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Splinting Hands to Decrease Pain and Improve Functional Use

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1

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Course Outline

25 minutes	Introductions, Course objectives Kinesiology of the arm – following the lines of movement- possible pressure points
20 minutes	Common conditions to use static splinting for
45 minutes	Wrist cock up- lab
55 minutes	Resting hand/intrinsic plus lab
45 minutes	Short thumb opponens
15 minutes	Q & A

2

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Course Objectives

Participants will be able to identify 5 possible pressure points on the upper extremity

Participants will be able to identify landmarks to limit or allow motion to occur in the upper extremity with orthotics

Participants will be able to describe 3 benefits of static custom orthotics

Participants will be able to identify 3 different strategies to improve proper fit of custom orthotics

Participants will be able to fabricate: Resting hand/ intrinsic plus, wrist cock-up and short thumb opponens splints

3

Disclosure Statement

I have no relevant financial or nonfinancial relationships to disclose

4

Anatomy

A Anterior view B Posterior view

5

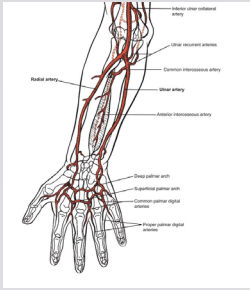
A Closer Look at the Hand

C Anterior view Posterior view

6

Main Arteries of the Arm

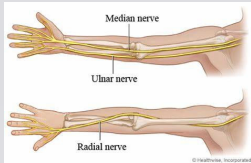
- Radial and Ulnar
- Deep and Superficial Palmar Branches
- Common Palmar Digital
- Proper Palmar Digital



7

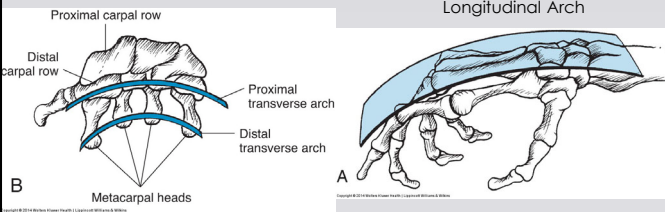
Nerves of the Upper Extremity

- Median nerve
- Ulnar nerve
- Radial nerve

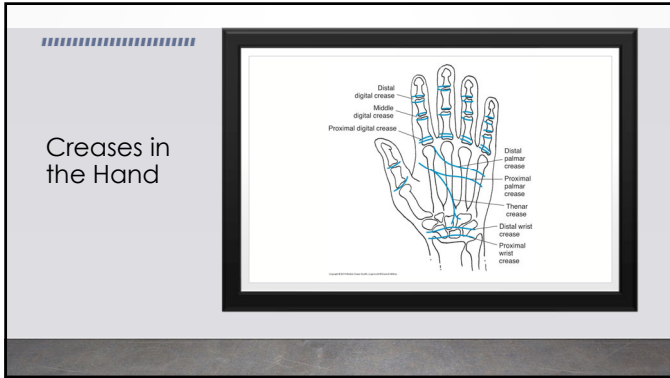


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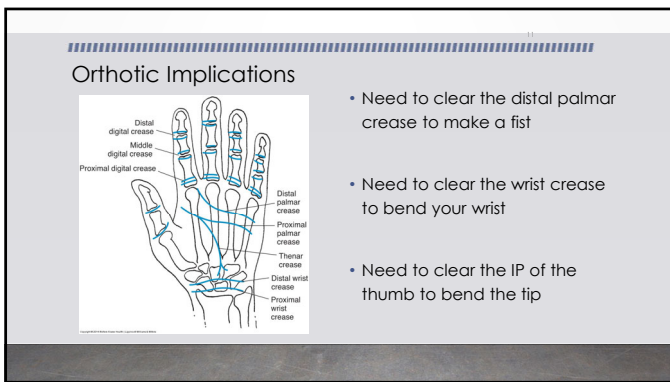
Arches in the Hand



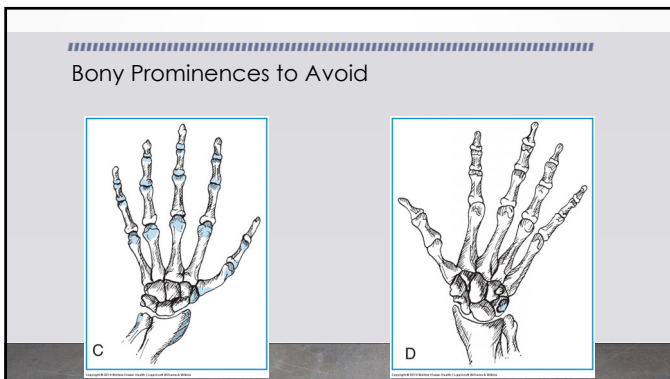
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Bony prominences

- Flare or blow out material
- Cut holes in straps or place them in other locations
- Pre-pad the areas prior to molding material
- Signs of soft tissue compromise
 - Pain, numbness and tingling
 - Redness
 - Skin necrosis or breakdown
 - Color changes
 - Increased swelling

13

14

Why is understanding anatomy important?

