

Slide 1

**Brace Yourself:
Orthopedic Splinting
Workshop**

BY TRIA DENINNO, MPAS, PA-C AND
TARA MCSWIGAN, MPAS, PA-C

Slide 2

Disclosures

We have no relevant relationships with ineligible companies to disclose within the past 24 months. (Note: Ineligible companies are defined as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.)

Slide 3

Objectives

At the conclusion of this session, participants should be able to

- Identify common extremity injuries that warrant immobilization with splinting
- Execute proper techniques and placement of upper and lower extremity splints
- Appreciate contraindications to splint use, as well as post application complications

Slide 4

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

Slide 5

Why Splint?

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

Slide 6

Splinting Features

- Non-circumferential – allows for swelling to occur without risk for complications
- Temporary (3-5 days)
- Easily Removable – monitoring of skin conditions
- Quick application

Slide 7

Which Injuries Can Be Splinted?

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

Slide 8

Consider the Mechanics

When approaching an injury...

- + Use clinical history to narrow differential
- + Understand mechanics of the injury
- + Anticipate specific injury and confirm with exam findings and imaging

Slide 9

Radiographic Imaging

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

Slide 10

Application of Splint - Supplies

- Supplies needed
 - Cotton padding (bony prominences, between digits)
 - Cool water
 - Towel
 - Measuring tape
 - Scissors
 - Elastic bandages
 - Splinting material (fiberglass vs. plaster)
 - Plaster – limited by drying time, user experience
 - Fiberglass – lighter, more porous, more expensive
 - Assistant
- Have ALL supplies ready before splint is applied

Slide 11

Splint Sizing

- Splinting material comes in a range of width sizes (1 inch-6 inch)
- Upper extremity
 - Adult: 2-4 inch width
 - Pediatric: 1-3 inch width
- Lower Extremity
 - Adult: 4-6 inch width
 - Pediatric: 2-3 inch width

Slide 12

Application of Splint

- Pre-splinting Procedures
 - 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

Slide 13

Application of Splint

- Pad bony prominences and between fingers
- Ensure splint edges are covered
- Use elastic bandage to wrap extremity starting distally and moving proximally (avoid wrapping too tightly)
- Smooth splinting material with palm of hand to prevent wrinkles/ridges in splinting material
- When able, splint the joint above and the joint below fracture

Slide 14

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)

Slide 15

Application of Splint - Aftercare

- Post-Splinting Procedure
 - Check and document neurovascular status
 - Circulation (capillary refill, pulses)
 - Motor
 - Sensation
 - Splint care/patient instructions
 - Ice and 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)

Slide 16

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)



© 2015 American Veterinary Medical Association. All rights reserved. www.avma.org

Slide 17

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



© 2015 American Veterinary Medical Association. All rights reserved. www.avma.org

Slide 18


Volar Splint Application



Slide 22

Upper Extremity Splints: Boxer/Ulnar Gutter

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




https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3970442/

Slide 23

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.orthopaedics.com/3635403.html?srsltid=AfmBOopu3C8m3b1e

Slide 24

Boxer Splint Video



Slide 25

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




© 2012 Elsevier Inc. All rights reserved. www.elsevier.com/locate/bsfr

Slide 26

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




© 2012 Elsevier Inc. All rights reserved. www.elsevier.com/locate/bsfr

Slide 27

Upper Extremity Splints: Long Arm

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



© 2012 Elsevier Inc. All rights reserved. www.elsevier.com/locate/bsfr

Slide 28

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.spdbmedical.com/for-medical-office-glass-splinting-system.html

Slide 29

Lower Extremity Splints: Posterior Ankle

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




http://www.spdbmedical.com/for-medical-office-glass-splinting-system.html

Slide 30

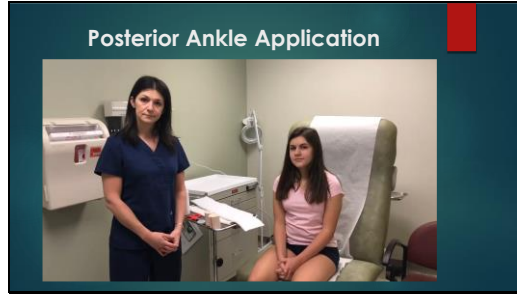
Lower Extremity Splints: Posterior Ankle

- Splint width:
 - Adult 4-5 inch
 - Child 3-4 inch
- Distribution
 - WTP splint (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.spdbmedical.com/for-medical-office-glass-splinting-system.html

Slide 31



Slide 32



Slide 33



Slide 34

Splinting Complications

- Compartment syndrome
- Flexion contractures
- Burns
- Pressure sores (caution especially in patients with neuropathy)
- Compliance issues

Slide 35

Take Home Points

- When presented with an injury, choose the appropriate splint for optimal healing
- Use proper application techniques to avoid complications
- Ensure appropriate follow up care
- When in doubt, SPLINT!

Slide 36

References

- Andrea Straccionini, Andrea "Basic Techniques for Splinting of Musculoskeletal Injuries," UpToDate, January 2, 2020
- Aggarwal, Rohit, Ring, David, "de Quervain tendinopathy," UpToDate, Jan 2, 2020
- Koehler, Scott, "Overview of Ankle Fractures in Adults," UpToDate, June 8, 2018
- Yu-Tsun Cheng et al, "Teaching Splinting Techniques Using a Just-In-Time Training Instructional Video," Pediatric Emergency Care, March 2017

Slide 37

QUESTION 1

When applying a splint, the elastic bandage should be wrapped in which distribution?

- a) Distal to proximal, covering digits completely
- b) Proximal to distal, leaving digits exposed
- c) Start anywhere, no need for a pattern
- d) Distal to proximal, leaving digits exposed

Slide 38

QUESTION 2

All of the following supplies are needed for proper splint application EXCEPT

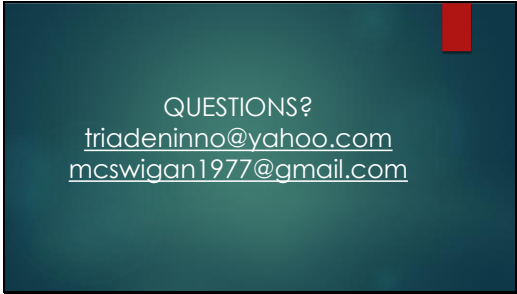
- a) Hot water
- b) Assistant
- c) Elastic bandage
- d) Splinting material

Slide 39

QUESTION 3

Splints should NOT be used for which of the following injuries?

- a) Sprains/strains
- b) Cellulitis
- c) Injuries with neurovascular compromise
- d) Unstable fractures



QUESTIONS?
triadeninno@yahoo.com
mcswigan1977@gmail.com
