Humerus Splint

“Coaptation Splint” or “U Splint”

Indications:
- Mid-shaft and some distal humeral shaft fractures
- Do not use a coaptation splint if the splint edges will end near the fracture site.

Alternatives: (choice depends upon the forces needed for the individual fracture)
- For mid- or distal humeral shaft fractures, or fractures with a radial nerve palsy, a long arm posterior splint works well.
- For mid-shaft humerus fractures, there are pre-made fracture braces.
- For proximal humerus fractures, use a sling or shoulder immobilizer with or without a pre-made humeral fracture brace.

Step #1: Positioning Patient and Applying Stockinette
- Patient sits up tall and relaxes arm so that the humerus hangs straight down.
- Assistant holds hand to keep elbow at 90° and thumb oriented vertically.
- Palpate medial sided of upper arm to assess position of fracture fragments.
- Use 4” stockinette for most adults.
- Make a transverse cut (or a “T” or a “+”) anterior to the antecubital fossa to prevent wrinkles and relieve tension.

Step #2: Padding (for comfort and to prevent skin breakdown at elbow)
- Lay on (do not stretch) 3 - 5 layers of cast padding. No wrinkles.
- Pad well close to the axilla and over the bony prominences of the elbow, especially medially over the ulnar nerve.
- Patients with vascular disease (e.g., diabetics) need extra padding.
- Avoid any tension in the antecubital fossa.

Step #3: Applying Splint Material
- Use 4” for most patients.
- Cut the splint material twice the length of the intended splint.
- Pull splint covering out beyond the rough fiberglass edges.
- Don’t submerge fiberglass. Just spray lightly with H₂O.
- Do not allow the medial end of splint to encroach into the axilla.

Step #4: Folding the Ends of the Stockinette
- Make sure that the padding folds over the edges of the splint.
- Do not allow the stockinette to cut into the antecubital fossa.

Step #5: Wrapping
- Wrap with an elastic (“Ace”) bandage.
- Apply very little tension. There should be no compression.
- The splint should not feel tight to the patient.
- Resist the tendency to wrap tightly. Instead, mold the splint to hold the humerus straight.
- The humerus does not need to be perfectly straight.
- Instruct patient to unwrap and re-wrap more loosely if splint becomes too tight.
- Discharge the patient in a sling.
Long Arm Posterior Splint

Indications:
- Significant elbow fractures
- Supracondylar fractures, in consultation with an orthopedist due to the high risk of neurovascular injuries
- Unstable mid- or distal humeral shaft fractures
- Post-reduction stabilization of elbow dislocations

Alternatives:
- Literature supports treating simple, stable post-reduction elbows with just a sling.
- Most minor elbow fractures can also be treated with only a sling.
- Humeral shaft fractures may be more comfortable in a coaptation splint.

Step #1: Positioning Patient and Applying Stockinette
- Keep elbow at 90° and thumb vertical.
- Use 4" stockinette for most adults
- Cut a hole in the stockinette for the thumb.
- Make a transverse cut (or a “T” or a “+”) anterior to the AC fossa to prevent wrinkles and relieve tension.

Step #2: Padding (for comfort and to prevent skin breakdown & fracture blisters)
- Lay on (do not stretch) 3 - 5 layers of cast padding. No wrinkles.
- Pad especially well over the fracture and bony prominences.
- Patients with vascular disease (e.g., diabetics) need extra padding.
- Distally, end the padding at the palmar crease.
- Avoid any bulk or tension in the antecubital fossa.

Step #3: Applying Splint Material
- Use 3" for most patients.
- Pull splint covering out beyond the rough fiberglass edges.
- Don’t submerge fiberglass. Just spray lightly with H₂O.
- The splint material “spirals” from posterior at upper arm to volar on wrist & hand.
- Splint the wrist in extension in all patients, but especially those who have sustained a radial nerve palsy.
- Fold the palm edge of splint slightly diagonally to expose palm crease.
- Cut away the folded corner to expose the thenar eminence.

Step #4: Folding the Ends of the Stockinette
- Cut another thumb hole for the folded stockinette.
- Make sure that the padding folds around the edges of the fiberglass.
- Make sure that the palmar crease and thenar eminence are completely exposed.

