

Splinting and Bracing of the Upper Extremity

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Disclosures



I have nothing to disclose!



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Objectives

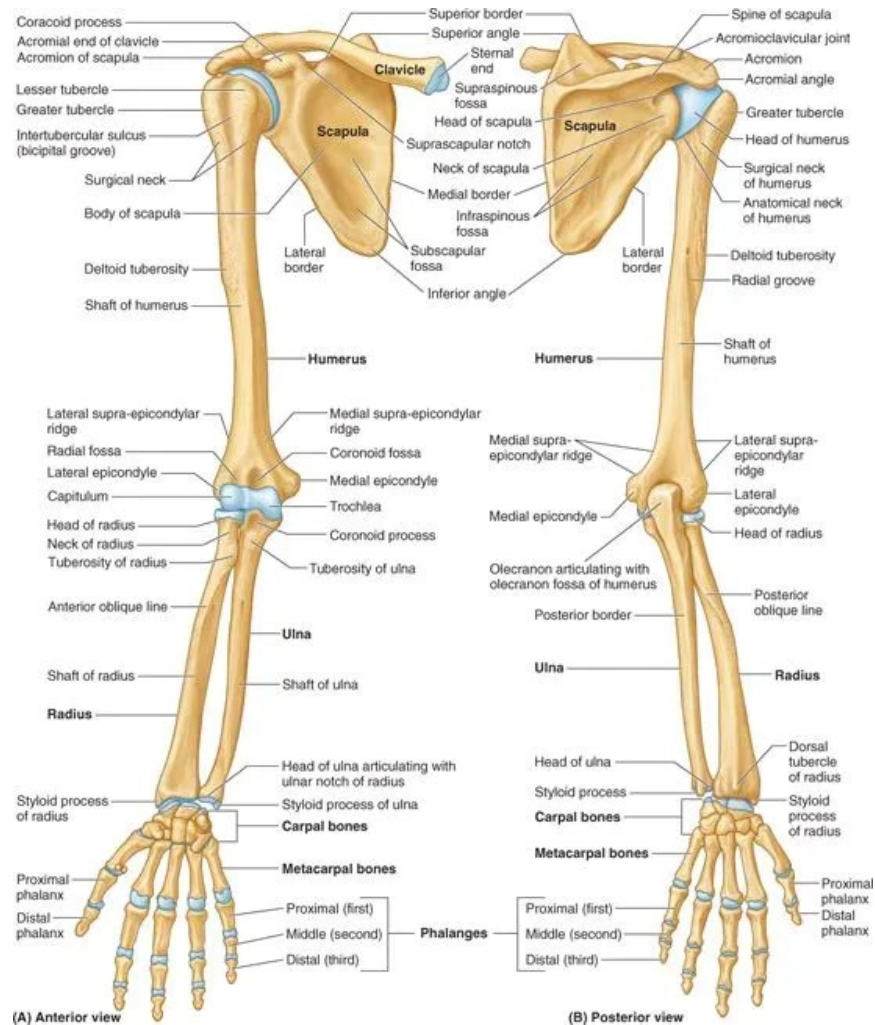
1. Understanding the fundamentals and nomenclature of splinting.
2. Understanding the anatomy of the upper extremity and mechanical principles.
3. Understand the guidelines for proper splinting.
4. Understand the most common forms of sideline emergency splints and how to apply them to the upper extremity.

