Update on the Evidence and Orthotic Management of the Upper Extremity in Rheumatic Populations

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Why use Orthotics?
• To provide pain relief
• To reduce inflammation and swelling
• To improve function

Causes of pain, joint deformity, & diminished function
• Synovitis / Tenosynovitis
• Periarticular and articular destruction
• Imbalance of forces acting on the joint
• Intrinsic / extrinsic tightness

Orthotics Relieve Pain by:
• reducing or preventing joint motion
• supporting joints in positions of comfort
Orthotics Reduce Inflammation & Swelling by:

- Reducing joint motion
- Reducing tendon excursion
- Alleviating external forces

Orthotics Improve Function by:

- Realigning and repositioning joints
- Stretching to relieve soft tissue tightness

Orthotics described in the ACR OT Competencies in Rheumatology Practice Guidelines

- Resting hand
- Wrist cock-up
- Finger and Thumb
- Ulnar deviation
- Elbow extension
- Dynamic outrigger

Is there evidence supporting the use of orthotics?

Yes ?
No ?
Maybe ?

Resting Hand Orthotics

- Decrease pain & inflammation
- Decrease stress on joints
- Reduce ulnar drift
- Maintain intrinsic length

For Periods of Acute Inflammation

Provide neutral rest of the tendons and joints for at least a portion of each day
- Trying to relieve the pain and swelling of tenosynovitis and synovitis.
For Long Term Conservative Management

Provide neutral rest of the joints for at least a portion of each day, typically at night

- Trying to prevent episodes of acute inflammation and swelling

Evidence for Resting Hand Orthotics

- Steultjens, et al. 2002
  - Splints are effective in reducing pain both immediately after provision of the splint and after splinting over a period of time.
  - Splinting has a negative effect on dexterity.
  - There were findings for a gain in grip strength immediately after provision of the splint.

- Silva, et al. – 2008
  - Night time splinting resulted in significant reduction in hand pain, improvements in grip and pinch strength, and UE function for patients with rheumatoid arthritis.

Evidence for resting hand splints

- Adams, et al. – 2008
  - Resting splints provided no significant benefit.
  - No significant difference between the two interventions on grip strength, deformity, hand function and pain.
  - The data favored the control group suggesting that resting splints should not be used as routine treatment of patients with early rheumatoid arthritis.

- Cochrane review 2010 – Egan et al.
  - Looked at studies up to August 2001
  - Resting splints don’t help with pain, pinch or grip but patients prefer wearing them to not

Wrist cock-up orthotics

- Pain Relief
- Provide support for increased function
- Assist with joint stability
- Limit wrist circumduction
- Reduce torque

Volar wrist orthosis

Evidence for Wrist Working Orthotics

- Cochrane Review 2010 – Egan et al
  - No clear indication working splints help with pain reduction during activity.

  - Significant pain relief in as little as 4 weeks
Muenster style orthosis

Wrist pain may also be the result of arthritis of the DRUJ. Murray, 2011

Thumb CMC Orthotics

- Decrease pain
- Improve function
- Improve grip strength
- Maintain thumb web space

Evidence for Thumb CMC orthotics

- Valdes & Marik – 2010
  - High evidence that immobilization of the CMC of the thumb improved hand function and decreased pain of osteoarthritis
  - Moderate evidence to support use of CMC orthotics to increase grip strength
- Egan/Brosseau – 2007
  - Fair evidence for effectiveness of splinting to relieve pain and improve function

Gomes Carreira et al. - 2010

Functional splinting during activity for patients with trapeziometacarpal osteoarthritis reduced pain but did not alter function, grip or pinch strength, or dexterity.

Rannou, et al. – 2009

Night CMC orthotics were found to decrease pain and disability after 12 months of wear and reduced need/desire for surgery after 7 months of wear

Hand Based Thumb Orthosis

Ottobock Thumboform Short
Functional MCP and Ulnar Deviation Orthotics

- Decrease pain
- Reduce flexion force during grip
- Realign the fingers to improve pinch
- Prevent intrinsic-plus position

Evidence for functional MCP and Ulnar deviation orthotics

1996 study by Rennie
- no improvement in pain, function and grip strength, pinch did improve

2008 Formsma & Dijkstra
- improvement in pain and dexterity when splinting and exercise program are used

Finger Orthotics

Swan Neck Splints

- Point Products: Oval-8® Splint
- SIRIS™ Ring Splints (Silver Ring Splints)
Boutonniere Splints

SIRIS™ Ring Splints (Silver Ring Splints)

Mallet Splints

IP Joint Lateralization Splints

Norco™ Lateral PIP Hinge Splint

3 Point Products: Oval-8® Splint

Elbow extension

- To reduce flexion contractures

Dynamic Outrigger

- after joint replacement

Evidence for Other Therapeutic Interventions

- Moderate evidence for joint protection education
- Moderate evidence for use of adaptive equipment
- Anecdotal / weak evidence for heat modalities
- Favorable outcomes for exercise with patient education
So...Is there evidence supporting the use of orthotics?

Yes

No

Maybe

"The potential of orthotics to provide pain relief for varying periods of time in certain patients, and at a relatively low cost, tends to support the current practice of recommending that patients try out various splints/orthoses in different activities in order to determine whether these splints are helpful to them."

Splints and Orthosis for treating rheumatoid arthritis (Cochrane Review 2010)

Egan, Brosseau, Farmer, Quimel, Rees, Tugwell, Wells


