Case Report

Anatomic Reconstruction of the Distal Radio-ulnar Ligament for Distal Radio-ulnar Joint Instability : A Case Report

Sahoo J

Abstract

Stability of the distal radio-ulnar joint (DRUJ) is provided by bony architecture and by soft tissues such as the triangular fibrocartilage complex (TFCC), the joint capsule, and surrounding muscles. Many authors have made various attempts to restore DRUJ stability surgically following trauma. The objective of this study was to analyse clinical outcomes after anatomic reconstruction of the distal radio-ulnar ligaments in a 26 years male with post-traumatic chronic instability of the DRUJ. Anatomic reconstruction of the major structures responsible for joint stability is the most important principle for the treatment of instability of an injured joint with an intact articular surface by using a palmaris longus tendon graft whose ends were anchored in pre-drilled holes in the radius and the ulna. Anatomical reconstruction of the distal radio-ulnar ligaments is thought to be an effective procedure for treating post-traumatic DRUJ instability.

Keywords: Distal radio-ulnar joint, Triangular fibrocartilage complex, Palmaris longus.

Introduction:

Cadaver studies have demonstrated that the volar and dorsal distal radio-ulnar ligaments, which are components of the TFCC, play a major role in stabilising the radio-ulnar joint[1,2]. Many authors have made various attempts to restore DRUJ stability surgically following trauma. However, these non-anatomic procedures are not reliable[3,4]. Anatomic reconstruction of the major structures responsible for joint stability is the most important principle for the treatment of instability of an injured joint with an intact articular surface. The objective of this study was to analyse clinical outcomes after anatomic reconstruction of the distal radio-ulnar ligaments in a patient with post-traumatic chronic instability of the DRUJ.

Author's affiliations:
MBBS, DNB(PMR), DNB(Ortho), Lecturer(PMR), PMDR
Physical Medicine and Rehabilitation Department, Swami Vivekananda National Institute of Rehabilitation Training and Research, Olatpur, Bairoi, Cuttack, Odisha-754010

Cite as:
Sahoo J. Anatomic reconstruction of the distal radioulnar ligament for distal radioulnar joint instability: a case report. *IJPMR June 2013*; Vol **24 (2):** 48-50.

Correspondence:
Dr Jagannatha Sahoo
Plot-1144, Shrabani Residency, Gadasahi Nayapalli, Bhubaneswar, Dist-Khurda-751012, Odisha
E Mail: jagannatha_sahoo@yahoo.co.in

Received on 26/11/2012, Accepted on 25/07/2013

Case Report:

Twenty six years old male had chief complaint of painful motions of the left wrist joint and inability to lift heavy object in that hand. He had history of injury four years back, for which he was treated by crepe bandage application and medication. He had persistent insecurity and discomfort during his daily activities, refractory to conservative management. Then he came to SVNIRTAR on 24.1.11. On examination there is a dimple in the ulnar side on pronation of forearm (Fig 1). The Piano key sign is positive. All the wrist range of movements were within normal limit. No significant tenderness was found.

A 4 to 5 cm curvy-linear skin incision (Fig 2) was made from the distal ulnar head extending proximally along the fifth extensor compartment. The fifth extensor compartment was opened, and the extensor digiti minimi tendon was retracted radially. An L-shaped flap was created in the distal radio-ulnar joint capsule, with one limb made along the dorsal rim of the sigmoid notch and the other made proximal and parallel to the dorsal DRUJ. The palmaris longus tendon graft (Fig 3) was harvested, and each end of the graft was connected to a thread to facilitate easy passage through the tunnels. A 2.0 mm drill hole was made in the radius, and then gradually enlarged with a straight curette to allow free passage of the tendon graft. To make the ulnar tunnel, the wrist was flexed volarly and the TFCC was pulled

Fig 1- *Showing Dimple*

Fig 2- *Showing Skin Incision*

Fig 3- *Showing Graft*

distally to expose the ulnar fovea. With the ulna pulled dorsally, a tunnel was made through the ulnar fovea at a tilt angle towards the ulnar side of the ulnar neck in the same way for the radial tunnel (Fig 4). The tendon graft was passed through the radial tunnel and both of its limbs were brought to the opening in the ulnar fovea. Then both limbs were passed through the ulna tunnel to the ulnar side of the ulnar neck. The limb on the volar side surrounded the ulna and was sutured with the other limb using 3-0 non-absorbable sutures (Fig 5). During the suturing procedure, both limbs were pulled taut with the forearm in neutral position, and care was taken not to restrict forearm rotation by imposing excessive tension. Motion of the wrist joint and the DRUJ was checked, and the final status of the reconstructed tendon was assessed with the anteroposterior stress test. Postoperatively, long-arm cast was applied for 6 weeks, followed by range of motion exercise to restore normal joint mobility. Normal activity was allowed at 10-12 weeks postoperatively, once normal range of motion was achieved.

