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Short Term Evaluation of Arthroscopic Outside in Repair of Type 1B TFCC Tear With Vertical Mattress Suture

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Abstract
Background: There has been controversy regarding the treatment of TFCC tear. Different surgical techniques for the treatment of TFCC prescribed. The purpose of this study was to evaluate the outcomes of arthroscopic outside in repair of the type1B TFCC tear with vertical mattress suture.
Methods: In this study, arthroscopic outside in repair of the type1B TFCC tear was done in 37 patients with TFCC tear with failure of conservative treatment.
Results: The mean score for pain improved from 7.6 to 2.9 points. The mean MMWS was improved from 62.1 to 91.2 points. DASH score also improved from 29.9 to 10.2 points and PRWE improved from 60 to 33points the ROM was improved from 85.8% to 92%. The grip strength improved from 82.5% to 89%).
Conclusion: Arthroscopic outside in repair of type1B TFCC tear with mattress suture is a reproducible method with improvement in function within a short period.

Keywords: wrist Arthroscopy, TFCC, outside in repair

1. Introduction
Triangular fibrocartilage (TFC) injuries are increasingly recognized as a cause of ulnar-sided Wrist pain. Palmer grouped these tears into either traumatic or degenerative with various sub classifications [1].
The traumatic lesions (class I) were grouped into four types. Type A is a central tear in the TFCC disc. Type B is peripheral tear from the ulnar side. Type C is a tear in the palmar side of the TFCC. Type D is a radial avulsion of the TFCC. Degenerative tears of the TFCC (type II) are caused by normal ageing or arthritis [2]. The central area of fibrocartilage disc is avascular, and is therefore called the debridement zone (60% of TFCC). 10% to 40% of the peripheral area of the TFCC has an extensive blood supply, and is therefore called the repair zone. This vascularity enables the surgeon to effect arthroscopic suture repair of peripheral Palmer type IB and ID TFCC tears which yielded encouraging results in many studies [3].
Conservative treatment for TFCC injury generally includes compresses, long arm splints or elastic bandages, and NSAIDS. Many patients experience relief of symptoms with such conservative treatment. [3] When the response to conservative treatment is poor, and in cases of wide rupture of the TFCC, surgical treatment is recommended due to the risk of DRUJ instability [4].
Acute type IB peripheral tears have been shown to be amenable to suture repair if they fail non operative management. Both open and arthroscopic series have shown good improvement in pain, grip strength, and function with repair of peripheral tears [5].
Several arthroscopic methods have been described, including inside-out, outside-in, and all-arthroscopic techniques [6]. The “outside-in” repair, which involves piercing the TFCC via the ulnar side of the wrist, has been described by several authors [7]. The “outside-in” techniques vary among authors with instrumentation and subtle surgical modifications [8].
The purpose of this study was to evaluate the short-term outcomes of arthroscopic outside in repair of the ulnar side TFCC tear with vertical mattress suture, using different validated scores. Authors also attempted to identify socio-demographic factors and that may be associated with the outcomes after arthroscopic surgery for type 1B TFCC tear.

2. Material and method
2.1 Patients
Our study consisted of 37consecutive arthroscopic outside in TFCC repair for type 1B TFCC tear performed in 37 patients between February 2011 and March 2013. There were 29 male

(29 wrists, 78.4%) and 8 female (8 wrists, 21.6%). The average patient age at the time of surgery was 23.3 years (range: 18-34 years). 17 patients (45.9%) were involved in heavy manual labor, 11 patients (29.8%) were house wives, and 5 patients (13.5%) were employed and 4 patients (10.8) not working at the time of surgery. 26 (70.2%) of the 37 wrist involved the dominant arm. All of these TFCC tears were treated non-operatively before undergoing arthroscopic release. Non-operative measures used were rest, activity modification, splint, physical therapy, non steroidal anti-inflammatory medication, and corticosteroid injection. The mean duration of this treatment was 11.1 months (range: 5-36 months). Clinically, the predominant symptoms were pain that increased with ulnar deviation and grasping. On physical examination, patients consistently had point tenderness distal to the ulnar styloid as well as positive TFCC stress test and TFCC stress test with compression. A neutral rotation posteroanterior radiograph and a pronated grip view to detected ulna positive showed 21 wrists with ulna neutral and 13 wrists with ulna minus and 4 wrists with ulna positive. MRI detected the lesion in 33 of the affected wrists.

