

Procedures: Splinting



NORTHWESTERN EM ORTHO CURRICULUM

Indications for Splinting



- Acute arthritis, including acute gout
- Severe contusions and abrasions
- Skin lacerations that cross joints
- Tendon lacerations
- Tenosynovitis
- Puncture wounds/bites to the hands, feet, and joints
- Fractures and sprains
- Reduced joint dislocations

Splinting Equipment



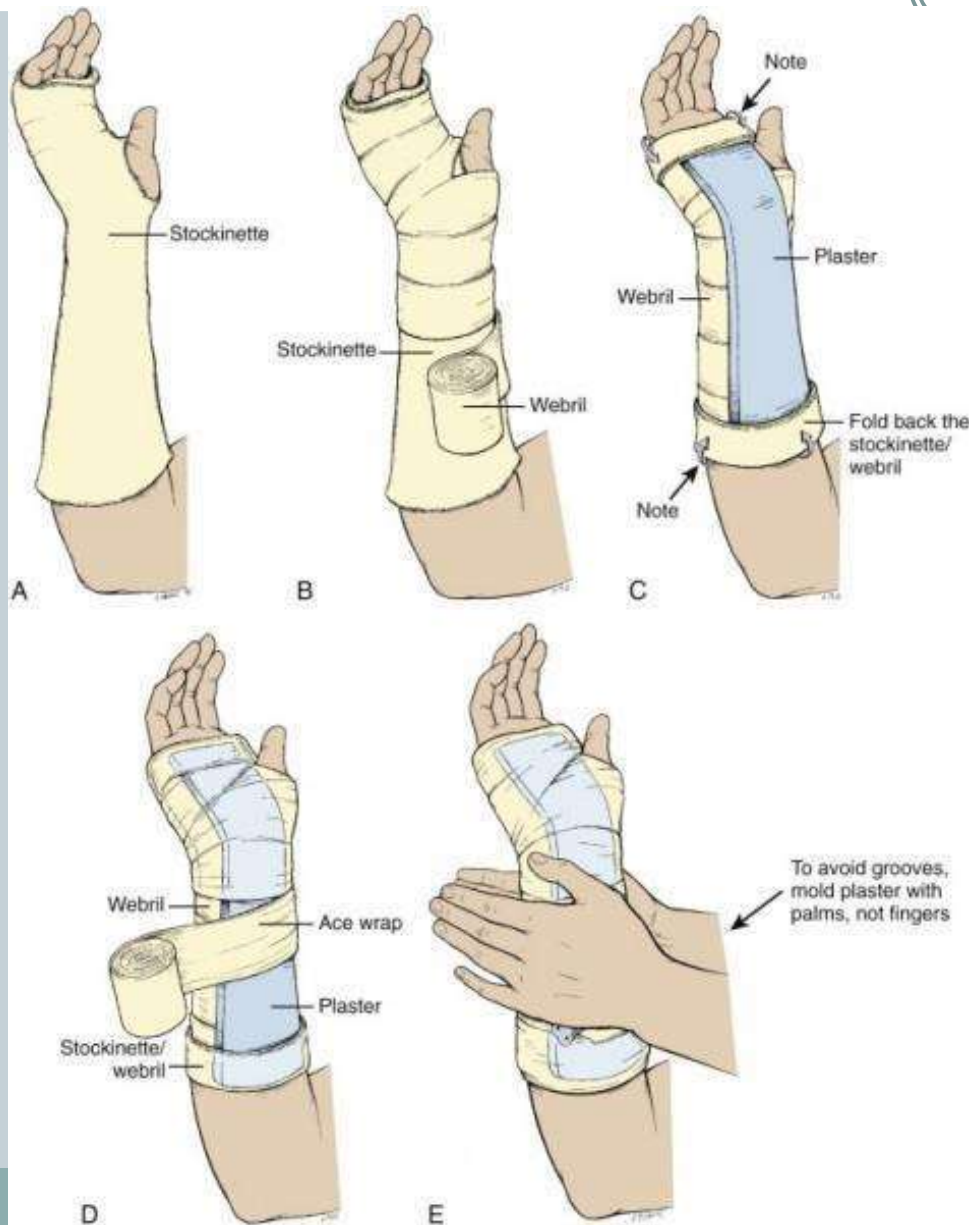
- Stockinette
- Splinting material
 - Plaster of Paris (at NMH)
 - ✦ Strips or rolls (2-, 3-, 4- or 6-inch widths)
 - Prefabricated Splint Rolls
 - ✦ Plaster
 - ✦ Fiberglass with polypropylene padding (at CMH)
- Padding (Webril)
- Ace Wrap
- Bucket/receptacle of warm water
- Trauma sheers

