Brace Yourself: Orthopedic Splinting Workshop

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Who's Who?

Depending on healthcare or community demographic, splinting can be utilized in several disciplines

- Orthopedic providers
- Emergency Medicine providers
- Urgent Care providers
- Primary Care providers

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Why Splint?

- Immobilize/stabilize injuries
- Promote and expedite healing
- Prevent exacerbation of injuries
- Improve pain

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Splinting Features

- Non-circumfrential – allows for swelling to occur
- Temporary (3-5 days)
- Easily Removable – monitoring of skin conditions
- Quick application

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Which Injuries Can Be Splinted?

- Fractures
- Sprains
- Tendon injury/rupture
- Inflammation/tenosynovitis
- Soft tissue infections/cellulitis

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Consider the Mechanics

Clinical history narrows differential

\+ Understand the mechanics

Anticipate specific injury and confirm exam findings

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Radiographic Imaging

- Intended to confirm suspected mechanical injury with visualized details
  - Obvious fractures (angulation, alignment)
  - Presumed fractures based on other findings (fat pads, patterns of swelling)
  - Dislocations/subluxations
- Focus on your exam findings, which may or may not be demonstrated with plain films

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Application of Splint - Supplies

- Supplies needed
  - Cotton padding (bony prominences, between digits)
  - Cool, clean water
  - Measuring tape
  - Scissors
  - Elastic bandage
  - Splinting fiberglass material
  - Assistant
- Have ALL supplies ready before splint is applied

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Application of Splint

- Pre-splinting Checklist
  - Address all skin abnormalities (lacerations, wounds, open fractures)
  - Assess for skin tenting/prominences
  - Remove all jewelry (watches, bracelets, rings)
  - Address pain needs
  - Check neurovascular status – must document!
    - Circulation (pulses, capillary refill)
    - Motor function
    - Sensation

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Application of Splint

- Pad bony prominences and between fingers
- Cover splint edges
- Wrap extremity distal to proximal (avoid wrapping too tightly)
- Smooth splinting material with palm of hand and avoid wrinkles/ridges
- When able, splint joint above and joint below fracture

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Application of Splint

- Positioning of splint
  - Proper alignment of splint is key to promote optimal healing and prevent complications
- Position of function
  - Wrist – slight dorsiflexion with fingers flexed
  - Elbow – 90 degree flexion
  - Ankle – 90 degree flexion (one exception)

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Application of Splint - Aftercare

- Post-Splinting Checklist
  - Check and document neurovascular status
    - Circulation (capillary refill, pulses)
    - Motor
    - Sensation
  - Splint care
    - Ice/elevation
    - Keep clean and dry
    - Instruct patient to continue to monitor neurovascular status
    - Do not remove splint unless needed (wound care, compromised neurovascular status)
    - Instructions for follow-up specialty care (2-3 days)

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Upper Extremity Splints: Volar

- Stabilization against flexion/extension of wrist and MCP joints
- Indications
  - Stable distal radius and/or ulnar fractures
  - Buckle fractures
  - 2nd-3rd metacarpal fractures
  - Wrist sprains
  - Synovial infections (extensor tenosynovitis due to animal bites, puncture wounds)

https://www.ahcmedia.com/articles/140086-common-orthopedic-injuries

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Upper Extremity Splints: Volar

- Splint width:
  - Adult 3-4 inch
  - Child 2-3 inch
- Distribution
  - Palmar crease to 2 inches distal to elbow
  - Slight dorsiflexion of wrist and flexion of fingers

https://www.benecaredirect.com/products/precut-moulded-splint

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Volar Splint Application

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Upper Extremity Splints: Thumb Spica

- Indications
  - Thumb fractures
  - Thumb Dislocation (post reduction)
  - 1st metacarpal fractures
  - Navicular/scaphoid fractures
  - DeQuervain's tenosynovitis

https://blog.teamalchemist.com/2010/10/09/thumb-dislocation-and-uscm-party/

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Upper Extremity Splints: Thumb Spica

- Splint width:
  - Adult 2-3 inch
  - Child 1-2 inch
- Distribution
  - Tip of thumb around dorsal forearm to 2 inches distal to elbow on ULNAR side
  - Slight dorsiflexion of wrist

https://oboi-online.com/ass/11233.php

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Thumb Spica Application

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Upper Extremity Splints: Boxer/Ulnar Gutter

- Indications
  - Fracture of 4th or 5th metacarpal bones (Boxer's fracture)
  - Isolated ulnar styloid fracture

http://www.guildfordupperlimb.co.uk/hand/boxers-fracture

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Upper Extremity Splints: Boxer/Ulnar Gutter

- Splint width:
  - Adult 3-4 inch
  - Child 2-3 inch
- Distribution
  - Tip of 5th finger (including 4th finger) forming gutter around forearm on ulnar side to 2 inches distal to elbow
  - Slight dorsiflexion of wrist

https://www.amazon.com/3M-Scotchcast-Conformable-Splint-72335/dp/B01DME2XX2

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Boxer Splint Video

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Upper Extremity Splints: Sugar Tong