- The therapists' goal is to appreciate normal joint mechanics
- To preserve as much as possible the normal anatomical alignment
- To provide the best opportunity for maximum functional use

14

15

Why is this important?

Therapists must understand normal conditions in order to identify what is abnormal.

This will help you identify how your therapy interventions will effect the final outcome.

15

Common Uses for Static Splints

- Provide symptom relief after injury or overuse
- Protect and properly position edematous structures
- Aid in maximizing functional use of the hand
- Maintain tissue length to prevent soft tissue contractures
- Protect healing structures and surgical procedures

16


Common Uses for Static Splints

- Maintain and protect reduction of a fracture
- Protect and improve joint alignment
- Block or transfer power of moment to enhance exercise
- Reduce tone and contracture of a spastic muscle

17

Goals of Orthotic Use:

- Reduce pain and inflammation
- Rest and support the weakened structures
- Position the involved joints in optimum alignment
- Help prevent or minimize joint deformities
- Improve functional use of the hand



18

Why Might a Person Need a Wrist Splint?

- Carpal tunnel
- Tendonitis
- Sprain or strain
- Pain from arthritis
- Prevention of overuse injuries on the computer
- To help avoid ulnar sided wrist pain associated with excessive mouse use, texting and playing video games

19

Uses for a Resting Hand Splint

- Properly position the joints of the thumb, wrist and hand for persons who have had strokes (to reduce tone)
- Maintain joint alignment to prevent contractures from forming in persons with OA
- Prevent clenching of the fingers at night and helps reduce triggering of the digits when sleeping

20

Uses for a Short Thumb Opponens

- To rest the thumb in proper alignment at night
- To correct alignment of the thumb during pinching tasks due to laxity of ligamentous support
- To protect the thumb during repetitive or heavy functional use tasks (gardening, working on the house, recreational activities)

21

PROCESS for Splinting Fabrication

- P- pattern creation
- R- refine pattern
- O- options for materials
- C- cut and heat
- E- evaluate fit while molding
- S- straps and components
- S- survey completed splint

22

Splinting Material

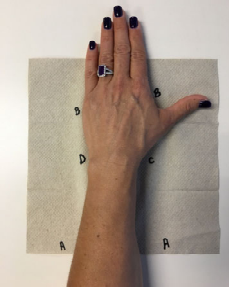
- Tailorsplint
- 1/16th inch
- One of the most versatile and popular Rolyan splinting material
- Moderate resistance to stretch; high level of conformability
- Non-toxic, latex-free, and radiolucent
- Ideal for novice and expert clinicians
- Coated- this means it will stick to itself when hot, but when it cools it will no longer stick

23

Wrist Cock-Up Pattern

A. Place marks for the proximal border 2/3 length of the forearm on both sides about 2 inches from the forearm

B. Place marks for the distal border just proximal to the index finger metacarpal phalangeal joint as well as the small finger metacarpal phalangeal joint

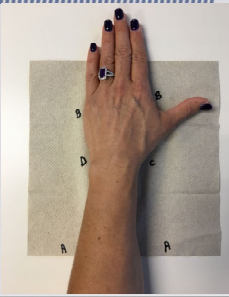


24

Wrist Cock-Up Pattern

C. Place a mark at the base of the thumb CMC joint, this will allow for thumb motion

D. Place one more mark outside the ulnar styloid about 1 inch



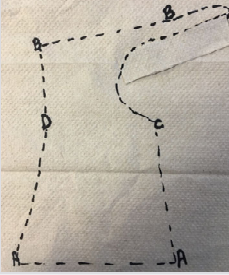
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Wrist-Cock Up Pattern

Allow enough material along the forearms to come up to 2/3 circumference- remember, the forearm tapers distally

The distal radial tab should be long enough (about 3 inches) to transverse through the palm

Remove your arm and connect the lines to form a basic pattern




26

Refine the Pattern

Cut it out and place it on your hand.

Place arrows in areas you wish to make longer

Cut the places that are too large or are impeding motion of your thumb and fingers.



27

Wrist Cock-Up Cut and Heat

- Transfer the pattern to the material by using the yellow grease pens
- Dip the material in the splint pan, watch it for 'doneness'
- Remove it, dry on the towel and drape the material over your non-dominant hand/forearm
- Cut out the pattern making long cuts to avoid choppy edges
- Cut off excess as you are going around the pattern

28

Wrist Cock-up Fitting

- Prepare the patient with a stockinette
- Position the patient using gravity to assist with forming the splint
- Dip the material once more, blot dry and form it on the patient
- Let gravity do the work and be mindful of protecting the arches in the hand
- Make sure you can see all the creases where motion should occur

29

Wrist Cock-Up Evaluate and Strap

- Make marks or 'mental notes' as to the areas that need to be adjusted
- Either spot heat, or spot dip the material where it needs to be adjusted, making sure it is hot enough to make smooth cuts.
- Place Velcro hook on the splint and secure with strapping.