All patients underwent an examination and evaluation preoperative and at 1.5, 3, 6 12, 18 and 24 months postoperatively. Patients' assessment consisted of evaluating the range of motion (ROM) and grip strength (Grip strength data are reported as percentage of strength compared with the contralateral healthy wrist). Health-related quality of life outcomes were assessed using two different scores including, the Disability modified Mayo wrist score (MMWS) of the Arm, Shoulder, and Hand (DASH), Visual Analogue Scale (VAS), and Patient Reported Wrist Evaluation (PRWE).

2.2. Operative procedure

The operation is performed under general anesthesia. The patient is positioned supine with the shoulder abducted and the involved extremity on an arm board. A non sterile tourniquet is used. The hand and forearm are draped freely after being prepared.and10 to 15 lbs of traction are applied to the long and ring fingers through the finger traps and placed into the wrist traction tower (Figure.1)...

A standard 3-4 portal just distal to Lister's tubercle is used as the viewing portal for the 2.7-mm arthroscope throughout the TFCC repair process (figure.2). We routinely make a 6-R portal under needle localization just radial to the ECU as the working portal during the repair. After completing a standard diagnostic arthroscopy, the morphology of the TFCC tears had been closely examined. The tear pattern most amenable to the repair technique described here is type IB tear of the TFCC without any clinical or arthroscopic evidence of DRUJ instability (figure.3). Such a tear will often have a positive trampoline test or loss of elastic recoil when the articular disk is depressed with a probe, suggestive of loss of tension to the ulnar capsule (video.1).

Once the tear has been identified and clearly visualized with the assistance of a probe (figure.4) & (video.2). The scar tissue is removed with a synovial shaver, allowing for a new bleeding surface for new scar tissue formation (video.3).

2cm longitudinal incision is made on the ulnar side of the wrist just volar to ECU. Blunt dissection with a right-angled clamp is used to identify and protect any branches of the dorsal sensory branch of the ulnar nerve within the field, and dissection is carried down to the retinaculum.

The instrument set for repair is composed from 2 of 24 gauge needle is used for outside-in repair and 3-0 proline suture as a loop (as the set of the meniscus is of large caliber and can injure the disc). The following steps pertain to each repair suture placed. The typical tear will accommodate between 1 and 2 mattress stitches, with the most volar stitch placed first. With the arthroscope in the 3-4 portal The first needle loaded with 2-0 PDS (polydioxanone monofilament) suture, starting approximately 1 cm proximal to the level of the ulnocarpal joint (Figure.5). The needle is then angled distal and radial to pierce the articular disc several millimeters radial to the edge of the tear (Figure.6) & (video.4). The 2-0 PDS is advanced into the joint, and then withdrawn with small artery forceps outside the joint through the 6R portal, the 2nd straight needle loaded with a loop of 3-0 PDS is inserted starting at the level of the ulnocarpal joint(Figure.7), and is angled directly radial to come through the disc in a point dorsal to the first needle, and the loop is advanced through the needle into the joint, and then withdrawn with small artery forceps outside the joint through the 6R portal. The 2-0 PDS is carefully passed through the loop, the loop are removed together with the 2-0 PDS from within the joint, creating the first mattress suture (Fig. 8). Both ends of each paired suture are sequentially rerouted such that the knot will lie directly on retinaculum with no interposed subcutaneous tissue or potential nerve branches and are then the knots are sequentially tied. Standard closure of the ulnar incision and arthroscopy portals is performed.

Postoperatively the patient was placed in a short arm volar splint postoperatively for 4 weeks. Intermittent bracing with a plastic brace was prescribed for another 4 weeks, and progressive gentle active motion of the wrist was allowed at this stage. Passive stretching exercise and active wrist rotation were prohibited until 3 months postoperatively.

2.3. Statistical analysis

Statistical analysis was performed using the Student's paired t-test to compare between the preoperative and postoperative variables with the statistical significance set at $P < 0.05$. Statistical analysis was performed with SPSS version 19 (SPSS, Chicago, IL).

3. Results

According to the patient's reports, after surgery 16 patients described themselves as completely asymptomatic, 18 were better or much better, and 3 remained the same. A highly statistically significant improvement was identified comparing preoperative with postoperative VAS for pain and PRWE ($P < 0.05$). The mean score for pain improved from 7.6 (range, 5-9) to 2.9 (range 0-7). The total PRWE improved from 55 out of 150 (range, 35-72) to 33 out of 150 (range, 7-68).

