

Thumbs Up for Function: Orthotic Intervention for the Thumb CMC Joint– Osteoarthritis

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The Importance of the Thumb CMC

- The thumb is the most important digit of the hand
- The CMC is most important joint of the thumb
- The CMC magnifies the complexity of human prehension (Neumann & Bielefeld, 2003)



CMC OA Incidence Varies

Clinical Findings

- 13% 41-50 years
- 57% 61-70
- 69% 80+

(Sodha et al., 2005)

Radiological Findings

- 20% over 40 years
- 42% in males and 57% in females over 75years

(Van Saase, et al. 1989)

Radiological findings do not necessarily correlate with clinical findings (Dahaghin, et al. 2005)

Why do we use an orthosis?

- **Decrease Pain** (Bani et al., 2013a, 2013b; Becker et al., 2013; Berggren et al., 2001; Boustedt et al., 2009; Egan and Brousseau, 2007; Gomes Carreira et al., 2010; Hermann et al., 2014; Kjeiken et al. 2011; Rannou et al. 2009; Valdes and Marik, 2010; Wajon and Ada, 2005; Weiss et al., 2004; Weiss et al. 2000, Bongi et al. 1991; Melvin & Carlson-Rioux, 1989; Swigart 1999)

- **Increase Function** (Bani et al., 2013a, 2013b, 2014; Becker et al., 2013; Boustedt et al. 2009; Hermann et al. 2014; Rannou et al. 2009, Sillem et al. 2011, Wajon & Ada, 2005; Gomes Carreira et al. 2010)

- **Decrease inflammation** (Zhang et al., 2007; Swigart et al. 1999)

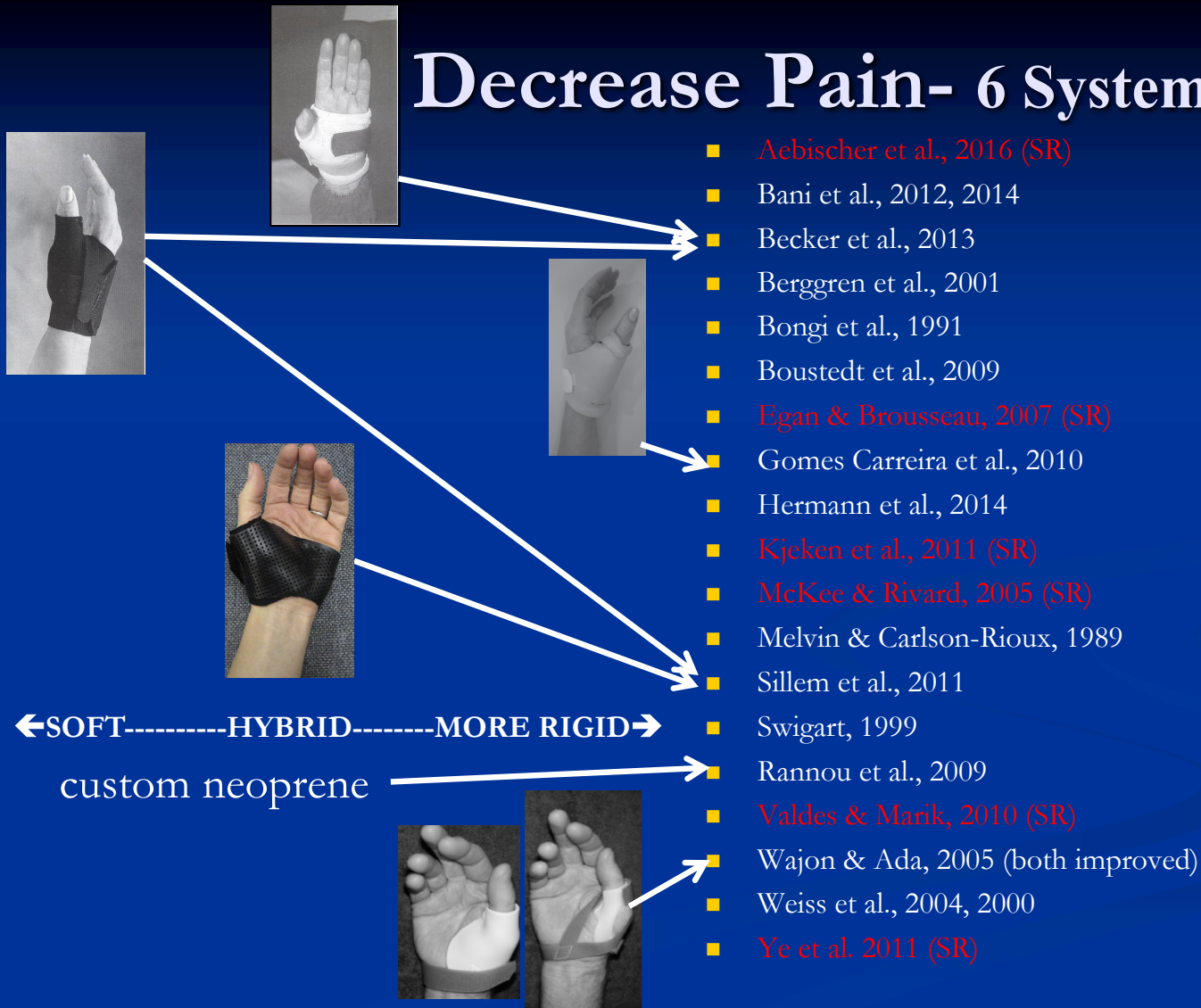
- **Pinch Strength** (Rannou et al. 2009; Wajon & Ada, 2009)