Plaster Preparation



- **Length:** Measure out the dry splint at the extremity to be splinted
 - remember the plaster shrinks slightly when wet, if too long, the ends can be folded back
 - Use plaster width that is slightly greater than the diameter of the limb
 - Can be measured on the contralateral extremity to avoid excessive manipulation of the injured extremity
- **Thickness:**
 - UE: 8-10 layers
 - LE 10-12 layers

General Splinting Procedure



- 1) Stockinette is applied
- 2) Webril is applied
- 3) The wet plaster is positioned
- 4) Elastic bandage is applied
- 5) The plaster is molded

General Splinting Procedure



- Measure and prepare the plaster
- Apply the stockinette so that it extends 2 or 3 inches beyond the plaster
- Apply 2 or 3 layers of Webril over the area to be splinted
 - Be generous
 - Avoid wrinkles
 - Place extra padding around bony prominences
 - Place Webril between digits that are going to be splinted to avoid maceration
- Wet the plaster and place it over the area to be splinted
 - Submerge the premeasured plaster in unused warm water
 - Remove the splint from the water and squeeze out the excess water and remove wrinkles
- Fold the ends of stockinette over the the plaster to smooth the edges of the splint

General Splinting Procedure (cont'd)



- Place a layer of Webril over the plaster
- Apply the ace wrap around the splint to secure it in place
 - Unwrap the bandage without placing too much tension around the extremity
- While still wet, mold the plaster to conform to the shape of the extremity
 - Use the palms of your hand rather than the fingers
- Place the patient's extremity in the position desired
 - Keep the patient still until the splint has dried and hardened (the plaster will become warm as it's drying)
 - Fast-drying: 5-8 minutes
 - Extra-fast drying: 2-4 minutes
- After the splint has dried, check the splinted extremity for function, arterial pulse, capillary refill, temperature of skin, and sensation

Specific Splints



Upper Extremity

- Long arm posterior splint
- Double sugar tong splint
- Volar splint
- Sugar tong splint
- Thumb spica splint
- Ulnar gutter splint
- Radial gutter splint
- Finger splints

