

The Stabilization Technique for Problematic Proximal Ulnar Stump Instability After the Suave-Kapandji Procedure in Rheumatoid Wrist

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Rheumatoid arthritis is a common cause of arthritis of the wrist, occurring more often among female patients. Despite the introduction of new anti-rheumatoid drugs, which can reduce the incidence of deformity from the disease, there is a large number of patients whose access to these medicines are socioeconomically limited. Moreover, in the case of Thailand, undersupply of rheumatologists also means that treatment for rheumatoid patients, especially in rural areas, remains delayed or lacking. This allows for various types of deformity of the fingers, thumb, wrist, distal radioulnar joint (DRUJ), elbow, and shoulder. At the wrist joint, where rheumatoid arthritis is most commonly observed, deformity such as dorsal prominence of the ulnar head, carpal volar subluxation and supination, and extensor carpi ulnaris (ECU) tendon volar subluxation, collectively known as the “caput ulnae syndrome”, usually occurs and causes patients to suffer from pain and disability.

The DRUJ is usually damaged in rheumatoid arthritis. Synovitis causes attenuation of dorsal capsule and triangular fibrocartilage (TFCC) and results in dorsal dislocation and finally arthritis of the DRUJ. In our observation, patients do experience pain originated from the DRUJ much more than that from the radiocarpal joint.

Focusing on salvaging the DRUJ from instability and arthritis, various procedures have been advocated and provided satisfactory results. These include Darrach’s operation, matched distal ulnar resection, hemiresection interposition arthroplasty (HIT), and the Suave-Kapandji procedure [1-5]. Each procedure has its own advantages and disadvantages, however, all share the most common serious post-operative complication: the proximal ulnar stump instability. This is usually represented by clunks and pain at the proximal end of ulna during forearm rotation, and at pronation in particular. The proximal ulnar stump prominence is more profound when the patient makes a tight grip.

At our institute, the Suave-Kapandji procedure is preferred when dealing with the DRUJ problem. As reported previously, we encountered the postoperative proximal ulnar stump instability and pain in a number of patients [6,7]. The instability can be detected in dorso-palmar and radioulnar directions, the so-called “radial impingement syndrome” [7,8]. To overcome this problem, we used the soft tissue stabilizing procedure, pronator quadratus muscle transfer and extensor retinaculum reconstruction, in combination with the Suave-Kapandji procedure. We published this technique in the *Hand Surgery* 2014, Vol.19, No.1:25-32. Although pronator quadratus muscle transfer had been reported, none of them had reported its use for the rheumatoid wrist [9,10].

The principle of the operation is to transfer the pronator quadratus muscle from the volar to dorsal aspect by release muscular attachment from the volar aspect of the ulna and reposition it to the dorsal aspect through the longitudinally cut interosseous membrane. The muscle is sutured to the dorsoulnar soft tissue complex, which includes dorsoulnar periosteum of ulna and the base of the extensor retinaculum flap [Figure 1]. In this new position of the pronator quadratus muscle, it will act as a cushion between the radial and ulnar shafts which, by theory, can prevent the radial impingement syndrome. In addition, during forearm rotation, contraction of the pronator quadratus will also pull the proximal ulnar stump anteriorly and will result in the reduction of dorsopalmar instability.

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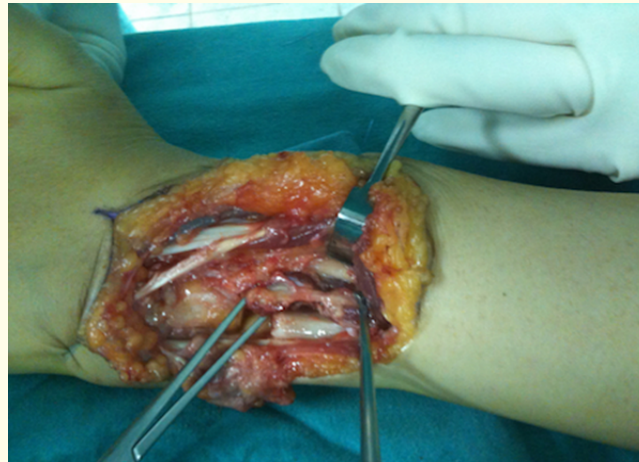


Figure 1: The pronator quadratus muscle is released, transferred dorsally through the interosseous space, and sutured to the dorsal periosteum of the ulna.

The extensor retinaculum flap, which must be preserved at the beginning of operation, is designed as a 3cm-wide ulnarly-based rectangular shape, covering the length from the 3rd to the 6th compartment [Figure 2 and 3]. This soft tissue flap is divided equally into 2 slips, proximal and distal flaps. At the end of the operation, the proximal flap is passed underneath the 4th, 5th, and 6th extensor compartments to prevent attritional lesion, while the distal flap is passed over all three compartments to prevent bowstringing of the extensor tendons. They are sutured to the remnants of the extensor retinaculum at the radial side. By this new arrangement of the extensor retinaculum, it will create the “scissoring effect” where all extensor tendons from 4th to 6th compartment – the ECU tendon in particular – will be kept between these 2 extensor retinaculum flaps [Figure 4 and 5]. The re-positioned ECU tendon at the dorsum of the proximal ulnar stump will provide an additional force to reduce the dorsal instability of the proximal ulnar stump via its contraction during grasping.





Figure 2 and 3: The ulnarly-based rectangular flap of extensor retinaculum must be preserved at the beginning of the operation.



Figure 4 and 5: The extensor retinaculum flap is divided equally into proximal and distal flaps. Then the proximal flap passes underneath while the distal flap passes over extensor tendons to suture at the radial soft tissue remnant creating “the scissoring effect”.

In our case series report, ten patients were female with an average age of 46 years. The follow up period was around 24 months. The results had shown that the reduction of pain and increase of supination motion were significantly improved clinically. There was no clunk sensation or pain detected at the proximal ulnar stump. Radiographic assessment revealed that, in static mode, the proximal ulnar stump improved significantly in dorsopalmar direction. The dorsal displacement reduced significantly to an almost normal position in the lateral view, while the radioulnar distance did not decrease. In the dynamic mode, by asking the patient to make a very tight grip, the dorsal stability of the proximal ulnar stump was still maintained in lateral view [Figure 6, 7, and 8]. The radioulnar distance, on the other hand, decreased significantly, although this did not cause any pain observed by the patients. The transferred pronator quadratus muscle mass situated between the radial shaft and proximal ulnar stump may have provided some cushioning effect in this instance.



Figure 6 and 7: Postoperative results demonstrate the good proximal ulnar stump stability in dorsopalmar direction during static and dynamic mode.



Figure 8: Postoperative radiographs demonstrate good stability of the proximal ulnar stump in dynamic and static mode.

At our institute today, we prefer to use the Suave-Kapandji procedure for salvaging the DRUJ from instability and arthritis in rheumatoid arthritis patients. Additionally, to prevent proximal ulnar stump instability, we routinely perform the soft tissue stabilizing procedure which combines the pronator quadratus muscle transfer and extensor retinaculum reconstruction simultaneously, in order to achieve satisfactory results.

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