

An alternative treatment for degenerative triangular fibrocartilage complex injuries with distal radioulnar joint instability: First experience with 48 patients

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ABSTRACT

Treatment of Ulna impaction syndrome (UIS) combined with distal radioulnar joint (DRUJ) instability due to irreparable degenerative triangular fibrocartilage complex (TFCC) injuries can be complex. We describe the outcomes of a novel technique for restoring DRUJ stability due to UIS using a distally based longitudinal extensor carpi ulnaris tendon strip (ECU) combined with Ulna Shortening Osteotomy (USO) in 48 patients. Patients were analyzed using standardized outcome measurements. The PRWHE total score improved from 66 (SD =15) at intake to 40 (25) at 3 months, and 28 (23) at 12 months postoperatively ($P<0.001$). The AROM showed a significant improvement in dorsal flexion and palmar flexion from 53° (11) at intake to 65° (8) 12 months ($P<0.001$) and from 45° (10) to 56° (12) ($P=0.01$), respectively. Adding a distally based longitudinal ECU strip to USO for restoring DRUJ stability, seems to be an effective treatment in patients with irreparable degenerative TFCC injuries due to UIS.

Surgical procedure

After brachial plexus block or general anaesthesia, a tourniquet was placed on the upper arm. A longitudinal incision on the dorsal-ulnar side of the forearm is made (Figure. 1a), taking care to preserve the dorsal sensory branches of the ulnar nerve. An oblique osteotomy was performed and the ulna was shortened by several millimeters according to the preoperative planning. The preoperative planning was done using pronated grip views and the ulna variance was assessed with the perpendicular method (Steyers and Blair, 1989). The surgeons performed the osteotomy using an external cutting device (Acumed® or Trimed®). The hardware was placed on the dorsal surface of the distal ulna.

After performing USO, the DRUJ stability was re-examined by the same surgeon as before USO with the ballotement test and was compared with the unaffected side. In case of persistent instability, an ECU strip reconstruction was added. About 2 cm proximal from the ulnar neck, the ECU was longitudinally split up to a length of one-third of the forearm (Figure. 1b). We use the radial-sided ECU strip with a diameter of 3-4 mm and a length of about 12-14 cm to stabilize the DRUJ. The ECU tendon strip was transposed first proximal to the ulnar head under the extensor digiti minimi flush over the bone towards the distal radius (Figure. 1c). At the level of the DRUJ, a suture anchor (Parcus or Mitek anchors) was placed at the dorso-ulnar area of the radius (Figure. 1d), anchoring the strip here but not too tight. The next transposition of the ECU strip was made at the distal level of the ulnar head, the strip was transposed flush over the TFCC complex towards the ulnar styloid (Figure. 1e). At this level, an incision was made at the palmar side of the ECU sheath. Through this incision, the ECU split was transposed inside the ECU sheath to its origin (Figure. 1f). Before suturing the ends together, we check that the loop fits well and is nearly tight against the ulnar head and around the DRUJ but is yet not pulled to maximal tightness. The next step is to suture the ECU split near the bone anchor and to fix it as tight as possible to the anchor and distal radius (Figure. 1g). The last step is suturing the proximal end with non-absorbable sutures, the wound was closed with Vicryl, Monocryl, or Prolene (Ethicon) in layers. Figure 2 demonstrates the ECU split technique.



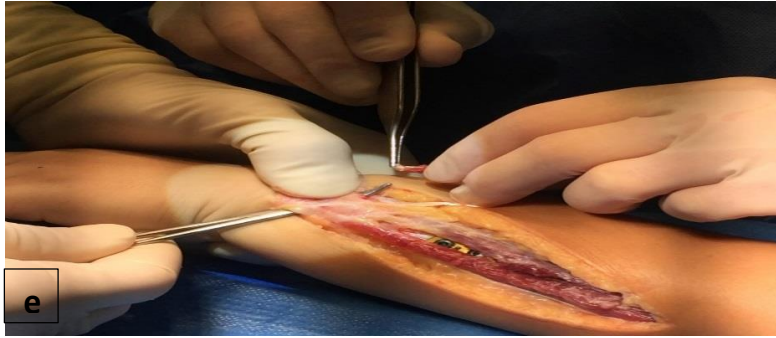


Figure 1. Surgical technique (a). A dorso-ulnar incision is made (b). An ECU split of about 4 mm in diameter and 12 cm in length is used (c). The ECU split is tunneled over bone towards the distal radius (d). At the level of the DRUJ, a suture anchor is placed at the dorso-ulnar surface of the radius and fixing the ECU split with it but not tight (e). Tunneling the split flush over the TFCC complex towards the processus styloideus ulnae (f). The ECU split is tunneled through a volar incision at the ECU sheet to its origin (g). Before suturing the ends of the ECU split, suture the ECU split near the bone anchor and fix it as tight as possible to the anchor and distal radius.

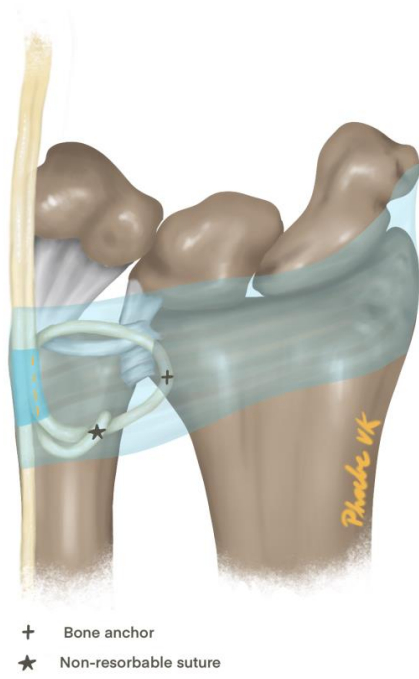


Figure 2. Illustration of the ECU split technique