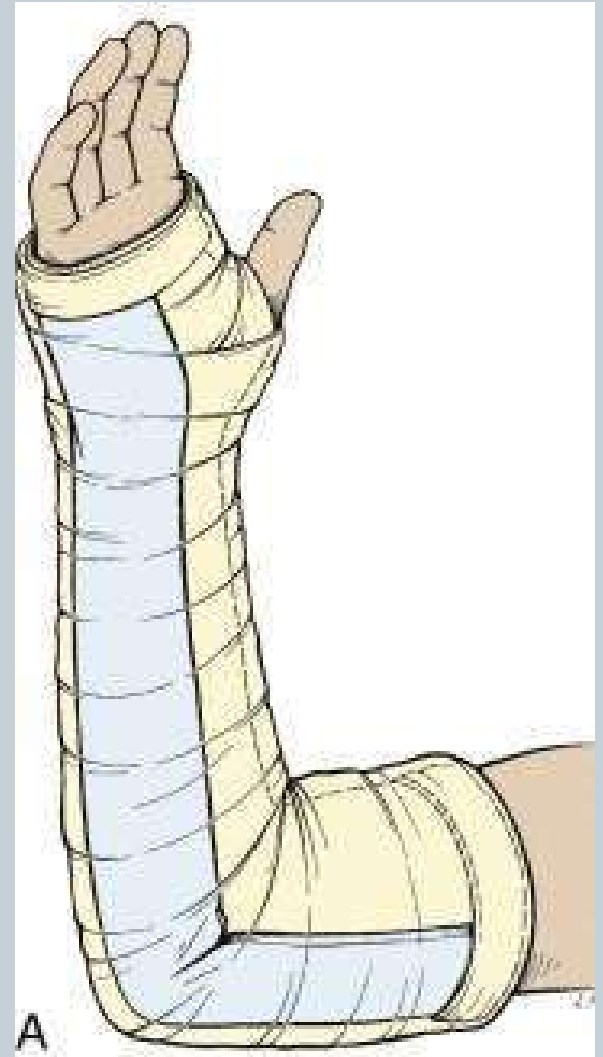
Lower Extremity

- Posterior knee splint
- Jones compression dressing
- Posterior ankle splint
- U-splint/stirrup splint

Long Arm Posterior Splint



- **Indications**
 - Injuries of the elbow and proximal forearm
- **Construction**
 - Starts on the posterior aspect of the proximal arm
 - Down the ulnar aspect of arm
 - Ends at the MCP joints
- **Application/Positioning**
 - Cut hole in stockinette for thumb
 - Elbow at 90 degrees
 - Forearm neutral position with thumb up
 - Neutral or slightly extended wrist (10 -20 degrees)



Double Sugar Tong



- **Indications**

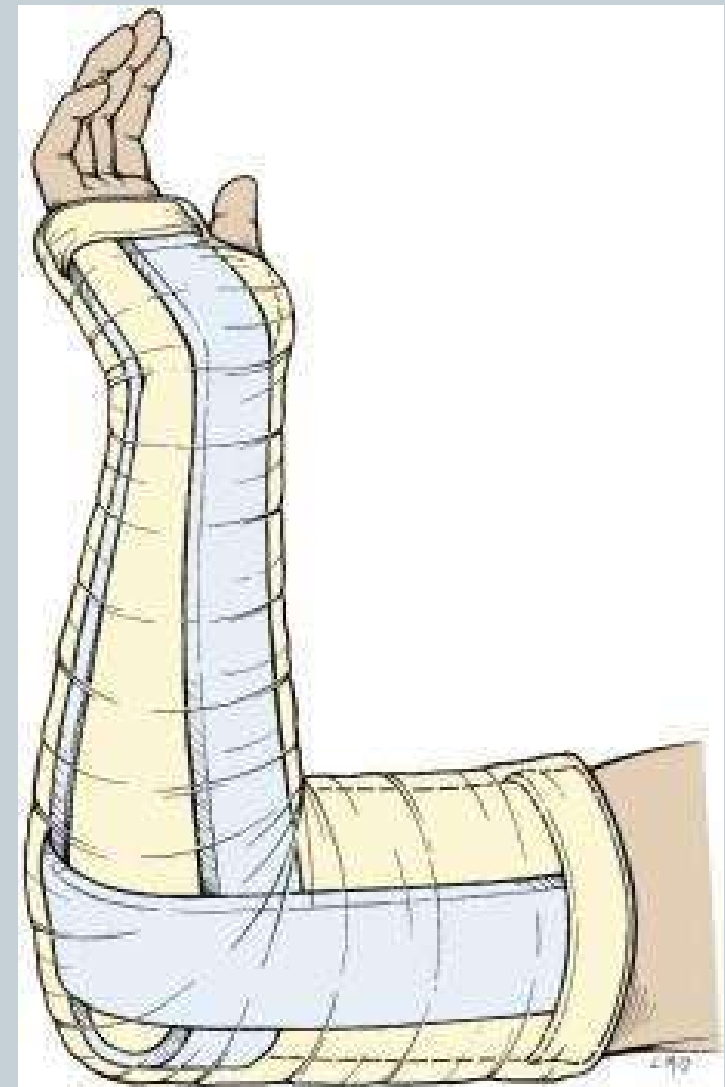
- Complex and unstable forearm and elbow fractures