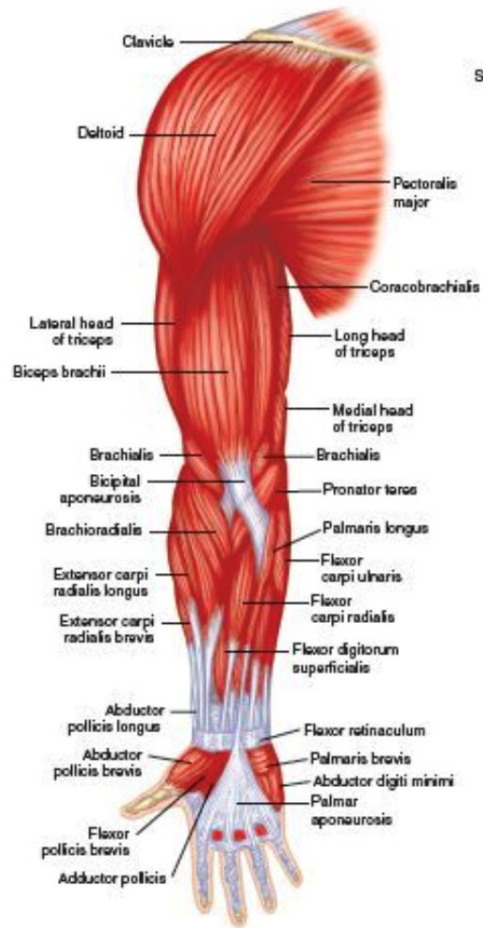


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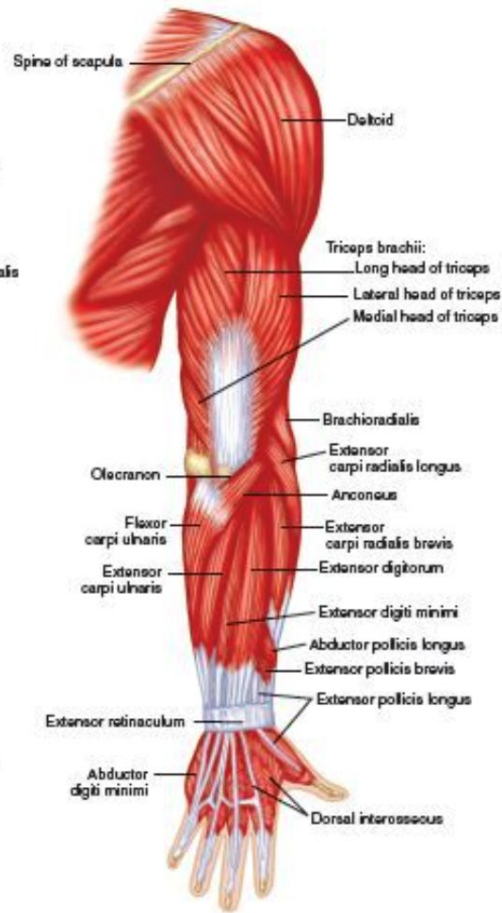
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ANTERIOR



POSTERIOR



Reasons for Immobilization

- Provide symptom relief after injury or overuse
- Protect and properly position edematous structure
- Aid in maximizing functional use of the hand
- Maintain tissue length to prevent soft tissue contracture
- Protect healing structures and surgical procedures
- Maintain and protect reduction of a fracture
- Protect and improve joint alignment
- Block or transfer power of movement to enhance exercise
- Reduce tone and contracture of spastic muscles.



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Guidelines for Splinting

- Put a dressing on any open wound before applying splint.
- Splint the injury in the position in which it is found.
- Make sure the splint immobilizes the injury and doesn't permit movement.
- Immobilize the joints above and below the site of injury.
- Elevate the splinted extremity if possible.
- Apply a cold pack to the injury around the splint.
- Continuously check the color and distal pulse of the extremity to make sure circulation is not impaired.



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Emergency Emotional Care

1. Accept everyone's right to personal feelings, because everyone comes from a unique background and has had different emotional experiences. Do not tell the injured person how they should feel.
2. Show empathy, not pity.
3. Accept the injured person's limitations as real.
4. Accept your own limitations as a provider of first aid.
 - ★ Be empathetic and calm and make it obvious the patient's feelings are understood and accepted.



