Journal of Hand Therapy 26 (2013) 287–290

Contents lists available at SciVerse ScienceDirect

Journal of Hand Therapy

journal homepage: www.jhandtherapy.org

Practice Forum

A simple distal radioulnar joint orthosis

Virginia H. O'Brien OTD, OTR/L, CHT[a,b,*], Jennifer Thurn OTR/L, CHT[a,b]

[a] Fairview Hand Center, University Orthopaedics Therapy Center, Minneapolis, MN, USA
[b] University of Minnesota Medical Center, Fairview, Minneapolis, MN, USA

ARTICLE INFO

Article history:
Received 24 March 2013
Accepted 8 April 2013
Available online 18 May 2013

Keywords:
Distal radioulnar joint orthosis
Orthosis
Wrist
Ligament laxity
Wrist injury

ABSTRACT

These authors describe an orthosis they have successfully used in their clinic to treat patients with distal radioulnar joint instability. In addition to describing how they fabricate the orthosis, these authors also describe how they determine if the patient needs volar or dorsal support, and how they then incorporate this support into the orthosis — *Victoria Priganc, PhD, OTR, CHT, CLT, Practice Forum Editor.*

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Introduction

Distal radioulnar joint (DRUJ) instability can result from traumatic injury: fracture of the distal radius or ulna, ligament injuries of the proximal radioulnar joint (PRUJ), DRUJ, ulnocarpal ligaments or extensor carpi ulnaris (ECU) tendon sheath, laxity related to systemic disease such as rheumatoid arthritis or Ehler–Danlos syndrome, or to general ligamentous laxity.[1] Instability of the DRUJ is categorized as volar, dorsal (most common), or global by the direction of the ulna in relation to the radius. Painful forearm supination, with ulnar head depression, is a clinical sign of volar instability (Fig. 1). Whereas painful pronation, with ulnar head prominence, is a clinical sign of dorsal instability.[2] When pain is present with both supination and pronation, it indicates a global instability pattern. The varied clinical tests for DRUJ instability have been well described in the literature.[3–5]

While surgical repairs are available, conservative intervention to control pain from the unstable DRUJ is often chosen as a first route. Non-surgical treatment choices may include radiocarpal strengthening, wrist stability exercises, or resting the joint in a wrist, forearm, or long-arm orthosis.[6,7] However, to create an orthosis that controls the excessive motion of the DRUJ can be difficult and challenging. The goal of fabricating an ideal DRUJ orthosis is to gain purchase of the two forearm bones, stabilize the DRUJ, yet still allow full wrist and elbow range of motion. The ideal DRUJ orthosis stabilizes without pressure points, while preventing excessive translation of the radius and ulna as they relate to each other during forearm rotation.

The limitations of current orthoses in the literature include restriction of range of motion (ROM) of the wrist and elbow, or forearm rotation, with inconsistent pain relief.[6–8]

Our clinic has designed a simple distal radioulnar joint (S-DRUJ) orthosis that supports, or controls the DRUJ without restricting wrist or elbow ROM, while allowing functional forearm rotation. We hypothesize it provides a counterforce which mimics the stabilizer ligaments to "seat" the ulnar head in the sigmoid notch of the radius. Clinically, patients report a significant reduction in pain and improved stability. This article shares our design with the readers.

How to fabricate the S-DRUJ orthosis

Decision tree for dorsal or volar instability support

Before this orthosis is fabricated, a clinical determination should be made as to which direction the DRUJ will be supported. This can be done first with a manual check. The patient places the elbow flexed to 90° on the table opposite the therapist, hand pointing to the ceiling, and forearm in neutral rotation. The therapist then applies a counterforce maneuver to mimic an anatomical alignment force. First, apply a *dorsal direction* force to the *volar radius* while simultaneously applying a *volar direction*

This paper was adapted from a poster presentation, presented by the above authors at the ASHT/ASSH Combined Annual Meeting, San Antonio, TX 2005, USA.

No grant support was received.

* Corresponding author. 2450 Riverside Ave., Suite R102, Minneapolis, MN 55454, USA. Tel.: +1 612 273 7880, +1 651 245 6664 (cell); fax: +1 612 273 7101.
E-mail addresses: vobrienotd@gmail.com, vobrien1@fairview.org (V.H. O'Brien).