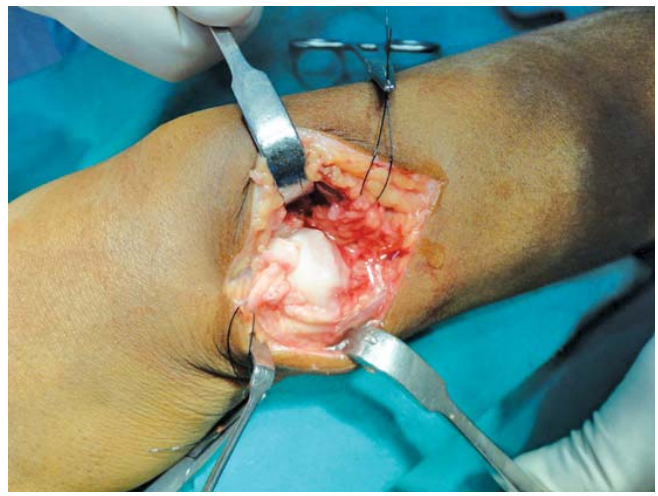

Fig 4- *Showing the Tunnel*

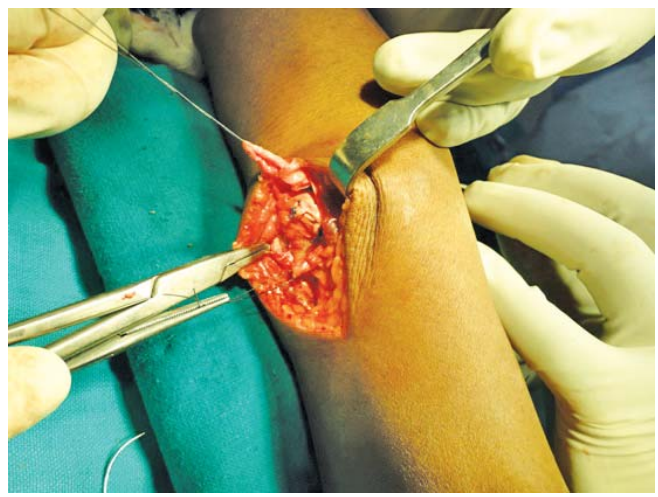

Fig 5- *Showing Suturing*

Objective clinical examination was performed using the anteroposterior stress test, range of motion evaluation, grip strength assessment using a dynamometer and plain radiography. Subjective clinical evaluation was performed using the Patient Rated Wrist Evaluation (PRWE)[5] and the Disabilities of the Arm, Shoulder and Hand (DASH)[6] at six months and one year . Till date patient have no similar complaint as before.

Discussion:

The methods for treating DRUJ instability have evolved from non-anatomical methods such as tenodesis to anatomical methods such as reconstruction of the distal radio ulnar ligaments. As anatomical reconstruction has been proven as the optimal treatment for instability in other joints such as knee and elbow, this attempt is quite natural. The reconstruction procedures suggested by some authors[7,8] using the palmaris longus tendon has been shown to be the most reliable and anatomically acceptable surgical technique. I performed distal radio-ulnar ligament reconstruction accordingly. DRUJ instability is difficult to diagnose because it presents with variable and often indistinct symptoms. The diagnostic criteria of DRUJ instability in the current study included repeated subluxation and reduction or dynamic instability observed during the stress test. The satisfactory results cannot be expected only by the joint realignment in patients with obvious subluxation because the dynamic instability would impair the DRUJ function. It is clear that ligament reconstruction is required when functional disability is largely attributable to dynamic instability. Functional results were satisfactory with preservation of joint motion. At the last follow-up, no objective symptoms or signs of subluxation were noted. Anatomical reconstruction of the distal radio-ulnar ligaments is thought to be an effective procedure for treating posttraumatic DRUJ instability.

References:

1. Af Ekenstam F, Hagert CG. Anatomical studies on the geometry and stability of the distal radio ulnar joint. *Scand J Plast Reconstr Surg 1985*; **19:** 17-25.
2. Palmer AK, Werner FW. The triangular fibrocartilage complex of the wrist: anatomy and function. *J Hand Surg Am 1981*; **6:** 153-62.
3. Breen TF, Jupiter JB. Extensor carpi ulnaris and flexor carpi ulnaris tenodesis of the unstable distal ulna. *J Hand Surg Am 1989*; **14:** 612-7.
4. Tsai TM, Stilwell JH. Repair of chronic subluxation of the distal radioulnar joint (ulnar dorsal) using flexor carpi ulnaris tendon. *J Hand Surg Br 1984*; **9:** 289-94.
5. MacDermid JC, Turgeon T, Richards RS, Beadle M, Roth JH. Patient rating of wrist pain and disability: a reliable and valid measurement tool. *J Orthop Trauma 1998*; **12:** 577-86.
6. Hudak PL, Amadio PC, Bombardier C. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder and hand). The Upper Extremity Collaborative Group (UECG). *Am J Med 1996*; **29:** 602-8.
7. Adams BD, Berger RA. An anatomic reconstruction of the distal radioulnar ligaments for posttraumatic distal radioulnar joint instability. *J Hand Surg Am 2002*; **27:** 243-51.
8. Lawler E, Adams BD. Reconstruction for DRUJ instability. *Hand (N Y) 2007*; **2:** 123-6.

IAPMRCON 2014

The 42nd Annual National Conference of
Indian Association of Physical Medicine & Rehabilitation

From: **23th January - 26th January 2014**

Venue: **IC & SR Building IIT Campus Guindy, Chennai**

Organising Chairman: **Dr. M. Feroz Khan**

Organising Secretary: **Dr. T. Jayakumar**

Joint Organising Secretaries: **Dr. T. S. Chellakumaraswamy, Dr. B. Prem Anand**

Treasurer: **Dr. P. Thirunavukkarasu**