- **Construction**

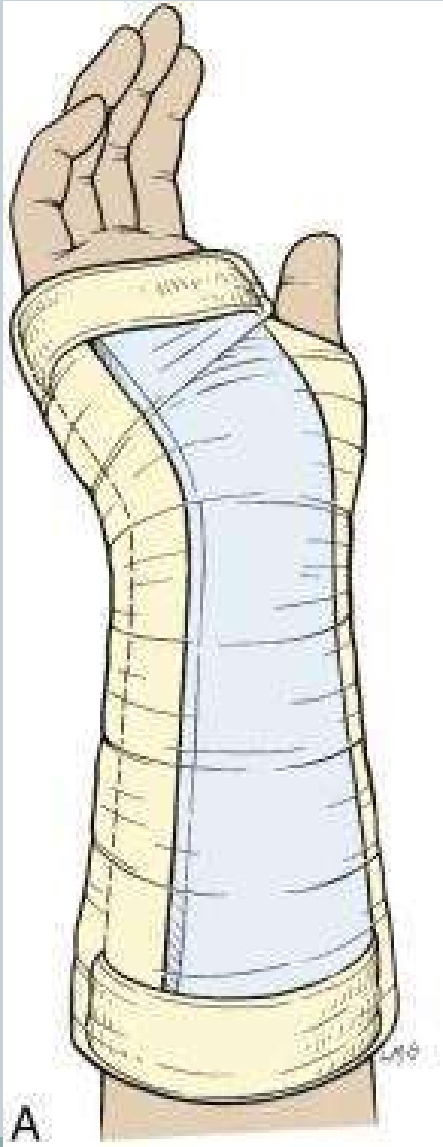
- Forearm splint – from MC heads on the dorsal hand, around elbow to volar MCP joints
- Arm splint – from anterior proximal humerus, around elbow, to posterior arm to prox humerus

- **Application/Positioning**

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



Volar Splint



- **Indications**

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

- **Construction**

- Starts in the palm at the MC heads, down the volar aspect of forearm to distal forearm

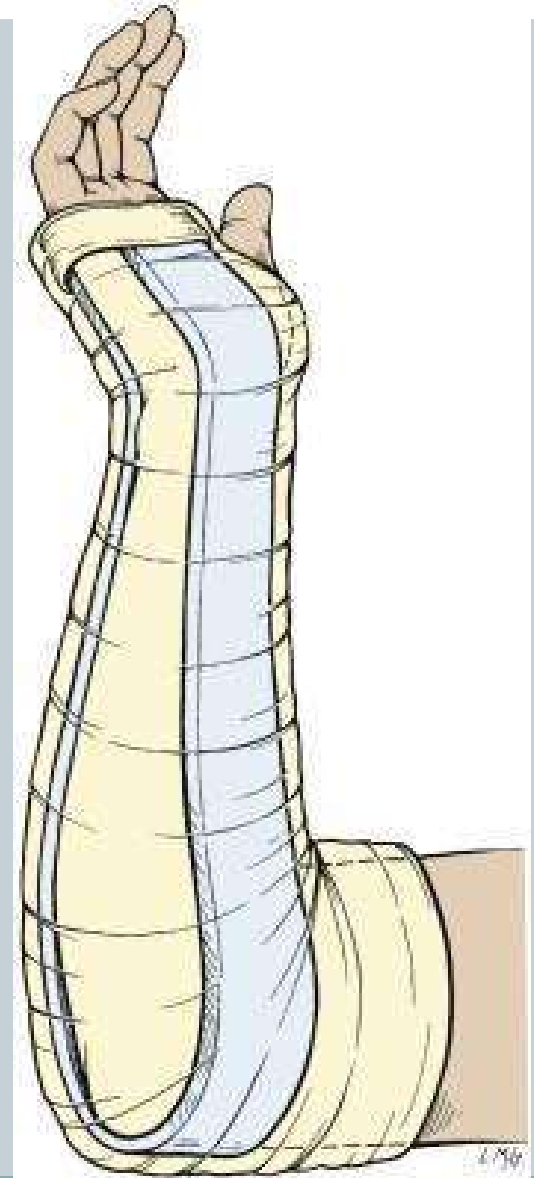
- **Application/Positioning**

- Cut hole in stockinette for thumb
- Forearm in neutral position with thumb up
- Wrist slightly extended (10-20 degrees)