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http://dx.doi.org/10.1016/j.jht.2013.04.004

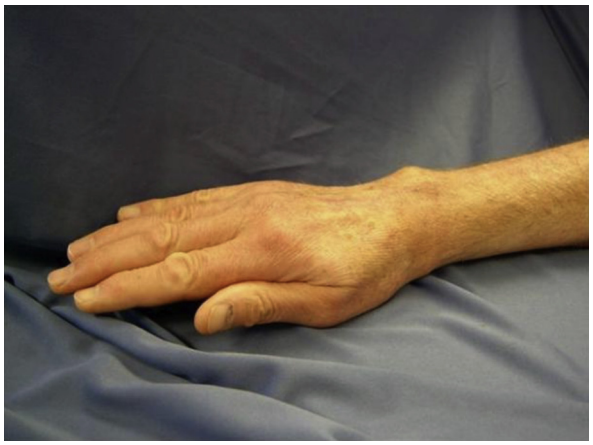

Fig. 1. Typical ulnar head prominence seen with dorsal DRUJ instability.

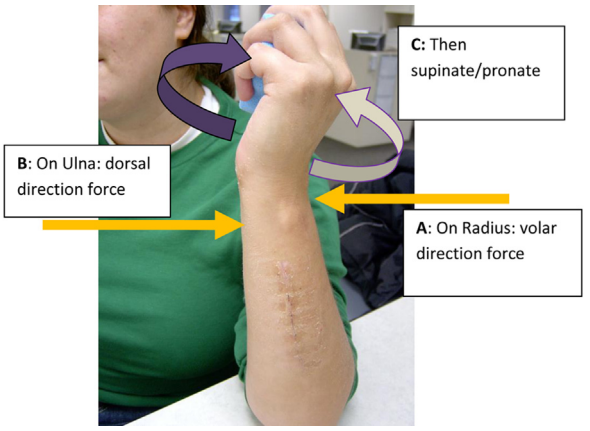

Fig. 3. Counterforce test for DRUJ support: for volar instability.

counterforce to the *dorsal ulna* (Fig. 2). The applied force should be just enough to position the joint in a more anatomical position. While the therapist maintains this pressure, the patient actively rotates the forearm. Note if this maneuver relieves their pain. If so, use this counterforce in the orthosis. If it does not, apply a counterforce in the opposite direction. This time, apply *volar direction force* to the *dorsal radius* and a *dorsal direction counterforce* to the *volar ulna* (Fig. 3). While maintaining this pressure, again allow the patient to rotate the forearm while noting pain relief. Build the counterforce into the orthosis, which corresponds to the position that provides pain relief. If neither of the maneuvers described above provide pain relief, then it is unlikely that the S-DRUJ orthosis will be helpful.

1. Materials needed:
   - 1/16″ thick elastic-type polyester thermoplastic, cut a width equal to the circumference of the forearm plus 2″ and a length of approximately 4–6″ (shorter for the easy to control DRUJ, longer for the hard to control DRUJ).
   - Two 1/8″ thick self-adhesive gel sheet strips, cut approximately 3/4″ wide, and the same the length of the orthosis.
   - 2–1″ wide self-adhesive hook and loop straps with D-rings attached.
   - Stockinet to use as a liner, and or moleskin to fabricate a tongue flap.

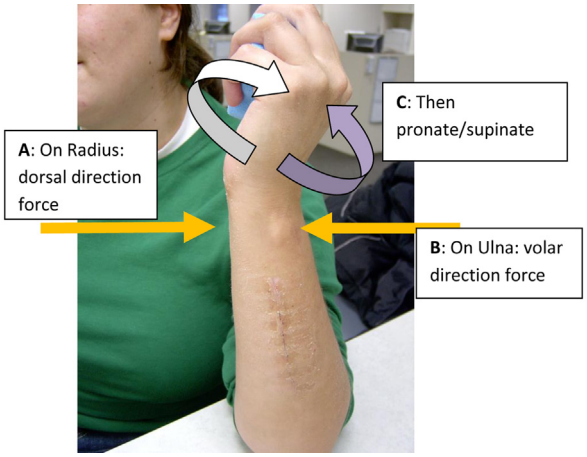

Fig. 2. Counterforce test for DRUJ support: for dorsal instability.

2. Heat the plastic and mold it circumferentially to the neutral positioned forearm (Fig. 4). Pinch the material together along the ulnar forearm border (or this can be seamed at radial aspect as needed) and trim the seam. While the material is still warm, provide the gentle counterforce pressure as determined in your manual assessment, with as much interosseous molding and definition between the ulna and the radius as possible (Figs. 5 and 6). When cool, pop the seam open, remove the orthosis, trim as needed, and smooth the seam edges.
3. Apply the counterforce gel strips after the orthosis is molded to mimic the counterforce applied in the test maneuver (as described above):

Fig. 4. Initial application for construction of DRUJ orthosis.

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