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APPLY BRYANT'S TRACTION
081-834-0001

Conditions: Given a child requiring Bryant's traction, on an power controlled orthopaedic crib/bed with overhead traction frame, accompanied by parent(s), family member, nursing personnel, physician, physician's written or verbal order, child's medical record, or Standard Form 513, work cart/station, (2) rolls of adhesive vent foam straps, (2) inch webril, (2) 2 inch elastic bandages, (2) spreader blocks, spool of traction cord, (4) pulleys with attachments, (3) skin adherent (benzoin) or non allergic substitute (e.g. mastisol) applicators, roll of 2 inch adhesive or paper tape, (2) safety pins, (2) weight carriers, (2) 5lb cast iron weight plates (weights are packaged in 1, 2, 5, or 10 lb increments), (2) short plain bars, (4) cross clamps, (2) 5 or 9 inch single clamp bars, 66 inch swivel clamp bar with upper and lower panel clamps, 27 inch single clamp bar, 36 inch center clamp bar, hand towel or sheet, ruler, goniometer, scissors, box of examination gloves and trash receptacle.

Standards: Is reached when adhesive vent foam straps with spreader blocks attached are secured to both legs with child secured to the bed. Traction cords are tied to spreader blocks, threaded through pulleys and tied to weight carriers at foot of bed. Weight plates identified in the physician's order are applied to weight carriers. The child's buttocks are maintained no more than 3 inches above the bed surface. Capillary refill test is administered to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Gather equipment to include spreader blocks, pulleys, weight carriers, weight plates, short plain bars, cross clamps, single clamp bars, swivel clamp bar with upper and lower panel clamps, and center clamp bars. Place on work cart/station.
3. Assemble materials to include tape, elastic bandages, spool of traction cord, safety pins, sheet/towel, webril, skin adherent with applicators, adhesive vent foam straps, ruler, goniometer, scissors, and exam gloves. Place on work cart/station.

CAUTION: Do not use traction cords that are frayed, worn or dirty, this may cause a medical threat to the patient and may cause further harm.
4. Check serviceability of overhead traction frame, equipment and bed.
   a. Inspect traction equipment for cracked, dented, and warped bars or broken handles and open all clamp holders.
   b. Inspect orthopaedic bed/crib as follows:
      (1) Bed remote control buttons are operational (e.g. head/foot elevation, raise/lower position, nurse call button).
      (2) Electrical cord/plug are not frayed
      (3) Remote control buttons are operational (e.g. head/foot elevation, raise/lower position, and nurse call button).
      (4) Bed wheels are locked.

NOTE: Turn all unserviceable equipment over to supervisor and continue to gather serviceable equipment.

5. Identify yourself to parent(s).

NOTE: Tell parent(s) your name and job title.

6. Explain the procedure to the parent(s).
Bryant's traction
NOTE: Inform parent(s) that Bryant's traction is used to stabilize both hips/legs and assist in alignment of bones. A towel/sheet is draped over the child's hips with the towel/sheet secured (pinned) to the outside of bed to reduce child's movement. Adhesive vent foam straps with spreader blocks are applied to each leg and secured with elastic bandages. Two traction cords are then tied to each of the spreader blocks with the opposite ends of the traction cords tied to the weight carriers. The prescribed weight plates are then added to the weight carrier. The legs will be positioned vertically with the buttocks 2 inches off the bed. (Refer to Figure 3-x)

7. Position the child (supine) in the middle of the bed.
NOTE: Have parent(s) console the child to assist in keeping the child calm and supine throughout the procedure. Nursing personnel may assist if parent(s) are not available.

8. Set up overhead traction frame for a crib.
NOTE: If child is in a crib continue with step 8. If child is in an orthopaedic bed go to step 9.
   a. Attach clamp bars to crib.
      (1) Secure 66 inch swivel clamp bar with panel clamp (upper and lower) to foot of the crib.
      (2) Secure 27 inch single clamp bar to the swivel clamp bar so that, bar extends over the child.
      (3) Secure 36 inch center clamp bar to 66 inch swivel clamp bar at foot of crib.
      (4) Secure 36 inch center clamp bar horizontally to the 27 inch single clamp bar and position directly above the child's hips.
   b. Attach pulleys to clamp bars.
9. Set up overhead traction frame for an orthopaedic bed.
   a. Attach (4) cross clamp bar holders to traction frame.
      (1) Secure (2) cross clamps to each long plain bar.
   NOTE: The cross clamps are secured at the child's hip level.
      (2) Secure (2) cross clamps to the middle of each single clamp bar at the foot of the bed.
   NOTE: The cross clamps are aligned with the cross clamps at the child's hips
   b. Secure plain bar to each cross clamp bar over child hips.
      (1) Place one end of plain bar in the cross clamp bar holder, adjust the bar and lock.
   CAUTION: The ridges of the bar and clamps must be in alignment to prevent the traction frame from coming apart and putting the patient at risk.
      (2) Place opposite end of plain bar in clamp bar holder and lock clamp.
   c. Secure single clamp bars to plain bar at foot of bed aligned with child's legs.
   d. Secure pulley attachments to single plain bars.
      (1) Place (2) pulley attachments above the outside of the child's left and right hips.
      (2) Place (2) pulley attachments to the single clamp bars at foot of bed aligned with the pulley's at the child's hip.

   NOTE: Always begin Bryant's traction with the uninjured leg/hip first to reduce movement of injured leg/hip, prevent rotation, and provide stabilization of the injury. When removing or adjusting Bryant's traction reverse the process and begin with the injured leg.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation techniques (BSI) prior to applying traction, splints, or cast to patient.
   b. Remove child's shoes and socks.
   NOTE: Give shoes and socks give to family member or nursing personnel.
   c. Inspects both legs/hips for any skin conditions (e.g., cuts, abrasion, lacerations or skin rashes). Inform nurse if the above are present before continuing.
   d. Pad both medial and lateral malleolus with webril or felt.
   NOTE: Webril or felt may be used. Padding is used to reduce any chafing that may occur while the child's legs are in Bryant's traction.

11. Check child's capillary refill/pulse.
   a. Squeeze child's toes and nail beds will turn white.
   b. Release child's toes and nail beds will return to pink.
   c. Place finger on the dorsalis pedis (top of foot) to check for normal pulse 100-140 beats per minute (BPM).
   CAUTION: If capillary refill is delayed for more than 2 seconds or BPM is below 100 inform physician and follow physician's order.

12. Apply skin adherent to child's uninjured leg.
   Note: The technician should use tincture of benzoin/mastisol adhesive in conjunction with adhesive/non adhesive vent foam straps.
   a. Ask parent(s) if child has ever had a skin rash after use of benzoin or after eating shellfish.
Performance Steps

b. If no known allergies, with applicator apply benzoin to the medial and lateral aspect of uninjured leg beginning one finger width distal to the child's groin and ending at the malleolus.
c. If known allergies apply mastisol as in step 12 b.

13. Secure vent foam strap with spreader block to the uninjured leg.
   a. Place vent foam strap beginning one finger width distal to the groin, down the medial side of the leg and around the heel ending on the lateral side of the leg opposite the start point.
   b. Fold down excess ends of adhesive vent foam strap, wrap bandage until vent foam strap is completely covered. Secure vent foam with clips and tape down the edge of the elastic bandage between the clips.
   
   NOTE: Depending on the size of the child, a second elastic bandage may be necessary to completely cover the vent foam strap and to reach the distal aspect of the groin.
   c. Remove the clips and dispose in trash receptacle.
   d. Slide spreader block in the distal end of the vent foam strap.

14. Follow same procedure (step 11-13) for the injured leg.

15. Secure child to bed.
   a. Fold a sheet or towel lengthwise and place over the child's hips.
   b. Pin one end of sheet/towel to the outside of the bed to lessen child's movement.
   c. Pull down firmly on the sheet/towel and pin the opposite end to the bed.
   
   Caution: To prevent pins from opening and causing harm to the child cover the pins with tape.

16. Tie traction cords to weight carriers and spreader blocks.
   a. Remove 8-12 feet of traction cord from the spool.
   b. Cut traction cord at measured length.
   c. On the uninjured side tie the end of first traction cord to one spreader block.
   
   Caution: To reduce the possibility of the traction cord slipping and causing injury to the child use a non slip knot (e.g. up and over, down and over, up and through).
   d. Thread opposite end of traction cord through pulley directly above the child's hips and through the pulley at the foot of the bed.
   e. Tie a non slip knot to the hook on the weight carriers.
   f. Repeat steps a, b, c, d and e to the injured side.

17. Apply weight plates to weight carriers.
   
   NOTE: Physician preference will determine amount of weight plates to be used.
   
   NOTE: Always inform parent(s) when adding or removing weight plates.
   a. Apply 5 lb weight plates to the weight carrier on the uninjured side.
   b. Apply 5 lb weight plates to the weight carrier on the injured side.
   
   NOTE: Weight plates are packaged in 1 lb, 2 lb, 3 lb, 4 lb, and 5 lb increments.

18. Check distance of child on the bed (Refer to figure 3-x)
Performance Steps

18. 2 inch distance from buttocks to bed.
   a. Place a ruler vertically and measure a 2 inch distance exists from the child's buttocks to the bed.
   b. If there is not at least a 2 inch distance, tell parent(s) the weight plates will be removed to make adjustments and go to step 19.
   c. If there is a 2 inch distance tape traction cord ends to avoid slippage and go to step 22.

   NOTE: After adjustments a 2-3 inch distance is allowed between the child's buttocks and the bed.

19. Adjust weight plates.
   NOTE: Always inform parent(s) when adding or removing weight plates.
   a. Remove the weight plates from the weight carrier on the injured leg.
   b. Remove the weight plates from the weight carrier on the uninjured leg.

   a. Remove tape and pin on one side of the sheet/towel.
   b. Pull down on opposite end of the towel/sheet and pin sheet/towel to bed.
   c. Cover pins with adhesive tape.

   NOTE: Always cover pins with tape to prevent pins from injuring the child.

21. Reapply weight plates to weight carriers.
   a. Apply 5lb weight plates to the weight carrier on the uninjured extremity.
   b. Apply 5lb weight plates to the weight carrier on the injured extremity and go to step 18.
Performance Steps

22. Check alignment of Bryant’s traction and child’s extremity.
   a. The center clamp bar is directly over the child’s hips.
   b. Each pulley on the center clamp bar are above the outside of the child’s hips and aligned
      with the pulleys at the foot of the bed.
   c. If center clamp bar or pulleys are not in alignment go to step 8.
   d. If center clamp bar and pulleys are in alignment go to step 23.

23. Check child’s capillary refill/pulse.
   a. Squeeze child's toes and nail beds will turn white
   b. Release patient's toes and nail beds will return to pink.
   c. Place finger on the dorsalis pedis (top of foot) to check for normal pulse 100-140 beats
      per minute (BPM).

   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's
   order.

24. Inspect overhead traction frame and bed.
   a. All clamps are tightened and locked.
   b. Bed rails are upright and locked.
   c. Bed wheels are in the locked position.

25. Inspect traction equipment.
   NOTE: Traction principles promote the effectiveness of traction. Any type of friction will reduce the
   efficiency of traction and hinder the pull and cause further discomfort to the patient.
   a. The weight carrier is hanging freely w/o touching the bed/floor.
   b. All knots are secured (tapped)
   c. All traction cords are centered on the track of the pulleys.
   d. All traction cords are hanging freely w/o touching the bed or frame.

   NOTE: Traction equipment is checked daily to promote effective medical care to the patient.

26. Give parent(s) verbal instructions on Bryant’s traction.
   a. Inform parent(s) to press the nurse call button on the either of the bed rails for assistance, if
      needed.
   b. Bryant's traction should only be removed by the nursing staff.
   c. Inform parent(s) keep child calm and avoid his/her moving around as much as possible to
      prevent problems.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Gathered equipment.</td>
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<td></td>
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<tr>
<td>3. Assembled materials.</td>
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<tr>
<td>4. Checked serviceability of overhead traction frame and bed.</td>
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<td></td>
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<tr>
<td>5. Identified self to parent(s).</td>
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<tr>
<td>6. Explained procedure to parent(s).</td>
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<td></td>
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<tr>
<td>7. Positioned the child.</td>
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<td></td>
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<tr>
<td>8. Set up overhead traction frame for crib or orthopaedic bed.</td>
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<tr>
<td>9. Prepared the child’s uninjured leg and malleolus.</td>
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<tr>
<td>11. Applied skin adherent to uninjured leg.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<tr>
<td>--------------------------------------------------------------------------------------</td>
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<tr>
<td>12. Applied vent foam strap with spreader block to uninjured leg.</td>
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</tr>
<tr>
<td>13. Secured vent foam strap to uninjured leg.</td>
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<td></td>
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<tr>
<td>14. Applied skin adherent to injured leg.</td>
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<tr>
<td>15. Applied vent foam strap with spreader block to injured leg.</td>
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<td></td>
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<tr>
<td>16. Secured vent foam strap to injured leg.</td>
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<tr>
<td>17. Secured child to bed.</td>
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<tr>
<td>18. Tied traction cords to weight carriers and spreader blocks.</td>
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<tr>
<td>19. Applied weight plates to weight carriers.</td>
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<tr>
<td>20. Checked 2 inch distance exist between the child's buttocks and the bed.</td>
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<tr>
<td>22. Adjusted towel/sheet.</td>
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<tr>
<td>23. Reapplied weight plates to weight carriers.</td>
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<tr>
<td>24. Checked child and traction alignment.</td>
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<tr>
<td>26. Inspected overhead traction frame and bed.</td>
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<tr>
<td>27. Inspected traction equipment.</td>
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<tr>
<td>28. Gave parent's verbal instruction on Bryant's traction.</td>
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</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task if all steps are passed(P). Score the orthopaedic technician a NO-GO if any step is failed(F). All performance measured tasks must be passed to receive a go.

**References**

- **Required**
  - NUTT, REX
  - STP 8-91H14-SM-TG
  - TM 8-231
  - TM 8-640
  - ZIMMER
LONG ARM HANGING CAST (LAHC)
081-834-0002

Conditions: Given an orthopaedic patient requiring a Long Arm Hanging Cast (LAHC), in supine or sitting position on an orthopaedic examination bed or chair, family member, nursing personnel, physician, physician’s verbal or written orders, patient's medical record, or Standard Form 513, work cart/station, roll of 2 or 3 inch stockinette, roll of 3 or 4 inch stockinette, stockinette container, (3) rolls of 2 or 3 inch webril, (2) rolls of 4 inch webril, (3) rolls of 3 inch plaster, (3) rolls of 4 inch plaster, box of 4 x 15 plaster reinforcement sheets, box of 5 x 30 plaster reinforcement sheets, (2) rolls of 2 inch fiberglass, (3) rolls of 3 inch fiberglass, fiberglass casting gloves, examination gloves, cast saw, cast spreader, (2) disposable foam ear plugs, (2) safety goggles for patient and technician, scissors, hospital pad (chux), (2) bed sheets, goniometer, ruler, bucket of tepid water w/bag, sink, spool of traction cord, tube of surgical lubricant, orthopaedic bump, roll of 2 inch adhesive tape, box of alcohol pads, damp wash towel, pillow, finger trap set with stand, 5 inch orthopaedic felt, (2) 8 x 7 inch surgipads, weight carrier, (2) 5lb weight plates, tape measure, cast care booklet, or equivalent, pen, and trash receptacle.

Standards: Is reached when the wrist (0-15 degrees of dorsal extension) and elbow (flexed at a 90 degree angle) are immobilized by the cast from the distal palmar crease (DPC)/metacarpophalangeal joints (MCPJ’s) to 2 inches distal to the axilla region. Ulnar, radial deviation, pronation and supination are eliminated from the wrist and forearm. The cast eliminates rotation of the wrist, forearm and elbow and allows free range of motion for the thumb and fingers. Capillary refill test is administered to the fingers/thumb and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).

2. Identify yourself to patient.
   NOTE: Tell the patient your name and job title

3. Explain the procedure to the patient.
Performance Steps

NOTE: The LAHC is applied from the distal palmar crease (DPC)/ metacarpophalangeal joints (MCPJ's) to 2 inch distal to the axilla/ base of the deltoid muscle, with the elbow flexed at a 90 degree angle. A plaster or fiberglass loop will be splinted or braced 1 inch proximal to the base of the thumb. Traction cord will be threaded through the loop at the base of the thumb and attached to a padded collar around the posterior (back) aspect of your neck. (Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's arms.
   a. Put on examination gloves.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Inspect both arms for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   c. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on fingers and wrists must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.
Performance Steps
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, ear plugs, safety goggles, finger trap set with stand, scissors, sheet padded felt with stockinette, (2) 5lb weight plates, weight carrier, bucket of tepid water w/bag. Place on work cart/station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include Webril, plaster or fiberglass rolls, plaster splints(4x15/5x30), examination gloves, fiberglass casting gloves, traction cord, alcohol pads/damp towel, padded felt w/stockinette. Open and remove (6) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material(fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures or as directed by physician.

CAUTION: Stockinette and Webril are forms of protection against the exothermic reaction of the casting materials. Technician and physician preference will dictate whether stockinette is used.
   a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.
   b. Place work cart with orthopaedic bump at edge of bed.

NOTE: Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. L stand, finger trap stand, nursing assistant)
   c. Place patient's uninjured elbow on the orthopaedic bump at a 90 degree angle to the upper torso.

NOTE: Measurements are taken on the uninjured arm to prevent further pain to the patient's injured arm. Instruments of measurements may vary (e.g. tape measure, ruler, or Webril).
   d. Measure from the axilla to 2 inches distal to metacarpophalangeal joints (MCPJ's) to obtain stockinette length.
   e. Pull down stockinette from stockinette container and cut measured length.
   f. Cuff the stockinette leaving a 1-2 inch border at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the volar aspect of cast.

NOTE: The volar aspect of the injured arm, located on the palm side of the hand.
   a. Open box of 4 x15 plaster reinforcement sheets. Remove and unwrap package. Peel back the edges of (5) sheets and remove from stack. Place on work cart/station.
   b. Place patient's uninjured hand in the supine position (palm up) and locate the distal palmer crease (DPC), thenar muscle and base of deltoid muscle.

NOTE: The DPC is furthest diagonal line on the volar aspect of the hand. The thenar muscle is at the base of the thumb on the volar aspect of the hand. The crease is noticeable when the thumb and 5th phalange (pinky finger) are brought together. The deltoid muscle is on the lateral aspect of the upper arm.
   c. Remove (1) plaster sheet from the stack of (5).
   d. Place sheet next to injured arm to obtain sheet length, the DPC and thenar muscle contour.
Performance Steps

NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/forearm

e. Draw a diagonal line on the plaster sheet that matches with the DPC of patient's hand.

NOTE: The diagonal cut facilitates free ROM of the fingers (extension and flexion).

f. Draw a curved line (half moon shape) on the plaster sheet that matches with the outer border of the thenar muscle on the patient's hand.

NOTE: The half moon pattern enables the thenar muscle to be observable and the thumb to adduct to all fingers promoting free range of motion (ROM)

g. Place stack of (5) plaster sheets next to measured length to identify the difference, cut off excess amount and place stack on work cart/station.

NOTE: Discard excess materials in the trash receptacle.

10. Prepare plaster reinforcement splint for the posterior aspect of cast.

a. Open box of 5 x30 plaster sheets. Remove and unwrap package from box. Locate edge of one stack (5 thickness) and remove from package.

NOTE: 5 x30 plaster sheets are usually stacked in increments of five from the manufacturer. If not pre-stacked, count out five layers of plaster splints.

b. Place distal end of plaster splint on the lateral aspect of the mid forearm and have patient hold the distal end. Simultaneously bring the proximal end 2 inches distal to the axilla or resting on the base of the deltoid muscle. Fold down the proximal end, cut off excess and place stack on work cart/station for later use.

c. Have patient rest injured arm on pillow.

11. Manufacture plaster /fiberglass loop.

a. Remove (2) 4 x 15 plaster sheet from stack of plaster sheets.

b. Hold plaster sheet vertically and fold length wise.

c. Hold both ends of the plaster sheet with index fingers and thumbs and place in water.

d. Remove plaster sheet when bubbles subside.

NOTE: Hold the plaster sheet vertically, place index finger and thumb on either side and squeegee out excess water.

e. Place sheet on working surface, smooth out sheet and drape over extra roll of webril.

12. Apply stockinette to patient's injured arm.

a. Place patient's injured elbow on the orthopaedic bump at a 90 degree angle to the upper torso.

b. Hold open the sides of the stockinette.

c. Instruct patient to place injured hand in the stockinette opening.

d. Roll stockinette on the injured arm from the axial region to 1 inch distal to the MCPJ's.

NOTE: Rolling the stockinette on promotes a better fit.

e. Pinch the stockinette at the base of the thumb and cubitum area and make a 45 degree angle cut.

NOTE: An alternative and authorized method is to cut the stockinette prior to application.

f. Have patient place thumb through the pre cut hole and smooth out stockinette.

13. Apply finger traps to fingers on injured hand (if not used go to step 14).

NOTE: Use of finger traps may be required based on patient's inability to maintain arm/wrist in the correct position, there is no assistance available, and fracture reduction is needed.

a. Place patient supine on the bed.

b. Apply stockinette go to step 12 b-f.

c. Place injured arm at a 90 degree angle to the upper torso and smooth out wrinkles in the stockinette.

d. With one hand, grasp patient's injured hand and abduct from upper torso.

e. With 2nd hand, grasp finger trap set and place individual finger traps onto fourth and fifth phalange past the MCPJ's.

14. Measure patient's injured elbow/wrist w/ goniometer.
Performance Steps

NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician.

a. Elbow measurement.
   (1) Place the stationary arm of the goniometer parallel to the humerus.
   (2) Place the moving arm of the goniometer vertically, bisecting the forearm and 2nd and 3rd MCPJ's.
   (3) Place the protractor of the goniometer on the elbow.
   (4) Set the elbow until the goniometer measures 90 degrees of flexion.

b. Wrist measurement.
   (1) Place the stationary arm of the goniometer vertically, bisecting the 5th phalange (pinky finger).
   (2) Place the moving arm of the goniometer vertically, bisecting the ulnar.
   (3) Place the protractor of the goniometer on the ulnar styloid.
   (4) Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.

15. Apply cast padding (webril) to injured arm.
CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers.

   a. Hold webril with one hand.
   b. With 2nd hand unroll the webril 1/2 -1 inch and grasp edge with index and middle fingers.
   c. Place the edge of the webril on the ulnar styloid and begin wrapping around the wrist two rotations.

   NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

   CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.
   d. Continue through the palm ending 1/2 inch distal to the stockinette edge, back up the forearm, figure of eight around the elbow, ending 1/2 inch proximal to the stockinette edge.
   e. With each turn overlap the webril by 1/2 -1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

   NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm and elbow to provide a better fit. The technician preference will determine which technique to use.

   a. If using fiberglass casting material, go to step number 17.
   b. If using plaster casting material, go to step number 19 and omit step 17 and 18.

17. Place fiberglass casting gloves on hands.
CAUTION: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while using fiberglass casting materials.

18. Open fiberglass casting package and go to step 19.
NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.

19. Apply 1st plaster/fiberglass roll.
NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.

   a. Hold plaster or fiberglass roll with one hand.
   b. With opposite hand unroll the plaster/fiberglass roll 1/2- 1 inch and grasp edge with thumb, index and middle fingers.

   NOTE: Placing the thumb under the forward edge of the roll can also be used.
**Performance Steps**

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

**CAUTION:** Removing the casting material when bubbles are present promotes dry spots during application. Dry spots may cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

e. Place edge of the plaster or fiberglass roll on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.

**NOTE:** The cast is most susceptible to losing strength in the palm region. Therefore, a twisting or cutting method is authorized.

The **Twisting method:** As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) twist and evenly space the casting material on the webril. Smooth out with volar side of fingers. The twisting method provides strength to the cast.

The **CUT method:** As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to the above methods.

f. Continue through the palm ending 1/2 inch distal to the edge of the webril, back up the forearm, figure of eight around the elbow, ending 1/2 inch from the proximal edge of the webril.

g. Overlap the plaster/fiberglass roll by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.

20. **Laminate the casting materials.**

   a. Place palm of each hand on the cast.

   **CAUTION:** To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.

   b. Rub the cast material in the direction it was applied.

   **NOTE:** Laminating the cast material fills in the pores which assist it providing strength to the cast.

   c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

21. **Apply reinforcement splint to volar aspect of cast.**

   **NOTE:** Plaster reinforcement splint is used to strength and support the cast.

   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Place reinforcement splint on the volar side of the cast in line with the DPC and the outer border of the thenar muscle and laminate.
   d. Maintain patient's wrist between 0-15 degrees of dorsal extension.

   **Note:** Place patient's thumb and index finger in opposition to one another.

22. **Apply reinforcement splint to posterior aspect of cast.**

   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Apply reinforcement splint to posterior aspect of the arm beginning 1/2 inch distal to the edge of the cast to mid forearm.
   d. Maintain patient's elbow at 90 degrees of flexion.

23. **Apply 2nd plaster/fiberglass roll (repeat steps 19-20).**

24. **Mold the cast material to the forearm/wrist.**

   **NOTE:** The interosseous mold is used to prevent movement of the injured wrist in the cast and promote fracture healing.

   a. Place the heel of one hand on the volar aspect of the distal wrist.
Performance Steps

b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
c. Squeeze the heels of the hands together.
d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g., How do you feel?, Is the pressure too much?)
e. Maintain patient's wrist in correct position.
f. Remove heels of hands from the cast when contours of the wrist and forearm have been shaped and the cast is cured.

NOTE: All casts require a mold. Crooked casts equal straight bones.

25. Mold the cast material to the bicipital muscle.

a. Place the palm of one hand on the anterior side of the biceps muscle.
b. Place the palm of the 2nd hand on the triceps muscle.
c. Press palms together and conform the plaster to the arm (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.
d. Have patient place injured arm on pillow to reduce arm strain.

26. Check range of motion (ROM) of phalanges and thumb.

a. Have patient extend, flex fingers and touch thumb to all fingers.
b. Cut the webril at the distal, proximal edges and at the base of the thumb.

CAUTION: The finished edge of the cast should end proximal to the base of the thumb to avoid radial nerve impingement.
c. Fold and tack down the webril and stockinette.

27. Check alignment of injured wrist with goniometer.

a. Place the stationary arm of the goniometer vertically, bisecting the forearm.
b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger).
c. Place protractor of the goniometer on the ulnar styloid.
d. The goniometer should measure 0-15 degrees of dorsal extension.

NOTE: If the wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove cast and go to step 12.

28. Check alignment of injured elbow with goniometer.

a. Place the stationary arm of the goniometer, bisecting the middle of the humerus and deltoid muscle.
b. Place the moving arm of the goniometer bisecting the lateral aspect of the forearm and the 2nd and 3rd MCPJ's, forming a 90 degree angle.
c. Place the protractor of the goniometer on the olecranon process (elbow).
d. Set elbow until the goniometer measure 90 degrees of flexion.

29. Apply 3rd and 4th plaster/fiberglass roll (repeat steps 19-20).

30. Trim the proximal and distal edges of cast.

a. Cut the outside edge of the webril.
b. Pull down the webril.

31. Check cast dimensions.

a. The distal edge of the cast rests at the DPC.
b. The radial aspect of the cast rests proximal to the snuff box.
c. Pull down the stockinette.
d. Trim as necessary.
e. Tape down edges of stockinette and webril.

32. Apply 5th roll of plaster/fiberglass (repeat step 19-20).

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.
Performance Steps

33. Place pre manufacturer loop on cast.
   NOTE: The hanging portion of this cast is designed to have gravity assist in aligning the broken bones. Physician’s preference will determine where on the cast the loop is applied. The weight of the cast and location of the loop is vital to the reduction of the fracture.
   a. Place the plaster or fiberglass loop 1 inch from the base of the thumb on the radial side of cast, or according to physician's order.

34. Place 2 inch roll of plaster/fiberglass roll in tepid water.
   a. Hold the plaster/fiberglass roll with one hand
   b. Grasp the edge of the plaster/fiberglass with opposite fingers.
   c. Pull plaster/fiberglass roll taut and place excess between index and middle finger.
   d. Place in water.

35. Remove plaster/fiberglass roll from water.
   a. Wait for the bubbles to subside before removing plaster/fiberglass roll.
   b. Squeeze the roll together to eliminate excess water.

36. Incorporate loop.
   a. Hold the plaster/fiberglass roll with one hand.
   b. Apply the plaster/fiberglass roll twice around the loop and bring the roll through the loop ensuring to tie the edge down.
   c. Using the same roll or a 2nd 2 inch roll, complete the same steps for the opposite edge.

37. Prepare collar and traction cord.
   a. Pull stockinette over the felt pad.
   b. Cut a hole in both ends of the felt/stockinette.
   c. Cut 6 feet length of traction cord.
   d. Insert one end of the traction cord through the hole in the felt pad and thread it through the opposite end.

38. Apply the collar to patient's neck.
   a. Place padded collar centered and posteriorly to the patient's neck.
   NOTE: The traction cord should be centered and on the posterior side of the felt pad to reduce chafing of the patient's neck.
   b. Insert one cord ends through the loop.
   c. Tie and tape cord ends together.
   d. Instruct the patient to let the cast hang.
   NOTE: The weight of the cast and the location of the loop have a definite relationship to the reduction of the fracture. Instruct patient not to remove the collar or the traction cord. Provide patient with extra padding should chafing and rubbing occur.

39. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction

40. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
   NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

41. Give patient verbal and written instructions on cast care.
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet (or written instructions).
   c. Instruct patient to extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
**Performance Steps**

d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing on it, coloring).

<table>
<thead>
<tr>
<th>42. Annotate the procedure applied to patient in medical record or SF 513.</th>
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<tbody>
<tr>
<td>NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.</td>
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</table>

| 43. Escort patient or direct family member to front desk to make a follow-up appointment. |

**Performance Measures**

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received or reviewed the order from the physician.</td>
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<td>2. Identified yourself to patient.</td>
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<td>3. Explained the procedure to patient.</td>
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<td>4. Inspected patient's arms.</td>
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<td>5. Checked patient's capillary refill.</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials.</td>
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<td>11. Manufactured loop.</td>
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<tr>
<td>12. Applied stockinette to patient's injured arm.</td>
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<td>17. Placed fiberglass casting gloves on hands.</td>
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<td>18. Opened fiberglass casting package.</td>
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<td>23. Applied 2nd plaster/fiberglass roll (repeat steps 19-20)</td>
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<td>24. Molded cast material to wrist/forearm.</td>
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<td>25. Molded cast material to the biceps muscle.</td>
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<td>28. Checked alignment of injured elbow with goniometer.</td>
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<tr>
<td>30. Trimmed cast.</td>
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<td>39. Cleaned plaster off patient’s skin using a damp wash cloth, towel or alcohol pad.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task if all steps are passed (P). Score the orthopaedic technician a NO-Go (NG) if any step is failed (F). All performance measured tasks must be passed to receive a GO.

**References**

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**APPLY BUCK’S TRACTION**

**081-834-0003**

**Conditions:** Given an orthopaedic patient requiring Buck’s Leg Traction supine on an power controlled orthopaedic bed with overhead traction frame, nursing personnel, family member(s), physician, physician's written or verbal order, patient's medical record or Standard Form 513, work cart/station, traction cart, spool of traction cord, pulley with attachment, 5 or 9 inch single clamp bar, pillow, weight carrier, 10lb cast iron weight plate (weights are packaged in 1, 2, 5, and 10 lb increments), roll of 2 inch paper tape, Buck’s traction boot or 36-48 inch long adhesive vent foam strap, spreader block, (3) skin adherent (benzoin or mastisol) applicators, roll of 2 inch webril or felt, (3) 3 or 4 inch elastic bandages, scissors, ruler, goniometer, examination gloves, trapeze, and trash receptacle.

**Standards:** Is reached when adhesive vent foam strap or Buck's traction boot with spreader block attached is secured to the patient’s injured leg. Traction cord is tied to the spreader block, threaded through the pulley and tied to weight carrier at the foot of the bed. Weight plates identified in the physician's order are applied to the weight carrier. The heel is suspended and supported off the bed by a pillow placed under the calf. Capillary refill test is administrated to the toes and successfully passed.

**Performance Steps**

1. **Receive order from the physician (review if in writing).**
2. **Gather needed equipment to include spreader block, pulley, weight carrier, weight plates, single clamp bar, adhesive vent foam strap or Buck's traction boot. Place on work cart/station.**
3. **Assemble materials to include paper tape, elastic bandages, spool of traction cord, pillow, webril, skin adherent with applicators, examination gloves, scissors and goniometer. Place on work cart/station.**
   **CAUTION:** Do not use traction cords that are frayed, worn or dirty, this is a medical threat to the patient and may cause further harm.
4. **Check serviceability of overhead traction frame and bed.**
   - **a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders.**
   - **NOTE:** Turn all unserviceable equipment over to supervisor and continue to gather serviceable equipment.
   - **b. Inspect orthopaedic bed as follows:**
     1. Bed rails are in the upright position and locked.
     2. Electrical cord/plug are not frayed.
     3. Remote control buttons are operational (e.g. head/foot elevation, raise/lower position, and nurse call button).
     4. Bed wheels are locked.
   - **NOTE:** Inform nurse if any of (1)-(4) failed and inspect another bed.
5. **Identify yourself to the patient.**
   - **NOTE:** Tell the patient your name and job title.
6. **Explain the procedure to the patient.**
Performance Steps

6

Buck's traction with vent foam strap
Performance Steps

6

Buck's traction with Buck's Traction Boot.

NOTE: Inform patient or family member that Buck's traction is designed to reduce muscle strain, and assist in alignment of lower extremity bones. Adhesive vent foam strap with spreader block or Buck's traction boot is secured to the injured leg with elastic bandages or straps. A pillow is placed under the calf to reduce bed sores and ulcers of the heel. (Refer to Figure 3-x)

CAUTION: The trapeze handle should be secured to the trapeze clamp when not in use to prevent further injury to patient. Technician will demonstrate for patient or family member(s) proper positioning of the trapeze when not in use.

7. Position the patient (supine) in the middle of the bed.

NOTE: Nursing personnel may assist with positioning the patient.

8. Prepare patient's injured leg and ankle for Buck's traction.
   a. Put on examination gloves
      CAUTION: Always practice Body Substance Isolation (BSI) when applying traction, splints or casts to patients.
   b. Remove patient's shoes and socks.
      CAUTION: Always have the same gender chaperone available when patient's personal property/clothing are to be removed.

NOTE: Give shoes/socks to family member or nursing personnel.
   c. Inspect both lower legs for any skin conditions (e.g. cuts, abrasions, laceration, or rashes).
Performance Steps

NOTE: Inform nurse if skin conditions are present before continuing.

d. Pad medial/lateral malleolus (ankle) of the injured leg.

NOTE: Webril or orthopaedic felt may be used. Padding is used to reduce any chafing of the skin that may occur while injured leg is in Buck’s traction.

9. Check patient's capillary refill of both feet.

CAUTION: Prior to starting any procedure on a patient, circulation is always checked.

a. Squeeze patient's toes and nail beds will turn white.

b. Release patient's toes and nail bed will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

10. Apply skin adherent to patient's injured leg.

Note: The technician should use tincture of benzoin/mastisol adhesive in conjunction with adhesive/non adhesive vent foam straps.

a. Pad the malleolus with webril.

b. Ask patient if they have ever had a skin rash after the use of benzoin or after eating shellfish.

NOTE: If patient is unable to answer, ask family member. If family member is not present use a substitute application (e.g. mastisol).

c. If no known allergies apply tincture of benzoin to the medial/lateral aspect of the injured leg beginning one inch distal to the fibula notch/head and ending one inch proximal to the malleolus (ankle).

d. If known allergies apply mastisol as in step 10c.

11. If using vent foam strap go to step 13

12. If using Buck’s traction boot go to step 14.

13. Secure the vent foam strap with spreader block to injured leg.

NOTE: The vent foam strap upon being secured should rest 1 inch distal to the fibular notch.

a. Place vent foam strap beginning 1 inch proximal to the fibular notch/head, down the medial side of the leg, continuing around the heel and ending on the lateral side opposite the start.

b. Place the edge of the elastic bandage on the malleolus and begin wrapping around the malleolus two rotations to secure the edge.

c. Fold down and hold excess ends of the vent foam strap.

d. Continue up the leg until the vent foam strap is completely covered and secure with clips.

NOTE: Depending on the size of the patient's leg a second elastic bandage may be necessary to completely cover the vent foam strap.

e. Tape down the elastic bandage between the clips.

f. Remove the clips and dispose in trash receptacle.

g. Slide the spreader block between the vent foam strap.

14. Open and slide Buck's traction boot under injured leg to 1 inch distal to the fibular notch and secure with straps.

CAUTION: When applying Buck's traction boot, assistance must be used to prevent further injury to the patient. The Buck’s boot is available in small, medium and large.

15. Secure the 5 or 9 inch single clamp bar (horizontally) to crossbar at foot of bed in alignment with the 2nd and 3rd phalanges (toes) of the injured leg/foot.

16. Secure the pulley attachment to the middle of the single clamp bar.

17. Tie traction cord to spreader block and weight carrier.

a. Remove 4-6 feet of traction cord from the spool.

b. Cut traction cord.

c. Tie a non slip knot to the end of spreader block.
Performance Steps

CAUTION: To reduce the possibility of the traction cord slipping and causing further injury to the patient
use a non slip knot (e.g. up and over, down and over, up and through).

d. Thread opposite end of traction cord through pulley directly at the foot of the bed.

e. Tie a non slip knot to the hook on the weight carrier.

18. Place a pillow lengthwise under the injured leg to elevate the heel off the bed.
CAUTION: It is necessary for the heel to be off the bed to reduce bed sores and skin related problems (e.g. ulcers).

19. Apply weight plates to the weight carrier.
CAUTION: Always inform patient prior to adding or removing weight plates.

NOTE: Physician's order will determine specific amount of weight plates to be used.

20. Elevate or raise the foot of the bed until traction cord is parallel to the floor.
NOTE: The bed is elevated or raised to provide counter traction which will assist in reducing muscle strain of the patient's injured leg.

NOTE: If bed is non electric manually raise (gatchet) the foot of bed. If bed is electric press button on control panel.

NOTE: The physician's order will indicate the bed elevated requirement.

21. Check single clamp bar alignment with the patient's injured leg.
NOTE: If single clamp bar at foot of bed is not aligned with 2nd and 3rd phalanges remove weight plates and go to step 15. If the heel is touching the bed, remove weight plates and go to step 18. If single clamp is aligned correctly go to step 22.

22. Check patient's capillary refill of both feet.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and the nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

23. Inspect overhead traction frame and bed.
   a. All clamps are tightened and locked.
   b. Bed rails are upright and locked.
   c. Bed wheels are locked.

24. Inspect traction equipment.
NOTE: Traction principles promote the effectiveness of traction. Any type of friction will reduce the efficiency of traction, hinder the pull and cause further discomfort to the patient.
   a. The weight carrier is hanging freely w/o touching the bed/floor.
   b. All knots are secured (tapped).
   c. The traction cord is centered on the track of the pulley.
   d. The traction cord is hanging freely w/o touching the bed or frame.
NOTE: Traction equipment is checked daily to promote effective medical care to the patient.

25. Give patient verbal instruction on Buck's traction.
   a. Inform patient to press the nurse call button on the side of the bed rails for assistance.
   b. Patient should only remove Buck's traction boot with physician's permission.
   c. The Buck's traction boot or adhesive vent foam strap should not impede circulation to the foot and toes.

Performance Measures

<table>
<thead>
<tr>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order form the physician (reviewed if in writing).</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
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<td>-------------------------------------------------------------------------------------</td>
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<tr>
<td>2. Gathered equipment.</td>
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<td>3. Assembled materials.</td>
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<tr>
<td>4. Checked serviceability of overhead traction frame and bed.</td>
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<tr>
<td>5. Identified your self to patient.</td>
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<tr>
<td>6. Explained the procedure to the patient.</td>
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<tr>
<td>7. Positioned the patient.</td>
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<tr>
<td>8. Prepared patient's injured leg and ankle for Buck's traction.</td>
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<tr>
<td>9. Checked patient's capillary refill of both feet.</td>
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<tr>
<td>10. Apply skin adherent to patient's injured leg.</td>
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<tr>
<td>11. Secured the vent foam strap with spreader block to injured leg.</td>
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<tr>
<td>12. Placed Buck's traction boot under injured leg one inch distal to the fibular notch and secured with straps.</td>
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<tr>
<td>13. Secured the 5 or 9 inch single clamp bar (horizontally) to crossbar at foot of bed in alignment with the 2nd and 3rd phalanges (toes) of the injured leg/foot.</td>
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<tr>
<td>14. Secured the pulley attachment to the middle of the single clamp bar.</td>
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<tr>
<td>15. Tied traction cord to spreader block and weight carrier.</td>
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<tr>
<td>16. Placed a pillow lengthwise under the injured leg to elevate the heel off the bed.</td>
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<td>17. Applied weight plates to weight carrier.</td>
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<tr>
<td>18. Elevated or raised the foot of the bed until traction cord is parallel to the floor.</td>
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<tr>
<td>19. Checked single clamp bar alignment with the patient's injured leg.</td>
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<tr>
<td>20. Checked patient's capillary refill of both feet.</td>
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<tr>
<td>21. Inspected overhead traction frame and bed.</td>
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<tr>
<td>22. Inspected traction equipment.</td>
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<tr>
<td>23. Gave patient verbal instructions on Buck's traction.</td>
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</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measured tasks must be passed to receive a go.

**References**

<table>
<thead>
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<th>Required Related</th>
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<tbody>
<tr>
<td>STP 8-91H14-SM-TG</td>
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<tr>
<td>TM 8-231</td>
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<tr>
<td>ZIMMER</td>
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</tbody>
</table>
Conditions: Given an orthopaedic patient, requiring Balanced Suspension Traction, supine on an power controlled orthopaedic bed with overhead traction frame, nursing personnel, physician, family member(s), physician's written or verbal order, patient's medical record or Standard Form 513, work cart/station, spool of traction cord, (5) pulleys with attachments, (3) 5 or 9 inch single clamp bars, pillow, (3) weight carriers, (6) cast iron weight plates or equivalent (weights are packaged in 1 2.5, and 10 lb increments), roll of 2 inch paper tape, Buck's traction boot or roll of adhesive vent foam strap, spreader block, (2) spreader bars, Thomas Leg Splint with Pearson attachment, (6) strap clamps, (3) lamb wool pads, (3) skin adherent (benzoin) or non allergic substitute (e.g. mastisol) applicators, roll of 2 inch webril, (3) 8 x 7 inch surgipad or felt pads, (3) 3 or 4 inch elastic bandages, goniometer, scissors, examination gloves, work cart/station, trapeze and trash receptacle.

Standards: Is reached when adhesive vent foam strap or Buck's traction boot with spreader block attached is secured to the patient's injured leg. The leg is supported and suspended off the bed by a padded Thomas Leg Splint with Pearson attachment. Traction cords are tied to the spreader block and spreader bars, threaded through the pulleys above the knee and at the foot of the bed and tied to weight carriers at the foot of the bed. Weight plates identified in the physician's order are applied to the weight carriers. Capillary refill test is administered to the toes and passed successfully.

Performance Steps

1. Receive order from the physician (review if in writing).

2. Gather needed equipment to include spreader block, spreader bars, Thomas splint with Pearson attachment, pulleys, weight carriers, weight plates, single clamp bars, adhesive vent foam strap or Buck's traction boot. Place on work cart/station.

3. Assemble materials to include paper tape, elastic bandages, spool of traction cord, pillow, webril, skin adherent applicators, examination gloves, scissors and goniometer. Place on work cart/station.

   CAUTION: Traction cords used should not be frayed, worn or dirty, this may cause a medical threat to the patient and may cause further harm.

4. Check serviceability of overhead traction frame and bed.
   a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders.
   NOTE: Inform orthopaedic supervisor if equipment is unserviceable and secure serviceable equipment.
   b. Inspect orthopaedic bed as follows:
      1. Bed rails are in the upright position and locked.
      2. Bed electrical cord/plug are not frayed.
      3. Remote control buttons are operational (e.g. head/foot elevation, raise/lower position, and nurse call button).
      4. Bed wheels are locked.
   NOTE: Inform nurse if any of (1)-(4) failed and inspect another bed.

5. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

6. Explain the procedure to the patient.
6

(Skin) Balanced Suspension Traction

NOTE: Inform patient or family member that Balanced Suspension is used for fractures of the femoral shaft, hip and lower leg traction and designed to reduce muscle strain associated with fractures, and assist in alignment of bones. Adhesive vent foam strap with spreader block or Buck's traction boot is secured to the injured leg with elastic bandages and supported by the Thomas Leg Splint with Pearson attachment. (Refer to Figure 3-x)

CAUTION: The trapeze handle should be secured to the trapeze clamp when not in use to prevent further injury to patient. Technician will demonstrate how to use and secure the trapeze for patient or family member(s).

7. Position the supine patient in the middle of the bed.
NOTE: Nursing personnel may be used with patient positioning.

8. Prepare patient's injured leg and ankle for balanced suspension traction.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Remove patient's shoes and socks.
   CAUTION: Always have the same gender chaperone available when patient's personal property/clothing are to be removed.

NOTE: Give shoes/socks to family member or nursing personnel.
Performance Steps

c. Inspect both legs for any skin conditions (e.g. cuts, abrasions, laceration, or rashes).

NOTE: Inform nurse if skin conditions are present before continuing.

d. Pad medial/lateral malleolus (ankle) of the injured leg.

NOTE. Webril or felt may be used. Padding is used to reduce any chafing that may occur while the patient's leg is in balanced suspension traction .

9. Check patient's capillary refill.

a. Squeeze patient's toes and nail beds will turn white .

b. Release patient's toes and nail beds will return pink .

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order

10. Secure (1) cross clamp to the center of each vertically placed double clamp bar at the foot of the bed.

11. Secure single plain bar to cross clamps at foot of bed.

a. Place one end of the plain bar in the clamp bar holder, adjust the bar and lock clamp.

CAUTION: The ridges of the bar and clamps must be in alignment to prevent the traction frame from coming apart and putting the patient at risk.

b. Place opposite end of plain bar into clamp bar holder and lock clamp.

12. Secure (2) single clamp bars horizontally to the plain bar at the foot of bed.

13. Secure (2) pulley attachments to the single clamp bars at the foot of bed.

14. Secure 18 inch single clamp bar to long plain bar proximal to the injured hip.

15. Secure pulley to 18 inch single clamp bar above the hip.

16. Secure 18 inch single clamp bar distal to the injured foot .

17. Secure pulley to the 18 inch single clamp bar above the phalanges (toes).

18. Secure 5 or 9 inch single clamp bar to the lower crossbar at the foot of the bed aligned with the injured leg's 2 and 3rd phalanges.

19. Secure pulley to single clamp bar at foot of bed.

20. Prepare Thomas Leg Splint with Pearson attachment.

a. Place Thomas Leg Splint to the side of the uninjured leg to determine splint length needed.

NOTE: All measurements are taken on the uninjured side.

NOTE: The Thomas Leg Splint is available in small, medium, and large.

NOTE: There should be at least a 6 inch distance between the patient's foot and the edge of the Thomas Leg splint.

b. Secure the Pearson attachment under the Traction Leg Splint aligned with the bend of the patient's knee and lock in place.

CAUTION: The alignment of the Pearson attachment reduces pressure on the fracture site.

c. Tie one end of the traction cord to the proximal strap clamp on the lateral side of the Thomas Leg Splint.

d. Loop the traction cord around the strap clamp on the opposite side of the Thomas Leg Splint and secure with a double knot.

e. Tie one end of the traction cord to the strap clamp at the distal end of the Pearson attachment.

NOTE: It is the technician's preference to start medial or lateral.

f. Wrap the traction cord around the strap clamp at the distal end of the Thomas Leg Splint.

g. Measure the traction cord length at 12-18 inches.
Performance Steps

**NOTE:** Most Thomas Leg Splints with Pearson attachments have strap clamps located on the side of the splint. If the strap clamps are not present tie the traction cord directly to the frame of the splint.

h. Wrap the opposite end of the traction cord through the strap clamp on the distal end of the Thomas Leg splint.

i. Loop the traction cord around the strap clamp on the distal end of the Pearson attachment maintaining the 12-18 inch distance and secure with a double knot.

**NOTE:** The padding should spaced equally to support the lower leg and thigh. The half ring must also be padded.

j. Apply padding (lamb wool) to the Thomas Leg splint and Pearson attachment and secure with strap clamps.

k. Place Thomas Leg Splint with Pearson attachment on work cart/station for later use.

**21. Apply skin adherent to injured leg.**

*Note:* Use tincture of benzoin/mastisol adhesive in conjunction with adhesive/non adhesive vent foam strap.

a. Ask patient if they have ever had a skin rash after the use of benzoin or after eating shell fish.

**NOTE:** If patient is unable to answer, ask family member. If family member is not present use a substitute application (e.g. mastisol).

b. If no known allergies exists apply tincture of benzoin/mastisol to the medial/lateral aspect of the injured leg beginning one inch distal to the fibula notch/head and ending at the malleolus/ankle

c. If known allergies apply mastisol as in step 21 b.

**22. If using vent foam strap go to step 24.**

**23. If using Buck's traction boot go to step 25.**

**24. Secure vent foam strap with spreader block to injured leg.**

a. Place vent foam strap beginning one inch proximal to the fibular notch/head, down the medial side of the injured leg continuing around the heel and ending on the lateral side of the injured leg opposite the start.

**NOTE:** Product availability and patient's leg size will determine whether the adhesive vent foam strap or the Buck's boot is used.

b. Fold down and hold excess ends of the vent foam strap while continuing to wrap the elastic bandage until the vent foam strap is completely covered.

**NOTE:** Depending on the size of the patient's leg a second elastic bandage may be necessary to completely cover the vent foam strap.

c. Secure elastic bandage with clips.

d. Slide spreader block between the vent foam strap

e. Tape down the elastic bandage in between the clips.

f. Remove the clips and dispose in trash receptacle.

**25. Open and slide Buck's traction boot under injured leg one inch distal to the fibular notch and secure with straps.**

**CAUTION:** When applying Buck's traction boot, assistance may be needed to lift leg and prevent further injury to the patient.

**26. Prepare traction cord.**

a. Remove 30 feet of traction cord from the spool.

b. Cut traction cord in (3) 10 foot increments.

**27. Position Thomas Leg Splint with Pearson attachment under patient's injured leg.**

**NOTE:** Nursing personnel may be needed to assist with patient and splint positioning.

a. Lift leg up and move splint under the leg with the ischial ring resting loosely against the ischial tuberosity.
**Performance Steps**

**CAUTION:** The patient will be experiencing a high level of pain, always have an assistant for placement of the Thomas splint.

b. Place injured leg on padded Thomas Splint.

c. Secure ischial ring strap to patient.

**NOTE:** Additional padding may be used under the strap for patient comfort.

d. Tie a non slip knot to the end of spreader block.

**CAUTION:** To reduce the possibility of the traction cord slipping and causing further injury to the patient use a non slip knot(e.g. up and over, down and over, up and through.

e. Thread opposite end of traction cord through pulley directly at the foot of the bed.

f. Tie a non slip knot to spreader bar at patient's knee.

g. Thread opposite end of traction cord through pulley directly above the patient's injured knee through the pulley at the foot of the bed.

h. Tie a non slip knot to end of the Thomas splint.

i. Thread opposite end of traction cord through pulley directly above the patient's injured foot through the pulley at the foot of the bed.

j. Tie all traction cords to individual weight carriers at the foot of the bed.

**28. Apply weight plates to the weight carriers.**

**CAUTION:** Always inform patient prior to adding or removing weight plates

**NOTE:** Physician orders will determine specific amount of weight plates that will be used.

a. Apply weights to traction weight carrier.

b. Apply weights to counter traction weight carrier.

c. Apply weights to balanced traction weight carrier.

**NOTE:** Traction weight is always applied first followed by counter traction weight.

**29. Elevate or raise the foot of the bed until traction cord is parallel to the floor.**

**NOTE:** The bed is elevated or raised to provide counter traction which will assist in reducing muscle strain and assist in alignment of the patient's injured leg.

**NOTE:** If bed is non electric manually raise (gatchet) the foot of bed. If bed is electric press button on control panel.

**NOTE:** The physician's order will indicate the bed elevation requirement.

**30. Check position of the single clamp bars.**

a. The single clamp bar is proximal to the hip.

b. The single clamp bar is distal to the foot.

**NOTE:** If single clamp bars are not in alignment, remove weights and go to step 12-19.

**31. Check position of Thomas Leg Splint and Pearson attachment.**

a. The Thomas Leg Splint must be suspended off the bed.

**NOTE:** No measurement is needed. The splint must not be in contact with the bed.

b. The Pearson attachment must be centered to the patient's injured knee.

**NOTE:** If Pearson attachment is not bisecting the knee, remove weights and go to step 20 b.

**32. Check patient's capillary refill of both feet.**

a. Squeeze patient's toes and nail beds will turn white.

b. Release patient's toes and nail beds will return pink.

**CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

**33. Inspect overhead traction frame and bed.**

a. All clamps are tightened and locked.

b. Bed rails are upright and locked.

c. Bed wheels are locked.
**Performance Steps**

34. Inspect traction equipment.

NOTE: Traction principles promote the effectiveness of traction. Friction will reduce the efficiency of traction, hinder the pull and cause further discomfort to the patient.
   a. The weight carrier is hanging freely w/o touching the bed/frame/floor.
   b. All knots are secured (tapped).
   c. All traction cords are centered on the track of each pulley.
   d. All traction cords are hanging freely w/o touching the bed/frame.

NOTE: If traction cords are touching bed, floor or frame, remove weights and adjust pulley’s and/or re-tie traction cords.

NOTE: Traction equipment is checked daily to promote effective medical care to the patient.

35. Give patient verbal instruction on Balanced Suspension Traction.
   a. Inform patient to press the nurse call button on the side of the bed rails for assistance if needed.
   b. Padding should always be placed at or around the groin region and ankle to reduce skin irritation and pressure.

**Performance Measures**

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Gathered equipment.</td>
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<tr>
<td>3. Assembled materials.</td>
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<tr>
<td>4. Checked serviceability of equipment and bed.</td>
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<tr>
<td>5. Identified your self to patient.</td>
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<tr>
<td>6. Explained the procedure to the patient.</td>
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<tr>
<td>7. Positioned the supine patient in the middle of the bed.</td>
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<tr>
<td>8. Prepared patient’s injured leg and ankle for balanced suspension traction.</td>
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<tr>
<td>10. Secured (1) cross clamp to the center of each vertical double clamp bar at the foot of the bed.</td>
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<tr>
<td>11. Secured single plain bar to cross clamps at foot of bed.</td>
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<tr>
<td>12. Secured (2) single clamp bars horizontally to the plain bar at the foot of bed.</td>
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<td>15. Secured pulley to 18 inch single clamp bar above the hip.</td>
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<td>16. Secured 18 inch single clamp bar distal to the injured foot.</td>
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<tr>
<td>17. Secured pulley to the 18 inch single clamp bar above the phalanges.</td>
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<tr>
<td>18. Secure 5 or 9 inch single clamp bar to the lower crossbar at the foot of the bed aligned with the injured leg’s 2nd and 3rd phalanges.</td>
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<tr>
<td>20. Applied skin adherent to injured leg.</td>
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Performance Measures

<table>
<thead>
<tr>
<th>Task</th>
<th>GO</th>
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<tbody>
<tr>
<td>21. Secured vent foam strap or Buck's boot to injured extremity.</td>
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<tr>
<td>23. Positioned Thomas Leg Splint with Pearson attachment under patient's injured leg.</td>
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<tr>
<td>25. Elevated or raised the foot of the bed until traction cords are parallel to the floor.</td>
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<tr>
<td>27. Checked position of Thomas Leg Splint and Pearson attachment.</td>
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<tr>
<td>28. Checked patient's capillary refill of both feet.</td>
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<tr>
<td>30. Gave patient verbal instruction on Balanced Suspension Traction.</td>
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<tr>
<td>30. Inspected overhead traction frame and bed.</td>
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<tr>
<td>31. Inspected traction equipment.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measured tasks must be passed to receive a go.

**References**

**Required**

NUTT, REX
STP 8-91H14-SM-TG
TM 8-231
ZIMMER
**APPLY RUSSELL'S TRACTION**

**081-834-0005**

**Conditions:** Given a patient, requiring Russell's traction, supine on a power controlled orthopaedic bed with overhead traction frame, family member(s), nursing personnel, physician, physician's written or verbal order, patient's medical record or SF 513, spool of traction cord, (3) pulleys with attachment, pillow, (2) 10 lb weight plates (1, 2, 4, 5, or 10 lbs. increments), weight carrier, 18 inch single clamp bar, (3) 9 inch single clamp bars, center clamp bar, (2) 3 inch elastic bandages, canvas sling, (4) surgipads or equivalent, spreader bar, spreader block, roll of 2 inch paper tape, Buck's traction boot, roll of adhesive vent foam strap, (3) skin adhesive (benzoin/mastisol) applicators, trapeze, ruler, goniometer, scissors, examination gloves, work cart/station and trash receptacle.

**Standards:** Is reached when adhesive vent foam strap or Buck's traction boot with spreader block attached is secured to the patient's injured leg. The knee supported and suspended off the bed by a padded knee sling is maintained between 25-35 degrees of flexion. Traction cord is tied to the spreader bar, threaded through the pulley above the knee, through the pulleys at the foot of the bed and tied to weight carrier. Weight plates identified in the physician's order are applied to weight carrier. Capillary refill test is administered to the toes and passed successfully.

**Performance Steps**

1. Receive the order from the physician (review if in writing).

2. Gather needed equipment to include spreader block, pulleys, weight carrier, weight plates, single clamp bars, adhesive vent foam strap or Buck's traction boot, canvas sling, center clamp bar, spreader bar.

3. Assemble materials to include paper tape, elastic bandages traction cord, pillow, webril, surgipads, pillow, skin adherent with applicators, examination gloves, scissors and goniometer. Place on work cart/station.

   **CAUTION:** Do not use traction cords that are frayed, worn or dirty, this may cause a medical threat to the patient and may cause further harm.

4. Check serviceability of overhead traction frame and bed.
   a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders and place on work cart/station.
   
   **NOTE:** Turn all unserviceable equipment over to supervisor and continue to gather serviceable equipment.
   
   b. Inspect orthopaedic bed as follows:
      1. Bed rails are in the upright position and locked.
      2. Bed electrical cord/plug are not frayed.
      3. Remote control buttons are operational (e.g., head/foot elevation, raise/ lower position, and nurse call button).
      4. Bed wheels are locked.
   
   **NOTE:** Inform nurse if any of (1)-(4) failed and inspect another bed.

5. Identify yourself to the patient.

   **NOTE:** Tell the patient your name and job title.

6. Explain the procedure to the patient.
NOTE: Inform patient or family member that Russell's traction is designed for treatment of knee injuries and fractures of the shaft of the femur. An adhesive vent foam strap or Buck's traction boot will be applied to the injured leg, secured with elastic bandages with the knee supported by a sling and a pillow placed under the calf. (Refer to Figure 3-x).

CAUTION: The trapeze handle should be secured to the trapeze clamp when not in use to prevent further injury to patient. Technician will demonstrate for patient or family member (s).

7. Position the supine patient in the middle of the bed.
NOTE: Nursing personnel may be needed with patient positioning.

8. Prepare patient's injured leg and ankle for Russell's traction.
   a. Place examination gloves on hands
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Remove patient's shoes and socks.
   CAUTION: Always have the same gender chaperone available when patient's personal property/clothing are to be removed.

NOTE: Give shoes and socks to family member or nursing personnel.
   c. Inspect both lower legs for any skin conditions (e.g., cuts, abrasions, lacerations, or rashes).
NOTE: Inform nurse is skin conditions are present before continuing.
Performance Steps

d. Pad medial/lateral malleolus (ankle) of injured leg.
NOTE: Webril, felt or surgipads may be used. Padding is used to reduce any chaffing that may occur while the patient's injured leg is in Russell's traction.

9. Check patient's capillary refill of both feet.
CAUTION: Prior to starting and finishing any procedure on a patient, circulation is always checked.
   a. Squeeze the patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

10. Apply skin adherent to injured leg.
Note: The technician should use tincture of benzoin/mastisol adhesive in conjunction with adhesive/non adhesive vent foam straps.
   a. Ask patient if they have ever had a skin rash after use of benzoin or after eating shell fish.
   b. If no known allergies exists apply tincture of benzoin to the medical/lateral aspect of the injured leg beginning one inch distal of fibula notch/head and ending at the malleolus (ankle).
   c. If known allergies exists apply mastisol in the same manner as 10b.

11. Secure vent foam strap or Buck's boot with spreader block to injured leg.
NOTE: Product availability and patient's leg size will determine whether the adhesive vent foam strap or the Buck's boot is used.
   a. If using vent foam strap go to step 12.
   b. If using Buck's traction boot go to step 13.

12. Secure the vent foam strap with spreader block to injured leg.
NOTE: The vent foam strap upon being secured should rest 1 inch distal to the fibular notch.
   a. Place vent foam strap beginning 1/2 inch proximal to the fibular notch/head, down the medial side of the leg, continuing around the heel and ending on the lateral side opposite the start.
   b. Place the edge of the elastic bandage on the malleolus and begin wrapping around the ankle two rotations to secure the edge.
   c. Fold down and hold excess ends of the vent foam strap while continuing to wrap the bandage until the vent foam strap is completely covered and secure with clips.
NOTE: Depending on the size of the patient's leg a second elastic bandage may be necessary to completely cover the vent foam strap.
   d. Tape down the elastic bandage between the clips.
   e. Remove the clips and dispose in trash receptacle.
   f. Slide the spreader block between the vent foam strap and patient's foot.

13. Open and slide Buck's traction boot under injured leg to one inch distal to the fibular notch and secure with straps.
CAUTION: When applying Buck's traction boot, assistance may be needed to lift leg and prevent further injury to the patient. The Buck's boot is available in small, medium and large.

14. Secure 18 inch single clamp bar to overhead traction bar proximal to the patient's injured knee.

15. Secure pulley attachment to the 18 inch single clamp bar in alignment with the injured knee.

16. Secure 9 inch single clamp (horizontally) to the crossbar at the foot of bed, medial to the injured leg.

17. Secure 9 inch single clamp bar (horizontally) to the distal end of the 9 inch single clamp bar.

18. Secure center clamp bar vertically to the 9 inch single clamp bar in alignment to the leg.
Performance Steps

19. Secure (2) pulley attachments to the center clamp bar approximately 10 inches apart.

20. Tie traction cord to spreader bar, block, and weight carrier.
   a. Remove 8-12 feet of traction cord from the spool.
   b. Cut traction cord at measured length.
   c. Tie a non-slip knot to the end of the spreader bar.
   d. Thread opposite end of traction cord through the pulley above the injured knee to the top pulley attached to the center clamp at the foot of the bed, to the spreader block, and ending through the bottom pulley attached to the center clamp.
   e. Tie a non-slip knot to the weight carrier.

21. Place pillow lengthwise under injured leg.
   CAUTION: If a pillow is ordered, it must remain in place. Removing the pillow can change the vectors of force alignment.

NOTE: The pillow may need to be adjusted throughout the application to obtain 25-35 degrees of knee flexion.

22. Apply weight plates to the weight carrier.
   CAUTION: Always inform patient prior to adding or removing weight plates.

NOTE: Physician's order will determine specific amount of weight plates needed.

NOTE: With the vector of force principle, the actual horizontal pulling force on the extremity is double the amount of applied weight, while the lift is equal to the actual weight.

23. Elevate or raise the foot of the bed
   NOTE: If bed is non-electric manually raise (gatchet) the foot of bed. If bed is electric press button on control panel.

NOTE: The bed is elevated or raised to provide counteraction which will assist in alignment of the fracture(s)

24. Measure injured knee with goniometer.
   a. Place the stationary arm of the goniometer horizontally, bisecting the lateral aspect of the femur.
   b. Place the moving arm of the goniometer horizontally, bisecting the lateral aspect of the fibula.
   c. Place the protractor of the goniometer on the lateral aspect of the knee.
   d. Set knee until the goniometer measures between 25-35 degrees of flexion.

NOTE: If angle is less than 25 or more than 35 degrees, remove weight plates, go to steps 21, 22, 23, 24.

25. Check and adjust alignment of traction equipment.
   a. The 18 inch single clamp bar is proximal to the patient's injured knee
   b. Pulley attachment is aligned with the injured knee.
   c. 9 inch single clamp at the foot of the bed is medial to the injured leg.
   d. 9 inch single clamp bar is secured (horizontally) to the distal end of the clamp bar in 26 c.
   e. Center clamp bar is aligned to injured leg.
   f. (2) pulley attachments are approximately 10 inches apart.

NOTE: Adjust traction equipment as needed.

26. Check patient's capillary refill of both feet.
   CAUTION: Prior to starting and finishing any procedure on a patient, circulation is always checked.
   a. Squeeze patient's toes and the nail beds turn white.
   b. Release patient's toes and the nail beds will return pink.
Performance Steps

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

27. Inspect overhead traction frame and bed.
   a. All clamps are tightened and locked.
   b. Bed rails are upright and locked.
   c. Bed wheels are locked.

28. Inspect traction equipment.

NOTE: Traction principles promote the effectiveness of traction. Any type of friction will reduce the efficiency of traction and hinder the pull and cause further discomfort to the patient.
   a. The weight carriers are hanging freely w/o touching the bed/floor/frame.
   b. All knots are secured (tapped).
   c. All traction cords are centered on the track of the pulleys.
   d. All traction cords are hanging freely w/o touching the bed or frame.

