The Outcomes of Arthroscopic Repair Versus Debridement for Chronic Unstable Triangular Fibrocartilage Complex Tears in Patients Undergoing Ulnar-Shortening Osteotomy

Joong-Bae Seo, MD,*† Jong-Pil Kim, MD,*† Hyung-Suk Yi, MD,* Kwang-Hee Park, MD*

Purpose The aim of this study was to compare the results of arthroscopic peripheral repair (AR) and arthroscopic debridement (AD) for the treatment of chronic unstable triangular fibrocartilage complex (TFCC) tears in ulnar-positive patients undergoing ulnar-shortening osteotomy (USO).

Methods A total of 31 patients who underwent arthroscopic treatments combined with USO for unstable TFCC tears and were followed-up at a minimum of 24 months were included in this retrospective cohort study. Fifteen patients were treated with AR, and 16 patients were treated with AD while at the same time undergoing a USO. Outcome measures included wrist range of motion, grip strength, Disabilities of the Arm, Shoulder, and Hand (DASH) and Patient-Rated Wrist Evaluation (PRWE) scores, and overall outcomes according to the modified Mayo wrist scoring system. In addition, a stress test to assess distal radioulnar joint (DRUJ) stability was performed before and after surgery to compare the 2 cohorts.

Results Both respective cohorts showed significant improvements in grip strength and subjective scores at the final follow-up. Grip strength, DASH, and PRWE scores were better in the AR group than in the AD group. The recovery rate from DRUJ instability observed during the preoperative examination was superior in the AR group.

Conclusions Both AD and AR of the TFCC combined with USO are reliable procedures with satisfactory clinical outcomes for unstable TFCC tears in ulnar-positive patients. However, AR of the TFCC is suggested if DRUJ stability is concomitantly compromised. *(J Hand Surg Am. 2016;41(5):615–623. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic IV.

Key words Arthroscopic repair, debridement, TFCC tear, ulnar-shortening osteotomy.

Despite a substantial success rate, unsatisfactory outcomes have been frequently observed after direct triangular fibrocartilage complex (TFCC) repair performed either arthroscopically or by the open approach, especially in patients with positive ulnar variance.[1–5] Ulnar-shortening osteotomy (USO) can aid in the healing process by reducing the load on the TFCC. In addition, the osteotomy can also help

*From the *Department of Orthopedic Surgery, College of Medicine, and the †Department of Kinesiology and Medical Science, Graduate School, Dankook University, Cheonan, Korea.*

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This study was approved by the institutional review board of the authors' hospital, and all investigations were conducted in conformity with ethical principles of research. Informed consent was given by all patients for the surgical procedure.

Corresponding author: Jong-Pil Kim, MD, Department of Orthopedic Surgery, Dankook University College of Medicine, 359 Manghyangro, Dongnam-gu, Cheonan 330-715, Korea; e-mail: kimjp@dankook.ac.kr.

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maintain the mechanical integrity of the distal radioulnar joint (DRUJ).[6,7] Several researchers have advocated USO alone for the treatment of TFCC injuries, also showing favorable results.[2,8,9] However, the stabilizing effect on the DRUJ resulting from a USO is not completely understood, especially in patients with unstable TFCC tears. Moreover, there are few studies reporting the clinical results of arthroscopic repair (AR) combined with USO.

The aim of this study was to evaluate the clinical outcomes of arthroscopic treatments for TFCC combined with a USO by comparing 2 cohorts with unstable TFCC tears that were treated with either AR or arthroscopic debridement (AD). We hypothesized that patients undergoing the USO would have better clinical outcomes following an AR of the unstable TFCC tear compared with AD.

PATIENTS AND METHODS

Patients

Ethics approval was granted by the Institutional Review Board of the authors for this retrospective study. All patients who had undergone arthroscopic treatment combined with USO from December 2006 to December 2013 were identified from a clinical database and were used to establish the sample of this study. The indications for arthroscopic treatment combined with USO in patients were (1) persistent ulnar-sided wrist pain in the TFCC area, which was exacerbated by applying axial and rotational stress to the ulnar deviated wrist,[10] or DRUJ instability[11–13] after undergoing conservative management for a 3-month period; (2) TFCC tears diagnosed by T1- and T2-weighted magnetic resonance imaging and confirmed by arthroscopy; and (3) at least 1-mm ulnar-positive variance confirmed with simple or dynamic radiographic views.[14,15] All surgical procedures were performed by the same hand surgeon.

The inclusion criteria for the study cohort were as follows: (1) TFCC tears diagnosed by arthroscopy and positive trampoline test and hook test,[3,11] or direct observation of a rupture at the foveal attachment of the TFCC through a central perforation of the articular disc, which was defined as an unstable TFCC tear; and (2) TFCC tears associated with ulnar-positive variance. Forty-two patients met these criteria (Fig. 1). In the beginning of the study period, we performed AD in the patients undergoing USO for chronic peripheral TFCC tear, but we began performing AR in addition to USO in 2010. No open TFCC repairs or DRUJ stabilization procedures were performed during the study period. The exclusion criteria were as follows: (1) posttraumatic ulnar-positive variance; (2) patients younger than 16 or older than 60 years; (3) radiographic evidence of degenerative arthritis at the radiocarpal joint or DRUJ; (4) bilateral involvement or complete scapholunate or lunotriquetral ligament tears; and (5) follow-up of less than 24 months.

A total of 31 patients were analyzed in this study: the first 16 patients were treated by AD and the latter 15 with AR. All patients underwent USO (Table 1).

Surgical technique

Diagnostic arthroscopy: Arthroscopy portals were established in the standard 3-4 and 4-5 positions with the wrist distracted by 10 to 15 pounds of vertical traction. The TFCC was evaluated with both the trampoline test and the hook test. The trampoline test was considered positive when a compressive load applied across the TFCC with a probe felt soft and compliant.[3,11] The hook test was positive when the TFCC was displaced toward the center of the radiocarpal joint with traction applied to its ulnar-most border with a probe.[2,12] Arthroscopic evaluation was performed before and after the ulnar-shortening osteotomy. Patients with any complete scapholunate or lunotriquetral ligament injury associated with the TFCC tear were not included in the study.

Ulnar-shortening osteotomy and arthroscopic TFCC repair: An oblique osteotomy was performed at the junction of the distal and middle third of the ulna, and fixation was achieved with a 5- or 6-hole low-contact dynamic compression plate (Synthes; Paoli, PA). The ulna was shortened to achieve neutral or −1-mm ulnar variance, but no shortening exceeded 5 mm in total. After the ulnar shortening, arthroscopic repair of the TFCC was performed again when the arthroscopic examination done before the osteotomy revealed an unstable TFCC tear. Often, a central perforation on the articular disc was noted, but several cases also required debridement of an overlying hypertrophic synovium on the peripheral edges of the TFCC to uncover the underlying lesion. Debridement was performed through the central perforation creating a cancellous trough at the fovea, and then a 1.2-mm K-wire was drilled into the fovea to create a bone tunnel. Next, a 20-gauge spinal needle was inserted through the tunnel and passed through the TFCC (Figs. 2, 3). A 1-0 polydioxanone suture was then passed through the needle and brought out of the joint, bringing the end of the suture with the TFCC suture retriever. The proximal end of the polydioxanone suture was pulled out of the ulnar incision by using a probe as a hook retriever. The sutures were tied down over the joint capsule with the wrist in a