SPLINTING TECHNIQUES

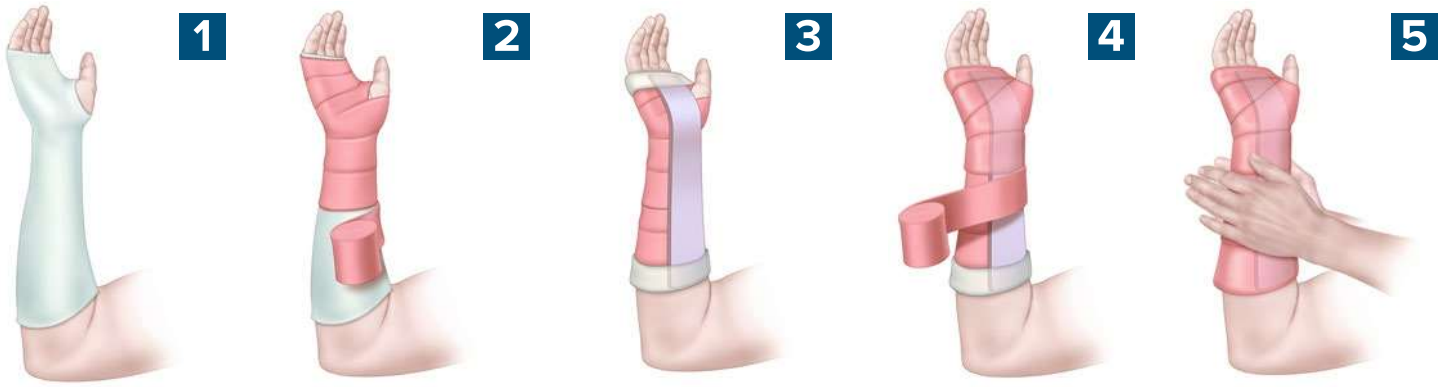
BASELINE MATERIALS

- Stockinette
- Splinting material
- Plaster
  - Upper extremity: 8–10 layers
  - Lower extremity: 10–12 layers
- Fiberglass
- Padding
- Elastic bandaging
- Bucket/receptacle of water (the warmer the water, the faster the splint sets)
- Trauma shears

BASELINE PROCEDURE

Measure and prepare the splinting material.

- Length: Measure out the dry splint on the contralateral extremity
- Width: Slightly greater than the diameter of the limb



1
Apply the stockinette to extend 2" beyond the splinting material.

2
Apply 2–3 layers of padding over the area to be splinted and between digits being splinted. Add an extra 2–3 layers over bony prominences.

3
Lightly moisten the splinting material. Place it and fold the ends of stockinette over the splinting material.

4
Apply the elastic bandaging.

5
While still wet, use palms to mold the splint to the desired shape.

6
Once hardened, check neruovascular status and motor function.

POSTERIOR LONG ARM SPLINT

INDICATIONS
- Olecranon fractures
- Humerus fractures
- Radial head and neck fractures

CONSTRUCTION
- Start at posterior proximal arm
- Down the ulnar forearm
- End at the metacarpophalangeal joints

APPLICATION
- Cut hole in stockinette for thumb
- Elbow at 90°
- Forearm neutral position with thumb up
- Neutral or slightly extended wrist (10–20°)

VOLAR SPLINT

INDICATIONS
- Soft tissue injuries of the hand and wrist
- Carpal bone fractures
- 2nd–5th metacarpal head fractures

CONSTRUCTION
- Start at palm at the metacarpal heads
- Down the volar forearm
- End at distal forearm

APPLICATION
- Cut hole in stockinette for thumb
- Forearm in neutral position with thumb up
- Wrist slightly extended (10–20°)
- Like holding a can

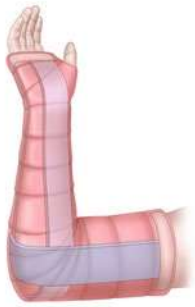
SUGAR TONG SPLINT

INDICATIONS
- Distal radius and ulna fractures

CONSTRUCTION
- Metacarpal heads on the dorsal hand
- Around elbow
- End at volar metacarpal phalangeal joints

APPLICATION
- Cut hole in stockinette for thumb
- Elbow at 90°
- Forearm neutral with thumb up
- Slightly extended wrist (10–20°)