Sugar Tong Splint



- **Indications**
 - Distal radius and ulna fractures
- **Construction**
 - From MC heads on the dorsal hand, around elbow to volar MCP joints
- **Application/Positioning**
 - Cut hole in stockinette for thumb
 - Elbow at 90 degrees
 - Forearm neutral with thumb up
 - Slightly extended wrist (10 -20 degrees)



Thumb Spica Splint

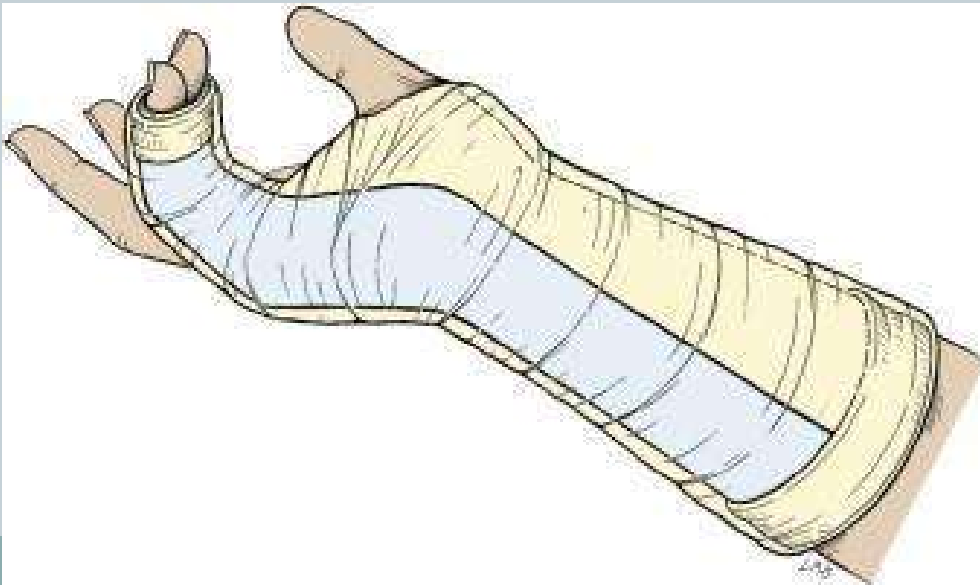


- **Indications**
 - Injuries to scaphoid, lunate, thumb and 1st metacarpal
 - Gamekeeper's thumb
 - De Quervain tenosynovitis
- **Construction**
 - From just distal to the interphalangeal joint of thumb to mid-forearm
- **Application/Positioning**
 - Cut hole in stockinette for thumb
 - Forearm in neutral 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**

- Starts at mid-forearm, runs along ulnar aspect of forearm to just beyond the DIP joint
- Include the 4th and 5th digits

- **Application/Positioning**

- Forearm in neutral
- Slight wrist extension (10-20 degrees)
- PIP and DIP joints 10-15 degrees of flexion
- 50 degrees of flexion of MCP joints
- If Boxer's fracture -> MCP joint flexed to 90 degrees

