Webinar #7 2020
Tips and Tricks in Orthotic Fabrication:
Hand Based
Resting Hand Orthoses

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Learning Objectives

At the conclusion of this session, participants will:

1. Recognize conditions of the hand that benefit from orthotic management.
2. Learn tips and tricks for working with low temperature thermoplastic materials that benefit specific orthotic fabrication.
3. Identify the steps of fabrication for 2-3 custom made hand-based orthoses.
4. Review the current evidence to support orthotic interventions for clinical conditions of the hand and fingers.
Hand- Based Orthoses

Hand- based orthoses, by definition, do not include the wrist. They might include the thumb, or not. They might include all of the digits, or some of the digits. They can be volar, dorsal or circumferential in design. They can position the fingers in flexion or extension depending on the diagnosis and goal of treatment.

Goals of orthotic wear:

• Protection after injury or surgery
• Positioning for healing
• Positioning against contracture
• Improved function
• Exercises
Typical Diagnoses

- Burns
- Fractures of the metacarpals, proximal or middle phalanges
- Dupuytren's contracture- after surgical release or injection
- Arthritis
- Other Trauma

Hand-Based Orthoses in MCP Flexion

Resting vs Intrinsic Plus Positioning

Resting or Functional Position
MCP joints- 30-40° flexion
Proximal interphalangeal (PIP) joints – slight flexion
Distal interphalangeal (DIP) joints – extension
Thumb – wide abduction and opposition, slight flexion

Intrinsic plus position
MCP joints- 70-90° flexion
Proximal interphalangeal (PIP) joints - extension
Distal interphalangeal (DIP) joints – extension
Thumb – mid-wide abduction and opposition and extension
Orthotic Management of Arthritis

- Decrease pain
- Position against deformities
- Decrease inflammation
- Decrease stress to the joints
- Provide support for increased function
- Assist with joint stability

- During periods of acute inflammation and pain
- For support and immobilization

Orthoses may reduce pain by relieving stress and muscle spasms.

Orthoses may not prevent additional deformity

Use clinical judgment to determine what joint positions for best.
Orthotic Management of Arthritis

Combine orthotic management with:
• Patient education in joint protection techniques
• Muscle strengthening exercises as able
• Maintain range of motion

Use orthosis as needed during activities and at nighttime.
Prolonged use of a resting orthosis may also be harmful.
Orthosis may improve the mechanics, but limit the sensory components of function.

Orthotic Management of Arthritis

Make the orthosis:
• Simple in design
• Easy to don and doff.
• Include only the affected joints
• Should not be too heavy or cumbersome.
• Custom-made for each patient.

Orthotic Management of Arthritis

For Ulnar Drift of the MCP joints:

An orthosis will only help if the joints can be passively positioned in a better alignment

https://www.youtube.com/watch?v=jaox7iW1uAc&t=2s

Burns

Acute Phase:
Orthoses- for positioning and edema control

Sub Acute Phase:
Orthoses - essential for positioning but also for stretching and lengthening the contracted scar tissue.

Late Phase:
Late phase of scar proliferation involves collagen remodeling.
Critical period for orthotic intervention to correct scar contracture.
Hand Burn Positioning

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Contracture Predisposition</th>
<th>Preventative Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsal Hand and Fingers</td>
<td>MCP Hyperextension</td>
<td>MCP 80° Flexion</td>
</tr>
<tr>
<td></td>
<td>IP Flexion</td>
<td>PIP/ DIP Extension</td>
</tr>
<tr>
<td></td>
<td>Thumb Adduction</td>
<td>Thumb abduction</td>
</tr>
<tr>
<td>Palmar Hand and Fingers</td>
<td>Finger Flexion</td>
<td>Finger Extension</td>
</tr>
<tr>
<td></td>
<td>Thumb adduction</td>
<td>Thumb radial abduction</td>
</tr>
</tbody>
</table>

Dupuytren’s Disease

- Affects the fibrous layer of tissue that lies underneath the skin in the palm and fingers.
- The fascia thickens, then tightens over time.
- The fingers are pulled inward, resulting in "Dupuytren's contracture."
- Mainly affects the ring and little fingers,
- Can affect all fingers and the thumb.
Dupuytren’s Disease

Treatment Options:

• Steroid injection: a corticosteroid injection may slow the progression of a contracture. The effectiveness of a steroid injection varies from patient to patient.

• Fasciotomy: removal of fascia

• Subtotal palmar fasciectomy

• Needle Aponeurotomy: use of a needle to break up cords

• Enzyme Injection: During the 24 to 72 hours following the injection, the enzyme will weaken/dissolve the contracted tissue.

Orthotic Management Post -Intervention

• Night- time extension orthosis

• Depends on specific client and specific procedure

• Not fully supported by clinical trials for all clients
Case Study

Right hand - post enzyme injection
Left hand - post surgery

Exercise Orthosis

Position the MCP Joints in extension or slight hyperextension to facilitate PIP and DIP active flexion
Benefits of the MCP Blocking Orthosis:

- Promotes gliding of flexors FDS and FDP within Zone II if tendon adherence is an issue
- Directs flexor force to the PIP and DIP joints
- Promotes reduction of digital edema through active motion
- Allows for active lumbrical and interosseous muscle elongation
Patterns

Blocking Orthosis (Exercises)

Resting Hand Orthoses without thumb

Resting Hand Orthosis including thumb

Material Considerations

Who is the patient?

Orthosis Design?

Diagnosis?

Memory?

Material Thickness?

Client / Clinician Preferences

Duration of wear?

Conforming or Rigid?

Perforations?
Hand Based Resting Orthosis/ Extension without thumb
Evidence


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Demonstrations

- Resting Hand Full Extension
  *Orfit Colors NS 1/12”*

- Resting Hand MCP Flexion
  *Oricast More 6”*

- Blocking Orthosis
  MCP extension
  *Orfilight 1/12”*
Thank you for your attention!

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