- **Stability** (Hamann et al., 2014, Barron et al. 2013)

Individuals with CMC OA have 2-3 times the functional limitations in dressing, eating, and carrying a 10# load. (Dillon et al. 2007)



Decrease Pain- 6 Systematic Reviews





When should an orthosis be worn?

- No standard instructions in many of the studies. (Henrique TQ de Ameda et al., 2016)
- During heavy or painful activities and at night (Berggren et al., 2001; Bongi et al., 1991; Buurke et al., 1999; Melvin & Carlson-Rioux, 1989; Swigart et al., 1999; Weiss et al., 2000).







Increased Function

■ DASH

- Bani et al., 2012 (improved over time)
- Becker et al., 2013
- Boustedt et al., 2009
- Gomes Carreira et al., 2010

■ AUSCAN

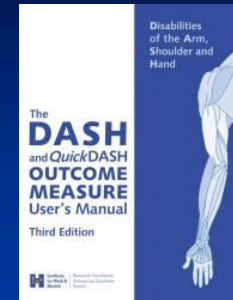
- Hermann et al., 2014
- Sillem et al., 2011 (Hybrid Orthosis)

■ Cochin Hand Function Scale

- Rannou et al., 2009 (12 months night wear)

■ Sollerman Test

- Wajon & Ada, 2005



Valdez et al. (2016) linked ICF components of Activity Limitation and Participation Restrictions to these outcome measures.

In addition the DASH and AUSCAN were also linked to Body Structures and Functions.

Decreased Inflammation



■ Swigart et al., 1999

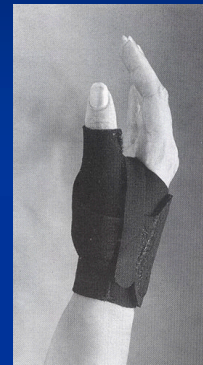
“Overall, splinting was found to be a well-tolerated and effective conservative treatment to diminish, but not completely eliminate, the symptoms of carpometacarpal joint arthritis and inflammation.”

■ Zhang et al., 2007 (SR)

“The focus of splinting the thumb CMC is to decrease inflammation by providing rest and immobilization.”

