

# Emergency Splinting

*“Applying a splint should not be a splinter”*

Edwin Smith Papyrus –loosely translated from ancient Egyptian

## GOALS

- improve pain and discomfort,
- decrease blood loss,
- reduce the risk for fat emboli
- minimize the potential for further neurovascular injury associated with

## INDICATIONS

- Fractures
- Sprains
- Reduced dislocations
- Tendon lacerations
- Deep lacerations across joints
- Painful joints associated with inflammatory disorders

## MATERIALS:

- Plaster Rolls or sheets (Plaster of Paris)
  - Strips or rolls of various width made from crinoline-type material impregnated with plaster which crystallizes or “sets” when water is added
- Prefabricated Splint Rolls (Ortho-Glass)
  - Layers of fiberglass between polypropylene padding
- Stockinette
- Cast padding
- Elastic bandages
- Adhesive tape
- Heavy scissors
- Bucket
- Protective sheets or pads to protect patient clothing
- gloves

## EDUCATION:

- Instructions should be both verbal and written to nursing staff and patient / family (if applicable)
- Importance of **elevation** to minimize swelling and decrease pain
- Apply **ice** bags or cold packs (bags of frozen vegetables also work well) for at least 30 minutes at a time during the first 24-48 hours after injury to decrease swelling and pain
- **Avoid** getting the splint **wet** –
- Explain signs of infection and vascular compromise,
- Be clear on follow-up

## PROCEDURE/TECHNIQUE:

- Prepare the patient and personnel
- - Cover patient with sheet or gown to protect clothing
  - **Inspect skin for wounds and soft tissue injuries**
  - Clean and dress wounds as usual prior to splint application
  - Consider repairing wounds as usual prior to splint application
- Padding
  - Apply stockinette if not painful for patient to extremity to extend several cm beyond edges of plaster, so that it may be folded back over the edges of the splint after plaster is applied to create a smooth edge
  - Roll on two to three layers of cast padding evenly and smoothly (but not too tight) over the area to be splinted.
  - Extend the padding out beyond the planned area to be splinted so that it can be folded back with the stockinette over the edges of plaster to create smooth edges.

- **Each turn of the webril/cast padding should overlap the previous by 25-50 % of its width.**
  - Place extra padding over bony prominences to decrease chance of creating pressure sores
  - An alternative to circumferential stockinette and cast padding is to place 2-3 layers of padding directly over wet plaster, and then apply this webril-lined splint over the area to be immobilized and secure it with an elastic bandage
- Prepare the plaster splint material
    - Ideal length and width of plaster depends on body part to be immobilized in the splint
    - Estimate the length by laying the dry splint next to the area to be splinted
    - Be generous in estimating length, the ends can always be trimmed or folded back
    - **Width should be slightly greater than the diameter of the limb to be immobilized**
    - Cut or tear the splint material to the desired length
    - Choose thickness based on body part to be immobilized, patient body size, and desired strength of splint
      - Average of 8-12 layers
      - Less layers (8-10) for upper extremities
      - More layers (12-15) for lower extremities
      - More layers may be needed for large patients
    - Fill a bucket with cool water, deep enough to immerse the splint material into
      - **Using cool water decreases the chances of thermal burns,** but takes longer for the splint to dry

- Application of the splint
  - Submerge the dry splint material in the bucket of water until bubbling stops
  - Remove splint material and gently squeeze out the excess water until plaster is wet and sloppy
  - Smooth out the splint to remove any wrinkles and laminate all layers
  - Place the splint over the webril cast padding and smooth it onto the extremity
  - An assistant (or a cooperative and willing patient) may be required to hold the splint in place while you adjust the splint
  - Fold back the edges of the stockinette and cast padding over the ends of the splint
  - Secure the splint with a bandage
  - Place the extremity in the desired position and mold the splint to the contour of the extremity using the palms of your hand. (Avoid using your fingers to mold in order to decrease indentations in the plaster which can lead to pressure sores)
  - Hold the splint in the desired position until it hardens
  
- **Check and finish the splint**
  - **Check for vascular compromise**
  - **Check for discomfort or pressure points**
  - **Apply tape along the sides of the splint to prevent elastic bandages from rolling or slipping, (avoid circumferential tape to allow for swelling)**
  - **Provide sling as needed**

## **COMPLICATIONS, Prevention & Management:**

### **Compartment Syndrome**

- Usually less common in splints than with circumferential casts
- may occur associated with splints from constricting webbril (cast padding) or elastic bandages that cause increased pressure within a closed space on an extremity
- increased pressure leads to inadequate tissue perfusion and loss of tissue (muscle, vascular and nerve) function within the compartment.
- **Presenting signs and symptoms: Know them**

#### Prevention

- avoid wrapping bandages too tightly
- NO circumferential splints
- elevate the extremity to the level of the heart
- Consult liberally

#### Pressure Sores

- Uncommon with short term splinting
- Can result from stockinette wrinkles, irregular wadding of padding, insufficient padding over bony prominences or indentions in plaster form using fingers to mold splint
- If suspected, remove the splint materials and check the skin carefully, care for wounds and revise the splint if necessary

#### Heat Injury

- can result from drying plaster which produces heat and may cause burns to underlying skin
- To reduce risk for thermal injury, use cool water to wet the splint material and keep splint thickness less than 12 sheets of plaster
- Do not put the splinted limb on plastic pillows

#### Infection

- More common with open wounds, but may occur with intact skin
- Clean and debride wounds well prior to splint application
- Consider using a removable splint for periodic wound checks

## **DOCUMENTATION FOR THE MEDICAL RECORD**

- **Note the indication for the splint**
- **Describe any wounds and their location under the splint**
- **Document the neurovascular exam findings**
- **Indicate what follow-up is planned for re-assessment of injury**

ITEMS FOR EVALUATION:

- Understands indications for splint
- Knowledge of different materials needed for splinting
- Ability to apply a functional splint which adequately immobilizes the intended part
- Understands potential complications and their prevention and management
- Explains procedure to patient and answers questions
- Proper documentation in the medical record