NOTE: Traction equipment is checked daily to promote effective medical care to the patient.

29. Give patient verbal instruction on Russell traction
   a. Inform patient to press the nurse call button on the side of the bed rails for assistance.
   b. The heel must remain off the bed.

CAUTION: Pressure sores may develop if heel remains in contact with the bed surface for a extended time.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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</thead>
<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<tr>
<td>2. Gathered needed equipment</td>
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<tr>
<td>3. Assembled materials</td>
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<tr>
<td>4. Checked serviceability of overhead traction frame and bed.</td>
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<tr>
<td>5. Identified yourself to patient.</td>
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<td>6. Explained the procedure to the patient.</td>
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<tr>
<td>7. Positioned the supine patient in the middle of the bed.</td>
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<tr>
<td>8. Prepared patient's injured leg and ankle for Russell's traction.</td>
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<tr>
<td>9. Checked patient's capillary refill of both feet.</td>
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<tr>
<td>10. Applied skin adherent to injured leg.</td>
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<tr>
<td>11. Secured vent foam strap or Buck's boot with spreader block to injured leg.</td>
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<tr>
<td>12. Secured 18 inch single clamp bar to overhead traction bar.</td>
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<tr>
<td>13. Secured pulley attachment to the 18 inch single clamp bar in alignment with the injured knee.</td>
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<tr>
<td>14. Secured 9 inch single clamp (horizontally) to the crossbar at the foot of bed, medial to the injured leg.</td>
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<tr>
<td>15. Secured 9 inch single clamp bar to distal end of above single clamp bar.</td>
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<tr>
<td>16. Secured center clamp bar vertically to 9 inch single clamp bar.</td>
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<tr>
<td>17. Secured (2) pulleys to the center clamp bar 10 inches apart.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<tr>
<td>18. Tied traction cord to spreader bar, block and weight carrier.</td>
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<tr>
<td>19. Placed a pillow lengthwise under injured leg.</td>
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<tr>
<td>20. Applied weight plates to weight carrier.</td>
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<tr>
<td>21. Elevated or raised the foot of the bed.</td>
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<tr>
<td>22. Measured injured knee with goniometer.</td>
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<tr>
<td>23. Checked and adjust alignment/angles.</td>
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<tr>
<td>24. Checked patient's capillary refill of both feet.</td>
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<tr>
<td>25. Inspected overhead traction frame and bed.</td>
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<tr>
<td>26. Inspected traction equipment.</td>
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<tr>
<td>27. Gave patient verbal instruction on Russell's traction.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a **GO** on the task, if all steps are passed (P). Score the orthopaedic technician a **NO-GO** if any step is failed (F). All performance measured tasks must be passed to receive a go.

**References**

**Required**

NUTT, REX
TM 8-231
ZIMMER
Conditions: Given a patient, requiring Dunlop traction, in supine position on a power controlled orthopaedic bed with overhead traction frame, nursing personnel, family member(s), physician, physician's written or verbal order, patient's medical record or Standard Form 513, work cart/station, traction cart, spool of traction cord, (2) pulley attachments, (3) skin adherent (benzoin/mastisol) applicators, roll of 36-48 inch long adhesive vent foam strap, (2) 3 inch elastic bandages, Nelson finger exerciser, spreader bar, spreader block, (2) 8 x 7 inch surgipads or 2 inch webril, canvas arm sling, 44 inch single clamp bar, (2) weight carriers, (2) 10 lb weight plates (1, 2, 4, 5 or 10 lbs. increments), roll of 2 inch paper tape, ruler, scissors, examination gloves, goniometer, trapeze and trash receptacle.

Standards: Is reached when the adhesive vent foam strap with spreader block / Nelson finger exerciser is secured to the injured arm. The arm is maintained at a 45 degree angle to the bed with traction cord tied to the spreader block, threaded through the pulleys at the end of the single clamp bar and tied to a weight carrier. A canvas sling with spreader bar is applied to the biceps region of the upper arm with a weight carrier attached. Weight plates identified in the physician's order are applied to the weight carriers at the side of the bed. Capillary refill test is administrated to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)

2. Gather needed equipment to include spreader block, spreader bar, pulley attachments, Nelson finger exerciser, weight carrier, weight plates, single clamp bar, roll of adhesive vent foam strap, and canvas sling.

3. Assemble materials to include paper tape, elastic bandages, spool of traction cord, webril, skin adherent applicators, examination gloves, scissors, ruler and goniometer. Place on work cart/station.

CAUTION: Do not use traction cords that are frayed, worn or dirty, this is a medical threat to the patient and may cause further harm.

4. Check serviceability of overhead traction frame and bed.
   a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders.
   NOTE: Turn all unserviceable equipment over to supervisor and continue to gather serviceable equipment.
   b. Inspect orthopaedic bed as follows:
      (1) Bed rails are in the upright position and locked.
   NOTE: Do not raise the bed rail on the patient's affected side.
      (2) Bed electrical cord/plug are not frayed.
Performance Steps

(3) Remote control buttons are operational (e.g. head/foot elevation, raise/lower position, and nurse call button).

(4) Bed wheels are locked.

NOTE: Inform nurse if 1-4 failed and inspect another bed.

5. Identify yourself to the patient.

NOTE: Tell the patient your name and job title.

6. Explain the procedure to the patient.

NOTE: Inform patient or family member that Dunlop traction is designed for treatment of elbow and humerus injuries. The injured arm is placed at a 45 degree angle, with an adhesive vent foam strap applied to the injured arm. A canvas sling is placed on the biceps muscle with physician order weight plates applied to weight carriers.(Refer to Figure 3-x).

CAUTION: The trapeze handle should be secured to the trapeze clamp when not in use to prevent further injury to patient. Technician will demonstrate for patient or family member(s) proper positioning of the trapeze when not in use.

7. Position the supine patient in the middle of the bed.

NOTE: Nursing personnel may assist with positioning the patient.

8. Prepare patient's injured arm for Dunlop traction
Performance Steps

a. Put on examination gloves.

CAUTION: Always practice Body Substance Isolation (BSI) when applying traction, splints or casts to patients.

b. Remove patient's jewelry.

CAUTION: Always have the same gender chaperone when patient's personal property/clothing are to be removed.

NOTE: Give jewelry to family member(s), or nursing personnel.

c. Inspect both arms for any skin conditions (e.g., cuts, abrasions, lacerations, or skin rashes).

NOTE: Inform nurse if skin conditions are present before continuing.

d. Pad the ulnar styloid of the injured arm.

NOTE: Webril or felt may be used. Padding is used to reduce any chafing of the skin that may occur while patient's injured arm is in Dunlop traction.

9. Check patient capillary refill of both hands.

CAUTION: Prior to starting any procedure on a patient, circulation is always checked.

a. Squeeze the patient's fingers and the nail beds will turn white.

b. Release the patient's fingers and the nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

10. Apply skin adherent to patient's injured arm.

Note: The technician should use tincture of benzoin/mastisol adhesive in conjunction with adhesive/non adhesive vent foam straps.

a. Ask patient if they have ever had a skin rash after use of benzoin or after eating shell fish.

NOTE: If patient is unable to answer, ask family member. If family member is not present use a substitute application (mastisol).

b. If no known allergies exists apply tincture of benzoin to the medial/lateral aspect of the injured arm beginning one finger width below the cubitum space and ending at the wrist.

c. If known allergies exists apply mastisol as in step 10 b.

11. If using the Nelson finger exerciser go to step 13.

12. If using adhesive vent foam with spreader block go to step 14.


NOTE: The adhesive vent foam strap should rest 1 inch distal to the cubitum space.

a. Have the patient hold the handle of the Nelson finger exerciser.

NOTE: The square end of the Nelson finger exerciser should point toward the head of the bed, with the patient's thumb aligned with the humerus.

b. Place vent foam strap beginning one inch distal to the cubitum space, up the volar side of the forearm, continuing distal to the hand, resting on the base of the Nelson exerciser and ending on the dorsal side of the forearm opposite the start.

c. Place the edge of the elastic bandage on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.

d. Fold down and hold excess ends of the vent foam strap while continuing to wrap the elastic bandage until the vent foam strap is completely covered and secure with clips.

e. Tape the elastic bandage between the clips.

f. Remove the clips and dispose in trash receptacle.

14. Secure adhesive vent foam strap with spreader block to injured arm.

a. Place vent foam strap beginning one inch distal to the cubitum space, up the volar side of the arm, continuing distal to the hand and ending on the dorsal side opposite the start.

b. Place the edge of the elastic bandage on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
Performance Steps

c. Fold down and hold excess ends of the vent foam strap while continuing to wrap the bandage until the vent foam strap is completely covered and secure with clips.
d. Tape the elastic bandage between the clips.
e. Remove the clips and dispose in trash receptacle.
f. Slide spreader block in between vent foam strap and the hand.
g. Have patient rest arm on bed or across chest.

15. Secure 44 inch single clamp bar to the long bar on the overhead frame.
   a. Align and secure the single clamp bar with the patient's injured shoulder
   b. Angle the single clamp bar at a 45 degree angle to the floor.

NOTE: The bar will start off at a 45 degree angle. Upon Dunlop traction completion, the arm not the bar is measured at a 45 degree angle.

16. Secure (2) pulley attachments three to four inches apart to the distal end of the single clamp bar.

17. Tie traction cord to Nelson finger exerciser/spreader block and weight carrier.
   a. Remove 4-6 feet of traction cord from the spool.
   b. Cut traction cord at measured length.
   c. Tie a non slip knot to the end of the Nelson finger exerciser/spreader block.
   d. Thread traction cord through pulleys on single clamp bar
   e. Tie a non slip knot to the weight carrier.

18. Place canvas sling on top of biceps muscle.

19. Insert spreader bar ends in perforated holes on the canvas sling and attach weight carrier.

NOTE: The patient's humerus should be hanging freely. If the humerus is resting on the bed, the traction will not be effective.

20. Apply weight plates.

CAUTION: Always inform patient prior to adding or removing weight plates.

NOTE: Physician's order will determine specific amount of weight plates needed.

21. Elevate or raise the bed on the affected side.

NOTE: The bed is elevated or raised to provide counter traction which will assist in alignment of the fracture and reduction of muscle strain to the patient's injured arm.

NOTE: If bed is non electric manually raise (gatchet) the foot of bed. If bed is electric press button on control panel.

NOTE: The physician's order will indicate the bed elevation requirement.

22. Measure injured arm at a 45 degree angle to the floor with goniometer.

   a. Place the stationary arm of the goniometer horizontally, bisecting the lateral aspect of the humerus.
   b. Place the moving arm of the goniometer vertically, bisecting the lateral aspect of the forearm and the 2nd and 3rd phalanges.
   c. Place the protractor of the goniometer on the olecranon process (elbow).
   d. Set olecranon process until goniometer measures 45 degrees of flexion.

NOTE: If arm is not at 45 degrees of flexion, remove weight and go to step 15 b and repeat to obtain alignment

23. Check single clamp bar alignment with the patient's injured humerus.

NOTE: If single clamp bar is not aligned with injured humerus, remove weights and go to steps 15 and 16 and repeat to obtain alignment.

24. Check patient's capillary refill of hands.

   a. Squeeze the patient's fingers and the nail beds will turn white.
Performance Steps

b. Release patient's fingers and the nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

25. Inspect overhead traction frame and bed.
   a. All clamps are tightened and locked.
   b. Bed rails upright and locked.
   c. Bed wheels are locked.

26. Inspect traction equipment.

NOTE: Traction principles promote the effectiveness of traction. Any type of friction will reduce the efficiency of traction and hinder the pull and cause further discomfort to the patient.
   a. The weight carriers are hanging freely w/o touching the bed, floor or frame.
   b. All knots are secured (tapped).
   c. All traction cords are centered on the pulley tracks.
   d. All traction cords are hanging freely w/o touching the bed, floor or frame.

NOTE: Traction equipment is checked daily to promote effective medical care to the patient.

27. Give patient verbal instruction on Dunlop traction.
   a. Inform patient to press the nurse call button on the side of the bed rails for assistance.
   b. The patient's humerus should be extended off the bed to assist with bone alignment.
   Note: The distance between the injured humerus and the mattress should be measured with the ruler between 2 to 3 inches.
   c. Patient should only remove Dunlop traction with physician's permission.
   d. The adhesive vent foam strap should not impede circulation to the hands and fingers.

Performance Measures

<table>
<thead>
<tr>
<th></th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order form the physician (reviewed if in writing).</td>
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<tr>
<td>2. Gathered needed equipment.</td>
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<td>3. Assembled materials.</td>
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<tr>
<td>4. Checked serviceability of overhead traction frame and bed.</td>
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<tr>
<td>5. Identified yourself to the patient.</td>
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<tr>
<td>6. Explained the procedure to the patient.</td>
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<tr>
<td>7. Positioned the supine patient in the middle of the bed.</td>
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<tr>
<td>8. Prepared patient's injured arm for Dunlop's traction.</td>
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<tr>
<td>9. Checked patient capillary refill of both hands.</td>
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<tr>
<td>10. Applied skin adherent to patient's injured arm.</td>
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<tr>
<td>12. Secured 44 inch single clamp bar to the long bar on the overhead frame.</td>
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<tr>
<td>13. Secured (2) pulley attachments to the distal end of single clamp bar.</td>
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<tr>
<td>15. Placed canvas sling on top of biceps muscle.</td>
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<tr>
<td>16. Inserted spreader bar ends into perforated holes on the canvas sling.</td>
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### Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>17</td>
<td>Attached weight carrier to spreader bar</td>
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<td>18</td>
<td>Applied weight plates</td>
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<td>19</td>
<td>Elevated or raised the bed on the affected side.</td>
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<tr>
<td>20</td>
<td>Measured injured arm at a 45 degree angle to the floor with goniometer.</td>
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<tr>
<td>21</td>
<td>Checked single clamp bar alignment with the patient's injured humerus.</td>
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<td>22</td>
<td>Checked patient's capillary refill of hands.</td>
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<tr>
<td>23</td>
<td>Inspected overhead traction frame and bed.</td>
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<tr>
<td>24</td>
<td>Inspected traction equipment.</td>
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<td>24</td>
<td>Gave patient verbal instruction on Dunlop traction.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO if any step is failed (F). All performance measured tasks must be passed to receive a go.

### References

**Required**
- NUTT, REX
- SPLINT, TRACTION & EXTRAC
- TM 8-231
- ZIMMER
Conditions: Given a patient requiring Pelvic traction supine on a powered controlled orthopaedic bed with overhead traction frame, nursing personnel, family member(s), physician, physician's written or verbal order, patient's medical record, or Standard Form 513, adjustable pelvic traction belt with straps and D-ring attachments, (2) safety pins, (2) S-hooks, spool of traction cord, (2) pulleys with attachment, (2) 5 or 9 inch single clamp bars, plain single bar, (2) cross clamps, (2) \( 10 \text{ lb} \) weight plates (1, 2, 4, 5, or 10 lb increments), (2) weight carriers, (2) 8 x 7 inch surgipads, orthopaedic felt or kerlix pads, roll of 2 inch paper tape, roll of 2 in webril, tape measure, goniometer, scissors, examination gloves, pillow, work cart/station, trapeze and trash receptacle.

Standards: Is reached when the pelvic belt is secured on the patient at or slightly below the greater trochanter of each femur. The pelvic straps attached to the belt are maintained between a 30 - 45 degree angle to the bed. The traction cord is tied to the pelvic straps, threaded through the pulleys and tied to the weight carriers at the foot of the bed. Physician ordered weight plates are attached to the weight carriers. The capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).

2. Gather needed equipment to include pelvic traction belt w/ D rings, pulleys, weight carriers, weight plates, single clamp bars, single plain bar, cross clamps, and S hooks.

3. Assemble materials to include paper tape, elastic bandages, spool of traction cord, webril, surgipads, safety pins, examination gloves, scissors and goniometer. Place on work cart/station.

   CAUTION: Do not use traction cords that are frayed, worn or dirty, this may cause a medical threat to the patient and may cause further harm.

4. Check serviceability of overhead traction frame and bed.

   a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders and place on work cart/station.

   NOTE: Turn all unserviceable equipment over to supervisor and continue to gather serviceable equipment.

   b. Inspect orthopaedic bed as follows:

      (1) Bed rails are in the upright position and locked.

      (2) Bed electrical cord/plug are not frayed.

      (3) Remote control buttons are operational (e.g., head/foot elevation, raise/lower position, and nurse call button).

      (4) Bed wheels are locked.

   NOTE: Inform nurse if any of (1) -(4) failed and inspect another bed.

5. Identify yourself to the patient.

   NOTE: Tell the patient your name and job title.

6. Explain the procedure to the patient.
Performance Steps

6

Pelvic Traction

NOTE: Inform patient or family member that pelvic traction is designed for treatment of sciatica (a nerve located on the back of the leg), muscle spasms in the lower back, and trial treatment of nerve root disorders.

NOTE: An adjustable pelvic traction belt is secure around the hips. Traction cords are tied to the straps and threaded through two pulleys at the foot of the bed. The traction cords are then tied to weight carriers with physician ordered weight plates added. A constant pull on the lower back will occur. (Refer to Figure 3-x).

CAUTION: The trapeze handle should be secured to the trapeze clamp when not in use to prevent further injury to patient. Technician will demonstrate for patient or family member(s).

7. Position the supine patient in the middle of the bed.

NOTE: Nursing personnel may be needed with patient positioning.

8. Prepare patient's hips and legs for pelvic traction.

CAUTION: Always practice Body Substance Isolation (BSI) when applying traction, splints or casts to patients.

   a. Put on examination gloves.
   b. Pull curtain around bed.

NOTE: If a curtain is not available use a partition.

   c. Remove patient's shoes, socks and pants.
Performance Steps

CAUTION: Always have the same gender chaperone available when patient's clothing need to be removed. Give clothing items to family member or nursing personnel.

d. Inspect both lower extremities for any skin conditions (e.g., cuts, abrasions, lacerations or skin rashes).

NOTE: Inform nurse if skin conditions are present before continuing.

e. Pad the medial/lateral aspects of the iliac crest.

NOTE: Webri or surgi pads may be used. Padding is used to reduce any chaffing that may occur while the patient's lower extremity is in pelvic traction.

9. Check patient's capillary refill of both feet.

CAUTION: Prior to starting and finishing any procedure on a patient, circulation is always checked prior to traction, splinting or casting application.

a. Squeeze the patient's toes and nail beds will turn white.

b. Release patient's toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

10. Measure patient's waist for pelvic traction belt sizing.

NOTE: A variety of measuring devices may be used. The patient may be asked waist or hip size, a variety of pelvic belts may be fitted to the patient or a tape measure may be used.

a. Measure around the crest of the ilium (outside of hip)

b. Obtain correct sized belt and place on work cart/station for later use.

11. Secure (2) cross clamps to the center of each vertical double clamp bar at the foot of the bed.

12. Secure single plain bar to cross clamps.

a. Insert one end of the plain bar in the clamp bar holder and lock in place.

b. Place opposite bar end in cross clamp holder, adjust bar and lock in place.

CAUTION: The ridges of the bar and clamps must be in alignment to prevent the traction frame from coming apart and putting the patient at risk.

13. Secure (2) 5 or 9 inch single clamp bars (horizontal) to cross bar at foot of bed.

a. Secure 1st single clamp bar lateral to the right femur and pelvis.

b. Secure 2nd single clamp bar lateral to the left femur and pelvis.

14. Secure pulley attachment to each single clamp bar.

15. Apply pelvic traction belt to patient.

NOTE: Nursing personnel may be used with application of pelvic belt.

a. Nursing personnel releases back panel straps on pelvic belt.

b. Technician palpates for the patient's greater trochanter.

CAUTION: Prior to placing your hands on a patient, inform the patient what you are doing and why you are doing it.

c. Place pelvic belt under patient's legs.

NOTE: The belt has a curved and straight edge. The curved end is pointed up when applying the belt to a patient.

d. Technician and nursing assistant slide belt above greater trochanter.

CAUTION: Proceed cautiously when sliding the belt.

a. Technician adjusts belt proximal to the middle of the patient's back with bottom of belt 1 inch above the patient's greater trochanter.

b. Technician secures the back panels ends to the belt.

c. Technician secures the pelvic belt together.

CAUTION: The Pelvic belt is not applied like an abdominal binder.

d. Assess the patient breathing by asking them questions to determine if the belt is restricting air flow.

NOTE: If patient is experiencing airway management problems, open the corset. Inform physician and follow physician's order.
Performance Steps

16. Place straps on pelvic belt.
   a. Place one pelvic belt strap to the posterior aspect of the belt, bisecting the hip.
   NOTE: The patient will need to be moved for proper placement of the posterior strap. Nursing assistance is authorized.
   b. Place second pelvic belt strap to the lateral aspect of the belt, bisecting the femur.
   c. Adjust straps on pelvic belt.
   NOTE: The belts should not be loose. Adjust the buckles on the straps as needed.
   d. Adjust padding between buckles and patient’s skin as needed.

17. Attach S hooks to D rings.
   NOTE: If S hooks are not available tie traction cord directly to the D rings.

18. Tie traction cords to S hooks and weight carriers.
   a. Cut traction cord in (2) 10 feet increments.
   b. Tie a non slip knot to S hooks of D rings.
   c. Thread opposite end of the traction cords through each of the pulleys at the foot of the bed.
   d. Tie a non slip knot to each hook on the weight carriers.
   CAUTION: If a pillow is placed under the knees when traction is initially set up, it must remain in place. Removing it may cause further injury to the patient.

19. Apply weight plates to weight carriers.
   CAUTION: Always inform the patient prior to adding or removing weight plates.
   NOTE: Physician’s order will determine the specific amount of weight plates to be used.

20. Elevate or raise the foot of the bed.
   NOTE: The bed is elevated or raised to provide counter traction which will assist in reducing muscle strain of the patient's injured hip.
   NOTE: If bed is non electric manually raise(gatchet) the foot of bed. If bed is electric press button on control panel.
   NOTE: The physician’s order will indicate the bed elevation requirement.

21. Measure pelvic straps between 30-45 degree angle to the bed with goniometer.
   a. Place the stationary arm of the goniometer horizontally, bisecting the lateral aspect of the top strap.
   b. Place the moving arm of the goniometer horizontally, bisecting the bottom strap.
   c. Place the protractor of the goniometer on the buckle of the strap.
   d. Set the straps until the goniometer measures the straps between 30-45 degree of flexion.
   NOTE: If angle is less than 30 or more than 45 degrees, remove weight plates, go to step 16 then 20 and repeat to obtain alignment.

22. Check single clamp bars alignment to patient's legs.
   a. 1st single clamp bar is lateral to the right femur and pelvis
   b. 2nd single clamp bar lateral to the left femur and pelvis
   NOTE: If single clamp bars are not aligned with legs, remove weight plates and return to step 13.

23. Check patient's capillary refill of both feet.
   CAUTION: Prior to starting and finishing any procedure on a patient, circulation is always checked.
   a. Squeeze the patient toes and the nail beds will turn white.
   b. Release patient's toes and the nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

24. Inspect overhead traction frame and bed.
   a. All clamps are tightened and locked.
Performance Steps

- Bed rails are upright and locked.
- Bed wheels are locked.

25. Inspect traction equipment.

**NOTE:** Traction principles promote the effectiveness of traction. Any type of friction will reduce the efficiency of traction and hinder the pull and cause further discomfort to the patient.
- The weight carriers are hanging freely w/o touching the bed/frame/floor.
- All knots are secured (tapped).
- All traction cords are centered on the track of the pulleys.
- All traction cords are hanging freely w/o touching the bed or frame.

**NOTE:** Traction equipment is checked daily to promote effective medical care to the patient.


- The pelvic belt should not impede breathing
- Inform patient to press the nurse call button on the side of the bed rails for assistance.
- Padding should always be placed at or around the iliac crest to reduce skin irritation and pressure.

### Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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</thead>
<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<tr>
<td>2. Gathered needed equipment.</td>
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<tr>
<td>3. Assembled materials.</td>
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<tr>
<td>4. Checked serviceability of overhead traction frame and bed.</td>
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<tr>
<td>5. Identified yourself to the patient.</td>
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<tr>
<td>6. Explained the procedure to the patient.</td>
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<tr>
<td>7. Positioned the supine patient in the middle of the bed.</td>
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<tr>
<td>9. Checked patient capillary refill of both feet.</td>
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<tr>
<td>10. Measured patient's waist for pelvic traction belt sizing.</td>
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<tr>
<td>11. Secured (2) cross clamps to the center of each vertical double clamp bar at the foot of the bed.</td>
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<tr>
<td>12. Secured single plain bar to cross clamps.</td>
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<td></td>
</tr>
<tr>
<td>13. Secured (2) 5 or 9 inch single clamp bars to cross bar at foot of bed.</td>
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</tr>
<tr>
<td>14. Secured one pulley to each single clamp bar.</td>
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<td></td>
</tr>
<tr>
<td>15. Applied pelvic traction belt to patient.</td>
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<td></td>
</tr>
<tr>
<td>16. Placed straps on pelvic belt.</td>
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<tr>
<td>17. Attached S hooks to D rings.</td>
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<tr>
<td>18. Tied traction cords to S hooks and weight carriers.</td>
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<td></td>
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<tr>
<td>19. Applied weight plates to weight carriers.</td>
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<tr>
<td>20. Elevated or raised the foot of the bed.</td>
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### Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>21.</td>
<td>Measured pelvic straps between 30-45 degree angle to the bed with goniometer.</td>
<td></td>
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<tr>
<td>22.</td>
<td>Checked single clamp bars alignment to patient's legs.</td>
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<tr>
<td>23.</td>
<td>Checked patient capillary refill of both feet.</td>
<td></td>
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<tr>
<td>24.</td>
<td>Inspected overhead traction frame and bed.</td>
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<tr>
<td>25.</td>
<td>Inspected traction equipment.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO if any step is failed (F). All performance measured tasks must be passed to receive a go.

### References

<table>
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<tr>
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<tbody>
<tr>
<td>NUTT, REX</td>
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<td>TM 8-231</td>
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<td>TM 8-640</td>
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<td>ZIMMER</td>
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APPLY CERVICAL TRACTION (SKIN)
081-834-0008

**Conditions:** Given a patient requiring Cervical traction supine on a power controlled orthopaedic bed with overhead traction frame, nursing personnel, family member, physician, physician’s written or verbal order, patient’s medical record or Standard Form 513, pulley with attachment, adjustable head halter, 6 feet of traction cord, 5 or 9 inch single clamp bar, spreader bar, (2) 8 x 7 inch combine surgipad (ABD pad), weight carrier, (2) weight plates (1, 2, 4, 5, 10 lbs increments), roll of 2 inch paper tape, scissors, work cart/station, trapeze, examination gloves and trash receptacle.

**Standards:** Is reached when the padded adjustable head halter with spreader bar attached is secured to the occipital region and chin of the patient. The traction cord is tied to the spreader bar, threaded through the pulley and tied to the weight carrier at the head of the bed. The weight plates identified in the physician’s order are applied to the weight carrier at the head of bed. Airway management test is administrated and passed successfully.

**Performance Steps**

1. Receive the order from the physician (review if in writing)
2. Gather needed equipment to include padded head halter, pulley, weight carrier, weight plates and single clamp bar.
3. Assemble materials to include roll of adhesive tape, traction cord, surgipads, examination gloves, scissors. Place on work cart/station.
4. Check serviceability of overhead traction frame and bed.
   a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders.

   **NOTE:** Turn all unserviceable equipment over to supervisor and continue to gather serviceable equipment.

   b. Inspect orthopaedic bed as follows:
      (1) Bed rails are in the upright position and locked.
      (2) Bed electrical cord/plug are not frayed.
      (3) Remote control buttons are operational (e.g. head/foot elevation, raise/lower position, and nurse call button).
      (4) Bed wheels are locked.

   **NOTE:** Inform nurse if any of (1)-(4) failed and inspect another bed.
5. Identify yourself to the patient.
   **NOTE:** Tell the patient your name and job title.
6. Explain the procedure to the patient.
NOTE: Inform patient or family member that Cervical traction is designed for treatment of whiplash, degenerative spine disorders and cervical strains. An adjustable head halter w/ D rings will be fitted to the chin and the occipital region (posterior aspect of head). A spreader bar is inserted into the perforated holes of the head halter. The traction cord is tied to the spreader bar and threaded through a pulley fastened to an extension bar at the head of the bed. The traction cord is then tied to a weight carrier at the head of the bed with weight plates added. A constant pull on the upper back (cervical area) will occur. A trapeze is attached to a single bar located above your head for assistance in getting up and out of bed. (Refer to Figure 3-x).

CAUTION: The trapeze handle should be secured to the trapeze clamp when not in use to prevent further injury to patient. Technician will demonstrate for patient or family member(s) proper positioning of the trapeze when not in use.

7. Position the supine patient in the middle of the bed.
NOTE: Nursing personnel may be used with patient positioning.

CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   a. Put on examination gloves.
   b. Remove patient's jewelry from neck, and ears.
Performance Steps
CAUTION: Always have the same gender chaperone when patient's personal property/clothing are to be removed.

NOTE: Give clothing/property to family member or nursing personnel.
   c. Inspect head for any skin conditions (e.g., cuts, abrasions, lacerations or rashes). Inform nurse if skin conditions are present before continuing.

9. Check patient's capillary refill.
CAUTION: Prior to starting and finishing any procedure on a patient, circulation is always checked.
   a. Squeeze the patient's fingers and the nail beds will turn white.
   b. Release the patient's fingers and the nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

10. Secure 5 or 9 inch single clamp bar to the middle of the crossbar at head of bed in aligned with patient's head.

11. Secure pulley to single clamp bar.

12. Apply head halter to patient.
   a. Disconnect the chin portion from the head halter.
   b. Slide the posterior portion of the head halter under the patient's head resting it on the occipital region.
CAUTION: To reduce further injury to the patient, slide the halter with nursing assistance if needed.
   c. Place cuff portion on chin.
   d. Place padding under halter to both temporal regions.
NOTE: Additional padding reduces chafing of the skin while the head halter is on.
   e. Attach chin straps to the side of the head halter.
CAUTION: Tighten one strap at a time inspecting that the patient has an open airway. If patient is experiencing difficulties breathing reduce the tension of the straps.
   f. Tighten or loosen the straps as needed.

13. Insert spreader bar ends to the D rings on the side of the head halter.

14. Tie traction cord to spreader bar and weight carrier
   a. Tie a non slip knot to the loop on the spreader bar.
   b. Thread opposite end of traction cord through the pulley on the single clamp bar.
   c. Tie non slip knot to the hook on the weight carrier.

15. Apply weight plates to the weight carrier.
CAUTION: Always inform the patient when adding or removing weight plates.

NOTE: Physician's order will determine the specific amount of weight plates that will be used.

16. Elevate or raise the head of bed until traction cord is parallel to the floor.
NOTE: The bed is elevated or raised to provide counter traction which will assist in reducing muscle strain of the patient's injured spine.

NOTE: If bed is non electric manually raise(gatchet) the foot of bed. If bed is electric press button on control panel.

NOTE: The physician's order will indicate the bed elevation requirement.

17. Check and adjust fit and angle of head halter.
   a. The technician will ask the patient if one side of the head halter has a greater pull than the other.
NOTE: If there is greater pull, remove weight plates and adjust the straps until the patient feels the same pull on both sides.
Performance Steps

b. The straps should not be tangled or touching the bed.

18. Check single clamp bar alignment with the patient's head.
   NOTE: If single clamp bar is not center to the posterior of the patient's head, remove weights and go to step 10.

19. Check patient's capillary refill of both hands and patent airway.
   a. Squeeze the patient's fingers and the nail beds will turn white.
   b. Release the patient's fingers and the nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order
   c. Ask the patient to articulate (e.g. name, date, time)
   NOTE: Adjust straps as needed.

20. Inspect overhead traction frame and bed.
   a. All clamps are tightened and locked.
   b. Bed rails are upright and locked.
   c. Bed wheels are locked.

21. Inspect traction equipment.
   NOTE: Traction principles promote the effectiveness of traction. Any friction will reduce the efficiency of traction and hinder the pull and cause further discomfort to the patient.
   a. The weight carrier is hanging freely w/o touching the bed/frame/floor.
   b. All knots are secured (tapped).
   c. The traction cord is centered on the track of the pulley.
   d. The traction cord is hanging freely w/o touching the bed/frame.
   NOTE: Traction equipment is checked daily to promote effective medical care to the patient.

22. Instruct patient on releasing the head halter.
   NOTE: The physician may order the traction released throughout the day for brief periods.
   a. Have patient grasp the end of the spreader bar.
   NOTE: The technician may guide the patient's hand to the spreader bar.
   b. Have patient pull the bar towards head.
   c. With the patient's opposite hand, grasp the D ring on the side of the head halter.
   d. Have patient release the D ring from the spreader bar.
   e. Have patient slowly release the spreader bar.
   CAUTION: Slowly releasing the spreader bar reduces further injury to patient.
   f. Have patient demonstrate head halter application and removal technique.

   a. Inform patient to press the nurse call button on the side of the bed rails for assistance if needed.
   b. The head halter should not impede breathing.
   c. Padding should always be placed at or around the temporal region to reduce skin irritation and pressure.
   d. Patient should only remove head halter with physician permission.

Performance Measures

<table>
<thead>
<tr>
<th>GO</th>
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<tbody>
<tr>
<td>1. Received or reviewed the order from the physician.</td>
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<tr>
<td>2. Gathered equipment.</td>
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<tr>
<td>3. Assembled materials.</td>
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</tr>
<tr>
<td>4. Checked serviceability of overhead traction frame and bed.</td>
<td></td>
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<tr>
<td>5. Identified yourself to the patient.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
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<td>----------------------</td>
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<tr>
<td>6. Explained the procedure to the patient.</td>
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<tr>
<td>7. Positioned the supine patient in the middle of the bed.</td>
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<tr>
<td>10. Secured single clamp bar to the middle of the crossbar at head of bed in alignment with patient's head.</td>
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<tr>
<td>11. Secured pulley to single clamp bar.</td>
<td></td>
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<tr>
<td>13. Inserted spreader bar ends in the D rings on the head halter.</td>
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<tr>
<td>14. Tied traction cord to spreader bar and weight carrier.</td>
<td></td>
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<tr>
<td>15. Applied weight plates to the weight carrier.</td>
<td></td>
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<tr>
<td>16. Elevated or raise the head of bed until traction cord is parallel to the floor.</td>
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<tr>
<td>17. Checked and adjusted alignment/angle.</td>
<td></td>
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<tr>
<td>18. Checked patient's capillary refill.</td>
<td></td>
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<tr>
<td>19. Inspected overhead traction frame and bed.</td>
<td></td>
</tr>
<tr>
<td>20. Inspected traction equipment.</td>
<td></td>
</tr>
<tr>
<td>21. Instructed patient on releasing the cervical traction.</td>
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<tr>
<td>22. Gave patient verbal instruction on cervical traction.</td>
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</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO if any step is failed (F). All performance measured tasks must be passed to receive a go.

**References**

**Required**

FISHER, S. V.
NUTT, REX
TM 8-231
ZIMMER
Conditions: Given an orthopaedic patient requiring a Short Arm Cast (SAC), sitting on an orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (3) rolls of 3 inch plaster, (2) rolls of 2 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (3) rolls of 2 or 3 inch fiberglass, (3) rolls of 2 or 3 inch webril, roll of 2 or 3 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, (2) hospital pads(chux), (2) bed sheets, pillow, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, tube of surgical lubricant, orthopaedic bump, finger trap set with stand, T stand (Turnstile stand), thermometer and trash receptacle.

Standards: Is reached when the wrist is immobilized, in neutral position (0-15 degrees of dorsal extension), by the cast from the distal palmar crease (DPC) / metacarpophalangeal joints (MCPJ's) to 1 inch distal to the cubitum space (bend of elbow). Ulnar, radial deviation, pronation and supination are eliminated from the wrist and forearm. The cast eliminates rotation of the wrist and forearm, while allowing full range of motion of the elbow, thumb and fingers. Capillary refill test is administered to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)
2. Identify yourself to patient.
   NOTE: Tell the patient your name and your job title.
3. Explain the procedure to the patient.
Performance Steps

NOTE: The Short Arm Cast (SAC) is applied from 1 inch distal to the cubitum space (bend of elbow) to the distal palmar crease (DPC)/metacarpophalangeal joints (MCPJ's), with the wrist in 0-15 degrees of dorsal extension. The cast allows complete elbow flexion and extension, restricts wrist movement and minimizes rotation of the forearm, with the fingers and thumb having full range of motion (ROM). (Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
Performance Steps

4a. Inspect patient's injured arm w/ BSI techniques

CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients. (figure 3-x)

b. Inspect both arms for any skin conditions (e.g., cuts, abrasions, laceration and skin rashes).

NOTE: Inform physician if conditions are present and follow physician's instruction.

c. Examine both arms and wrists for jewelry and remove if found.

NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's hands/fingers.

   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, goniometer, thermometer and bucket of tepid water w/ bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.
## Performance Steps

### 7. Assemble materials to include stockinette, webril, plaster and fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement splint, tube of surgical lubricant, alcohol pads or damp wash towel. Open and remove (3) plaster rolls from packages and place on work cart/station.

**NOTE:** Physician’s order, technician’s preference, availability of supplies, and/or patient’s extremity size will determine which casting material (fiberglass/plaster) will be used.

### 8. Prepare stockinette.

**NOTE:** Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician’s preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

- **a.** Place hospital pad or bed sheet on patient’s lap.

**NOTE:** All patient’s should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

- **b.** Place work cart with orthopaedic bump at edge of bed.

**NOTE:** Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. T stand(turnstile casting stand), finger trap stand, nursing assistant )

- **c.** Place patient’s uninjured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.

**NOTE:** Measurements are taken on the uninjured arm to prevent further pain or discomfort to the patient.

**NOTE:** Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

- **d.** Measure from the cubitum space (bend of elbow) to 2 inches distal to the MCPJ’s for stockinette length.

- **e.** Pull down stockinette from stockinette container and cut measured length.

- **f.** Roll stockinette leaving a 1-2 inch cuff at the distal end. Place on work cart/station for later use. (Refer to Figure 3-x)
Performance Steps

9. Prepare plaster reinforcement splint for the volar aspect of the cast.

NOTE: The volar aspect of the arm is located on the palm side of the hand/forearm.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (5) sheets, remove from the stack. Place on work cart/station.
   b. Place patient's uninjured hand in the supine position (palm up) and locate DPC, thenar muscle and the cubitum space.

NOTE: The DPC is furthest diagonal line on the volar aspect of the hand. The thenar muscle is at the base of the thumb on the volar aspect of the hand. The crease is noticeable when the thumb and 5th phalange (pinky finger) are brought together. The cubitum space is located at the bend of the arm.
   c. Remove (1) plaster sheet from the stack of (5).
   d. Place sheet next to uninjured arm to obtain sheet length, the DPC and thenar muscle contours.

NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/forearm.
   e. Draw a diagonal line on the plaster sheet that matches with the DPC of patient's hand.

NOTE: The diagonal cut facilitates free ROM of the fingers (extension and flexion).
   f. Draw a curved line (half moon shape) on the plaster sheet that matches with the outer border of the thenar muscle on the patient's hand. (refer to figure 3-x)
Performance Steps

9f
Thenar muscle cut

NOTE: The half moon pattern enables the thenar muscle to be observable and the thumb to adduct to all fingers promoting free range of motion (ROM)
g. Place sheet on stack, cut the outlined patterns and excess length for all sheets, and place stack on work cart/station for later use.
NOTE: Discard excess material in the trash receptacle.

10. Apply stockinette to the patient's injured arm. (Refer to Figure 3-x.)
   a. Place patient's injured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.
   b. Hold open the sides of the stockinette.
   c. Have patient place injured hand in the stockinette opening.
   d. Roll stockinette on the injured arm from the cubitum space (bend of elbow) to 1 inch distal to the MCPJ's. (Refer to figure 3-x)
Performance Steps

10d
Rolling stockinette on injured arm

NOTE: Rolling the stockinette on promotes a better fit.
   e. Pinch the stockinette at the base of the thumb and make a 1/2 inch cut at a 45 degree angle.
      (Refer to Figure 3-x.)

NOTE: An alternative and authorized method is to cut the stockinette prior to application.
   f. Have patient place thumb through pre cut hole and smooth out stockinette. (Refer to figure 3-x)
Performance Steps

10f
Placement of thumb through stockinette

11. Measure patient's injured wrist with goniometer. (Refer to figure 3-x)
Performance Steps

11 Placement of goniometer

NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician.

   a. Place the patient's index finger and thumb in opposition to one another.

NOTE: Placing the thumb and forefinger in opposition to one another assists the patient in maintaining wrist in neutral position. This is commonly referred to as the can of coke position.

   b. Place the stationary arm of the goniometer vertically, bisecting the ulnar.

   c. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger)

   d. Place the protractor of the goniometer on the ulnar styloid.

   e. Set wrist until the goniometer measures 0-15 degrees of dorsal extension (Refer to Figure 3-x).

12. Apply cast padding (webril) to injured wrist/forearm.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers

   a. Hold webril with one hand.

   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.

   c. Place the edge of the webril on the ulnar styloid and begin wrapping around the wrist two rotations (Refer to Figure 3-x)
Performance Steps

12c  Begin webril application at the wrist

NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient’s hand/fingers.

d. Continue through the palm ending 1/2 inch distal to the edge of the stockinette, back up the forearm ending 1/2 inch proximal to the edge of the stockinette. (Refer to Figure 3-x).
Performance Steps

12d
Apply webril to stockinette edge

e. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm to provide a better fit. The technician preference will determine which technique to use.

   a. If using fiberglass casting materials go to step 14, 15 and 16.
   b. If using plaster casting materials go to step 16.

14. Place fiberglass casting gloves on hands.
Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while applying a fiberglass cast.

15. Open fiberglass casting package and go to step 16.
NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.

16. Apply 1st plaster/fiberglass roll.
NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.
   a. Hold plaster or fiberglass roll with one hand.
**Performance Steps**

NOTE: Alternate method may be used.

b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

e. Place the edge of the casting material on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge (Refer to figure 3x).
Performance Steps

16f
Twisting technique of plaster casting material
Performance Steps

NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a twisting or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) twist and evenly space the casting material on the webril. Smooth out with volar side of fingers. The twisting method provides strength to the cast (Refer to figure 3-x)

The CUT method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods. (Refer to figure 3-x)

f. Continue through the palm ending 1/2 inch distal to the edge of the webril, back up the forearm ending 1/2 inch proximal to the edge of the webril (Refer to figure 3-x)
Performance Steps

16f
Bringing fiberglass through palm

g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast. (Refer to Figure 3-x)
16g
Plaster edge should rest 1 inch distal to webril edge

17. Laminate the casting material.
   a. Place palm of each hand on the cast. (refer to Figure 3-x)
Performance Steps

17 a
Smoothing casting material w/ palms

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.

b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color. The white color of the cast indicates the curing process has started.

18. Apply reinforcement splint to volar aspect of cast (Refer to Figure 3-x).
Performance Steps

18

Application of reinforcement splint to volar aspect of wrist/forearm

NOTE: The reinforcement splint is used to strengthen and support the cast.

a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
b. Squeeze the splint together to eliminate excess water.
c. Place reinforcement splint on the volar side of the cast in line with the DPC and the outer boarder of the thenar muscle.
d. Laminate the splint to the cast.
e. Maintain patient's wrist between 0-15 degrees of dorsal extension.

NOTE: Have the patient place thumb and forefinger in opposition to one another.

19. Apply 2nd plaster/fiberglass roll (repeat steps 16-17).

20. Mold the cast material to wrist/forearm.

NOTE: The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.

a. Place the heel of one hand on the volar aspect of the distal wrist.
b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
c. Squeeze the heels of each hand together (refer to figure 3-x)
Performance Steps

20c  Application of interosseous mold

d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.
CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
e. Remove heels of each hand from cast when contours of the wrist and forearm have been shaped to the wrist/forearm and cast is cured.

21. Check range of motion (ROM) of phalanges and thumb.
   a. Have patient extend, flex fingers.
   b. Have patient rotate thumb and touch all fingers to thumb.
CAUTION: The finished edge of the cast should end proximal to the base of the thumb to avoid radial nerve impingement.

22. Check alignment of wrist with goniometer(Refer to figure 3-x).
Performance Steps

22. Use of goniometer after casting application

a. Place the stationary arm of the goniometer vertically, bisecting the ulnar.
b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger).
c. Place the protractor of the goniometer on the ulnar styloid.
d. The wrist is measured between 0-15 degrees of dorsal extension.

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove cast and go to step 11.

23. Check cast dimensions (Refer to figure 3-x)
Performance Steps

23
Cast edge proximal to MCPJ's
Performance Steps

23

The cast distal edge rests at or below DPC

a. On the volar side the distal edge of the cast rests at the DPC.
b. On the dorsal side the distal edge of the cast rests at the base of the MCPJ's.
c. The cast edge at the base of the thumb rests proximal to the snuff box. (Refer to figure 3-x)
Performance Steps

Radial view of SAC-To observe the snuff box.

d. The proximal edge of the cast rests 1 inch distal to the cubitum space.(Refer to Figure 3-x)
Performance Steps

6. Cast edge rest 1 inch distal to cubitum space

e. Tape down edges of stockinette and webril.

24. Apply 3rd plaster roll (repeat steps 16-17)

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

25. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

26. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.

   Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

27. Give patient verbal and written instructions on cast care.
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
   b. Present patient with cast care booklet (or written instructions).
   c. Instruct patient to elevate the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
**Performance Steps**

d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

28. Fit sling to patient as required.

NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles’, Smith’s, Bennett's), patient's comfort, physician's or technician's preference.

29. Annotate the procedure applied to patient in medical record or SF 513.

NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

30. Escort or direct patient to front desk to make a follow up appointment.

**Performance Measures**

<table>
<thead>
<tr>
<th></th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<tr>
<td>2. Identified yourself to patient.</td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials</td>
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<tr>
<td>9. Prepared plaster reinforcement splint for the volar aspect of the cast.</td>
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<tr>
<td>10. Applied stockinette to patient's injured arm.</td>
<td></td>
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<tr>
<td>11. Measured patient's injured wrist w/ goniometer.</td>
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<tr>
<td>12. Applied cast padding (webri) to injured wrist/forearm</td>
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<tr>
<td>14. Placed fiberglass casting/ examination gloves on hands.</td>
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<tr>
<td>15. Opened fiberglass casting package.</td>
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<tr>
<td>16. Applied 1st plaster or fiberglass roll.</td>
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<tr>
<td>17. Laminated the casting material.</td>
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<tr>
<td>18. Applied reinforcement splint to volar aspect of cast.</td>
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<tr>
<td>19. Applied 2nd plaster or fiberglass roll.</td>
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<tr>
<td>20. Molded the cast.</td>
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<tr>
<td>21. Checked range of motion (ROM) of phalanges and thumb.</td>
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<tr>
<td>22. Checked alignment of injured wrist with goniometer.</td>
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<tr>
<td>23. Checked cast dimensions.</td>
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</table>
### Performance Measures

<table>
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<tr>
<th></th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>25.</td>
<td>Checked patient's capillary refill.</td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>27.</td>
<td>Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>28.</td>
<td>Fitted sling as required.</td>
<td></td>
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<tr>
<td>29.</td>
<td>Annotated the procedure applied to patient in medical record or SF 513.</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Escorted patient or direct family to front desk for follow-up appointment.</td>
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</table>

### Evaluation Guidance: Score the orthopaedic technician a GO on the task if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

### References

**Required**

0-443-04809-6  
0812110-0765  
0-8151-0910-5  
0-8342-0763-X  
38709590  
THE MANUAL OF ORTHOPEDICS  
TM 8-231  
TM 8-640
**Conditions:** Given an orthopaedic patient requiring a Muenster cast, sitting on an orthopaedic examination bed, family member, nursing personnel, physician, physician’s verbal or written order, patient’s medical record, or Standard Form 513 (consultation form), pen, work cart/station, (4) rolls of 3 or 4 inch plaster, (2) rolls of 5 inch ortho flex plaster, box of 4 x 15 inch plaster reinforcement sheets, (4) rolls of 2 or 3 inch fiberglass, (3) rolls of 2 or 3 inch webril, roll of stockinette (2, 3 or 4 inch), stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, 2 pairs of safety goggles, box of disposable ear plugs, roll of 2 inch adhesive tape, (2) hospital pads (chux), (2) bed sheets, pillow, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, thermometer, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, tube of surgical lubricant, orthopaedic bump, T stand (turnstile casting stand) and trash receptacle.

**Standards:** Is reached when the wrist is immobilized, in a neutral position, by the cast from the distal palmar crease (DPC) / metacarpophalangeal joints (MCPJ’s) to 3 inches proximal to the elbow. Ulnar, radial deviation and pronation supination are eliminated from the wrist. The cast restricts rotation of the forearm, but allows complete elbow flexion and extension with free range of motion for the thumb and fingers. Capillary refill test is administered to the fingers and passed successfully.

**Performance Steps**

1. Receive the order from the physician (review if in writing).

2. Identify yourself to patient.
   NOTE: Tell patient your name and job title.

3. Explain the procedure to the patient.
Performance Steps

3
Fiberglass Muenster
NOTE: The Muenster cast is applied from the distal palmar crease (DPC)/ metacarpophalangeal joints (MCPJ's) to 1 inch distal to the cubitum space (bend of arm) with flanges (side supports) 3 inches proximal to the elbow (olecranon). The cast allows complete elbow flexion and extension and restricts rotation of forearm. The fingers and thumb will have full range of motion (refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's arms.

CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.

   a. Put on examination gloves.
   b. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).

NOTE: Inform physician if skin conditions are present and follow physician's instruction.

   c. Examine both arms and wrists for jewelry and remove if found.

NOTE: All jewelry on fingers and wrists must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.

   a. Squeeze patient's fingers and nail beds will turn white
Performance Steps

b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, T stand, orthopaedic bump, goniometer, scissors, thermometer and bucket of tepid water w/plastic bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chux), bed sheet, sling, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads and damp wash towel. Open and remove (4) plaster rolls from their packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster/ortho flex) will be used. The technician may choose to use ortho flex for the supracondylar area.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. Place hospital pad or bed sheet over patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

b. Place the work cart with orthopaedic bump at the side of bed.

c. Place patient's uninjured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.

NOTE: Measurements are taken on the uninjured arm to prevent further pain or discomfort to the patient. Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

d. Measure from 2 inches distal to the MCPJ's to mid humerus to obtain stockinette length.

e. Pull down stockinette from stockinette container and cut measured length.

f. Roll stockinette leaving a 1-2 inch cuff at the distal end. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the volar aspect of the cast.

NOTE: The volar aspect of the arm is located on the palm side of the hand/forearm.

a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (5) sheets, remove from the stack. Place on work cart/station.

b. Place patient's hand in the supine position (palm up) and locate distal palmar crease (DPC), thenar muscle, medial and lateral supracondylar and the cubitum space.

NOTE: The DPC is furthest diagonal line on the volar aspect of the hand. The thenar muscle is at the base of the thumb (heel of hand). The crease is noticeable when the thumb and 5th phalange (pinky finger) are brought together. The supracondylar are on the lateral/medial sides of the elbow. The cubitum space is at the bend of the arm.

c. Remove (1) plaster sheet from the stack of (5).

d. Place sheet next to injured arm to obtain sheet length, the DPC and thenar muscle contour.

NOTE: To increase patient cleanliness the plaster sheet does not have to rest on the hand/forearm.

e. Draw a diagonal line on the plaster sheet that matches with the DPC of patient's hand.

NOTE: The diagonal line facilitates free range of motion (ROM) of the fingers (extension and flexion).
Performance Steps

f. Draw a curved line (half moon shape) on the plaster sheet that matches with the outer border of the thenar muscle on the patient's hand

NOTE: The half moon pattern enables the thenar muscle to be observable and the thumb to adduct to all fingers promoting free ROM.

g. Place sheet on stack, cut the outlined patterns and excess length for all sheets, and place on work cart/station for later use.

NOTE: Discard excess material in the trash receptacle.

10. Prepare plaster reinforcement splint for the supracondylar (olecranon) region.

NOTE: The splints (flanges) prevent rotation of the forearm.

a. Peel back the edges of (5) sheets, remove from the stack and fold in half.

b. Place sheets next to the medial and lateral supracondylar.

c. Draw a curved line (half moon shape) on the plaster sheets that matches with the medial and lateral supracondylar of uninjured arm.

d. Cut the outlined patterns and place on work cart/station for later use.

11. Apply stockinette to patient's injured arm.

a. Place patient upper arm (triceps muscle region) on the orthopaedic bump at a 45 degree angle to the upper torso.

b. Hold open the sides of the stockinette.

c. Instruct patient to place injured hand in the opening of the stockinette.

d. Roll stockinette on the injured arm 1 inch distal to the MCPJ's, to 3 inches proximal to the olecranon (elbow).

NOTE: Rolling the stockinette on promotes a better fit.

e. Pinch the stockinette at the base of the thumb and make a 1/2 inch cut at a 45 degree angle.

NOTE: An alternative and authorized method is to cut the stockinette prior to application.

f. Have patient place thumb through pre cut hole and smooth out stockinette.

12. Measure patient's injured wrist with goniometer.

NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician.

a. Position the patient's elbow at a 45 degree angle to upper torso.

NOTE: Family members, nursing staff, or orthopaedic technician can be used to assist in positioning the patient's arm.

b. Place the patient's index finger and thumb in opposition to one another.

NOTE: Placing the thumb and forefinger in opposition to one another assists the patient in maintaining wrist in neutral position. This is commonly referred to as the can of coke position.

c. Place the stationary arm of the goniometer vertically, bisecting the ulnar.

d. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (pinky finger).

e. Place the protractor of the goniometer on the ulnar styloid.

f. Set wrist until the goniometer measures 0-15 degrees of dorsal extension.

13. Apply cast padding (webril) to patient's injured arm.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sore which can lead to ulcers.

a. Hold webril with one hand.

b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.

NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid causing circulation compromise of the patient's hand/fingers.


**Performance Steps**

d. Continue through the palm ending 1/2 inch distal to the stockinette edge, back up the forearm around the elbow ending 1/2 inch proximal to the stockinette edge.

NOTE: Wrap the cast padding in an overlapping figure of eights over the cubitum space. This will assist in reducing wrinkles and provide the supracondylar with additional padding.

e. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally) when wrapping around the elbow to provide a better fit. The technician preference will determine which technique is used.


15. If using fiberglass casting materials go to step 17 and 18.

16. If using plaster casting materials go to step 19.

17. Place fiberglass casting gloves on hands.

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns when applying a fiberglass cast.

18. Open fiberglass casting package and go to step 19.

NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.

19. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended to protect the technician’s hands as the resin in the plaster rolls may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll with one hand.

b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots affects the integrity of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

e. Place the edge of the casting material on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.

NOTE: The cast is most susceptible to losing it's strength in the palm region. Therefore, a twisting or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) twist and evenly space the casting material on the webril. Smooth out with volar side of fingers. The twisting method provides strength to the cast.

The Cut method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.

f. Continue through the palm ending 1/2 inch distal to the edge of the webril, back up the forearm figure eight around the elbow ending 1/2 inch proximal to the edge of the webril.

NOTE: Wrapping the cast material in a overlapping figure of eights over the cubitum space will provide the required strength for the supracondylar flanges.

g. Overlap the cast material by 1/2-1/4 the previous wrap. The top of the cast material should bisect the middle of the previous layer and present evenly applied padding.
Performance Steps
NOTE: As the roll is pushed around the cubitum space a horizontal cut to the proximal edge of the casting material is authorized.

20. Laminate the casting material.
   a. Place palm of each hand on the cast.
   CAUTION: To reduce cast indentations, which can cause pressure sores to the patient's skin under the cast, keep finger tips off the cast during the application and molding process. If patient feels pressure sores or hot spots developing under the cast, the cast must be removed immediately
   b. Rub the cast material in the direction it was applied.
   NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.
   c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.
   NOTE: The dull white color represents the cast material beginning to cure.

21. Apply reinforcement splint to the volar aspect of cast.
   NOTE: The reinforcement splint is used to strengthen and support the cast.
   a. Place the splint in tepid water, wait for bubbles to subside and remove from water
   b. Squeeze the splint together to remove excess water.
   c. Place reinforcement splint to the volar side of the cast in line with the DPC and the outer boarder of the thenar muscle.
   d. Laminate the splint to the cast.
   e. Maintain patient's wrist between 0-15 degrees of dorsal extension.
   NOTE: Place the patient's thumb and forefinger in opposition to one another.

22. Apply 2nd plaster/fiberglass roll( repeat steps 19-20)

23. Mold the cast (interosseous).
   NOTE: The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.
   CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. how do they feel?, is the pressure too much?)
   e. Maintain the patient's wrist in correct position.
   NOTE: Placing the patient's thumb and forefinger in opposition to one another assist in maintaining wrist in neutral position.
   f. Remove heels of each hand from cast when contours of the wrist and forearm have been shaped and cast is cured.

24. Mold the cast (medial and lateral supracondylar).
   NOTE: The supracondylar mold is used to prevent rotation of the forearm
   a. Place the lateral aspect of the each thumb and heel on the lateral and medial condyle.
   b. Apply firm and gradual pressure.
   c. Maintain the patient's arm at 45 degrees of extension.
   d. Remove heels of each hand from cast when contours of the condylars have been shaped and cast is cured.

25. Trim cast to fit patient.
   a. Draw a curved line (half moon shape) on the medial and lateral side of the cast that matches with the outer border of the supracondylar mold.
   NOTE: Physician's order will determine extension and flexion requirements of the elbow.
   b. Connect the line on the anterior aspect of the cast at 1 1/2 -2 inches distal to the elbow flexion crease.
   c. Connect the line on the posterior aspect of the cast at 3 inches distal to the tip of the olecranon.
Performance Steps

d. Cut the outline and place excess casting materials in trash receptacle.

NOTE: Depending on the thickness and type of casting material used, the technician is authorized to use a cast saw.

e. Cut the webril at the base of the thumb, elbow and fold down the stockinette over the edges of the cast.

CAUTION: The finished edge of the cast should end proximal to the base of the thumb to avoid radial nerve impingement.

f. Tape down edges of stockinette/webril.

NOTE: Adhesive tape or plaster remnants can be used.

26. Check range of motion (ROM) of phalanges, thumb and elbow.

   a. Have patient extend, flex fingers and touch thumb to all fingers.
   b. Have patient extend and flex elbow.

27. Check cast dimensions.

   a. The distal edge of the cast rests at the DPC.
   b. The radial aspect of the cast is proximal to the snuff box.
   c. The cubitum space is visible.
   d. The flanges are 3 inches proximal to the medial and lateral condylar.

NOTE: The physician's order will determine the length of the flanges.

28. Check alignment of wrist with goniometer.

   a. Place the stationary arm of the goniometer vertically, bisecting the ulnar.
   b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (pinky finger).
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. The wrist is measured between 0-15 degrees of dorsal extension.

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove cast and go to step 11.

29. Apply 3rd plaster/fiberglass roll (repeat steps 19-20).

30. Apply reinforcement splints to the supracondylar region.

   a. Place the splint in tepid water, wait for bubbles to subside and remove from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Extend the splint, place index and middle finger on either side of the splint and squeegee out excess water.
   d. Place reinforcement splint on the lateral and medial sides of the supracondylar in line with the cut out flanges and laminate splint.

31. Apply 4th plaster roll (repeat steps 19-20)

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work. Technician preference will determine where the last roll is started.

32. Check patient's capillary refill.

   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

33. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.

   Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

34. Give patient verbal and written instructions on cast care.

   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
   b. Present patient with cast care booklet (or written instructions).
Performance Steps

c. Instruct patient to elevated the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling in the extremity.
d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

35. Fit sling to patient as required.
NOTE: Consideration for applying a sling include elderly patient’s, severity of fractures (e.g. Colles’, Smith’s, Bennett’s), patient’s comfort, physician’s or technician’s preference.

36. Annotate the procedure applied to the patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to patient and sign your name.

37. Escort patient or direct patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>GO</th>
<th>NO GO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Identified yourself to patient.</td>
<td></td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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</tr>
<tr>
<td>4. Inspected patient’s arms.</td>
<td></td>
</tr>
<tr>
<td>5. Checked patient’s capillary refill.</td>
<td></td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
<td></td>
</tr>
<tr>
<td>9. Prepared plaster reinforcement splint for the volar aspect of the cast.</td>
<td></td>
</tr>
<tr>
<td>10. Prepared plaster reinforcement splint for the supracondylar (olecranon).</td>
<td></td>
</tr>
<tr>
<td>11. Applied stockinette to patient’s injured arm.</td>
<td></td>
</tr>
<tr>
<td>12. Measured patient’s injured wrist w/ goniometer.</td>
<td></td>
</tr>
<tr>
<td>13. Applied cast padding (webril) to patient’s arm.</td>
<td></td>
</tr>
<tr>
<td>15. If used fiberglass casting materials go to step 17 and 18.</td>
<td></td>
</tr>
<tr>
<td>16. If used plaster casting materials go to step 19.</td>
<td></td>
</tr>
<tr>
<td>17. Placed fiberglass casting gloves on hands.</td>
<td></td>
</tr>
<tr>
<td>18. Opened fiberglass casting package and go to step 19.</td>
<td></td>
</tr>
<tr>
<td>19. Applied 1st plaster/fiberglass roll.</td>
<td></td>
</tr>
<tr>
<td>20. Laminated the casting material.</td>
<td></td>
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<tr>
<td>21. Applied reinforcement splint to the volar aspect of cast.</td>
<td></td>
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<tr>
<td>22. Applied 2nd plaster/fiberglass roll.</td>
<td></td>
</tr>
<tr>
<td>23. Molded cast (interosseous).</td>
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<tr>
<td>24. Molded cast (supracondylar).</td>
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</tbody>
</table>
## Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>GO</th>
<th>NO GO</th>
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</thead>
<tbody>
<tr>
<td>25.</td>
<td>Trimmed cast to fit patient.</td>
<td></td>
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<tr>
<td>26.</td>
<td>Checked range of motion (ROM) of phalanges, thumb and elbow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Checked cast dimensions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Checked alignment of wrist with goniometer.</td>
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<tr>
<td>30.</td>
<td>Applied reinforcement splints to the supracondylar flanges.</td>
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<tr>
<td>32.</td>
<td>Checked patient’s capillary refill.</td>
<td></td>
<td></td>
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<tr>
<td>33.</td>
<td>Cleaned plaster resin off of patient’s skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>34.</td>
<td>Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>35.</td>
<td>Fitted sling to patient as required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Annotated the procedure in patient’s medical record or SF 513.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Escorted patient or direct patient to front desk to make a follow up appointment.</td>
<td></td>
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</tbody>
</table>

### Evaluation Guidance:
Score the orthopaedic technician a GO on the task if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

### References
- **Required**
  - 0812110-0765
  - 0-8151-0910-5
  - 0-8342-0763-X
  - 38709590
  - BLAUVELT, CAROLYN T.
  - STP 8-91H14-SM-TG THROUGH SELF-INSTRUCTION
  - TM 6-840
  - TM 8-231

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  - 0812110-0765
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  - 0-8342-0763-X
  - 38709590
  - BLAUVELT, CAROLYN T.
  - STP 8-91H14-SM-TG THROUGH SELF-INSTRUCTION
  - TM 6-840
  - TM 8-231
APPLY A LONG ARM CAST
081-834-0015

Conditions: Given an orthopaedic patient requiring a Long Arm Cast (LAC), in supine or sitting position on a orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written orders, patient's medical record, or Standard Form 513 (consultation form), work cart/station, sink, roll of (2, 3, or 4 inch) stockinette, stockinette container, (2) rolls of 2 inch webril(cast padding) (3) roll of 3 inch webril(cast padding), (3) rolls of 3 inch plaster, (3) rolls of 4 inch plaster, box of 4 x 15 plaster reinforcement splint, box of 5 x 30 plaster reinforcement splint, (2) rolls of 2 or 3 inch fiberglass, (2) rolls of 4 inch fiberglass, fiberglass casting gloves, examination gloves, scissors, (3) hospital pads (chux), (2) bed sheets, goniometer, ruler, tape measure, bucket of water w/ plastic bag, tube of surgical lubricant, orthopaedic bump, box of alcohol pads, damp wash cloth or towel, pillow, finger trap set, cast care booklet or equivalent, pen, sling, thermometer and trash receptacle.

Standards: Is reached when the wrist (0-15 degrees of dorsal extension) and elbow (flexed at a 90 degree angle) are immobilized by the cast from the distal palmar crease (DPC)/metacarpophalangeal joints (MCPJ's) to 2 inches distal to the axilla region. Ulnar, radial deviation, pronation and supination are eliminated from the wrist and forearm. The cast eliminates rotation of the wrist, forearm and elbow and allows free range of motion for the thumb and fingers. Capillary refill test is administered to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)
2. Identify yourself to the patient.
   NOTE: Tell patient your name and job title.
3. Explain the procedure to the patient.
Performance Steps

NOTE: The LAC is applied from the distal palmar crease (DPC) to 2 inches distal to the axilla region/base of the deltoid muscle, with elbow flexed at a 90 degree angle. The wrist will be placed in a neutral position (0-15 degrees dorsal extension), absent of radial, ulnar deviation, pronation, supination with the fingers and thumb having full range of motion (ROM). (Refer to Figure 3-x)

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Inspect both arms for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   c. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on fingers and wrists must be removed. Give jewelry to family member or secure with patient's belongings in NCO office.