Step #5: Wrapping
- Wrap with an elastic (“Ace”) bandage.
- A 360° twist through the web space will keep the same wrapping surface outward (for instance, if the Ace bandage has integrated Velcro at the end).
- Apply very little tension. There should be no compression.
- The splint should not feel tight, especially over the AC fossa and carpal tunnel.
- Enlarge the thumb holes. Patient should be able to oppose all fingers to thumb.
- Instruct patient to unwrap and re-wrap more loosely if splint becomes too tight.
- Discharge patient in a sling.
Long Leg Splint

Indications:
- Tibial shaft fractures

Suitable for a patient who will be...
- admitted for surgery or to watch for compartment syndrome.
- discharged with careful instructions (e.g., toddlers with minimal tibial displacement).
- non-weight-bearing.
- prevented from removing the splint at home.

Alternatives:
- For a plateau fracture in a patient with good skin and vascular status, consider a long, hinged, knee brace, to use non-weight-bearing.

Step #1: Positioning Patient and Applying Stockinette
- Use strict vigilance throughout procedure to keep the ankle at a neutral 90° to prevent calf shortening. Sedate if needed.
- Bending the knee to 45 - 60° and allowing the toes to flex will both help in allowing the ankle to dorsiflex to neutral.
- If patient will be ambulating, a 60° knee bend allows swing-through.
- To prevent rotational deformity, align 2nd toe with tibial tuberosity.
- Okay to leave tibia shortened. Lax compartments have more volume.
- At this point, stockinette should extend almost all the way up the thigh.
- Make a transverse cut (or a “T” or a “+”) anterior to the ankle and behind the knee to prevent wrinkles and relieve tension.

Step #2: Padding (for comfort and to prevent skin breakdown & fx. blisters)
- Lay on (do not stretch) 3 - 5 layers of cast padding. No wrinkles.
- Pad more over the fracture, over and around bony prominences, and posterior to the malleoli and the calcaneus.
- Patients with vascular disease (e.g., diabetics) need extra padding.
- Proximally, the padding should extend 3/4 of the way up the thigh.

Step #3: Applying Fiberglass or Plaster Splint Material
- Typical adult widths: 4” for the posterior piece; 3” for the stirrup.
- Pull splint covering out beyond the rough fiberglass edges.
- Option: stripping the padding from the fiberglass or plaster roll will make the other layers to stick to it and may strengthen the splint.
- Submerge plaster in water, then wring it dry in a towel.
- Don’t submerge fiberglass. Just spray it lightly with H2O.
- The posterior splint material should reach 2/3 of the way up the thigh.
- The stirrup should extend proximal to the tibial plateau to stabilize the tibia.
- Heel corner can be flared out or folded, but not pushed in, because that could create a pressure point.
- Use flat palm to push on ball of foot (not toes) to keep ankle neutral.
- If being admitted, expose toes so that during the night the big toe can be flexed (passive stretch) to assess for compartment syndrome.
- Continue to keep the 2nd toe aligned with the tibial tuberosity.

Step #4: Folding the Ends of the Stockinette

Step #5: Wrapping
- Wrap w/ bias-cut cotton (for admission) or “Ace” bandage (for discharge).
- Apply very little tension. There should be almost no compression.
- The splint should not feel tight to the patient.
**Reverse Sugar Tong Splint**

**Indications:** (same as for a standard sugar tong splint)
- Temporary pre-op comfort for Galeazzi fx. or radial/ulnar shaft fractures
- To inhibit pronation and supination

**Alternatives:**
- Use a molded, short arm splint (i.e., elbow free) for most distal radius fractures.
- Use a pre-made wrist brace for stable, minimally angulated radial torus fractures.

**Step #1: Positioning the Patient**
- Keep wrist in functional extension to prevent shortening of finger flexors.
- Apply 3-point pressure to radius if holding a fracture reduction.
- Keep elbow at 90°.

**Step #2: Applying Stockinette**
- 3" for most adults; 4" for large adults
- Cut a hole for the thumb.
- Make a transverse cut (or a “T” or a “+”) anterior to the AC fossa to prevent wrinkles and relieve tension.