The mean MMWS was improved from 62.1 (range 40 - 80) preoperatively to 91.2 (range, 75 -100) postoperatively, this improvement was statistically significant ($P < 0.05$). Evaluation of functional outcomes with the DASH score also revealed statistically significant improvement ($P < 0.05$). The mean preoperative score was 29.9 (range, 6.8-44.2), while the mean postoperative score was 10.2 (range, 0 to 31.8).the range of motion was improved from 85.8% (range 70%- 100%) to 92%(range 70%- 100%) of the normal side. the grip strength of the affected side improved from 82.5% (range 60% to 100% of the normal side) to 89% (range 75%-100%). No significant associations were observed between age, gender, preoperative length of non-operative treatment, time to return to work and final outcome ($P > 0.05$). Two complications were reported: one patient had dorsal ulnar nerve (DUN) neurapraxia, and the other one had weakness in extension of little finger (extensor digiti minimi irritation). Both of them resolved with non operative treatment.

4. Discussion

TFCC injuries are common, especially in an active patient population. When nonoperative modalities fail to resolve symptoms associated with this injury, surgical management is indicated. A number of open, arthroscopic-assisted and arthroscopic techniques have been described [5].

Several series have shown good results of arthroscopic repair of peripheral TFCC tears with the outside-in technique [4]. In a multicenter study of arthroscopic TFCC repairs with an average follow-up of 37 months, Corso *et al*. [9] reported that 29 of 45 wrists were rated as excellent, 12 as good, and 4 as poor according to postoperative MMWS. Millants *et al*. [10] in 2002 published an outcome study of 35 patients who had arthroscopic surgical repair. Patients were assessed using the VAS and DASH score. According to the DASH score, 29 patients had good results, 5 had fair results, and 1 had a poor result. Grip strength and wrist motion were not assessed. Haugstvedt *et al*. [3] reported 70% good to excellent results by Mayo score in their cohort of 20 peripheral tears, with a 90% range of motion and 83% grip strength in comparison with the uninjured side.

The three previously described studies are critically examined the results of arthroscopic treatment of TFCC tears. These studies note the definitive value of arthroscopy with respect to diagnosis upon direct visualization, minimization of soft-tissue trauma, cosmesis, and quicker recovery.

Trumble *et al*. [11] reported that 22 patients treated with arthroscopic technique had a mean arc of motion at 36 months that was 86% of the contralateral side, and a grip strength that was approximately equal to 82% of the contralateral side.

Although the majority of patients received treatment within 4 months of injury, we cannot confirm this for all patients. Our study seems to confirm the results of the previous papers. The technique is easy and the required equipment is available in all the operating theaters. Since all the patients had longstanding therapy previously, and no other pathologies were disclosed, the correlation between the pathology (TFCC tear) and the symptoms (ulnar wrist pain) and the efficacy of the treatment seems to be obvious.

5. Figures

Fig 1: Traction applied to the wrist joint by wrist traction tower

Fig 2: Viewing and working dorsal wrist portals

Fig 3: Type 1B TFCC tear

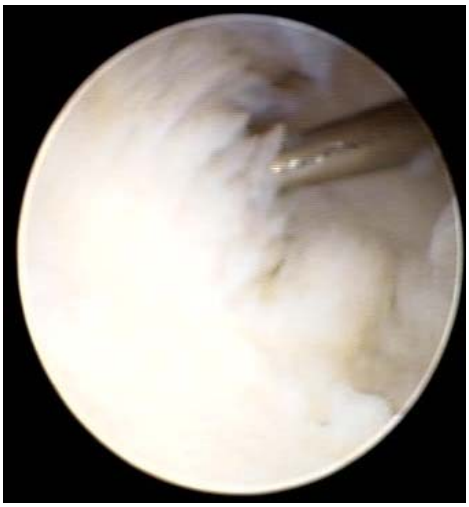

Fig 4: Probing of the TFCC tear.

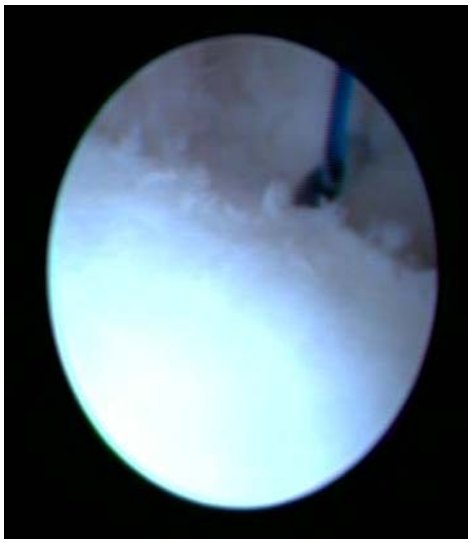

Fig 5: Passage of the 1st suture through the capsule at the level of ulnocarpal joint

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Fig 6: 1st suture passage through the TFC radial to the site of the tear.