Radial Gutter Splint

- **Indications**

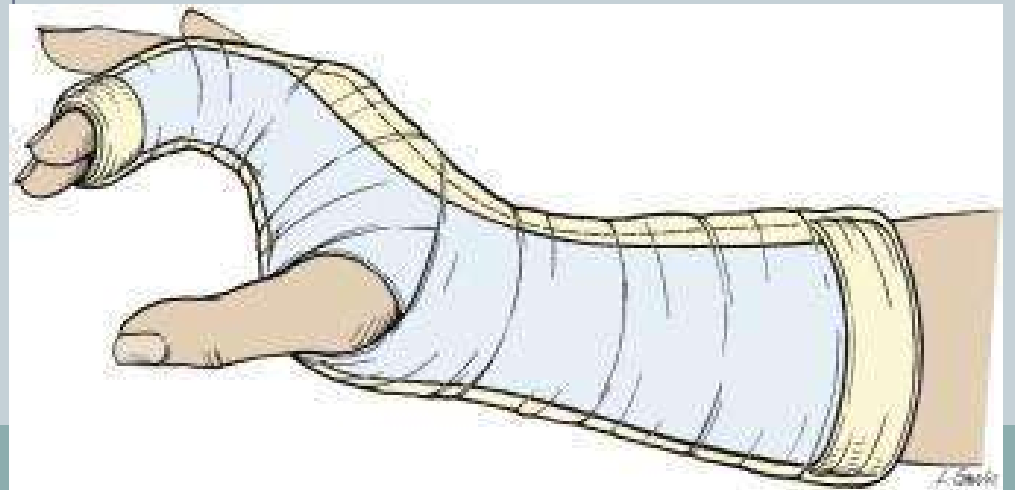
- Fractures and soft tissue injuries of index and 3rd digits
- Fractures of the neck, shaft and base of the 2nd and 3rd metacarpals

- **Construction**

- Starts at mid-forearm, down the radial aspect of forearm to just distal to the DIP joint of 2nd and 3rd digits

- **Application/Positioning**

- Cut hole in stockinette and plaster for the thumb
- Hand in position of function
- Forearm in neutral position
- Wrist slightly extended
- MCP 50 degrees of flexion
- PIP and DIP joints 5 to 10 degrees of flexion



Finger Splints

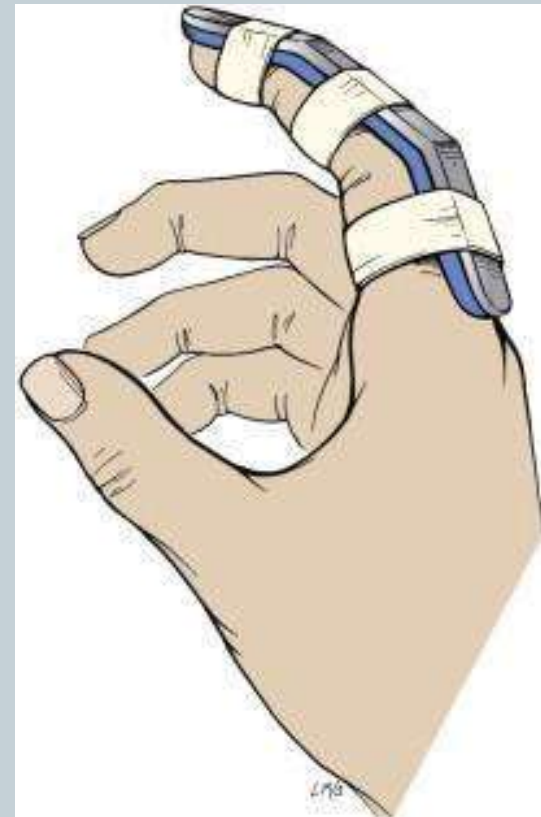
- Buddy tape

- Indications: minor finger sprains



- Aluminum finger splints

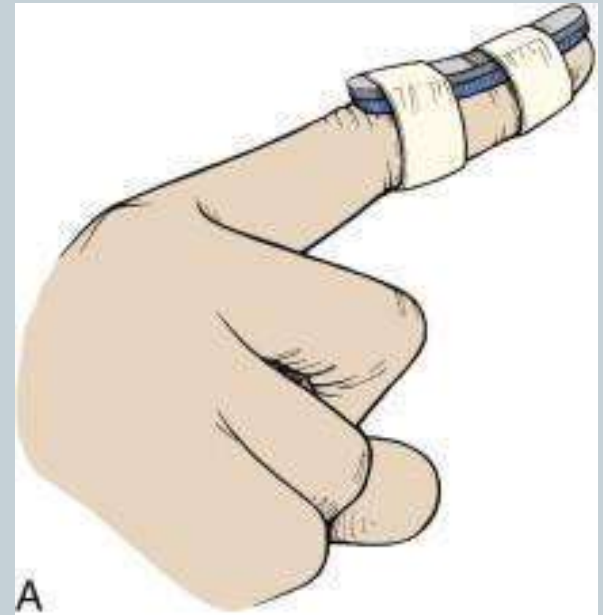
- Phalanx fractures
- After tendon repairs