- Stabilizes against flexion/extension AND supination of wrist
- Indications
  - Colle's fractures (distal radius and ulnar fracture with dorsal displacement)
  - Unstable wrist fractures

https://health.uconn.edu/msi/clinical-services/orthopaedic-surgery/hand-and-wrist/distal-radius-fracture-colles-fracture/

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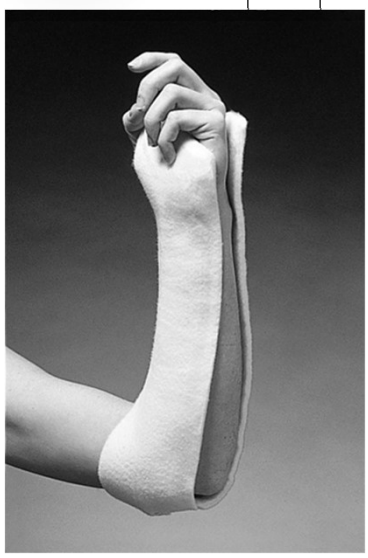
Upper Extremity Splints: Sugar Tong

- Splint width:
  - Adult 3-4 inch
  - Child 2-3 inch
- Distribution
  - Elbow flexed to 90 degrees
  - Splint from MCPs on palmar side, wrapping around elbow, to MCPs on dorsal side
  - Place extremity in sling after application of splint to prevent slippage with movement of extremity



http://www.quickmedical.com/bsn-medical-ortho-glass-splinting-system.html

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Upper Extremity Splints: Long Arm

- Indications
  - Proximal forearm fractures/radial head fractures
  - Distal humerus fractures
  - Elbow sprains

http://emedicine.medscape.com/article/824654-workup

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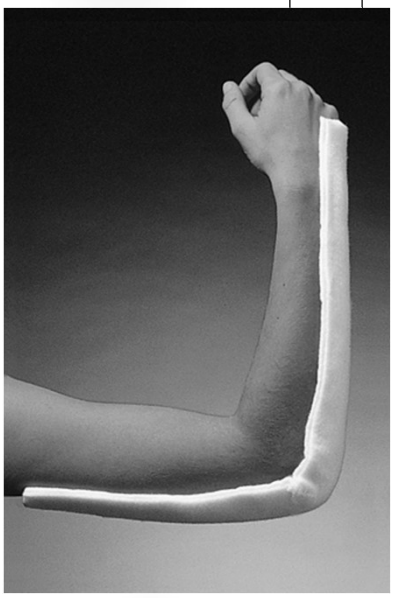
Upper Extremity Splints: Long Arm

- Splint width:
  - Adult 3-4 inch
  - Child 2-3 inch
- Distribution
  - Elbow flexed at 90 degrees
  - Splint from 5th MCP joint over ulnar aspect of forearm to 2 inches distal to axilla
  - Slight dorsiflexion of wrist
  - Place splinted extremity in sling

http://www.quickmedical.com/bsn-medical-ortho-glass-splinting-system.html



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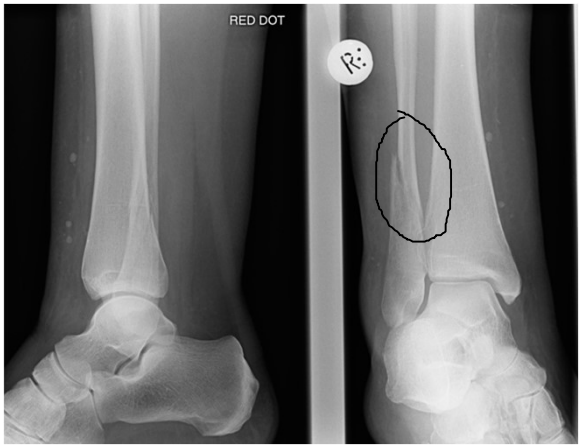
Lower Extremity Splints: Posterior Ankle

- Indications
  - Metatarsal fractures
  - Distal fibula fractures
  - Achilles tendon rupture (slight plantar flexion)



http://imageinterpretation.co.uk/ankle.html

Lower Extremity Splints: Posterior Ankle

- Splint width:
  - Adult 4-5 inch
  - Child 3-4 inch
- Distribution
  - MTP joints (2 in. toe pad) on plantar surface of foot to 2 inches distal to popliteal space
  - 90-degree flexion of ankle (Achilles tendon rupture – slight plantar flexion)
  - Discharge patient with crutches and advise non-weightbearing status

http://www.quickmedical.com/bsn-medical-ortho-glass-splinting-system.html

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Posterior Ankle Application

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Lower Extremity Splint: Stir up

- Indications
  - Bi/trimalleolar fractures
  - Unstable ankle fractures
  - Severe ankle sprain

http://quizlet.com/31988537/medical-diagnostics-ortho-flash-cards/

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Lower Extremity Splint: Stir Up

- Splint width:
  - Adult 4-5 inch
  - Child 3-4 inch
- Distribution
  - 2 inches below knee on medial side around calcaneus to 2 inches below knee on lateral side
  - 90-degree flexion of ankle
  - Discharge patient with crutches and advise non-weightbearing status

http://www.quickmedical.com/bsn-medical-ortho-glass-splinting-system.html

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Splinting Complications

- Compartment syndrome
- Flexion contractures
- Burns
- Pressure sores
- Compliance issues

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QUESTIONS?

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