Reconstruction of the Distal Oblique Bundle of the Interosseous Membrane: A Technique to Restore Distal Radioulnar Joint Stability

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The distal radioulnar ligament reconstruction is a technique that may be used for distal radioulnar joint instability without arthritis and failed nonsurgical management; clinical results demonstrate resolved or improved stability. Recent literature has focused on the distal oblique bundle of the interosseous membrane and its contributions to stability. This article describes a technically simple surgical technique to reconstruct the distal oblique bundle and restore distal radioulnar joint stability. *(J Hand Surg Am. 2015;40(11):2279–2282. Copyright © 2015 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Distal oblique bundle, distal radioulnar joint, stability, wrist.

When there is distal radioulnar joint (DRUJ) instability without arthritis and failed nonsurgical management, multiple reconstruction techniques exist to re-create stability.[1–5] The distal radioulnar ligament (DRUL) reconstruction described by Adams[1] is a commonly employed technique with clinical results demonstrating resolved or improved stability in 12 of 4 patients with 1 to 4 years follow-up after surgery.

Recent literature has focused attention on the distal interosseous membrane and a potential contribution to DRUJ stability.[6–10] Noda et al[6] described the distal oblique bundle (DOB) as the most substantial component of the distal interosseous membrane. The DOB has proven to confer stability to the DRUJ in all positions of forearm rotation. Kitamura et al[9] tested 10 cadaver arms and demonstrated that cadaveric specimens with a DOB possessed significantly greater DRUJ stability, as manifested by decreased DRUJ translation in the neutral forearm position compared with those without a DOB. A technique employing reconstruction of the DOB has been recently described in the literature that has been shown to reduce instability at the DRUJ.[11]

This article describes the surgical reconstruction of the DOB to restore DRUJ stability.

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Received for publication June 26, 2014; accepted in revised form August 20, 2015.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

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0363-5023/15/4011-0028$36.00/0
http://dx.doi.org/10.1016/j.jhsa.2015.08.019

INDICATIONS AND CONTRAINDICATIONS

Distal oblique bundle reconstruction is indicated in patients with chronic symptomatic instability of the DRUJ who have failed nonsurgical modalities such as activity modification, orthosis fabrication, and injection therapies. It may serve as an alternative technique to the Adams DRUL reconstruction. This procedure is contraindicated in patients with medical comorbidities precluding operative management and arthritis involving the DRUJ. Standard posteroanterior and lateral radiographs and axial computed tomography scans taken with both forearms in pronation and supination may support a clinical examination of instability and rule out arthritic involvement of the DRUJ. A preoperative evaluation should confirm the diagnosis of DRUJ instability and associated pain by physical examination. The presence of a palmaris longus or extensor indicis proprius should be confirmed if an autograft reconstruction is desired.

SURGICAL ANATOMY

The DOB is a coalescence of obliquely oriented ligamentous fibers within the distal interosseous membrane

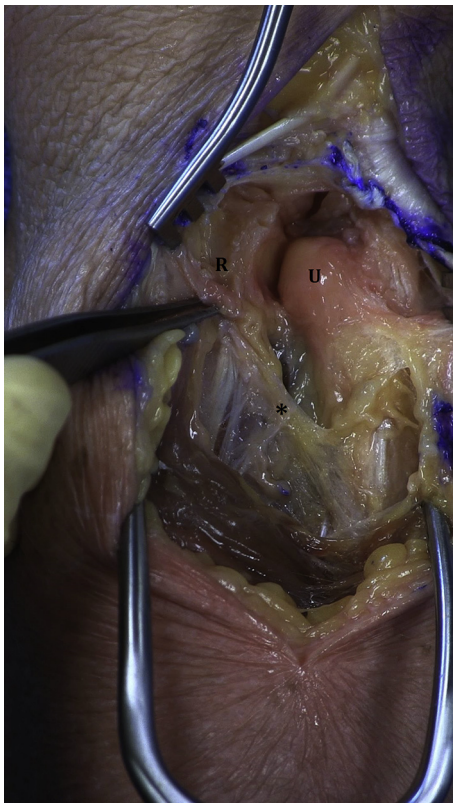

FIGURE 1: Specimen shows the DOB (*). R, radius; U, ulna. Reprinted with permission from Riggenbach MD, Conrad BP, Wright TW, Dell PC. Distal oblique bundle reconstruction and distal radioulnar joint instability. *J Wrist Surg*. 2013;2(4): 330–336.

