

ARTHROSCOPIC REPAIR OF THE ULNAR TEAR OF THE TFCC

T. NAKAMURA, H. IKEGAMI, K. SATO, N. NAKAMICHI, N. OKUYAMA, S. TAKAYAMA

Department of Orthopaedic Surgery, School of Medicine, Keio University, Tokyo, Japan

SUMMARY

Purpose: Repair of the ulnar tear of the triangular fibrocartilage complex (TFCC) is controversial. We presented arthroscopic repair technique of the ulnar disruption of the TFCC. **Methods:** Seventeen wrists of ulnar side tear of the TFCC were treated by arthroscopic trans-ulnar or capsular repair technique. Relief of pain, changes in range of rotation, and DRUJ instability was examined pre- and postoperatively. Period between the initial injury and surgery, and preoperative ulnar variance were also analyzed. **Results:** We obtained 11 excellent, 1 good, 3 fair and 2 poor clinical results overall. Trans-ulnar suturing was superior to the capsular suturing. The earlier the repair was done, the better clinical results obtained. Positive ulnar variance indicated relatively worse results. **Conclusions:** Arthroscopic repair of the TFCC via trans-ulnar fashion is adequate repair method for ulnar disruption of the TFCC. *Riv Chir Mano* 2006; 3: 291-293

KEY WORDS

Triangular fibrocartilage complex, ulnar tear, wrist arthroscopy, repair

INTRODUCTION

The triangular fibrocartilage complex (TFCC) is a ligament-fibrocartilage complex at the ulnar side of the wrist (1, 2) (Fig. 1). The radioulnar ligament, which is the most important stabilizing ligament between the radius and ulna, is demonstrating vertical origin from the center of the fovea (3, 4). The central attaching fiber of the RUL demonstrates nearly isometric length pattern during forearm rotation (5).

When the TFCC is torn (6), arthroscopic partial resection, arthroscopic repair, open repair, ulnar shortening procedure and reconstruction are used for treatment (7). For ulnar detachment injury of the TFCC (7), severe DRUJ instability may be induced, thus repair and reconstruction of the TFCC are recommended. In this paper, we described our arthroscopic repair technique for ulnar TFCC tear.

PATIENTS AND METHODS

We treated 17 wrists (8 male, 9 female; 7 right, 10 left) of TFCC tear with the arthroscopic repair techniques. Age ranged with 14 to 37 with a mean age of 24. There were horizontal TFCC tear with distal ulnar tear in 6 wrists, ulnar detachment in 10, and proximal tear in 1 wrist. Period between the initial injury and operation was average 8 months (range 1 month to 4 years). Technique used was the capsular suturing in 3 wrists (Zachee method (8) in 2 wrists, Whipple method (9) in 1 wrist) and the trans-ulnar suturing in 14 wrists. Ulnar variance was +2 mm in 5 wrist, 0 mm in 10 wrist, and -1 mm in 2 wrists. Average follow up was 3 years 6 months. Clinical evaluation system including relief of pain, range of rotation, and DRUJ instability was used. We also analyzed the differentials in suturing methods, in injury condi-

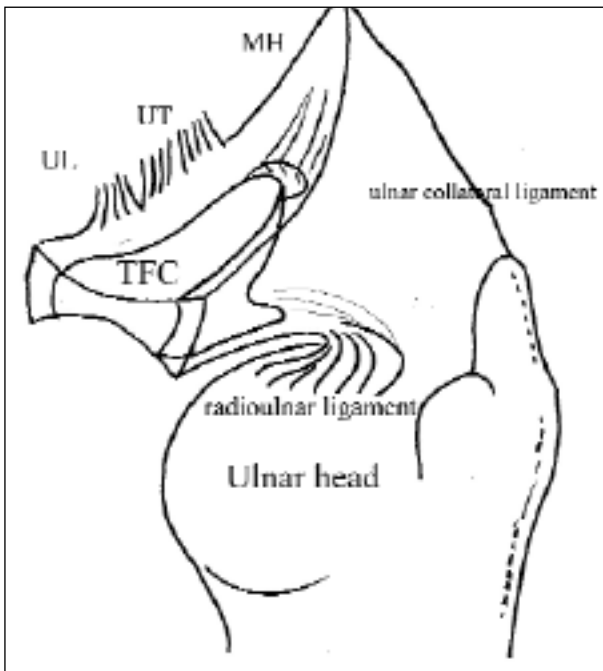


Figure 1. Three dimensional structure of the TFCC. The TFCC consists of the distal hammock-like component supporting the ulnar carpus, proximal component as the radioulnar ligament, and the ulnar component consisting of the sheath floor of the ECU and thickened ulnar joint capsule. TFC, triangular fibrocartilage; UL, ulnolunate ligament; UT, lunotriquetral ligament; MH, meniscus homologue.

tions such as acute, semi-acute and chronic and in ulnar variances.