5. Check patient's capillary refill of both hands.
   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink.
Performance Steps

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, ear plugs, safety goggles, finger trap set, scissors, sheet padded felt with stockinette, (2) 5lb weight plates, weight carrier, bucket of tepid water w/plastic bag, ruler, goniometer. Place on work cart/station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster or fiberglass rolls, plaster splints(4x15/5x30), examination gloves, fiberglass casting gloves, spool of traction cord, alcohol pads/damp towel, padded felt w/stockinette. Open and remove (5) plaster rolls from packages and place on work cart/station.

NOTE: Physician order, technician's preference, availability of supplies, and or patient's extremity size will determine which casting material(fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is a form of protection against the exothermic reaction caused by the casting materials and generally used for all casts except on patients who have had recent surgery, recently reduced fractures or as directed by the physician.

a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

b. Place work cart with orthopaedic bump at edge of bed.

NOTE: Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. T stand, finger trap stand, nursing assistant)

c. Place patient's uninjured elbow on the orthopaedic bump at a 90 degree angle to the upper torso.

NOTE: Measurements are taken on the uninjured arm to prevent further pain/discomfort to the patient. Instruments of measurements may vary (e.g. tape measure, ruler, or webril)

d. Measure from 2 inches distal to the MCPJ's to the axilla region to obtain stockinette length.

e. Pull down stockinette from stockinette container and cut measured length.

f. Roll stockinette leaving a 1-2 inch cuff at the distal end. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the volar aspect of cast.

NOTE: The volar aspect of the arm is located on the palm side of the hand.

a. Open box of 4 x 15 reinforcement plaster sheets. Remove the sheets and unwrap package. Peel back the edges of (5) sheets. Remove sheets from stack. Place on work cart/station.

b. Place patient's uninjured hand supine (palm up) and locate the DPC.

NOTE: The DPC is furthest diagonal line on the volar aspect of the hand. The thenar muscle is at the base of the thumb on the volar aspect of the hand. The crease is noticeable when the thumb and 5th phalange (pinky finger) are brought together. The deltoid muscle is on the lateral aspect of the upper arm.

c. Remove (1) plaster sheet from the stack of (5).

d. Place sheet next to uninjured arm to obtain sheet length, the DPC and thenar muscle contour.

NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/forearm

e. Draw a diagonal line on the plaster sheet that matches with the DPC of patient's hand.

NOTE: The diagonal line facilitates free ROM of the fingers (extension and flexion).

f. Draw a curved line (half moon shape) on the plaster sheet that matches with the outer border of the thenar muscle on the patient's hand.
Performance Steps
NOTE: The half moon pattern enables the thenar muscle to be observable and the thumb to adduct to all fingers promoting free range of motion (ROM)
  g. Place stack of (5) plaster sheets next to measured length to identify the difference, cut off excess amount and place on work cart/station.
NOTE: Discard excess material in the trash receptacle.

10. Prepare plaster reinforcement sheets for the posterior aspect of cast.
   a. Open box of 5 x 30 plaster sheets. Remove and unwrap package. Locate edge of one stack and remove from package.
   NOTE: 5 x 30 plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers.
   b. Position the patient's uninjured elbow at a 90 degree angle to upper torso.
   NOTE: Family members, nursing staff, orthopaedic technician or finger trap stand can be used to assist in positioning the patient's arm.
   c. Place distal end of plaster stack on the lateral aspect of the mid forearm and have patient or assistant hold the distal end. Simultaneously bring the proximal end 2 inches distal to the axilla or resting on the base to the deltoid muscle. Fold down the proximal end, cut off excess and place stack on work cart/station for later use.

11. Apply stockinette to patient's injured arm.
   a. Place patient's injured elbow on the orthopaedic bump.
   b. Hold the sides of the stockinette open.
   c. Instruct patient to place injured hand in the open end of the stockinette.
   d. Roll stockinet on the injured arm from 2 inches distal to the MCPJ's to the axilla region.
   NOTE: Rolling the stockinette on promotes a better fit.
   e. Pinch the stockinette at the base of the thumb and cubitum area and make a 1/2 cut at a 45 degree angle.
   NOTE: An alternative and authorized method is to cut the stockinette prior to application.
   f. Have patient place thumb through pre cut hole and smooth out stockinette.

12. Apply finger traps to fingers on injured hand (if not used go to step 13).
NOTE: Use of finger traps may be required based on patient's inability to maintain arm/wrist in the correct position, there is no assistance available, and fracture reduction is needed.
   a. Place patient in supine position on the bed.
   b. Place injured arm at a 90 degree angle to the upper torso and smooth out wrinkles in the stockinette.
   c. With one hand, grasp patient's injured hand and abduct from upper torso.
   d. With 2nd hand, grasp finger trap set and place individual finger traps on fourth and fifth phalange past the MCPJ's.

13. Measure patient's injured wrist w/ goniometer.
NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician.
   a. Position the patient's injured elbow at a 90 degree angle to upper torso.
NOTE: Family member(s), nursing staff, orthopaedic technician or finger trap stand can be used to assist in positioning the patient's arm.
   b. Place the patient's index finger and thumb in opposition to one another.
NOTE: Placing the thumb and forefinger in opposition to one another assist the patient in maintaining wrist in neutral position. This is commonly referred to as the can of coke position.
   c. Place the stationary arm of the goniometer vertically, bisecting the ulnar.
   d. Place the moving arm of the goniometer vertically, bisecting the 5th phalange (pinky finger).
   e. Place the protractor of the goniometer on the ulnar styloid.
   f. Set wrist until the goniometer measures 0-15 degrees of dorsal extension.

14. Measure injured elbow with goniometer.
Performance Steps

a. Place the stationary arm of the goniometer horizontally, bisecting the middle of the humerus and deltoid.
b. Place the moving arm of the goniometer vertically, bisecting the middle of the forearm and the 2nd and 3rd phalanges.
c. Place the protractor of the goniometer on the olecranon (elbow), forming a 90 degree angle.
d. Set elbow until the goniometer measures 90 degrees of flexion.

15. Apply cast padding (webril) to injured arm.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers.

a. Hold the roll with one hand.
b. With opposite hand unroll the cast padding 1/2 -1 inch and grasp edge with thumb, index and middle fingers.
c. Place webril end on the ulnar styloid and begin wrapping around the wrist two rotations.

NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.

d. Continue through the palm ending 1/2 inch distal to the edge of the stockinette, back up the forearm, figure eight around the elbow, ending 1/2 inch proximal to the edge of the stockinette.
e. With each turn overlap the webril by 1/2- 1/4 from the previous wrap. The top of the webril should bisect the middle of then previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm and elbow to provide a better fit. The technician preference will determine which technique to use.


a. If using fiberglass casting materials go to step 17 and 18.
b. If using plaster casting materials go to step 19.

17. Place fiberglass casting gloves on hands.

CAUTION: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while using fiberglass casting materials.

18. Open fiberglass casting package and go to step 19.

NOTE: Open one fiberglass package at a time. As the fiberglass roll comes in contact with the air, the roll will start to cure and harden.

19. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll with one hand.

NOTE: Alternate method may be used.

b. With opposite hand unroll the plaster/fiberglass 1/2 -1 inch and grasp edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll in bucket of water and remove when bubbles cease to exist.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.
Performance Steps

e. Place the plaster or fiberglass end on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.

NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a twisting or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) twist and evenly space the casting material on the webril. Smooth out with volar side of fingers. The twisting method provides strength to the cast.

The CUT method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.

f. Continue through the palm ending 1/2 inch distal to the edge of the webril, back up the forearm, figure of eight around the elbow, ending 1/2 inch proximal to the edge of the webril.

g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer covering up the shadow line and present an evenly applied cast.

NOTE: Depending on the size of the patient's forearm and biceps region more than two rolls may be needed for the initial roll. Begin extra roll where the previous roll left off.

20. Laminate the casting materials.

a. Place palm of each hand on the cast.

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.

b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

NOTE: The dull white color represents the cast material beginning to cure.

21. Apply plaster reinforcement splint to volar aspect of cast. (if using fiberglass go to step 23).

NOTE: Plaster reinforcement splint is used to strength and support the cast.

a. Place the plaster splint in bucket of tepid water, wait for bubbles to subside and remove splint from water.

b. Squeeze the splint together to eliminate excess water.

c. Extend plaster splint and squeegee out excess water.

NOTE: Place index and middle fingers on either side of the splint and move fingers down the splint.

d. Place reinforcement splint on the volar side of the cast in line with the DPC and the outer boarder of the thenar muscle.

e. Smooth out splint and continue to laminate.

f. Maintain patient's wrist between 0-15 degrees of dorsal extension.

NOTE: Place patient's thumb and index finger in opposition to one another.

22. Apply plaster reinforcement splint to the posterior aspect of the cast.

NOTE: Plaster reinforcement splint is used to strength and support the cast. Upper extremity fiberglass casts do not require a splint, due to the strength of the fiberglass casting material.

a. Place plaster splint in bucket of tepid water, wait for bubbles to subside and remove splint from water.

b. Squeeze the plaster splint together.

c. Extend plaster splint and squeegee out excess water.

NOTE: Place index and middle fingers on either side of the splint and move fingers down the splint.

d. Place reinforcement splint centered and on the posterior side of the elbow extending from mid forearm to 1/2 inch distal to the webril edge.

e. Smooth out splint and continue to laminate.

f. Maintain patient's elbow at 90 degrees of flexion.
Performance Steps

NOTE: Family member(s), nursing staff, orthopaedic technician or finger trap stand can be used to assist in positioning the patient's arm.

23. Apply 2nd plaster/fiberglass roll (repeat steps 19-20).

24. Measure injured elbow with goniometer.
   a. Place the stationary arm of the goniometer horizontally, bisecting the middle of the humerus and deltoid muscle.
   b. Place the moving arm of the goniometer vertically, bisecting the middle of the forearm and the 2nd and 3rd phalanges.
   c. Place the protractor of the goniometer on the olecranon (elbow), forming a 90 degree angle.
   d. The goniometer should measure 90 degrees of flexion.

NOTE: If elbow is not measured at 90 degrees of flexion, the forearm pronated or supinated, remove the cast and go to step 8.

25. Measure patient's injured wrist with goniometer.
   a. Place the stationary arm of the goniometer vertically, bisecting the ulnar.
   b. Place the moving arm of the goniometer vertically, bisecting the 5th phalange (pinky finger).
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. The goniometer should measure between 0-15 degrees of dorsal extension.

NOTE: If wrist is not measured between 0-15 degrees of dorsal extension degrees the forearm is in pronation or supination, remove the cast and go to step 8.

26. Mold the cast (interosseous).

   NOTE: The interosseous mold is used to prevent movement of the injured wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.
   e. Maintain patient's wrist in correct position.
   f. Remove hands from cast when contours of the wrist and forearm have been shaped and the cast is cured.

NOTE: All casts require a mold. Crooked casts equal straight bones.

27. Mold the cast (bicipital).

   NOTE: The bicipital mold is used to prevent movement of the humerus in the cast and promote fracture healing.
   a. Place the palm of one hand on the biceps muscle.
   b. Place the palm of the 2nd hand on the triceps muscle.
   c. Press palms together and conform the plaster/fiberglass to the upper arm (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.

28. Apply 3rd plaster/fiberglass roll (repeat steps 19-20).

29. Trim proximal and distal edges of cast.
   a. Cut the outside edge of the cast padding.
   b. Pull down the cast padding and stockinette.

   CAUTION: The finished edge of the cast should end proximal to the base of the thumb to avoid radial nerve.

30. Check range of motion (ROM) of phalanges and thumb.

   NOTE: Patient should freely be able to extend and flex fingers and touch thumb to all fingers.

31. Check cast dimensions.
   a. The cast rests at the DPC.
Performance Steps

b. The cast edge on the radial side rests proximal to the snuff box.
NOTE: The proximal aspect of the thumb should have full ROM.
c. The proximal edge of the cast should be 2 inches distal to the axilla region.
d. Pull down webril and stockinette.
e. Tape down edges of stockinette and webril

32. Apply 4th roll of plaster/fiberglass (repeat steps 19-20).
NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work. Technician preference will determine where that last roll is started.

NOTE: Depending on the size of the patient’s arm a fifth roll of plaster can be used.

33. Check patient’s capillary refill.
   a. Squeeze patient’s fingers and nail beds will turn white
   b. Release patient’s fingers and nail beds will return to pink
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

34. Clean plaster resin off patient’s skin using a damp wash cloth, towel or alcohol pad.
NOTE: Use alcohol pads or fresh water from the faucet , not from the casting bucket.

35. Give patient verbal and written instruction on cast care.
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet (or written instruction)
   c. Instruct patient to extend, flex, and wiggle fingers (demonstrate for patient) to reduce swelling.
   d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing on it, coloring)

36. Fit sling as needed.
NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient’s comfort, physician's or technician's preference.

37. Annotate the procedure.
NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

38. Escort patient or direct family member to front desk to make a follow-up appointment.

Performance Measures

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Identified yourself to the patient.</td>
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<td>3. Explained the procedure to the patient.</td>
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<td>4. Inspected patient’s arms.</td>
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<tr>
<td>5. Checked patient’s capillary refill of both hands.</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials.</td>
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<td>9. Prepared plaster reinforcement splint for the volar aspect of cast.</td>
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<td>Performance Measures</td>
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<tr>
<td>10. Prepared plaster reinforcement sheets for the posterior aspect of cast.</td>
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<tr>
<td>11. Applied stockinette to patient's injured arm.</td>
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<td>12. Apply finger traps to fingers on injured hand (if not used go to step 13).</td>
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<tr>
<td>15. Applied cast padding (webril) to injured arm/wrist.</td>
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<td>17. Placed fiberglass casting gloves on hands.</td>
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<td>18. Opened fiberglass casting package.</td>
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<td>19. Applied 1st plaster/fiberglass roll.</td>
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<tr>
<td>20. Laminated the cast.</td>
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<tr>
<td>22. Applied plaster reinforcement splint to the posterior aspect of the cast.</td>
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<td>23. Applied 2nd plaster/fiberglass roll.</td>
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<td>24. Measured injured elbow with goniometer.</td>
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<tr>
<td>25. Measured injured wrist w/ goniometer.</td>
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<tr>
<td>26. Molded the cast (interosseous).</td>
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<tr>
<td>27. Molded the cast (bicipital).</td>
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<tr>
<td>29. Trimmed proximal and distal edges of cast.</td>
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<tr>
<td>30. Checked range of motion (ROM) of phalanges and thumb.</td>
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<td>31. Checked cast dimensions</td>
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<tr>
<td>32. Applied 4th roll of plaster/fiberglass.</td>
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<tr>
<td>33. Checked patient's capillary refill.</td>
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<tr>
<td>34. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>35. Gave patient verbal and written instructions on cast care.</td>
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<td>36. Fitted sling as needed.</td>
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<tr>
<td>37. Annotated the procedure in patient's medical record.</td>
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<tr>
<td>38. Escorted patient to front desk to make a follow-up appointment.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.
References

Required

Related

0-443-04809-6
0812110-0765
0-8151-0910-5
0-8342-0763-X
38709590
STP 8-91H14-SM-TG
TM 8-231
TM 8-640
APPLY A LONG LEG CAST
081-834-0017

Conditions: Given an orthopaedic patient requiring a Long Leg Cast (LLC), sitting on a orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (4) rolls of 6 inch plaster, (3) rolls of 4 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (5) rolls of 4 or 5 inch fiberglass, (2) rolls of 3 inch webril, (3) rolls of 4 inch webril, (3) rolls of 6 inch webril, roll of stockinette (2, 3, or 4 inch), stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, (2) safety goggles, (2) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (3) hospital pads (chux), (2) bed sheets, pillow, (2) disposable paper shorts, disposable hospital gown, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, thermometer, support bar, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, tube of surgical lubricant, orthopaedic bump, T (turnstile)stand, thigh holder, cast shoe and trash receptacle.

Standards: Is reached when the injured leg, ankle and knee are immobilized by the cast from the web spacing of the toes to 4 inches distal to the groin (on the medial side), and flared 1 inch proximal to the greater trochanter (on the lateral side). The ankle is dorsiflexed at a 90 degree angle, absent of inversion or eversion with toes having full range of motion. The knee is flexed between 0-15 degrees. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).

2. Identify yourself to patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   NOTE: The Long Leg Cast (LLC) is applied from the web spacing of the toes to 4 inches distal to the groin (on the medial side) and flared 1 inch proximal to the greater trochanter (on the lateral side) with the knee flexed between 0-15 degrees.

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect injured leg/ankle with patient supine on the examination bed.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Remove patient's shoes, socks and pants.
   NOTE: Provide patient with paper shorts or hospital scrubs. If unavailable, cut the pant leg at the seam.

   NOTE: Provide patient with privacy when they are disrobing (e.g., bed curtain, bed sheet)
   c. Inspect patient's injured leg for any skin conditions (e.g., cuts, abrasions, lacerations and skin rashes).

   NOTE: Inform physician if conditions are present and follow physician's order.
   d. Examine both legs for jewelry and remove if found.
   NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.
Performance Steps

5. Check patient’s capillary refill.
   a. Squeeze patient’s toes and nail beds will turn white.
   b. Release patient’s toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician’s instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, T stand, thigh holder, support bar, orthopaedic bump, goniometer, scissors, thermometer and bucket of tepid water w/ plastic bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads and damp wash towel. Open and remove (5) plaster rolls from their packages and place on work cart/station.

NOTE: Physician’s order, technician’s preference, availability of supplies, and/or patient’s extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures or as directed by physician.

CAUTION: Stockinette and webril are forms of protection against the exothermic reaction of the casting materials. Technician and physician preference will dictate whether stockinette is used.
   a. Place hospital pad or bed sheet on patient’s lap.
   NOTE: All patient’s should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and protect their privacy.
   b. Place the patient’s uninjured ankle at a 90 degree angle to the tibia and knee between 0-15 degree of flexion.
   NOTE: Measurements are taken on the uninjured leg to prevent further pain to the patient’s injured leg.
   NOTE: Assistance(nursing personnel ) may assist with taking measurements.
   NOTE: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).
   c. Measure from 2 inches distal to the toes to 4 inches distal to the groin and 2 inches proximal to the greater trochanter to obtain stockinette length.
   d. Pull down stockinette from stockinette container and cut measured length.
   e. Roll stockinette leaving a 1-2 inch cuff at the distal end. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the posterior aspect of the cast.

NOTE: The plaster reinforcement splint will be prepared for the posterior side of the injured leg/ankle.
   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of one stack and remove from package. Place on work cart/station.
   NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets.
   b. Measure from 3 inches distal to the popliteal space, to the web spacing of the toes.
   CAUTION: The peroneal nerve is located on the lateral side of the leg. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Locate the fibula notch/ head and measure 1 finger breadth below to prevent this condition.
Performance Steps

10. Prepare plaster reinforcement splint for use at the femoral condyles.

NOTE: The plaster reinforcement splints are designed to assist in reinforcing the cast at the knee region.

   a. Locate edge of two stacks.
   b. Measure on the medial and lateral sides of the leg 4 inches distal to the groin crossing the knee and ending at the distal edge of the calf muscle.

NOTE: The splints can also be applied on the medial/lateral side of the cast. The application of the splint is technician preference.

   c. Place (2) stacks of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.

NOTE: Discard excess material in the trash receptacle.

11. Apply stockinette to patient's injured leg.

   a. Hold open sides of the stockinette.
   b. Instruct patient to place injured foot in the opening of the stockinette.
   c. Roll stockinette on injured ankle/leg from 3 inches proximal to the greater trochanter to 2 inches distal to the phalanges.

NOTE: The patient may assist in rolling the stockinette past the greater trochanter

   d. Pinch the stockinette at the base of the tibia/fibula and back of knee and cut at a 45 degree angle.

NOTE: Cutting the stockinette reduces the chance of pressure sores developing from excessive stockinette rubbing or bunching up under the cast.

12. Position the patient's injured ankle at a 90 degree angle to the tibia.

NOTE: There are several ways to obtain a 90 degree angle. The patient could maintain the position, a nursing personnel or family member can assist, a T stand, or thigh stand could be used. It is the technician preference.

   a. Instruct patient to dorsiflex the foot.

NOTE: Many patient's will not know the meaning of dorsiflex. Instruct the patient to pull their toes towards their head or have the patient simulate squishing a bug with their heel. Either technique will assist the patient in maintaining the ankle at 90 degrees. Each technician may use their own techniques.

   b. Align the 2nd and 3rd phalanges with the knee.

NOTE: Aligning the phalanges with the knee reduces eversion or inversion of the foot.

   c. Have nursing personnel grasp the metatarsals of the patient's injured foot under the stockinette.

NOTE: Grasping the metatarsals under the stockinette, reduces the chance the foot will be inverted or everted.

   d. Have nursing personnel place opposite forearm under the patient's injured knee.

NOTE: Bracing the forearm under the knee reduces muscle strain for the patient, assists with proper ankle angle and knee flexion.

13. Measure patient's injured ankle w/ goniometer.

NOTE: The ankle is always positioned at a 90 degree angle( dorsiflexion), absent of inversion and eversion, unless otherwise indicated by physician's order. The knee is flexed between 0-15 degrees, unless otherwise indicated by physician's order.

   a. Place the stationary arm of the goniometer parallel to the fibula.
   b. Place the moving arm of the goniometer bisecting, the lateral edge of the heel and the head of the fifth metatarsal.
   c. Place the protractor of the goniometer on the lateral malleolus.
   d. Set the ankle until the goniometer measures 90 degrees of dorsiflexion.
Performance Steps

14. Apply cast padding (webril) to patient's injured leg.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers

a. Hold webril with one hand.
   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index, middle finger and thumb.
   c. Place the edge of the webril at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

NOTE: The technician may also start 1 inch from the distal edge of the stockinette.

NOTE: The webril application is started at the distal aspect of the tibia/fibula to provide an anchor and extra padding to the malleolus.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's toes.

d. Continue up the foot and leg, ending 3 inches distal to the fibula head.

CAUTION: The peroneal nerve is located on the lateral side of the leg. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Locate the fibula notch/ head and measure 1 finger breath width below to prevent this condition.

e. With each turn overlap the webril by 1/2 -1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding. To reduce possible constrictive edema caused by applying webril too tight, keep the webril on the extremity as it is applied.

15. Prepare casting materials.

a. If using plaster rolls, go to step 18
b. If using fiberglass rolls, go to step 16 and 17.

16. Place fiberglass casting gloves on hands.

CAUTION: To prevent chemical burns to the hands it is mandatory for the technician to use fiberglass casting gloves.

17. Open fiberglass casting package and go to step 18.

NOTE: Open one fiberglass package at a time. As fiberglass comes in contact with the air, the roll will start to cure (set up).

18. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.

a. Hold plaster/fiberglass roll with one hand.
   b. With opposite hand unroll the plaster/fiberglass 1/2 -1 inch and grasp the edge with thumb, index and middle fingers.

NOTE: Alternate method of placing the thumb under the forward edge of the roll can also be used.

c. Place plaster/fiberglass roll vertically in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

e. Place the edge of the casting material at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

NOTE: The technician may also start 1 inch proximal to the edge of the webril.
Performance Steps
f. Continue down the foot, ending 1/2 inch distal to the edge of the webril, back up the leg, ending 1/2 inch proximal to the edge of the webril.
g. With each turn overlap the plaster/fiberglass by 1/4 -1/2 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present evenly applied casting material.
NOTE: To reduce possible constrictive edema caused by applying the plaster/fiberglass too tight, keep the plaster/fiberglass roll on the extremity as it is applied.

19. Laminate the casting materials.
   a. Place palm of each hand on the cast.
   CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.
   b. Rub the cast material in the direction it was applied.
   NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.
   c. Continue rubbing the plaster cast until the tone/texture changes from a glossy/creamy color to a dull white color. If using fiberglass continue to laminate until the cast begins to harden.
   NOTE: The dull white color indicates the plaster is beginning to cure

20. Apply reinforcement splint to posterior aspect of cast.
   NOTE: The plaster reinforcement splint is used to strength and support the cast.
   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water..
   b. Squeeze the splint together to eliminate excess water.
   c. Place reinforcement splint on the posterior side of the cast in line with the web spacing of the foot and below the tibial tuberosity and laminate the splint.
   d. Maintain patient's ankle at 90 degree dorsiflexion.
   NOTE: Instruct the patient to squish a bug with their heal or bring their toes to their nose. Either technique will assist the patient in bringing their ankle to a 90 degree angle. The technician may have their own preference to the above techniques.

21. Apply 2nd plaster/fiberglass roll ( repeat steps 18-19 ).

22. Mold the cast material to the lower leg.
   a. Place palm of hand on the gastrocnemius muscle and apply pressure. Hold until contours takes shape.
   NOTE: A flat board can also be used to mold the gastrocnemius.
   b. Place lateral aspect of both thumbs ( forming a triangle) on the tibia and apply even pressure up/down the tibia. Hold until contours take shape.
   CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure ( e. g. How do you feel?, Is the pressure too much ?)
   c. Place lateral aspect of both thumbs ( forming a c) on the malleolus and apply even pressure to the border of the malleolus. Hold until contours take shape.
   d. Remove heels of hands from the cast when contours of the ankle, tibia/fibula have been shaped and the cast is cured.
   NOTE: All casts require a mold. Crooked casts equal straight bones.
   e. Have assistant remove hand from under stockinet at the patient's foot.

23. Check range of motion ( ROM ) of phalanges.
   a. Have patient extend, flex toes.
   b. Cut the webril at the distal, proximal edges and at the base of the MTPJ'S
   CAUTION: The finished edge of the cast should end proximal to the base of the fifth MTPJ to avoid nerve impingement.
   c. Fold and tack down the webril and stockinet with casting material.

24. Check alignment of injured ankle with goniometer.
   a. Place the stationary arm of the goniometer parallel to the fibula.
   b. Place the moving arm of the goniometer vertical bisecting the 5th metatarsal head.
Performance Steps
  c. Place the protractor of the goniometer on the lateral malleolus.
  d. The goniometer should measure 90 degrees of dorsiflexion.
NOTE: If the malleolus is not at 90 degrees of dorsiflexion, everted or inverted remove cast and go to step 13.

25. Position the patient's injured leg to extend cast.
NOTE: Family members, nursing staff, thigh stand, or orthopaedic bump can be used to assist in maintaining the proper flexion of the patient's knee.
NOTE: If no assistance is available, do not begin the upper portion of the cast until the heel of the cast has dried.
  a. Place the stationary arm of the goniometer horizontally, bisecting the lateral aspect of the femur.
  b. Place the moving arm of the goniometer horizontally, bisecting the lateral aspect of the fibula.
  c. Place the protractor of the goniometer on the lateral aspect of the knee.
  d. Set knee until the goniometer measures between 0-15 degrees of flexion.
CAUTION: The patient will not be able to maintain this position. The technician may used an assistant or other supports.

26. Apply webril to patient's injured leg.
  a. Hold webril roll with one hand.
  b. With 2nd hand unroll webril 1/2 -1 inch and grasp edge with index and middle finger.
  c. Place edge of the webril at the proximal edge of the previous applied webril.
NOTE: There must be webril to webril contact to facilitate an evenly applied cast and to reduce cast complications.
  d. Continue around the knee in a figure of eight wrap and up the leg.
  e. Angle the webril roll and continue pass the greater trochanter ending 1/2 inch distal to the medial and lateral stockinette edge.
NOTE: The webril can be cut or torn to redirect the roll at an angle
  f. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shadow line and present evenly applied padding. To reduce possible constrictive edema caused by applying webril too tight, keep the webril on the extremity as it is applied.
NOTE: If webril is wrinkled, shadow lines exist, or knee is not between 0-15 degrees of flexion, remove webril, reposition knee and return to step

27. Apply 3rd plaster roll.
  a. Place casting material on the distal portion of the SLC and begin wrapping around the knee.
  b. Continue around the knee in a figure eight wrap and up the leg and ending 1/2 inch from the cast padding.
  c. Angle the cast material and continue pass the greater trochanter ending 1/2 inch distal to the medial and lateral webril edge.
NOTE: The cast material can be fan folded to encompass the greater trochanter.
  d. With each turn overlap the plaster/fiberglass by 1/2 -1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied application.
NOTE: To reduce possible constrictive edema caused by applying plaster/fiberglass too tight, keep the casting materials on the extremity as it is applied.

28. Apply plaster reinforcement splint.
NOTE: Plaster reinforcement splint is used to strength and support the cast.
  a. Place splint in bucket of tepid water, wait for bubbles to subside and remove splint from water.
  b. Squeeze the plaster splint together.
  c. Extend plaster splint and squeegee out excess water.
NOTE: Place index and middle fingers on either side of the splint and move fingers down the splint.
Performance Steps

d. Place reinforcement splint from medial to lateral over the knee extending above and below the extension joint.

NOTE: The plaster reinforcement splint must extend above and below the extension joint (where the SLC connects to the LLC).

e. Repeat steps 28 a through d for the medial side.
f. Smooth out splint and continue to laminate.

29. Apply 4th plaster/fiberglass roll (repeat step 27 )

30. Mold the cast material to the upper leg.
   a. Quadrilateral mold: Place the palm of one hand on the lateral side of the quadrilateral muscle.
   b. Place the palm of one hand on the medial side of the quadrilateral muscle.
   c. Press palms together and conform the plaster to the leg (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.

NOTE: Have patient place injured leg on pillow to reduce leg strain.

31. Mold the cast material to the femoral condyles.
   a. Place the palm of one hand on the medial side of the femoral condyle.
   b. Place the palm of one hand on the lateral side of the femoral condyle.
   c. Press palms together and conform the plaster to the femoral condyles (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.

NOTE: The art of molding casting material is a continues and ongoing procedure.

32. Check cast dimensions.
   a. The distal edge of the cast rest at the web spacing of the foot.
   b. The 5th metatarsal is visible.

NOTE: Having the cast edge rests below the 5th metatarsal head reduces circulation compromise.
   c. The proximal edge of the cast is 4 inches distal to the groin on the medial side and 2 inches proximal to the greater trochanter on the lateral side.

33. Apply 5th roll of plaster/fiberglass (repeat step 27 ).

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

34. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

35. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.

NOTE: Use alcohol pads or fresh water from the faucet and not from the casting bucket.

36. Apply a cast shoe.

NOTE: Cast shoes are available in small, medium and large sizes. The technician can determine which size is appropriate by asking the patient their foot size or by sizing the patient's foot after casting application.

37. Administer a crutch ambulation treatment (see task number 081-836-0041)

38. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep leg elevated and flex and extend toes to increase circulation in the foot.
   d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).
Performance Steps

e. Instruct patient to use crutches and not to place any pressure on the cast for 24-48 hrs.

39. Annotate the procedure applied to patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

40. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>GO</th>
<th>NO GO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Received the order from the physician (reviewed if in writing).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Identified yourself to patient.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Explained the procedure to the patient.</td>
<td></td>
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<tr>
<td>4.</td>
<td>Inspected injured leg/ankle with patient (supine) on the examination bed.</td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Checked patient's capillary refill.</td>
<td></td>
<td></td>
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<tr>
<td>6.</td>
<td>Gathered equipment</td>
<td></td>
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<tr>
<td>7.</td>
<td>Assembled materials</td>
<td></td>
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</tr>
<tr>
<td>9.</td>
<td>Prepared plaster reinforcement splint for the posterior aspect of the cast.</td>
<td></td>
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</tr>
<tr>
<td>10.</td>
<td>Prepared plaster reinforcement splint for use at the femoral condyles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Applied stockinette to patient's injured leg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Positioned the patient's injured ankle at a 90 degree angle to the tibia.</td>
<td></td>
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</tr>
<tr>
<td>14.</td>
<td>Applied cast padding (webril) to patient's injured leg.</td>
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</tr>
<tr>
<td>16.</td>
<td>Placed fiberglass casting gloves on hands.</td>
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<td></td>
</tr>
<tr>
<td>17.</td>
<td>Opened fiberglass casting package and go to step 18</td>
<td></td>
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</tr>
<tr>
<td>18.</td>
<td>Applied 1st plaster/fiberglass roll.</td>
<td></td>
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</tr>
<tr>
<td>19.</td>
<td>Laminated the casting materials.</td>
<td></td>
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<tr>
<td>20.</td>
<td>Applied reinforcement splint to posterior aspect of cast.</td>
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</tr>
<tr>
<td>21.</td>
<td>Applied 2nd plaster/fiberglass roll (repeat steps 18-19)</td>
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<tr>
<td>22.</td>
<td>Molded the cast material to the lower leg.</td>
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<tr>
<td>23.</td>
<td>Checked range of motion (ROM) of phalanges.</td>
<td></td>
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<tr>
<td>24.</td>
<td>Checked alignment of injured ankle with goniometer.</td>
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<tr>
<td>25.</td>
<td>Positioned the patient's leg to extend cast.</td>
<td></td>
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</tr>
<tr>
<td>26.</td>
<td>Applied webril to injured leg.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Applied 3rd plaster roll to injured leg.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
<td></td>
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<td>-------------------------------------------------------------------------------------</td>
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<tr>
<td>30. Molded the cast material to the upper leg.</td>
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<tr>
<td>31. Molded the cast material to the femoral condyles.</td>
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<tr>
<td>32. Checked cast dimensions.</td>
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<tr>
<td>34. Checked patient's capillary refill.</td>
<td></td>
<td></td>
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<tr>
<td>35. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>36. Applied a cast shoe.</td>
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<tr>
<td>37. Administered a crutch ambulation treatment (see task number 081-836-0041)</td>
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<tr>
<td>38. Gave patient verbal and written instructions on cast care.</td>
<td></td>
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<tr>
<td>39. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>40. Escorted patient to front desk to make a follow up appointment.</td>
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</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**
- 0812110-0765
- 0-8151-0910-5
- 0-8342-0763-X
- 38709590
- BLAUVELT, CAROLYN T.
- STP 8-911H14-SM-TG
- THROUGH SELF-INSTRUCTION
- TM 6-840
- TM 8-231
APPLY A LONG ARM CYLINDER CAST (LACC)

081-834-0018

Conditions: Given an orthopaedic patient requiring a Long Arm Cylinder Cast (LACC), in supine or sitting position on a orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), work cart/station, sink, roll of (2, 3, or 4 inch) stockinette, stockinette container, (2) rolls of 2 inch webril(cast padding), (3) roll of 3 inch webril(cast padding), (3) rolls of 3 inch plaster, (3) rolls of 4 inch plaster, box of 4 x 15 plaster reinforcement sheets, box of 5 x 30 plaster reinforcement sheets, (2) rolls of 2 or 3 inch fiberglass, (2) rolls of 4 inch fiberglass, fiberglass casting gloves, examination gloves, scissors, (3) hospital pads (chux), (2) bed sheets, goniometer, ruler, tape measure, bucket of tepid water with plastic bag, sink, tube of surgical lubricant, orthopaedic bump, box of alcohol pads, damp wash cloth or towel, pillow, finger trap set, T (turnstile) stand, cast care booklet or equivalent, pen, thermometer, sling, and trash receptacle.

Standards: Is reached when the elbow is immobilized and flexed at a 90 degree angle by the cast from 1 inch proximal to the ulnar styloid to 2 inches distal to the axilla region. Pronation and supination are eliminated from the forearm. The cast restricts rotation of the forearm and elbow, with free range of motion for the hand and fingers. Capillary refill test is administered to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
Performance Steps

Long Arm Cylinder Cast

NOTE: The LACC is applied from 1 inch proximal to the ulnar styloid to 2 inches distal to the axilla region/base of the deltoid muscle, with elbow flexed at a 90 degree angle, absent of pronation and supination with wrist, fingers and thumb having full range of motion (ROM). (Refer to Figure 3-x)

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
   b. Inspect both arms for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's order.
   c. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on fingers and wrists must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink.
Performance Steps

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, ear plugs, safety goggles, finger traps with stand, lead apron with thyroid collar, fluro scan, scissors, padded felt with stockinette, (2) 5lb weight plates, weight carrier, bucket of tepid water w/ plastic bag. Place on work cart/station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster or fiberglass rolls, plaster splints(4x15/5x30), examination gloves, fiberglass casting gloves, traction cord, alcohol pads/damp towel, padded felt w/ stockinette. Open and remove (5) plaster rolls from packages and place on work cart/station.

NOTE: Physician order, technician's preference, availability of supplies, and or patient's extremity size will determine which casting material(fiberglass/ plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is a form of protection against the exothermic reaction caused by the casting materials and generally used for all casts except on patients who have had recent surgery, recently reduced fractures or as directed by the physician.

a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering( e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

b. Place work cart with orthopaedic bump at edge of bed.

NOTE: Technician preference will determine if orthopaedic bump is used. A number of props may be use ( e.g. T stand, finger trap stand, nursing assistant )

c. Place patient's uninjured elbow on the orthopaedic bump at a 90 degree angle to the upper torso.

NOTE: Measurements are taken on the uninjured arm to prevent further pain/discomfort to the patient. Instruments of measurements may vary(e.g. tape measure, ruler, or webril)

d. Measure from 2 inches distal to the ulnar styloid to the axilla for stockinette length.

e. Pull down stockinette from stockinette container and cut measured length.

f. Roll the stockinette in a cuff leaving a 1-2 inch border at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the posterior aspect of cast.

a. Open box of 5 x 30 plaster sheets. Remove and unwrap package from box. Locate edge of one stack( 5 thickness) and remove from package.

NOTE: 5 x 30 plaster sheets are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers.

b. Move uninjured elbow at a 90 degree angle to the upper torso.

c. Place distal end of plaster splint on the posterior aspect of the arm one inch proximal to the ulnar styloid to 2 inches distal to the axilla region or resting at the base of the deltoid muscle. Place sheet on work cart/station for later use.

10. Apply stockinette to patient's injured arm.

a. Hold the sides of the stockinette open.

b. Instruct patient to place injured hand in the opening of the stockinette.

c. Roll stockinette from the axilla region to 2 inch distal to the ulnar styloid.

NOTE: Rolling the stockinette on promotes a better fit.

d. Pinch the stockinette at the cubitum space and make a 45 degree angle cut.

NOTE: An alternative and authorized method is to cut the stockinette prior to application.
Performance Steps

11. Apply finger traps to fingers on injured hand (if not used go to step 12).

NOTE: Use of finger traps may be required based on patient's inability to maintain arm/wrist in the correct position, there is no assistance available, and fracture reduction is needed.
   a. Place patient supine on the bed.
   b. Place injured arm at a 90 degree angle to the upper torso and smooth out wrinkles in the stockinette.
   c. With one hand, grasp patient's injured hand and abduct from upper torso.
   d. With 2nd hand, grasp finger trap set and place individual finger traps onto fourth and fifth phalanges past the MCPJ's.

12. Measure injured elbow with goniometer.
   a. Place the stationary arm of the goniometer horizontally, bisecting the middle of the humerus and deltoid muscle.
   b. Place the moving arm of the goniometer vertically, bisecting the forearm and the 2nd and 3rd phalanges.
   c. Place the protractor of the goniometer on the olecranon (elbow).
   d. The goniometer should measure 90 degrees of flexion.

NOTE: If elbow is not measured at 90 degrees of flexion, the wrist is not between 0-15 degrees of dorsal extension, the forearm is in pronation or supination repeat step 12 until elbow and wrist are measured at correct angle.

13. Apply cast padding (webril) to forearm.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers
   a. Hold with one hand.
   b. With 2nd hand unroll the webril 1/2 -1 inch and grasp edge with index and middle finger.
   c. Place the edge of the webril 1 inch distal to the ulnar styloid and begin wrapping around the forearm two rotations.

NOTE: The webril application is started at the base of the ulnar styloid to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.
   d. Continue back up the forearm, figure of eight around the elbow and ending 1/2 inch proximal to the edge of the stockinette.

NOTE: Wrap the cast padding in an overlapping figure of eights over the cubitum space. This will assist in reducing wrinkles and provide the supracondylar with additional padding.
   e. With each turn overlap the webril by 1/2- 1/4 from the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally ) when wrapping around the elbow to provide a better fit. The technician preference will determine which technique to use.

   a. If using fiberglass casting materials go to steps 15, 16 and 17
   b. If using plaster casting materials go to step 18.

15. Place fiberglass casting gloves on hands.

CAUTION: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while using fiberglass casting materials.

16. Open fiberglass casting package and go to step 18.

NOTE: Open one fiberglass package at a time. As the fiberglass roll comes in contact with the air, the roll will start to cure and harden.

17. Apply 1st plaster/ fiberglass roll.
Performance Steps

NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll with one hand.
   b. With opposite hand unroll the plaster/fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to exist.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots can cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

   e. Place the edge of the plaster or fiberglass roll 1/2 inch distal to the edge of the webril and begin wrapping around the wrist two rotations to secure the edge.
   f. Continue back up the forearm, figure eight around the elbow, ending 1/2 inch proximal to the edge of the webril.
   g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.

18. Laminate the casting materials.

   a. Place palm of each hand on the cast.

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure or hot spots developing under the cast, the cast must be removed immediately.

   b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist in providing strength to the cast.

   c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

NOTE: The dull white color indicates the casting material is curing.

19. Apply posterior reinforcement splint.

NOTE: Plaster reinforcement splint is used to strengthen and support the cast.

   a. Place the plaster splint in bucket of tepid water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Extend plaster splint and squeegee out excess water.

NOTE: Place index and middle fingers on either side of the splint and move fingers down the splint.

   d. Place reinforcement splint on the posterior side of the elbow extending from the axilla region to mid forearm.
   e. Smooth out splint and continue to laminate.
   f. Maintain patient's elbow at 90 degrees of flexion.

20. Apply 2nd plaster/fiberglass roll (repeat steps 18-19).

21. Measure injured elbow with goniometer.

   a. Place the stationary arm of the goniometer horizontally, bisecting the middle of the humerus and deltoid muscle.
   b. Place the moving arm of the goniometer vertically, bisecting the middle of the forearm and the 2nd and 3rd phalanges.
   c. Place the protractor of the goniometer on the olecranon (elbow).
   d. The goniometer should measure 90 degrees of flexion.

NOTE: If elbow is not measured at 90 degrees of flexion, the forearm is in pronation or supination, remove the cast and go to step 8.
### Performance Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>22.</td>
<td>Mold the cast material to the forearm.</td>
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<tr>
<td></td>
<td><strong>NOTE:</strong> The interosseous mold is used to prevent movement of the injured forearm in the cast and promote fracture healing.</td>
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<tr>
<td></td>
<td>a. Place the heel of one hand on the volar aspect of the cast.</td>
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<td></td>
<td>b. Place the heel of the second hand on the dorsal aspect of the cast.</td>
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<td></td>
<td>c. Squeeze the heels of each hand together</td>
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<td></td>
<td>d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.</td>
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<tr>
<td></td>
<td><strong>CAUTION:</strong> Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g., How do you feel?, Is the pressure too much?)</td>
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<tr>
<td></td>
<td>e. Maintain patient's elbow in correct position.</td>
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<td></td>
<td>f. Remove heels from cast when contours of the wrist and forearm have been shaped and the cast is cured.</td>
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<td></td>
<td><strong>NOTE:</strong> All casts require a mold. Crooked casts equal straight bones.</td>
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<tr>
<td>23.</td>
<td>Mold the cast material to upper arm.</td>
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<td></td>
<td><strong>NOTE:</strong> The bicipital mold is used to prevent movement of the elbow.</td>
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<tr>
<td></td>
<td>a. Place the palm of one hand on the biceps muscle.</td>
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<td></td>
<td>b. Place the palm of the 2nd hand on the triceps muscle.</td>
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<td></td>
<td>c. Press palms together and conform the plaster/fiberglass to the upper arm (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.</td>
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<tr>
<td>24.</td>
<td>Check range of motion (ROM) of wrist, phalanges and thumb.</td>
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<td></td>
<td>a. Have patient rotate wrist.</td>
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<td><strong>NOTE:</strong> Patient should have full ROM of the wrist.</td>
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<td></td>
<td>b. Have patient extend, flex fingers and touch thumb to all fingers.</td>
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<tr>
<td>25.</td>
<td>Apply 3rd and 4th plaster/fiberglass roll (repeat steps 18-19)</td>
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<tr>
<td>26.</td>
<td>Trim proximal and distal ends of cast.</td>
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<td></td>
<td>a. Cut the outside edge of the cast padding.</td>
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<td></td>
<td>b. Pull down the cast padding.</td>
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<td></td>
<td>c. Pull down the stockinette.</td>
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<td></td>
<td>d. Have patient rest injured arm on pillow to reduce muscle strain.</td>
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<td></td>
<td><strong>NOTE:</strong> Continue to trim as necessary.</td>
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<tr>
<td>27.</td>
<td>Check cast dimensions.</td>
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<td></td>
<td>a. The distal edge of the cast rests 1 inch proximal to the ulnar styloid.</td>
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<td></td>
<td>b. The proximal edge of the cast is 2 inches distal to the axilla region.</td>
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<td></td>
<td>c. Tape down edges of stockinette and webril.</td>
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<td></td>
<td><strong>NOTE:</strong> Adhesive tape or plaster remnants can be used to tack down the edges.</td>
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<tr>
<td>28.</td>
<td>Apply 5th roll of plaster/fiberglass (repeat steps 18-19).</td>
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<td></td>
<td><strong>NOTE:</strong> The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.</td>
</tr>
<tr>
<td>29.</td>
<td>Check patient's capillary refill.</td>
</tr>
<tr>
<td></td>
<td>a. Squeeze patient's fingers and nail beds will turn white</td>
</tr>
<tr>
<td></td>
<td>b. Release patient's fingers and nail beds will return pink</td>
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<tr>
<td></td>
<td><strong>CAUTION:</strong> If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.</td>
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<tr>
<td>30.</td>
<td>Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td></td>
<td><strong>NOTE:</strong> Use alcohol pads or fresh water from the faucet and not from the casting bucket.</td>
</tr>
</tbody>
</table>
Performance Steps

a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone numb. After duty hours instruct patient to report to the Emergency Room.
b. Present patient with cast care booklet ( or written instruction)
c. Instruct patient to extend, flex, and wiggle fingers (demonstrate for patient) to reduce swelling.
d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing on it, coloring)

32. Fit sling as needed.
NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. colles', smith's, bennett's), patient's comfort, physician's or technician's preference.

33. Annotate the procedure.
NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

34. Escort patient or direct family member to front desk to make a follow-up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
</tr>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Identified yourself to the patient.</td>
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<td></td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<td></td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<td></td>
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<tr>
<td>5. Checked patient's capillary refill.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
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<tr>
<td>9. Prepared plaster reinforcement splint for the posterior aspect of cast.</td>
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<tr>
<td>10. Applied stockinette to patient's injured arm.</td>
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<tr>
<td>11. Applied finger traps on patient's injured hand (if not used go to step 12)</td>
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<tr>
<td>12. Measured patient's injured wrist with goniometer.</td>
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<tr>
<td>14. Applied cast padding (webril) to patient's injured arm.</td>
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<tr>
<td>16. Placed fiberglass casting gloves on hands.</td>
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<tr>
<td>17. Opened fiberglass casting package.</td>
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<tr>
<td>18. Applied 1st plaster/fiberglass roll.</td>
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<tr>
<td>19. Laminated the cast.</td>
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<tr>
<td>20. Applied posterior reinforcement splint.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<td>-----------------------------------------------------------------------------------</td>
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<tr>
<td>22. Measured injured elbow w/ goniometer.</td>
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<tr>
<td>23. Molded the cast material to the forearm.</td>
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<tr>
<td>24. Molded the cast material to upper arm.</td>
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</tr>
<tr>
<td>25. Checked range of motion of wrist, phalanges and thumb.</td>
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<tr>
<td>26. Applied 3rd and 4th plaster/fiberglass roll( repeat steps 18-19 )</td>
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</tr>
<tr>
<td>27. Trimmed proximal and distal edges of cast to fit patient.</td>
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<tr>
<td>28. Checked cast dimensions.</td>
<td></td>
<td></td>
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<tr>
<td>30. Checked patient's capillary refill.</td>
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<tr>
<td>31. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>32. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>33. Fitted sling as needed.</td>
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<tr>
<td>34. Annotated the procedure in patient's medical record or SF 513.</td>
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<tr>
<td>35. Escorted patient to front desk to make a follow-up appointment.</td>
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</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**

- 0-443-04809-6
- 0812110-0765
- 0-8151-0910-5
- 0-8342-0763-X
- 38709590
- STP 8-91H14-SM-TG
- TM 8-231
- TM 8-640
Conditions: Given an orthopaedic patient requiring a Long Leg Cylinder Cast (LLCC) supine on an orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (4) rolls of 6 inch plaster, (4) rolls of 4 inch plaster, (2) rolls of 5 inch ortho flex, box of 5 x 30 inch plaster reinforcement sheets, (5) rolls of 4 or 5 inch fiberglass, (2) rolls of 3 inch webril, (3) rolls of 4 inch webril, (3) rolls of 6 inch webril, roll of (3, 4 or 6 inch) stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, adhesive applicators (tincture of benzoin or mastisol), (2) safety goggles, (3) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (3) hospital pads (chux), (2) bed sheets, pillow, (2) disposable paper shorts, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, thermometer, support bar, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, tube of surgical lubricant, orthopaedic bump, thigh holder, support bar and trash receptacle.

Standards: Is reached when the injured leg is immobilized by the cast 3 inches proximal to the medial malleolus to 4 inches distal to the groin (on the medial side), and flared 2 inches proximal to the greater trochanter on the lateral side. The knee is flexed between 0-15 degrees. The ankle and toes have full range of motion. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Identify yourself to patient.
   NOTE: Tell the patient your name and title.
3. Explain the procedure to the patient.
Performance Steps

3
LLCC
Performance Steps

3 LLCC

NOTE: The Long Leg Cylinder Cast (LLCC) is applied 2 inches proximal to the greater trochanter (on the lateral side), 4 inches distal from the groin on the medial side, and 3 inches proximal to the medial malleolus, with the knee flexed between 0-15 degrees. (Refer to Figure 3-x)

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn’t cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

Note: The LLCC has a high incidence of slipping after two -three days after application. Therefore, the technician may prefer to use an adhesive applicator to reduce cast slippage. Tincture of benzoin should be applied to the injured leg prior to webri application. It is the technician preference to use tincture of benzoin or stockinette.

4. Inspect injured leg/ankle with patient supine on the examination bed.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place the patient supine on the examination bed.
   c. Remove patient's shoes and socks from both feet.
   d. Remove patient's pants.
Performance Steps
NOTE: Provide patient with paper shorts. If unavailable, cut the pants at the seam.

NOTE: Secure patient's clothing in NCOIC's office, until casting is completed.
   e. Place hospital pad or bed sheet on patient's lap.
NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and protect their privacy.
   f. Check patient's injured leg for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
NOTE: Inform physician if conditions are present and follow physician's order.
   g. Examine both legs for jewelry and remove if found.
NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, thigh holder, support bar, orthopaedic bump, goniometer, scissors, thermometer and bucket of tepid water w/plastic bag. Place on work cart or station.
CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads, benzoin swabs and damp wash towel. Open and remove (5) plaster rolls from their packages and place on work cart/station.
NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare medial/ lateral plaster reinforcement splints.
NOTE: When using plaster reinforcement splints on a lower extremity cast the reinforcement splint is 5 thickness.
   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edges of two stacks and remove from package. Place on work cart/station.
NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets.
   b. Measure on the medial and lateral aspect of the leg, 4 inches distal to the groin crossing over the knee to the calf muscle.
NOTE: If 5 x 30 plaster sheets are not long enough, plaster rolls can be used. It is the technician preference.
   c. Place stacks of (5) plaster sheets next to the measured lengths, cut off excess amount and place on work cart/station.
NOTE: Discard all excess material in the trash receptacle.

9. Apply skin adherent to injured leg.
NOTE: Tincture of benzoin/mastisol is used to prevent the cast from slipping.
   a. Ask patient if they have ever had a skin rash after the use of benzoin or after eating shell fish.
Performance Steps
NOTE: If patient is unable to answer, ask family member. If family member is not present use a substitute application (e.g., mastisol).
   b. If no known allergies exists apply tincture of benzoin on the medial/lateral aspect of the injured leg beginning four inches distal to the groin and ending one inch above the malleolus (ankle)
   c. If known allergies exists apply mastisol as in step 9 b.

10. Measure patient’s injured knee w/ goniometer.
NOTE: All LLCC are applied with knee between 0-15 degrees of flexion, unless otherwise indicated by physician’s order.
   a. Position the patient's injured knee between 0-15 degrees of flexion.
NOTE: There are several ways to obtain 0-15 degrees of flexion. The patient could maintain the position, nursing personnel or family member can assist, a thigh stand or orthopaedic bump could also be used. It is the technician preference.
   b. Place the stationary arm of the goniometer parallel to the fibula.
   c. Place the moving arm of the goniometer in line with the lateral edge of the femur.
   d. Place the protractor of the goniometer on the lateral aspect of the knee.
   e. Set the knee until the goniometer measures between 0-15 degrees flexion.

11. Apply cast padding (webril).
CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers
   a. Hold webril with one hand.
   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index, middle finger and thumb.
   c. Place the edge of the webril proximal to the tibia/fibula and begin wrapping around the above malleolus two rotations.
NOTE: The webril application is started 2 inches proximal of the tibia/fibula (ankle) to provide an anchor and extra padding to the malleolus.
CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient’s foot.

CAUTION: The peroneal nerve is located on the lateral side of the leg. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Locate the fibula notch/ head and apply extra padding.
   d. Continue wrapping the padding up the leg.
   e. Wrap a figure of eight around the knee and continue past the greater trochanter.
   f. Hold the padding diagonal to the thigh and wrap 4 inches distal to the groin and end 3 inches proximal to the greater trochanter.
NOTE: The cast padding can be ripped or layered to insure the greater trochanter is covered.
   g. With each turn overlap the webril by 1/2 -1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding. To reduce possible constrictive edema caused by applying webril too tight, keep the webril on the extremity as it is applied.
NOTE: Extra padding in the form of felt, or adhesive padding can be place 1 inch proximal to the ankle and groin area for extra protection.

   a. If using plaster rolls, go to step 15.
NOTE: The technician may need to use more than one roll per application. If more than one roll is needed, the technician should start where the last roll ended.
   b. If using fiberglass rolls, go to step 13 and 14.

13. Place fiberglass casting gloves on hands.
Performance Steps

CAUTION: To prevent chemical burns to the hands it is mandatory for the technician to use fiberglass casting gloves.

14. Open fiberglass casting package and go to step 15.

NOTE: Open one fiberglass package at a time. As fiberglass comes in contact with the air, the roll will start to cure (set up).

15. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.
   a. Hold plaster/fiberglass roll with one hand.
   b. With opposite hand unroll the plaster/fiberglass 1/2 -1 inch and grasp the edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.
   c. Place plaster/fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.
   d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.
   e. Place the edge of the casting material 1/2 inch distal to the webril and begin wrapping above the malleolus two rotations.
   f. Wrap a figure of eight around the knee.

NOTE: The cast medial edge is 4 inches distal to the groin, with the cast lateral edge 2 inches proximal to the greater trochanter.
   g. Continue wrapping the casting material up the leg.

NOTE: The cast material can be fan folded to obtain a distance of 4 inches distal to the groin and 2 inches proximal to the greater trochanter.
   h. Place the roll diagonally to the cast and continue wrapping the cast material ending 1/2 inch from the proximal edge of the webril.

NOTE: Patient positioning may need to be adjusted. Assistance is authorized.
   i. With each turn overlap the plaster/fiberglass by 1/4 -1/2 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present evenly applied casting material. To reduce possible constrictive edema caused by applying the plaster/fiberglass too tight, keep the plaster/fiberglass roll on the extremity as it is applied.

16. Laminate the casting materials.
   a. Place palm of each hand on the cast.

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure or hot spots developing under the cast, the cast must be removed immediately.
   b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material assist it providing strength to the cast.
   c. Continue rubbing the plaster cast until the tone/texture changes from a glossy/creamy color to a dull white color. If using fiberglass continue to laminate until the cast begins to cure.

17. Apply reinforcement splints to knee.

NOTE: Plaster reinforcement splint is used to strength and support the cast.
   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water..
   b. Squeeze the splint together to eliminate excess water.
   c. Place 1st reinforcement splint (figure of eight) at the proximal edge of the cast on the lateral side crossing over the knee and resting on the gastrocnemius muscle.

NOTE: The splint can also be placed on the medial or lateral sides of the cast.
   d. Place 2nd reinforcement splint at the proximal edge of the cast the medial side crossing over the knee and resting on the gastrocnemius muscle.
   e. Laminate the splint to the cast.
Performance Steps

18. Apply 2nd plaster/fiberglass roll (repeat steps 15-16).

19. Mold casting material to leg.
   a. The femoral mold
      (1) Place the lateral aspect of the thumbs above the femoral head apply pressure. Hold until contours take shape.
   b. The tibia mold (triangle mold)
      (1) Place lateral aspect of the thumbs on either side of the tibia, apply pressure and follow the contour of the tibia proximal and distal.
   c. The gastrocnemius mold (flat mold).
      (1) Place the palm of your hand on the gastrocnemius and follow the contour of the muscle.
   d. The soleus mold.
      (1) Place the heels of the hand on each side of the soleus and apply pressure.
   e. The quadriceps muscle and greater trochanter molds.
      (1) Place the palm of one hand on the lateral side of the quadriceps muscle.
      (2) Place the palm of opposite hand on the medial side of the quadriceps muscle and apply pressure. Hold until contours take shape.
      (3) Place the palm of one hand on the anterior side of the quadriceps muscle.
      (4) Place the palm of one hand on the posterior side of the quadriceps muscle.
      (5) Place the palm of one hand on the lateral side of the greater trochanter, and conform the plaster.

NOTE: All molds are ongoing and may take several minutes. Continue to laminate and mold until cast is cured.

20. Check range of motion (ROM) of ankle and phalanges.
   a. Have patient extend and flex ankle.
   b. Have patient extend, flex toes.

21. Measure injured knee with goniometer.
   a. Place the stationary arm of the goniometer horizontally, bisecting the middle of the femur.
   b. Place the moving arm of the goniometer horizontally, bisecting the lateral aspect of the fibula.
   c. Place the protractor of the goniometer on the lateral aspect of the knee.
   d. The knee should measure between 0-15 degrees of flexion.

NOTE: If knee is not at 0-15 degrees of flexion (or physician's order), remove cast and go to step 10.

22. Apply 3rd, 4th plaster/fiberglass roll (repeat steps 17-18).

23. Check cast dimensions.
   a. Pull down the stockinette.
   b. Have patient flex and extend ankle.
   c. Trim as necessary.
   d. Tape down edges of stockinette.


NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

25. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

26. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.

NOTE: Use alcohol pads or fresh water from the faucet and not from the casting bucket.
Performance Steps

27. Administer a crutch ambulation treatment. (See Task Number 081-836-0041)

28. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep leg elevated and flex and extend foot and toes to increase circulation in the foot.
   d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).
   e. Instruct patient to use crutches and not to place any pressure on the cast for 24-48 hrs.

29. Annotate the procedure applied to patient in medical record or SF 513.
   NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

30. Escort patient or family member to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Identified yourself to patient.</td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspect injured leg/ankle with patient supine on the examination bed.</td>
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<tr>
<td>5. Checked patient's capillary refill.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<td>7. Assembled materials.</td>
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<tr>
<td>8. Prepare medial/lateral plaster reinforcement splints.</td>
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<tr>
<td>9. Applied skin adherent to injured leg.</td>
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<tr>
<td>10. Measured patient's injured knee w/ goniometer.</td>
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<tr>
<td>11. Applied cast padding (webril).</td>
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<tr>
<td>13. Placed fiberglass casting gloves on hands.</td>
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<tr>
<td>14. Opened fiberglass casting package and go to step 15</td>
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<tr>
<td>15. Applied 1st plaster/fiberglass roll.</td>
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<tr>
<td>16. Laminated the casting materials.</td>
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<tr>
<td>17. Applied plaster splints to medial and lateral aspect of cast.</td>
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<tr>
<td>18. Applied 2nd plaster/fiberglass roll.</td>
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<tr>
<td>19. Molded the cast material to the leg.</td>
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<tr>
<td>20. Checked range of motion (ROM) of ankle.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<tr>
<td>22. Applied 3rd and 4th plaster/fiberglass roll.</td>
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<tr>
<td>23. Checked cast dimensions.</td>
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<tr>
<td>25. Checked patient's capillary refill.</td>
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<tr>
<td>26. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>27. Administered a crutch ambulation treatment.(See Task Number 081-836-0041)</td>
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<tr>
<td>28. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>29. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>30. Escorted patient to front desk to make a follow up appointment.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

| Required                           | Related                                                        |
|------------------------------------|                                                               |
| 0812110-0765                       | 0-8151-0910-5                                                 |
| 0-8342-0763-X                      | 38709590                                                       |
| BLAUVELT, CAROLYN T.               | BLAUVELT, CAROLYN T.                                          |
| THROUGH SELF-INSTRUCTION           | THROUGH SELF-INSTRUCTION                                      |
| TM 8-231                           | TM 8-231                                                       |
| TM 8-640                           | TM 8-640                                                       |
 Conditions: Given an orthopaedic patient requiring a Short Leg Cast (SLC) sitting or supine on an orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (3) rolls of 6 inch plaster, (5) rolls of 4 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 4 or 5 inch fiberglass, (2) rolls of 4 inch webril, (2) rolls of 3 inch webril, roll of 3 or 4 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, (2) safety goggles, (2) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (2) hospital pads(chux), (2) bed sheets, pillow, disposable paper shorts or hospital scrubs, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, thermometer, support bar, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, tube of surgical lubricant, orthopaedic bump, T(Turnstile) stand, thigh holder, 1 pr of crutches, cast shoe and trash receptacle.

Standards: Is reached when the injured leg and ankle are immobilized by the cast from the web spacing of the toes to 3 inches distal to the popliteal space (bend of the knee). The ankle is in neutral position (90 degrees of dorsiflexion) absent of inversion or eversion with toes having full range of motion. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).

2. Identify yourself to patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
NOTE: The Short Leg Cast is applied from the web spacing of the toes to 3 inches distal to the popliteal region (bend of knee) with the ankle in neutral position (90 degrees dorsiflexion). The knee and toes will have full range of motion. (Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's injured leg/ankle.
   a. Place examination gloves on hands.
Performance Steps

4a

Inspect patient's injured leg with examination gloves on

CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients. (Refer to Figure 3-x).

b. Remove patient's shoes and socks from both feet. Roll pants up above the knee.
NOTE: If patient is unable to get pant leg easily above knee, provide patient with paper shorts or hospital scrubs. If unavailable, cut the pants at the seam.
c. Place patient in supine position on the examination bed.
d. Check patient's injured leg for any skin conditions (e.g., cuts, abrasions, lacerations and skin rashes).
NOTE: Inform physician if conditions are present and follow physician's order.
e. Examine both legs for jewelry and remove if found.
NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.

a. Squeeze patient's toes and nail beds will turn white.
b. Release patient's toes and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, T stand, thigh holder, support bar, orthopaedic bump, goniometer, scissors, thermometer and bucket of tepid water w/plastic bag. Place on work cart or station.
Performance Steps

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads and damp towel. Open and remove (5) plaster rolls from their packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and protect their privacy.

b. Measure from 2 inches distal to the popliteal space, to 1 inch distal to the toes for stockinette length. (Refer to Figure 3-x).
Performance Steps

**8b**

Webril can be used to measure the length needed for the stockinette

**NOTE:** For proper measurement of the stockinette, the patient's ankle must be at a 90 degree ankle.

**NOTE:** Measurements are taken on the uninjured leg to prevent further pain to the patient's inured leg.

**NOTE:** Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

  c. Pull down stockinette from stockinette container and cut measured length.

  d. Roll stockinette leaving a 1-2 inch cuff at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the posterior aspect of the cast.

**NOTE:** The plaster reinforcement splint will be prepared for the posterior side of the injured leg/ankle.

  a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of one stack and remove from package. Place on work cart/station.

**NOTE:** 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets.

  b. Measure from 3 inches distal to the popliteal space (or 1 finger width from the fibula notch/head) to the web spacing of the toes.

**CAUTION:** The peroneal nerve is located on the lateral side of the leg. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Locate the fibula notch/ head and measure 1 finger breath width below to prevent this condition.
Performance Steps
  c. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.
NOTE: Discard excessive material in the trash receptacle.

10. Apply stockinette to patient's injured leg. (figure 3-x)

Stockinette is optional - When applied rolled it on

  a. Position the patient's injured ankle at a 90 degree angle to the tibia.
NOTE: There are several ways to obtain a 90 degree angle. The patient could maintain the position, nursing personnel or family member can assist, a T stand, or thigh holder could be used, or the patient could be placed in the prone position. It is the technician preference.
  b. Hold open sides of the stockinette.
  c. Instruct patient to place injured foot in the opening.
  d. Roll stockinette on injured ankle/leg from 1 inch distal to the toes to 2 inches proximal to the knee.
NOTE: The patient may assist in rolling up the stockinette past the knee.
  e. Pinch the stockinette at the base of the tibia/fibula and cut a 45 degree angle.
NOTE: Cutting the stockinette reduces the chance of pressure sores developing from the stockinette rubbing or bunching up under the cast.