DOUBLE SUGAR TONG SPLINT

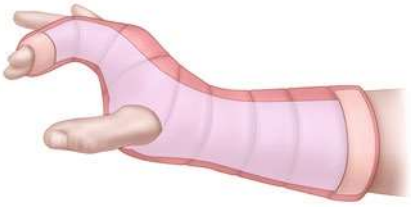


INDICATIONS
- Complex and unstable forearm and elbow fractures

CONSTRUCTION
- Forearm splint: as above
- Arm splint
  - Start at anterior proximal humerus
  - Around elbow
- End at posterior proximal humerus

APPLICATION
- Cut hole in stockinette for thumb
- Elbow at 90°
- Forearm neutral with thumb up
- Slightly extended wrist (10–20°)

RADIAL GUTTER SPLINT



INDICATIONS
- Fractures and soft tissue injuries of index and 3rd digits
- Fractures of the neck, shaft and base of the 2nd and 3rd metacarpals

CONSTRUCTION
- Starts at mid-forearm
- Down the radial forearm
- End mid-distal phalanx of 2nd and 3rd digits

APPLICATION
- Cut hole in stockinette and splinting material for the thumb
- Hand in position of function
- Forearm in neutral position
- Wrist slightly extended
- MCP 50° of flexion
- Proximal interphalangeal and distal interphalangeal joints 5°–10° flexion

THUMB SPICA SPLINT

INDICATIONS
- Injuries to scaphoid, lunate, thumb and 1st metacarpal
- Gamekeeper's/Skier's thumb
- De Quervain tenosynovitis

CONSTRUCTION
- Start at mid-distal phalanx of thumb
- End at mid-forearm

APPLICATION
- Cut hole in stockinette for thumb
- Cut wedges on both sides of splinting material at MCP joint
- Forearm in neutral position with thumb in wineglass position

ULNAR GUTTER SPLINT

INDICATIONS
- Fractures and soft tissue injuries of 5th digit
- Fractures of the neck, shaft, and base of 4th and 5th metacarpals

CONSTRUCTION
- Start at mid-forearm
- Extend down ulnar forearm
- End at mid-distal phalanx
- Include the 4th and 5th digits

APPLICATION
- Hand in position of function
- Forearm in neutral position
- Wrist slightly extended
- MCP 50° of flexion
- Proximal interphalangeal and distal interphalangeal joints 5–10° flexion
- If boxer's fracture: flex the metacarpal phalangeal joints to 90°

MALLET FINGER

INDICATION
- Mallet Finger

CONSTRUCTION
- Splint only the distal interphalangeal joint

APPLICATION
- Splint distal interphalangeal joint in hyperextension
- DIP must remain in continuous extension for 6–8 weeks

FINGER SPLINTS

INDICATION
- Phalanx fractures
- Tendon repairs

CONSTRUCTION
- Splint across fractured phalanx or repaired tendon

APPLICATION
- If tendon repair: splint in flexion or extension, depending on tendon repaired

POSTERIOR KNEE SPLINT

INDICATIONS
- Patients with legs too large for knee immobilizer
- Angulated fractures
- Injuries that require urgent operative fixation

CONSTRUCTION
- Start just inferior to buttocks crease
- Down the posterior leg
- End approximately 6cm above the malleoli

APPLICATION
- Slightly flexed knee

POSTERIOR ANKLE & STIRRUP SPLINTS

INDICATIONS
- Grade 2–Grade 3 ankle sprains
- Fractures of distal fibula and tibia
- Reduced ankle dislocations
- Can add stirrup splint for unstable ankle fractures

CONSTRUCTION—POSTERIOR ANKLE
- Start at plantar surface of the metatarsal heads
- Extend up posterior leg
- End at the level of the fibular head

CONSTRUCTION—STIRRUP
- Laterally, start 3–4cm below the level of fibular head
- Extend under the plantar surface of foot
- End at medial and lateral side of leg to just below fibular head

APPLICATION
- Place with the patient in the prone position
- Ankle at 90°
- Place posterior ankle splint first

SPLINTING COMPLICATIONS

- Compartment syndrome
- Ischemia
- Neurologic injury
- Thermal injury
- Pressure sores, skin breakdown
- Infection
- Dermatitis
- Joint stiffness

RESOURCES

Boyd A, Benjamin H, Asplund C. Principles of Casting and Splinting. *Am Fam Physician*. 2009 Jan 1;79(1):16–22.

Eiff MP, Hatch RL. Fracture Management for Primary Care. Philadelphia, PA: Elsiver/Saunders, 2012.

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