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98.1 Indications

- Need for immobilization for fracture, dislocation, or soft tissue injury
- Suspicion for occult injury of an extremity
- Immobilization for pain management

98.2 Contraindications

- Absolute
 - Open fracture (requires operative intervention)
- Relative
 - Infection
 - Compartment syndrome

98.3 Materials and Medications (Fig. 98.1)

- Plaster of Paris
- Fast drying: 5–8 min to set
- Extra fast drying: 2–4 min to set
 - Variety of widths depending upon splint of choice:
 - Splints may take up to 2 days to dry and achieve maximum strength.
- Prefabricated splinting materials
 - Plaster OCL® (Orthopedic Casting Laboratories)
 - 10–20 sheets of plaster with padding and cover
 - Faster setup time but less customizable

- Fiberglass splints
 - Cure rapidly
 - Less messy
 - Less moldable
 - Stronger and lighter
- Stockinette.
 - Protects the skin.
 - Variety of sizes available.
- Soft wrap (WebriI™).
 - Provides padding.
 - Five to six layers depending on anticipated swelling.
 - Too much padding reduces the stability of the splint.
 - Use extra padding over bony prominences.
 - Pad between digits for splinting of digits.
 - Avoid wrinkles, which generate pressure points.
 - Do not wrap circumferentially.
 - Increased risk of ischemia.
- Ace wraps.
 - Variety of sizes depending.
 - Larger widths over legs.
 - Narrow widths around fingers and joints.
 - Avoid bunching by using narrow widths at joints.
- Water
 - Warm water and splint sets more quickly but increases the risk of burns.
 - Splint drying is an exothermic or heat-releasing reaction.
 - Hot water leaves less time to mold the splint.

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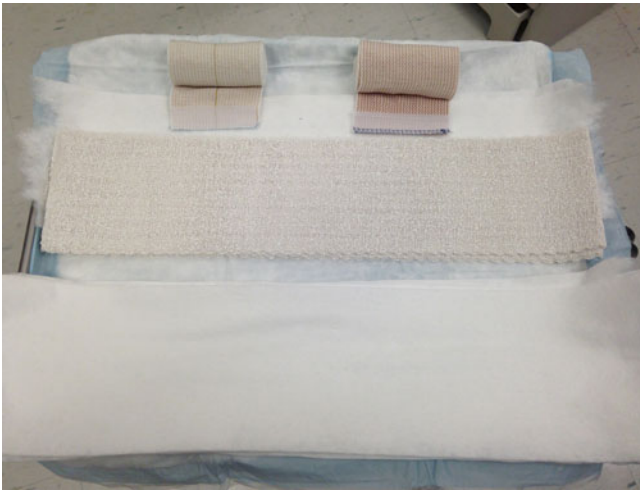


Fig. 98.1 Posterior splint materials: plaster of Paris, Ace wraps, soft roll. Note there are two layers of soft wrap: the inner layer to face the patient (eight layers) and the outer layer to pad the exterior (two layers)

98.4 Procedure

1. Completely expose and examine the afflicted body part for tissue, vascular, or neurological injury.
 - Address respective injuries before proceeding.
2. Lay out all splinting materials before initiating procedure.
 - Layer plaster of Paris.
 - Upper extremity: 8–10 layers.
 - Lower extremity: 12–15 layers.
 - Up to 20 for a large person.
 - More layers of plaster of Paris increase the risk of burn and the weight of the splint.
3. Administer appropriate anesthesia.
 - Conscious sedation
 - Hematoma block
 - Intra-articular injection
 - Intravenous pain medication
 - Oral pain medication
4. Hang fractures as indicated for improved success of reduction to relax muscles before reduction attempt.
5. Reduce afflicted extremity.
6. While maintaining reduction, apply respective splint.
7. Apply in the following order for plaster of Paris splint.
 - Stockinette (not necessary).
 - Soft wrap.
 - Select appropriate layers of plaster of Paris.
 - Prepare plaster of Paris to create splint:
 - Layer plaster with no overlap.
 - Submerge completely into water.
 - Crumple into ball without letting go of the ends of the splint.
 - Release the lower end of the splint while holding the top tightly together.
 - Run fingers in a “squeeze” manner from top to bottom to smooth the splint (Fig. 98.2).
 - This also removes excess water.
 - Repeat until the splint is smooth and free of dripping water.
 - Apply soft wrap layers to the splint.
 - Apply thicker layer to the patient’s body.
 - Apply two or three layers of soft wrap to the exterior of plaster of Paris for padding and to facilitate drying.
 - Apply Ace wrap to hold the splint and assist in contouring the splint to the patient’s extremity (Fig. 98.3).
 - Applying the Ace wrap too tightly may cause ischemia. Observe the patient after splinting for 30 min for tingling, burning, pain, or discomfort.
 - Mold the splint without making indentations with the fingertips (Fig. 98.4).
 - An indentation may cause a pressure point, which may result in an ulcer.



Fig. 98.2 Hold the top of the saturated plaster securely with one hand while removing excess water with the other hand



Fig. 98.3 Apply Ace wrap to hold the splint and assist in contouring the splint to the patient's extremity



Fig. 98.4 Hold the splint in a neutral anatomical position while taking care not to make indentations with the fingertips

- Allow the splint to cure while the practitioner maintains the appropriate position. This will take approximately 5 min depending upon water temperature and splint thickness.

98.5 Complications

- Ischemia may result in compartment syndrome.
 - Advise the patient to unwrap the splint for the following indications.
 - Increasing pain.
 - Discoloration of fingers, toes, or the splinted extremity.
 - Loss of sensation of splinted extremity.
- Burns
 - Plaster drying releases heat.
 - Increased risk with limited layers of padding.
 - If pain is troubling the patient, remove the splint and add more padding.

- Pressure sores
 - Apply ample padding.
 - Smooth all wrinkles.
 - Instruct the patient to return for increased discomfort.
- Infection
 - Clean and débride all devitalized tissue before application.
 - Requires close follow-up to reevaluate wounds.

Selected Reading

- Fitch MT, Nicks BA, Pariyadath M, McGinnis HD, Manthey DE. Basic splinting techniques. *N Engl J Med.* 2008;359:e32.
- Marx JA, Hockberger R, Walls R, editors. *Rosen's emergency medicine: concepts and clinical practice.* 7th ed. Philadelphia: Mosby; 2010.
- Simon R, Sherman S, Koenigsknecht S. *Emergency orthopedics—the extremities.* New York: McGraw-Hill; 2007.