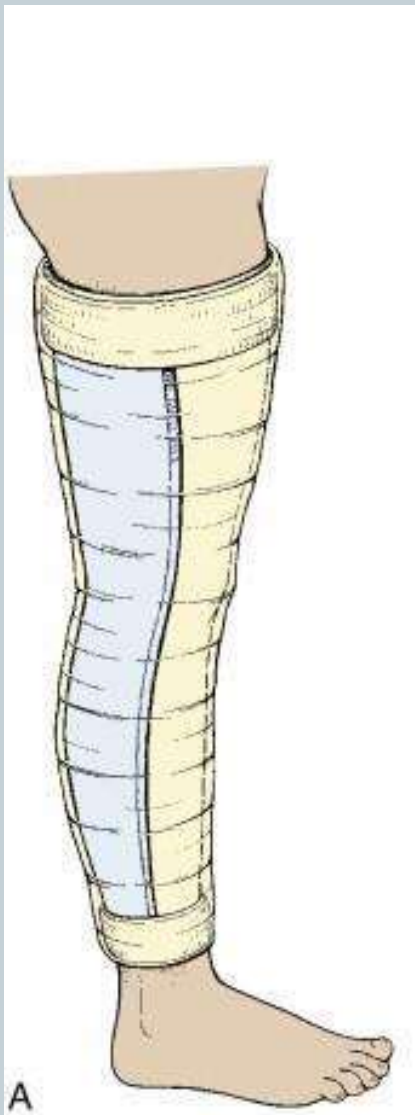
Finger Splints for Mallet Finger



- Indication
 - Mallet Finger
- Construction
 - Splint only the DIP joint
- Application/Positioning
 - Splint DIP joint in hyperextension
 - Cannot be removed for 6-8 weeks



Posterior Knee Splint



- **Indications**
 - Patients with legs too large for knee immobilizer
 - Angulated fractures
 - Injuries that require urgent operative fixation
- **Construction**
 - Starts just below buttocks crease on dorsal aspect of leg to 5 to 8 cm above the malleoli
- **Application/Positioning**
 - Slightly flexed knee (especially in kids so they don't bear weight)

Jones Compression Dressing



- **Indications**

- Short-term immobilization of soft tissue injuries of knee
- Not for injuries that require strict immobilization

- **Construction**

- Webril and Ace wrap from the groin to a few inches above the malleoli
- 2 to 3 layers of webril

- **Application**

- Slight flexion of the knee

Posterior Ankle Splint (Post Mold)