TECHNIQUE

In the capsular suturing method, the injured TFCC was sutured to the ulnar capsule with inside-out (8) or outside-in (9) techniques. In the trans-ulnar suturing, the detached TFCC was tightly pull-out sutured to the ulnar fovea with the stitches through two small holes from the ulnar cortex of the ulna (Fig. 2). Anatomical findings of the TFCC (2-4) induced the basic concept of this technique (Fig. 3), where the line between the ulnar apex of the triangular fibrocartilage and 15 mm proximal point from the ulnar styloid runs through the center of the fovea, the isometric point of the forearm rotation.

RESULTS

Pain was in all 17 wrists preoperatively. Postoperatively 11 wrists indicated no pain, mild motion pain was in 1 and severe pain remained in 2. In 4 wrists, recurrence of pain was noted 8 to 12 months after the surgery. There was no loss of range of rotation pre and postoperatively. DRUJ instability was found in all 17 wrists, including severe instability (no end point) in 13, moderate (obvious instability) in 2, and mild instability in 2. There was no DRUJ instability in 12 wrists postoperatively, however, in 5 wrists, moderate to severe DRUJ was found. Final clinical results obtained was 11 excellent, 1 good, 3 fair and 2 poor results.

The capsular suturing obtained 1 good, 1 fair and 1 poor result, while the trans-ulnar suturing obtained 11 excellent, 2 fair and 1 poor result.

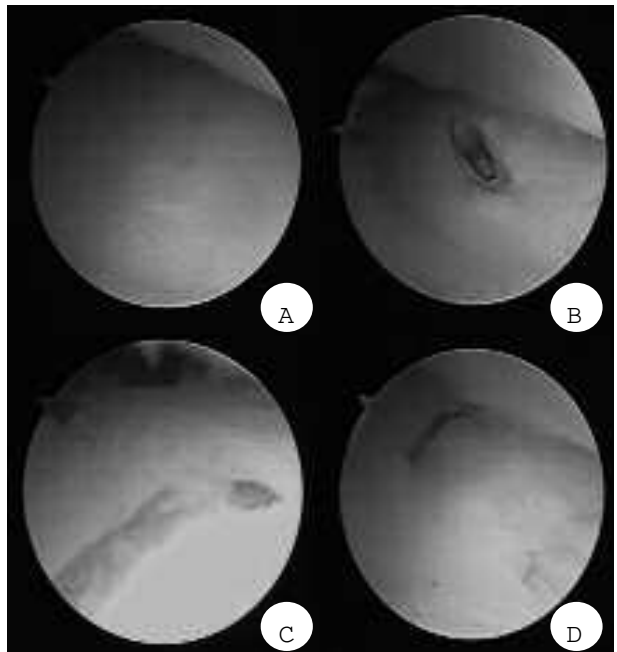


Figure 2. Actual arthroscopic repair of the TFCC (from A to D). A) The ulnar half of the TFCC. Tension of the TFCC is decreased due to detachment of the RUL from the fovea; B) The 21G needle comes from the ulnar cortex of the ulna. This needle must run through the fovea of the ulna; C) The main stitch is set on the TFCC with outside-in fashion. Additional stitch is anchored the ulnar apex of the TFCC to the 6U portal joint capsule; D) The TFCC is tightly sutured to the ulnar fovea.