**Step #3: Padding** (for comfort and to prevent skin breakdown & fx. blisters)
- Lay on (do not stretch) 3 - 5 layers of cast padding. No wrinkles.
- Pad especially well over the fracture and bony prominences.
- Patients with vascular disease (e.g., diabetics) need extra padding.
- Distally, end the padding at the palmer crease.
- Proximally, cover the distal triceps area well.
- Avoid any bulk or tension in the antecubital fossa.

**Step #4: Applying Splint Material**
- Use 3" for most patients. Cut material well over twice the length of the intended splint.
- Cut the piece into two slightly unequal lengths, connected by a bit of fabric at one edge that will traverse the web space.
- Pull splint covering out beyond the rough fiberglass edges.
- Don’t submerge. Just spray lightly with H2O.
- Fold the palm edge slightly diagonally to expose palmer crease.
- Cut away a triangle to expose the thenar eminence.
- Splint material can rest above the humeral epicondyles.
- Wrap the “tails” around the posterior elbow.

**Step #5: Folding the Ends of the Stockinette**
- Cut another thumb hole for the folded stockinette
- Make sure that the padding folds over the edges of the splint.
- Make sure that the palmer crease is completely exposed.
- Again, do not allow the stockinette to cut into the antecubital fossa.

**Step #6: Wrapping**
- Wrap with either bias-cut cotton or an elastic bandage.
- A 360° twist through the web space will keep the same wrapping surface outward (for instance, if elastic bandage has integrated Velcro at the end).
- Apply very little tension. There should be no compression.
- The splint should *not feel tight* to the patient, especially over carpal tunnel.
- If holding an unstable radius fracture, *do not wrap tighter*. Instead, mold the splint to create gentle 3-point pressure to the radius as in step #1.
- Enlarge the thumb holes. Patient should be able to oppose all fingers to thumb.
- Instruct patient to unwrap and re-wrap more loosely if splint becomes too tight.
- Discharge the patient in a sling.
Short Arm Splint
“Dorsal-Volar” or “Short Reverse Sugar Tong” or “Double Slab”

Indications:
• Distal radius fractures, stable or unstable
• Non-scaphoid carpal fractures

Alternatives:
• Off-the-shelf wrist brace for torus fractures of distal radius

Step #1: Positioning Patient
• A distal radius fx. causing a median nerve deficit must be reduced.
• Keep wrist in extension to prevent shortening of finger flexors.
• Apply 3-point pressure to radius if holding an unstable distal radius fracture.
• Keep elbow at 90° to keep splint from encroaching into antecubital fossa.

Step #2: Applying Stockinette
• 2” for children; 3” for most adults
• Cut a hole for the thumb.

Step #3: Padding (for comfort and to prevent skin breakdown & fx. blisters)
• Lay on (do not stretch) 3 - 5 layers of cast padding. No wrinkles.
• Pad especially well over the fracture and bony prominences.
• Patients with vascular disease (e.g., diabetics) need extra padding.
• Distally, end the padding at the palmer crease.
• Proximally, extend to the AC fossa while the elbow is at 90°.

Step #4: Applying Splint Material
• Use 3” for most patients. Cut to twice the length of the intended splint.
• Cut into two slightly unequal lengths, bridged by a bit of fabric at one edge that will cross the web space.
• Because of the wrist extension, the longer piece will be volar.
• Pull splint covering out beyond the rough fiberglass edges.
• Don’t submerge. Just spray lightly with H2O.
• Fold palm edge slightly diagonally to expose palmer crease.
• Cut away a triangle to expose the thenar eminence.

Step #5: Folding the Ends of the Stockinette
• Cut another thumb hole for the folded stockinette
• Make sure that padding folds around the edges of the splint.
• Make sure that the palmer crease is completely exposed.
• Make sure the AC fossa is free even with the elbow bent.