11. Measure patient's injured ankle w/ goniometer. (Refer to Figure 3-x).
Performance Steps

11. Place the injured ankle in neutral position

NOTE: All short leg walking casts (SLWC) are applied in neutral position (90 degrees dorsiflexion) absent of inversion and eversion, unless otherwise indicated by physician.
   a. Place thigh stand under patient's leg (hamstring region)
   CAUTION: Depending on the orthopaedic device used, the toes and foot may lose blood flow. Always communicate with the patient and remove device if patient complains toes are falling asleep or technician observes color change in the foot.
   b. Place foot and ankle in neutral position.
   NOTE: To assist the patient in maintaining a 90 degree angle, have the patient bend the knee and flex the toes. The technician may use their own style to assist patient.
   c. Place the stationary arm of the goniometer so that it bisects the fibula.
   d. Place the moving arm of the goniometer so that it bisects the head of the fifth metatarsal.
   e. Place the protractor of the goniometer on the lateral malleolus.
   f. Set the ankle until the goniometer measures 90 degrees of dorsiflexion.
   NOTE: Have patient simulate squashing a bug with the heel of their foot. This will assist in maintaining the ankle at a 90 degree angle.

12. Apply cast padding (webril)(Figure 3-x).
Performance Steps

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers
a. Hold webril with hand.
   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index, middle finger and thumb.
   c. Place the edge of the webril at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

NOTE: The technician may also start 1 inch distal to the edge of the stockinette.

NOTE: The webril application is started at the distal aspect of the tibia/fibula to provide an anchor and extra padding to the malleolus.
   d. Continue up the foot ending 1/2 inch distal to the edge of the stockinette.(Refer to Figure 3-x).
Performance Steps

12d
Application of webril to injured leg
Performance Steps

12e
Evenly spaced and wrinkled free webril

e. With each turn overlap the webril by 1/2 - 1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding. To reduce possible constrictive edema caused by applying webril too tight, keep the webril on the extremity as it is applied. (Refer to Figure 3-x)

   a. If using plaster rolls, go to step 16
   b. If using fiberglass rolls, go to steps 14 and 15.

14. Place fiberglass casting gloves on hands.
   CAUTION: To prevent chemical burns to the hands it is mandatory for the technician to use fiberglass casting gloves

15. Open fiberglass casting package and go to step 16
   NOTE: Open one fiberglass package at a time. As fiberglass comes in contact with the air, the roll will start to cure (set up ).

16. Apply 1st plaster/fiberglass roll.
   NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.

   a. Hold plaster/fiberglass roll with one hand.
Performance Steps
   b. With opposite hand unroll the plaster/fiberglass 1/2 -1 inch and grasp the edge with thumb, index and middle fingers.
   NOTE: Placing the thumb under the forward edge of the roll can also be used.
   c. Place plaster/fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.
   CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.
   d. Squeeze the roll together (do not wring the roll).
   NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.
   e. Place the edge of the casting material at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

NOTE: The technician may also start 1 inch distal to the edge of the webril. (Refer to Figure 3-x)

f. Continue down the foot ending 1/2 inch distal edge to the webril, back up the leg ending 1/2 inch from the proximal edge of the webril. (Refer to Figure 3-x).
Performance Steps

16f
Apply casting material distal to proximal

g. With each turn overlap the plaster/fiberglass by \( \frac{1}{4} - \frac{1}{2} \) the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present evenly applied casting material. (Refer to Figure 3-x).
NOTE: To reduce possible constrictive edema caused by applying the plaster/fiberglass too tight, keep the plaster/fiberglass roll on the extremity as it is applied.

17. Laminate the casting materials.
   a. Place palm of each hand on the cast.
   CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.
   b. Rub the cast material in the direction it was applied.
   NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.
   c. Continue rubbing the plaster cast until the tone/texture changes from a glossy/creamy color to a dull white color. If using fiberglass continue to laminate until the cast begins to cure.

18. Apply plaster reinforcement splint to posterior aspect of cast.(figure 3-x)
Performance Steps

18. Application of posterior splint

NOTE: Plaster reinforcement splint is used to strengthen and support the cast.

a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
b. Squeeze the splint together to eliminate excess water.
c. Place reinforcement splint to the posterior side of the cast in line with the web spacing of the foot and below the tibial tuberosity and laminate the splint to the cast.

NOTE: Rub with volar aspect of fingers or palm of hands and ensure that the pores on the splint are filled in and no longer visible.

d. Maintain patient’s ankle at 90 degree dorsiflexion until splint adheres to cast material.

NOTE: Instruct the patient to squash a bug with their heal of their foot or bring their toes to their nose. Either technique will assist the patient in bringing their ankle to a 90 degree angle. The technician may have their own preference to the above techniques.

19. Apply 2nd plaster/fiberglass roll (repeat steps 16-17).

20. Mold the cast material to the lower leg.

a. Place palm of hand on the gastrocnemius muscle and apply pressure. Hold until contours take shape. (Refer to Figure 3-x).
Performance Steps

20a
Gastrocnemius mold

NOTE: A flat board can also be used to mold to the gastrocnemius muscle.

b. Place lateral aspect of both thumbs (forming a triangle) on the tibia and apply even pressure up/down the tibia. Hold until contours take shape. (figure 3-x)
Performance Steps

20b
Triangle mold

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)

c. Place palm of hand on the plantar arch and apply pressure. Hold until contour takes shape (Refer to Figure 3-x).
Performance Steps

20c
Plantar arch mold

d. Place lateral aspect of both thumbs on the malleolus and apply even pressure. Hold until contours take shape. (Refer to Figure 3-x)
Performance Steps

20d
Malleolus mold

e. Place palm of hand on calcaneus and apply pressure. Hold until contour takes shape. (Refer to Figure 3-x).
Performance Steps

20e
Calcaneus mold

f. Place index finger and thumb on achilles and apply even pressure. Hold until contour takes shape. (Refer to Figure 3-x).
Performance Steps

20f
Achilles mold

g. Remove hands from the cast when contours of the malleolus, tibia, calcaneus, achilles and arch have been shaped and the cast is cured.
NOTE: All casts require a mold. Crooked casts equal straight.

21. Check range of motion (ROM) of phalanges.
   a. Have patient extend, flex toes.
   b. Cut the webril at the distal, proximal edges and at the base of the 5th metatarsophalangeal joint (MTPJ)
CAUTION: The finished edge of the cast should end proximal to the base of the fifth MTPJ to avoid nerve impingement.
   c. Fold and tack down the webril and stockinette.

22. Check alignment of injured ankle with goniometer.(figure 3-x)
Performance Steps

22

Use of goniometer

a. Place the stationary arm of the goniometer so that it bisects the fibula.
b. Place the moving arm of the goniometer so that it bisects the 5th MTPJ.
c. Place the protractor of the goniometer on the lateral malleolus.
d. The goniometer should measure 90 degrees of dorsiflexion.

NOTE: If the malleolus is not at 90 degrees of dorsiflexion, everted or inverted remove cast and return to step 10.

23. Apply 3rd plaster/fiberglass roll (repeat steps 16-17).

24. Check cast dimensions.
   a. The distal edge of the cast rests on the web spacing of the foot. (figure 3-x)
Performance Steps

24c
Cast edge rests at the web spacing

b. The 5th metatarsal is visible and has full range of motion.

NOTE: Continue to trim the cast if the 5th metatarsal is not observed.

c. The proximal cast edge rests one inch below the fibula head/notch or 3 inches distal to the popliteal space. (Refer to Figure 3-x).
Performance Steps

24c
Cast edge is 3 inches distal to the popliteal space

25. Apply 4th roll of plaster/fiberglass (repeat steps 16-17).
NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

27. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

28. Apply a cast shoe.

29. Administer a crutch ambulation treatment (see task number 081-836-0041).

30. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
**Performance Steps**

- c. Instruct patient to keep leg elevated and flex and extend toes to increase circulation in the foot.
- d. Instruct patient not to stick any objects down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).
- e. Instruct patient to use crutches and not to place any pressure on the cast for 24-48 hrs.

**Performance Measures**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>GO</th>
<th>NO GO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Received the order from the physician (reviewed if in writing).</td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>Identified yourself to patient.</td>
<td></td>
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<tr>
<td>3.</td>
<td>Explained the procedure to the patient.</td>
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<tr>
<td>4.</td>
<td>Inspected patient’s injured leg/ankle.</td>
<td></td>
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<tr>
<td>5.</td>
<td>Checked patient’s capillary refill.</td>
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<tr>
<td>6.</td>
<td>Gathered equipment.</td>
<td></td>
<td></td>
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<tr>
<td>7.</td>
<td>Assembled materials.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Prepared plaster reinforcement splint for the posterior aspect of the cast.</td>
<td></td>
<td></td>
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<tr>
<td>10.</td>
<td>Applied stockinette to patient’s injured leg.</td>
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<tr>
<td>11.</td>
<td>Measured patient’s injured ankle w/goniometer.</td>
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<tr>
<td>14.</td>
<td>Placed fiberglass casting gloves on hands.</td>
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</tr>
<tr>
<td>15.</td>
<td>Opened fiberglass casting package and go to step 16.</td>
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</tr>
<tr>
<td>17.</td>
<td>Laminated the casting materials.</td>
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<tr>
<td>18.</td>
<td>Applied plaster reinforcement splint to posterior aspect of cast.</td>
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<tr>
<td>19.</td>
<td>Applied 2nd plaster/fiberglass roll repeat steps (16-17).</td>
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<tr>
<td>20.</td>
<td>Molded the cast material to the lower leg.</td>
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<tr>
<td>21.</td>
<td>Checked range of motion (ROM) of phalanges.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Checked alignment of injured ankle with goniometer.</td>
<td></td>
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<tr>
<td>23.</td>
<td>Applied 3rd plaster/fiberglass roll (repeat steps 16-17).</td>
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<tr>
<td>24.</td>
<td>Checked cast dimensions.</td>
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<tr>
<td>25.</td>
<td>Applied 4th roll of plaster/fiberglass (repeat steps 16-17).</td>
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</tbody>
</table>

31. Annotate the procedure applied to patient in medical record or SF 513.

**NOTE:** Record the procedure applied and cast care instruction provided to the patient in the patient’s medical record or Standard Form 513 and sign your name.

32. Escort patient or family member to front desk to make a follow up appointment.
<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
</tr>
</thead>
<tbody>
<tr>
<td>26. Checked patient's capillary refill.</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>27. Cleaned plaster resin off patient's skin using a damp cloth, towel or alcohol pad.</td>
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<td>——</td>
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<tr>
<td>28. Applied a cast shoe.</td>
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<td>——</td>
</tr>
<tr>
<td>29. Administered a crutch ambulation treatment (see task number 081-836-0041).</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>30. Gave patient verbal and written instructions on cast care.</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>31. Annotated the procedure applied to patient in medical record or SF 513.</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>32. Escorted patient to front desk to make a follow up appointment.</td>
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</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**

- 0812110-0765
- 0-8151-0910-5
- 0-8342-0763-X
- 38709590
- BLAUVELT, CAROLYN T.
- STP 8-91H14-SM-TG
- THROUGH SELF-INSTRUCTION
- TM 8-231
- TM 8-640
APPLY A MINERVA JACKET
081-834-0023

Conditions: Given an orthopaedic patient requiring a Minerva Jacket sitting on an orthopaedic examination bed, fracture table or standing grasping an overhead horizontal support bar stand, nursing personnel, family member, physician, physician’s verbal or written order, patient’s medical record, or Standard Form 513(consultation form), pen, grease pencil, work cart/station, (5) rolls of 6 inch plaster, (5) rolls of 4 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (7) rolls of 4 or 5 inch fiberglass, (5) rolls of 4 inch webril, (4) rolls of 3 inch webril, disposable hospital gown, disposable paper shorts, roll of 6, 10 or 12 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, (2) safety goggles, (2) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (5-10) hospital pads(chux), (2-4) bed sheets, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, (3) felt pads or equivalent, thermometer, cast care booklet or equivalent, box of alcohol pads, (2) damp wash cloths, (2) hand towels, sink w/ faucet, tube of surgical lubricant and trash receptacle.

Standards: Is reached when the upper torso and head are immobilized from the symphysis pubis to the chin anteriorly, across the forehead with ears, eyes and mouth left free, and from the coccyx to the upper border of the occipital lobe posteriorly. The head has restricted movement with the arms and hands having full range of motion. The patient can sit comfortably, breath freely and digestion is unrestricted. The capillary refill test is administrated to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).

2. Identify yourself to patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   NOTE: The Minerva Jacket extends from the symphysis pubis to the chin anteriorly and from the coccyx to the upper border of the occipital region posteriorly. A band of casting material is carried from the occipital region across the forehead anteriorly, with the ears and mouth left free.

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn’t cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient’s injured torso.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient behind privacy curtain.
   c. Give patient disposable paper shorts and gown.
   CAUTION: The same gender chaperone should always be present to assist female patients in removal of clothing.
   d. Instruct patient to remove all clothing and put on shorts and gown.
   e. Check patient’s upper torso for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician’s order.
   f. Examine both legs and arms for jewelry and remove if found.
   NOTE: All jewelry must be removed. Give jewelry and clothing to family member or secure with patient’s belongings in NCOIC office.

5. Check patient’s capillary refill.
Performance Steps

a. Squeeze patient's fingers and nail beds will turn white.
b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, standing bar set, fracture table, goniometer, scissors, thermometer and bucket of tepid water w/ bag and place on work cart or station. Place standing bar or fracture next to examination bed.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include felt pads, stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, towel, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads and damp towel. Open and remove (6) plaster rolls from their packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. With the patient standing erect or supine on the fracture table, measure from the head to 2 inches distal to the iliac crests for stockinette length.

Note: Instruments of measurements may vary (e.g. tape measure, ruler, plaster sheet, or webril).

b. Pull down stockinette from stockinette container and cut 1-2 inches past the measured length.

c. Roll stockinette leaving 1-2 inch border at the distal edge. Place on work cart/station for later use.

9. Prepare 9 plaster reinforcement splints for the upper and lower cast.

a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edges of ten stacks and remove from package. Place on work cart/station.

NOTE: 5 x 30 inch plaster sheets are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets.

b. Measure length of both anterior iliac crests.

c. Measure each shoulder from base of scapula to pectoralis muscle.

d. Measure circumferential around the forehead.

e. Measure from the chin down the anterior surface of the neck to the upper abdominal region.

f. Measure from the occipital region posterior to mid back.

g. Measure length of sacrococcygeal region.

h. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.

NOTE: Discard excess material in the trash receptacle.


NOTE: Orthopaedic felt pads are used to reduce chafing at distal and proximal edges of cast.

a. Measure length of both anterior iliac crests.

b. Measure length of sacrococcygeal region.

c. Place orthopaedic felt next to the measured lengths, cut off excess amount and place on work cart/station.

NOTE: Discard excess material in the trash receptacle.

11. Apply stockinette to patient's upper torso.
Performance Steps

a. Place bed sheets on floor and have patient stand on sheets.

NOTE: Bed sheets are used to keep the floor clean during the casting process.

b. Have patient remove gown.

CAUTION: Always use the same gender chaperone when patient's are disrobing.

c. Hold open sides of the stockinette.

d. Place the stockinette on patient.

NOTE: The patient can either step into the stockinette and pull it on, or have patient place arms above head and pull stockinette down.

e. Pinch the stockinette at the base of the shoulder and cut the stockinette at a 45 degree angle.

f. Have patient place arms through the pre cut hole and adjust stockinette.

g. Cut the stockinette for eyes, nose and mouth openings.

NOTE: Stockinette should be 1-2 inches superior to the head and 3 inches distal to the iliac crests.

12. Measure patient's spine with goniometer.

NOTE: All body casts are applied absent of flexion or extension unless directed by physician's order.

a. Have patient stand erect.

NOTE: Family members, nursing staff, orthopaedic technician or support bar may be used to assist in positioning the patient.

b. Place the stationary arm of the goniometer vertical, bisecting the oblique muscles.

c. Place the moving arm of the goniometer vertical, bisecting the lateral side of the femur.

d. Place the protractor of the goniometer on the iliac crest,

e. Set spine until the goniometer measures 0 or 180 degrees.

NOTE: Physician will determine the flexion/extension needed.

13. Place folded towel over the area of the diaphragm and have technician or patient hold in place until secured by the webril.

CAUTION: A small folded towel is placed over the diaphragm and top of the stomach for a later cutaway of the area which will provide for breathing and digestion.

14. Apply cast padding (webril) to patient's head and upper torso.

a. Hold webril with one hand.

b. Unroll the webril 1/2 - 1 inch with second hand and grasp edge with index and middle finger.

c. Wrap the webril around the forehead and chin.

d. Cut away webril at eyes, nose and mouth.

e. Wrap the webril from the upper axillary level to below the greater trochanter.

f. Apply 4 strips of webril over each shoulder from mid scapula to mid pectoralis muscle.

g. Overlap the webril by 1/2-1/4 the previous wrap.

NOTE: The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

15. Apply felt padding to the anterior superior iliac spine, forehead, chin and ears.

NOTE: The felt pads can be applied horizontal or vertical on the iliac crests, spine and are used to reduce chaffing of the skin.


a. If using fiberglass casting materials go to step 17, 18 and 19

b. If using plaster casting materials go to step 19.

17. Place fiberglass casting gloves on hands.

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns when applying a fiberglass cast.

NOTE: Tube of surgical lubricant can be used to keep the gloves from adhering to fiberglass casting material.

18. Open fiberglass casting package and go to step 19.
Performance Steps
NOTE: One fiberglass package should be opened at a time, because fiberglass will start to cure and harden with air contact.

19. Apply 1st and 2nd plaster/fiberglass roll.
NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.
   a. Hold plaster or fiberglass roll vertically.
   b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.
   c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.
   CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots affect the integrity of the cast.
   d. Squeeze the roll together (do not wring the roll).
   NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll.
   e. Wrap the cast material around the neck, chin, mandible and postauricular and occipital regions of the skull and to the frontal region of the head across the temporal area to the upper occipital and posterior parietal regions.
   Caution: At no time is the casting material encasing the patient's mouth, nose or eyes.
   f. Wrap the casting material in a figure-eight manner around the shoulders
g. Continue to wrap casting material to the level of the greater trochanters.
NOTE: More than one roll may be used initially.

NOTE: The weight of the body jacket should rest on the iliac crests

20. Laminate the casting material.
   a. Place palm of each hand on the cast.
   CAUTION: To reduce cast indentations, which can cause pressure sores to the patient's skin under the cast, keep finger tips off the cast during the application and molding process.
   CAUTION: The patient must be asked throughout the casting process if they feel pressure sores or hot spots developing under the cast. hot spots are areas within the cast that continue to stay warm and may even progress to hot. If sores or hot spots are developing the cast must be removed immediately.
   b. Rub the cast material in the direction it was applied.
   NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.
   c. Conform the casting material to the body contours.
   d. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.
NOTE: The dull white color represents the cast beginning to cure.

21. Apply reinforcement splints to the cast.
NOTE: The reinforcement splints are used to strengthen and support the cast.

NOTE: The splints are applied vertical, horizontal or by physician's order.
   a. Place each splint individually in tepid water, wait for bubbles to subside and remove from water.
   b. Squeeze each splint together to remove excess water.
   c. Place one reinforcement splint over each shoulder from the mid scapula to the pectoralis muscle.
   d. Place one reinforcement splint from the base of the chin down the anterior surface of the neck to the upper abdominal region.
   e. Place one reinforcement splint circumferential around the frontal region of the head.
f. Place two reinforcement splints to the posterior aspect of the head beginning above the occipital region and ending mid scapula region.
Performance Steps

g. Place two to three reinforcement splints to the posterior (sacral area), medial and lateral (oblique muscle region).
h. Laminate splints to casting material.

22. Apply 3rd and 4th plaster/fiberglass rolls (repeat steps 19-20)

23. Mold the cast.
   a. Place heels of each hand on iliac crests, apply firm pressure.
   b. Remove hands from cast when contours of the iliac crests have been shaped and cast is cured.
   c. Apply firm and gradual pressure beginning above the axilla and progress down the torso.
   CAUTION: Excessive pressure may result in further patient injury. Talk to the patient during this procedure (e.g. How do they feel?, Is the pressure too much?)
   d. Remove hands from cast when contours of the torso have been shaped to the body and cast is cured.

24. Trim cast to fit patient.
   CAUTION: Patients in the cast room are always offered and encourage to use hearing/eye protection. Technicians must wear hearing/eye protection when removing a cast.

NOTE: Patient's are under no obligation to wear hearing and eye protection, but are told of the consequences of not using hearing and eye protection.
   a. Draw and cut the lower trimming line:
   NOTE: The markings can be done by a pen, grease pencil etc.
   
Note: The cast saw along with scissors can be used to cut outlines.

   (1) Draw a curved line from the symphysis pubis arch upward, downward above the flexion crease of the hip joint to the greater trochanter.
   (2) The line is continued across the lower buttock region in a curved fashion to the sacrococcygeal junction and is connected to the opposite trimming line.
   (3) Draw a 4 inch circular outline at the diaphragm.
   (4) With the cast saw cut outlines, remove towel and place excess cast material in trash receptacle.
   (5) Fold webril and stockinette edges over the trimmed cast ends and secure with adhesive tape.
   b. Draw and cut the upper trimming line:

   (1) Draw the outline of the shoulder joint on the posterior and anterior of cast.
   (2) Draw an curved line from just below the occipital bone located on the posterior aspect of the head, behind the ears, parallel to the chin and connected to the opposite trimming line.
   (3) With the cast saw cut outlines, remove excess cast material.
   (4) Fold webril and stockinette edges over the trimmed cast ends and secure with adhesive tape.

25. Check range of motion (ROM) of shoulders and hips.
   a. Have patient sit in chair from a standing position.
   b. Have patient rotate shoulders.
   c. Have patient inhale and exhale to determine airway compliance.
   d. Have patient rotate hips.
   NOTE: If patient is unable to accomplish a-d trim the cast as needed.

26. Check cast dimensions.
   a. The distal aspect of the cast rests on the iliac crests.
   b. The frontal region of the forehead is immobilized.
   c. The casting material is well molded to chin.
   d. The lateral aspect of each scapula is visible.
   e. Each shoulder joint is visible.
Performance Steps

f. Each ear is visible.

27. Apply 5th and 6th plaster/fiberglass rolls ( repeat steps 19-20 )
NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

28. Check patient's capillary refill and airway.
   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink.
   c. Have patient speak.
CAUTION: If capillary refill is delayed for more than 2 seconds or patient is experiencing difficulty speaking inform physician and follow physician's instruction.

29. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

30. Give patient verbal and written instructions on cast care.
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast.
   b. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
   c. Provide patient with cast care booklet or equivalent.
   d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

31. Annotate the procedure applied to the patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to patient and sign your name.

32. Escort patient or direct patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Identified yourself to patient.</td>
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<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's injured torso.</td>
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<tr>
<td>5. Checked patient's capillary refill.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<td>7. Assembled materials</td>
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<tr>
<td>9. Prepared 10 plaster reinforcement splints for the upper and lower cast.</td>
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<tr>
<td>11. Applied stockinette to patient's upper torso.</td>
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<tr>
<td>12. Measured patient's spine with goniometer.</td>
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<tr>
<td>13. Placed folded towel over the area of the diaphragm.</td>
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<tr>
<td>14. Applied cast padding (webril) to patient's head and upper torso.</td>
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<tr>
<td>15. Applied felt padding to the anterior/superior iliac spine, forehead, chin and ears.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
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<tr>
<td>17. Placed fiberglass casting gloves on hands.</td>
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<tr>
<td>18. Opened fiberglass casting package.</td>
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<tr>
<td>19. Applied 1st and 2nd plaster/fiberglass roll.</td>
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<td>20. Laminated the casting material.</td>
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<tr>
<td>21. Applied reinforcement splints to the cast.</td>
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<tr>
<td>23. Molded the cast material to extremity.</td>
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<tr>
<td>24. Trimmed cast to fit patient.</td>
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<tr>
<td>25. Checked range of motion (ROM) of shoulders and hips.</td>
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<tr>
<td>27. Applied 5th and 6th plaster/fiberglass rolls</td>
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<tr>
<td>29. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>30. Annotated the procedure applied to the patient in medical record or SF 513.</td>
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<tr>
<td>31. Escorted patient or direct patient to front desk to make a follow up appointment.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO(NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**

- 0812110-0765
- 0-8151-0910-5
- 0-8342-0763-X
- 38709590
- TC 8-640
Conditions: Given an orthopaedic patient requiring a Body Jacket sitting on a orthopaedic examination bed with curtain or partition, nursing personnel, physician, chaperone, family member, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, orthopaedic fracture table, standing support bar, (5) rolls of 6 inch plaster, (5) rolls of 4 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 4 or 5 inch fiberglass, (5) rolls of 4 inch webril, (4) rolls of 3 inch webril, disposable hospital gown, disposable paper shorts, roll of 6, 10 or 12 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, (2) safety goggles, (2) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (5-10) hospital pads(chux), (2-4) bed sheets, pillow, disposable paper shorts or gown, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, (3) felt pads or equivalent, thermometer, cast care booklet or equivalent, box of alcohol pads, (2) damp wash cloths or towels, (2) hand towels, sink w/ faucet, tube of surgical lubricant and trash receptacle.

Standards: Is reached when the upper torso is immobilized by the cast from the jugular notch to the symphysis pubis and resting on the iliac crests. The neck and shoulders have full range of motion. The patient can sit comfortably, breathe freely and digestion is unrestricted. The capillary refill test is administered to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).

2. Identify yourself to patient.

NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
Performance Steps

3

Body Jacket

NOTE: The Body Jacket is applied from 3 inches distal to the nipple line (sternal notch) to the symphysis pubis with the spine in neutral position. The neck, shoulders, hands, fingers, knees, hips, ankles, and toes have full range of motion. (Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H₂O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's injured torso.
   a. Place examination gloves on hands.
   b. Place patient behind privacy curtain.
   c. Give patient disposable paper shorts and gown.
   d. Instruct patient to remove all clothing and put on shorts and gown.
   e. Check patient's upper torso for any skin conditions (e.g., cuts, abrasions, lacerations and skin rashes).

NOTE: Inform physician if conditions are present and follow physician's order.
Performance Steps

   f. Examine both legs and arms for jewelry and remove if found.

NOTE: All jewelry must be removed. Give jewelry and clothing to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, standing bar set, fracture table, goniometer, scissors, thermometer and bucket of tepid water w/ bag. Place on work cart or station. Place fracture table/support stand next examination bed.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include felt pads, stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, towel, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads and damp towel. Open and remove (5) plaster rolls from their packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.
   a. With the patient standing erect or supine on the fracture table, measure from the axilla region to 2 inches distal to the iliac crests for stockinette length.

Note: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).
   b. Pull down stockinette from stockinette container and cut 1-2 inches past the measured length.
   c. Roll stockinette leaving 1-2 inch border at the distal edge. Place on work cart/station for later use.

9. Prepare 3 plaster reinforcement splints for the posterior, medial and lateral aspects of the cast.
   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edges of three stacks and remove from package. Place on work cart/station.

NOTE: 5 x 30 inch plaster sheets are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets.
   b. Measure the patient's upper thigh from medial to lateral.
   c. Measure the patient's upper thigh from medial to lateral.
   d. Measure length of sacrococcygeal region.
   e. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.

NOTE: Discard excess material in the trash receptacle.


NOTE: Orthopaedic felt pads are used to reduce chafing at distal and proximal edges of cast.
   a. Measure the patient's upper thigh from medial to lateral.
   b. Measure length of both anterior iliac crest.
   c. Measure length of sacrococcygeal region.
Performance Steps

d. Place orthopaedic felt next to the measured lengths, cut off excess amount and place on work cart/station.
NOTE: Discard excess material in the trash receptacle.

11. Apply stockinette to patient's upper torso.
   a. Place bed sheets on floor and have patient stand on sheets.
   NOTE: Bed sheets are used to keep the floor clean during the casting process.
   b. Have patient remove gown.
   CAUTION: Always use the same gender chaperone when patient's are disrobing.
   c. Hold open sides of the stockinette.
   d. Place the stockinette on patient.
   NOTE: The patient can either step in the stockinette and pull it on, or have patient place arms above head and pull stockinette down.
   e. Pinch the stockinette at the base of the shoulder and cut the stockinette at a 45 degree angle.
   f. Have patient place arms through the pre cut hole and adjust stockinette.
   NOTE: Stockinette should be 3 inches proximal to the nipple line and 3 inches distal to the iliac crests.

12. Measure patient's spine with goniometer.
NOTE: All body casts are applied absent of flexion or extension unless directed by physician's order.
   a. Have patient stand erect.
   NOTE: Family members, nursing staff, orthopaedic technician or support bar may be used to assist in positioning the patient.
   b. Place the stationary arm of the goniometer so that it bisects the oblique muscles.
   c. Place the moving arm of the goniometer so that it bisects the lateral side of the femur.
   d. Place the protractor of the goniometer on the iliac crest.
   e. Set spine until the goniometer measures 0 or 180 degrees.

13. Apply felt padding to the iliac crests, spine and any other areas of special attention.
NOTE: The felt pads can be applied horizontal or vertical on the iliac crests and are used to reduce chaffing of the skin. The patient or nursing personnel can hold pads/towel in place prior to webril application.

14. Place folded towel over the area of the diaphragm.
CAUTION: A small folded towel is placed over the diaphragm and top of the stomach for a later cutaway of the area which will provide for breathing and digestion.

15. Apply cast padding (webril) to patient's upper torso.
   a. Hold webril with one hand.
   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.
   c. Place the edge of the webril 1 inch proximal to the stockinette edge at the sternal notch and begin wrapping distal around the torso.
   CAUTION: Keep the cast padding on the extremity throughout the application to avoid causing circulation compromise of the patient's chest.
   d. Continue down the torso ending 1 inch distal to the stockinette.
   e. With each turn overlap the webril by 1/2 - 1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

   a. If using fiberglass casting materials go to steps 17, 18 and 19
   b. If using plaster casting materials go to step 19.

17. Place fiberglass casting gloves on hands.
Performance Steps

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns when applying a fiberglass cast.

NOTE: Tube of surgical lubricant can be used to keep the gloves from adhering to fiberglass casting material.

18. Open fiberglass casting package and go to step 19.

NOTE: Open one fiberglass package at a time, because fiberglass will start to cure and harden with air contact.

19. Apply 1st and 2nd plaster/fiberglass roll.

NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll with one hand.

b. With opposite hand, unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index, and middle fingers.

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots affect the integrity of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

   e. Place the edge of the casting material at the iliac crests and begin wrapping around the torso.

   f. Continue up the torso ending 1 inch distal to the webril edge.

   g. Overlap the cast material by 1/2-1/4 the previous wrap. The top of the cast material should bisect the middle of the previous layer and present evenly applied cast material.

NOTE: More than one roll may need to be applied initially.

NOTE: The weight of the body jacket should rest on the iliac crests.

20. Laminate the casting material.

   a. Place palm of each hand on the cast.

   CAUTION: To reduce cast indentations, which can cause pressure sores to the patient's skin under the cast, keep finger tips off the cast during the application and molding process.

CAUTION: The patient must be asked throughout the casting process if they feel pressure sores or hot spots developing under the cast. Hot spots are areas within the cast that continue to stay warm and may even progress to hot. If sores or hot spots are developing, the cast must be removed immediately.

   b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist in providing strength to the cast.

   c. Conform the casting material to the body contours.

   d. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

NOTE: The dull white color represents the cast beginning to cure.

21. Apply reinforcement splints to the cast.

NOTE: The reinforcement splints are used to strengthen and support the cast.

NOTE: The splints are applied vertical, horizontal or by physician's order.

   a. Place each splint individually in tepid water, wait for bubbles to subside and remove from water.

   b. Squeeze each splint together to remove excess water.
Performance Steps

c. Place reinforcement splints to the posterior (sacral area), medial and lateral (oblique muscle region) aspects of the cast 1 inch distal to the edge of the cast material.
d. Laminate splints to the cast.
e. Maintain patient's spine in physician order position.

NOTE: Instruct the patient to remain in the same position as directed. A technician or family member may assist the patient.

22. Apply 3rd and 4th plaster/fiberglass rolls (repeat steps 19-20).

23. Mold the cast.

a. Place heels of each hand on iliac crests, apply firm pressure.
b. Remove hands from cast when contours of the iliac crests have been shaped and cast is cured.
c. Apply firm and gradual pressure beginning below the axilla and progress down the torso.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient during this procedure (e.g., How do they feel?, Is the pressure too much?)
d. Remove hands from cast when contours of the torso have been shaped to the body and cast is cured.

24. Trim cast to fit patient.

CAUTION: Patients in the cast room are always offered and encourage to use hearing/eye protection. Technicians must wear hearing/eye protection when removing a cast.

NOTE: Patient's are under no obligation to wear hearing and eye protection, but are told of the consequences of not using hearing and eye protection.

a. Draw and cut the lower trimming line:

NOTE: The markings can be done by a pen, grease pencil etc.

NOTE: The cast saw along with scissors can be used to cut outlines.

(1) Draw a curved line from the symphysis pubis arch upward and then downward above the flexion crease of the hip joint to the greater trochanter.
(2) The line is continued across the lower buttock region in a curved fashion to the sacrococcygeal junction and is connected to the opposite trimming line.
(3) Draw a 4 inch radius outline at the diaphragm.

NOTE: Use the costal margin and navel as landmarks.

(4) With the cast saw cut the outline and place excess cast material in trash receptacle remove towel.
(5) Fold webril and stockinette edges over the trimmed cast ends and secure with adhesive tape.

b. Draw and cut the upper trimming line:

(1) Draw a curved line from the upper sternum, going laterally and downward to the lower portion of the axilla and then proceed medial and upward to the lateral border of the scapula and connect to the opposite trimming line.
(2) With the cast saw cut the outline and place excess cast material in trash receptacle.
(3) Fold webril and stockinette edges over the trimmed cast ends and secure with adhesive tape.

25. Check range of motion (ROM) of shoulders and hips.

a. Have patient sit in chair from a standing position.
b. Have patient rotate shoulders.
c. Have patient rotate hips.
d. Have patient inhale and exhale to determine airway compliance.

NOTE: If patient is unable to accomplish a-d trim the cast as needed.

26. Check cast dimensions.

a. The top of the sternum is visible.
Performance Steps

b. The lower edge of the scapula is visible.
c. The distal aspect of the cast rests on the iliac crests.
d. There is 2-4 inch distance from the axilla to the edge of the cast.

27. Measure patient's spine with goniometer.
   a. Place the stationary arm of the goniometer vertically, bisecting the oblique muscles.
   b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the femur.
   c. Place the protractor of the goniometer on the iliac crest.
   d. The spine is measured in neutral position or according to physician's order.

28. Apply 5th and 6th plaster/fiberglass rolls (repeat steps 19-20)
   NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

29. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

30. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
   Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast.
   b. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
   c. Provide patient with cast care booklet or equivalent.
   d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring).

32. Annotate the procedure applied to the patient in medical record or SF 513.
   NOTE: Record the procedure applied and cast care instruction provided to patient and sign your name.

33. Escort patient or direct patient to front desk to make a follow up appointment.

Performance Measures

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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

- **Required**
  - 0812110-0765
  - 0-8342-0763-X
  - 38709590
  - TM 8-231
APPLY A VELPEAU CAST
081-834-0025

Conditions: Given an orthopaedic patient requiring a Velpeau cast sitting on an orthopaedic examination bed with curtain or partition (if available), fracture table or standing grasping an overhead horizontal support bar, nursing personnel, family member, chaperone, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, grease pencil, work cart/station, (5) rolls of 6 inch plaster, (5) rolls of 4 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 4 or 5 inch fiberglass, (5) rolls of 4 inch webril, (4) rolls of 3 inch webril, disposable hospital gown, disposable paper shorts, roll of 6, 10 or 12 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, (2) safety goggles, (2) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (5-10) hospital pads (chux), (2-4) bed sheets, pillow, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, (3) felt pads or equivalent, thermometer, cast care booklet or equivalent, box of alcohol pads, (2) washer cloths or towels, (2) hand towels, sink w/ faucet, tube of surgical lubricant and trash receptacle.

Standards: Is reached when the cast extends from the iliac crests to 2 inches distal to the axilla of the unaffected side and extends up to include the injured arm from 1 inch proximal to the ulnar styloid and immobilizing the shoulder. The injured arm is positioned at a 45 degree angle to the upper torso with the wrist having full range of motion. The neck, uninjured shoulder and hands have full range of motion. The patient can sit comfortably, breathe freely and digestion is unrestricted. The Capillary refill test is administrated to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Identify yourself to patient.
   NOTE: Tell the patient your name and job title.
3. Explain the procedure to the patient.
NOTE: The Velpeau cast extends from the iliac crests to below the axilla on the unaffected side enclosing the shoulder and the upper arm of the affected side down to the distal palmar crease with elbow flexed at a 45 degree angle. The neck, hands, wrists, fingers hip, unaffected shoulder have full range of motion. (Refer to Figure 3-x)

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's injured torso.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient behind privacy curtain.
   c. Give patient disposable paper shorts and gown. Female patient's will need to remove upper undergarments.
   CAUTION: The same gender chaperone should always be present to assist female patients in removal of clothing.
   d. Instruct patient to remove all clothing and put on shorts and gown.
Performance Steps  

**e.** Check patient's upper torso for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes.

**NOTE:** Inform physician if conditions are present and follow physician's order.

**f.** Examine both legs and arms for jewelry and remove if found.

**NOTE:** All jewelry must be removed. Give jewelry and clothing to family member or secure with patient's belongings in NCOIC office.

### 5. Check patient's capillary refill.

a. Squeeze patient's fingers and nail beds will turn white.

b. Release patient's fingers and nail beds will return pink.

**CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

### 6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, goniometer, scissors, thermometer and bucket of tepid water w/ plastic bag. Place on work cart or station. Place fracture table / support stand next examination bed.

**CAUTION:** The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

**CAUTION:** The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

### 7. Assemble materials to include felt pads, stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, towel, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, surgical lubricant, tape measure, box of alcohol pads and damp towel. Open and remove (5) plaster rolls from their packages and place on work cart/station.

**NOTE:** Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

### 8. Prepare stockinette.

**NOTE:** Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. With the patient standing erect or supine on the fracture table, measure from the axilla region to 2 inches distal to the iliac crests for stockinette length.

**Note:** Instruments of measurements may vary (e.g. tape measure or webril).

b. Pull down stockinette from stockinette container and cut 1-2 inches past the measured length.

c. Roll stockinette up leaving a 1-2 inch border at the distal end. Place on work cart/station for later use.

### 9. Prepare plaster reinforcement splints for the cast.

a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Place on work cart/station.

**NOTE:** 5 x 30 inch plaster sheets are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets for each splint.

b. Place the edge of (1) sheet from the base of the deltoid muscle to one inch proximal to the ulnar styloid on the uninjured arm, fold edge and tear/cut excess. Place sheet on top of remaining stack of 4 and tear/cut other sheets to obtained length. Place on work cart/station for later use.

c. Place the edge of (1) sheet from the 2nd stack starting at the medial thigh extending to the lateral thigh until sheet ends connect. Place sheet on top of remaining stack of 4 and tear/cut other sheets to obtained length. Place on work cart/station for later use.

**NOTE:** Depending on the patient's size folding and cutting off excess may be needed.
Performance Steps

d. Place the edge of (1) sheet from the 3rd stack beginning at the lateral end of the iliac crest and extending past the medial end. Place sheet on top of remaining stack of 4 and tear/cut other sheets to obtained length. Place on work cart/station for later use.

e. Place the edge of (1) sheet from the 4th stack sheet to the sacrococcygeal region. Place sheet on top of remaining stack of 4 and tear/cut other sheets to obtained length. Place on work cart/station for later use.


a. Using instruments of measurement, obtain the needed length of the patient's upper thigh from medial to lateral.

b. Measure length of both anterior iliac crest.

c. Measure length of sacrococcygeal region.

d. Measure the circumference of the wrist.

e. Measure from the acromioclavicular joint (ac) diagonally across the chest under the axilla region posteriorly across the back ending opposite from the start.

f. Measure the circumference of the elbow.

g. Place orthopaedic felt next to the measured lengths, cut off excess amount and place on work cart/station.

NOTE: Discard excess material in the trash receptacle.

11. Apply stockinette to patient's upper torso.

a. Place bed sheets on floor and have patient stand on sheets.

NOTE: Bed sheets are used to keep the floor clean.

b. Have patient remove gown.

CAUTION: Always use the same gender chaperone.

c. Place 4x4 pads in the axilla region.

NOTE: Pads are used to reduce chafing of the patient's skin.

d. Hold open sides of the stockinette.

e. Place the stockinette on patient.

NOTE: The patient can either step in the stockinette and pull it on, or have patient place arms above head and pull stockinette down.

f. Pinch the stockinette at the base of the shoulder and cut the stockinette at a 45 degree angle.

g. Have patient place arms through the pre cut hole and adjust stockinette.

NOTE: Stockinette should be 3 inches above the nipple line and 3 inches distal to the iliac crests. Separate stockinette may be used for the arm.

12. Measure patient's injured arm with goniometer.

NOTE: All Velpeau casts are applied as directed by physician's order.

a. Have patient stand erect.

NOTE: Family members, nursing staff, orthopaedic technician or support stand may be used to assist in positioning the patient.

b. Place patient's injured arm across the chest with fingers pointing towards the uninjured shoulder.

c. Place the stationary arm of the goniometer so that it bisects the deltoid muscle or humerus.

d. Place the moving arm of the goniometer so that it bisects the forearm.

e. Place the protractor of the goniometer on the olecranon process (elbow).

f. Set elbow until the goniometer measures between 85-110 degrees of flexion.

NOTE: Physician's order will specify elbow flexion requirement.

13. Apply felt padding to the iliac crests, shoulder, elbow, and axilla region.

NOTE: The felt pads are used to reduce chafing of the skin. The patient or nursing personnel can hold pads/towel in place prior to webril application.

14. Place folded towel over the area of the diaphragm.
Performance Steps

CAUTION: A small folded towel is placed over the diaphragm and top of the stomach for a later cutaway of the area which will provide for breathing and digestion.

15. Apply cast padding (webril) to patient's upper torso and shoulder.
   a. Hold webril vertically with one hand.
   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.
   c. Place the edge of the webril 1 inch proximal to the stockinette edge at the jugular notch and begin wrapping distal around the torso.
   CAUTION: Keep the cast padding on the extremity throughout the application to avoid causing circulation compromise of the patient's chest.
   d. Continue down the torso ending 1 inch distal to the stockinette edge.
   e. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.
   f. Apply extra padding as needed.

   a. If using fiberglass casting materials go to steps 17, 18 and 19.
   b. If using plaster casting materials go to step 19.

17. Place fiberglass casting gloves on hands.
   Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns when applying a fiberglass cast.

   NOTE: Tube of surgical lubricant can be used to keep the gloves from adhering to fiberglass casting material.

18. Open fiberglass casting package and go to step 19.
   NOTE: Open one fiberglass package at a time, because fiberglass will start to cure and harden with air contact

19. Apply 1st and 2nd plaster/fiberglass roll.
   NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.
   a. Hold plaster or fiberglass roll with one hand.
   b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers or place the thumb under the forward edge of the roll.
   c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.
   CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots affects the integrity of the cast.
   d. Squeeze the roll together (do not wring the roll).
   NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.
   e. Place the edge of the casting material at the iliac crest and begin wrapping around the torso.
   f. Continue up the torso, figure of eight around the injured shoulder ending 1 inch distal to the webril edge.
   g. Place the edge of the casting material at the top of the shoulder and continue wrapping to 1 inch proximal to the ulnar styloid.
   h. With each turn overlap the cast material by 1/2-1/4 the previous wrap. The top of the cast material should bisect the middle of the previous layer and present evenly applied cast material.
   i. Apply second roll (repeat steps 19 a-g).

20. Laminate the casting material.
   NOTE: Laminating the cast material provides strength to the cast material.
   a. Place palm of each hand on the cast.
Performance Steps

CAUTION: To reduce cast indentations, which can cause pressure sores to the patient’s skin under the cast, keep finger tips off the cast during the application and molding process.

CAUTION: The patient must be asked throughout the casting process if they feel pressure sores or hot spots developing under the cast. Hot spots are areas within the cast that continue to stay warm and may even progress to hot. If sores or hot spots are developing the cast must be removed immediately.

b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

c. Conform the casting material to the body contours.

d. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

NOTE: The dull white color represents the cast beginning to cure.

21. Apply reinforcement splints to the cast.

NOTE: The reinforcement splints are used to strengthen and support the cast.

NOTE: The splints are applied vertically, horizontally or in a manner prescribed by physician’s order.

a. Place each splint individually in tepid water, wait for bubbles to subside and remove from water.

b. Squeeze each splint together to remove excess water.

c. Place reinforcement splints posteriorly (along the coccyx region), at the iliac crests, and posteriorly to the injured shoulder.

d. Laminate splints to the cast.

22. Positioned injured arm on patient’s chest.

NOTE: Physician’s order will determine at what angle the elbow is positioned.

23. Apply 3rd and 4th plaster/fiberglass rolls (repeat steps 19-20)

NOTE: Incorporate injured arm/shoulder with the 3rd/4th roll of casting material.

24. Mold the cast.

a. Place heels of hand on iliac crests, apply firm pressure.

b. Remove heels of the hands from cast when contours of the iliac crests have been shaped and cast is cured.

c. Apply firm and gradual pressure beginning below the axilla and progress down the torso.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient during this procedure (e.g. How do they feel? Is the pressure too much?)

d. Remove heels of the hands from cast when contours of the torso have been shaped to the body and cast is cured.

25. Trim cast to fit patient.

CAUTION: Patients in the cast room are always offered and encourage to use hearing/eye protection. Technicians must wear hearing/eye protection when removing a cast.

NOTE: Patient’s are under no obligation to wear hearing and eye protection, but they should be aware of the consequences of not using hearing and eye protection.

a. Draw and cut the lower trimming line:

NOTE: The markings can be done by a pen, grease pencil, etc.

NOTE: The cast saw along with scissors can be used to cut outlines.

(1) Draw a curved line from the symphysis pubis arch upward then downward above the flexion crease of the hip joint to the greater trochanter.

(2) The line is continued across the lower buttock region in a curved fashion to the sacrococcygeal junction and is connected to the opposite trimming line.
Performance Steps

(3) Cut a 4 inch radius outline at the diaphragm, remove cast material excess and small towel.

NOTE: Use the costal margin and navel as landmarks.

b. Draw and cut the upper trimming line:
   (1) Draw a curved line from the upper sternum, going laterally and downward to the lower portion of the axilla and then proceed medial and upward to the lateral border of the scapula and connect to the opposite trimming line.
   (2) Cut the outline with a cast saw and place excess casting material in trash receptacle.
   (3) Fold webril and stockinette edges over the trimmed cast ends and secure with adhesive tape.

26. Check range of motion (ROM) of uninjured shoulder and hips.
   a. Have patient sit in chair from a standing position.
   b. Have patient rotate uninjured shoulder and both wrists.
   c. Have patient rotate hips.
   d. Have patient inhale and exhale to determine airway compliance.

NOTE: If patient is unable to accomplish step 26 a-d, continue to trim cast.

27. Check cast dimensions.
   a. There is 2-4 inch distance from the axilla on the uninjured side to the edge of the cast.
   b. The cast edge on the injured side is proximal to the ac joint and proximal to the ulnar styloid.
   c. The cast arm is at a 45 degree angle and resting diagonally across the chest.
   d. The distal aspect of the cast rests on the iliac crests.

28. Measure patient's injured arm with goniometer go to step 12.

29. Apply 5th and 6th plaster/fiberglass rolls (repeat steps 19-20)

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

30. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

31. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.

Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

32. Give patient verbal and written instructions on cast care.
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast.
   b. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
   c. Provide patient with cast care booklet or equivalent.
   d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

33. Annotate the procedure applied to the patient in medical record or SF 513.

NOTE: Record the procedure applied and cast care instruction provided to patient and sign your name.

34. Escort patient or direct patient to front desk to make a follow up appointment.

Performance Measures

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33. Escorted patient or direct patient to front desk to make a follow up appointment.

**Evaluation Guidance:** Score the orthopaedic technician a **GO** on the task, if all steps are passed (P). Score the orthopaedic technician a **NO-GO** (NG) if any step is failed (F). All performance measures must be passed to receive a go.

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**APPLY A SHOULDER SPICA CAST**

081-834-0026

**Conditions:** Given an orthopaedic patient requiring a Shoulder Spica cast sitting on a orthopaedic examination bed with curtain/partition, fracture table or standing bar set, physician, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, grease pencil, work cart/station, (5) rolls of 6 inch plaster, (5) rolls of 4 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 4 or 5 inch fiberglass, (5) rolls of 4 inch webril, (4) rolls of 3 inch webril, disposable hospital gown, disposable paper shorts, roll of 6, 10 or 12 inch stockinette, stockinette container, (4) 4 x 4 kerlix pads, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, (2) safety goggles, (2) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (5-10) hospital pads(chux), (2-4) bed sheets, pillow, disposable paper shorts, 12 inch wooden bar/strut, cast saw, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, (3) felt pads or equivalent, thermometer, cast care booklet or equivalent, box of alcohol pads, (2) wash cloths or towels, (2) hand towels, sink w/ faucet and trash receptacle.

**Standards:** Is reached when the cast extends from the iliac crests to 2 inches distal to the axilla of the unaffected side and extends distal to the acromioclavicular joint (AC joint). The injury arm is abducted at a 90 degree angle to the upper torso with the wrist having full range of motion. The neck, uninjured shoulder and hands have full range of motion. The patient can sit comfortably, breath freely and digestion is unrestricted. The Capillary refill test is administrated to the fingers and passed successfully.

**Performance Steps**

1. Receive the order from the physician (review if in writing)
2. Identify yourself to patient. 
   NOTE: Tell the patient your name and job title.
3. Explain the procedure to the patient.
Performance Steps

3
Shoulder Spica Cast

NOTE: The shoulder spica cast extends from the iliac crests to 2 inches distal to the axilla of the unaffected side and extends distal to the acromioclavicular joint (AC joint). The injury arm is abducted at a 90 degree angle to the upper torso with the wrist having full range of motion. The neck, uninjured shoulder and both hands have full range of motion. The patient can sit comfortably, breath freely and digestion is unrestricted. The Capillary refill test is administrated to the fingers and passed successfully. (Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's injured torso.

CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.

a. Place examination gloves on hands.

b. Place patient behind privacy curtain.

c. Give patient disposable paper shorts and gown.

CAUTION: The same gender chaperone should always be present to assist female patients in removal of clothing.

d. Instruct patient to remove all clothing and put on shorts and gown.
Performance Steps

e. Check patient's upper torso for any skin conditions (e.g., cuts, abrasions, lacerations and
   skin rashes).

NOTE: Inform physician if any of the above conditions are present and follow physician's order.

f. Examine both legs and arms for jewelry and remove if found.

Note: Give jewelry to family members or secure in NCOIC's office.

5. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's
instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, goniometer,
   scissors, thermometer and bucket of tepid water w/ bag. Place on work cart/station. Place
   standing bar set and/or fracture table next to examination bed.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury
(possible burns) to the patient. The technician should draw water that is room temperature and initially
use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast
bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include felt pads, stockinette, webril, plaster or fiberglass rolls, wooden bar
   12 inches in length, fiberglass casting gloves, examination gloves, towel, hospital pad (chux), bed
   sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads and damp
towel. Open and remove (5) plaster rolls from their packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity
size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery,
recently reduced fractures, technician's preference or as directed by the physician. Stockinette and
webril are forms of protection against the exothermic reaction of the casting materials.

   a. With the patient standing erect or supine on the fracture table measure from the axilla region
to 2 inches distal to the iliac crests for stockinette length for torso stockinette and from
acromioclavicular region to 1 inch distal to the metacarpal phalanges joint (MCPJ's) for the
arm stockinette.

Note: Instruments of measurements may vary (e.g., tape measure, ruler, or webril).

   b. Pull down stockinette from stockinette container and cut 1-2 inches past the measured
lengths.

   c. Roll each stockinette leaving 1-2 inch border at the distal edge. Place on work cart/station for
later use.

9. Prepare 4 plaster reinforcement splints for the posterior aspect of the arm, anterior and posterior
iliac crests and sacrococcygeal region.

NOTE: 5 x 30 inch plaster sheets are usually stacked in increments of five from the manufacturer. If
not pre stacked, count out five layers of plaster sheets.

   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate
edges of four stacks and remove from package. Place on work cart/station.

   b. Measure the patient's arm from the ac joint to palmar crease.

   c. Measure anterior/posterior iliac crests

   d. Measure length of sacrococcygeal region.

   e. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and
place on work cart/station.

NOTE: Discard excess material in the trash receptacle.

Performance Steps
NOTE: Orthopaedic felt pads are used to reduce chafing at distal and proximal edges of cast.
   a. Measure anterior/posterior iliac crests
   b. Measure length of sacrococcygeal region.
   c. Place felt pads next to measured lengths, cut off excess amount and place on work cart/station.

11. Apply stockinette to patient's upper torso.
   a. Place bed sheets on floor and patient step onto sheets.
   b. Have patient remove gown.
   c. Hold open sides of the stockinette.
   d. Place the stockinette on patient.
   NOTE: The patient can either step into the stockinette and pull it on, or place stockinette over the patient's head and pull stockinette down.
   e. Pinch the stockinette at the base of the shoulder and cut the stockinette at a 45 degree angle.
   f. Have patient place arms through the pre cut hole and adjust stockinette.
   NOTE: Stockinette should be 3 inches proximal to the nipple line and 3 inches distal to the iliac crests.
   g. Place stockinette on patient's arm from medial aspect of the ac joint to 1 inch distal to the palmar crease.
   NOTE: Pull the end of the stockinette over the adjacent cut end of the body stockinette.

12. Apply cast padding (webril) to patient's injured arm and torso.
   a. Place felt padding to the iliac crests, spine and axilla region. Have technician hold the padding in place until secured by the webril.
   b. Place folded towel over the area of the diaphragm.
   CAUTION: A small folded towel is placed over the diaphragm and top of the stomach for a later cutaway of the area which will provide for breathing and digestion.
   c. Hold webril with one hand.
   d. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.
   e. Place webril end on the ulnar styloid and begin wrapping around the wrist two rotations.
   NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.
   f. Continue through the palmar crease, up the forearm, figure eight around the elbow and shoulder ending 1/2 inch proximal to the edge of the stockinette superior to the acromioclavicular joint (AC joint).
   g. Place the webril on the iliac crest and continue around the torso, figure eight around the shoulder ending distal to the acromioclavicular joint.
   h. With each turn overlap the webril by 1/2-1/4 the previous wrap.
   NOTE: The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

   a. If using fiberglass casting materials go to step 14, 15 and 16.
   b. If using plaster casting materials go to step 16.

14. Place fiberglass casting gloves on hands.
Performance Steps

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns when applying a fiberglass cast.

NOTE: Tube of surgical lubricant can be used to keep gloves from adhering to fiberglass casting material.

15. Open fiberglass casting package and go to step 16.

NOTE: Open one fiberglass package at a time, because fiberglass will start to cure and harden with air contact.

16. Apply 1st and 2nd plaster/fiberglass roll.

NOTE: If using plaster, examination gloves are recommended to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll vertically.
b. With opposite hand, unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.
c. Place the plaster or fiberglass roll in a bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots affects the integrity of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.
e. Place the plaster or fiberglass on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.

NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a twisting or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) twist and evenly space the casting material on the webril. Smooth out with volar side of fingers. The twisting method provides strength to the cast.

The CUT method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.

g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the cast material should bisect the middle of the previous layer and present an evenly applied cast.

NOTE: Depending on the size of the patient's forearm and biceps region more than two rolls may be needed for the initial roll. Begin extra roll where the previous roll left off.

h. Place the casting material at the iliac crests and begin wrapping around the torso.

i. Overlap the cast material by 1/2-1/4 the previous wrap. The top of the cast material should bisect the middle of the previous layer and present evenly applied cast material.

NOTE: More than one roll may need to be applied initially.

NOTE: The weight of the shoulder spica should rest on the iliac crests.

NOTE: The edge of the cast must be superior to the acromioclavicular joint (AC joint).

17. Laminate the casting material.

a. Place palm of each hand on the cast.
Performance Steps
CAUTION: To reduce cast indentations, which can cause pressure sores to the patient's skin under the cast, keep finger tips off the cast during the application and molding process.

CAUTION: The patient must be asked throughout the casting process if they feel pressure sores or hot spots developing under the cast. Hot spots are areas within the cast that continue to stay warm and may even progress to hot. If sores or hot spots are developing the cast must be removed immediately.

b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

c. Conform the casting material to the body contours.

d. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

NOTE: The dull white color represents the cast beginning to cure.

18. Apply reinforcement splints to the cast.

NOTE: The reinforcement splints are used to strengthen and support the cast. Splints may be applied vertically, horizontally or by physician's order.

a. Place each splint individually in tepid water, wait for bubbles to subside and remove from water.

b. Squeeze each splint together to remove excess water.

c. Place reinforcement splints to the posterior (sacral area), on the anterior/posterior aspects of the iliac crests and on the posterior aspect of the arm.

d. Laminate splints to the cast.

NOTE: Instruct the patient to remain in the same position as directed. A technician or family member may assist the patient.

19. Apply 3rd and 4th plaster/fiberglass rolls (repeat steps 16-17)

20. Mold the cast.

a. Place heels of each hand on iliac crests, apply firm pressure.

b. Remove hands from cast when contours of the iliac crests have been shaped and cast is cured.

c. Apply firm and gradual pressure beginning below the axilla and progress down the torso.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient during this procedure (e.g. how do they feel?, is the pressure too much?)

d. Apply firm and gradual pressure beginning at the ac joint and progress down the arm and torso.

e. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)

f. Remove hands from cast when contours of the torso have been shaped to the body and cast is cured.

21. Secure wooden bar (strut) to the medial aspect of the mid forearm and anterior iliac crest region.

NOTE: A wooden bar from an old/unusable crutch or metal bar can be used.

NOTE: Physician's order will determine whether the injured arm is adducted or abducted from the torso.

b. Place strut next to the measured length obtained in 21 a and cut off excess amount with cast saw.

CAUTION: For safety purposes do not cut the strut in front of the patient.

c. Place strut end at the anterior iliac crest.

d. With casting material wrap a figure eight around the end of the strut and cast.

e. Continue wrapping the casting material across the strut and laminate.

f. Place opposite strut end on the medial aspect of forearm.
Performance Steps

\textbf{g.} With casting material wrap a figure eight around the opposite end of the strut, around the cast and laminate the casting material.

\textbf{22.} Check range of motion (ROM) of uninjured shoulder and hips.
\begin{itemize}
  \item a. Have patient sit in chair from a standing position.
  \item b. Have patient rotate uninjured shoulder.
  \item c. Have patient rotate hips.
  \item d. Have patient inhale and exhale to determine airway compliance.
\end{itemize}
\textbf{NOTE.} If patient is unable to accomplish a-d trim the cast as needed.

\textbf{23.} Trim cast to fit patient.
\textbf{CAUTION:} Patients in the cast room are always offered and encourage to use hearing/eye protection. Technicians must wear hearing/eye protection when removing a cast.

\textbf{NOTE:} Patient's are under no obligation to wear hearing and eye protection, but are told of the consequences of not using hearing and eye protection.
\begin{itemize}
  \item a. With scissors, cut the edge of the cast padding at the base of the thumb, distal palmar crease and ac joint region.
  \item b. Draw a curved line from the symphysis pubis arch upward and then downward above the flexion crease of the hip joint to the greater trochanter.
\end{itemize}
\textbf{NOTE:} The markings can be done by a pen or grease pencil.
\begin{itemize}
  \item c. Continue the line across the lower buttock region in a curved fashion to the sacrococcygeal junction and connect to the opposite trimming line.
  \item d. Draw a 4 inch circular outline at the diaphragm.
  \item e. Cut the outline with the cast saw, remove towel and place excess cast material in trash receptacle.
  \item f. Fold webril and stockinette edges over the trimmed cast ends and secure with adhesive tape.
\end{itemize}
\textbf{CAUTION:} The finished edge of the cast should end proximal to the base of the thumb to avoid radial nerve, superior to the ac joint, and to the distal palmar crease.

\textbf{24.} Check cast dimensions.
\begin{itemize}
  \item a. The cast incorporates the acromioclavicular joint (AC joint)
  \item b. The lower edge of the scapula on the uninjured side is visible.
  \item c. The distal aspect of the cast rests on the iliac crests.
  \item d. The injured arm is at a 90 degree angle to the torso with strut fixed to casted torso.
  \item e. The distal aspect of long arm cast rests at the distal palmar crest.
\end{itemize}

\textbf{25.} Apply 5th and 6th plaster/fiberglass rolls (repeat steps 16-17).
\textbf{NOTE:} The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

\textbf{26.} Check patient's capillary refill.
\begin{itemize}
  \item a. Squeeze patient's fingers and nail beds will turn white
  \item b. Release patient's fingers and nail beds will return pink.
\end{itemize}
\textbf{CAUTION:} If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

\textbf{27.} Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
\textbf{Note:} Use alcohol pad or fresh water from the faucet and not from the casting bucket.

\textbf{28.} Give patient verbal and written instructions on cast care.
\begin{itemize}
  \item a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast.
  \item b. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
  \item c. Provide patient with cast care booklet or equivalent.
Performance Steps
d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

29. Annotate the procedure applied to the patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to patient and sign your name.

30. Escort patient or direct patient to front desk to make a follow up appointment.

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<tr>
<td>2. Identified yourself to patient.</td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's injured torso.</td>
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<tr>
<td>5. Checked patient's capillary refill.</td>
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<tr>
<td>6. Gathered equipment</td>
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<tr>
<td>7. Assembled materials</td>
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<tr>
<td>9. Prepared 6 plaster reinforcement splints for the posterior aspect of the arm,</td>
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<tr>
<td>anterior and posterior iliac crests and sacrococcygeal region.</td>
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<tr>
<td>11. Applied stockinette to patient's upper torso.</td>
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<tr>
<td>12. Applied felt padding to the iliac crests, spine, and axilla region.</td>
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<tr>
<td>13. Placed folded towel over the area of the diaphragm.</td>
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<tr>
<td>14. Applied cast padding (webril) to patient's injured arm.</td>
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<tr>
<td>16. Placed fiberglass casting gloves on hands.</td>
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<td>17. Opened fiberglass casting package</td>
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<tr>
<td>18. Applied 1st and 2nd plaster/fiberglass roll.</td>
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<tr>
<td>19. Laminated the casting material.</td>
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<tr>
<td>20. Applied reinforcement splints to the cast.</td>
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<tr>
<td>22. Molded the cast material.</td>
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<tr>
<td>23. Applied wooden bar (strut) to the medial aspect of the mid forearm and anterior iliac crest region.</td>
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<tr>
<td>24. Checked range of motion (ROM) of uninjured shoulder and hips.</td>
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<tr>
<td>25. Trimmed cast to fit patient.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<td>--------------------------------------------------------------------------------------</td>
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<tr>
<td>27. Checked cast dimensions.</td>
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<tr>
<td>28. Checked patient's capillary refill.</td>
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<tr>
<td>29. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>30. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>31. Annotated the procedure applied to the patient in medical record or SF 513.</td>
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<tr>
<td>32. Escorted patient or direct patient to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**

0812110-0765
0-8342-0763-X
38709590
TM 8-231
Conditions: Given an orthopaedic patient requiring a Hip Spica cast laying supine on an examination bed, hip spica table with padded peroneal post and spinous process bar or orthopaedic fracture table, nursing personnel, orthopaedic technician, family member, chaperone, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, treatment room, (5) rolls of 6 inch plaster, (5) rolls of 4 inch plaster, (2) rolls of 2 inch plaster/fiberglass, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 4 or 5 inch fiberglass, (5) rolls of 4 inch webril, (4) rolls of 3 inch webril, gown, blanket, pillow, roll of stockinette (6,10 or 12 inches), roll of 2,3 or 4 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw, cast spreader, (2) pair of safety goggles, (2) packages of ear plugs, roll of 2 inch adhesive tape, (5-8) hospital pads(chux), (2-5) bed sheets, blanket, 18 inch wooden/metal bar(strut), goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, (3) orthopaedic felt pads or equivalent, thermometer, cast care booklet or equivalent, box of alcohol pads, (2)damp wash cloths or towels, (2) hand towels, sink w/faucet, tube of surgical lubricant and trash receptacle.

Standards: Is reached when the pelvic girdle and injured leg are immobilized by the cast from 3 inches proximal to the nipple line (jugular notch) to the metatarsal heads on the injured side, to the level of the greater trochanter on the opposite side. The neck, shoulders, uninjured knee, uninjured ankle and toes have full range of motion. The patient can breath freely and digestion is unrestricted. The Capillary refill test is administrated to the toes on both feet and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).

2. Identify yourself to parent(s).

   NOTE: Tell the parent(s) your name and job title.

3. Explain the procedure to the parent(s).
Performance Steps

Unilateral hip spica cast

One and one-half hip spica cast

Bilateral long leg hip spica cast

3

Hip Spica
Performance Steps

Infant Hip Spica

NOTE: The Hip Spica is applied from 3 inches distal to the nipple line (jugular notch) to the metatarsal heads on the injured side and to 2 inches proximal to the uninjured knee. The neck, shoulders, hands, fingers, toes and uninjured foot have full range of motion. (Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's upper torso and legs.
   a. Place examination gloves on hands.
   b. Pull privacy curtain.
   c. Instruct or assist parent in removal of child's clothing.

CAUTION: A chaperone should always be used.
Performance Steps

d. Check child's upper torso and legs for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).

NOTE: Inform physician if conditions are present and follow physician's order.

e. Examine both legs and arms for jewelry and remove if found.