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Types of Sideline Emergency Splints

- Rapid form vacuum immobilizer
- Air splint (not recommended)
- SAM splint
- Sling and swathe bandage

Useful Items to help you

- ❖ Tape and cohesive bandages
- ❖ Small towels
- ❖ Double length elastic bandages



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Vaccum Splint



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SAM Splint



Arm Sling and Swathe



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Images:

- <https://basicmedicalkey.com/upper-limb-5>
- <https://medicine.en-academic.com/5376/Muscle>
- <https://orthochild.com/produkt/child-arm-sling-am-sob-03>



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Young Athlete Symposium: A Review of Common Upper Extremity Injuries and Occupational Therapy Orthosis



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Goals of Orthosis Fabrication Course

Review Common Types of Upper Extremity Injuries

Review occupational therapy orthosis interventions that can be helpful for return to sport



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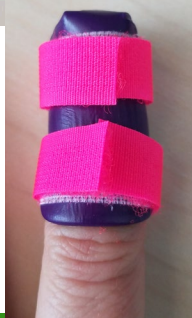
Common Types of Orthosis

Delta Cast



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Thermoplastic



Orficast



Delta Cast

- A Functional Polyester Cast tape that provides stabilization to an injured area while allowing movement proximally and distally.
- Frequently used after initial immobilization period of a fracture.

- Delta Cast Conformable is a Rigid and semi rigid cast tape based on the technique of adding layers
- It is made out of a multi-directional polyester, not fiberglass
- Has Silicon and latex free resin
- It's 3D stretch allows for moldability
- It can be used as a traditional cast or created into removable orthosis
- Easily removed with scissors
- Water resistant or water proof with correct underlayer – washable in the dishwasher
- You have 3-5 minute working time before it starts to set
- Cost effective
- Comes in a Variety of colors
- When fabricated correctly it is Flexible and easy to take off and on



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Medical Cast et al. (2021); Coppard et al. (2020); Thomas, J (2022)

Thermoplastic

- Heat moldable plastic that is custom fit for each patient.
 - Frequently used after initial immobilization period of a fracture or soft tissue injury.
 - Used to treat mallet fingers, volar plate injuries and collateral ligament injuries.
-
- Conformability- aka drape: The degree to which a heated material is able to mold well and produce an intimate fit that encompasses the contours and irregularities of the body part
 - Resistance to stretch: the degree to which a heated material is able to counteract being stretched or pulled
 - Memory: degree to which a material is able to return to its original shape once molded and then reheated
 - Rigidity: The ultimate stiffness or strength of a material or the degree to which a molded orthosis is able to resist deformation when external forces are applied
 - Bonding: the ability of the material to adhere to itself once heated



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Medical Kest et al. (2021); Coppard et al. (2020); Thomas, J (2022)



Orficast

- Fabric-like thermoplastic material on a roll
- Frequently used after initial immobilization period of a soft tissue injury.
- Frequently used for protection of an injury that needs to fit under a glove or mitt. - Ex: baseball catcher, soccer keeper glove, lacrosse glove.
- Sometimes used to treat mallet fingers, volar plate injuries and collateral ligament injuries, OT preference

Comes in different sizes and widths, similar to thermoplastic sheets.



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Medical, Kost et al. (2021); Coppard et al. (2020); Thomas, J (2022)



Common Injury Review

- Colles fractures- Distal Radius Fracture commonly from FOOSH
- Smith fractures- Distal Radius Fracture (reverse Colles Fx)
- Boutonnière deformity- Hyper extension of DIP, flexion of PIP.
 - Central slip is injured or ruptured resulting in decreased PIP extension. Lateral bands migrate volarly increasing pull on DIP extension
- Volar plate avulsion- injury of volar PIP capsule
 - Usually a hyperextension injury of PIP joint that happens in falls or ball sports. Can be soft tissue only or include an avulsion fracture of the proximal or middle phalanx.
 - Increased risk of swan neck if not treated properly
 - OT will fabricate a dorsal blocking splint with finger in ~30 degrees of flexion
- Jersey finger- rupture of FDP
- Mallet finger- rupture of terminal extensor tendon
 - Can be bony or soft tissue only. Depending OT will fabricate a mallet orthosis to keep DIP in extension at all times- 6 weeks is standard, 8 weeks if chronic
- UCL tear- aka skier's thumb



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