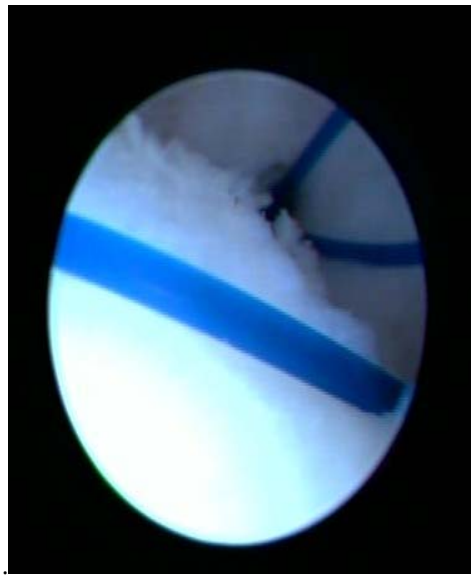

Fig 7: Passage of the suture loop just proximal to the 1st suture.

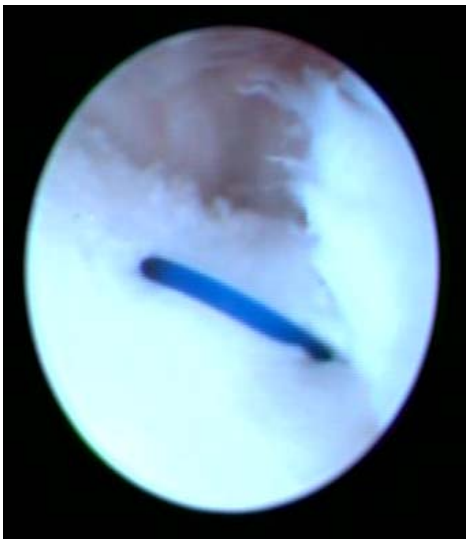

Fig 8: Creating the 1st suture mattress.

6. Conclusion

TFCC tears are a common cause of ulnar-sided wrist pain. Arthroscopic repairs of stable TFCC tears in our series with mattress suture, as well as the literature, have good results. Repair of TFCC tears is important functionally with regard to wrist stability and load bearing. With arthroscopic repair, there seems to be improved ROM and grip strength. Arthroscopic repairs of TFCC tears can restore wrist function, permitting patients to return to sporting activities and labor.

List of abbreviation

TFCC	Triangular fibrocartilage complex
NSAIDS	Non-Steroidal Anti-Inflammatory Drugs
DRUJ	Distal Radio-Ulnar Joint
MMWS	Modified Mayo Wrist Score
DASH	Disability Of The Arm, Shoulder, And Hand
VAS	Visual Analog Scale
PRWE	Patient Related Wrist Evaluation
ROM	Range Of Motion
ECU	Extensor Carpi Ulnaris

7. References

1. Palmer AK. Triangular fibrocartilage complex lesions: a classification. J Hand Surg (Am) 14:594-606,1989.
2. Manfred Infanger and Daniela Grimm: Meniscus and discus lesions of triangular fibrocartilage complex (TFCC): treatment by laser-assisted wrist arthroscopy. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2009; 466-471.
3. Haugstvedt J, Husby T. Results of repair of peripheral tears in the triangular fibrocartilage complex using an arthroscopic suture technique. Scand J Plast Reconstr Surg Hand Surg. 1999; 33:439-47.
4. R.W. Wysocki and D.S. Ruch: Outside-in Repair of TFCC Tears. Oper Tech Sports Med. 2010; 18:163-167.
5. Jeffrey Yao. All-arthroscopic TFCC repair using Fast-Fix. Operative techniques in Sports Med.2010; 18:168-172.
6. Chloros GD, Wiesler ER, Poehling GG: Current concepts in wrist arthroscopy. Arthroscopy. 2008; 24:343-354.
7. Ruch DS, Papadonikolakis A: Arthroscopically assisted repair of peripheral triangular fibrocartilage complex tears: Factors affecting outcome. Arthroscopy. 2005; 21:1126-30.

8. C.J. Micucci and C.C. Schmidt. Arthroscopic repair of ulnar-sided TFCC tear. Oper Tech Orthop. 2007; 17:118-124.
9. Corso SJ, Savoie FH, Geissler WB, *et al*. Arthroscopic repair of peripheral avulsions of the triangular fibrocartilage complex of the wrist: A multicenter study. Arthroscopy. 1997; 13:78-84.
10. Millants P, De Smet L, Van Ransbeeck H. Outcome study of arthroscopic suturing of ulnar avulsions of the triangular fibrocartilage complex of the wrist. Chirurgie de la Main. 2002; 21:298 –300.
11. Trumble TE, Gilbert M, Vedder N. Arthroscopic repair of the triangular fibrocartilage complex. Arthroscopy.1996; 12:588 –597.