NOTE: All jewelry must be removed. Give jewelry to family member or secure with child's belongings in NCOIC office.

f. Place a full size blanket or sheet over child's body.

NOTE: Keep the child warm during gather equipment and materials.

5. Check child's capillary refill.

a. Squeeze child's fingers/toes and nail beds will turn white.

b. Release child's fingers/toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, support bar set, fracture table or hip spica table, 18 inch wooden bar, goniometer, scissors, thermometer and bucket of tepid water w/plastic bag. Place on work cart or station.

NOTE: The peroneal post and spinous process bar are padded with webril or ortho felt for child's comfort.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the child. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include orthopaedic felt pads, stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, towel, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads and damp towel. Open and remove (7) plaster rolls from their packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. With child supine on the orthopaedic examination bed measure from the axilla to mid thigh and from mid thigh to one inch distal of the toes.

Note: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

NOTE: All measurements are taken on the uninjured side for patient comfort.

b. Pull down stockinette from stockinette container and cut measured lengths.

c. Roll up each stockinette leaving a 1-2 inch cuff at the distal edge. Place on work cart/station for later use.

9. Prepare 1 plaster reinforcement splint for the posterior, lateral and groin aspects of the cast on injured side.

a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edges of three stacks and remove from package. Place on work cart/station.

NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out 15-20 layers of plaster sheets.

b. Measure across the sacral region over both hips.
Performance Steps

c. Measure across the pubic area and around each hip.
d. Place stack of (5) plaster sheets next to the measured lengths, cut off excess amount and place on work cart/station.

NOTE: Discard all excessive material in the trash receptacle.

a. Measure length of sacral region across the hips.
b. Measure length of iliac crests anteriorly
c. Measure length of mid axillary across the chest.
d. Place orthopaedic felt next to the measured lengths, cut off excess and place on work cart/station.

11. Apply stockinette to child.
a. Remove sheet or blanket from child.
CAUTION: Always use chaperone (same sex nursing personnel or parent).
b. Hold open 1st stockinette.
c. Roll the stockinette up the child's leg.
d. Hold open sides of 2nd stockinette.

NOTE: Assistance from the nursing personnel can be used.
e. Place stockinette over upper torso and adjust stockinette to torso.
f. Cut the medial aspect of the stockinette.
g. Eliminate any wrinkles and tape the cut stockinette ends together.

NOTE: The stockinette should be 3 inches proximal of the nipple line and resting at mid thigh with 1st stockinette 2 inches distal of the toes and resting at the groin region.

12. Place child on hip spica table.

NOTE: Physician will assist with body placement.
a. The child is placed supine on the hip spica table.
b. The child's groin is placed up against the peroneal post.
c. The spinous processes bar is placed between the child's skin and the applied stockinette for easy removal of child from hip spica table.
d. The child's scapula is flush with the edge of the hip spica table.
e. Nursing assistant(s) are holding the child's legs.

NOTE: The physician's order will determine if hips are adducted or abducted and injured knee flexion.

13. Apply felt padding to the iliac crests, spine and any other areas of special attention.

NOTE: The orthopaedic felt is applied to all bony prominences to reduce friction and cast complications. Physician's order will determine whether the pads are applied first or the webril.
a. Place felt posterior across the sacral region. The felt should rests on both iliac crests.
b. Place felt anterior across the axillary region. The felt is positioned 2 inches distal to the nipple line.
c. Place felt padding vertical on spine. The felt should encompass the length of the spine.

14. Place folded hand towel over area of the diaphragm.

15. Apply cast padding (webril) to patient's upper torso and injured leg.
a. Hold webril with one hand.
b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.
c. Place the edge of the webril 1 inch proximal of the stockinette edge at the sternal notch and begin wrapping distal around the torso.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid causing circulation compromise of the child's chest.
d. Continue down the torso overlapping figure of eight between the torso (inguinal region) and upper leg ending at the metatarsals.
Performance Steps

NOTE: The following sequence is used for applying the cast padding as well as the cast material:
begin at the pubic symphysis, greater trochanter, gluteal fold, peroneal crease, inguinal ligament,
anterior superior iliac spine, lower sacrum, opposite anterior superior iliac spine, inguinal ligament,
peroneal crease, gluteal fold, greater trochanter, pubic symphysis.
e. Place the edge of the webril at the proximal edge of the stockinette on the uninjured leg and
continue down the torso overlapping figure of eight between the torso (inguinal region) and
upper leg, wrapping around the thigh and continue to the base of the thigh.
f. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should
bisect the middle of the previous layer covering up the shallow line and present evenly
applied padding.


17. If using fiberglass casting materials go to step 19 then 20.

18. If using plaster casting materials go to step 21.

19. Place fiberglass casting gloves on hands.
Caution: The use of fiberglass casting gloves is mandatory to prevent the technician from receiving
chemical burns when applying a fiberglass cast.

20. Open fiberglass casting package and go to step 21.
NOTE: Open one fiberglass package at a time, as fiberglass begins to cure and harden after contact
with air.

21. Apply 1st and 2nd plaster/fiberglass roll to injured leg.
NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the
plaster rolls may cause the skin on the hands to dry up.
a. Hold plaster or fiberglass roll with hand.
b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb,
index and middle fingers.
NOTE: Alternative method may be used.
c. Place the plaster or fiberglass roll in the bucket of tepid water and remove when bubbles
cease to rise.
CAUTION: Removal of casting material prior to the cessation of bubbles will indicate the presence of
dry spots in the casting material. Dry spots in the casting material will reduce the integrity of the cast if
applied.
d. Squeeze the roll together (do not wring the roll).
NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently
squeeze the roll inward
   e. Place the edge of the casting material 1 inch distal to the stockinette edge and begin
   wrapping around the torso.
   f. Continue down the torso overlapping figure of eight between the torso (inguinal region) and
   upper leg ending at the metatarsals.
NOTE: The following sequence of application is used most often: beginning at the pubic symphysis,
greater trochanter, gluteal fold, peroneal crease, inguinal ligament, anterior superior iliac spine, lower
sacrum, opposite anterior superior iliac spine, inguinal ligament, peroneal crease, gluteal fold, greater
trochanter, pubic symphysis.
g. Place the edge of the cast material at the proximal edge of the stockinette on the uninjured
   leg and continue down the torso overlapping figure of eight between the torso (inguinal region) and
   upper leg, wrapping around the thigh and continue to the base of the thigh.
h. Overlap the cast material by 1/2-1/4 the previous wrap. The top of the cast material should
   bisect the middle of the previous layer and present evenly applied padding.

22. Laminate the casting material.
   a. Place palm of each hand on the cast.
Performance Steps

CAUTION: To reduce cast indentations, which can cause pressure sores to the patient's skin under the cast, keep finger tips off the cast during the application and molding process. If patient feels pressure sores or hot spots developing under the cast, the cast must be removed immediately.

b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

c. Conform the casting material to the body contours.

d. Continue rubbing the cast until the tone /texture changes from a glossy/creamy color to a dull white color.

23. Apply reinforcement splints to the posterior, lateral and inguinal region aspects of the cast.

NOTE: The reinforcement splints are used to strengthen and support the cast.

a. Place each splint individually into tepid water, wait for bubbles to subside and remove from water.

b. Squeeze the splint together to remove excess water.

c. Place the reinforcement splints.

(1) The first splint is placed across the sacral area posteriorly over both hips.

(2) The second and third splints are placed medial across the pubic area and around each hip (forming a figure of eight around the hips).

NOTE: Laminate the splints to facilitate cast strength over the posterior aspect of the hip joints (known as the beginners triangle).

d. Instruct assistant to maintain patient's knee and ankle in neutral position.

CAUTION: It is vital that the neutral positioning of the knee and ankle are maintained.


25. Mold cast to body contours.

a. Place heels of hand on iliac crests, apply firm pressure.

b. Remove heels of the hands from cast when contours of the iliac crests have been shaped and cast is cured.

c. Apply firm and gradual pressure beginning at the femoral condyle and progress down the leg.

CAUTION: Excessive pressure may result in further patient injury. Talk to the child while performing this procedure (e.g., how do they feel?, is the pressure too much?)

d. Remove heels of the hands from cast when contours of the torso have been shaped and cast is cured.

26. Trim cast to fit child.

CAUTION: Patients in the cast room are always offered hearing/eye protection. Technicians must wear hearing/eye protection during cast modification procedures. Child must wear hearing/eye protection.

a. Remove the child from the fracture or hip spica table.

NOTE: Members of the casting team will secure the child, while the other member removes the fracture table or hip spica table.

b. Place clean sheet on bed and gently lay child on bed.

c. Draw a straight line anteriorly below the xiphoid process.

d. Draw a curved line anteriorly above the pubis symphysis arch around each leg.

NOTE: The physician may draw the lines needed.

e. The line is continued across the lower buttock region in a curved fashion above the coccyx and is connected to the opposite trimming line.

CAUTION: The child will need to be turned for trimming the posterior aspect of the cast. All members of the casting team will assist in moving the child as an unit.

f. Draw a 4 inch radius outline anteriorly at the abdomen.

NOTE: Use the costal margin and navel as landmarks.

g. With the cast saw cut the previous drawn outlines, remove towel and place excess cast material in receptacle.
Performance Steps

h. Fold webril and stockinette edges over the trimmed cast ends and secure with paper tape.

27. Check cast dimensions.
   a. The nipple line is visible.
   b. The cast edge on the uninjured leg is 2-4 inches above the knee.
   c. The cast edge on the injured leg rests at the web spacing of the toes.

28. Apply 4th and 5th plaster/fiberglass rolls (repeat steps 21-22).
NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work. Technician preference will determine where that last roll is started.

29. Attach wooden bar (strut) to the medial aspect of the injured and uninjured leg above the knee.
NOTE: A wooden bar from an old/unusable crutch or metal bar can be used. The strut is used to assist in moving the child.
   a. Measure distance between legs with tape measure or ruler.
   NOTE: Physician's order will determine at what distance the legs are either adducted or abducted.
   b. Place strut next to the measured length and cut off excess amount.
   NOTE: The cast saw is used to cut the strut.

CAUTION: For safety purposes do not cut the strut in front of the child.
   c. Place strut end on cast above knee on the injured side.
   NOTE: The physician will determine the location of the strut.
   d. Wrap a figure-of-8 around the end of the strut and cast.
   e. Continue wrapping the casting material across the strut and laminate the casting material.
   f. Place opposite strut end above knee on the uninjured side.
   NOTE: The physician will determine the location of the strut ends.
   g. Wrap a figure-of-8 around the opposite end of the strut, around the cast and laminate the casting material.

30. Check child's capillary refill.
   a. Squeeze child's fingers/toes and nail beds will turn white
   b. Release child's fingers/toes and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

31. Clean plaster resin off child's skin using a damp wash cloth, towel or alcohol pad.
Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

32. Give parent(s) verbal and written instructions on cast care.
   a. Instruct the parent(s) to call the cast clinic should they have any concerns or questions regarding their cast. Provide parent(s) with a copy of the clinic hours and telephone number. After duty hours instruct parent(s) to report to emergency room.
   b. Provide parent(s) with cast care booklet or equivalent.
   c. Instruct parent(s) not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring).

33. Annotate the procedure applied in child's medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to parent(s) and sign your name.

34. Escort parent(s) or direct parent(s) to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
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<tr>
<td>2. Identified yourself to parent(s)</td>
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### Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>3.</td>
<td>Explained the procedure to the parent(s)</td>
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<tr>
<td>4.</td>
<td>Inspected child's upper torso and legs.</td>
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<tr>
<td>5.</td>
<td>Checked child's capillary refill.</td>
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<td>6.</td>
<td>Gathered equipment.</td>
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<td>7.</td>
<td>Assembled materials</td>
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<tr>
<td>9.</td>
<td>Prepared 3 plaster reinforcement splints for the posterior, lateral and groin aspects of the cast on injured side.</td>
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<td>11.</td>
<td>Applied stockinette to child</td>
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<td>12.</td>
<td>Place child on hip spica table.</td>
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<td>Applied felt padding to the iliac crests, spine and any other areas of special attention.</td>
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<td>14.</td>
<td>Placed folded towel over diaphragm.</td>
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<td>15.</td>
<td>Applied cast padding (webril) to patient's upper torso and injured leg.</td>
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<td>17.</td>
<td>Placed fiberglass casting gloves on hands.</td>
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<td>18.</td>
<td>Opened fiberglass casting package.</td>
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<td>19.</td>
<td>Applied 1st and 2nd plaster/fiberglass roll.</td>
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<td>20.</td>
<td>Laminated the casting material.</td>
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<tr>
<td>21.</td>
<td>Applied reinforcement splints to the posterior, lateral and groin aspects of the cast.</td>
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<td>23.</td>
<td>Molded the cast.</td>
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<td>24.</td>
<td>Trimmed cast to fit child.</td>
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<td>25.</td>
<td>Checked cast dimensions.</td>
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<tr>
<td>27.</td>
<td>Attached wooden bar (strut) to cast.</td>
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<td>29.</td>
<td>Cleaned plaster resin off child's skin using a damp cloth, towel or alcohol pad.</td>
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<td>30.</td>
<td>Gave parent(s) verbal and written instructions on cast care.</td>
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<tr>
<td>31.</td>
<td>Annotated the procedure applied in child's medical record or SF 513.</td>
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<tr>
<td>32.</td>
<td>Escort child to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

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APPLY A SHORT LEG SPLINT
081-834-0030

Conditions: Given an orthopaedic patient requiring a Short Leg Splint (SLS) sitting or supine on a orthopaedic examination bed, nursing personnel, physician, family member, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (6) rolls of 6 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 6 inch webril, examination gloves, scissors, (3) elastic bandages, roll of 2 inch paper tape, (2) hospital pads (chux), (2) bed sheets, pillow, disposable paper shorts, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, thermometer, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, tube of surgical lubricant, orthopaedic bump, thigh holder, 1 pair of crutches and trash receptacle.

Standards: Is reached when a posterior splint is secured to the patient's injured leg from the tips of the toes to 3 inches distal to the popliteal space (bend of the knee) with (3) elastic bandages. The ankle is measured at 90 degrees of dorsiflexion, absent of inversion or eversion, with toes having full range of motion. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Identify yourself to patient.
   Note: Explain to patient your name, and job title.
3. Explain the procedure to the patient.
Performance Steps

NOTE: The Short Leg splint is applied from the tips of the toes to 3 inches distal to the popliteal region (bend of knee) with the ankle at a 90 degree angle. The knee and toes will have full range of motion. (refer to Figure 3-x).

CAUTION: During the splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a normal common occurrence and safe chemical reaction. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's injured leg/ankle.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient supine on the examination bed.
   c. Have patient remove shoes and socks from both feet and roll pant leg above the injured knee.
   NOTE: If patient is unable to get pants easily above knee, provide patient with paper shorts or hospital scrubs. If unavailable, cut the pant leg at the seam.
   d. Check patient's injured leg for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).

3

Short Leg Splint
Performance Steps

e. Call or send for physician if skin conditions are present. Follow physician's order.

f. Examine both legs for jewelry and remove if found.

NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in locked NCOIC office.

5. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, orthopaedic bump, thigh holder, goniometer, marking pen, bucket of tepid water with plastic bag. Place on work cart/station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webri, plaster rolls, examination gloves, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, box of alcohol pads and towel. Open and remove (3) plaster rolls from their packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webri).
   a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting procedure.
   b. Locate the fibula head on the uninjured leg.

CAUTION: The peroneal nerve is located on the lateral side of the knee. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Measure 1 finger breadth below the fibula head and provide extra padding to the area to prevent further injury to the patient.
   c. Place the uninjured ankle at a 90 degree angle to the tibia.

NOTE: There are several ways to position and maintain a the ankle at a 90 degree angle. The patient could maintain the angle, nursing personnel or family member can assist. It is the technician preference.
   d. Measure from 1 inch distal to the tips of the toes to 3 inches distal to the popliteal region.

NOTE: Webri, tape measure or plaster splint may be used to measure the distance from the toes to the popliteal region.
   e. Measure from one finger breadth from the fibula head on the lateral side of knee, around the heel, up the leg ending opposite from the start.
   f. Place measure webri on work station/cart.
   g. Roll out second layer to the same length and place on the middle of the previous padding.
   h. Layer the padding 2-4 thickness.

   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of 6 stacks and remove from package. Place on work cart/station.
Performance Steps
NOTE: 15-20 plaster sheets are needed for all lower extremity splints.

NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out in groups of five, 20-30 layers of plaster sheets.

NOTE: The technician may choose to use 6 inch plaster rolls.

b. Place 3 stack of sheets on each padding, cut excess as needed.

NOTE: The sheets should be centered on the padding leaving a 1/2 inch edge on all sides.

10. Measure patient's injured ankle w/ goniometer.

a. Position the patient's injured ankle at a 90 degree angle to the tibia.

NOTE: There are several ways to maintain the ankle at a 90 degree angle. The patient could maintain the ankle position, nursing personnel or family member may assist, a thigh holder may be used, or place the patient in the prone position. It is the technician preference.

b. Place the stationary arm of the goniometer parallel to the tibia.

c. Place the moving arm of the goniometer in line with the lateral edge of the heel and the head of the fifth metatarsal (little toe).

d. Place the protractor of the goniometer on the lateral malleolus.

e. Set the ankle until the goniometer measures 90 degrees of dorsiflexion.

NOTE: To assist the patient in maintaining a 90 degree angle, have the patient bend the knee and point toes upward or simulate squashing a bug with the heel of their foot. This will assist in maintaining the ankle at a 90 degree angle.

NOTE: The technician may use their own style to assist patient.

11. Apply posterior splint (L) to injured leg.

a. Place thigh holder under patient's injured leg (hamstring region)

CAUTION: Depending on the orthopaedic device used, the circulation to the toes and foot may be constricted. Always communicate with the patient and remove device if patient complains about toes falling asleep or technician observes color change in the foot.

NOTE: All short leg splints (SLS) are applied in neutral position (90 degrees dorsiflexion) absent of inversion and eversion, unless otherwise indicated by physician.

b. Maintain ankle at a 90 degree angle to the tibia.

c. Hold each end of the plaster sheets, place in bucket of tepid water and remove when bubbles cease to rise.

d. Squeeze the splint together.

NOTE: Squeezing the roll together equally distributes the water. Wringing the roll quickens the drying time of the splint and may cause the plaster not to cure.

e. Place the plaster sheets centered and 1/2 inch from the edge of the padding and laminate plaster.

f. Laminate plaster splint.

g. Fold over the edges of the padding.

h. Place additional layer of webril padding over folded edges.

i. Place the padded splint on posterior side of the leg from the tips of the toes to 3 inches distal to the popliteal space.

12. Secure the splint to injured leg.

a. Place the edge of the elastic bandage at the base of the phalanges and begin wrapping around the foot two rotations to secure the edge.

b. Continue down the foot and leg until the padding is completely covered.

c. Fold down and hold excess ends of the padding while continuing to wrap the bandage until the padding is completely covered.

d. Secure elastic bandage with clips temporary.

e. Tape down the elastic bandage between the clips.

f. Remove the clips and dispose in trash receptacle.
Performance Steps

13. Apply medial/lateral(U) splint to injured leg.
   a. Follow steps 11c-h.
   b. Place the padded splint on medial side of the leg around the heel and up the lateral aspect of the leg 3 inches distal to the popliteal space.
   c. Follow step 12.

14. Mold the splint to the ankle/leg
   a. Place palm of hand on the gastrocnemius muscle and apply pressure. Hold until the contour takes shape.
   b. Place lateral aspect of both thumbs on the malleolus and apply even pressure. Hold until the contour takes shape.
   c. Place palm of hand on the calcaneus and apply pressure. Hold until the contour takes shape.
   d. Place palm of hand on the planter arch and apply pressure. Hold until the contour takes shape.

15. Check range of motion (ROM) of phalanges and knee.
   a. Have patient extend, flex toes.
   b. Have patient extend and flex knee.

16. Check alignment of injured ankle with goniometer.
   a. Place the stationary arm of the goniometer parallel to the fibula.
   b. Place the moving arm of the goniometer vertically, bisecting the 5th MTPJ.
   c. Place the protractor of the goniometer on the lateral malleolus.
   d. The goniometer should measure 90 degrees of dorsiflexion.
   NOTE: If the malleolus is not at 90 degrees of dorsal flexion, everted or inverted remove splint and go to step 8 to repeat process.

17. Check splint dimensions.
   a. The tips of the toes are visible.
   b. The splint edges rest one inch below the fibula head/notch (or 3 inches distal to the popliteal space) to the tips of the toes.

18. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

19. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
   NOTE: Use alcohol pads or fresh water from the faucet and not from the casting bucket.

20. Administer a crutch ambulation treatment (Task 081-836-0041).

   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or some form of written instruction.
   c. Instruct patient to keep leg elevated and flex and extend toes to increase circulation in the foot.
   d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the splint (e.g., writing or coloring the cast).
   e. Instruct patient to use crutches when walking.

22. Annotate the procedure applied to patient in medical record or SF 513.
**Performance Steps**

NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

23. Escort patient to front desk to make a follow up appointment.

**Performance Measures**

<table>
<thead>
<tr>
<th>Step Description</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
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<td>2. Identified yourself to patient.</td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<td>4. Inspected patient's injured leg/ankle.</td>
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<td>5. Checked patient's capillary refill.</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials.</td>
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<tr>
<td>8. Prepared plaster splint for the injured leg.</td>
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<tr>
<td>10. Measured patient's injured ankle w/ goniometer.</td>
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<tr>
<td>11. Applied posterior splint to injured leg.</td>
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<tr>
<td>12. Secured splint to injured leg.</td>
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<td>13. Molded the splint to the ankle/leg.</td>
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<tr>
<td>14. Checked range of motion (ROM) of phalanges and knee.</td>
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<td>15. Checked alignment of injured ankle with goniometer.</td>
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<td>17. Checked patient's capillary refill.</td>
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<td>18. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<td>19. Administered a crutch ambulation treatment (see task number 081-836-0041).</td>
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<td>20. Gave patient verbal and written instructions on cast care</td>
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<tr>
<td>21. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>22. Escorted patient to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

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Conditions: Given an orthopaedic patient requiring a Long Arm Posterior Splint (LAPS), in supine or sitting position on an orthopaedic examination bed, nursing personnel, physician, physician's verbal or written orders, family member, patient's medical record, or Standard Form 513 (consultation form), work cart/station, sink, (3) roll of 6 inch webril (cast padding), (4) rolls of 4 inch plaster, (4) rolls of 6 inch plaster, box of 4 x 15 plaster reinforcement sheets, box of 5 x 30 plaster reinforcement sheets, examination gloves, scissors, (3) hospital pads (chux), (2) bed sheets, goniometer, ruler, tape measure, bucket of water w/plastic bag, sink, tube of surgical lubricant, orthopaedic bump, (3) elastic bandages, box of alcohol pads/damp towel, pillow, roll of 2 inch adhesive tape, cast care booklet or equivalent, pen, sling, thermometer and trash receptacle.

Standards: Is reached when a posterior splint is secured to the patient's injured arm from the distal palmar crease/metacarpophalangeal joints to 2 inches distal to the axilla by (3) elastic bandages. The wrist is measured between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation). The elbow is measured at 90 degrees of flexion, (absent of pronation and supination), with the fingers and thumb having full range of motion. Capillary refill test is administered to the fingers and passed.

Performance Steps

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   NOTE: The Long Arm Posterior Splint (LAPS) is applied from the distal palmar crease (DPC) to 2 inches distal to the axilla or base of the deltoid muscle, with elbow flexed at a 90 degree angle. The wrist will be placed in a neutral position (0-15 degrees dorsal extension), absent of radial, ulnar deviation, pronation, supination with the fingers and thumb having full range of motion (ROM).

CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient sitting or supine on examination bed.
   c. Inspect both arms for any skin conditions (e.g., cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   d. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's hands/fingers.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.
Performance Steps

6. Gather equipment to include scissors, thermometer and bucket of tepid water w/ plastic bag.
   Place on work cart or station.
   CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury
   (possible burns) to the patient. The technician should draw room temperature water and initially use a
   thermometer to gauge water temperature.

   CAUTION: The technician must change the water after each application as the residue in the cast
   bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed
   sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (3) plaster
   rolls from packages and place on work cart/station.
   NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size
   will determine which casting material (fiberglass/plaster) will be used.

8. Measure patient's uninjured elbow w/ goniometer.
   a. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patient's should be given a covering( e.g. chux, bed sheet) to reduce damaging their clothing
   during the casting process .
   b. Place work cart with orthopaedic bump at the edge of the bed.
   c. Position the patient's uninjured elbow at a 90 degree angle to the upper torso.
   NOTE: There are several ways to obtain a 90 degree angle. The patient could maintain the position,
   nursing personnel or family member can assist. It is the technician preference.

   NOTE: The long arm posterior splint (LAPS) is applied with elbow at 90 degrees flexion and wrist
   between 0-15 dorsal extension, absent of supination and pronation, unless otherwise indicated by
   physician's order.
   d. Place the stationary arm of the goniometer bisecting the humerus.
   e. Place the moving arm of the goniometer bisecting the 2nd and 3rd metacarpals.
   f. Place the protractor of the goniometer on the olecranon process( elbow ).
   g. Set the elbow until the goniometer measures 90 degrees of flexion.

9. Measure patient's uninjured wrist w/ goniometer.
   a. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
   b. Place the moving arm of the goniometer bisecting the 5th phalange(little finger).
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.

10. Prepare cast padding (webril) for posterior splint.
    a. With the patient's uninjured arm at a 90 degree angle to the upper torso, locate the distal
        palmar crease(DPC) and base of the deltoid muscle.
    NOTE: The distal palmar crease( DPC ) is the distal diagonal line on the volar aspect of the hand. The
    deltoid muscle is at the base of the upper arm, or 2 inches from the axilla region on the lateral side.
    b. Measure from the DPC to 2 inches distal to the axilla region.
    c. Place measure webril on work station/cart.
    d. Roll out second layer and bisect the middle of the previous padding.
    e. Layer the padding 2-4 thickness.

    a. Measure the lateral aspect of the upper arm from base of the deltoid muscle to mid forearm.
    b. Measure the medial aspect of the upper arm from the base of the deltoid muscle to mid
        forearm.
    NOTE: The physician may choose to use one stirrup to encompass the elbow. The measurement will be
    the same.
    c. Place measured webril lengths on work station/cart.
    d. Roll out second layer and bisect the middle of the each previous padding.
Performance Steps
  e. Layer each padding 2-4 thickness.

12. Prepare plaster splint.
   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of 2 stacks and remove from package. Place on work cart/station.
   NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out 10-15 layers of plaster sheets.
   b. Open box of 4 x 15 inch plaster reinforcement sheets. Remove and unwrap package. Locate edges of 10-15 plaster sheets and remove from package. Place on work cart/station.
   NOTE: The technician may choose to use 4 inch plaster rolls.
   c. Place stack of 15-20 (5 x 30 inch) plaster sheets 1/2 inch distal to the edge of the webril, cut off excess amount. Place on work cart/station.
   d. Place stack of 5-10 (4 x 15 inch) plaster sheets 1/2 inch distal to the edge of the webril, cut off excess amount. Place on work cart/station.
   NOTE: Discard all excess materials in trash receptacle.

13. Apply posterior splint to injured arm.
   NOTE: Assistance(e.g. family member, nurse) may be used when securing splint.
   a. Hold each end of the plaster sheets, place in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the splint together (do not wring the roll).
   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
   d. Laminate plaster splint.
   e. Fold over the edges of the padding.
   f. Place additional layer of padding over folded edges.
   g. Place the padded splint on posterior side of the arm from the DPC to 2 inches distal to the axilla.

14. Apply stirrups to splint.
   a. Hold end of first stirrup, place in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the splint together (do not wring the splint).
   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding and laminate plaster.
   d. Laminate plaster splint.
   e. Fold over the edges of the padding.
   f. Place additional layer of webril padding over folded edges.
   g. Place the padded splint on the medial side of the posterior splint from the base of the deltoid muscle to mid forearm.
   h. Repeat steps 13 a-g for lateral splint.

15. Secure posterior splint and stirrups to injured arm.
   a. Place the edge of the elastic bandage on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
   b. Fold down and hold excess ends of the padding, wrap a figure of eight around the elbow, continue down the arm until the padding is completely covered.
   c. Secure elastic bandage with clips.
   d. Tape down the elastic bandage between the clips.
   e. Remove the clips and dispose in trash receptacle.

16. Mold the splint to the arm.
   a. Place palm of hand on the triceps muscle and apply pressure. Hold until contours takes shape.
   b. Place palm of hand on the olecranon (elbow) and apply pressure. Hold until contours takes shape.
   c. Place palm of hand along the ulnar and apply pressure. Hold until contours takes shape.

17. Check range of motion (ROM) of phalanges and shoulder.
Performance Steps

a. Have patient extend, flex fingers.
b. Have patient adduct and abduct arm.

18. Check alignment of injured elbow with goniometer.
   a. Place the stationary arm of the goniometer parallel to the forearm bisecting the 2nd and 3rd phalanges.
   b. Place the moving arm of the goniometer vertically, bisecting the humerus.
   c. Place the protractor of the goniometer on the lateral olecranon (elbow).
   d. The goniometer should measure 90 degrees of flexion.
   
NOTE: If the elbow is not at 90 degrees of flexion, supinated or pronated remove splint and go to step 8.

19. Check splint dimensions.
   a. The distal edge of the cast rests at the DPC.
   b. The splint proximal edge rests two inches distal to the axilla region or at base of deltoid muscle.

20. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

21. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
   
NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

22. Fit patient with a sling.

23. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep arm elevated and flex and extend fingers to increase circulation in the hand
   d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding).

24. Annotate the procedure applied to patient in medical record or SF 513.
   
NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

25. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
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<tr>
<th>Performance Measures</th>
<th>GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician( reviewed if in writing)</td>
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<tr>
<td>2. Identified yourself to the patient.</td>
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<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<td>6. Gathered equipment</td>
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<td>7. Assembled materials</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
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<tr>
<td>8. Measured patient's uninjured elbow w/ goniometer.</td>
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<tr>
<td>10. Prepared cast padding (webril) for posterior splint.</td>
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<tr>
<td>13. Applied posterior splint to injured arm.</td>
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<tr>
<td>15. Secured posterior splint and stirrups to injured arm.</td>
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<td>16. Molded the splint to the arm.</td>
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<td>17. Checked range of motion (ROM) of phalanges and shoulder.</td>
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<tr>
<td>21. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<td>22. Fitted patient with a sling.</td>
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<td>23. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>25. Escorted patient to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

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**APPLY A GUTTER SPLINT**

**081-834-0032**

**Conditions:** Given an orthopaedic patient requiring a Gutter Splint, in supine or sitting position on an orthopaedic examination bed, family members, nursing personnel, physician, physician’s verbal or written orders, patient’s medical record, or Standard Form 513 (consultation form), work cart/station, sink, (3) roll of 4 inch webril(cast padding), (2) rolls of 4 inch plaster, box of 4 x 15 plaster reinforcement sheets, box of 5 x 30 plaster reinforcement sheets, examination gloves, scissors, (3) hospital pads (chux), (2) bed sheets, goniometer, ruler, tape measure, bucket of water w/ plastic bag, sink, orthopaedic bump, (3) elastic bandages, box of alcohol pads/damp wash cloth, towel, pillow, roll of 2 inch adhesive tape, cast care booklet or equivalent, pen, sling, thermometer and trash receptacle.

**Standards:** Is reached when a splint is applied on the dorsal aspect of the injured hand from the tips of the 4th and 5th phalanges to 1 inch distal to the cubitum space and secured with elastic bandages. The wrist is measured between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation) and the 4th and 5th metacarpals are measured between 70-90 degrees of flexion, with the uninjured phalanges and thumb having full range of motion. Capillary refill test is administered to all phalanges and successfully passed.

**Performance Steps**

1. Receive the order from the physician (review if in writing)
2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.
3. Explain the procedure to the patient.
   NOTE: The Ulnar gutter splint is applied from the tips of the 4th and 5th phalanges to 1 inch distal to the cubitum space with wrist between 0-15 degrees of dorsal extension and phalanges between 70-90 degrees of flexion. The wrist will be absent of radial, ulnar deviation, pronation, supination with the uninjured fingers and thumb having full range of motion (ROM).
4. Inspect patient’s arms.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician’s instruction.
   c. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient’s belongings in NCOIC office.
5. Check capillary refill of patient’s hands/fingers.
   a. Squeeze patient’s fingers and nail beds will turn white.
   b. Release patient’s fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician’s instruction.
6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.
**Performance Steps**

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (2) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webril) for ulnar splint.
   a. Place work cart with orthopaedic bump at the edge of the bed.
   b. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patient's should be given a covering(e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.
   c. Position the patient's uninjured elbow on the bump with arm at a 45 degree angle to the floor. Locate the 4th and 5th phalanges.
   NOTE: The 4th and 5th metacarpals (knuckles) are on the dorsal aspect of the hand.
   d. Measure from the tips of the 4th and 5th phalanges, down the ulnar to 1 inch distal to the cubitum space.
   NOTE: Instruments of measurements may vary (e.g. tape measure, ruler or webril)
   e. Place measure webril on work station/cart.
   f. Roll out second layer and bisect the middle of the previous padding.
   g. Layer the padding 2-4 thickness.

9. Prepare plaster splint for the ulnar aspect of the hand.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.
   NOTE: The technician may choose to use 3 or 4 inch plaster rolls if 4 x 12 sheets are not wide or long enough.
   b. Locate the 4th and 5th metacarpals.
   c. Remove (1) plaster sheet from the stack of (10-15).
   d. Place sheet on the dorsal side of the patient's hand/forearm, distal to the 4th and 5th phalanges and covering the metacarpals.
   Caution: The plaster sheets must be wide enough( to cover the 4th and 5th metacarpals circumferential) and long enough (distal to the injured phalanges to 1 inch to the cubitum space) to protect the injury.
   e. Hold the plaster sheet vertically and cut a 1 inch line in the middle of the plaster sheet (V cut).
   NOTE: The vertical cut (or V cut) enables the plaster to be evenly centered both on the dorsal and volar sides of the phalanges.
   f. Place sheet on stack, cut the outlined pattern and excess length for all sheets, and place on work cart/station for later use.
   NOTE: Discard all excess materials in trash receptacle.

10. Measure patient's injured wrist w/goniometer.
    a. Position the patient's injured elbow on the orthopaedic bump at a 45 degree angle to the floor.
    NOTE: There are several ways to obtain a 45 degree angle. The patient could maintain the position, nursing personnel or family member can assist. It is the technician preference.
    b. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
    c. Place the moving arm of the goniometer bisecting the 5th phalange.
    d. Place the protractor of the goniometer on the ulnar styloid.
    e. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.
Performance Steps

11. Measure patient's uninjured 4th and 5th phalanges w/ goniometer.
   a. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
   b. Place the moving arm of the goniometer bisecting the 5th phalange.
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. Set the phalanges until the goniometer measures between 70-90 degrees of flexion.

12. Apply ulnar gutter splint to injured arm.
   NOTE: Assistance (family member or nurse) may be used to secure splint to injured arm.
   NOTE: The ulnar gutter splint is applied with the wrist between 0-15 degrees of dorsal extension, absent of radial and ulnar deviation and supination and pronation and the 4th and 5th phalanges flexed between 70-90 degrees, unless otherwise indicated by physician's order.
   a. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the sheets together to eliminate excess water.
   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
   d. Laminate plaster splint.
   e. Cut the webbril in line with the plaster vertical cut.
   f. Fold over the edges of the padding.
   g. Place additional layer of padding over folded edges.
   h. Place padding between the fourth and fifth phalanges.
   NOTE: Padding is placed between the phalanges to reduce maceration of the skin.
   i. Tape the injured phalanges together.
   NOTE: Tapping the injured phalanges reduces rotation of the phalanges when splinted.
   j. Check the position of the phalanges.
   CAUTION: Always position the injury and then apply the splint. Never apply the splint and then position. This may cause further injury (e.g. pressure sores) to the patient.
   k. Place the padded splint on the ulnar aspect of the hand covering the 4th and 5th metacarpals and distal to the injured phalanges.
   CAUTION: The 4th and 5th metacarpals must be covered circumferential by the splint to properly immobilize the injury and prevent further injury to the patient.

   a. Hold elastic roll with one hand.
   b. Place the edge of the elastic bandage on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
   c. Continue through the palm, around the 4th and 5th phalanges back up the forearm ending 1 inch distal to the cubitum space.
   d. Secure elastic bandage with clips.
   e. Tape down the elastic bandage in between the clips.
   f. Remove the clips and dispose in trash receptacle.

14. Mold splint to forearm/wrist.
   NOTE. The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.
   CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel? Is the pressure too much?)
   e. Remove heels of each hand from splint when contours of the wrist and forearm have been shaped and splint is cured.
### Performance Steps

<table>
<thead>
<tr>
<th>Performance Step</th>
<th>Description</th>
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| 15. Mold the splint to the 4th and 5th metacarpals. | **NOTE.** This mold is used to prevent movement of the metacarpals in the splint and promote fracture healing.  
   a. Place heel of hand on the dorsal aspect of the injured phalanges and apply gradual pressure.  
   **NOTE:** The physician may apply an additional mold.  
   b. Maintain patient's injured phalanges in correct position.  
   c. Remove palm of hand from splint when contours of the phalanges and wrist have been shaped, the phalanges are between 70-90 degrees of flexion and the splint is cured. |
| 16. Check range of motion (ROM) of uninjured phalanges and elbow. | a. Have patient extend and flex non injured fingers and touch to thumb.  
   b. Have patient extend and flex elbow |
| 17. Check alignment of injured wrist and phalanges with goniometer. | a. Place the stationary arm of the goniometer vertically, bisecting the forearm.  
   b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger).  
   c. Place the protractor of the goniometer on the ulnar styloid.  
   d. The wrist is measured between 0-15 degrees dorsal extension and the injured phalanges between 70-90 degrees of flexion.  
   **NOTE:** If wrist is not within 0-15 degrees of dorsal extension, phalanges are not within 70-90 degrees of flexion, ulnar or radial deviation are present, remove splint and go to step 11. |
| 18. Check splint dimensions. | a. Proximal edge of splint is 1 inch distal to the cubitum space.  
   b. The splint is covering both the 4th and 5th metacarpals.  
   **NOTE:** If splint is not covering the 4th and 5th metacarpals, remove splint and go to step 12.  
   c. The distal edge of the splint is 1/2 inch distal to the injured phalanges tips.  
   **NOTE:** If the splint is not distal to the injured phalanges and the distal interphalangeal joint (DIP) is allowed to flex, remove splint and go to step 8. |
| 19. Check patient's capillary refill. | a. Squeeze patient's fingers and nail beds will turn white.  
   b. Release patient's fingers and nail beds will return pink.  
   **CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction. |
| 20. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad. | **NOTE:** Use alcohol pad or fresh water from the faucet and not from the casting bucket. |
| 21. Fit patient with a sling. | **NOTE:** Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference. |
| 22. Give patient verbal and written instructions on cast care. | a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.  
   b. Present patient with cast care booklet or (written instruction)  
   c. Instruct patient to keep arm elevated and flex and extend uninjured fingers to increase circulation in the hand  
   d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding). |
| 23. Annotate the procedure applied to patient in medical record or SF 513. | **NOTE:** Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name. |
Performance Steps

24. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>GO</th>
<th>NO GO</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Received the order from the physician (reviewed if in writing)</td>
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<tr>
<td>2.</td>
<td>Identified yourself to the patient.</td>
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<tr>
<td>3.</td>
<td>Explained the procedure to the patient.</td>
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<td>4.</td>
<td>Inspected patient’s arms.</td>
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<td>6.</td>
<td>Gathered equipment</td>
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<td>7.</td>
<td>Assembled materials</td>
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<td>8.</td>
<td>Prepared cast padding (webril) for ulnar splint.</td>
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<td>9.</td>
<td>Prepared plaster splint for the ulnar aspect of the hand.</td>
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<tr>
<td>10.</td>
<td>Measured patient’s injured wrist w/ goniometer.</td>
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<tr>
<td>11.</td>
<td>Measured patient’s uninjured 4th and 5th phalanges w/ goniometer.</td>
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<tr>
<td>12.</td>
<td>Applied ulnar gutter splint to injured arm.</td>
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<tr>
<td>14.</td>
<td>Molded splint to forearm/wrist.</td>
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<tr>
<td>15.</td>
<td>Molded splint to the 4th and 5th metacarpals.</td>
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<tr>
<td>16.</td>
<td>Checked range of motion (ROM) of uninjured phalanges and elbow.</td>
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<tr>
<td>17.</td>
<td>Checked alignment of injured wrist and injured phalanges with goniometer.</td>
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<tr>
<td>18.</td>
<td>Checked splint dimensions.</td>
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<tr>
<td>20.</td>
<td>Cleaned plaster off patient’s skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>22.</td>
<td>Gave patient verbal and written instructions on cast care.</td>
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<td>23.</td>
<td>Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>24.</td>
<td>Escort patient to front desk to make a follow up appointment.</td>
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</table>

Evaluation Guidance: Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

References

- Required
  - 0812110-0765
  - 0-8342-0763-X
  - 38709590
References

Required

Related

TM 8-231
APPLY A SHORT ARM VOLAR SPLINT
081-834-0033

Conditions: Given an orthopaedic patient requiring a Short Arm Splint (SAS), sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (3) rolls of 4 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (3) rolls of 4 inch webril, (2) 3 inch elastic bandages, examination gloves, 1 pair of scissors, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, orthopaedic bump, thermometer and trash receptacle.

Standards: Is reached when a short arm splint is secured to the volar aspect of the patient's injured arm from the distal palmar crease (DPC) / metacarpophalangeal joints (MCPJ'S) to 1 inch distal to the cubitum space by (2) elastic bandages. The wrist is measured between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation, pronation or supination), with the fingers and thumb having full range of motion. Capillary refill test is administered to the fingers and thumb and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   NOTE: The Short Arm Splint (SAS) is applied from the distal palmar crease (DPC) to 1 inch distal to the cubitum space with wrist between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation, pronation or supination), with the fingers and thumb having full range of motion (ROM).
   CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient sitting or supine on examination bed.
   c. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   d. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's hands/fingers.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.
Performance Steps

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (2) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webril) for volar splint.
   a. Place work cart with orthopaedic bump at the edge of the bed.
   b. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

c. Position the patient's uninjured elbow on the bump at a 45 degree angle to the upper torso. Locate the DPC and base of the thenar muscle.

NOTE: The DPC is the distal diagonal line on the volar aspect of the hand. The thenar muscle is at the base of the thumb on the medial side.

d. Measure from 1 inch distal to the DPC to 1 inch distal to the cubitum space.

e. Place webril on work cart/station.

f. Roll out second layer and place lengthwise on the middle of the previous padding.

g. Layer the padding 2-4 thickness.

9. Prepare plaster splint for the volar aspect of the hand.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.

NOTE: The technician may choose to use 4 inch plaster rolls.

b. Locate DPC, thenar muscle and the cubitum space.

c. Remove (1) plaster sheet from the stack of (10-15).

d. Place sheet next to uninjured arm to obtain sheet length, the DPC and thenar muscle contours.

NOTE: To increase patient cleanliness the sheet does not have to rest on the patient skin.

e. Draw a diagonal line on the plaster sheet that matches with the DPC of patient's hand.

NOTE: The diagonal line which will be cut will facilitate free ROM of the fingers (extension and flexion).

f. Draw a curved line (half moon shape) on the plaster sheet that matches with the outer border of the thenar muscle on the patient's hand.

NOTE: The half moon pattern enables the thenar muscle to be observable and the thumb to adduct to all fingers promoting free range of motion (ROM).

g. Place sheet on stack, cut the outlined patterns and excess length for all sheets, and place on work cart/station for later use.

NOTE: Discard excess material in the trash receptacle.

10. Measure patient's injured wrist w/goniometer.
    a. Position the patient's injured elbow on the bump at a 45 degree angle to the upper torso.
    b. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
    c. Place the moving arm of the goniometer bisecting the 5th phalange.
    d. Place the protractor of the goniometer on the ulnar styloid.
    e. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.

11. Apply volar splint to injured arm.

NOTE: Assistance may be used prior to securing splint.
Performance Steps
a. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the sheets together to eliminate excess water.
NOTE: Do not wring the sheet, this will cause the roll to dry up quickly
   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
   d. Laminate plaster splint.
   e. Fold over the edges of the padding.
   f. Place additional layer of padding over folded edges.
   g. Place the padded splint on the volar aspect of the hand aligned with the DPC and the thenar muscle.

12. Secure volar splint to injured arm.
   a. Hold elastic roll with one hand.
   b. Place the edge of the elastic bandage on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
   c. Continue through the palm and back up the forearm covering all the padding.
   d. Secure elastic bandage with clips.
   e. Tape down the elastic bandage between the clips.
   f. Remove the clips and dispose in trash receptacle.

13. Mold the splint to forearm/wrist.
NOTE. The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.
CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
   e. Maintain patient's wrist in correct position.
NOTE: The patient's wrist should be in the cock up position (thumb and index finger in opposition to each other)
   f. Remove heels of each hand from splint when contours of the wrist and forearm have been shaped and splint is cured.

14. Check range of motion (ROM) of phalanges and elbow.
   a. Have patient extend, flex fingers and touch thumb to all fingers.
   b. Have patient extend and flex elbow.

15. Check alignment of injured wrist with goniometer.
   a. Place the stationary arm of the goniometer vertically, bisecting the ulnar.
   b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger)
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. The wrist is measured between 0-15 degrees of dorsal extension.
NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove splint and go to step 9.

16. Check splint dimensions.
   a. The splint edge is resting on the DPC.
   b. The edge of the splint is resting on thenar muscle border.

17. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.
### Performance Steps

18. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.  
**NOTE:** Use alcohol pad or fresh water from the faucet and not from the casting bucket.

19. Fit patient with a sling.  
**NOTE:** Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles’, Smith’s, Bennett’s), patient’s comfort, physician’s or technician’s preference.

20. Give patient verbal and written instructions on cast care.  
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or ('written instruction')
   c. Instruct patient to keep arm elevated and flex and extend uninjured fingers to increase circulation in the hand
   d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding).

21. Annotate the procedure applied to patient in medical record or SF 513.  
**NOTE:** Record the procedure applied and cast care instruction provided to the patient in patient’s medical record or Standard Form 513 and sign your name.

22. Escort patient to front desk to make a follow up appointment.

### Performance Measures

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<thead>
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<tr>
<td>4.</td>
<td>Inspected patient’s arms</td>
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<tr>
<td>5.</td>
<td>Checked capillary refill of patient’s hands/fingers</td>
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<td>6.</td>
<td>Gathered equipment</td>
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<tr>
<td>11.</td>
<td>Applied volar splint to injured arm</td>
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<td>12.</td>
<td>Secured volar splint to injured arm</td>
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<tr>
<td>13.</td>
<td>Molded the splint to forearm/wrist</td>
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<td>Checked range of motion (ROM) of phalanges and elbow</td>
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<td>Checked splint dimensions</td>
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<td>17.</td>
<td>Checked patient’s capillary refill</td>
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</tr>
<tr>
<td>18.</td>
<td>Cleaned plaster off patient’s skin using a damp wash cloth, towel or alcohol pad</td>
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<tbody>
<tr>
<td>19. Fitted patient with a sling.</td>
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<tr>
<td>20. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>21. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>22. Escorted patient to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

### References

**Required**

- 0812110-0765
- 0-8342-0763-X
- 38709590
- TM 8-231
**APPLY A SUGAR TONG SPLINT**

**081-834-0034**

**Conditions:** Given an orthopaedic patient requiring a Sugar Tong Splint (STS) sitting or supine on a orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (4) rolls of 4 or 6 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, box of 5 x 30 inch plaster reinforcement sheets, (2) rolls of 4 inch webril, (2) 3 inch elastic bandages, examination gloves, scissors, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, orthopaedic bump, thermometer and trash receptacle.

**Standards:** Is reached when the patient's injured arm from the base of the metacarpophalangeal joints (MCPJ's) to the Distal Palmar crease (DPC) is immobilized by a sugar tong splint (STS) and secured with (2) elastic bandages. The elbow is measured at 90 degrees of flexion (absent of pronation or supination). The wrist is measured between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation) with the fingers having full range of motion and thumb having restricted movement. Capillary refill test is administered to the fingers and successfully passed.

**Performance Steps**

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<td>2.</td>
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<td>NOTE:</td>
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</tr>
<tr>
<td>3.</td>
<td>Explain the procedure to the patient.</td>
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</tbody>
</table>
Performance Steps

NOTE: The Sugar Tong splint (STS) will be applied from the base of the metacarpophalangeal joints (MCPJ’s), posteriorly around the elbow to the distal palmer crease (DPC). The elbow will be flexed at 90 degrees, with the wrist between 0-15 degrees of dorsal extension and absent of radial, ulnar deviation, pronation, supination. The fingers will have full range of motion (ROM) with the thumb having restricted movement. (Refer to Figure 3-x).

CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient’s arms.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient sitting or supine on examination bed.
   c. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician’s instruction.
   d. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.
Performance Steps

5. Check capillary refill of patient's hands/fingers.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (2) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webril) for sugar tong splint.
   a. Place work cart with orthopaedic bump at the edge of the bed.
   b. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.
   c. Position the patient's uninjured elbow on the bump at a 90 degree angle to the floor. Locate the DPC and MCPJ's.

NOTE: The DPC is the distal diagonal line on the volar aspect of the hand. The MCPJ's are the knuckles on the dorsal side of the hand.
   d. Measure from distal to the MCPJ's, posteriorly around the elbow, to the DPC.

NOTE: Instruments of measurement may vary (e.g. tape measure, plaster sheet or webril).
   e. Place instrument of measure on work cart/station.
   f. Roll out two layers of webril bisecting each other.
   g. Layer the padding 2-4 thickness.

9. Prepare plaster splint for the volar and dorsal aspects of the forearm.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.

NOTE: The technician may choose to use 4 inch plaster rolls.
   b. Locate DPC and the MCPJ's.
   c. Remove (1) plaster sheet from the stack of (10-15).
   d. Place sheet next to uninjured arm to obtain sheet length, the DPC and MCPJ's contours.

NOTE: To increase patient cleanliness the sheet does not have to rest on the
   e. Place sheet on stack, cut excess length for all sheets, and place on work cart/station for later use.

NOTE: Discard excess materials in the trash receptacle.

10. Measure patient's injured wrist w/ goniometer.
    a. Position the patient's injured elbow on the bump at a 90 degree angle to the upper torso.
    b. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
    c. Place the moving arm of the goniometer bisecting the 5th phalange.
    d. Place the protractor of the goniometer on the ulnar styloid.
    e. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.
Performance Steps

11. Measure patient's injured elbow w/ goniometer.
   a. Place the stationary arm of the goniometer bisecting the lateral aspect of the humerus.
   b. Place the moving arm of the goniometer bisecting the forearm.
   c. Place the protractor of the goniometer on the olecranon process (elbow).
   d. Set the elbow until the goniometer measures 90 degrees of flexion.

12. Apply single tong splint to injured arm.
   NOTE: Assistance may be used prior to securing splint.
   a. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the sheets together to eliminate excess water.
   NOTE: Do not wring the sheet, this will cause the roll to dry up quickly.
   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
   d. Laminate plaster splint.
   e. Fold over the edges of the padding.
   f. Place additional layer of padding over folded edges.
   g. Place the padded splint from the base of the MCPJ's posteriorly around the elbow to the DPC.
   NOTE: The elbow should be flexed at 90 degrees.

13. Secure sugar tong splint to injured arm.
   a. Hold elastic roll with one hand.
   b. Place the edge of the elastic bandage on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
   c. Continue through the palm, back up the forearm and figure of eight around the elbow.
   d. Secure elastic bandage with clips.
   e. Tape down the elastic bandage between the clips.
   f. Remove the clips and dispose in trash receptacle.

14. Mold the splint to forearm/wrist.
   NOTE: The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.
   CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
   e. Maintain patient's wrist in correct position.
   f. Remove heels of each hand from splint when contours of the wrist and forearm have been shaped and splint is cured.

15. Mold splint to elbow.
   a. Place the heel of one hand on the anterior aspect of the elbow.
   b. Place the heel of one hand on the posterior aspect of the elbow.
   c. Apply firm and gradual pressure at the elbow and maintain the elbow in correct position.
   d. Remove heels of each hand from splint when contours of the elbow have been shaped and splint is cured.

16. Check range of motion (ROM) of phalanges/shoulder.
   a. Have patient extend and flex fingers.
   b. Have patient abduct and adduct shoulder.

17. Check alignment of injured wrist/elbow with goniometer.
   a. Place the stationary arm of the goniometer vertically, bisecting the ulnar.
Performance Steps

b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger).
c. Place the protractor of the goniometer on the ulnar styloid.
d. The wrist is measured between 0-15 degrees of dorsal extension.

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove splint and go to step 11.
e. The elbow is measured at 90 degrees of flexion.

18. Check splint dimensions.
   a. The dorsal edge of the splint is at the base of the MCPJ's.
   b. The volar edge of the splint is flush with the DPC.

19. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

20. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.

NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

21. Fit patient with a sling.

NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

22. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep arm elevated and flex and extend uninjured fingers to increase circulation in the hand
   d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding).

23. Annotate the procedure applied to patient in medical record or SF 513.

NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

24. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>GO</th>
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<tbody>
<tr>
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<td>3. Explained the procedure to the patient.</td>
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<td>4. Inspected patient's arms.</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials.</td>
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<tr>
<td>8. Prepared cast padding (webril) for sugar tong splint.</td>
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<td>9. Prepared plaster splint for the volar and dorsal aspects of the forearm</td>
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<td>Performance Measures</td>
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<tr>
<td>10. Measured patient's injured wrist w/ goniometer.</td>
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<tr>
<td>11. Measured patient's injured elbow w/ goniometer.</td>
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<tr>
<td>12. Applied single tong splint to injured arm.</td>
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<tr>
<td>13. Secured sugar tong splint to injured arm.</td>
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<tr>
<td>14. Molded the splint to forearm/wrist.</td>
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<tr>
<td>15. Molded splint to elbow.</td>
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<tr>
<td>16. Checked range of motion ( ROM ) of phalanges/shoulder.</td>
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<tr>
<td>17. Checked alignment of injured wrist/elbow with goniometer.</td>
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<tr>
<td>18. Checked splint dimensions.</td>
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<td>20. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>22. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>23. Annotated the procedure applied to patient in medical record or SF 513.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**  
**Required**  
0812110-0765  
0-8342-0763-X  
38709590  
TM 8-231
APPLY A LONG LEG SPLINT
081-834-0035

Conditions: Given an orthopaedic patient requiring a Long Leg Splint (LLS) sitting or supine on an orthopaedic examination bed, nursing personnel, physician, family member, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (5) rolls of 6 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (5) rolls of 6 inch webril, (5) elastic bandages, examination gloves, scissors, roll of 2 inch adhesive tape, (4) hospital pads (chux), (2) bed sheets, pillow, disposable paper shorts, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, thermometer, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, orthopaedic bump, 1 pair of crutches and trash receptacle.

Standards: Is reached when a posterior splint is secured to the patient's injured leg with (3) elastic bandages from the tips of the toes to 4 inches distal to the groin. The ankle is in neutral position (90 degrees of dorsiflexion), absent of inversion or eversion, with toes having full range of motion. The knee is flexed between 0-15 degrees. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Identify yourself to patient.
   NOTE: Tell the patient your name and job title.
3. Explain the procedure to the patient.
   NOTE: The Long Leg splint is applied from the tips of the toes to 4 inches distal to the groin with the ankle in neutral position (90 degrees dorsiflexion) and knee flexed between 0-15 degrees. The toes will have full range of motion.
   CAUTION: During the splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster ( gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.
4. Inspect patient's injured leg/ankle.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient supine on the examination bed.
   c. Remove patient's shoes and socks from both feet and pant leg on injured side.
   NOTE: Provide patient with paper shorts or hospital scrubs. If unavailable, cut the pants at the seam.
   d. Check patient's injured leg for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's order.
   e. Examine both legs for jewelry and remove if found.
   NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.
5. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.
Performance Steps

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.

   CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

   CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, box of alcohol pads and damp towel. Open and remove (3) plaster rolls from their packages and place on work cart/station.

   NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webril).
   a. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   b. Locate the fibula head.
   CAUTION: The peroneal nerve is located on the lateral side of the knee. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Measure 1 finger breadth below the fibula head and provide extra padding to the area to prevent further injury to the patient.
   c. Place the uninjured ankle at a 90 degree angle to the tibia.
   d. Place the knee between 0-15 degrees of flexion.
   e. Measure 1 inch distal to the tips of the toes to 4 inches distal to the groin.
   NOTE: Instruments of measurement may vary (e.g. tape measure, plaster sheet or webril).

   NOTE: Patient may assist technician by placing the edge of the ruler at the inguinal region, placing the width of their hand in the same manner, or the technician can locate the buttock crease and use webril to obtain distance needed. The technician may also use their own technique
   f. Place measured webril on work station/cart.
   g. Roll out second layer and place on the middle of the previous padding.
   h. Layer the padding 2-4 thickness.

   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of six stacks and remove from package. Place on work cart/station.

   NOTE: 15-20 plaster sheets are needed for all lower extremity splints.

   NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out 20-30 layers of plaster sheets.

   NOTE: The technician may choose to use 6 inch plaster rolls.
   b. Place stack of sheets on padding, cut excess as needed.

10. Measure patient's injured ankle w/ goniometer.
    a. Position the patient's injured ankle at a 90 degree angle to the tibia.

    NOTE: There are several ways to maintain the ankle at a 90 degree angle. The patient could maintain the position, nursing personnel or family member can assist. It is the technician preference.

    b. Place the stationary arm of the goniometer parallel to the tibia.

    c. Place the moving arm of the goniometer in line with the lateral edge of the heel and the head of the fifth metatarsal.

    d. Place the protractor of the goniometer on the lateral malleolus.
Performance Steps

e. Set the ankle until the goniometer measures 90 degrees of dorsiflexion.

NOTE: To assist the patient in maintaining a 90 degree angle, have the patient bend the knee and point toes upward or simulate squashing a bug with the heel of their foot. This will assist in maintaining the ankle at a 90 degree angle.

NOTE: The technician may use their own style to assist patient.

11. Measure patient's injured knee with goniometer.

   a. Place the stationary arm of the goniometer bisecting the fibula.
   b. Place the moving arm of the goniometer bisecting the femur.
   c. Place the protractor of the goniometer on the lateral aspect of the knee.
   d. Set the knee until the goniometer measures between 0-15 degrees of flexion.

NOTE: Nursing personnel or orthopaedic props (e.g. orthopaedic bump, pillow) may assist the patient in maintaining the correct knee angle.

CAUTION: Depending on the orthopaedic device used, the circulation to the toes and foot may be constricted. Always communicate with the patient and remove device if patient complains toes are falling asleep or technician observes color changes in the foot.

12. Apply posterior splint to injured leg.

NOTE: All Long leg splint (LLS) are applied in neutral position (90 degrees dorsiflexion) absent of inversion and eversion with knee flexed between 0-15 degrees, unless otherwise indicated by physician.

   a. Hold the ends of the plaster sheets, place in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the splint together.

NOTE: Squeezing the plaster sheets together equally distributes the water. Wringing the sheets quickens the drying time of the splint and may cause the plaster not to cure.

   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding and laminate plaster.
   d. Fold over the edges of the padding.
   e. Place additional layer of webril padding over folded edges.
   f. Place the padded splint on posterior side of the leg from 4 inches distal to the groin or the gluteal crease to the tips of the toes.

13. Secure long leg splint to injured leg.

   a. Hold elastic roll with one hand.
   b. Place the edge of the elastic bandage at the tips of the toes and begin wrapping around the fore foot.
   c. Continue around the malleolus up the leg.
   d. Wrap a figure of eight around the knee.
   e. Fold down and hold excess ends of the padding while continuing to wrap the bandage until the padding is completely covered.
   f. Secure elastic bandage with clips.
   g. Tape down the elastic bandage between the clips.
   h. Remove the clips and dispose in trash receptacle.
   i. Place pillow under injured leg.

14. Mold the splint to the ankle/knee/leg

   a. Place palm of hand on the gastrocnemius and apply pressure. Hold until contours takes shape.
   b. Place lateral aspect of both thumbs on the malleolus and apply even pressure. Hold until contours take shape.
   c. Place palm of hand on the calcaneus and apply pressure. Hold until contour takes shape.
   d. Place palm of hand on the plantar arch and apply pressure. Hold until contour takes shape.
   e. Place palm of hand on the hamstring region and apply pressure. Hold until contour takes shape.
**Performance Steps**

f. Place palm of hand on the posterior aspect of the knee and apply pressure. Hold until contour takes shape.

15. Check range of motion (ROM) of phalanges and hip  
   a. Have patient extend and flex toes.  
   b. Have patient raise and lower leg.

16. Check alignment of injured ankle and knee with goniometer (go to steps 10-11).  
**NOTE:** If the malleolus is not at 90 degrees of dorsal flexion, everted or inverted and knee is not between 0-15 degrees of flexion, remove splint and go to step 8.

17. Check splint dimensions.  
   a. The toes are visible.  
   b. The splint edges rest at the tips of the toes and 4 inches distal to the groin region or resting on the gluteal crease.

18. Check patient's capillary refill.  
   a. Squeeze patient's toes and nail beds will turn white.  
   b. Release patient's toes and nail beds will return pink.  
   **CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

19. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.  
**Note:** Use alcohol pad or fresh water from the faucet and not from the casting bucket.

20. Administer a crutch ambulation treatment (see task number 081-836-0041).

   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.  
   b. Present patient with cast care booklet or (written instruction)  
   c. Instruct patient to keep leg elevated and flex and extend toes to increase circulation in the foot.  
   d. Instruct patient not to stick any objects down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).  
   e. Instruct patient to use crutches when walking.

22. Annotate the procedure applied to patient in medical record or SF 513.  
**NOTE:** Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

23. Escort patient to front desk to make a follow up appointment.

**Performance Measures**

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<thead>
<tr>
<th>Performance Measures</th>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's injured leg/ankle.</td>
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<td>5. Checked patient's capillary refill.</td>
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<td>6. Gather equipment.</td>
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<td>7. Assembled materials.</td>
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<tr>
<td>Performance Measures</td>
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<tr>
<td>10. Measured patient's injured ankle w/ goniometer.</td>
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<tr>
<td>11. Measured patient's injured knee w/ goniometer.</td>
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<tr>
<td>12. Applied posterior splint to injured leg.</td>
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<tr>
<td>13. Secured long leg splint to injured leg.</td>
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<tr>
<td>14. Molded the splint to the ankle/knee/leg</td>
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<tr>
<td>15. Checked range of motion (ROM) of phalanges and hip.</td>
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<tr>
<td>20. Administered a crutch ambulation treatment (see task number 081-836-0041).</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**

- 0812110-0765
- 0-8342-0763-X
- 38709590
- TM 8-231
**APPLY A COMPRESSION DRESSING WITH A PLASTER SPLINT**

081-834-0036

**Conditions:** Given an orthopaedic patient requiring an lower or upper extremity compression dressing with plaster splint, sitting or supine on an orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (4) rolls of 6 inch plaster, box of 4 x 12 inch plaster reinforcement sheets, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 6 inch webril, box of purified cotton, (2) packages of kerlix fluffs, examination gloves, scissors, (3) elastic bandages, roll of 2 inch adhesive tape, (2) hospital pads(chux), (2) bed sheets, pillow, disposable paper shorts, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, thermometer, cast care booklet or equivalent, a box of alcohol pads, damp wash cloth or towel, sink w/faucet, orthopaedic bump, thigh holder, 1 pair of crutches T (Turnstile) stand and trash receptacle.

**Standards:** Is reached when purified cotton roll or kerlix fluffs with a reinforcement splint are secured to the injured extremity by (3) elastic bandages. Capillary refill test is administrated to the phalanges and passed successfully.

**Performance Steps**

1. **Receive the order from the physician (review if in writing).**

   NOTE: Tell the patient your name and job title.

2. ** Identify yourself to patient.**

   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.

   a. Place examination gloves on hands.
   b. Remove patient's shoes and socks from both feet. Roll pants up above the knee.
   c. Check patient's injured arm or leg for any skin conditions (e.g., cuts, abrasions, lacerations and skin rashes).

   NOTE: If patient is unable to get pants easily above knee, provide patient with paper shorts. If unavailable, cut the pants at the seam.

   d. Examine both arms or legs for jewelry and remove if found.

   NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

3. **Explain the procedure to the patient.**

   NOTE: Tell the patient why the procedure is necessary.

   For leg application: Purified cotton (Robert Jones/Bulky Jones) is applied from the tips of the toes to 4 inches distal to the groin region. A posterior splint is applied to the cotton with the ankle in neutral position (90 degrees dorsiflexion). The toes will have full range of motion.

   For the hand application: Kerlix fluffs are placed between the fingers and thumb to the proximal interphalangeal joint (PIP). The Kerlix fluffs are secured with a kerlix roll. A volar splint is secured from distal palmar crease (DPC) to 1 inch distal to the cubitum space with elastic bandages.

   CAUTION: During the splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. **Inspect patient's injured leg/ankle.**

   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.

   a. Place examination gloves on hands.
   b. Remove patient's shoes and socks from both feet. Roll pants up above the knee.
   c. Check patient's injured arm or leg for any skin conditions (e.g., cuts, abrasions, lacerations and skin rashes).