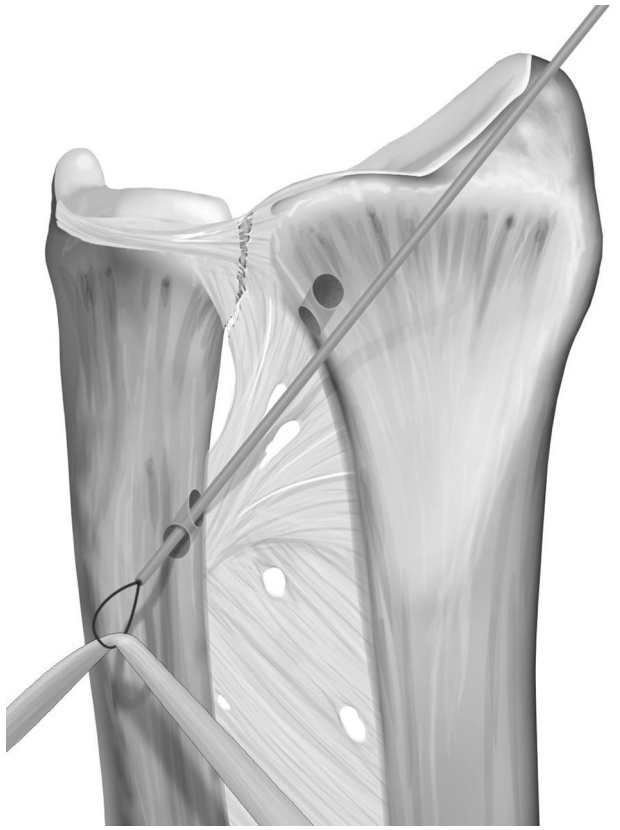

FIGURE 2: Suture passer retrieving the tendon graft through the ulnar drill hole placed approximately one-sixth of the length of the ulna proximal to the ulnar articular surface.

that runs from the dorsal ulna to the inferior rim of the sigmoid notch[6–8] (Fig. 1). Kitamura et al[9] tested 10 cadaver arms and found the DOB was present in 4 of 10. They demonstrated that cadaveric specimens with a DOB possessed significantly greater DRUJ stability, as manifested by decreased DRUJ translation in the neutral forearm position, compared with those without a DOB.

SURGICAL TECHNIQUE

The patient is placed supine on the operating table with the affected extremity on a hand table. A tourniquet is applied around the upper arm. After sterile preparation, draping, and tourniquet inflation, a 6-cm dorsal longitudinal incision is made over the fifth dorsal compartment. The compartment is incised and the extensor digiti quinti tendon is retracted ulnarly. The floor of the fifth dorsal compartment is carefully incised and the underlying interosseous membrane is evaluated for the presence and integrity of the DOB. With chronic instability, the DOB may be torn or severely attenuated. A search for the DOB or remnants should be performed at the inferior rim of the sigmoid notch and along the dorsal ulna approximately one-sixth the length of the ulna from the articular margin to the level of the olecranon process[9,10] (Fig. 1). These landmarks are the origin and insertion of the DOB and should be used as guides for drill hole placement should ligament remnants not be discernible. A 3.0-mm drill is then used to drill holes in the radius just inferior to the sigmoid notch and along the dorsal aspect of the ulna at the landmarks specified as the origin and insertion of the DOB. The ulnar hole should be oriented along the dorsal aspect of the ulna and directed volarly and radially to emerge at the level of the interosseous membrane. The radial drill hole should be placed just inferior to the sigmoid notch in the middle of the metaphyseal radius. The drill holes should leave a 3- to 5-mm bone bridge and should be large enough for easy passage of the graft.

Once the holes have been created, a tendon graft is harvested or, alternatively, an allograft may be used. The palmaris longus, split extensor carpi radialis longus, and extensor indicis proprius have all been used in this reconstruction with success. Often, the ends of the graft require tapering to easily fit through the drill holes. A suture passer is fed through the ulna and radius sequentially retrieving the tendon graft (Figs. 2, 3). An assistant maintains the wrist in 60° of supination while a curved tendon passer (Superior Surgical, Pottstown,