- **Indications**

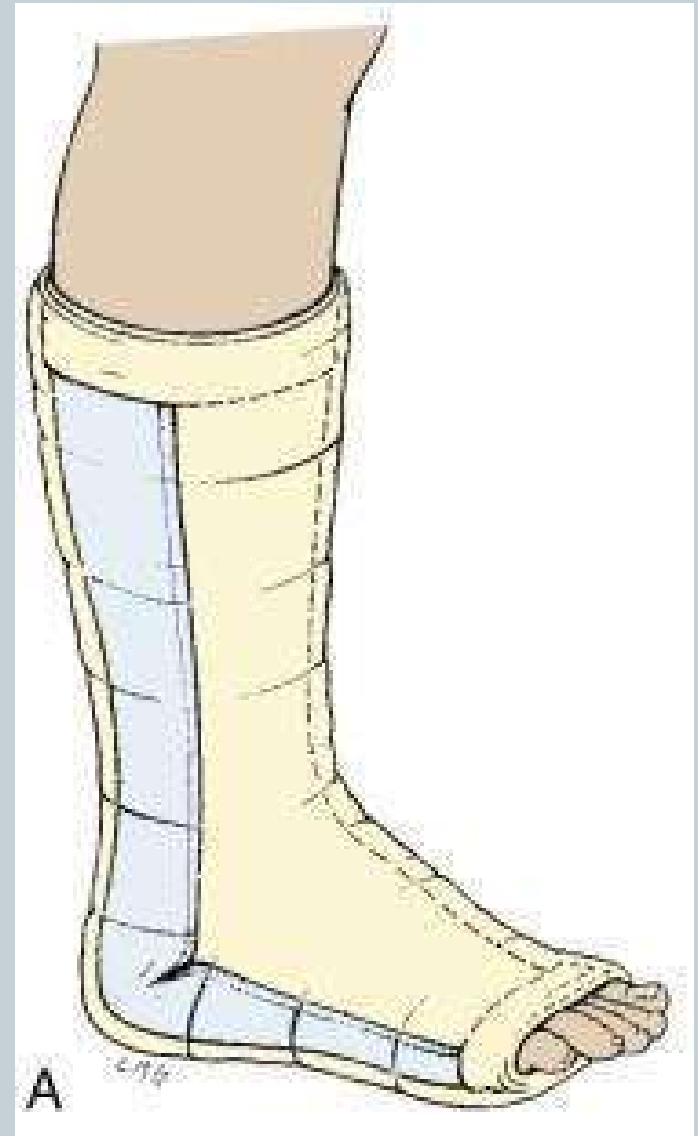
- Severe ankle sprains
- Fractures of distal fibula and tibia
- Reduced ankle dislocations
- Can add stirrup splint for unstable ankle fractures

- **Construction**

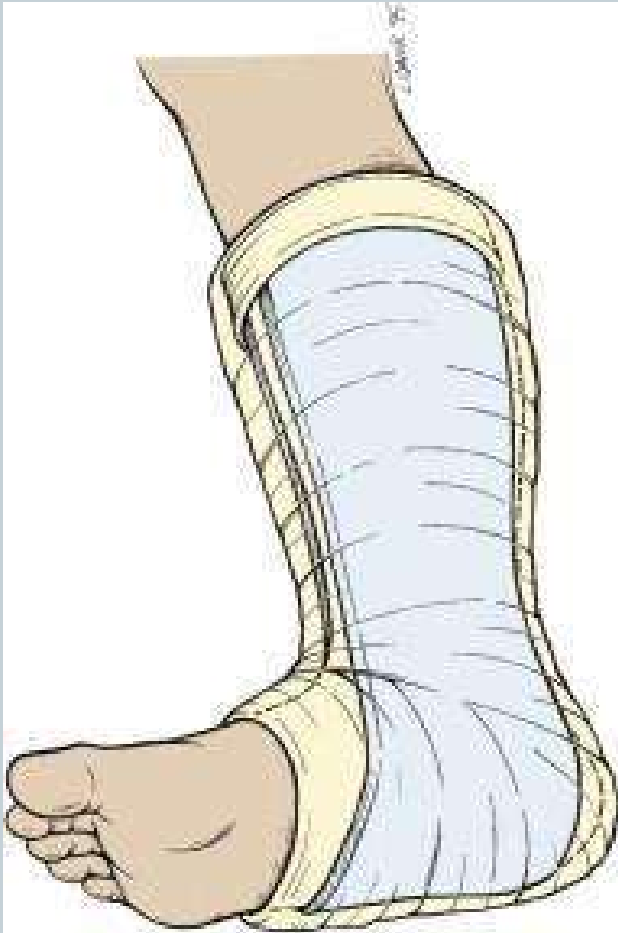
- From plantar surface of the metatarsal heads to the level of the fibular head posteriorly

- **Application/Positioning**

- Most easily applied in the prone position
- Ankle to 90 degrees



U-Splint/Stirrup Splint



- **Indications**

- Severe ankle sprains
- Fractures of distal fibula and tibia
- Reduced ankle dislocations
- Can be added to post mold for unstable ankle fracture

- **Construction**

- Passes under the plantar surface of foot and extends up medial and lateral sides of leg to just below level of fibular head

- **Application/Positioning**

- Most easily applied in the prone position
- Ankle to 90 degrees
- If placed with post mold, place post mold first