Increased Pinch Strength

- Rannou et al. 2009
- Wajon & Ada, 2009
- Bani et al., 2014
- Grenier et al. 2016



2.47#

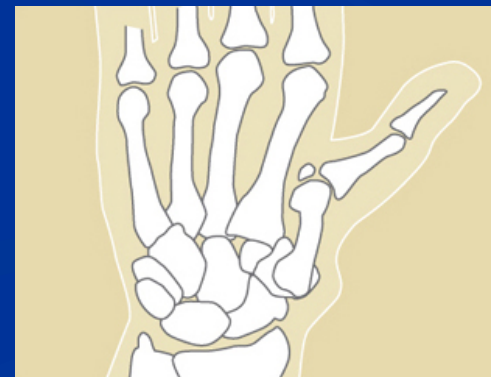


3.25#



2.64 #

Other studies do not show an increase



STABILITY



Rhizo Forte V/2013 BSN



Rhizo Hit SPOR



Rhizomed MEDI
High Stabilization (↓AROM –
Low functionality)



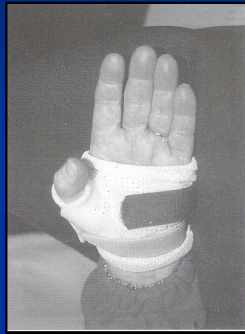
Push® MetaGrip®
Largest Functionality

Hamann N. et al., 2014: CMC and MCP joint motion restriction is at the expense of hand functionality.

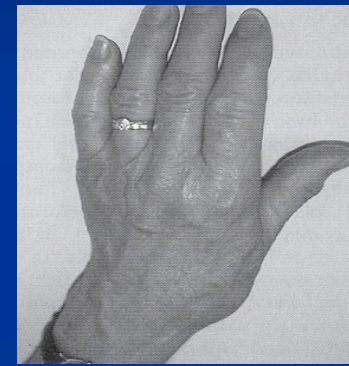
- Motion analysis with orthoses in place for AROM
- Sollerman Test for functionality



To include the MP or not to include the MP that is the question.....



- Both decreased pain
- PUSH® MetaGrip® with the MP free allowed more function



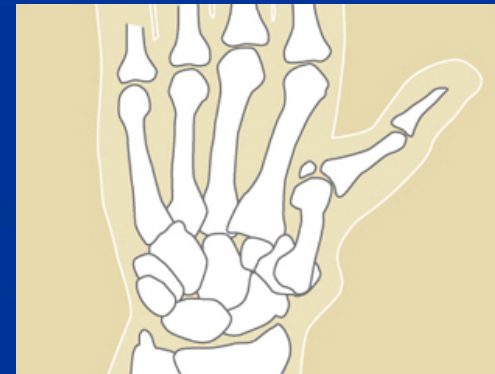
Professional clinical judgment
is required

Vegt, A. E., Grond, R., Gruschke, J. S., Boomsma, M. F., Emmelot, C. H., Dijkstra, P. U., & Sluis, C. K. (2017). The effect of two different orthoses on pain, hand function, patient satisfaction and preference in patients with thumb carpometacarpal osteoarthritis. *Bone Joint J*, 99-B(2), 237-244. Accessed March 09, 2017.

<https://doi.org/10.1302/0301-620X.99B2.37684>.

STABILITY

- Weiss et al., 2000, 2004
- Reported decreased CMC joint subluxation using radiographic assessment and observed joint position.
- Both hard and soft orthoses decreased pain and subluxation
- Better alignment with custom orthosis.



Reducing the Need for Surgery

- Berggren et al. (2001). A seven year prospective study.
 - Joint Protection, adaptive equipment, soft orthoses (leather or textile)
 - After 7 months 23 out of 33 (70%) did not want an operation. During the next 7 additional years only 2 more had surgery.



Orthotic Preferences

- Weiss et al. (2000): Found both long and short splints decreased pain and 73% preferred a short splint.
- Valdes & Marik (2010): Patients preferred exclusion of the wrist and a flexible orthosis
- de Almeida et al. (2016): widespread clinical variation in practices and preferences

Combinations

- Boustedt et al., 2009: Pain and stiffness decreased with orthotics, exercise, and joint protection vs. joint protection alone.
- Aebischer et al., 2016: Single interventions not effective and should be combined with orthotics.

Conclusion

- CMC Orthoses can decrease pain, increase function, decrease inflammation, increase pinch strength, improve thumb stability, and may reduce the need for surgery.
- The orthotic selection should be individualized for each client.
- Research backs up what you do!

Fabrication time!



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