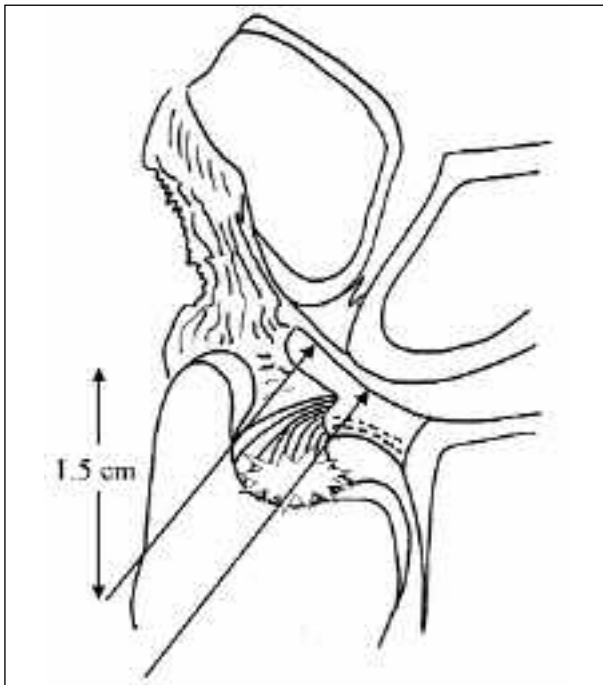


Figure 3. Basic concept of the arthroscopic repair of the TFCC. The line between the ulnar half of the TFC and 1.5 cm proximal from the ulnar styloid lies on the fovea of the ulna, where the forearm rotation axis passes.

All cases with excellent and good results had operation within 7 months (average 4 months). Cases with fair and poor clinical results had arthroscopic repair average 19 months after the initial injury (range 7 months to 4 years).

Positive ulnar variance (+2 mm) wrists indicated 1 excellent, 2 fair and 2 poor result. The neutral to -1 mm variance wrists obtained 10 excellent, 1 good and 1 fair result.

DISCUSSION/CONCLUSIONS

We obtained excellent clinical results, especially with trans-ulnar suturing technique. In the capsular suturing technique, stitches do not go through the injured fovea site, thus DRUJ instability still remained. As opposed in the trans-ulnar suturing technique, the detached TFCC induced into the fovea directly.

Excellent clinical results were also obtained in acute and sub-acute cases, which were treated within 7 months. Chronic cases 7 months after the initial injury indicated fair and poor clinical result. This is maybe due to healing potential of the injured TFCC. Through arthroscopy, debridement of the fovea tends to be insufficient than open repair technique (7).

We also found fair clinical results in positive ulnar variance wrist. When the ulna demonstrates positive variance, the sutured site faced relatively higher pressure from the ulnar head during forearm rotation than in neutral or minus variance wrists. Arthroscopic Wafer procedure or ulnar shortening procedure may be needed.

REFERENCES

1. Palmer AK, Werner FW. The triangular fibrocartilage complex of the wrist -anatomy and function. *J Hand Surg* 1981; 6: 153-62.
2. Nakamura T, Yabe Y, Horiuchi Y. Functional anatomy of the triangular fibrocartilage complex. *J Hand Surg* 1996; 21B: 581-6.
3. Nakamura T, Yabe Y. Histological anatomy of the triangular fibrocartilage complex of the human wrist. *Ann Anat* 2000; 182: 567-72.
4. Nakamura T, Yabe Y, Horiuchi Y, et al. Origins and insertions of the triangular fibrocartilage complex - A histological study. *J Hand Surg* 2001; 26B: 446-54.
5. Nakamura T, Makita A. The proximal ligamentous component of the triangular fibrocartilage complex: functional anatomy and three-dimensional changes in length of the radioulnar ligament during pronation-supination. *J Hand Surg* 2000; 25B: 479-86.
6. Palmer AK. Triangular fibrocartilage complex lesions: a classification. *J Hand Surg Am* 1989; 14: 594-606.
7. Nakamura T, Nakao Y, Ikegami H, Sato K: Open repair of the ulnar disruption of the triangular fibrocartilage complex with double three-dimensional mattress suturing technique. *Tech Hand Up Extrem Surg* 2004; 8: 116-23.
8. Zachee B, De Smet L, Fabry G: Arthroscopic suturing of TFCC lesions. *Arthroscopy* 1993; 9: 242-3.
9. Haugstvedt JR, Husby T. Results of repair of peripheral tears in the triangular fibrocartilage complex using an arthroscopic suture technique. *Scan J Plast Reconstr Surg* 1999; 33: 439-47.