

## USING A RELATIVE MOTION ORTHOSIS WHEN TREATING A BOUTONNIÈRE INJURY

By Karol S. Young OTD, OTR/L, CHT

Commonly, individuals with sports related proximal interphalangeal (PIP) joint injuries may seek care several weeks after injury or may even ignore the injury until the season is over. Because many athletes do not recognize the severity of a volar dislocation of the PIP joint, the injury often progresses to a boutonnière deformity prior to seeing a medical professional.

Historically, the standard of care for such an injury would have been prolonged immobilization of the PIP joint in extension while allowing active DIP flexion. Currently, however, there is increasing support for changing the way we treat boutonnière deformities.(1,2) If the boutonnière injury has a flexion contracture of the PIP joint, first passive PIP joint extension is regained, and then a relative motion orthosis (RMO) is used to place the injured digit/s in 15 to 20 degrees more metacarpophalangeal (MCP) joint flexion than the adjacent digits. This position not only provides protection to the healing dorsal PIP joint structures, but it also

Recently we saw T.J., a volleyball player, who had delayed seeking treatment following a PIP joint volar dislocation eight weeks earlier. See Figure 1. She presented with a PIP joint flexion contracture of 35 degrees. To regain full passive PIP joint extension, we serially casted T.J.'s PIP joint using the method described in our BraceLab's [Clinical Pearl No. 44](#) and in our [Obstinate PIP video](#). Using the full length of the finger obtains a more precise positioning of the PIP joint and leaving the DIP joint free to flex at this stage is irrelevant until the PIP joint gains full extension.

When T.J. achieved full PIP joint extension at three weeks, she began wearing a static PIP extension orthosis at night. Initially the short orthosis



Figure 1: T.J.'s finger at eight weeks post injury

facilitates active redirection to assist in regaining/maintaining full PIP joint extension.(3)



Figure 2: Static extension orthosis shown on and off the finger

Look for clinical information in our *Clinicians Classroom* at BraceLab.com, including information previously at HandLab.com

## USING A RELATIVE MOTION ORTHOSIS WHEN TREATING A BOUTONNIERE INJURY (continued)

design immobilizing only the PIP joint in extension (allowing active distal interphalangeal (DIP) flexion) did not hold the PIP joint in full extension. Therefore, a full finger gutter night extension orthosis was used. (Also [illustrated in our Obstinate PIP video](#).) Small slits in the side of the orthosis allowed placement of straps directly over the PIP joint to assure a position of full PIP extension (Fig-



*Figure 3: The relative motion orthosis blocks MP extension of the long finger.*

ure 2).

During the day T.J. wore a relative motion extension orthosis (RMO) which held the MCP joint of the injured finger in flexion. See Figure 3. Blocking the MCP joint in flexion prevents full flexion of the interphalangeal (IP) joints which places maximum tension on the dorsal apparatus over the PIP joint. With the MCP blocked during finger extension, all force is directed toward proximal excursion of the dorsal apparatus over the PIP joint and thus demands that the lateral bands glide dorsally and proximally. This allows functional, although limited, use of the hand. For a thorough explanation of the use of a RMO to facilitate active redirection see BraceLab's [Clinical Pearl No. 26](#).

T.J. also began oblique retinacular ligament (ORL) stretches with the PIP joint held in extension during active flexion of the DIP joint six times daily. See Figure 4. This exercise takes the ORL to its longest position, which has been in a shortened position when the boutonniere deformity allows the DIP joint to rest in hyperextension. Active



*Figure 4: PIP joint must be in full extension when flexing the DIP joint to effectively lengthen the ORL*

or passive DIP joint flexion with the PIP joint held in full extension brings the lateral bands to their most dorsal position.

T.J. was instructed to avoid tight gripping and to avoid all sports play but was allowed to per-



*Figure 5A: Flexed fingers showing buddy taping*      *Figure 5B: Extended fingers showing buddy taping*

form light activities of daily living. After wearing the RMO full time daily for 10 weeks, T.J. achieved full active range of motion of the PIP joint. As a precaution, the injured digit was buddy taped to an adjacent finger when T.J. returned to sports at 12 weeks. (See Figure 5 A & B).

Traditionally, prolonged immobilization of the PIP joint in extension for all boutonniere injuries was required, but T.J. is an example of successful use of a relative motion orthosis to allow early PIP joint motion while maintaining PIP joint extension and a safe return to sport after injury.



[www.BraceLab.com](http://www.BraceLab.com)  
support@BraceLab.com

Look for clinical information in our *Clinicians Classroom* at BraceLab.com, including information previously at HandLab.com

## USING A RELATIVE MOTION ORTHOSIS WHEN TREATING A BOUTONNIERE INJURY (continued)

### REFERENCES

1. Merritt WH, Wong AL, Lalonde DH. Recent developments are changing extensor tendon management. *Plast Reconstr Surg.* 2020;145(3):617e-628e. doi: [10.1097/PRS.0000000000006556](https://doi.org/10.1097/PRS.0000000000006556). PMID: 32097332
2. Merritt WH, Jarrell K. A paradigm shift in managing acute and chronic boutonniere deformity: Anatomic rationale and early clinical results for the relative motion concept permitting immediate active motion and hand use. *Ann Plast Surg.* 2020;84(3S Suppl 2):S141-S150. doi: [10.1097/SAP.0000000000002307](https://doi.org/10.1097/SAP.0000000000002307).
3. Colditz JC. Active redirection instead of passive motion for joint stiffness. *IFSSH Ezine*, 2014;4(4):41-44. [https://www.ifssh.info/pdf/ISSUE16\\_November\\_2014.pdf](https://www.ifssh.info/pdf/ISSUE16_November_2014.pdf)