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31



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Splinting material

- Ezeform
- 1/8th thickness
- High resistance to stretch and moderate conformability
- Excellent choice for medium hand splints & large back supports
- Non-toxic, latex-free, and radiolucent

33

Resting Hand Pattern

- A. Place marks for the proximal border 2/3 length of the forearm on both sides about 2 inches from the forearm
- B. Place marks for the width of the hand at the index finger and small finger (MCP) metacarpal phalangeal joints, adding about 1/4 to 1/2" to each side
- C. Place a mark approximately 1" distal to the fingertips

34

Thumb piece: on the mark for the index finger MCP joint draw a line straight down thru the thumb MCP and proximal to about the radial styloid. NOTE: the thumb piece will loop around under the hand allowing the thumb to sit in palmar abduction. The curved part should end at the mid-thenar mass in line with the 3rd metacarpal

- E. Place one more mark outside the ulnar styloid about 1 inch

35

Turn your hand on the ulnar side and find the spot where the base of the 3rd metacarpal is. Place a dot there.

Connect all marks to form the pattern


Base of the 3rd metacarpal

36

Resting Hand Refine Pattern

Place arrows in areas you wish to make longer

Cut the places that are too large or are impeding motion



37

Resting Hand Cut and Heat

- Transfer the pattern to the material by using the yellow grease pens
- Dip the material in the splint pan, watch it for 'doneness'
- Remove it, dry on the towel and drape the material over your non-dominant hand/forearm
- Cut out the pattern making long cuts to avoid choppy edges
- Place the cut out material on a towel and go to prepare your patient

38

Resting Hand Fitting

- Prepare the patient with a stockinette and have a paper towel handy
- Position the patient using gravity to assist with forming the splint, this could be with elbow on the table, or with palm up resting on the table
- Dip the material once more, blot dry and form it on the patient

39

Resting Hand Evaluate while Molding

- Let gravity do the work and be mindful of protecting the arches in the hand
- Use the paper towel to prevent the thumb piece from sticking to the hand component
- Look to see if there are any bony areas that need to be cleared and if the sides of the orthotic are 2/3 of the circumference

40

Resting Hand Strapping

- Attach Velcro hook to the splint and strap
 - Volar part of the pan where the fingers rest
 - Volar part of the thumb piece
- Across the wrist
- Across the forearm

41



Grand
Finale

42

43

Splinting Materials

- Aquaplast-T watercolors, 3/32" thick and is perforated (13%)- or solid
 - Coated for a temporary bond
 - Moderate resistance to stretch, moderate drape and good conformability
 - 100% memory
 - Ideal for hand / finger based orthotics or for ones that need frequent reheating

43

44

Orthotic Fabrication- Short Opponens

Clear distal palmar crease

Clear wrist crease

Needs to allow tip to bend and oppose index finger

44

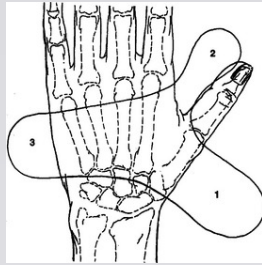
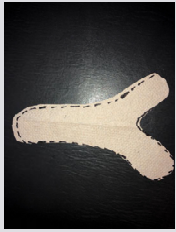
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Drawing a Pattern

- Mark the proximal border just distal to the wrist crease
- Mark the distal border at the thumb IP flexion crease and distal palmar crease
- Connect the lines adding 1-1 ½ inches along the ulnar border

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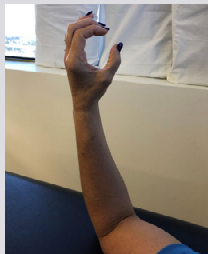
The Basic Pattern- add some room for the MP if needed



46

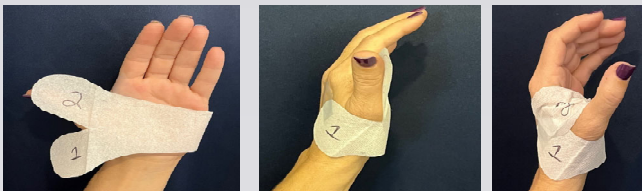
Ready to Place on the Patient?

- Make sure your patient is positioned with elbow on the table, thumb in abduction and opposing the index, making a "C" shape
- No Stockinette needed
- Place the material on, wrapping the proximal flap first and the distal one on top
- Ask them to lightly pinch their index finger



47

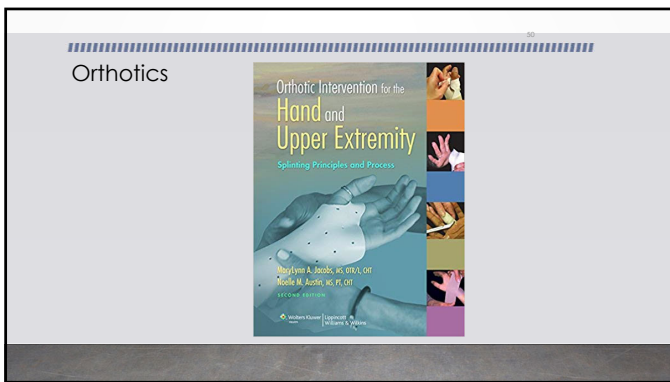
Applying the material



48



49



50



51



52

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53

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54