   NOTE: If patient is unable to get pants easily above knee, provide patient with paper shorts. If unavailable, cut the pants at the seam.

   d. Examine both arms or legs for jewelry and remove if found.

   NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.
Performance Steps

5. Check patient's capillary refill.
   a. Squeeze patient's phalanges and nail beds will turn white.
   b. Release patient's phalanges and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, orthopaedic bump, T stand, thigh holder, goniometer, marking pen, bucket of tepid water with plastic bag. Place on work cart/station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, box of plaster reinforcement sheets, package of purified cotton, kerlix fluffs, elastic bandages, box of alcohol pads and damp wash cloth or towel and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare splint materials.
   a. If applying compression dressing to lower extremity, go to step 9.
   b. If applying compression dressing to upper extremity, go to step 20.

   a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patients should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   b. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of three to four stacks and remove from package. Place on work cart/station.

NOTE: 15-20 plaster sheets are needed for all lower extremity splints.

NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre-stacked, count out in groups of five (20-30 layers of plaster sheets).

NOTE: The technician may choose to use (3) 6 inch plaster rolls.
   c. Locate the fibula head.

CAUTION: The fibula head is located on the lateral side of the patella. Along side the fibula head is the peroneal nerve. If the peroneal is constricted the nerve may die and cause drop foot (nerve palsy). This is an irreversible condition. Measure one finger width below the fibula head and provide extra padding to the area to prevent further injury to the patient.
   d. Place the uninjured ankle at a 90 degree angle to the tibia.

NOTE: There are several ways to position and maintain the ankle at a 90 degree angle. The patient could flex their toes, press their heel down or nursing personnel/family member can assist. It is the technician preference.
   e. Measure from 1 inch distal to the tips of the toes to 3 inches distal to the popliteal region.

NOTE: Measuring devices such as webril, tape measure or plaster sheets may be used.
   f. Place measured plaster sheets on work cart/station.

10. Prepare purified cotton roll (Bulky Jones).
    a. Open the package and remove cotton roll.
    b. Locate edge of protective wrap and extend the cotton roll.
    c. Unroll the cotton.
    d. Tear the cotton roll in half. Place on work cart/station.

NOTE: The cotton roll is design to be torn easily, however, scissors may be used.
### Performance Steps

11. **Measure patient's injured ankle with goniometer.**
   - **a.** Position the patient's injured ankle at a 90 degree angle to the tibia.
   - **NOTE:** There are several methods to maintain the patient's ankle at a 90 degree angle. The patient could flex their foot with toes pointing towards their head, nursing personnel or family member may assist, or place the patient in the prone position with toes pointing down. It is the technician preference.
   - **b.** Place the stationary arm of the goniometer parallel to the fibula.
   - **c.** Place the moving arm of the goniometer in line with the lateral edge of the heel and the head of the fifth metatarsal (little toe).
   - **d.** Place the protractor of the goniometer on the lateral malleolus.
   - **e.** Set the ankle until the goniometer measures 90 degree of dorsiflexion.

   **NOTE:** To assist the patient in maintaining the ankle at a 90 degree angle, have the patient bend the knee, point toes toward their head or simulate squashing a bug with the heel of the foot. This will assist in maintaining the ankle at the correct angle.

   **NOTE:** The technician may use their own style to assist the patient.

12. **Apply purified cotton roll to the injured ankle foot and leg.**
   - **a.** Place thigh holder under patient's injured leg (hamstring region)

   **CAUTION:** Depending on the orthopaedic device used, circulation is a major concern. Always communicate with the patient and remove device if patient complains about toes falling asleep or technician observes color change in the toes/foot.
   - **b.** Place the edge of the cotton roll at the tips of the phalanges and begin wrapping around the foot two rotation to secure the edge.
   - **c.** Continue down the foot and leg to 3 inches distal to the popliteal region.
   - **d.** Secure the cotton with kerlix roll.

   **NOTE:** The second cotton roll may be used if necessary.

13. **Apply posterior splint to injured leg.**

   **NOTE:** All short leg splints are applied with ankle in neutral position (90 degrees of dorsiflexion), absent of inversion and eversion, unless otherwise indicated by physician's order.
   - **a.** Grasp each end of the stack of plaster sheets, place in bucket of tepid water and remove when bubbles cease to rise.
   - **NOTE:** The absent of bubbles indicates the plaster sheets are equally saturated with water.
   - **b.** Squeeze the sheets together.

   **NOTE:** Squeezing the sheets together equally distributes the water. Wringing the sheets quickens the drying time of the splint and may cause the plaster not to cure.
   - **c.** Place plaster sheets on work cart/station and laminate.
   - **d.** Place the splint on the posterior side of the leg from the tips of the phalanges to 3 inches distal to the popliteal region.

14. **Secure the splint to the injured leg.**

   - **a.** Place edge of the elastic bandage at the base of the phalanges and begin wrapping around the foot two rotations to secure the edge.
   - **b.** Continue down the foot and leg.
   - **c.** Fold down and hold excess ends of the splint while continuing to wrap the bandage until the splint and cotton are completely covered.
   - **d.** Secure elastic bandage with clips temporarily
   - **e.** Tape down the elastic bandage between the clips.
   - **f.** Remove the clips and dispose in trash receptacle.

15. **Mold the splint to the ankle/leg.**

   - **a.** Place palm of hand on the gastrocnemius and apply pressure. Hold until contour takes shape.
   - **b.** Place lateral aspect of both thumbs on the malleolus and apply even pressure. Hold until contour takes shape.
   - **c.** Place palm of hand on the calcaneus and apply pressure. Hold until contour takes shape.
Performance Steps
   d. Place palm of hand on the planter arch and apply pressure. Hold until contour takes shape.

16. Check range of motion (ROM) of phalanges and knee.
   a. Have patient extend and flex toes.
   b. Gave patient extend and flex knee.

17. Check alignment of injured ankle with goniometer.
   a. Place the stationary arm of the goniometer parallel to the fibula.
   b. Place the moving arm of the goniometer bisecting the fifth metatarsal (little toe).
   c. Place the protractor of the goniometer on the lateral malleolus.
   d. The goniometer should measure 90 degree of dorsiflexion.
   NOTE: If the malleolus is not at 90 degree of dorsiflexion, everted or inverted remove splint and go to step 8 to repeat process.

18. Check splint dimensions.
   a. The tips of the toes are visible.
   b. The splint edges rest one inch below the fibula head or 3 inches distal to the popliteal region and to the tips of the phalanges.

19. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.
   c. Go to step 30.

20. Prepare Bulky Jones (Compression Dressing) for upper extremity.
   a. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patients should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   b. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.
   NOTE: The technician may choose to use 4 inch plaster rolls.
   c. Locate DPC, thenar muscle and the cubitum space on the uninjured arm.
   d. Remove (1) plaster sheet from the stack of (10-15).
   e. Place sheet next to uninjured arm to obtain sheet length, the DPC and thenar muscle contours.
   NOTE: To increase patient cleanliness the sheet does not have to rest on the patient skin.
   f. Draw a diagonal line on the plaster sheet that matches with the DPC of patient's hand.
   NOTE: The diagonal line will be cut to facilitate free ROM of the fingers (extension and flexion).
   g. Draw a curved line (half moon shape) on the plaster sheet that matches with the outer border of the thenar muscle on the patient's hand.
   NOTE: The half moon pattern enables the thenar muscle to be observable and the thumb to adduct to all fingers promoting free range of motion (ROM).
   h. Place sheet on stack, cut the outlined patterns and excess length for all sheets, and place on work cart/station for later use.
   NOTE: Discard excess material in the trash receptacle.

21. Measure patient's injured wrist w/ goniometer.
   a. Position the patient's injured elbow on the bump at a 45 degree angle to the upper torso.
   b. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
   c. Place the moving arm of the goniometer bisecting the 5th phalange.
   d. Place the protractor of the goniometer on the ulnar styloid.
   e. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.

22. Prepare kerlix fluff's.
**Performance Steps**

a. Open kerlix fluff package.
b. Remove and unfold kerlix fluffs
c. Place kerlix fluffs between each phalange.

**NOTE:** Kerlix fluffs are placed between each phalange to the middle knuckle (PIP) of each phalange. More than one kerlix fluff may be needed.

23. Secure fluffs with kerlix roll.

a. Hold kerlix roll with one hand.
b. Place the edge of the kerlix roll on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
c. Continue through the palm, fan folding between the phalanges back up the forearm ending 1 inch distal to the cubitum space.

**NOTE:** The kerlix roll should be applied snugly to provide compression to the injured hand.

24. Apply volar splint to injured arm.

**NOTE:** Assistance may be used prior to securing splint.

a. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
b. Squeeze the sheets together to eliminate excess water.

**NOTE:** Do not wring the sheet, this will cause the roll to dry up quickly
c. Place the plaster sheets on work cart/station.
d. Laminate plaster splint.
e. Place the splint on the volar aspect of the hand aligned with the DPC and the thenar muscle.
f. Secure kerlix fluffs with kerlix roll.

25. Secure volar splint to injured arm.

a. Hold elastic roll with one hand.
b. Secure the elastic bandage on the ulnar styloid by wrapping 2 rotations around the wrist.

**NOTE:** Pull the elastic bandage snugly to compress the swelling.
c. Continue through the palm, phalanges and back up the forearm ending 1 inch distal to the cubitum space.
d. Secure elastic bandage with clips.
e. Tape down the elastic bandage between the clips.
f. Remove the clips and dispose in trash receptacle.

26. Mold the splint to forearm/wrist.

**NOTE:** The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.

a. Place the heel of one hand on the volar aspect of the distal wrist.
b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
c. Squeeze the heels of each hand together
d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.

**CAUTION:** Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g., How do you feel?, Is the pressure too much?)
e. Remove heels of each hand from splint when contours of the wrist and forearm have been shaped and the splint is cured.

27. Check range of motion (ROM) of phalanges and elbow.

a. Have patient extend, flex fingers and touch thumb to all fingers.
b. Have patient extend and flex elbow.

28. Check alignment of injured wrist with goniometer.

a. Place the stationary arm of the goniometer vertically, bisecting the forearm.
b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger)
c. Place the protractor of the goniometer on the ulnar styloid.
d. The wrist is measured between 0-15 degrees of dorsal extension.
**Performance Steps**

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove splint and return to step 21.

29. Check splint dimensions.
   - The distal edge of the splint is resting on the DPC.
   - The medial edge of the splint is resting on thenar muscle border.
   - The proximal edge of the splint is resting one inch distal to the cubitum space.

30. Check patient's capillary refill.
   - Squeeze patient's fingers/toes and nail beds will turn white.
   - Release patient's fingers/toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

31. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
   NOTE: Use alcohol pads or fresh water from the faucet and not from the casting bucket.

32. Fit patient with sling.

33. Administer a crutch ambulation treatment if splint applied to lower extremity. (See Task 081-836-0041).

34. Give patient verbal and written instruction on cast care.
   - Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room (ER).
   - Present patient with cast care booklet or some form of written instruction.
   - Instruct patient to keep leg elevated and flex and extend toes to increase circulation to the foot.

35. Annotate the procedure applied to patient in medical record or SF 513.
   NOTE: Record the procedure applied and cast care instruction provide to the patient in patient's medical record or SF 513 and sign your name.

36. Escort patient to front desk to make a follow up appointment.

**Performance Measures**

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>GO</th>
<th>NO GO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing).</td>
<td></td>
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<tr>
<td>2. Identified yourself to patient.</td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's injured leg/ankle.</td>
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<tr>
<td>5. Checked patient's capillary refill.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
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<tr>
<td>10. Prepared purified cotton roll (Bulky Jones).</td>
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</tr>
<tr>
<td>11. Measured patient's injured ankle with goniometer.</td>
<td></td>
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</tr>
<tr>
<td>12. Applied purified cotton roll to the injured ankle foot and leg.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<td>-------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>13. Applied posterior splint to injured leg.</td>
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<tr>
<td>14. Secured the splint to the injured leg.</td>
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<tr>
<td>15. Molded the splint to the ankle/leg.</td>
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<tr>
<td>16. Checked range of motion (ROM) of phalanges and knee.</td>
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<tr>
<td>17. Checked alignment of injured ankle with goniometer.</td>
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<tr>
<td>18. Checked splint dimensions.</td>
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<tr>
<td>22. Applied kerlix fluff's.</td>
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</tr>
<tr>
<td>23. Secured fluffs with kerlix roll.</td>
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</tr>
<tr>
<td>25. Secured volar splint to injured arm.</td>
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<tr>
<td>26. Molded the splint to forearm/wrist.</td>
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<tr>
<td>27. Checked range of motion (ROM) of phalanges and elbow.</td>
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<tr>
<td>28. Checked alignment of injured wrist with goniometer.</td>
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<tr>
<td>29. Checked splint dimensions.</td>
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<td></td>
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<tr>
<td>30. Checked patient's capillary refill.</td>
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<tr>
<td>31. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>32. Fitted patient with sling.</td>
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<tr>
<td>34. Gave patient verbal and written instruction on cast care.</td>
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<tr>
<td>35. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>36. Escort patient to front desk to make a follow up appointment.</td>
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</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO GO (NG) if any step is failed (F). All performance measured tasks must be passed to receive a go.

**References**

<table>
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<tr>
<th>Required</th>
<th>Related</th>
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<td>COPPARD, B. M. &amp; LOHMAN</td>
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<td>TM 6-840</td>
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<td>TM 8-231</td>
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</tbody>
</table>
Conditions: Given an orthopaedic patient with a casted extremity, sitting or supine on an orthopaedic examination bed, nursing personnel, family member, physician’s verbal or written order, patient’s medical record, or Standard Form 513 (consultation form), marking pen, cast cutter with vacuum, cast spreader, cast bender (duck bill), (3) packages of disposable foam ear plugs, (3) safety goggles, work cart/ station, fiberglass casting gloves, examination gloves, scissors, roll of 2 inch adhesive tape, 2 or 3 inch webril or equivalent, (2) 3 inch elastic bandages, (1) 3 or 4 inch fiberglass/plaster rolls, (2) hospital pads (chux), bed sheet, pillow, ruler, tape measure, bucket of tepid water w/ plastic bag, box of alcohol pads, wash cloth/towel, sink w/ faucet, tube of surgical lubricant, orthopaedic bump, and thermometer.

Standards: Is reached when the cast is cut medial/lateral or anterior/posterior, and opened by cast spreader or cast bender (duck bill). The cast padding is cut re- padded and secured by fiberglass/plaster roll or elastic bandage. Capillary refill is administrated to the toes/fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)
2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.
3. Position the patient (supine) in the middle of the bed or sitting in chair.
4. Explain the procedure to the patient.
Performance Steps

4. Bivalved lower extremity cast
Performance Steps

Bivalved upper extremity cast

NOTE: The cast is cut by a cast saw along the side. The cast is then opened by placing cast spreader between the precut line and squeezing the handles together. The cast padding is cut with scissors. Additional padding is applied and the cast is secured by elastic bandages. (Refer to Figure 3-x).

CAUTION: The patient may be scared of the cast removal process. Demonstrate to the patient how the cast saw operates and what to expect during the removal process.

5. Inspect cast.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Ask patient if cast was exposed to water, cast padding was pulled out, or the location of external pins.
   NOTE: Depending on the length of time the cast has been on, the technician must look for soft spots, missing webril, cast exposed to water or location of external pins.
   c. Check for bony prominences (e.g. ulnar styloid, malleolus)

6. Gather equipment to include scissors, cast saw, cast spreader, cast benders, hearing and eye protection for patient and technician. Place on work cart/station.

7. Assemble materials to include; examination gloves, fiberglass casting gloves, elastic bandages, plaster/fiberglass roll, webril (casting padding), roll of tape and place on work cart/station.
### Performance Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>8.</td>
<td>Cut the medial aspect of the cast.</td>
</tr>
<tr>
<td></td>
<td>NOTE: All casts are cut medial and lateral, with a few exceptions (Long arm cast-anterior/posterior)</td>
</tr>
<tr>
<td></td>
<td>a. Place privacy pad or bed sheet on patient's lap or above cast area.</td>
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<tr>
<td></td>
<td>b. Demonstrate the cast removal process.</td>
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<td></td>
<td>NOTE: Inform patient that the cast blade oscillate, it does not rotate.</td>
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<tr>
<td></td>
<td>c. Instruct patient to place hearing and eye protection on.</td>
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<td></td>
<td>NOTE: It is the technician's responsibility to offer and encourage the patient to wear safety apparatus. However, it is the patient's ultimate decision whether to use or not to use protective equipment.</td>
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<tr>
<td></td>
<td>d. Technician dons safety equipment.</td>
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<td></td>
<td>NOTE: The technician must wear goggles, hearing protection.</td>
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<td></td>
<td>e. Place the cast cutter plug in the electrical wall outlet.</td>
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<tr>
<td></td>
<td>CAUTION: The dust that is produce during the removal of the cast is a carcinogenic. All cast saws must be attached to a cast cutter vacuum.</td>
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<tr>
<td></td>
<td>f. Grasp the cast cutter handle between the thumb and index finger.</td>
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<tr>
<td></td>
<td>g. Rest the thumb on the cast handle maintaining contact throughout the procedure.</td>
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<tr>
<td></td>
<td>h. Turn on the cast saw.</td>
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<tr>
<td></td>
<td>i. Apply pressure to the saw using an up and down motion of the wrist and lifting the blade in the direction of the cut.</td>
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<tr>
<td></td>
<td>CAUTION: Do not bring the blade out of the cutting grove, do not drag the saw or leave it in one place too long, this will cause the blade to produce friction (heat up), burn or cut the patient.</td>
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<tr>
<td></td>
<td>NOTE: When resistance is absent, lift the saw blade up and advance in the direction of the cut.</td>
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<tr>
<td></td>
<td>NOTE: Always cut in a straight line and away from the patient.</td>
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<tr>
<td>9.</td>
<td>Cut the lateral aspect of the cast (follow step 8).</td>
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<tr>
<td></td>
<td>a. Turn the cast saw off.</td>
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<tr>
<td></td>
<td>b. Unplug cast cutter cord from wall outlet.</td>
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<tr>
<td>10.</td>
<td>Separate the cast.</td>
</tr>
<tr>
<td></td>
<td>a. Place cast spreader edge in the pre cut line on medial and lateral aspect of cast.</td>
</tr>
<tr>
<td></td>
<td>b. Pull the handles together.</td>
</tr>
<tr>
<td>11.</td>
<td>Cut the underlying cast padding.</td>
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<tr>
<td></td>
<td>CAUTION: Always cut away from the patient.</td>
</tr>
<tr>
<td>12.</td>
<td>Remove the anterior and posterior shells for splint fabrication, if required.</td>
</tr>
<tr>
<td>13.</td>
<td>Inspect patient's skin.</td>
</tr>
<tr>
<td></td>
<td>NOTE: Reports the presence of any unusual skin conditions such as drainage, blisters, rashes, and pressure sores to the physician and follow physician's instruction.</td>
</tr>
<tr>
<td>14.</td>
<td>Re-pad the cast.</td>
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<tr>
<td></td>
<td>a. Insert felt or webril between the cast's cut edges.</td>
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<td></td>
<td>NOTE: This separation should be approximately 1/4-1/2 inches in order to prevent window edema and promote circulation.</td>
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<tr>
<td></td>
<td>NOTE: If there is a need to do a wound check, dressing change, or suture removal, the anterior part, the posterior part, or both, are removed, lined with Webril, and replaced.</td>
</tr>
<tr>
<td></td>
<td>b. Place bivalved cast, if applicable, as splints to the extremity.</td>
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<tr>
<td>15.</td>
<td>Secure the elastic bandage clips with adhesive tape.</td>
</tr>
<tr>
<td></td>
<td>a. Wrap the bivalved cast with an elastic bandage.</td>
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<tr>
<td></td>
<td>b. Secure the bandage with clips.</td>
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<tr>
<td></td>
<td>c. Tape clips.</td>
</tr>
<tr>
<td>16.</td>
<td>Check patient's capillary refill.</td>
</tr>
</tbody>
</table>
Performance Steps
a. Squeeze patient's fingers/toes and nail beds will turn white
b. Release patient's fingers/toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

17. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient not to stick any objects down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).

18. Annotate the procedure applied to patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

19. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>GO</th>
<th>NO GO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Received the order from the physician( reviewed if in writing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Identified yourself to the patient.</td>
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<tr>
<td>3. Positioned the patient (supine) in the middle of the bed or sitting in chair.</td>
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<tr>
<td>4. Explained the procedure to the patient.</td>
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</tr>
<tr>
<td>5. Inspected cast.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
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</tr>
<tr>
<td>8. Removed the medial aspect of the cast.</td>
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<td></td>
</tr>
<tr>
<td>9. Removed the lateral aspect of the cast.</td>
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<td></td>
</tr>
<tr>
<td>10. Separated the cast.</td>
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<tr>
<td>11. Removed the underlying cast padding.</td>
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<tr>
<td>12. Removed the anterior and posterior shells for splint fabrication, if required.</td>
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<tr>
<td>13. Inspected patient's skin.</td>
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</tr>
<tr>
<td>14. Padded the cast.</td>
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</tr>
<tr>
<td>15. Secured the elastic bandage clips with adhesive tape.</td>
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<td>17. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>18. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<td>19. Escort patient to front desk to make a follow up appointment.</td>
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Evaluation Guidance: Score the soldier a GO on the task, if all steps are passed (P). Score the soldier NO-GO if any step is failed (F). If the soldier fails any step, show what was done wrong and how to do it correctly.
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**SET UP ORTHOPEDIC BED WITH TRAPEZE**

081-834-0044

**Conditions:** Given a power controlled orthopaedic bed with or without patient, nursing personnel, physician’s verbal or written order, (2) long plain bars, (4) I.V. post with clamps, (4) double clamp bars, (3) single plain bars, (2) cross clamps, trapeze with hand grip, and examination gloves.

**Standards:** Is reached when (1) I.V. post with clamp is inserted in each of the I.V. holders at the foot/head of the bed. The (2) plain bars are secured by the I.V. holders at the foot and head of bed. The (4) double clamp bars (swivel ends up) are attached vertical to the outside of the horizontal plain bars at the foot/head of the bed. The (2) long plain bars are secured to each of the double clamp bars. One cross clamp is fasten to the middle of each long plain bar. A plain bar is secured to each cross clamp. The trapeze is fasten to the plain bar with the handgrip placed on the trapeze knob to avoid injury to a patient.

**Performance Steps**

1. Receive the order from the physician (review if in writing)

2. Gather needed equipment to include: orthopaedic bed, I.V. post clamps, single plain bars, double clamp bars, cross clamps, long plain bars and trapeze with hand grip.

3. Check serviceability of overhead traction frame and bed.
   - a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders.
   - NOTE: Inform orthopaedic supervisor if equipment is unserviceable and secure serviceable equipment.
   - b. Inspect orthopaedic bed as follows:
     - (1) Bed rails are in the upright position and locked.
     - (2) Bed electrical cord/plug are not frayed.
     - (3) Remote control buttons are operational (e.g. head/foot elevation, raise/lower position, and nurse call button).
     - (4) Bed wheels are locked.
   - NOTE: Inform nurse if bed is non operational and obtain another bed.

4. Identify yourself to the patient.
Performance Steps

4

Overhead traction bed set up.

NOTE: Inform the patient of your name and job title.

NOTE: A traction frame may be set up in absent of a patient. If a patient is occupying the bed inform them of the procedure. (Refer to figure 3-x).

5. Insert each of the (4) I.V. post clamps into the I.V. post holders.
NOTE: The I.V. holders are located in each corner of the bed frame.

6. Secure (2) plain bars in (4) I.V. post clamps.
   a. Place the plain bar ends in the clamp holder
   NOTE: The clamp knob should be positioned to the outside of the bed for easier access by the technician.
   b. Adjust the bars and close the clamps.
   c. Lock the clamp bar holders.
   CAUTION: It is extremely important for the plain bar to sit flush inside the clamp holder. An uneven fit could further injury to the patient.

NOTE: It is the technician’s preference to start at the foot or the head of the bed. Safety first, Safety always.

7. Secure the (4) double clamp bars to end of plain bars.
Performance Steps
a. Attach four double clamp bars (swivel end up) vertical to the plain bar at the foot/head of the bed.

NOTE: The double clamp bar should be fasten to 1/2-1 inch from the end of the horizontal bar. Bars fasten further away provide the most support to the frame. The knob of the double clamp bar should face out (to prevent complete detachment of the clamp should the knob become loose). The bars at the foot need to line up with the bars at the head of the bed.

8. Secure 1st long plain bar in the double clamp bar holders.
CAUTION: If a patient is occupying the bed, nursing assistance should be present. If no assistance is available, start at the foot of the bed.
   a. Place the plain bar ends in the clamp bar holders.
   b. Adjust the bar and close the clamps.

NOTE: Do not lock the clamp until both ends of the bar are flush and fitted evenly.
   c. Lock the clamp bar holders.

9. Follow step 8 for remaining 2 double clamp bars.

10. Fasten two cross clamps to the long plain bars (below shoulder of patient)

11. Secure cross clamps onto the plain bar.
   a. Place the plain bar ends into the clamp holders.
   b. Adjust the bar and close the clamps.
   c. Lock the clamp bar holders.

12. Secure trapeze with hand grip to the plain bar.
   a. Place the trapeze clamp holder onto the plain bar.
   b. Adjust the clamp holder and close the clamp.
   c. Lock the clamp bar holder.
   d. Secure the handgrip to the clamp knob.

Performance Measures

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Evaluation Guidance: Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measured tasks must be passed to receive a GO.
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</table>
Conditions: Given an orthopaedic patient with a casted extremity sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), marking pen, cast cutter with vacuum, cast spreader, cast bender (duck bills), (3) packages of disposable foam ear plugs, (3) safety goggles, work cart/station, fiberglass casting gloves, examination gloves, scissors, roll of 2 inch adhesive tape, (2) elastic bandages, (2) 3 or 4 inch fiberglass/plaster rolls, (2) hospital pads (chux), bed sheet, pillow, ruler, tape measure, bucket of tepid water w/plastic bag, box of alcohol pads, damp wash cloth or towel, sink w/faucet, tube of surgical lubricant, orthopaedic bump, thermometer and (2) plastic or wooden spacers.

Standards: Is reached when the physician has drawn a transverse line on the cast and the outline is cut or segment of fiberglass/plaster removed. A cast spreader is used to open the segment and a (plastic/wooden) spacer is inserted. With successful placement of spacer and correct angulation of the fracture the spacer is secured by plaster/fiberglass roll or elastic bandage. Capillary refill is administrated to the phalanges and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   NOTE: The physician will draw a line on the cast and a portion of the cast will be removed or a plastic/wooden spacer inserted.

CAUTION: This is a very painful procedure for the patient. Make every attempt to do this procedure in a treatment room away from other patients.

4. Inspect cast.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Ask patient if cast was exposed to water, cast padding was pulled out, or the location of wound.
   NOTE: Depending on the length of time the cast has been on, the technician should touch the cast looking for soft spots, missing webril, cast exposed to water or location of wound.

5. Gather equipment to include cast saw with vacuum, cast spreader, ear plugs, safety goggles, scissors, elastic bandages, bucket of tepid water w/plastic bag. Place on work cart/station.
   CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.
Performance Steps

6. Assemble materials to include webri, plaster or fiberglass rolls, plaster splints(4x15/5x30), examination gloves, fiberglass casting gloves, plastic or wood wedges. Open and remove (2) plaster rolls from packages, (2) plaster reinforcement sheets and place on work cart/station.

7. Open wedge go to step 9.

8. Closed wedge go to step 10.


NOTE: The physician will determine where to place the wedge and size used.
   a. Place hospital pad or bed sheet on patient's lap or above cast area.
   b. Physician will draw a line on the cast

NOTE: Determining where the line is drawn is the responsibility of the physician.
   c. Explain the cast wedge process to patient.
   d. Instruct patient to use hearing and eye protection.

NOTE: Determining where the line is drawn is the responsibility of the physician.

NOTE: The physician will determine where specifically the lines are drawn and the distance between the lines.

NOTE: When resistance is absent, lift the saw blade up and advance in the direction of the cut.

NOTE: Always cut in a straight line and away from the patient.
   a. The physician draws a line circumferential around the cast leaving 2-3 inches distance from the drawn edges
   b. Nursing assistant grasps the distal edge of casted extremity of the patient.

NOTE: Grasping the distal edge of the extremity provides traction to the fractured bone prior to cast manipulation.
   c. Patient is offered hearing and eye protection

NOTE: It is the physician's preference to use elastic bandage or casting material.
Performance Steps

NOTE: Patient’s are always offered hearing and eye protection prior to cast removal.

d. Plug the cast saw plug in the wall outlet.

e. Turn the cast saw on.

f. Apply pressure to the saw using an up and down motion of the wrist and lifting the blade in the direction of the marked outline.

CAUTION: Do not bring the blade out of the cutting groove, do not drag the saw or leave it in one place too long, this will cause the blade to heat up, burn or cut the patient. Always cut away from the patient.

NOTE: When resistance is absent, lift the saw blade up and advance in the direction of the cut.

NOTE: Always cut in a straight line and away from the patient.

g. Turn the cast saw off.

h. Remove section of casting material.

i. Close the wedge.

NOTE: The physician will close the wedge.

j. Apply fiberglass, plaster roll or plaster splint to closed wedge.

11. Check patient capillary refill.

a. Squeeze patient’s phalanges and nail beds will turn white.

b. Release patient’s phalanges and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician’s instruction.


a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.

b. Present patient with cast care booklet (or written instruction)

c. Instruct patient to extend, flex, and wiggle fingers (demonstrate for patient) to reduce swelling.

d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing on it, coloring)

13. Annotate the procedure.

NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

14. Escort patient or direct family member to front desk to make a follow-up appointment.

Performance Measures

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<th>GO</th>
<th>NO GO</th>
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</table>

1. Received the order from the physician (reviewed if in writing)

2. Identified yourself to the patient.

3. Explained the procedure to the patient.

4. Inspected cast.

5. Gathered equipment.

6. Assembled materials.

7. Opened wedge procedure

8. Closed wedge procedure


10. Gave patient verbal and written instruction on cast care.

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Performance Measures

<table>
<thead>
<tr>
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<tr>
<td>11. Annotated the procedure.</td>
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<tr>
<td>12. Escorted patient or direct family member to front desk to make a follow-up appointment.</td>
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</table>

Evaluation Guidance: Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

References

Required

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TOTAL CONTACT CAST
081-834-0046

Conditions: Given an orthopaedic patient requiring a Total Contact Cast (TCC) sitting or supine on a orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (3) rolls of 6 inch plaster, (5) rolls of 4 inch plaster, (2) rolls of ortho flex, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 4 or 5 inch fiberglass, (2) rolls of 4 inch webril, (2) rolls of 3 inch webril, roll of 3 or 4 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw with vacuum, cast spreader, (2) safety goggles, (2) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (2) hospital pads(chux), (5) felt pads, (2) bed sheets, pillow, disposable paper shorts or hospital scrubs, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, thermometer, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, tube of surgical lubricant, orthopaedic bump, T stand, thigh holder, 1 pr of crutches, cast shoe, flat board and trash receptacle.

Standards: Is reached when the injured foot and leg are casted from the tip of the toes to 3 inches distal to the popliteal space (bend of the knee). The ankle is in neutral position (90 degrees of dorsiflexion) absent of inversion or eversion.

Performance Steps

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<tr>
<td>1.</td>
<td>Receive the order from the physician (review if in writing)</td>
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<td>2.</td>
<td>Identify yourself to patient.</td>
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<tr>
<td>NOTE:</td>
<td>Tell the patient your name and job title.</td>
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<tr>
<td>3.</td>
<td>Explain the procedure to the patient.</td>
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Performance Steps

NOTE: The TCC is used exclusively for diabetic patients with ulcers of the foot/leg that are not healing in a timely manner.

NOTE: Total Contact Cast (TCC) is applied from the tips of the toes to 3 inches distal to the popliteal space, with the ankle at a 90 degree angle. The cast allows complete knee flexion and extension, restricts phalanges, foot and ankle movement (Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's upper extremities.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Remove patient's shoes and socks from both feet. Roll pant leg above the knee.
   NOTE: If patient is unable to get pant leg easily above knee, provide patient with paper shorts or hospital scrubs. If unavailable, cut the pants at the seam.
   c. Place patient in supine position on the examination bed.
   d. Check patient's injured leg for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
   e. Examine both legs for jewelry and remove if found.
   NOTE: All jewelry on both ankles must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
**Performance Steps**

b. Release patient's toes and nail beds will return pink.

**CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw with vacuum, cast spreader, hearing protection, goggles, T stand, thigh holder, support bar, orthopaedic bump, goniometer, scissors, thermometer and bucket of tepid water w/ plastic bag. Place on work cart or station.

**CAUTION:** The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

**CAUTION:** The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement splint, surgical lubricant, alcohol pads/damp towel. Open and remove (5) plaster rolls from their packages and place on work cart/station.

**NOTE:** Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

**NOTE:** Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. Place hospital pad or bed sheet on patient's lap.

**NOTE:** All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

b. Place orthopaedic bump on bed.

**NOTE:** Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. T stand, finger trap stand, nursing assistant).

c. Measure the distance from tip of toes to 3 inches distal to the popliteal space.

**NOTE:** Measurements are taken on the uninjured leg to prevent further pain or discomfort to the patient. Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

d. Pull down stockinette from stockinette container and cut measured length.

e. Roll stockinette in a cuff leaving a 1-2 inch border at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the posterior aspect of the cast.

**NOTE:** The plaster reinforcement splint will be prepared for the posterior side of the injured leg/ankle.

a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of one stack and remove from package. Place on work cart/station.

**NOTE:** Kerlix fluffs or strips of webril may be used.

b. Measure from 3 inches distal to the popliteal space (or 1 finger breadth from the fibula notch/head) to the tip of the toes.

**CAUTION:** The peroneal nerve is located on the lateral side of the leg. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Locate the fibula notch/ head and measure 1 finger width below to prevent this condition.

c. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.

10. Place cotton between toes to absorb moisture.

**NOTE:** Kerlix fluffs or strips of webril may be used.

11. Apply stockinette to patient's injured leg.
Performance Steps

CAUTION: The application of the stockinette must be wrinkled free. Wrinkles can cause ulcers to the skin and cause further injury to the patient.

a. Place patient's injured leg on the orthopaedic bump with ankle at a 90 degree angle to the tibia.

NOTE: There are several ways to obtain a 90 degree angle. The patient could maintain the position, nursing personnel or family member can assist, a T stand, or thigh stand could be used, or the patient could be placed in the prone position. It is the technician's preference.

b. Hold open the sides of the stockinette.

c. Instruct patient to place injured foot in the opening.

d. Roll stockinette on the injured leg 1 inch past the phalanges to 3 inches proximal to the knee.

NOTE: Rolling the stockinette on promotes a better fit.

e. Pinch the stockinette at the base of the ankle and make a 1/2 inch cut at a 45 degree angle and seal it with paper tape.

f. Fold over the distal edge of the stockinette and tape it down.

12. Measure patient's injured ankle with goniometer.

NOTE: All short leg walking casts (SLWC) are applied in neutral position (90 degrees dorsiflexion) absent of inversion and eversion, unless otherwise indicated by physician's order.

a. Place the stationary arm of the goniometer in horizontally, bisecting the fibula.

b. Place the moving arm of the goniometer in a vertically, bisecting the lateral side of the 5th phalange.

c. Place the protractor of the goniometer on the malleolus.

d. Set wrist until the goniometer measures 90 degrees of dorsal flexion.

13. Apply felt to injured ankle/leg. (Refer to Figure 3-x).


15. Place fiberglass casting gloves on hands.

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while applying a fiberglass cast.

16. Open fiberglass casting package and go to step 18.

NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.

17. Open and remove (3) plaster rolls from their packages and place on work cart/station.
### Performance Steps

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| 18. | **Apply 1st plaster/fiberglass roll.**  
**NOTE:** Examination gloves are recommended to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.  
| a. | Hold plaster or fiberglass roll vertical with one hand.  
**NOTE:** Two hands may also be used.  
| b. | With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.  
**NOTE:** Placing the thumb under the forward edge of the roll can also be used.  
| c. | Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.  
**CAUTION:** Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.  
| d. | Squeeze the roll together (do not wring the roll).  
**NOTE:** To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.  
| e. | Place the edge of the casting material distal to the edge of the felt padding and begin wrapping around the foot two rotations to secure the edge.  
| f. | Continue up the leg ending 1/2 inch distal to the edge of the stockinette.  
| g. | With each turn overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.  
**CAUTION:** All bulges or wrinkles must be eliminated. If wrinkles develop, remove casting material and go to step 10.  
| 19. | **Laminate the casting material.**  
| a. | Place palm of each hand on the cast.  
**CAUTION:** To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.  
| b. | Rub the cast material in the direction it was applied.  
**NOTE:** Laminating the cast material fills in the pores which assist it providing strength to the cast.  
| c. | Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.  
| 20. | **Apply reinforcement splint to posterior aspect of cast.**  
**NOTE:** The reinforcement splint is used to strengthen and support the cast.  
| a. | Place the splint in tepid water, wait for bubbles to subside and remove splint from water.  
| b. | Squeeze the splint together to eliminate excess water.  
| c. | Place reinforcement splint to the posterior aspect of the cast from 3 inches distal to the popliteal space to tip of toes and laminate the splint.  
| d. | Maintain patient's ankle at 90 degrees of dorsal flexion until splint adheres to cast material.  
**NOTE:** Instruct the patient to squash a bug with their heal of their foot or bring their toes to their nose. Either technique will assist the patient in bringing their ankle to a 90 degree angle. The technician may have their own preference to the above techniques.  
| 21. | **Apply 2nd plaster/fiberglass roll (repeat steps 18 -19)**  
| 22. | **Mold the cast material to the lower leg.**  
| a. | Place palm of hand on the gastrocnemius muscle and apply pressure. Hold until contours take shape.  
**NOTE:** A flat board can also be used to mold to the gastrocnemius muscle.  
|
Performance Steps

b. Place lateral aspect of both thumbs (forming a triangle) on the tibia and apply even pressure up/down the tibia. Hold until contours take shape.
CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
c. Place lateral aspect of both thumbs on tibia and apply pressure. Hold until contour takes shape.
d. Place lateral aspect of both thumbs on the malleolus and apply even pressure. Hold until contours take shape.
e. Place palm of hand on calcaneus and apply pressure. Hold until contour takes shape.
f. Place index finger and thumb on achilles and apply even pressure. Hold until contour takes shape.
g. Remove hands from the cast when contours of the malleolus, tibia, calcaneus, achilles have been shaped and the cast is cured.
NOTE: All casts require a mold. Crooked casts equal straight.

23. Check alignment of ankle with goniometer.
   a. Place the stationary arm of the goniometer horizontally, bisecting the fibula
   b. Place the moving arm of the goniometer in vertically, bisecting the lateral side of the 5th phalange.
c. Place the protractor of the goniometer on the lateral malleolus.
d. The ankle is measured at 90 degrees of dorsal flexion.
NOTE: If ankle is not at 90 degrees of dorsiflexion, everted or inverted, remove cast and go to step 10.

24. Check cast dimensions.
   a. Tips of toes are covered by the cast.
b. The cast edge rests 3 inches distal to the popliteal space
c. Fold and tack down the webril and stockinette.

25. Apply 3rd plaster roll (repeat steps 18-19)
NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

26. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
Note: Fresh water from the faucet and not from the casting bucket should be used.

27. Apply cast shoe

28. Administer a crutch ambulation instruction (See task number 081-836-0041)

29. Give patient verbal and written instructions on cast care.
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
b. Present patient with cast care booklet (or written instructions).
c. Instruct patient to elevated the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

30. Annotate the procedure applied to patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

31. Escort patient or direct patient to front desk to make a follow up appointment.
<table>
<thead>
<tr>
<th>Performance Measures</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<td>5. Checked patient's capillary refill.</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials</td>
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<tr>
<td>9. Prepared plaster reinforcement splint for the posterior aspect of the cast.</td>
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<tr>
<td>10. Placed cotton between toes to absorb moisture.</td>
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<tr>
<td>11. Applied stockinette to patient's injured leg.</td>
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<tr>
<td>12. Measured patient's injured ankle w/goniometer.</td>
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<tr>
<td>15. Placed fiberglass casting/examination gloves on hands.</td>
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<tr>
<td>17. Opened packages of plaster rolls.</td>
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<tr>
<td>18. Applied 1st plaster or fiberglass roll.</td>
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<tr>
<td>19. Laminated the casting material.</td>
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<tr>
<td>20. Applied reinforcement splint to posterior aspect of cast.</td>
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<tr>
<td>21. Applied 2nd plaster or fiberglass roll.</td>
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<td>22. Molded the cast material to the lower leg.</td>
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<tr>
<td>23. Checked alignment of injured wrist with goniometer.</td>
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<tr>
<td>24. Checked cast dimensions.</td>
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<tr>
<td>26. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or</td>
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<td>alcohol pad.</td>
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<tr>
<td>27. Applied cast shoe.</td>
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<tr>
<td>28. Administered crutch ambulation instruction.</td>
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Evaluation Guidance: Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

References

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Conditions: Given an orthopaedic patient requiring a Coaptation splint, sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (3) rolls of 4 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (3) rolls of 4 inch webril, examination gloves, scissors, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, orthopaedic bump, thermometer and trash receptacle.

Standards: Is reached when the injured humerus/shoulder are immobilized with the Coaptation splint 1 inch superior to the acromioclavicular joint (AC joint) anteriorly around the elbow, ending posteriorly 2 inches distal to the axilla region, with the elbow at a 90 degree angle. The splint restricts rotation of the humerus, shoulder and elbow, with hand, thumb and fingers having full range of motion. Capillary refill test is administered to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   NOTE: The Coaptation splint is applied from 1 inch superior to the acromioclavicular joint (AC joint) to 2 inches distal to the axilla region with the elbow flexed at a 90 degree angle. The splint allows full range of motion of the wrist, fingers and thumb with limited motion of the forearm and restrictive motion of the humerus.

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's upper extremities.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Inspect both arms for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   c. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrists must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.
Performance Steps

6. Gather equipment to include scissors, thermometer and bucket of tepid water w/ bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement splint, alcohol pads or damp wash towel. Place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webril) for Coaptation splint.
   a. Place work cart with orthopaedic bump at the edge of the bed.
   b. Place hospital pad or bed sheet on patient's lap.
   c. Position the patient's uninjured elbow at a 90 degree angle to the upper extremity. Locate the ac joint and 2 inches distal to the axilla region.
   d. Measure from the 1 inch proximal to the AC joint to 2 inches posteriorly around the elbow, to 2 inches distal to the axilla region.
   NOTE: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).
   e. Place webril on work cart/station.
   f. Roll out second layer and bisect the middle of the previous padding.
   g. Layer the padding 2-4 thickness.

9. Prepare plaster splint for the anterior and posterior aspect of the upper arm.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.
   b. Remove (1) plaster sheet from the stack of (10-15) sheets.
   c. Place sheet from the base of the deltoid muscle around elbow to 2 inches from the axilla region.
   d. Place sheet on stack, cut excess length for all sheets, and place on work cart/station for later use.
   NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/forearm.
   e. Place plaster on work cart/station.
   f. Roll out second layer and bisect the middle of the previous padding.
   g. Layer the padding 2-4 thickness.

10. Measure patient's injured elbow w/goniometer.
    a. Place the stationary arm of the goniometer bisecting the lateral aspect of the humerus.
    b. Place the moving arm of the goniometer bisecting the forearm.
    c. Place the protractor of the goniometer on the olecranon process (elbow).
    d. Set the elbow until the goniometer measures 90 degrees of flexion.

11. Apply splint to injured upper arm.
    NOTE: Assistance may be used to secure the splint to the injured arm.
    a. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
    b. Squeeze the sheets together to eliminate excess water.
    c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
    d. Laminate plaster splint.
    e. Fold over the edges of the padding.
Performance Steps

f. Place additional layer of padding over folded edges.
g. Place the padded splint from the superior aspect of the AC joint, down the arm, over the elbow, posteriorly up the arm, ending 2 inches distal to the axilla region.

NOTE: The elbow should be flexed at 90 degrees or according to physician's order.

12. Secure Coaptation splint to injured arm.
   a. Hold elastic roll with one hand.
   b. Place the edge of the elastic bandage on the AC joint and begin wrapping around the shoulder two rotations to secure the edge.
   c. Continue through the axilla, down the forearm and figure of eight around the elbow.
   d. Secure elastic bandage with clips.
   e. Tape down the elastic bandage between the clips.
   f. Remove the clips and dispose in trash receptacle.

13. Mold casting material to elbow.
    NOTE: Physician will mold the cast material.

14. Check ROM of phalanges and thumb.
    a. Have patient extend, flex fingers and touch thumb to all fingers.
    b. Have patient extend and flex wrist.

15. Check alignment of elbow with goniometer.
    a. Place the stationary arm of the goniometer horizontally, bisecting the forearm.
    b. Place the moving arm of the goniometer in a vertically, bisecting the lateral side of the humerus.
    c. Place the protractor of the goniometer on the olecranon (elbow) process.
    d. The elbow is measured at 90 degrees of flexion.

16. Check splint dimensions.
    a. The proximal edge of the splint is superior to the AC joint.
    b. The proximal edge of the splint rests 2 inches distal to the axilla region.

17. Check patient's capillary refill.
    a. Squeeze patient's fingers and nail beds will turn white.
    b. Release patient's fingers and nail bed will return pink.
    CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

18. Clean plaster resin off patient's skin using a damp wash cloth or towel or alcohol pad.
    Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

19. Give patient verbal and written instructions on cast care.
    a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
    b. Present patient with cast care booklet (or written instructions).
    c. Instruct patient to elevated the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
    d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g., writing on it, coloring.)

20. Fit sling to patient as required.
    NOTE: Consideration for applying a sling include: elderly patient, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

21. Annotate the procedure applied to patient in medical record or SF 513.
    NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.
### Performance Steps

22. Escort patient or direct patient to front desk to make a follow up appointment.

### Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
<th>Performance</th>
<th>GO</th>
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<tbody>
<tr>
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<td>11.</td>
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<tr>
<td>12.</td>
<td>Secured Coaptation splint to injured arm.</td>
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<tr>
<td>13.</td>
<td>Molded casting material to arm/elbow.</td>
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<td>19.</td>
<td>Gave patient verbal and written instructions on cast care.</td>
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<td>20.</td>
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### Evaluation Guidance:
Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

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Conditions: Given a orthopaedic patient requiring a Patella Tendon Bearing cast (PTB), in supine or sitting position on an orthopaedic examination bed, nursing personnel, family member, physician, physician’s verbal or written orders, patient medical record, or Standard Form 513, work cart/station, roll of 3 inch and 4 inch stockinette, stockinette container, (4) 3 inch webril rolls, (3) 4 inch plaster rolls, (3) 6 inch plaster rolls, (2) rolls of 5 inch ortho flex, box of 5 x 30 plaster reinforcement sheets, box of 4 x 15 plaster reinforcement sheets, tube of surgical lubricant, (4) 4 inch fiberglass rolls, fiberglass casting gloves, examination gloves, cast saw with vacuum, cast spreader, box of disposable foam ear plugs, (2) safety goggles, marking pen, scissors, (3) hospital pads, (2) bed sheets, goniometer, bucket of tepid water w/plastic bag, T stand, thigh holder, box of alcohol pads, damp wash cloth or towel, cast care booklet or equivalent, tape measure, ruler, pillow, 1 pair of crutches, flat board, orthopaedic bump, trash receptacle, disposable paper shorts or gown, cast shoe, thermometer and sink with faucet.

Standards: Is reached when the injured leg and ankle are immobilized by the cast from the web spacing of the toes to 2-3 inches proximal to the femoral condyles on the medial and lateral sides, with the popliteal space uncovered. The ankle is in neutral position (90 degrees of dorsiflexion) absent of inversion or eversion with toes and knee having full range of motion. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Identify yourself to patient. NOTE: Tell the patient your name and job title.
3. Explain the procedure to the patient.
Performance Steps

3
Lateral view of PTB
Performance Steps

NOTE: The PTB cast eliminates rotation of the tibia (bone on the medial side of the leg) and fibula (bone on the lateral side of leg). The knee has full extension and the ankle is immobilized at a 90-degree angle. (Refer to Figure 3-x)

NOTE: Instruct the patient that during the cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if the cast doesn’t cool down or there is an increase of heat intensity during the application process, inform the technician and the cast may need to be removed.

4. Inspect injured leg/ankle with patient supine on the examination bed.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Remove shoes and socks from both feet. Roll pant leg above the knee.
   NOTE: If patient is unable to get pant leg above knee, provide patient with paper shorts or hospital gown. If unavailable, cut the pants at the seam.
   c. Examine both legs for jewelry and remove if found.
NOTE: All jewelry must be removed. Give jewelry and clothing items to family member or secure with patient's belongings in NCOIC office.
Performance Steps
d. Check patient's injured leg for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).

NOTE: Inform physician if conditions are present and follow physician's instructions.

5. Check patient's capillary refill.
   a. Squeeze the patient's toes and nail beds turn white.
   b. Release patient's toes and the nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician instructions.

6. Gather equipment to include: cast saw with vacuum, cast spreader, ear plugs, safety goggles, scissors, privacy pad/sheet, orthopaedic bump, T stand (turnstile casting stand), thigh holder, goniometer, marking pen, bucket of tepid water w/plastic bag. Place on work cart/station.
   CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

   CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include: webril (cast padding), stockinette, plaster/fiberglass rolls, box of plaster reinforcement sheets (5 x 30), package of fiberglass reinforcement splints (5 x 30), examination gloves, fiberglass casting gloves, tube of surgical lubricant, alcohol pads/damp towel/wash cloth, pillow, 1 pair of crutches and cast shoe. Open and remove (5) plaster rolls from packages and place on work cart/station.
   NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.
   NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures or as directed by the physician. Stockinette and webril (cast padding) are forms of protection against the exothermic reaction of the casting materials. Technician and physician preference will dictate whether stockinette is used.
   a. Place the patient in the sitting position with uninjured knee and ankle at 90 degree angles to the tibia.
   NOTE: Measurements are taken on the uninjured leg to prevent further pain to the patient's injured leg.
   NOTE: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).
   b. Measure from 3 inches proximal to the patella to the tips of the toes to obtain stockinette length.
   c. Pull down stockinette from stockinette container and cut measured length.
   d. Roll stockinette leaving a 1-2 inch cuff at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint (posterior)
   NOTE: The plaster reinforcement splint will be prepared for the posterior side of the injured leg/ankle.
   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of one stack and remove from package. Place on work cart/station.
   NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets.
   b. Measure from 3 inches distal to the popliteal space (or 1 finger breath from the fibula notch/head) to the web spacing of the toes.
   CAUTION: The peroneal nerve is located on the lateral side of the leg. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Locate the fibula notch/ head and measure 1 finger width below to prevent this condition.
Performance Steps

c. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.

NOTE: Discard excess material in the trash receptacle.

10. Prepare 2nd plaster reinforcement splint for use at the femoral condyles.

NOTE: The plaster reinforcement splints (flanges) are designed to assist the cast in limiting rotation of the tibia/fibula and redirecting the stress placed on the fracture site to the patella tendon.

   a. Locate edge of one stack.
   b. Locate the femoral condyles on the lateral/medial side of the knee.
   c. Place sheet on the lateral side of the femoral condyle.
   d. Draw a horse shoe line on the plaster sheet that matches with the medial femoral condyle.
   e. Place the sheet on the medial side of the femoral condyle.
   f. Draw a horse shoe line on the plaster sheet that matches with the lateral femoral condyle.
   g. Cut outlined pattern for all sheets. Place on work cart/station for later use.

11. Apply stockinette to injured leg.

   a. Drape a privacy pad/sheet over the patient's lap.
   b. Hold open the sides of the stockinette.
   c. Instruct patient to place injured foot in the opening.
   d. Roll stockinette on injured ankle/leg from 1 inch distal to the toes to 3 inches proximal to the patella.

   NOTE: The patient may assist in rolling up the stockinette past the patella.
   e. Fold and cut the stockinette at the bend of the ankle.

   NOTE: Cutting the stockinette reduces the chance of pressure sores developing from the stockinette rubbing or bunching up under the cast.
   f. Smooth out the stockinette.

12. Measure patient's injured ankle w/ goniometer.

   NOTE: All short leg casts (SLC) are applied in the neutral position (90 degrees dorsiflexion) absent of inversion and eversion, unless otherwise indicated by the physician's order.

   a. Position the patient's injured ankle at a 90 degree angle to the tibia.
   b. Place the stationary arm of the goniometer parallel to the fibula.
   c. Place the moving arm of the goniometer in line with the lateral edge of the heel and the head of the fifth metatarsal.
   d. Place the protractor of the goniometer on the lateral malleolus.
   e. Set the ankle until the goniometer measures 90 degrees of dorsiflexion.

13. Apply cast padding (webril).

   CAUTION: The webril must be removed if wrinkles appear. Wrinkled padding can cause pressure sores, which can lead to ulcers.

   a. Hold webril with one hand.
   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index, middle finger and thumb.
   c. Place the edge of the webril at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

   NOTE: The technician may also start 1 inch distal to the stockinette edge.

   NOTE: The webril application is started at the distal aspect of the tibia/fibula to provide an anchor and extra padding to the malleolus.

   CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's toes.
**Performance Steps**

d. Continue down the foot ending 1/2 inch from the distal stockinette, back up the leg ending 1/2 inch from the proximal edge of the stockinette.

e. With each turn overlap the webril by 1/2 -1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding. To reduce possible constrictive edema caused by applying webril too tight, keep the webril on the extremity as it is applied.


   a. If using plaster rolls, go to step 17.
   b. If using fiberglass rolls, go to steps 15 and 16.

15. Place fiberglass casting gloves on hands.

   CAUTION: To prevent chemical burns to the hands it is mandatory for the technician to use fiberglass casting gloves.

16. Open fiberglass casting package and go to step 17.

   NOTE: Open one fiberglass package at a time. As fiberglass comes in contact with the air, the roll will start to cure (set up).

17. Apply 1st plaster/fiberglass roll.

   NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.

   a. Hold plaster/fiberglass roll vertical with one hand.

   b. With opposite hand unroll the plaster/fiberglass 1/2 -1 inch and grasp the edge with thumb, index and middle fingers.

   c. Place plaster/fiberglass roll vertical in bucket of water and remove when bubbles cease to rise.

   d. Squeeze the roll together (do not wring the roll).

   NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

   e. Place the edge of the casting material at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

   NOTE: The technician may also start 1 inch to the distal edge of the webril.

   f. Continue down the foot ending 1/2 inch from the distal edge of the webril, back up the leg ending 1/2 inch from the proximal edge of the webril.

   g. With each turn overlap the plaster/fiberglass by 1/4 -1/2 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present evenly applied casting material. To reduce possible constrictive edema caused by applying the plaster/fiberglass too tight, keep the plaster/fiberglass on the extremity as it is applied.

18. Laminate the cast.

   a. Place palm of each hand on anterior and posterior aspect of the cast.

   CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels excessive pressure or hot spots developing under the cast, the cast must be removed immediately.

   b. Rub the cast material in the direction it was applied.

   NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

   c. Continue rubbing the plaster cast until the tone/texture changes from a glossy/creamy color to a dull white color. If using fiberglass continue to laminate until the cast is cured.

19. Apply reinforcement splint to posterior aspect of cast.

   NOTE: The reinforcement splint is used to strengthen and support the cast.

   a. Place the splint in tepid water, wait for bubbles to cease to rise and remove splint from water.

   b. Squeeze the splint together to eliminate excess water.
Performance Steps
   c. Place splint on the cast beginning from the web space of the toes to 1 finger width below the fibular notch/head or 3 inches distal to the popliteal space and laminate.
   
d. Maintain patient’s ankle at 90 degree dorsiflexion until splint adheres to cast material.

20. Apply 2nd plaster/fiberglass roll (repeat steps 17-18).

21. Mold the cast material to the lower leg.
   a. Place palm of hand on the gastrocnemius muscle and apply pressure. Hold until contours takes shape.
   
   NOTE: A flat board can also be used to mold the cast to the gastrocnemius.
   b. Place lateral aspect of both thumbs (forming a triangle) on the tibia and apply even pressure up/down the tibia. Hold until contours take shape.
   c. Place the web spacing of the thumb and index finger(C mold) to the distal aspect of the patella and apply pressure. Hold until contours take shape.
   
   NOTE: The molding process may take several minutes. Ensure the cast is well molded before continuing. The cast is well molded when the malleolus, tibia, plantar arch achilles, calcaneus, gastrocnemius and the femoral condyles are visible.
   d. Place heel of hands on the femoral condyles. Hold until contours take shape.
   e. Place palm of hand on plantar arch. Hold until contour take shape.
   f. Place palm of hand on calcaneus. Hold until contour take shape.

22. Trim cast to fit patient.
   a. Draw a curved line (half moon shape) on the cast that matches with the outer border of the previous molded femoral condyles.
   b. With cast saw trim the outline around the femoral condyles and posteriorly to the level opposite of the tibial tuberosity.
   c. With cast saw trim distal aspect of the cast for toes visibility and ROM.
   d. Remove excess casting material and disregard in trash receptacle.
   e. Fold and tack down the webril and stockinette.
   
   NOTE: Tape or plaster remnants can be used to tack down the stockinette.

23. Check range of motion (ROM) of knee and toes.
   a. Have patient extend and flex knee and toes.
   b. Cut webril at the distal and proximal edges and the posterior aspect of the knee.

24. Check alignment of ankle with goniometer.
   a. Place the stationary arm of the goniometer bisecting the 5th metatarsal.
   b. Place the moving arm of the goniometer bisecting the tibia.
   c. Place the protractor of the goniometer on the lateral malleolus.
   
   NOTE: If the ankle is not at 90 degrees, inverted or everted remove cast and go to step 12.

25. Check cast dimensions.
   a. The proximal cast edge is one finger breath distal to the fibula notch.
   b. The distal cast edge is in line with the web spacing on the posterior aspect of the foot.
   c. The anterior portion of the cast rests on the patella tendon.

26. Apply and laminate splint to femoral condyles.
   a. Place plaster reinforcement splint in water. Wait for bubbles to cease to rise and remove splint from water.
   b. With second hand place index and middle finger on either side of the splint and squeegee out excess water.
   c. Place reinforcement splint on the lateral side of the cast in line with the outer border of the femoral condyle and laminate.
   d. Follow a-c for the medial side splint application.

27. Apply 3rd and 4th plaster/fiberglass roll (repeat steps 17-18).
   
   NOTE: A fan fold technique may be used to reinforce the flanges.
**Performance Steps**

28. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
   **CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

29. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
   **NOTE:** Use alcohol pad or fresh water from the faucet and not from the casting bucket.

30. Apply cast shoe.

31. Administer a crutch ambulation instruction (See task number 081-836-0041)

32. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep leg elevated and flex and extend toes to increase circulation in the foot.
   d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).
   e. Instruct patient to use crutches and not to place any pressure on the cast for 24-48 hours.

33. Annotate patient's medical record or SF 513.
   **NOTE:** Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

34. Escort patient to front desk to make a follow up appointment.

**Evaluation Preparation:**

**Performance Measures**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>GO</th>
<th>NO GO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Received or reviewed the order from the physician.</td>
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<tr>
<td>2.</td>
<td>Identified yourself to patient.</td>
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<tr>
<td>3.</td>
<td>Explained the procedure to patient.</td>
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<tr>
<td>4.</td>
<td>Inspected injured leg/ankle with patient supine on the examination bed.</td>
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<td>5.</td>
<td>Checked patient's capillary refill.</td>
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<td>6.</td>
<td>Gathered equipment.</td>
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<td>7.</td>
<td>Assembled materials.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<tr>
<td>11. Applied stockinette to injured leg.</td>
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<tr>
<td>12. Measured patient's injured ankle w/goniometer.</td>
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<tr>
<td>15. Placed fiberglass casting gloves on hands.</td>
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<tr>
<td>17. Applied 1st plaster/fiberglass roll.</td>
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<tr>
<td>18. Laminated the cast.</td>
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<tr>
<td>19. Applied reinforcement splint to posterior aspect of cast.</td>
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<tr>
<td>21. Molded the cast material to the lower leg.</td>
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<tr>
<td>22. Trimmed cast to fit patient.</td>
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<tr>
<td>23. Checked range of motion (ROM) of knee and toes.</td>
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<tr>
<td>24. Check alignment of ankle with goniometer.</td>
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<tr>
<td>25. Checked cast dimensions.</td>
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<tr>
<td>26. Applied and laminated plaster reinforcement splint to medial/lateral side of femoral condyle</td>
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<td>27. Applied 3rd and 4th plaster/fiberglass roll.</td>
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<tr>
<td>28. Checked patient's capillary refill.</td>
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<tr>
<td>29. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<td>31. Administered a crutch ambulation treatment (See task number 081-836-0041)</td>
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<td>32. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>33. Annotated the procedure applied in patient's medical record or SF 513.</td>
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<tr>
<td>34. Escorted patient to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the ortho tech a NO-GO (NG) if any step is failed (F). All performance measured tasks must be passed to receive a go.

**References**

**Required**

- 0-443-04809-6
- 0812110-0765
- 0-8151-0910-5
- 0-8342-0763-X
<table>
<thead>
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APPLY A QUADRILATERAL THIGH BEARING CAST
081-834-0049

Conditions: Given an orthopaedic patient requiring a Quadrilateral Thigh Bearing cast (QTB) sitting or supine on an orthopaedic examination bed, nursing personnel, family members, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), grease pencil, pen, work cart/station, (4) rolls of orthoflex, (4) rolls of 6 inch plaster, (4) rolls of 4 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (5) rolls of 4 or 5 inch fiberglass, (2) rolls of 3 inch webril, (3) rolls of 4 inch webril, (3) rolls of 6 inch webril, roll of (3,4 or 6 inch) stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, cast saw with vacuum, cast spreader, (2) safety goggles, (3) packages of disposable foam ear plugs, roll of 2 inch adhesive tape, (3) hospital pads(chux), bed sheet, pillow, (2) disposable paper shorts, two knee hinges, elastic knee cage, quadrilateral socket, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, thermometer, support bar, cast care booklet or equivalent, box of alcohol pads, damp wash cloth/or towel, sink w/faucet, tube of surgical lubricant, orthopaedic bump, flat board, thigh holder, T stand, 1 pair of crutches and trash receptacle.

Standards: Is reached when the injured leg, ankle and knee are immobilized by the cast from the web spacing of the toes to 4 inches distal to the groin (on the medial side), and flared 3 inches proximal to the greater trochanter on the lateral side. Hinges are applied to the medial and lateral aspects of the knee. The ankle is dorsiflexed at a 90 degree angle, absent of inversion or eversion with toes having full range of motion. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Identify yourself to patient.
3. Explain the procedure to the patient.
Performance Steps

Quadrilateral Weight Bearing Cast

NOTE: The Quadrilateral Thigh Bearing cast is applied from 4 inches distal to the groin (on the medial side) and flared 3 inches proximal to the greater trochanter (on the lateral side) to the web spacing of the toes with ROM hinges applied to the injured knee to promote range of motion.
(Refer to Figure 3-x).

CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H₂O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's injured leg/ankle.
   a. Place examination gloves on hands.
   b. Remove patient's shoes, socks and pants.

NOTE: Provide patient with paper shorts or hospital scrubs. If unavailable, cut the pants at the seam.
   c. Inspect patient's injured leg for any skin conditions (e.g. cuts, abrasions, lacerations and skin rashes).

NOTE: Inform physician if any of the above conditions are present and follow physician's order.
   d. Examine both legs for jewelry and remove if found.

NOTE: All jewelry must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.
Performance Steps

5. Check patient's capillary refill.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.

   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician instructions.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, T stand, thigh holder, support bar, orthopaedic bump, goniometer, scissors, thermometer and bucket of tepid water with bag. Place on work cart or station.

   CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw water that is room temperature and initially use a thermometer to gauge water temperature.

   CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include stockinette, webril, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chu), bed sheet, box of plaster reinforcement sheets, surgical lubricant, box of alcohol pads, damp towel, (2) knee hinges, elastic knee cage, and Quadrilateral socket. Open and remove (7) plaster rolls from their packages and place on work cart/station.

   NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

   NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures or as directed by physician.

   CAUTION: Stockinette and webril are forms of protection against the exothermic reaction of the casting materials. Technician and physician preference will dictate whether stockinette is used.
   a. Place hospital pad or bed sheet over patient's lap.
   b. Place the patient's uninjured ankle at a 90 degree angle to the tibia and knee between 0-15 degree of flexion.
   c. Measure from the groin and 2 inches proximal to the greater trochanter to the web spacing of the toes to obtain stockinette length.
   d. Pull down stockinette from stockinette container and cut measured length.
   e. Roll stockinette leaving a 1-2 inch cuff at the distal end. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the posterior aspect of the cast.

   NOTE: The plaster reinforcement splint will be prepared for the posterior side of the injured leg/ankle.
   a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of one stack and remove from package. Place on work cart/station.

   NOTE: 5 x 30 inch plaster splints are usually stacked in increments of five from the manufacturer. If not pre stacked, count out five layers of plaster sheets.
   b. Measure from the gluteal crease to the web spacing of the toes.
   c. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.

   NOTE: Discard all excess material in the trash receptacle.