Step #6: Wrapping
• Wrap with an elastic (“Ace”) bandage.
• Make a 360° twist through the web space with the Ace wrap.
• Apply very little tension. There should be no compression, especially over the carpal tunnel.
• Even if holding an unstable fracture, do not wrap more tightly. Instead, mold the splint to create gentle 3-point pressure to the radius as in step #1.
• Enlarge the thumb holes. Patient should be able to oppose all fingers to thumb.
• Instruct patient to unwrap and re-wrap Ace more loosely if splint becomes too tight.
Short Arm Thumb Spica Splint

Indications:
- Traumatic snuff box tenderness until follow-up
- Scaphoid fracture awaiting casting or ORIF
- UCL tear (skier’s thumb)
- DeQuervain’s tenosynovitis

Alternatives:
- For a patient with good vascular and skin status, consider a pre-made thumb spica brace instead of a custom splint.
- For scaphoid fractures, a thumb spica cast can also be used, if applied carefully to a reliable patient and discharged with good instructions.

Step #1: Positioning Patient
- Align thumb with the radius. This keeps the wrist in slight extension.
- Keep wrist in functional extension to prevent shortening of finger flexors.
- Thumb spica splints do not normally need stockinette or padding.

Step #2: Applying Splint Material
- Use 3” splint material for most patients.
- Stay well out of the antecubital fossa.
- Pull splint covering out beyond the rough fiberglass edges.
- Don’t submerge. Just spray lightly with H₂O.

Step #3: Wrapping
- Wrap with 3” elastic (“Ace”) bandage, starting at thumb and spiraling proximally.
- If the patient has a short thumb, the first few turns can be made with the bandage folded lengthwise.
- Wrap in the direction that has the bandage crossing the back of the hand when it leaves the thumb. That will prevent the creation of a pocket of elastic bandage over the palm.
- Apply very little tension. There should be no compression.
- The splint should not feel tight to the patient.
- The wrap only needs to be tight enough to hold the splint to the forearm. The rigidity of the splint (not a tight wrap) stabilizes the thumb and wrist.
- Instruct the patient to unwrap and re-wrap more loosely if splint becomes too tight.
Short Leg Splint

Indication:

• Ankle fracture(s) with disrupted mortice

Suitable for a patient who will be...

• admitted. Or...
• discharged with careful instructions and prompt follow-up.
• non-weight-bearing or “toe touch,” not full weight-bearing.
• prevented from removing the splint at home.

Alternatives:

• For a single, isolated, minimally-displaced fracture (e.g., lateral malleolus with no medial disruption) in a patient with good skin and vascular status, consider a pre-made walking boot instead of a custom splint.

Step #1: Positioning Patient and Applying Stockinette

• Patient may be prone or supine.
• Use strict vigilance throughout procedure to keep the ankle at a neutral 90° to prevent calf shortening.
• Sedate prn.
• Bend the knee to 90° to allow the ankle to dorsiflex to neutral.
• Align 2nd toe with tibial tuberosity to prevent rotational deformity.
• Stockinette is cosmetic. May omit if patient is being admitted.
• Make a transverse cut (or a “T” or “+”) in the stockinette anterior to the ankle to prevent wrinkles and to relieve tension.

Step #2: Padding (for comfort and to prevent skin breakdown & fx. blisters)

• Lay on (do not stretch) at least 5 layers of cast padding. No wrinkles.
• Fill in the hollow places behind the malleoli.
• Pad more over the fracture and over and around bony prominences.
• Proximally, extend just over the bulge of calf but not into the popliteal fossa even with knee fully flexed.

Step #3: Applying Splint Material

• Typical widths: 3 - 4” for the posterior piece; 3” for the stirrup.
• Pull splint covering out beyond the rough fiberglass edges.
• Don’t submerge fiberglass. Just spray lightly with H₂O.
• Laterally, splint material should not reach the fibular neck & peroneal nerve.
• Posteriorly, splint material should not reach the popliteal fossa.
• Distally, splint should reach the end of the toes if pt. will be discharged.
• The heel corner can be flared out or folded, but not pushed in, which might create a pressure point.
• Edges of splint should touch without overlapping, to avoid pressure points.
• Use flat palm to push on ball of foot (not toes) to keep ankle neutral.

Step #4: Folding the Ends of the Stockinette

Step #5: Wrapping

• Wrap w/ bias-cut cotton (if in-patient) or “Ace” elastic wrap (if discharge).
• Apply very little tension. There should be very little compression.
• The splint should not feel tight to the patient.