10. Prepare plaster reinforcement splint for use at the femoral condyles.
Performance Steps
NOTE: The plaster reinforcement splints are designed to assist in reinforcing the cast at the knee region.
   a. Locate edge of two stacks.
   b. Measure on the medial and lateral sides of the leg 4 inches distal to the groin crossing the knee and ending at the calf muscle.
NOTE: The splints could also be applied on the medial/lateral side of the cast. The application of the splint is technician preference.
   c. Place (2) stacks of (5) plaster sheets next to the measured length, cut off excess amount and place on work cart/station.
NOTE: All excess materials will be discarded in trash receptacle.

11. Prepare plaster reinforcement splint for use at the greater trochanter.
NOTE: The plaster reinforcement splints are designed to assist in reinforcing the cast at the greater trochanter.
   a. Locate edge of one stack.
   b. Measure the length of the greater trochanter.
   c. Place stack of (5) plaster sheets next to the measured length, cut off excess amount and place plaster sheets on work cart/station.
NOTE: Disregard excess materials in trash receptacle.

12. Apply stockinette to patient's injured leg.
   a. Apply elastic knee cage to leg.
   b. Apply quadrilateral socket to thigh.
NOTE: Physician's order will indicate use of quadrilateral socket. When using the quadrilateral socket having the patient stand will provide a better fit at the base of the thigh.
   c. Hold open sides of the stockinette.
   d. Instruct patient to place injured foot in the opening of the stockinette.
   e. Roll stockinette on injured ankle/leg resting 1 inch distal to the toes to 3 inches proximal to the greater trochanter.
NOTE: The patient may assist in rolling the stockinette past the greater trochanter.
   f. Pinch the stockinette at the base of the tibia/fibula and make a cut at a 45 degree angle.
   g. Pinch the stockinette at the back of knee and make a cut at a 45 degree angle.
NOTE: Cutting the stockinette reduces the chance of pressure sores developing from the stockinette rubbing or bunching up under the cast.

13. Position the patient's injured ankle at a 90 degree angle to the tibia.
NOTE: There are several ways to obtain a 90 degree angle. The patient could maintain the position, nursing personnel or family member can assist. A thigh holder, or thigh stand could be used. It is the technician preference.
   a. Instruct patient to dorsiflex foot.
NOTE: Many patient’s will not know the meaning of dorsiflex. Instruct the patient to pull their toes towards their head or have the patient simulate squishing a bug with their heel. Either technique will assist the patient in maintaining the ankle at 90 degrees. Each technician may use their own techniques.
   b. Align the 2nd and 3rd phalanges with the knee.
NOTE: Aligning the phalanges with the knee reduces eversion or inversion of the foot.
   c. Have assistant grasp the metatarsals of the injured foot under the stockinette.
NOTE: Grasping the metatarsals under the stockinette, reduces the chance the foot will be inverted or everted.
   d. Have assistant place opposite forearm under the patient's injured knee.
NOTE: Bracing the forearm under the knee reduces muscle strain for the patient, assists with ankle angle and knee flexion.

14. Measure patient’s injured ankle w/ goniometer.
Performance Steps

NOTE: The ankle is always positioned at a 90 degree angle (dorsiflexion), absent of inversion and eversion, unless otherwise indicated by physician's order. The knee is flexed between 0-15 degrees, unless otherwise indicated by physician's order.

a. Place the stationary arm of the goniometer parallel to the fibula.
b. Place the moving arm of the goniometer bisecting, the lateral edge of the heel and the head of the fifth metatarsal.
c. Place the protractor of the goniometer on the lateral malleolus.
d. Set the ankle until the goniometer measures 90 degrees of dorsiflexion.

15. Measure injured knee with goniometer.
a. Place the stationary arm of the goniometer horizontal, bisecting the lateral aspect of the femur.
b. Place the moving arm of the goniometer horizontal, bisecting the lateral aspect of the fibula.
c. Place the protractor of the goniometer on the lateral aspect of the knee.
d. Set knee until the goniometer measures between 0-15 degrees of flexion.

CAUTION: The patient will not be able to maintain this position. The technician may use an assistant or other supports e.g. t stand, thigh holder.

16. Apply cast padding (webri) to patient's injured leg.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers

a. Hold webril vertically with one hand.
b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index, middle finger and thumb.
c. Place the edge of the webril at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

NOTE: The technician may also start 1 inch from the distal edge of the stockinette.

NOTE: The webril application is started at the distal aspect of the tibia/fibula to provide an anchor and extra padding to the malleolus.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's toes.
d. Continue up the foot and leg, figure eight around the knee ending 1 inch distal to the edge of the stockinette.

NOTE: The webril should end at the highest point on the medial thigh that patient comfort is allowed.
e. With each turn overlap the webril by 1/2 - 1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding. To reduce possible constrictive edema caused by applying webril too tight, keep the webril on the extremity as it is applied.

CAUTION: The peroneal nerve is located on the lateral side of the leg. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Locate the fibula notch/ head and provide extra padding to prevent this condition.

17. Prepare casting materials.
a. If using plaster rolls, go to step 20
b. If using fiberglass rolls, go to step 18.

18. Place fiberglass casting gloves on hands.

CAUTION: To prevent chemical burns to the hands it is mandatory for the technician to use fiberglass casting gloves.

NOTE: Tube of surgical lubricant can be used to keep gloves from adhering to fiberglass casting material.

19. Open fiberglass casting package and go to step 18
Performance Steps

NOTE: Open one fiberglass package at a time. As fiberglass comes in contact with the air, the roll will start to cure (set up).

20. Apply 2 plaster/fiberglass rolls.

NOTE: If using plaster, examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.
   a. Hold plaster/fiberglass roll vertically with one hand.
   b. With opposite hand unroll the plaster/fiberglass 1/2 -1 inch and grasp the edge with thumb, index and middle fingers.

NOTE: Alternate method of placing the thumb under the forward edge of the roll can also be used.
   c. Place plaster/fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.
   d. Squeeze the roll together (DO NOT WRING THE ROLL).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.
   e. Place the edge of the casting material at the distal aspect of the tibia/fibula and begin wrapping around the malleolus two rotations.

NOTE: The technician may also start 1 inch distal to the edge of the webril.
   f. Continue up the foot and leg, figure eight around the knee ending 1 inch distal to the edge of the webril.
   g. With each turn overlap the plaster/fiberglass by 1/4 -1/2 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present evenly applied casting material.

NOTE: To reduce possible constrictive edema caused by applying the plaster/fiberglass too tight keep the plaster/fiberglass roll on the extremity as it is applied.

21. Laminate the casting materials.
   a. Place palm of each hand on the cast.

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.
   b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.
   c. Continue rubbing the plaster cast until the tone/texture changes from a glossy/creamy color to a dull white color. If using fiberglass continue to laminate until the cast begins to cure.

22. Apply plaster splint to posterior aspect of cast.

NOTE: Plaster reinforcement splint is used to strength and support the cast.
   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Place reinforcement splint on the posterior side of the cast in line with the web spacing of the foot and gluteal crease.
   d. Laminate the splint to the cast.
   e. Maintain patient's ankle at 90 degree dorsiflexion.

NOTE: Instruct the patient to squish a bug with their heal or bring their toes to their nose. Either technique will assist the patient in bringing their ankle to a 90 degree angle. The technician may have their own preference to the above techniques.

23. Apply plaster splint to quadriceps muscle/greater trochanter region.
   a. repeat steps 22 a and b.
   b. Place reinforcement splint on the lateral side of the cast in line with the superior aspect of the greater trochanter and the medial aspect of the quadriceps muscle.
   c. Laminate the splint to the cast.

24. Apply 2 plaster/fiberglass rolls (repeat steps 20-21)
Performance Steps

25. Mold the cast material to the lower leg.
   a. Place palm of hand on the gastrocnemius muscle and apply pressure. Hold until contours take shape.
   NOTE: A flat board can also be used to mold the gastrocnemius
   b. Place lateral aspect of both thumbs (forming a triangle) on the tibia and apply even pressure up/down the tibia. Hold until contours take shape.
   CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
   c. Place lateral aspect of both thumbs (forming a c) on the malleolus and apply even pressure to the border of the malleolus. Hold until contours take shape.
   d. Remove heels of hands from the cast when contours of the ankle, tibia/fibula have been shaped and the cast is cured.
   NOTE: All casts require molding. Crooked casts equal straight bones.

26. Mold the cast material to the upper leg.
   a. Quadrilateral mold: Place the palm of one hand on the lateral side of the quadrilateral muscle.
   b. Place the palm of the other hand on the medial side of the quadrilateral muscle.
   c. Press palms together and conform the cast material to the leg (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.

27. Mold the cast material to the femoral condyles.
   a. Place the palm of one hand on the medial side of the femoral condyle.
   b. Place the palm of one hand on the lateral side of the femoral condyle.
   c. Press palms together and conform the plaster to the femoral condyles (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.
   NOTE: The art of molding casting material is a continuous and ongoing procedure.

28. Check cast dimensions.
   a. The web spacing is visible
   b. The 5th metatarsal is visible.
   c. The proximal edge of the cast is 4 inches distal to the groin region on the medial side and 3 inches proximal to the greater trochanter on the lateral side.
   NOTE: Using the cast saw or scissors trim the distal/proximal edges of the cast as needed.

29. Trim the knee region of cast.
   CAUTION: Prior to using a cast saw, the patient is always offered hearing and eye protection. The technician must always wear hearing and eye protection when removing a cast.
   a. With grease pencil draw two transverse (medial and lateral) circumferential lines above and below the knee joint.
   NOTE: The transverse lines are made 4 inches from the center of the femoral condyles.
   b. With cast saw trim the transverse lines anteriorly and posteriorly to the level opposite of the tibial tuberosity.
   c. Remove excess casting material and disregard in trash receptacle.
   d. Fold and tack down the webril and stockinette.
   NOTE: Tape or plaster remnants can be used to tack down the stockinette.
   e. Trim distal aspect of the cast so that all toes are visible and have full ROM.
   f. Fold and tack down the webril and stockinette at the toes.
   NOTE: Tape or plaster remnants can be used to tack down the stockinette.

30. Secure two knee hinges to cast.
   NOTE: Physician's order will determine placement of knee hinges.
   a. Place stationary arm of the first hinge on the lateral aspect of the leg bisecting the femur and the moving arm bisecting the fibula. The rotation part of the hinge should be in line with the middle of the patella.
Performance Steps

NOTE: To assist in alignment of the hinges, nursing assistant, physician or orthopaedic technician may be used.

b. Place the edge of the casting material on the distal arm of the hinge and begin wrapping around the lower leg two rotations to secure the edge.
c. Bring the casting material between the hinge and leg and lock in hinge.
d. Continue down the leg and laminate as you roll.
e. Repeat steps 30 b-d for the proximal end of the hinge brace.
f. Place stationary arm of the second hinge on the medial aspect of the leg bisecting the femur and the moving arm bisecting the fibula. The rotation part of the hinge should be in line with the middle of the patella.
g. Place the edge of the casting material on the distal arm of the hinge and begin wrapping around the lower leg two rotations to secure the edge.
h. Bring the casting material between the hinge and leg and lock in hinge.
i. Continue down the leg and laminate as you roll.
j. Repeat steps 30 g-i for the proximal end of the hinge brace.

31. Apply 5th roll of plaster/fiberglass (repeat step 20-21).

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

32. Check patient's capillary refill.

   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

33. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.

NOTE: Fresh water from the faucet and not from the casting bucket should be used.

34. Apply a cast shoe.

35. Administer a crutch ambulation instruction (See task number 081-836-0041)

36. Give patient verbal and written instructions on cast care.

   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep leg elevated and flex and extend toes to increase circulation in the foot.
   d. Instruct patient not to stick anything down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).
   e. Instruct patient not to place any pressure on the cast for 24-48 hrs.

37. Annotate the procedure applied to patient in medical record or SF 513.

NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

38. Escort patient to front desk to make a follow up appointment.

Performance Measures

1. Received the order from the physician (reviewed if in writing).

2. Identified yourself to patient.

3. Explained the procedure to the patient.

4. Inspected injured leg/ankle with patient supine on the examination bed.
<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>5. Checked patient's capillary refill.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
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<tr>
<td>9. Prepared plaster reinforcement splint for the posterior aspect of the cast.</td>
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<tr>
<td>10. Prepared plaster reinforcement splint for use at the femoral condyles.</td>
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<tr>
<td>11. Prepared plaster reinforcement splint for use at the greater trochanter.</td>
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<tr>
<td>12. Applied stockinette to patient's injured leg.</td>
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<tr>
<td>13. Positioned the patient's injured ankle at a 90 degree angle to the tibia.</td>
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<tr>
<td>15. Measured injured knee with goniometer.</td>
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<tr>
<td>16. Applied cast padding (webril) to patient's injured leg.</td>
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<tr>
<td>17. Prepared casting materials.</td>
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<tr>
<td>18. Placed fiberglass casting gloves on hands.</td>
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<tr>
<td>21. Laminated the casting materials.</td>
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<tr>
<td>22. Applied plaster splint to posterior aspect of cast.</td>
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<tr>
<td>23. Applied plaster splint to quadriceps muscle/greater trochanter region.</td>
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<tr>
<td>24. Applied 2 plaster/fiberglass rolls</td>
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<tr>
<td>25. Molded the cast material to the lower leg.</td>
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<td>26. Molded the cast material to the upper leg.</td>
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<td>27. Molded the cast material to the femoral condyles.</td>
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<tr>
<td>28. Checked cast dimensions.</td>
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<tr>
<td>29. Trimmed the knee region of cast.</td>
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<tr>
<td>30. Secured two knee hinges to cast.</td>
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<tr>
<td>31. Applied 5th roll of plaster/fiberglass</td>
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<tr>
<td>32. Checked patient's capillary refill.</td>
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<tr>
<td>33. Cleaned plaster off patient's skin using a damp cloth, towel or alcohol pad.</td>
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<tr>
<td>34. Applied a cast shoe.</td>
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<td>35. Issued crutches and demonstrate proper use.</td>
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<tr>
<td>36. Gave patient verbal and written instructions on cast care.</td>
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</tbody>
</table>
Performance Measures

37. Annotated the procedure applied to patient in medical record or SF 513. 

38. Escorted patient to front desk to make a follow up appointment.

Evaluation Guidance: Score the orthopaedic technician a GO on the task if all steps are passed (P). Score the ortho tech a NO-GO (NG) if any step is failed (F). All performance measured tasks must be passed to receive a go.

References

Required

Related

0812110-0765
0-8342-0763-X
38709590
TM 8-231
TM 8-640
APPLY A SHORT ARM CAST WITH FINGER SPLINT OUTRIGGER
081-834-0056

**Conditions:** Given an orthopaedic patient requiring a Short Arm Cast (SAC) with outrigger, sitting or supine on an orthopaedic examination bed, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, 6-10 inch aluminum splint, (3) rolls of 3 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (3) rolls of 2 or 3 inch fiberglass, (3) rolls of 2 or 3 inch webril, roll of 2 or 3 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, tube of surgical lubricant, orthopaedic bump, thermometer, and trash receptacle.

**Standards:** Is reached when the short arm cast is applied to the patient's injured arm from the distal palmar crease/metacarpophalangeal joints to 1 inch distal to the cubitum space (bend of elbow). The wrist is immobilized by the cast between 0-15 degrees of dorsal extension (absent of ulnar, radial, supination or pronation). An aluminum splint is secured to the volar aspect of the cast, from 1 inch proximal to the cast edge to 2 inches distal to the injured finger(s). The cast restricts rotation of the wrist with free range of motion of the elbow, thumb and uninjured fingers. Capillary refill test is administered and passed.

**Performance Steps**

1. Receive the order from the physician (review if in writing)

2. Identify yourself to patient.
   NOTE: Tell the patient your name and your job title.

3. Explain the procedure to the patient.
   NOTE: The Short Arm Cast (SAC) with aluminum splint is applied from 1 inch distal to the cubitum space (bend of elbow) to the distal palmar crease (DPC)/metacarpophalangeal joints (MCPJ's), with the wrist in 0-15 degrees of dorsal extension. The cast allows complete elbow flexion and extension, restricts wrist movement and injured fingers. The thumb and uninjured fingers will have full range of motion (ROM).

   CAUTION: During cast application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The cast will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the cast may need to be removed.

4. Inspect patient's upper extremities.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   c. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.
Performance Steps

5. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include cast saw, cast spreader, hearing protection, goggles, finger trap set with stand and scissors, thermometer, aluminum splint and bucket of tepid water w/ bag. Open and remove (4) plaster rolls from their packages and place on work cart/station. Place on work cart or station.
CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include stockinette, webri, plaster or fiberglass rolls, fiberglass casting gloves, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement splint, surgical lubricant, alcohol pads/damp towel. Place on work cart/station.
NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.
NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webri are forms of protection against the exothermic reaction of the casting materials.
   a. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.
   b. Place work cart with orthopaedic bump at edge of bed.
   NOTE: Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. T stand, finger trap stand, nursing assistant)
   c. Place patient's uninjured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.
   NOTE: Measurements are taken on the uninjured arm to prevent further pain or discomfort to the patient.
   NOTE: Instruments of measurements may vary (e.g. tape measure, ruler, or webri).
   d. Measure from the cubitum space (bend of elbow) to 2 inches distal to the MCPJ's for stockinette length.
   e. Pull down stockinette from stockinette container and cut measured length.
   f. Roll stockinette leaving a 1-2 inch cuff at the distal end. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the volar aspect of the cast.
NOTE: The volar aspect of the arm is located on the palm side of the hand/forearm.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (5) sheets, remove from the stack. Place on work cart/station.
   b. Place patient's uninjured hand in the supine position (palm up) and locate distal palmar crease (DPC), thenar muscle and the cubitum space.
NOTE: The DPC is furthest diagonal line on the volar aspect of the hand. The thenar muscle is at the base of the thumb on the volar aspect of the hand. The crease is noticeable when the thumb and 5th phalange (pinky finger) are brought together. The cubitum space is located at the bend of the arm.
   c. Remove (1) plaster sheet from the stack of (5).
Performance Steps

d. Place sheet next to injured arm to obtain sheet length, the DPC and thenar muscle contour.

NOTE: To increase patient cleanliness, the sheet does not have to rest on the hand/forearm.

e. Draw a diagonal line on the plaster sheet that matches with the DPC of patient's hand.

NOTE: The diagonal cut facilitates free ROM of the fingers (extension and flexion).

f. Draw a curved line (half moon shape) on the plaster sheet that matches with the outer border of the thenar muscle on the patient's hand.

NOTE: The half moon pattern enables the thenar muscle to be observable and the thumb to adduct to all fingers promoting free range of motion (ROM).

g. Place sheet on stack, cut the outlined patterns and excess length for all sheets, and place on work cart/station for later use.

NOTE: Discard excess material in the trash receptacle.


a. Place aluminum splint next to uninjured arm to obtain splint length.

NOTE: The splint should extend 2 inches distal to the finger tips.

b. Cut measured length and place on work cart/station for later use.

NOTE: Discard excess material in the trash receptacle.

11. Apply stockinette to patient's injured arm.

a. Place patient's injured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.

b. Hold open the sides of the stockinette.

c. Instruct patient to place injured hand into the opening.

d. Roll stockinette on the injured arm 1 inch distal to the MCPJ's to the cubitum space (bend of elbow).

NOTE: Rolling the stockinette on promotes a better fit.

e. Pinch the stockinette at the base of the thumb and make a 1/2 inch cut at a 45 degree angle.

f. Place patient thumb through pre cut hole and smooth out stockinette.

12. Apply finger traps to fingers on injured hand (if not used go to step 12).

NOTE: Use of finger traps may be required based on patient's inability to maintain arm/wrist in the correct position, there is no assistance available, and fracture reduction is needed.

a. Place patient in supine position on the bed.

b. Place injured arm at a 90 degree angle to the upper torso and smooth out wrinkles in the stockinette.

c. With one hand, grasp patient's injured hand and abduct from upper torso.

d. With 2nd hand, grasp finger trap set and place individual finger traps onto fourth and fifth phalange past the MCPJ's.


NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician.

a. Place patient's index finger and thumb in opposition to one another.

NOTE: Placing the thumb and forefinger in opposition to one another assist the patient in maintaining wrist in neutral position. This is commonly referred to as the can of coke position.

b. Place the stationary arm of the goniometer in a vertically bisecting the forearm.

c. Place the moving arm of the goniometer in a vertically bisecting the lateral side of the 5th phalange (pinky finger).

d. Place the protract of the goniometer on the ulnar styloid.

e. Set wrist until the goniometer measures 0 -15 degrees of dorsal extension.

14. Apply cast padding (webril) to injured wrist/forearm.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers.

a. Hold webril vertical with one hand.
Performance Steps

b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.

c. Place the edge of the webril on the ulnar styloid and begin wrapping around the wrist two rotations.

NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.

d. Continue through the palm ending 1/2 inch from the distal edge of the stockinette, back up the forearm ending 1/2 inch from the proximal edge of the stockinette.

e. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm to provide a better fit. The technician preference will determine which technique to use.

15. Prepare casting materials.

a. If using fiberglass casting materials go to step 15.

b. If using plaster casting materials go to step 17.

16. Place fiberglass casting gloves on hands.

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while applying a fiberglass cast.

17. Open fiberglass casting package and go to step 18.

NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.

18. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll with one hand.

NOTE: Alternate method may be used.

b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll vertical into bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

e. Place the edge of the casting material on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.

NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a twitching or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) and twist. Evenly space the casting material on the webril and smooth out with volar side of fingers. The twisting method provides strength to the cast.

The CUT method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.
Performance Steps

f. Continue through the palm ending 1/2 inch from the distal edge of the webri, back up the forearm ending 1/2 inch from the proximal edge of the webril.
g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.

19. Laminate the casting material.
   a. Place palm of each hand on the cast.
   CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.
   b. Rub the cast material in the direction it was applied.
   NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.
   c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

20. Apply reinforcement splint to volar aspect of cast.
   NOTE: The reinforcement splint is used to strengthen and support the cast.
   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Place reinforcement splint to the volar side of the cast in line with the DPC and the outer border of the thenar muscle.
   d. Laminate splint on to cast.
   e. Maintain patient's wrist between 0-15 degrees of dorsal extension.
   NOTE: Place the patient's thumb and forefinger in opposition to one another.

21. Apply 2nd plaster/fiberglass roll (repeat steps 18-19)

22. Mold the cast material to wrist/forearm.
   NOTE: The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of the hands together
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.
   CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
   e. Maintain patient's wrist in correct position.
   f. Remove heels of the hands from cast when contours of the wrist and forearm have been shaped and cast is cured.

23. Check range of motion (ROM) of phalanges and thumb.
   a. Have patient extend, flex fingers and touch thumb to all uninjured fingers.
   b. Cut the webril at the distal, proximal edges and at the base of the thumb.
   CAUTION: The finished edge of the cast should end proximal to the base of the thumb to avoid radial nerve impingement.

24. Check alignment of wrist with goniometer.
   a. Place the stationary arm of the goniometer vertically, bisecting the forearm.
   b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger)
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. The wrist is measured at 0-15 degrees dorsal extension.
   NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove cast and go to step 11.

25. Check cast dimensions.
Performance Steps

a. On the volar side the distal edge of the cast rests at the DPC.
b. On the dorsal side the distal edge of the cast rests at the base of the MCPJ's.
c. The cast edge at the base of the thumb rests proximal to the snuff box.
d. The proximal edge of the cast rests 1 inch distal to the cubitum space.
e. Tape down edges of stockinette and webril.

26. Secure aluminum splint to volar aspect of cast.
   a. Place padding between injured fingers.
   b. Place aluminum splint on the volar aspect of cast.
   NOTE: The splint can be formed to fit the contours of the wrist.
   c. Tap the fingers to the aluminum splint.

27. Apply 3rd plaster roll (repeat steps 18-19)

28. Apply 4th plaster roll (repeat steps 18-19)
   NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

29. Check patient's capillary refill.
   a. Squeeze patient's finger tips and nail beds will turn white.
   b. Release patient's finger tips and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

30. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
    Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

    a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
    b. Present patient with cast care booklet (or written instructions).
    c. Instruct patient to elevated the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
    d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

32. Fit sling to patient as required.
    NOTE: Consideration for applying a sling include elderly patient’s, severity of fractures (e.g. colles’, smith’s, bennett’s), patient’s comfort, physician’s or technician’s preference.

33. Annotate the procedure applied to patient in medical record or SF 513.
    NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

34. Escort patient or direct patient to front desk to make a follow up appointment.

Performance Measures

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<tr>
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<td>3. Explained the procedure to the patient.</td>
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<td>4. Inspected patient's upper extremities.</td>
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<tr>
<td>5. Checked patient's capillary refill.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials</td>
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<td>9. Prepared plaster reinforcement splint for the volar aspect of the cast.</td>
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<td>11. Applied stockinette to patient's injured arm.</td>
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<td>14. Applied cast padding( webril) to injured wrist/forearm</td>
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<tr>
<td>16. Placed fiberglass casting/ examination gloves on hands.</td>
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<td>17. Opened fiberglass casting package.</td>
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<td>18. Applied 1st plaster or fiberglass roll.</td>
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<td>19. Laminated the casting material.</td>
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<td>20. Applied reinforcement splint to volar aspect of cast.</td>
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<td>21. Applied 2nd plaster or fiberglass roll.</td>
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<td>22. Molded cast material to wrist/forearm.</td>
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<td>23. Checked range of motion ( ROM ) of phalanges and thumb.</td>
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<td>24. Checked alignment of injured wrist with goniometer.</td>
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<td>25. Checked cast dimensions.</td>
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<td>27. Applied 3rd plaster roll.</td>
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<td>28. Applied th plaster roll.</td>
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<td>29. Checked patient's capillary refill.</td>
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<td>30. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<td>31. Gave patient verbal and written instructions on cast care.</td>
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<td>33. Fitted sling as required.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO( NG ) if any step is failed (F). All performance measures must be passed to receive a go.
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**APPLY SHORT ARM RADIAL GUTTER CAST**

**081-834-0057**

**Conditions:** Given an orthopaedic patient requiring a Radial Gutter cast, sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen, work cart/station, (2) rolls of 4 inch plaster, (3) rolls of 3 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (2) rolls of 2 or 3 inch webril, roll of 2 or 3 inch stockinette, stockinette container, examination gloves, scissors, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, finger trap set with stand, bucket of tepid water w/plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, orthopaedic bump, thermometer and trash receptacle.

**Standards:** Is reached when the cast is applied to the radial aspect of the patient's injured arm from the tips of the 1st and 2nd phalanges down the dorsal side of the hand completely covering the 1st and 2nd metacarpophalangeal joints (MCPJS) to 1 inch distal to the cubitum space (bend of elbow). The wrist is immobilized by the cast between 0-15 degrees of dorsal extension (absent of ulnar, radial, supination or pronation). The 1st and 2nd phalanges are measured between 70-90 degrees of flexion. The cast eliminates rotation of the wrist with free range of motion of the elbow, thumb and uninjured fingers. Capillary refill test is administered to the fingers/thumb and successfully passed.

**Performance Steps**

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.

   **NOTE:** Tell the patient your name and job title.

3. Explain the procedure to the patient.

   **NOTE:** The Radial gutter cast (RGC) is applied from the tip of the index and middle phalanges to 1 inch distal to the cubitum space. The injured phalanges will be flexed between 70-90 degrees, with the wrist between 0-15 degrees of dorsal extension and absent of radial, ulnar deviation, pronation and supination. The uninjured fingers and thumb will have full range of motion (ROM).

   **CAUTION:** During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
   **CAUTION:** Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient sitting or supine on examination bed.
   c. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   **NOTE:** Inform physician if conditions are present and follow physician's instruction.
   d. Examine both arms and wrists for jewelry and remove if found.
   **NOTE:** All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's hands/fingers.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   **CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.
Performance Steps

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (3) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

b. Place work cart with orthopaedic bump at edge of bed.

NOTE: Technician preference will determine if orthopaedic bump is used. A number of props may be used (e.g. finger trap stand, nursing assistant).

c. Place patient's uninjured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.

NOTE: Measurements are taken on the uninjured arm to prevent further pain or discomfort to the patient.

NOTE: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

d. Measure from 1 inch distal of the DIP to the cubitum space (bend of elbow) for stockinette length.

e. Pull down stockinette from stockinette container and cut measured length.

f. Roll stockinette leaving a 1-2 inch border at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the radial aspect of the cast.

a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (5) sheets, remove from the stack. Place on work cart/station.

b. Remove (1) plaster sheet from the stack of (5).

c. Have patient flex 1st and 2nd phalanges.

d. Remove (1) plaster sheet from the stack of (5).

e. Place sheet next to uninjured phalanges and arm to obtain sheet length.

NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/forearm.

f. Place sheet on stack, cut the excess length for all sheets, and place on work cart/station for later use.

NOTE: Discard excess material in the trash receptacle.

10. Apply stockinette to patient's injured arm.

a. Place patient's injured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.

b. Place a webril strip between the 1st and 2nd phalanges.

NOTE: A 1 inch stockinette can be applied to the 1st and 2nd phalanges in addition to the hand and arm stockinette.
Performance Steps

c. Hold open the sides of the stockinette.
d. Instruct patient to place injured hand in the opening.
e. Roll stockinette on the injured arm from 1 inch distal to the 1st and 2nd distal interphalangeal joints to the cubitum space (bend of elbow).

NOTE: Rolling the stockinette on promotes a better fit.

f. Pinch the stockinette at the base of the thumb and make a 1/2 inch cut at a 45 degree angle.
g. Place patient thumb through pre cut hole and smooth out stockinette.

11. Measure patient's injured phalanges and wrist with goniometer.

NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician.
a. Place the patient's index finger and thumb in opposition to one another.

NOTE: Placing the thumb and forefinger in opposition to one another assists the patient in maintaining wrist in neutral position. This is commonly referred to as the can of coke position.

b. Place the 1st and 2nd phalanges in the flexed position.
c. Place the stationary arm of the goniometer vertical, bisecting the forearm.
d. Place the moving arm of the goniometer horizontal, bisecting the lateral side of the 1st phalange (index finger)
e. Place the protractor of the goniometer on the ulnar styloid.
f. Set wrist until the goniometer measures 0-15 degrees of dorsal extension and set 1st and 2nd phalanges until the goniometer measures 70-90 degrees of flexion.

12. Apply cast padding (webril) to injured phalanges, wrist and forearm

a. Place cast padding between the index and middle fingers.
b. Hold webril with one hand.
c. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.
d. Place the edge of the webril on the ulnar styloid and begin wrapping around the wrist two rotations.

NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.

e. Continue through the palm, around the 1st and 2nd phalanges back up the forearm ending 1 inch distal to the stockinette edge.
f. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm to provide a better fit. The technician preference will determine which technique to use.


a. If using fiberglass casting materials go to step 14 and 15.
b. If using plaster casting materials go to step 16.

14. Place fiberglass casting gloves on hands.

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while applying a fiberglass cast.

15. Open fiberglass casting package and go to step 16.

NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.

16. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended when using plaster to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.
a. Hold plaster or fiberglass roll with one hand.
Performance Steps
NOTE: Alternate method may be used.
   b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.
NOTE: Placing the thumb under the forward edge of the roll can also be used.
   c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.
CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.
   d. Squeeze the roll together (do not wring the roll).
NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.
   e. Place the edge of the casting material on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a twisting or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) twist and evenly space the casting material on the webril. Smooth out with volar side of fingers. The twisting method provides strength to the cast.

The CUT method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.
   f. Continue through the palm, around the 1st and 2nd phalanges back up the forearm ending 1/2 inch proximal to the edge of the webril.
   g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.

17. Laminate the casting material.
   a. Place palm of each hand on the cast.
CAUTION: To reduce cast indentations, which can cause pressure sore to the patient’s skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.
   b. Rub the cast material in the direction it was applied.
NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.
   c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

18. Apply reinforcement splint to index and middle phalanges.
NOTE: The reinforcement splint is used to strengthen and support the cast.
   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Place reinforcement splint around the 1st and 2nd phalanges.
   d. Laminate splint on cast.
   e. Maintain patient’s wrist between 0-15 degrees of dorsal extension and 1st and 2nd phalanges between 7-90 degrees of flexion. (repeat step 11).

19. Apply 2nd plaster/fiberglass roll (repeat steps 16-17).

20. Mold casting material to forearm/wrist.
NOTE. The mold to the wrist and forearm is called the interosseous mold. The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
Performance Steps

d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g., How do you feel?, Is the pressure too much?)

e. Remove heels of each hand from cast when contours of the wrist and forearm have been shaped and cast is cured.

21. Mold cast material to phalanges.

NOTE: The physician will mold the phalanges.

22. Check range of motion (ROM) of phalanges and thumb.

a. Have patient extend, flex uninjured fingers and touch thumb to all fingers.

CAUTION: The finished edge of the cast should end proximal to the base of the thumb to avoid radial nerve impingement.

b. Have patient extend and flex elbow.

23. Check alignment of wrist with goniometer. Go to step 11.

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, 1st and 2nd phalanges are not between 70-90 degrees of flexion, remove cast and go to step 8.

24. Check cast dimensions.

a. The cast edge rests at the distal palmar crease.

b. The cast edge rests proximal to the snuff box.

c. The cast extends 1/2 to 1 inch distal to the tips of the 1st and 2nd phalanges.

d. The 1st and 2nd metacarpophalangeal joints (MCPJ's) are covered.

e. Tape down edges of stockinette and webril.

25. Apply 3rd plaster roll (repeat steps 16-17).

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.


a. Squeeze patient's fingers and nail beds will turn white.

b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

27. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.

Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

28. Give patient verbal and written instructions on cast care.

a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.

b. Present patient with cast care booklet (or written instructions).

c. Instruct patient to elevated the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.

d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g., writing on it, coloring.)

29. Fit sling to patient as required.

NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g., Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

30. Annotate the procedure applied to patient in medical record or SF 513.
Performance Steps
NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tr>
<td>31.</td>
<td>Escort patient or direct patient to front desk to make a follow up appointment.</td>
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### Performance Measures

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<tr>
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<tbody>
<tr>
<td>1.</td>
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<td>2.</td>
<td>Identified yourself to the patient.</td>
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<td>3.</td>
<td>Explained the procedure to the patient.</td>
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<td>4.</td>
<td>Inspected patient's arms.</td>
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<td>6.</td>
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<td>11.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

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**APPLY SHORT ARM COBRA CAST**

081-834-0060

**Conditions:** Given an orthopaedic patient requiring a Short Arm Cobra cast sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (4) rolls of 3 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (3) rolls of 2 or 3 inch fiberglass, (3) rolls of 2 or 3 inch webbril, roll of 2 or 3 inch stockinette, stockinette container, fiberglass casting gloves, examination gloves, scissors, roll of 2inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, tube of surgical lubricant, orthopaedic bump, thermometer and trash receptacle.

**Standards:** Is reached when the cast is applied to the patient's injured arm from the tips of the phalanges down the dorsal/volar aspect of the hand completely covering the metacarpophalangeal joints (MCPJ’S) to 1 inch distal to the cubitum space (bend of elbow). The wrist is immobilized by the cast between 0-15 degrees of dorsal extension (absent of ulnar, radial, supination or pronation). The phalanges are measured between 70 - 90 degrees of flexion. The cast restricts rotation of the wrist and phalanges, with free range of motion of the elbow, and thumb. Capillary refill test is administered to the thumb and fingers and passed successfully.

**Performance Steps**

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.
   NOTE: Tell patient your name and job title.

3. Explain the procedure to the patient.
Performance Steps

3

Volar view of Cobra Cast
Performance Steps

3
Lateral view of Cobra Cast
3. **Lateral view of Cobra Cast**

**NOTE:** The Short Arm Cobra cast will be applied from the 1 inch distal to the tips of the phalanges to 1 inch distal to the cubitum space with wrist between 0-15 degrees of dorsal extension. The phalanges will be flexed between 70-90 degrees. The wrist will be absent of radial, ulnar deviation, pronation, supination with the thumb having full range of motion (ROM). (Refer to Figure 3-x).

**CAUTION:** During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. **Inspect patient's arms.**
   - a. Place examination gloves on hands.
   - CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   - b. Place patient sitting or supine on examination bed.
   - c. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   - NOTE: Inform physician if conditions are present and follow physician's instruction.
   - d. Examine both arms and wrists for jewelry and remove if found.

**NOTE:** All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. **Check capillary refill of patient's hands/fingers.**
Performance Steps
a. Squeeze patient's fingers and nail beds will turn white.
b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (3) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.

NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

b. Place work cart with orthopaedic bump at edge of bed.

NOTE: Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. T stand, finger trap stand, nursing assistant)

c. Place patient's uninjured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.

NOTE: Measurements are taken on the uninjured arm to prevent further pain or discomfort to the patient.

NOTE: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

d. Measure from 2 inch distal to the phalanges to the cubitum space (bend of elbow) for stockinette length.

e. Pull down stockinette from stockinette container and cut measured length.

f. Roll stockinette leaving 1-2 inch cuff at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the dorsal and volar aspects of the cast.

NOTE: The cobra cast can be applied to both the volar/dorsal aspects of the hand or to each side separately. Physician's order will determine if the dorsal or volar aspect of the hand are encased.

a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (5) sheets, remove from the stack. Place on work cart/station.

b. Place patient's uninjured phalanges between 70-90 degrees of flexion.

c. Remove (1) plaster sheet from the stack of (5).

d. Place sheet on the dorsal aspect of the hand from the tip of the phalanges to the cubital space to obtain sheet length.

e. Place sheet on the volar aspect of the hand from the tip of the phalanges to the cubital space to obtain sheet length.

NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/forearm.
Performance Steps

f. Draw a half moon line to the volar side of the plaster sheet at the base of the thenar muscle.
g. Place sheet on stack, cut the outlined pattern and excess length for all sheets, and place on work cart/station for later use.

NOTE: Disregard excess materials in a trash receptacle.

10. Apply stockinette to patient's injured arm.
   a. Place patient's injured elbow on the orthopaedic bump.
   b. Place webril (casting padding) strips between patient's fingers.

NOTE: Padding reduces chafing and skin sores from developing.

11. Measure patient's injured wrist and phalanges with goniometer.

   a. Position the patient's injured elbow at a 90 degree angle to upper torso.
   b. Place the patient's phalange between 70-90 degrees of flexion.
   c. Place the stationary arm of the goniometer vertical, bisecting the forearm.
   d. Place the moving arm of the goniometer vertical, bisecting the lateral side of the 5th phalange (pinky finger).
   e. Place the protractor of the goniometer on the ulnar styloid.
   f. Set wrist until the goniometer measures 0-15 degrees of dorsal extension.
   g. Set phalanges until the goniometer measures 70-90 degrees of flexion.

12. Apply cast padding (webril) to injured phalanges, wrist and forearm.

   a. Place webril strips between each phalanges
   b. Hold webril vertically with one hand.
   c. With 2nd hand unroll the webril 1/2-1inch and grasp edge with index and middle finger.
   d. Place the edge of the webril on the ulnar styloid and begin wrapping around the wrist two rotations.

NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.
   e. Continue through the palm, around the phalanges, back up the forearm and ending 1 inch distal to the stockinette edge.
   f. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm and around the thumb to provide a better fit. The technician preference will determine which technique to use.


   a. If using fiberglass casting materials go to step 14 and 15.
   b. If using plaster casting materials go to step 16.
**Performance Steps**

14. Place fiberglass casting gloves on hands.

Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while applying a fiberglass cast.

15. Open fiberglass casting package and go to step 16.

NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.

16. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended when using plaster to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll vertically with one hand.

NOTE: Alternate method may be used.

b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

e. Place the edge of the casting material on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.

NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a twitching or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) and twist. Evenly space the casting material on the webril and smooth out with volar side of fingers. The twisting method provides strength to the cast.

The CUT method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.

f. Continue through the palm, around the phalanges, back up the forearm, ending 1/2 inch proximal to the edge of the webril.

g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.

17. Laminate the casting material.

a. Place palm of each hand on the cast.

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.

b. Rub the cast material in the direction it was applied.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

18. Apply reinforcement splint to volar/dorsal aspect of cast.

NOTE: The reinforcement splint is used to strengthen and support the cast.

a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.

b. Squeeze the splint together to eliminate excess water.
Performance Steps

c. Place reinforcement splint on the volar/dorsal side of the cast.
d. Laminate splint on cast.
e. Maintain patient’s wrist between 0-15 degrees of dorsal extension and phalanges between 70-90 degrees of flexion.

19. Apply 2nd plaster/fiberglass roll (repeat steps 16-17).

20. Mold casting material to forearm/wrist.
NOTE. The mold to the wrist and forearm is called the interosseous mold. The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
  a. Place the heel of one hand on the volar aspect of the distal wrist.
  b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
  c. Squeeze the heels of each hand.
  d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.
CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
e. Remove heels of each hand from cast when contours of the wrist and forearm have been shaped and cast is cured.

21. Mold cast material to phalanges.
  a. Cup the injured phalanges with hand.
  b. Apply pressure to the phalanges.
  c. Apply firm and gradual pressure beginning at the tip of the phalanges and progress up the forearm while maintaining the phalanges and wrist in correct position.
  d. Remove heels of each hand from cast when contours of the phalanges, wrist and forearm have been shaped and cast is cured.

22. Check range of motion (ROM) of thumb and elbow.
  a. Have patient extend and flex thumb.
  b. Have patient extend and flex elbow.

23. Check alignment of wrist and phalanges with goniometer. Go to step 11.
NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present or the phalanges are not flexed between 70-90 degrees, remove cast and go to step 8.

24. Check cast dimensions.
  a. The cast edge rests 1 inch distal to the tip of the phalanges
CAUTION: To avoid further injury to the patient, the finished edge of the cast should end distal to the tip of the thumb.
  b. The cast edge should rests 1 inch distal to the cubital space.
Caution: To promote full range of motion of the patient’s elbow, the finished edge of the cast should rests 1 inch distal to the cubital space.
  c. Tape down edges of stockinette and webril.

25. Apply 3rd plaster roll (repeat steps 16-17).
NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.

  a. Squeeze patient’s fingers and nail beds will turn white.
  b. Release patient’s fingers and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician’s instruction.

27. Clean plaster resin off patient’s skin using a damp wash cloth, towel or alcohol pad.
Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.
**Performance Steps**

28. **Give patient verbal and written instructions on cast care.**
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to Emergency Room (ER).
   b. Present patient with cast care booklet (or written instructions).
   c. Instruct patient to elevate the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
   d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring).

29. **Fit sling to patient as required.**
   NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

30. **Annotate the procedure applied to patient in medical record or SF 513.**
   NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

31. **Escort patient or direct patient to front desk to make a follow up appointment.**

**Performance Measures**

<table>
<thead>
<tr>
<th>Step</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<tr>
<td>2. Identified yourself to the patient.</td>
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<td>3. Explained the procedure to the patient</td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials.</td>
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<tr>
<td>9. Prepared plaster reinforcement splint for the dorsal and volar aspects of the cast.</td>
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<tr>
<td>10. Applied stockinette to patient's injured arm.</td>
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<tr>
<td>11. Measured patient's injured wrist and phalanges with goniometer.</td>
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<tr>
<td>12. Applied cast padding (webril) to injured phalanges, wrist and forearm.</td>
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<tr>
<td>14. Placed fiberglass casting gloves on hands.</td>
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<td>15. Opened fiberglass casting package.</td>
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<td>17. Laminated the casting material.</td>
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<tr>
<td>18. Applied reinforcement splint to volar/dorsal aspect of cast.</td>
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<tr>
<td>19. Applied 2nd plaster/fiberglass roll.</td>
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<tr>
<td>Performance Measures</td>
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<tr>
<td>20. Molded casting material to forearm/wrist.</td>
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<tr>
<td>21. Molded cast material to phalanges.</td>
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<tr>
<td>22. Checked range of motion (ROM) of thumb and elbow.</td>
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<td>23. Checked alignment of wrist and phalanges with goniometer.</td>
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<tr>
<td>24. Checked cast dimensions.</td>
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<tr>
<td>27. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>28. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>29. Fitted sling to patient as required.</td>
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<tr>
<td>30. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>31. Escorted patient or direct patient to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

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Conditions: Given an orthopaedic patient requiring a Short Arm Thumb Spica Cast (SATSC), sitting or supine on an orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, finger trap set with stand, (3) rolls of 3 or 4 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (2) rolls of 2 or 3 inch fiberglass, (2) rolls of 2 or 3 inch webril, fiberglass casting gloves, examination gloves, scissors, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, orthopaedic bump, thermometer and trash receptacle.

Standards: Is reached when the cast is applied from the tip of the injured thumb down the radial side of the hand and arm to 1 inch distal to the cubitum space (bend of elbow). The wrist is immobilized by the cast between 0-15 degrees of dorsal extension (absent of ulnar, radial, supination or pronation). The cast eliminates rotation of the wrist and thumb, with free range of motion of the elbow and uninjured fingers. Capillary refill test is administered to the fingers and thumb and successfully passed.

Performance Steps

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
Performance Steps

NOTE: The Short Arm Thumb Spica cast (SATSC) is applied from the tip of the thumb to 1 inch distal to the cubitum space with wrist between 0-15 degrees of dorsal extension. The wrist will be absent of radial, ulnar deviation, pronation, supination with the uninjured fingers having full range of motion (ROM). (Refer to Figure 3-x).

CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
   CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   "   b. Place patient sitting or supine on examination bed.
   "   c. Roll patient's shirt sleeve above injured elbow.
   "   d. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   "   e. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.
Performance Steps

5. Check capillary refill of patient's hands/fingers.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.
   CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.
   CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads, damp wash cloth or towel. Open and remove (3) plaster rolls from packages and place on work cart/station.
   NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare stockinette.
   NOTE: Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.
   a. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.
   b. Place work cart with orthopaedic bump at edge of bed.
   NOTE: Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. T stand, finger trap stand, nursing assistant)
   c. Place patient's uninjured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.
   NOTE: Measurements are taken on the uninjured arm to prevent further pain or discomfort to the patient.
   NOTE: Instruments of measurements may vary (e.g. tape measure, ruler, or webril).
   d. Measure from 1 inch distal to the thumb to the cubitum space (bend of elbow) for stockinette length.
   e. Pull down stockinette from stockinette container and cut measured length.
   f. Roll stockinette leaving 1-2 inch cuff at the distal edge. Place on work cart/station for later use.

9. Prepare plaster reinforcement splint for the radial aspect of the cast.
   NOTE: The radial aspect of the arm is located on the thumb side of the hand/forearm.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (5) sheets, remove from the stack. Place on work cart/station.
   b. Place patient's uninjured thumb in opposition to the index finger.
   c. Remove (1) plaster sheet from the stack of (5).
   d. Place sheet from the tip of the thumb to the cubital space to obtain sheet length.
   NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/forearm.
   e. Draw a horizontal line on each side of the plaster sheet at the base of the thumb.
   f. Place sheet on stack, cut the outlined pattern and excess length for all sheets, and place on work cart/station for later use.
Performance Steps
NOTE: Discard excess material in the trash receptacle.

10. Apply stockinette to patient's injured arm.
   a. Place patient's injured elbow on the orthopaedic bump.
   b. Hold open the sides of the stockinette.
   NOTE: 1 inch stockinette can be applied to the thumb in addition to the hand and arm stockinette.
   c. Instruct patient to place injured hand in the opening of the stockinette.
   d. Roll the stockinette on the injured arm from the cubitum space (bend of elbow) to one inch distal to the thumb.
   NOTE: Rolling the stockinette on promotes a better fit.
   e. Pinch the stockinette at the base of the thumb and make a 1/2 inch cut to the stockinette.
   f. Place patient's thumb through pre cut hole and smooth out stockinette.

11. Measure patient's injured wrist with goniometer.
   NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician's order.
   a. Position the patient's injured elbow at a 90 degree angle to upper torso.
   NOTE: Family member(s), nursing staff, orthopaedic technician or finger traps can be used to assist in positioning the patient's arm.
   b. Place the patient's index finger and thumb in opposition to one another (Refer to figure 3-x)
   NOTE: Placing the thumb and forefinger in opposition to one another assist the patient in maintaining wrist in neutral position and reduces the strain on the thumb ligament.
   c. Place the stationary arm of the goniometer vertically, bisecting the forearm.
   d. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (pinky finger)
   e. Place the protractor of the goniometer on the ulnar styloid.
   f. Set wrist until the goniometer measures 0-15 degrees of dorsal extension.

12. Apply cast padding (webril) to injured thumb, wrist and forearm (Refer to figure 3-x).
   a. Hold webril with one hand.
   b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.
   c. Place the edge of the webril on the ulnar styloid and begin wrapping around the wrist two rotations.
   NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid. The webril application can also be started at the distal edge of the thumb.
   CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.
   d. Continue through the palm, around the thumb, back up the forearm and ending 1 inch distal to the stockinette edge.
   e. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.
   NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm and around the thumb to provide a better fit. The technician preference will determine which technique to use.

   a. If using fiberglass casting materials go to step 14 and 15.
   b. If using plaster casting materials go to step 16.

14. Place fiberglass casting gloves on hands.
   Caution: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while applying a fiberglass cast.

15. Open fiberglass casting package and go to step 16.
   NOTE: Open one fiberglass package at a time. As fiberglass roll comes in contact with the air, the roll will start to cure and harden.
Performance Steps

16. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended when using plaster to protect the technician's hands as the resin in the plaster rolls may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll with one hand.

NOTE: Alternate method may be used.

b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.

d. Squeeze the roll together (do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

e. Place the edge of the casting material on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge (Refer to Figure 3-x).

NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a twitching or cut method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) twist and evenly space the casting material on the webril. Smooth out with volar side of fingers. The twisting method provides strength to the cast.

The CUT method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.

f. Continue through the palm, around the thumb, back up the forearm, ending 1/2 inch proximal to the edge of the webril (Refer to Figure 3-x).

g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.

17. Laminate the casting material.

a. Place palm of each hand on the cast.

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.

b. Rub the cast material in the direction it was applied (Refer to figure 3-x).

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color.

18. Apply reinforcement splint to radial aspect of cast.

NOTE: The reinforcement splint is used to strengthen and support the cast.

a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.

b. Squeeze the splint together to eliminate excess water.

c. Place reinforcement splint on the radial side of the cast around the thumb.

d. Laminate splint on cast.

e. Maintain patient's wrist between 0-15 degrees of dorsal extension and thumb in opposition to the index finger.

NOTE: Maintain patient's thumb and index finger in opposition to one another.

19. Apply 2nd plaster/fiberglass roll (repeat steps 16-17).
Performance Steps

20. Mold casting material to forearm/wrist.

NOTE. The mold to the wrist and forearm is called the interosseous mold. The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.

a. Place the heel of one hand on the volar aspect of the distal wrist.
b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
c. Squeeze the heels of each hand
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel? Is the pressure too much?)

e. Maintain patient's wrist in correct position.

f. Remove heels of each hand from cast when contours of the wrist and forearm have been shaped and cast is cured.

21. Mold cast material to thumb.

a. Cup the injured thumb with hand.
b. Apply pressure to the thumb.
c. Apply firm and gradual pressure beginning at the tip of the thumb and progress up the forearm while maintaining the thumb and wrist in correct position.

d. Remove heels of each hand from cast when contours of the thumb, wrist and forearm have been shaped and cast is cured.

22. Check range of motion (ROM) of phalanges and thumb.

a. Have patient extend, flex uninjured fingers.
b. Have patient extend and flex elbow.

23. Check alignment of wrist with goniometer. Go to step 11.

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present or the thumb is not in opposition to the index finger, remove cast and go to step 8.

24. Check cast dimensions.

a. The cast edge rests 1 inch distal to the tip of the thumb.

CAUTION: To avoid further injury to the patient, the finished edge of the cast should end distal to the tip of the thumb.

b. The cast edge rests at the distal palmar crease.

c. The cast edge should rests 1 inch distal to the cubital space.

Caution: To promote full range of motion of the patient's elbow, the finished edge of the cast should rests 1 inch distal to the cubital space.

   d. Tape down edges of stockinette and webril.

25. Apply 3rd plaster roll (repeat steps 16-17).

NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work.


a. Squeeze patient's fingers and nail beds will turn white.
b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

27. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.

Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

28. Give patient verbal and written instructions on cast care.

a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number.
   After duty hours instruct patient to report to emergency room.
Performance Steps

b. Present patient with cast care booklet (or written instructions).
c. Instruct patient to elevated the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

29. Fit sling to patient as required.
NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

30. Annotate the procedure applied to patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

31. Escort patient or direct patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<td>2. Identified yourself to the patient.</td>
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<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<td>6. Gathered equipment.</td>
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<td>7. Assembled materials.</td>
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<tr>
<td>9. Prepared plaster reinforcement splint for the radial aspect of the cast.</td>
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<tr>
<td>10. Applied stockinette to patient's injured arm.</td>
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<tr>
<td>11. Measured patient's injured wrist with goniometer.</td>
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<tr>
<td>12. Applied cast padding (webril) to injured thumb, wrist and forearm.</td>
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<tr>
<td>14. Placed fiberglass casting gloves on hands.</td>
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<td>15. Opened fiberglass casting package.</td>
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<td>17. Laminated the casting material.</td>
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<tr>
<td>18. Applied reinforcement splint to radial aspect of cast.</td>
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<tr>
<td>19. Applied 2nd plaster/fiberglass roll.</td>
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<tr>
<td>20. Molded casting material to forearm/wrist.</td>
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<tr>
<td>21. Molded cast material to thumb.</td>
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<tr>
<td>22. Checked range of motion (ROM) of phalanges and thumb.</td>
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<td>23. Check alignment of wrist with goniometer.</td>
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<td>Performance Measures</td>
<td>GO</td>
<td>NO-Go</td>
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<tr>
<td>24. Checked cast dimensions.</td>
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<tr>
<td>25. Applied 3rd plaster roll</td>
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<td>27. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>28. Gave patient verbal and written instructions on cast care.</td>
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<td>29. Fitted sling to patient as required.</td>
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<td>30. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<td>31. Escorted patient or direct patient to front desk to make a follow up appointment.</td>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO( NG ) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

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Conditions: Given an orthopaedic patient requiring a Long Arm Thumb Spica Cast (LATSC), in supine or sitting position on an orthopaedic examination bed or chair, family member, nursing personnel, physician, physician's verbal or written orders, patient's medical record, or Standard Form (consultation form) 513, work cart/station, roll of 2 or 3 inch stockinette, roll of 3 or 4 inch stockinette, stockinette container, (3) rolls of 2 or 3 inch webril, (2) rolls of 4 inch webril, (3) rolls of 3 inch plaster, (3) rolls of 4 inch plaster, box of 4 x 15 plaster reinforcement sheets, box of 5 x 30 plaster reinforcement sheets, (2) rolls of 2 inch fiberglass (3) rolls of 3 or 4 inch fiberglass, fiberglass casting gloves, examination gloves, scissors, hospital pad (chux), (2) bed sheets, goniometer, ruler, bucket of tepid water w/ plastic bag, sink, tube of surgical lubricant, orthopaedic bump, roll of adhesive 2 inch tape, box of alcohol pads, damp wash cloth or towel, pillow, finger trap set, sling, tape measure, cast care booklet, or equivalent, pen, and trash receptacle.

Standards: Is reached when the wrist is immobilized, between 0-15 degrees of dorsal extension, by the cast from the tip of the thumb and distal palmar crease (DPC)/metacarpophalangeal joints (MCPJ's) to 2 inches distal to the axilla. The elbow is immobilized at 90 degrees of flexion. Ulnar, radial deviation, pronation and supination are eliminated from the wrist and forearm. The cast eliminates rotation of the thumb, wrist, forearm and elbow, with free range of motion of the fingers. Capillary refill test is administered to the fingers/thumb and passed.

Performance Steps

1. Receive the order from the physician (review if in writing)

NOTE: Tell the patient your name and job title.

2. Identify yourself to the patient.

CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.

3. Explain the procedure to the patient.

NOTE: The Long Arm Thumb Spica cast will be applied from the tip of the thumb to 2 inches distal to the axilla region with the wrist between 0-15 degrees of dorsal extension and the elbow at 90 degrees of flexion. The wrist will be absent of radial, ulnar deviation, pronation, supination with the uninjured fingers having full range of motion (ROM).

CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's arms.

a. Place examination gloves on hands.

CAUTION: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.

b. Place patient sitting or supine on examination bed.

c. Remove patient's shirt.

d. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).

NOTE: Inform physician if conditions are present and follow physician's instruction.

e. Examine both arms and wrists for jewelry and remove if found.

NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's hands/fingers.

a. Squeeze patient's fingers and nail beds will turn white.

b. Release patient's fingers and nail beds will return pink.
**Performance Steps**

**CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

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**6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.**

**CAUTION:** The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

**CAUTION:** The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

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**7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (5) plaster rolls from packages and place on work cart/station.**

**NOTE:** Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

---

**8. Prepare stockinette.**

**NOTE:** Stockinette is generally used for all casts except on patients who have had recent surgery, recently reduced fractures, technician's preference or as directed by the physician. Stockinette and webril are forms of protection against the exothermic reaction of the casting materials.

- Place hospital pad or bed sheet on patient's lap.

**NOTE:** All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process.

- Place work cart with orthopaedic bump at edge of bed.

**NOTE:** Technician preference will determine if orthopaedic bump is used. A number of props may be use (e.g. L stand, finger trap stand, nursing assistant)

- Place patient's uninjured elbow on the orthopaedic bump at a 45 degree angle to the upper torso.

**NOTE:** Measurements are taken on the uninjured arm to prevent further pain or discomfort to the patient.

**NOTE:** Instruments of measurements may vary (e.g. tape measure, ruler, or webril).

- Measure from 1 inch distal to the thumb to the axilla region to obtain stockinette length.

- Pull down stockinette from stockinette container and cut measured length.

- Roll the stockinette into a cuff leaving a 1-2 inch border at the distal edge. Place on work cart/station for later use.

---

**9. Prepare plaster reinforcement splint for the radial aspect of the cast.**

**NOTE:** The radial aspect of the arm is located on the thumb side of the hand/forearm.

- Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (5) sheets, remove from the stack. Place on work cart/station.

- Place patient's uninjured thumb in opposition to the index finger.

- Remove (1) plaster sheet from the stack of (5).

- Place sheet next to uninjured arm to obtain sheet length.

**NOTE:** To increase patient cleanliness the sheet does not have to rest on the hand/forearm

- Draw a horizontal line on each side of the plaster sheet at the base of the thumb.

- Place sheet on stack, cut the outlined pattern and excess length for all sheets, and place on work cart/station for later use.

**NOTE:** The lines at the base of the thumb are designed for the splint to lay flat on the cast.

**NOTE:** Discard excess materials in the trash receptacle.

---

**10. Prepare plaster reinforcement sheets for the posterior aspect of cast.**
Performance Steps
a. Open box of 5 x 30 plaster sheets. Remove and unwrap package. Locate edge of one stack and remove from package.
NOTE: 5 x 30 plaster splints are usually stacked in increments of five from the manufacturer. If not pre-stacked, count out five layers.
b. Position the patient's elbow at a 90 degree angle to upper torso.
NOTE: Family members, nursing staff, orthopaedic technician or finger traps can be used to assist in positioning the patient's arm.
c. Place distal end of plaster stack on the lateral aspect of the mid forearm and have patient or assistant hold the distal end. Simultaneously bring the proximal end 2 inches distal to the axilla or resting on the base of the deltoid muscle. Fold down the proximal end, cut off excess and place stack on work cart/station for later use.

11. Apply stockinette to patient's injured arm.
   a. Place patient's injured elbow on the orthopaedic bump.
   b. Hold open the sides of the stockinette.
NOTE: A 1 inch stockinette can be applied to the thumb in addition to the hand and arm stockinette.
   c. Instruct patient to place injured hand in the opening of the stockinette.
   d. Roll stockinet on the injured arm from 1 inch distal to the tip of the thumb, to the axilla region.
NOTE: Rolling the stockinette on promotes a better fit.
   e. Pinch the stockinette at the base of the thumb and cubitum area and make a 1/2 cut at a 45 degree angle.
NOTE: An alternative and authorized method is to cut the stockinette prior to application.
   f. Place patient thumb through pre cut hole and smooth out stockinette.

12. Apply finger traps to fingers on injured hand (if not used go to step 13).
NOTE: Use of finger traps may be required based on patient's inability to maintain arm/wrist in the correct position, there is no assistance available, and fracture reduction is needed.
   a. Place patient in supine position on the bed.
   b. Place injured arm at a 90 degree angle to the upper torso and smooth out wrinkles in the stockinette.
   c. With one hand, grasp patient's injured hand and abduct from upper torso.
   d. With 2nd hand, grasp finger trap set and place individual finger traps on fourth and fifth phalange past the MCP's.

13. Measure patient's injured wrist w/goniometer.
NOTE: All hand casts are applied absent of pronation, supination, radial, or ulnar deviation unless directed by physician.
   a. Position the patient's injured elbow at a 90 degree angle to upper torso.
NOTE: Family member(s), nursing staff, orthopaedic technician or finger traps can be used to assist in positioning the patient's arm.
   b. Place the patient's index finger and thumb in opposition to one another.
NOTE: Placing the thumb and forefinger in opposition to one another assist the patient in maintaining wrist in neutral position and reduces the strain on the ligaments.
   c. Place the stationary arm of the goniometer vertically, bisecting the forearm.
   d. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (pinky finger).
   e. Place the protractor of the goniometer on the ulnar styloid.
   f. Set wrist until the goniometer measures 0-15 degrees of dorsal extension.

14. Measure injured elbow with goniometer.
   a. Place the stationary arm of the goniometer vertically, bisecting the middle of the humerus and deltoid.
   b. Place the moving arm of the goniometer horizontally, bisecting the middle of the forearm.
   c. Place the protractor of the goniometer on the olecranon (elbow), forming a 90 degree angle.
   d. Set elbow until the goniometer measures 90 degrees of flexion.
Performance Steps

15. Apply cast padding (webril) to injured thumb, wrist and forearm.

CAUTION: If the cast padding is wrinkled it must be removed and new padding applied. Wrinkled padding can cause pressure sores which can lead to ulcers

a. Hold webril with one hand.

b. With 2nd hand unroll the webril 1/2 - 1 inch and grasp edge with index and middle finger.

c. Place the edge of the webril on the ulnar styloid and begin wrapping around the wrist two rotations.

NOTE: The webril application is started at the wrist to provide an anchor and extra padding to the ulnar styloid.

CAUTION: Keep the cast padding on the extremity throughout the application to avoid circulation compromise of the patient's hand/fingers.

d. Continue through the palm around the thumb ending 1/2 inch distal to the edge of the stockinette, back up the forearm, figure eight around the elbow, ending 1/2 proximal to the edge of the stockinette.

e. With each turn overlap the webril by 1/2-1/4 the previous wrap. The top of the webril should bisect the middle of the previous layer covering up the shallow line and present evenly applied padding.

NOTE: The cast padding can be cut or torn (horizontally) when wrapping through the palm and around the thumb to provide a better fit. The technician preference will determine which technique to use.


a. If using fiberglass casting materials go to step 17 and 18.

b. If using plaster casting materials go to step 18.

17. Place fiberglass casting gloves on hands.

CAUTION: The use of fiberglass casting gloves are mandatory to prevent the technician from receiving chemical burns while using fiberglass casting materials

18. Open fiberglass casting package and go to step 19.

NOTE: Open one fiberglass package at a time. As the fiberglass roll comes in contact with the air, the roll will start to cure and harden.

19. Apply 1st plaster/fiberglass roll.

NOTE: Examination gloves are recommended to protect the technician's hands as the resin in the plaster may cause the skin on the hands to dry up.

a. Hold plaster or fiberglass roll vertical with one hand.

NOTE: Alternate method may be used.

b. With opposite hand unroll the plaster or fiberglass 1/2-1 inch and grasp edge with thumb, index and middle fingers.

NOTE: Placing the thumb under the forward edge of the roll can also be used.

c. Place the plaster or fiberglass roll in bucket of tepid water and remove when bubbles cease to rise.

CAUTION: Removing the casting material when bubbles are present ensures dry spots will be visible during application. Dry spots cause integrity break down of the cast.

d. Squeeze the roll together(do not wring the roll).

NOTE: To evenly distribute the water and prevent telescoping of the roll during application gently squeeze the roll inward.

e. Place the edge of the casting material on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
Performance Steps
NOTE: The cast is most susceptible to losing strength in the palm region. Therefore, a cut or twisting method is authorized.

The Twisting method: As the roll is pushed through the palm pinch the sides of the plaster roll together (not recommended for fiberglass) and twist. Evenly space the casting material on the webril and smooth out with volar side of fingers. The twisting method provides strength to the cast.

The Cut method: As the roll is pushed through the palm make a horizontal cut to the proximal edge of the plaster/fiberglass roll and smooth out with volar aspect of fingers or palm. The cutting method provides cast cosmetics. Each technician may have their own preference to these methods.

f. Continue through the palm around the thumb ending 1/2 inch distal to the edge of the webril, back up the forearm, figure of eight around the elbow, ending 1/2 inch proximal to the edge of the webril

g. Overlap the plaster/fiberglass by 1/2 or 1/4 the previous wrap. The top of the plaster/fiberglass should bisect the middle of the previous layer and present an evenly applied cast.

NOTE: Depending on the size of the patient's forearm and biceps region more than two rolls may be needed for the initial roll. Begin extra roll where the previous roll left off.

20. Laminate the casting material.
   a. Place palm of each hand on the cast.
   b. Rub the cast material in the direction it was applied.
   c. Continue rubbing the cast until the tone/texture changes from a glossy/creamy color to a dull white color

CAUTION: To reduce cast indentations, which can cause pressure sore to the patient's skin under the cast, keep finger tips off the cast during application and molding process. If the patient feels pressure sore or hot spots developing under the cast, the cast must be removed immediately.

21. Apply reinforcement splint to the radial aspect of cast.
   a. Place the splint in tepid water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the splint together to eliminate excess water.
   c. Place reinforcement splint on the radial side of the cast around the thumb.
   d. Laminate splint on cast.
   e. Maintain patient's wrist between 0-15 degrees of dorsal extension and thumb in opposition to the index finger.

NOTE: Laminating the cast material fills in the pores which assist it providing strength to the cast.

22. Apply plaster reinforcement splint to the posterior aspect of the cast.
   a. Place plaster splint in bucket of taped water, wait for bubbles to subside and remove splint from water.
   b. Squeeze the plaster splint together.
   c. Extend plaster splint and squeegee out excess water.
   d. Place reinforcement splint centered and on the posterior side of the elbow extending from mid forearm to 1/2 inch distal to the webril edge.
   e. Smooth out splint and continue to laminate.
   f. Maintain patient's elbow at 90 degrees of flexion.

NOTE: Family member(s), nursing staff, orthopaedic technician or finger traps can be used to assist in positioning the patient's arm.

23. Apply 2nd plaster/fiberglass roll (repeat steps 19-20).

24. Measure injured elbow with goniometer.
Performance Steps

a. Place the stationary arm of the goniometer horizontal, bisecting the middle of the humerus and deltoid muscle.
b. Place the moving arm of the goniometer vertical, bisecting the middle of the forearm.
c. Place the protractor of the goniometer on the olecranon (elbow), forming a 90 degree angle.
d. The goniometer should measure 90 degrees of flexion.

NOTE: If elbow is not at 90 degrees of flexion, the forearm is pronated or supinated, remove the cast and go to step 8.

25. Measure patient's injured wrist w/ goniometer.
   a. Place the stationary arm of the goniometer vertically, bisecting the forearm.
   b. Place the moving arm of the goniometer vertically, bisecting the 5th phalange (pinky finger).
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. The goniometer should measure between 0-15 degrees of dorsal extension.

NOTE: If wrist is not between 0-15 degrees of dorsal extension, the forearm is in pronated or supinated, remove the cast and go to step 8.

26. Mold the cast material to the wrist/forearm.

NOTE: The interosseous mold is used to prevent movement of the injured wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
   d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
   e. Maintain patient's wrist in correct position.
   f. Remove hands from cast when contours of the wrist and forearm have been shaped and the cast is cured.

NOTE: All casts require a mold. Crooked casts equal straight bones.

27. Mold the cast material to the biceps muscle.

NOTE: The bicipital mold is used to prevent movement of the humerus in the cast and promote fracture healing.
   a. Place the palm of one hand on the biceps muscle.
   b. Place the palm of the 2nd hand on the triceps muscle.
   c. Press palms together and conform the plaster/fiberglass to the upper arm (hold for 5-30 seconds) or until plaster/fiberglass begins to cure.

28. Mold the cast material to the thumb.
   a. Cup the injured thumb with hand.
   b. Squeeze the thumb.
   c. Apply firm and gradual pressure beginning at the tip of the thumb and progress up the forearm while maintaining the thumb and wrist in correct position.
   d. Remove heels of each hand from cast when contours of the thumb, wrist and forearm have been shaped and cast is cured.

29. Apply 3rd and 4th plaster/fiberglass roll (repeat steps 19-20)

30. Trim proximal and distal edges of cast.
   a. Cut the outside edge of the cast padding.
   b. Pull down the cast padding and stockinette over the edges of the cast to provide a finished look.

31. Check range of motion (ROM) of phalanges.

NOTE: Patient should freely be able to extend and flex fingers.

32. Check alignment of wrist with goniometer. Go to step 25.
Performance Steps

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present or the thumb is not in opposition to the index finger, or elbow is not flexed at 90 degrees, remove cast and go to step 8.

33. Check cast dimensions.
   a. The cast edge rests 1/2 inch distal to the tip of the thumb.
   CAUTION: To avoid further injury to the patient, the finished edge of the cast should end distal to the tip of the thumb.
   b. The cast edge rests at the distal palmar crease.
   c. The cast edge should rest 2 inches distal to the axilla region.
   d. Tape down edges of stockinette and webril.

34. Apply 5th roll of plaster/fiberglass (repeat steps 19-20).
   NOTE: The last roll in all casting applications is commonly referred to as the beautification roll or the money roll. Take pride in your work. Technician's preference will determine where that last roll is started.

35. Check patient's capillary refill.
   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

36. Clean plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.
   Note: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

37. Give patient verbal and written instructions on cast care.
   a. Instruct the patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to emergency room.
   b. Present patient with cast care booklet (or written instructions).
   c. Instruct patient to elevate the extremity above the heart, extend, flex and wiggle fingers (demonstrate for patient) to reduce swelling.
   d. Instruct patient not to stick anything down the cast, do not remove the cast and do not alter the cast (e.g. writing on it, coloring.)

38. Fit sling to patient as required.
   NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

39. Annotate the procedure applied to patient in medical record or SF 513.
   NOTE: Record the procedure applied and cast care instruction provided to patient in medical record or Standard Form 513 and sign your name.

40. Escort patient or direct patient to front desk to make a follow up appointment.

Performance Measures

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<th>Performance Measure</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
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<tr>
<td>2. Identified yourself to the patient.</td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
<td>NO GO</td>
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<tr>
<td>7. Assembled materials.</td>
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<tr>
<td>9. Prepared plaster reinforcement splint for the radial aspect of the cast.</td>
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<tr>
<td>10. Prepared plaster reinforcement sheets for the posterior aspect of cast.</td>
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<tr>
<td>11. Applied stockinette to patient's injured arm.</td>
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<tr>
<td>12. Applied finger traps to fingers on injured hand (if not used go to step 13).</td>
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<tr>
<td>15. Applied cast padding (webril) to injured thumb, wrist and forearm.</td>
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<tr>
<td>17. Placed fiberglass casting gloves on hands.</td>
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<tr>
<td>18. Opened fiberglass casting package.</td>
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<tr>
<td>19. Applied 1st plaster/ fiberglass roll.</td>
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<tr>
<td>20. Laminated the casting material.</td>
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<tr>
<td>22. Applied plaster reinforcement splint. to the posterior aspect of the cast</td>
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<tr>
<td>23. Applied 2nd plaster/fiberglass roll.</td>
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<tr>
<td>24. Measured injured elbow with goniometer.</td>
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<tr>
<td>25. Measured patient's injured wrist w/ goniometer.</td>
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<tr>
<td>26. Molded the cast material to the wrist/forearm.</td>
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<tr>
<td>27. Molded the cast material to the biceps muscle.</td>
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<tr>
<td>28. Molded the cast material to the thumb.</td>
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<tr>
<td>30. Trimmed proximal and distal edges of cast.</td>
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<tr>
<td>31. Checked range of motion (ROM) of phalanges.</td>
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<tr>
<td>32. Checked alignment of wrist with goniometer.</td>
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<tr>
<td>33. Checked cast dimensions.</td>
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<tr>
<td>34. Applied 5th roll of plaster/fiberglass.</td>
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<tr>
<td>35. Checked patient's capillary refill.</td>
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<tr>
<td>36. Cleaned plaster resin off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>37. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>38. Fitted sling to patient as required.</td>
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</tbody>
</table>
Performance Measures

39. Annotated the procedure applied to patient in medical record or SF 513.
   GO    NO GO
   ———  ———

40. Escorted patient or direct patient to front desk to make a follow up appointment.
   GO    NO GO
   ———  ———

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

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<tr>
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<th>Related</th>
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APPLY DOUBLE SUGAR TONG SPLINT

081-834-0064

Conditions: Given an orthopaedic patient requiring a Double Sugar Tong (DST) sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (4) rolls of 4 or 6 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, box of 5 x 30 inch plaster reinforcement sheets, (5) rolls of 4 inch webril, (4) 3 inch elastic bandages, examination gloves, scissors, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, orthopaedic bump, thermometer and trash receptacle.

Standards: Is reached when the patient's injured arm, from the base of the metacarpophalangeal joints (MCPJ's) and distal palmar crease (DPC) to the base of the deltoid muscle or 2 inches distal to the axilla, is immobilized by a double sugar splint and secured with (4) elastic bandages. The elbow is measured at 90 degrees of flexion (absent of pronation or supination). The wrist is measured between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation) with the fingers having full range of motion and thumb having restricted movement. Capillary refill test is administered to the fingers and successfully passed.

Performance Steps

1. Receive the order from the physician (review if in writing)

   NOTE: Identify yourself to the patient.

   NOTE: Tell the patient your name and job title.

2. Explain the procedure to the patient.

   NOTE: The Double Sugar Tong Splint (DSTS) is applied from the base of the metacarpophalangeal joints (MCPJ's), posteriorly around the elbow to the distal palmar crease (DPC) and from the base of the deltoid to 2 inches distal to the axilla region. The elbow will be flexed at 90 degrees, with the wrist between 0-15 degrees of dorsal extension and absent of radial, ulnar deviation, pronation, supination. The fingers will have full range of motion (ROM) with the thumb having restricted movement.

   CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

3. Inspect patient's arms.
   a. Place examination gloves on hands.
   b. Place patient sitting or supine on examination bed.
   c. Remove patient's shirt.
   d. Inspect both arms for any skin conditions (e.g. cuts, abrasions, lacerations, and skin rashes).
   e. Examine both arms and wrists for jewelry and remove if found.

   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry and clothing to family member or secure with patient's belongings in NCOIC office.

   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.

   NOTE: Inform physician if conditions are present and follow physician's instruction.

   NOTE: Practice Body Substance Isolation (BSI) prior to applying traction, splints or cast to patients.
Performance Steps

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (4) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webril) for 1st splint.
   a. Place work cart with orthopaedic bump at the edge of the bed.
   b. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   c. Position the patient's uninjured elbow on the bump at a 90 degree angle to the floor. Locate the DPC and MCPJ's.
   NOTE: The DPC is the distal diagonal line on the volar aspect of the hand. The MCPJ's are the knuckles on the dorsal side of the hand.
   d. Measure from the MCPJ's, posteriorly around the elbow, to the DPC.
   e. Place webril on work cart/station.
   f. Roll out second layer and bisect the middle of the previous padding.
   g. Layer the padding 2-4 thickness.

9. Prepare cast padding (webril) for 2nd splint.
   a. Measure from the base of the deltoid muscle, laterally around the elbow, to 2 inches distal to the axilla region.
   b. Place webril on work cart/station.
   c. Roll out second layer and bisect the middle of the previous padding.
   d. Layer the padding 2-4 thickness.

10. Prepare plaster splint for the volar and dorsal aspects of the forearm
    a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.
    NOTE: The technician may choose to use 4 inch plaster rolls.
    b. Locate DPC and the MCPJ's.
    c. Remove (1) plaster sheet from the stack of (10-15).
    d. Place sheet next to uninjured arm to obtain sheet length, the DPC and MCPJ's contours.
    NOTE: To increase patient cleanliness the sheet does not have to rest on the patient skin or extremity.
    e. Place sheet on stack, cut excess length for all sheets, and place on work cart/station for later use.
    NOTE: Discard excess material in the trash receptacle.

11. Prepare plaster splint for the anterior and posterior aspect of the upper arm.
    a. Locate the base of the deltoid muscle and 2 inches from the axilla region.
    b. Remove (1) plaster sheet from the stack of (10-15).
    c. Place sheet from the base of the deltoid muscle, around the elbow to 2 inches distal to the axilla region.
**Performance Steps**

d. Place sheet on stack, cut excess length for all sheets, and place on work cart/station for later use.

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12. Measure patient's injured wrist w/ goniometer.
   a. Position the patient's injured elbow on the bump at a 90 degree angle to the upper torso.
   b. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
   c. Place the moving arm of the goniometer bisecting the 5th phalange.
   d. Place the protractor of the goniometer on the ulnar styloid.
   e. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.

13. Measure patient's injured elbow w/ goniometer.
   a. Place the stationary arm of the goniometer bisecting the lateral aspect of the humerus.
   b. Place the moving arm of the goniometer bisecting the forearm.
   c. Place the protractor of the goniometer on the olecranon process (elbow).
   d. Set the elbow until the goniometer measures 90 degrees of flexion.

14. Apply 1st splint to injured wrist and forearm.

   NOTE: Assistance may be used prior to securing splint.
   a. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the sheets together to eliminate excess water.

   NOTE: Do not wring the sheet, this will cause the roll to dry up quickly
   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
   d. Laminate plaster splint.
   e. Fold over the edges of the padding.
   f. Place additional layer of padding over folded edges.
   g. Place the padded splint from the base of the MCPJ's posteriorly around the elbow to the DPC.

15. Apply 2nd splint to injured upper arm.

   NOTE: Assistance (nurse, family member) may be used to secure the 1st splint, during 2nd splint application.
   a. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
   b. Squeeze the sheets together to eliminate excess water.
   c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
   d. Laminate plaster splint.
   e. Fold over the edges of the padding.
   f. Place additional layer of padding over folded edges.
   g. Place the padded splint from the base of the deltoid muscle down the arm over the elbow, posteriorly up the arm, ending 2 inches from the axilla region.

   NOTE: The elbow should be flexed at 90 degrees.

16. Secure DSTS to injured arm.

   a. Hold elastic roll with one hand.
   b. Place the edge of the elastic bandage on the ulnar styloid and begin wrapping around the wrist two rotations to secure the edge.
   c. Continue through the palm, back up the forearm, figure of eight around the elbow, to the axilla region.
   d. Secure elastic bandage with clips.
   e. Tape down the elastic bandage between the clips.
   f. Remove the clips and dispose in trash receptacle.

17. Mold splint to forearm/wrist.

   NOTE: The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
   a. Place the heel of one hand on the volar aspect of the distal wrist.
   b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
   c. Squeeze the heels of each hand together.
Performance Steps

d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm while maintaining the wrist in correct position.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)

e. Remove heels of each hand from splint when contours of the wrist and forearm have been shaped and splint is cured.

18. Mold splint to elbow.

a. Place the heel of one hand on the anterior aspect of the elbow.

b. Place the heel of the other hand on the posterior aspect of the elbow.

c. Apply firm and gradual pressure at the elbow and maintain the elbow in correct position.

d. Remove heels of each hand from splint when contours of the elbow have been shaped and splint is cured.

19. Check range of motion (ROM) of phalanges/shoulder.

a. Have patient extend and flex fingers.

b. Have patient abduct and adduct shoulder.

20. Check alignment of injured wrist/elbow with goniometer.

a. Place the stationary arm of the goniometer parallel to the forearm.

b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (little finger)

c. Place the protractor of the goniometer on the ulnar styloid.

d. The wrist is measured between 0-15 degrees of dorsal extension.

NOTE: If wrist is not within 0-15 degrees of dorsal extension, ulnar or radial deviation are present, remove splint and go to step 10.

e. Go to step 13 for dorsal extension, ulnar or radial deviation measurement.

NOTE: If elbow is not 90 degrees of flexion or wrist is not between 0-15 degrees, remove splint and go to step 11.

21. Check splint dimensions.

a. The distal edge of the splint is at the base of the MCPJ's.

b. The volar edge of the splint is flush with the DPC.

c. The proximal edge of the splint rests 2 inches distal to the axilla region or at the base of the deltoid muscle

22. Check patient's capillary refill.

a. Squeeze patient's fingers and nail beds will turn white.

b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

23. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.

NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

24. Fit patient with a sling.

NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

25. Give patient verbal and written instructions on cast care.

a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room (ER).

b. Present patient with cast care booklet or (written instruction)

c. Instruct patient to keep arm elevated and flex and extend uninjured fingers to increase circulation in the hand
Performance Steps
d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding).

26. Annotate the procedure applied to patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

27. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
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<tr>
<td>2. Identified yourself to the patient.</td>
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<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
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<tr>
<td>8. Prepared cast padding (webril) for 1st splint.</td>
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<td>10. Prepared plaster splint for the volar and dorsal aspects of the upper arm.</td>
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<tr>
<td>11. Prepared plaster splint for the anterior and posterior aspect of the upper arm.</td>
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<tr>
<td>12. Measured patient's injured wrist w/goniometer.</td>
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<tr>
<td>15. Applied 2nd splint to injured upper arm.</td>
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<tr>
<td>16. Secured double sugar tong splint to injured arm.</td>
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<tr>
<td>17. Molded splint to forearm/wrist.</td>
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<tr>
<td>18. Molded splint to elbow.</td>
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<tr>
<td>19. Checked range of motion (ROM) of phalanges/shoulder.</td>
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<tr>
<td>20. Checked alignment of injured wrist/elbow with goniometer.</td>
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<tr>
<td>22. Checked patient's capillary refill.</td>
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<tr>
<td>23. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>24. Fitted patient with a sling.</td>
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<tr>
<td>25. Gave patient verbal and written instructions on cast care.</td>
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<td>26. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>27. Escorted patient to front desk to make a follow up appointment.</td>
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</table>
Evaluation Guidance: Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

References
Required
Related
0812110-0765
0-8342-0763-X
38709590
TM 6-840
Conditions: Given an orthopaedic patient requiring a Long Double Sugar Tong Splint (LDSTS) sitting or supine on a orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513(consultation form), pen , work cart/station, (4) rolls of 6 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 6 inch webril, examination gloves, scissors,(4) elastic bandages, roll of 2 inch adhesive tape, (2) hospital pads(chux), bed sheet, pillow, disposable paper shorts or hospital gown, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, thermometer, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, orthopaedic bump, thigh holder, 1 pair of crutches and trash receptacle.

Standards: Is reached when a posterior splint and medial/lateral splint are secured to the patient's injured leg from the tips of the toes to 4 inches distal to the groin with (4) elastic bandages. The ankle is measured at 90 degrees of dorsiflexion, absent of inversion or eversion, with toes having full range of motion. The knee is measured between 0-15 degrees of flexion. Capillary refill test is administrated to the toes and passed successfully.

Performance Steps

1. Receive the order from the physician(review if in writing)

2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   NOTE: The Long Double Sugar Tong splint (LDST) is applied from the tips of the toes, posteriorly up the leg, to 4 inches distal to the groin (inguinal region). The ankle will be dorsiflexed at 90 degrees, absent of eversion or inversion with the knee flexed between 0-15 degrees. The toes will have full range of motion(ROM).

CAUTION: During splinting application a chemical response(exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn’t cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's legs.
   a. Place examination gloves on hands.
   Caution: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient supine on examination bed.
   c. Remove patient pants and place a sheet over the patient's lap.
   d. Inspect both legs for any skin conditions(e.g. cuts, abrasions, laceration and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   e. Examine both legs for jewelry and remove if found.
   NOTE: All jewelry must be removed. Give jewelry and clothing to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's toes.
   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/plastic bag. Place on work cart or station.
**Performance Steps**

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webri, plaster rolls, examination gloves, hospital pad (chux), bed sheet, plaster reinforcement sheets, alcohol pads/damp towel. Open and remove (6) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webri) for 1st splint.
   a. Place hospital pad or bed sheet on patient's lap.
   
   NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   
   b. Locate the fibula head on uninjured leg.
   
   CAUTION: The peroneal nerve is located on the lateral side of the knee. If the nerve is constricted it could die and cause drop foot (known as nerve palsy). This is an irreversible condition. Measure 1 finger width below the fibula head and provide extra padding to the area to prevent further injury to the patient.
   
   c. Place the uninjured ankle at a 90 degree angle to the tibia.
   
   d. Measure from 1 inch distal to the tips of the toes to 4 inches distal to the groin region (inguinal region).
   
   e. Place measure webri on work station/cart.
   
   f. Roll out second layer of padding and bisect the middle of the previous padding.
   
   g. Layer the padding 2-4 thickness.

9. Prepare cast padding (webri) for 2nd splint.
   a. Measure from 4 inches distal to the inguinal region down the medial aspect of the leg around the ankle up the lateral aspect of the leg opposite from the start.
   
   b. Place measured webri on work station/cart.
   
   c. Roll out second layer and bisect the middle of the previous padding.
   
   d. Layer the padding 2-4 thickness.

    a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of six stacks and remove from package. Place on work cart/station.
    
    NOTE: 4 or 6 inch plaster rolls can also be used.
    
    b. Place (3) stack of sheets on each padding and cut excess as needed.

11. Measure patient's injured ankle w/ goniometer.
    a. Position the patient's injured ankle at a 90 degree angle to the tibia.
    
    NOTE: There are several ways to maintain the ankle at a 90 degree angle. The patient could maintain the position, nursing personnel or family member can assist. It is the technician preference.
    
    b. Place the stationary arm of the goniometer parallel to the tibia.
    
    c. Place the moving arm of the goniometer in line with the lateral edge of the heel and the head of the fifth metatarsal.
    
    d. Place the protractor of the goniometer on the lateral malleolus.
    
    e. Set the ankle until the goniometer measures 90 degrees of dorsiflexion.
    
    NOTE: To assist the patient in maintaining a 90 degree angle, have the patient bend the knee (up to 15 degrees) and point toes upward or simulate squashing a bug with the heel of their foot. This will assist in maintaining the ankle at a 90 degree angle.
    
    NOTE: The technician may have their own technique to assist the patient.
### Performance Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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</table>
| **12. Measure patient's injured knee w/ goniometer** | a. Place the stationary arm of the goniometer parallel to the femur.  
  b. Place the moving arm of the goniometer parallel to the fibula.  
  c. Place the protractor of the goniometer on the lateral aspect of the patella.  
  d. Set the knee until the goniometer measures between 0-15 degrees of flexion. |
| **13. Apply posterior splint to injured leg.** | a. Hold each end of the triple thickness of plaster sheets, place in bucket of tepid water and remove when bubbles cease to rise.  
  b. Squeeze the splint together.  
  NOTE: Squeezing the roll together equally distributes the water. Wrinkling the roll quickens the drying time of the splint and may cause the plaster not to cure.  
  c. Place the plaster sheets centered and 1/2 inch from the edge of the padding.  
  d. Laminate plaster splint.  
  e. Fold over the edges of the padding.  
  f. Place additional layer of webril padding over folded edges.  
  g. Place the padded splint on posterior side of the leg 4 inches from the groin (gluteal crease) to the tips of the toes. |
| **14. Apply medial/lateral splint to injured leg.** | a. Follow step 12 a-f.  
  b. Place the padded splint on medial side of the leg 4 inches distal to the inguinal space around the ankle up the lateral side of the leg resting opposite from start. |
| **15. Secure long double sugar tong splint to injured leg.** | a. Hold elastic bandage with one hand.  
  b. Place the edge of the elastic bandage above the malleolus and begin wrapping around the malleolus two rotations to secure the edge.  
  c. Fold down and hold excess ends of the padding while continuing to wrap the bandage until the padding is completely covered.  
  d. Secure elastic bandage with clips.  
  e. Tape down the elastic bandage in between the clips.  
  f. Remove the clips and dispose in trash receptacle. |
| **16. Mold the splint to the ankle/leg** | a. Place palm of hand on the gastrocnemius and apply pressure. Hold until contours takes shape.  
  b. Place lateral aspect of both thumbs on the malleolus and apply even pressure. Hold until contours take shape.  
  c. Place palm of hand on the calcaneus and apply pressure. Hold until contour takes shape.  
  d. Place lateral aspect of both thumbs on the knee and apply even pressure. Hold until contours take shape.  
  e. Place palm of hand on the plantar arch and apply pressure. Hold until contour takes shape.  
  f. Place pillow under splinted leg. |
| **17. Check range of motion (ROM) of phalanges by having the patient extend and flex toes.** | |
| **18. Check alignment of injured ankle with goniometer.** | a. Place the stationary arm of the goniometer parallel bisecting the fibula.  
  b. Place the moving arm of the goniometer parallel bisecting the 5th Metatarsophalangeal joint (MTPJ).  
  c. Place the protractor of the goniometer on the lateral malleolus.  
  d. The goniometer should measure 90 degrees of dorsiflexion.  
  NOTE: If the malleolus is not at 90 degrees of dorsal flexion, everted or inverted, remove splint and go to step 8. |
| **19. Measure patient’s injured knee w/ goniometer (go to step 12)** | |

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Performance Steps
NOTE: If the knee is not between 0-15 degrees of flexion, remove splint and go to step 8.

20. Check splint dimensions.
   a. The tips of the toes are visible.
   b. The posterior splint edge rests at the gluteal crease and at the tips of the toes.

   a. Squeeze patient's toes and nail beds will turn white.
   b. Release patient's toes and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

22. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
   NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

23. Administer a crutch ambulation treatment (see task 081-836-0041).

24. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep leg elevated and flex and extend toes to increase circulation in the foot.
   d. Instruct patient not to stick any objects down the cast, do not remove the cast, and do not alter the cast (e.g. writing or coloring the cast).
   e. Instruct patient to use crutches when walking.

25. Annotate the procedure applied to patient in medical record or SF 513.
   NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

26. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician( reviewed if in writing)</td>
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<tr>
<td>2. Identified yourself to the patient.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Explained the procedure to the patient.</td>
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</tr>
<tr>
<td>4. Inspected patient's legs.</td>
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<tr>
<td>5. Checked capillary refill of patient's toes.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
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<tr>
<td>11. Measured patient's injured ankle w/ goniometer.</td>
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<tr>
<td>12. Measured patient's injured knee w/ goniometer</td>
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<tr>
<td>13. Applied posterior splint to injured leg.</td>
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<tr>
<td>Performance Measures</td>
<td>GO</td>
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<tr>
<td>15. Secured long double sugar tong splint to injured leg.</td>
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<tr>
<td>16. Molded the splint to the ankle/leg</td>
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<tr>
<td>17. Checked range of motion (ROM) of phalanges.</td>
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<tr>
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<tr>
<td>20. Checked splint dimensions.</td>
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<tr>
<td>22. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>24. Gave patient verbal and written instructions on cast care.</td>
<td></td>
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<tr>
<td>25. Annotated the procedure applied to patient in medical record or SF 513.</td>
<td></td>
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<tr>
<td>26. Escorted patient to front desk to make a follow up appointment.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a **GO** on the task, if all steps are passed (P). Score the orthopaedic technician a **NO-GO** (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

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Conditions: Given an orthopaedic patient requiring a Radial Gutter Splint, sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (2) rolls of 4 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (2) rolls of 4 inch webril, (2) inch elastic bandages, examination gloves, scissors, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, orthopaedic bump, thermometer and trash receptacle.

Standards: Is reached when a splint is secured to the patient's injured arm from the tip of the index and middle fingers to 1 inch distal to the cubitum space by (2) elastic bandages. The wrist is measured between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation, pronation or supination). The immobilized fingers are measured between 70-90 degrees of flexion with the thumb, ring and pinky fingers having full range of motion. Capillary refill test is administered to fingers and thumb and successfully passed.

Performance Steps

1. Receive the order from the physician (review if in writing).
2. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.
3. Explain the procedure to the patient.
   NOTE: The Radial gutter splint (RGS) is applied from the tip of the index and middle phalanges to 1 inch distal to the cubitum space. The injured phalanges will be flexed between 70-90 degrees, with the wrist between 0-15 degrees of dorsal extension and absent of radial, ulnar deviation, pronation and supination. The uninjured fingers will have full range of motion (ROM).

   CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's arms.
   a. Place examination gloves on hands.
   Caution: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Place patient sitting or supine on examination bed.
   c. Roll patient's shirt sleeve above elbow on injured side.
   d. Inspect both arms for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician's instruction.
   e. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's hands/fingers.
   a. Squeeze patient's fingers and nail beds will turn white.
   b. Release patient's fingers and nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.
Performance Steps
CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webbril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (2) plaster rolls from packages and place on work cart/station.

8. Prepare cast padding (webbril) for radial gutter splint.
   a. Place work cart with orthopaedic bump at the edge of the bed.
   b. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   c. Position the patient's uninjured elbow on the bump at a 45 degree angle to the floor.
   d. Measure from 1 inch distal to the tips of 1st and 2nd phalanges to 1 inch distal to the cubitum space.

NOTE: Measuring devices such as webbril, tape measure or plaster sheets may be used.
   e. Place webbril on work cart/station.
   f. Roll out second layer and bisect the middle of the previous padding.
   g. Layer the padding 2-4 thickness.

9. Prepare plaster splint for the radial side of the hand and forearm.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.

NOTE: The technician may choose to use 4 inch plaster rolls.
   b. Remove (1) plaster sheet from the stack of (10-15).
   c. Place sheet next to uninjured arm to obtain sheet length.

NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/arm.
   d. Place sheet on stack, cut excess length for all sheets, and place on work cart/station for later use.

NOTE: Discard excess material in the trash receptacle.

10. Measure patient's injured wrist w/ goniometer.
    a. Position the patient's injured elbow on the bump at a 45 degree angle to the upper extremity.
    b. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
    c. Place the moving arm of the goniometer bisecting the 5th phalange.
    d. Place the protractor of the goniometer on the ulnar styloid.
    e. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.

11. Measure patient's 1st and 2nd phalanges w/ goniometer.
    a. Place the stationary arm of the goniometer bisecting the lateral aspect of the radius.
    b. Place the moving arm of the goniometer bisecting the 1st phalange.
    c. Place the protractor of the goniometer on the radial styloid.
    d. Set the injured phalanges until the goniometer measures between 70-90 degrees of flexion.

12. Apply radial gutter splint to injured hand/arm.
    NOTE: Assistance may be used prior to securing splint.
    a. Place a strip of webbril between the injured phalanges.
    b. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
    c. Squeeze the sheets together to eliminate excess water.
Performance Steps
NOTE: Do not wring the sheet, this will cause the roll to dry more quickly
  d. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
e. Laminate plaster splint.
f. Fold over the edges of the padding.
g. Place additional layer of padding over folded edges.
h. Place the padded splint from the tips of the injured phalanges to 1 inch distal to the cubitum space.

13. Secure radial gutter splint to injured phalanges and arm.
a. Hold elastic roll with one hand.
b. Place the edge of the elastic bandage on the radial styloid and begin wrapping around the wrist two rotations to secure the edge.
c. Continue through the palm, around the index and middle phalanges to 1 inch distal to the cubitum space.
d. Secure elastic bandage with clips at back of wrist.
e. Tape down the elastic bandage between the clips.
f. Remove the clips and dispose in trash receptacle.

14. Mold casting material to forearm/wrist.
NOTE. The interosseous mold is used to prevent movement of the wrist in the cast and promote fracture healing.
a. Place the heel of one hand on the volar aspect of the distal wrist.
b. Place the heel of the second hand on the dorsal aspect of the distal wrist.
c. Squeeze the heels of each hand together.
d. Apply firm and gradual pressure beginning at the wrist and progress up the forearm.
CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g. How do you feel?, Is the pressure too much?)
e. Maintain patient's wrist in correct position.
f. Remove heels of each hand from splint when contours of the wrist and forearm have been shaped and splint is cured.

15. Mold casting material to 2nd and 3rd metacarpals.
NOTE. This mold is used to prevent movement of the metacarpals in the splint and promote fracture healing.
a. Place heel of hand on the dorsal aspect of the injured phalanges and apply gradual pressure.
NOTE: The physician may apply an additional mold.
b. Maintain patient's injured phalanges in correct position.
c. Remove palm of hand from splint when contours of the phalanges and wrist have been shaped, the phalanges are between 70-90 degrees of flexion and the splint is cured.

16. Check range of motion (ROM) of phalanges.
a. Have patient extend and flex uninjured fingers.
b. Have patient rotate thumb.

17. Check alignment of injured wrist and injured fingers with goniometer (go to steps 10-11).
NOTE: If wrist is not within 0-15 degrees of dorsal extension, the 1st and 2nd phalanges are not within 70-90 degrees of flexion, ulnar or radial deviation are present, remove splint and return to step 11.

18. Check splint dimensions.
a. The splint edge is 1 inch distal to the cubitum space.
b. The splint is covering both the 1st and 2nd metacarpals and is 1/2 inch distal to the injured phalanges.
NOTE: If splint is not covering the 1st and 2nd metacarpals and not distal to the injured phalanges remove splint and go to step 10.
c. The edge of the splint is 1/2 inch distal to the injured phalanges tips.

19. Check patient's capillary refill.
Performance Steps

- a. Squeeze patient's fingers and nail beds will turn white.
- b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

20. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
   NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

21. Fit patient with a sling.
   NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

22. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or written instruction.
   c. Instruct patient to keep arm elevated and flex and extend uninjured fingers to increase circulation in the hand.
   d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding).

23. Annotate the procedure applied to patient in medical record or SF 513.
   NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

24. Escort patient to front desk to make a follow up appointment.

Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
<td>1. Received the order from the physician (reviewed if in writing)</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>2. Identified yourself to the patient.</td>
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</tr>
<tr>
<td>3. Explained the procedure to the patient.</td>
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<tr>
<td>4. Inspected patient's arms.</td>
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<tr>
<td>5. Checked capillary refill of patient's hands/fingers.</td>
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<tr>
<td>6. Gathered equipment.</td>
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<tr>
<td>7. Assembled materials.</td>
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<tr>
<td>8. Prepared cast padding (webril) for radial gutter splint.</td>
<td>___</td>
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<tr>
<td>9. Prepared plaster splint for the radial side of the hand and forearm.</td>
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<td>___</td>
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<tr>
<td>10. Measured patient's injured wrist w/goniometer.</td>
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<tr>
<td>11. Measured patient's 1st and 2nd phalanges w/goniometer.</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>12. Applied radial gutter splint to injured hand/arm.</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>13. Secured radial gutter splint to injured phalanges and arm.</td>
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<tr>
<td>14. Molded casting material to forearm/wrist.</td>
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<tr>
<td>15. Molded casting material to 1st and 2nd metacarpals.</td>
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<tr>
<td>16. Checked range of motion (ROM) of phalanges.</td>
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### Performance Measures

<table>
<thead>
<tr>
<th>Step</th>
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<tbody>
<tr>
<td>17. Checked alignment of injured wrist and injured fingers with goniometer.</td>
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<tr>
<td>18. Checked splint dimensions.</td>
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<tr>
<td>20. Cleaned plaster off patient's skin using a damp wash cloth, towel or alcohol pad.</td>
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<tr>
<td>22. Gave patient verbal and written instructions on cast care.</td>
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<tr>
<td>23. Annotated the procedure applied to patient in medical record or SF 513.</td>
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<tr>
<td>24. Escorted patient to front desk to make a follow up appointment.</td>
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</table>

**Evaluation Guidance:** Score the orthopaedic technician a **GO** on the task, if all steps are passed (P). Score the orthopaedic technician a **NO-GO** (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**
- 0812110-0765
- 081-C-S004
- 0-8342-0763-X
- 38709590
- TC 8-640
**APPLY THUMB SPICA SPLINT**

**081-834-0067**

**Conditions:** Given an orthopaedic patient, requiring a Thumb Spica Splint, sitting or supine on an orthopaedic examination bed, family member, nursing personnel, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (2) rolls of 4 inch plaster, box of 4 x 15 inch plaster reinforcement sheets, (2) rolls of 4 inch webril, (2) 2 inch elastic bandages, examination gloves, scissors, roll of 2inch adhesive tape, (2) hospital pads (chux), bed sheet, goniometer, ruler, tape measure, bucket of tepid water w/plastic bag, sling, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/faucet, orthopaedic bump, thermometer and trash receptacle.

**Standards:** Is reached when the splint is secured to the patient's injured arm from the tip of the thumb to 1 inch distal to the cubitum space by (2) elastic bandages. The wrist is measured between 0-15 degrees of dorsal extension (absent of ulnar or radial deviation, pronation or supination). The immobilized thumb is in direct opposition to the index finger with all fingers having full range of motion. Capillary refill test is administered to fingers and thumb and successfully passed.

**Performance Steps**

1. Receive the order from the physician (review if in writing)

2. Identify yourself to the patient.
   
   NOTE: Tell the patient your name and job title.

3. Explain the procedure to the patient.
   
   NOTE: The Thumb Spica splint (TSAS) is applied from tip of the thumb to 1 inch distal to the cubitum space, with the wrist between 0-15 degrees of dorsal extension (absent of radial, ulnar deviation, pronation and supination). The fingers will have full range of motion (ROM) with the thumb having restricted movement.

   CAUTION: During splinting application a chemical response (exothermic reaction) will occur between the water (H2O) and the plaster (gypsum). This is a safe and common occurrence. The splint will initially become warm and cool down within 2-5 minutes. However, if it doesn't cool down or there is an increase of heat intensity during the cast application, the splint may need to be removed.

4. Inspect patient's arms.
   
   a. Place examination gloves on hands.

   Caution: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.

   b. Place patient sitting or supine on examination bed.

   c. Inspect both arms for any skin conditions (e.g., cuts, abrasions, laceration and skin rashes).

   NOTE: Inform physician if conditions are present and follow physician's instruction.

   d. Examine both arms and wrists for jewelry and remove if found.

   NOTE: All jewelry on both hands and wrist must be removed. Give jewelry to family member or secure with patient's belongings in NCOIC office.

5. Check capillary refill of patient's hands/ fingers.
   
   a. Squeeze patient's fingers and nail beds will turn white.

   b. Release patient's fingers and nail beds will return pink.

   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/plastic bag. Place on work cart or station.
Performance Steps
CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp towel. Open and remove (2) plaster rolls from packages and place on work cart/station.

Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads/damp wash cloth or towel. Open and remove (2) plaster rolls from packages and place on work cart/station.

8. Prepare cast padding (webril) for thumb Spica splint.
   a. Place work cart with orthopaedic bump at the edge of the bed.
   b. Place hospital pad or bed sheet on patient's lap.
   NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   c. Position the patient's uninjured elbow on the bump at a 45 degree angle to the floor.
   d. Measure from 1 inch distal to the tip of the thumb to 1 inch distal to the cubitum space.
   NOTE: Instruments of measurements may vary (e.g. tape measure, ruler or webril)
   e. Place webril on work cart/station.
   f. Roll out second layer and bisect the middle of the previous padding.
   g. Layer the padding 2-4 thickness.

9. Prepare plaster splint for the radial side of the hand and forearm.
   a. Open box of 4 x 15 plaster reinforcement sheets. Remove sheets from box and unwrap package. Peel back the edges of (10-15) sheets, remove from the stack. Place on work cart/station.
   NOTE: The technician may choose to use 4 inch plaster rolls.
   b. Remove (1) plaster sheet from the stack of (10-15).
   c. Place sheet next to uninjured arm to obtain sheet length.
   NOTE: To increase patient cleanliness the sheet does not have to rest on the hand/arm.
   d. Place sheet on stack, cut excess length for all sheets, and place on work cart/station for later use.

10. Measure patient's injured wrist w/ goniometer.
    a. Position the patient's injured elbow on the bump at a 45 degree angle to the upper extremity.
    b. Place the stationary arm of the goniometer bisecting the lateral aspect of the ulnar.
    c. Place the moving arm of the goniometer bisecting the 5th phalange.
    d. Place the protractor of the goniometer on the ulnar styloid.
    e. Set the wrist until the goniometer measures between 0-15 degrees of dorsal extension.

11. Apply thumb spica splint to injured thumb.
    NOTE: Assistance (e.g. family member or nurse) may be used prior to securing splint.
    a. Position the patient's injured thumb in opposition to the index finger.
    b. Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
    c. Squeeze the sheets together to eliminate excess water.
    NOTE: Do not wring the sheet, this will cause the roll to dry up quickly
    d. Place the plaster sheets centered and 1/2 inch from the edge of the padding.
    e. Laminate plaster splint.
    f. Fold over the edges of the padding.
    g. Place additional layer of padding over folded edges.
    h. Place the padded splint from the tip of the injured thumb to 1 inch distal to the cubitum space.

12. Secure thumb Spica splint to injured thumb and arm.
Performance Steps
a. Hold elastic roll with one hand.
b. Place the edge of the elastic bandage on the radial styloid and begin wrapping around the wrist two rotations to secure the edge.
c. Continue through the palm, around the thumb and back down the forearm ending 1 inch distal to the cubitum space.
d. Secure elastic bandage with clips.
e. Tape down the elastic bandage between the clips.
f. Remove the clips and dispose in trash receptacle.

13. Mold splint to thumb.
NOTE. This mold is used to prevent movement of the thumb in the splint and promote fracture healing.
  a. Place hand around the thumb (Cup mold).
  b. Apply gradual pressure beginning at the tip of the thumb, continuing down the radius.
  c. Remove palm of hand from splint when contours of the thumb and wrist have been shaped and the splint is cured.

14. Check range of motion (ROM) of phalanges.
  a. Have patient extend and flex uninjured fingers.
  b. Have patient flex and extend elbow.

15. Check alignment of injured wrist with goniometer (go to step 10).
NOTE: If wrist is not within 0-15 degrees of dorsal extension, the thumb is not in opposition to the thumb, ulnar or radial deviation are present, remove splint and go to step 9 and repeat the process.

16. Check splint dimensions.
  a. Proximal edge of splint is 1 inch distal to the cubitum space.
  b. The edge of the splint is 1/2 inch distal to the injured tip of the thumb.
NOTE: If the splint is not distal to the injured thumb and the distal interphalange joint (DIP) is allowed to flex, remove splint and go to step 11.

17. Check patient's capillary refill.
  a. Squeeze patient's fingers and nail beds will turn white.
  b. Release patient's fingers and nail beds will return pink.
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

18. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

19. Fit patient with a sling.
NOTE: Consideration for applying a sling include elderly patient's, severity of fractures (e.g. Colles', Smith's, Bennett's), patient's comfort, physician's or technician's preference.

20. Give patient verbal and written instructions on cast care.
  a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
  b. Present patient with cast care booklet or (written instruction)
  c. Instruct patient to keep arm elevated and flex and extend uninjured fingers to increase circulation in the hand
  d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding).

21. Annotate the procedure applied to patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

22. Escort patient to front desk to make a follow up appointment.
### Performance Measures

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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

- **Required**
  - 0812110-0765
  - 0-8342-0763-X
  - 38709590
  - TM 6-840

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345
**Conditions**: Given an orthopaedic patient requiring a Medial/Lateral splint supine on an orthopaedic examination bed, nursing personnel, family member, physician, physician's verbal or written order, patient's medical record, or Standard Form 513 (consultation form), pen, work cart/station, (4) rolls of 6 inch plaster, box of 5 x 30 inch plaster reinforcement sheets, (4) rolls of 6 inch webril, examination gloves, scissors, (4) elastic bandages, roll of 2 inch adhesive tape, (2) hospital pads (chux), bed sheet, pillow, disposable paper shorts, goniometer, ruler, tape measure, bucket of tepid water w/ plastic bag, thermometer, cast care booklet or equivalent, box of alcohol pads, damp wash cloth or towel, sink w/ faucet, orthopaedic bump, thigh holder, 1 pair of crutches and trash receptacle.

**Standards**: Is reached when a medial/lateral splint is secured to the patient's injured leg from 4 inches distal to the groin (on the medial side) and 1 inch distal to the greater trochanter (on the lateral side) to 2 inches proximal to the medial malleolus, with (4) elastic bandages. The knee is measured between 0 - 15 degrees of flexion, with toes and ankle having full range of motion. Capillary refill test is administrated to the toes and passed successfully.

**Performance Steps**

1. Receive the order from the physician (review if in writing)
2. Identify yourself to the patient.
   - NOTE: Tell the patient your name and job title.
3. Explain the procedure to the patient.
   - NOTE: The Medial/Lateral splint is applied from 4 inches distal of the groin (on the medial side of injured leg) to 2 inches proximal to the medial malleolus and from 2 inches distal to the greater trochanter (on the lateral aspect of the injured leg) to 2 inches proximal to the lateral malleolus. The knee will be flexed between 0 - 15 degrees. The toes and ankle will have full range of motion (ROM).
4. Inspect patient's legs.
   - a. Place examination gloves on hands.
   - Caution: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   - b. Place patient supine on examination bed.
   - c. Remove patient's pants and place sheet over lap.
   - d. Inspect both legs for any skin conditions (e.g. cuts, abrasions, laceration and skin rashes).
   - NOTE: Inform physician if conditions are present and follow physician's instruction.
   - e. Examine both legs for jewelry and remove if found.
   - NOTE: All jewelry on both legs must be removed. Give jewelry and clothing to family member or secure with patient's belongings in NCOIC office.
5. Check capillary refill of patient's toes.
   - a. Squeeze patient's toes and nail beds will turn white.
   - b. Release patient's toes and nail beds will return pink.
   - CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.
Performance Steps

6. Gather equipment to include scissors, thermometer, goniometer, ruler and bucket of tepid water w/ plastic bag. Place on work cart or station.

CAUTION: The temperature of the water must be tepid (70-80 degrees) to reduce further injury (possible burns) to the patient. The technician should draw room temperature water and initially use a thermometer to gauge water temperature.

CAUTION: The technician must change the water after each application as the residue in the cast bucket will act as an accelerator causing the casting material to increase in heat emission.

7. Assemble materials to include webril, plaster rolls, examination gloves, hospital pad (chux), bed sheet, sling, plaster reinforcement sheet, alcohol pads or damp wash cloth or towel. Open and remove (6) plaster rolls from packages and place on work cart/station.

NOTE: Physician's order, technician's preference, availability of supplies, and/or patient's extremity size will determine which casting material (fiberglass/plaster) will be used.

8. Prepare cast padding (webril) for 1st splint.
   a. Place hospital pad or bed sheet on patient's lap.

NOTE: All patient's should be given a covering (e.g. chux, bed sheet) to reduce damaging their clothing during the casting process and for privacy.
   b. Locate the fibula head on the uninjured leg.

CAUTION: The peroneal nerve is located on the lateral side of the knee. If constricted the nerve may die and cause drop foot (known as nerve palsy). This is an irreversible condition. Pad the area to prevent further injury to the patient.
   c. Place the uninjured knee between 0-15 degree of flexion.
   d. Measure from 4 inches distal to the groin to 2 inches proximal to the medial malleolus.

NOTE: Instruments of measurements may vary (e.g. tape measure, ruler or webril)
   e. Place measure webril on work station/cart.
   f. Roll out second layer and bisect the middle of the previous padding.
   g. Layer the padding 2-4 thickness.

9. Prepare cast padding (webril) for 2nd splint.
   a. Measure from 2 inches distal to the greater trochanter to 2 inches proximal to the lateral malleolus.
   b. Roll out second layer of padding and bisect the middle of the previous padding.
   c. Layer the padding 2-4 thickness.

    a. Open box of 5 x 30 inch plaster reinforcement sheets. Remove and unwrap package. Locate edge of six stacks and remove from package. Place on work cart/station.
    b. Place (3) stack of sheets on each padding and cut excess as needed.

11. Measure patient's injured knee w/ goniometer.
    NOTE: There are several ways to maintain the knee at 0-15 degree of flexion. The patient could maintain the position, nursing personnel or family member can assist, or an orthopaedic bump placed under the heel could be used. It is the technician's preference.
    a. Place orthopaedic bump under patient's heel of the injured leg.

CAUTION: Depending on the orthopaedic device used, the circulation to the toes and foot may be constricted. Always communicate with the patient and remove device if patient complains about toes falling asleep or technician observes a color change in the foot.
   b. Place the stationary arm of the goniometer bisecting the lateral aspect of the femur.
   c. Place the moving arm of the goniometer bisecting the fibula.
   d. Place the protractor of the goniometer on the lateral aspect of the knee.
   e. Set the knee until the goniometer measures between 0-15 degrees of flexion.

12. Apply medial splint to injured leg.
    NOTE: Assistance may be used prior to securing
Performance Steps
- Place the plaster sheets in bucket of tepid water and remove when bubbles cease to rise.
- Squeeze the sheets together to eliminate excess water.

NOTE: Do not wring the sheet, this will cause the roll to dry up quickly.
- Place the plaster sheets centered and 1/2 inch from the edge of the padding.
- Laminate plaster splint.
- Fold over the edges of the padding.
- Place additional layer of padding over folded edges.
- Place the padded splint on medial side of the leg from 4 inches distal to the groin to 2 inches proximal to the malleolus.

NOTE: Nursing assistant or patient may hold splints in place.

13. Apply lateral splint to injured leg.
   - Follow step 12 a-g
   - Place the padded splint on lateral side of the leg from 2 inches distal to the greater trochanter to 2 inches proximal to the malleolus.

14. Secure medial/lateral splint to injured leg.
   - Hold elastic roll with one hand.
   - Place the edge of the elastic bandage above the malleolus and begin wrapping around the leg two rotations to secure the edge.
   - Continue up the leg, figure of eight around the knee, to the groin region.
   - Secure elastic bandage with clips.
   - Tape down the elastic bandage between the clips.
   - Remove the clips and dispose in trash receptacle.

15. Mold the splint to the knee/leg
   - Place the heel of one hand on the lateral aspect of the knee.
   - Place the heel of the second hand on the medial aspect of the knee.
   - Squeeze the heels of each hand together.
   - Apply firm and gradual pressure beginning at the knee and progress up and down the leg while maintaining the knee in correct position.

CAUTION: Excessive pressure may result in further patient injury. Talk to the patient while performing this procedure (e.g., How do you feel?, Is the pressure too much?)
- Maintain patient's knee in correct position.

NOTE: Nursing assistance may be used.
   - Remove heels of each hand from splint when contours of the knee and leg have been shaped and splint is cured.

16. Check range of motion (ROM) of phalanges/ankle.
   - Have patient extend and flex toes.
   - Have patient extend and flex ankle.

17. Check alignment of injured knee with goniometer.
   - Place the stationary arm of the goniometer horizontal, bisecting the femur.
   - Place the moving arm of the goniometer vertical, bisecting the fibula.
   - Place the protractor of the goniometer on the knee.
   - The knee is measured between 0-15 degrees of flexion.

NOTE: If knee is not within 0-15 degrees of flexion remove splint, go to step 11 and repeat the process.

18. Check splint dimensions.
   - The medial splint edge rest 4 inches distal to the groin and 2 inches proximal to the malleolus.
   - The lateral splint edge rest 2 inches distal to the greater trochanter and 2 inches proximal to the malleolus.

19. Check patient's capillary refill.
   - Squeeze patient's toes and nail beds will turn white.
   - Release patient's toes and nail beds will return pink.
Performance Steps
CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

20. Clean plaster off patient's skin using a damp wash cloth, towel or alcohol pad.
NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.

21. Administer crutch ambulation treatment (see task number 081-836-0041).

22. Give patient verbal and written instructions on cast care.
   a. Instruct patient to call the cast clinic should they have any concerns or questions regarding their cast. Provide patient with a copy of the clinic hours and telephone number. After duty hours instruct patient to report to the Emergency Room.
   b. Present patient with cast care booklet or (written instruction)
   c. Instruct patient to keep leg elevated and flex and extend toes and ankle to increase circulation in the foot.
   d. Instruct patient not to stick any objects down the splint, do not remove the splint, and do not alter the cast (e.g. cutting, removing padding).

23. Annotate the procedure applied to patient in medical record or SF 513.
NOTE: Record the procedure applied and cast care instruction provided to the patient in patient's medical record or Standard Form 513 and sign your name.

24. Escort patient to front desk to make a follow up appointment.

Performance Measures

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<tr>
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<th>GO</th>
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**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

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Conditions: Given a patient requiring finger traction, in supine position on an orthopaedic bed, finger trap set with stand, family member, nursing personnel, physician, physician’s written or verbal order, patient medical record or Standard Form 513, (2) hospital pads (chux), roll of 2 inch adhesive tape, canvas sling, weight carrier, (2) weight plates (1, 2, 4, 5 or 10 lbs. increments), padded felt with stockinette, spool of traction cord, scissors, examination gloves, goniometer and trash receptacle.

Standards: Is reached when finger traps are secured to 2 or more fingers on the injured hand. The arm is maintained at a 90 degree angle to the bed with the humerus suspended off the bed with the wrist between 0-15 degrees of dorsal extension. A canvas sling is applied on the biceps region of the upper arm with weight carrier attached. Weight plates identified in the physician’s order are applied to the weight carrier at the side of the bed. Capillary refill test is administrated to the fingers and passed successfully.

Performance Steps

1. Receive the order from the physician (review if in writing)
2. Identify yourself to the patient.
3. Position the patient (supine) in the middle of the bed.
4. Explain the procedure to the patient.
NOTE: Finger traps are placed on two or more fingers and used to suspend the arm off the bed in a vertical position. (Refer to Figure 3-x).

5. Inspect patient's arms.
   a. Place examination gloves on hands. **Caution:** Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Roll patient's shirt and place bed sheet over chest.
   c. Inspect both arms for any skin conditions (e.g., cuts, abrasions, lacerations and skin rashes).
   NOTE: Inform physician if conditions are present and follow physician instructions.
   d. Examine both arms and wrists for jewelry and remove if found.
   NOTE: All jewelry on fingers and wrists must be removed. Give jewelry and clothing to family member or secure with patient's belongings in NCO office.

6. Check capillary refill of patient's fingers.
   a. Squeeze patient's fingers and nail bed will turn white
   b. Release patient's fingers and nail bed will return pink.
   **CAUTION:** If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

7. Clean patient's skin using a damp wash cloth, towel or alcohol pad.
   NOTE: Use alcohol pad or fresh water from the faucet and not from the casting bucket.
Performance Steps

8. Gather equipment to include finger traps with stand, scissors, padded felt with stockinette, (2) 5lb weight plates, weight carrier. Place on work cart/station.

9. Assemble materials to include; examination gloves, traction cord, padded felt w/ stockinette and place on work cart/station.

10. Apply finger traps to fingers on injured hand.

NOTE: Use of finger traps may be required based on patient's inability to maintain arm/wrist in the correct position, there is no assistance available, and fracture reduction is needed.
   a. Remove patient's shirt.
   b. Place patient supine on bed with humerus off the bed.

NOTE: To prevent the patient from falling off the bed, position the patient's legs towards the opposite corner of bed.
   c. With one hand, grasp patient's injured hand and abduct from upper torso.
   d. With 2nd hand, grasp finger trap set and place individual finger traps on fourth and fifth phalange past the metacarpophalangeal joints (MCPJ's)

NOTE: Physician's order will determine which phalanges are used.

11. Measure injured wrist between 0 -15 dorsal extension
   a. Place the stationary arm of the goniometer vertically, bisecting the ulnar side of the forearm.
   b. Place the moving arm of the goniometer vertically, bisecting the lateral side of the 5th phalange (pinky finger).
   c. Place the protractor of the goniometer on the ulnar styloid.
   d. Set wrist until the goniometer measures 0-15 degrees of dorsal extension.

12. Place padded stockinette on biceps muscle of injured arm.

13. Attach the weight carrier hook through perforated holes on the stockinette.

14. Apply the weight plates to weight carrier.

NOTE: Physician will determine amount of weight plates to use.

NOTE: Inform patient prior to adding or removing weight plates.

15. Inspect distance of patient's humerus suspended off the bed.

NOTE: If patient's humerus is touching the bed, remove weight plates and adjust patient's arm.

16. Check capillary refill of patient's fingers.
   a. Squeeze patient's fingers and nail beds will turn white
   b. Release patient's fingers and nail beds will return pink.

CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's instruction.

17. Refer to task 081-834-0002 for casting application.

Performance Measures

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<td>8. Gathered equipment.</td>
<td></td>
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<tr>
<td>10. Applied finger traps to fingers on injured hand.</td>
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<tr>
<td>11. Measured injured elbow at a 90 degree angle to the upper torso</td>
<td></td>
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<tr>
<td>13. Placed padded stockinette on biceps muscle of injured arm.</td>
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<tr>
<td>14. Placed weight carrier hook through perforated holes on the stockinette.</td>
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<tr>
<td>15. Applied weight plate to weight carrier.</td>
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</tr>
<tr>
<td>16. Inspected distance of patient's humerus suspended off the bed.</td>
<td></td>
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<tr>
<td>17. Checked capillary refill of patient's fingers.</td>
<td></td>
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</tr>
<tr>
<td>18. Referred to task 081-834-0002 for casting application.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Evaluation Guidance:** Score the orthopaedic technician a GO on the task, if all steps are passed (P). Score the orthopaedic technician a NO-GO (NG) if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**

- TM 6-840
- ZIMMER
APPLY RIGHT ANGLE SKIN/SKELETAL TRACTION

081-834-0070

**Conditions:** Given a patient requiring Right Angle traction in supine position on a power controlled orthopaedic bed with overhead traction frame, nursing personnel, physician, physician’s written or verbal order, patient medical record or Standard Form 513, (3) skin adherent (benzoin/mastisol) w/applicators, roll of adhesive vent foam strap, (2) 3 inch elastic bandages, Nelson finger exerciser, spreader bar, spreader block, (2) pulleys with attachment, spool of traction cord, (2) 8 x 7 inch surgipad pads, webril or equivalent, canvas sling, 18 inch single clamp bar, (2) weight carriers, (2) weight plates (1, 2, 4, 5 or 10 lbs. increments), roll of 2 inch adhesive tape, ruler, scissors, examination gloves, goniometer and trash receptacle.

**Standards:** Is reached when the adhesive vent foam strap with spreader block / Nelson finger exerciser is secured to the injured arm. The arm is maintained at a 90 degree angle to the bed with traction cord tied to the spreader block, threaded through the pulleys at the end of the single clamp bar and tied to the weight holder. A canvas sling with spreader bar is applied to the biceps region of the upper arm with weight holder attached. Weight plates identified in the physician's order are applied to the weight carriers at the side of the bed. Capillary refill test is administrated to fingers and passed successfully.

**Performance Steps**

1. Receive the order from the physician (review if in writing).

2. Gather needed equipment to include spreader block, spreader bar, pulleys, weight carriers, weight plates, single clamp bar, adhesive vent foam strap, and canvas sling.

3. Assemble materials to include paper tape, elastic bandages, traction cord, webril, skin adherent with applicator, examination gloves, scissors, ruler and goniometer. Place on work cart/station. CAUTION: Traction cords used should not be frayed, worn or dirty, this may cause a medical threat to the patient and may cause further harm.

4. Check serviceability of overhead traction frame and bed.
   a. Inspect traction equipment for cracked, dented, and warped bars, or broken handles. Open all clamp holders.
   NOTE: Turn all unserviceable equipment over to supervisor and continue to gather serviceable equipment.
   b. Inspect orthopaedic bed as follows:
      (1) Bed rails are in the upright position and locked.
      NOTE: Do not raise the bed rail on the patient's affected side.
      (2) Bed electrical cord/plug are not frayed.
      (3) Remote control buttons are operational (e.g. head/foot elevation, raise/lower position, and nurse call button).
      (4) Bed wheels are locked.
      NOTE: Inform nurse if 1-4 failed and inspect another bed.

5. Identify yourself to the patient.
   NOTE: Tell the patient your name and job title.

6. Explain the procedure to the patient.
Performance Steps

NOTE: Inform patient or family member that Right Angle traction is designed for treatment of elbow and humerus injuries. The injured arm is placed at a 90 degree angle to the bed, with adhesive vent foam strap applied to the injured arm. A canvas sling is placed on the biceps muscle with physician order weight plates applied to weight carriers. (Refer to Figure 3-x).

CAUTION: The trapeze handle should be secured to the trapeze clamp when not in use to prevent further injury to patient. Technician will demonstrate how to use and secure the trapeze for patient or family member(s).

7. Position the supine patient in the middle of the bed.

8. Prepare patient's injured arm.
   a. Place examination gloves on hands.
   Caution: Always practice Body Substance Isolation (BSI) prior to applying traction, splints or casts to patients.
   b. Remove patient's shirt and jewelry.
   NOTE: Give clothing and jewelry to family member or nursing personnel.
   c. Inspect both extremities for any skin conditions (e.g. cuts, abrasions, lacerations, or rashes). Inform nurse if skin conditions are present before continuing.
   d. Pad the ulnar styloid of the injured arm.
Performance Steps

NOTE: Webril or felt may be used. Padding is used to reduce any chaffing that may occur while arm is in traction.

9. Check patient capillary refill.
   a. Squeeze the patient's fingers and the nail beds will turn white.
   b. Release the patient's fingers and the nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

10. Apply skin adherent to injured arm.
    NOTE: Use tincture of benzoin/mastisol adhesive in conjunction with adhesive/non adhesive vent foam straps.
    a. Ask patient if they have ever had a skin rash after use of benzoin or after eating shell fish.
    NOTE: If patient is unable to answer, ask family member. If family member is not present use a substitute application (mastisol).
    b. If no known allergies exists apply tincture of benzoin to the medial/lateral aspect of the injured arm beginning one finger width below the cubitum space and ending at the wrist.
    c. If known allergies exists apply mastisol in the same manner.

11. If using the Nelson finger exerciser go to step 13.

12. If using the adhesive vent foam strap with spreader block go to step 14.

13. Apply and secure adhesive vent foam strap with Nelson finger exerciser to injured arm.
    NOTE: The adhesive vent foam strap should rest 1 inch distal to the cubitum space.
    a. Have the patient hold the handle of the Nelson finger exerciser.
    NOTE: The square end of the Nelson finger exerciser should point toward the head of the bed, with the patient's thumb aligned with the humerus.
    b. Place vent foam strap on the spreader block portion of the Nelson finger exerciser and measure 1 inch distal to the cubitum space.
    c. Fold down and hold excess ends of the vent foam strap while continuing to wrap the elastic bandage until the vent foam strap is completely covered and secure with clips.
    d. Tape the elastic bandage between the clips.
    e. Remove the clips and dispose in trash receptacle.

14. Apply and secure adhesive vent foam strap with spreader block to injured arm.
    a. Apply the vent foam strap from the posterior side of the elbow, up beyond the tips of the fingers ending on the anterior side opposite from the start.
    b. Fold down and hold excess ends of the vent foam strap while continuing to wrap the bandage until the vent foam strap is completely covered and secure with clips.
    c. Tape the elastic bandage between the clips.
    d. Remove the clips and dispose in trash receptacle.
    e. Slide spreader block into the top of the vent foam strap.
    f. Have patient rest arm on bed.

15. Secure 44 inch single clamp bar to the long bar on the overhead frame.
    a. Align and attach the single clamp bar with the patient's injured shoulder
    b. Angled the single clamp bar at a 90 degree angle to the floor.

16. Secure (2) pulleys to the distal end of the single clamp bar.

17. Adjust the patient's position.
    NOTE: Nursing personnel may be used with patient positioning.
    a. Place the patient's feet in the corner opposite of injured arm.
    b. Have patient move injured arm(humerus) off the bed.
    NOTE: The patient's humerus should be hanging freely. If the humerus is resting on the bed, the traction will not be effective.
Performance Steps

18. Tie traction cord to Nelson finger exerciser/spreader block.
   a. Remove 4-6 feet of traction cord from the spool.
   b. Cut traction cord in half.
   c. Tie non slip knot to the end of the spreader block.
   NOTE: To reduce the possibility of the traction cord slipping and causing further injury to the patient, use a non slip knot (e.g. up and over, down and over, up and through).
   d. Thread opposite end of traction cord through pulleys on the single clamp bar and tie to weight carrier.

19. Place canvas sling on top of biceps muscle.

20. Insert spreader bar ends in perforated holes on the canvas sling.

21. Attach weight carrier to spreader bar

22. Apply weight plates to weight carrier.
   Caution: Always communicate to the patient prior to adding or removing weight plates.

23. Elevate or raise the bed on the affected side.
   NOTE: The physician's order will indicate the bed elevation requirement.

24. Check single clamp bar alignment with the patient's injured arm.
   NOTE: If single clamp bar at the side of the bed is not aligned with the humerus go to step 15 and repeat to obtain alignment.

25. Measure injured arm at a 90 degree angle to the floor with goniometer.
   a. Place the stationary arm of the goniometer in the horizontally, bisecting the lateral aspect of the humerus.
   b. Place the moving arm of the goniometer in the horizontally, bisecting the lateral aspect of the forearm and the 2nd and 3rd phalanges.
   c. Place the protractor of the goniometer on the olecranon process (elbow).
   d. Set olecranon process until goniometer measures 90 degrees of flexion.

26. Check traction and arm alignment/angles and adjust if necessary.
   a. The elbow is flexed at a 90 degree angle.
   b. Single clamp bar is aligned with the patient's injured humerus.
   c. Adjust pulley's as needed.

27. Check patient capillary refill.
   a. Squeeze the patient's fingers and the nail beds will turn white.
   b. Release the patient's fingers and the nail beds will return pink.
   CAUTION: If capillary refill is delayed for more than 2 seconds inform physician and follow physician's order.

28. Inspect overhead traction frame and bed.
   a. All clamps are tighten and locked.
   b. Bed rails upright and locked.
   c. Bed wheels are locked.

29. Inspect traction equipment.
   NOTE: Traction principles promote the effectiveness of traction. Any type of friction will reduce the efficiency of traction and hinder the pull and cause further discomfort to the patient.
   a. The weight carriers are hanging freely w/o touching the bed, floor or frame.
   b. All knots are secured (tapped).
   c. All traction cords are centered on the pulley tracks.
   d. All traction cords are hanging freely w/o touching the bed, floor or frame.
   NOTE: Traction equipment is checked daily to promote effective medical care to the patient.
Performance Steps

   a. Inform patient to push the nurse call button on the side of the bed rails for assistance.
   b. The patient’s humerus must be extended off the bed to assist with bone alignment.

Performance Measures

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<thead>
<tr>
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<th>GO</th>
<th>NO GO</th>
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<tbody>
<tr>
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<tr>
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<tr>
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**Evaluation Guidance:** Score the orthopaedic technician a **GO** on the task, if all steps are passed (P). Score the orthopaedic technician a **NO-GO (NG)** if any step is failed (F). All performance measures must be passed to receive a go.

**References**

**Required**

- BLAUVELT, CAROLYN T.
- NUTT, REX
- STP 8-91H14-SM-TG
- TF 8-4749
- THROUGH SELF-INSTRUCTION
- TM 8-231
- TM 8-640
- ZIMMER

**Related**