Clinical, Radiographic, and Arthroscopic Outcomes After Ulnar Shortening Osteotomy: A Long-Term Follow-Up Study

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Purpose Previous studies have investigated the long-term outcomes of ulnar shortening osteotomy (USO) in the treatment of ulnocarpal abutment syndrome (UCA), but none have used arthroscopic assessments. The purpose of this study was to investigate the long-term clinical outcomes of USO with patient-based, arthroscopic, and radiographic assessments.

Methods We retrospectively reviewed 30 patients with UCA after a minimum follow-up of 5 years, with arthroscopic evaluations at the time of both USO and plate removal. We confirmed the initial diagnosis of UCA by radiography and arthroscopy. Mean age at the time of index surgery was 37 years. Mean duration of follow-up was 11 years (range, 5–19 y). We obtained Disabilities of the Arm, Shoulder, and Hand and Hand20 self-assessments postoperatively for all patients. Bony spur formation was evaluated postoperatively from plain radiographs.

Results We detected triangular fibrocartilage complex (TFCC) disc tear in 13 wrists arthroscopically at the time of USO. Of these, 10 showed no evidence of TFCC disc tear at second-look arthroscopy. The remaining 17 cases showed no TFCC disc tear at either first- or second-look arthroscopy. Follow-up radiography revealed that bony spurs at the distal radioulnar joint had progressed in 13 wrists. Disabilities of the Shoulder, Arm, and Hand and Hand20 scores did not significantly correlate with the presence of bony spurs or TFCC disc tears. Range of motion decreased significantly with age only. Lower grip strength correlated with bony spur and lower radial inclination. Triangular fibrocartilage complex tear, male sex, and advanced age were associated with lower Disabilities of the Shoulder, Arm, and Hand and Hand20 scores.

Conclusions Ulnar shortening osteotomy achieved excellent long-term results in most cases. Most TFCC disc tears identified at the initial surgery had healed by long-term arthroscopic follow-up. We suggest that UCA with a TFCC disc tear is a good indication for USO. *(J Hand Surg 2012;37A:2468–2474. Copyright © 2012 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic IV.

Key words Ulnar shortening osteotomy, ulnar wrist pain, arthroscopy, triangular fibrocartilage complex.

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Ulnar shortening osteotomy (USO) is widely used for various conditions associated with ulnar wrist pain, including ulnocarpal abutment syndrome (UCA) and triangular fibrocartilage complex (TFCC) injury.[1–3] These disorders often arise in young patients, but few previous studies have investigated the long-term outcomes of USO.[4] Ulnar shortening osteotomy decreases the load on the ulnar carpus and may cause degenerative changes in the distal radioulnar joint (DRUJ).[5–7] Although many studies have reported on degenerative changes and biomechanical results, those investigations did not use arthroscopic assessments of the TFCC.[8]

Tatebe et al[9] reported that the avascular zone of the TFCC possesses some potential for repair after USO, but factors promoting such spontaneous repair have not been identified. Numerous soft tissue structures including the TFCC contribute to the stability of the wrist.[10] However, few reports have evaluated arthroscopic findings and long-term clinical results.

We designed the present study to evaluate the long-term clinical results of USO. The purpose of this study was to compare arthroscopic TFCC assessments and radiographic evaluation of the DRUJ with clinical results and subjective evaluations by the patient using the Disabilities of the Arm, Shoulder, and Hand (DASH) and Hand20 questionnaires.[11] Our hypotheses were that USO achieves reasonable results and that the condition of the TFCC affects clinical outcomes.

MATERIALS AND METHODS

The institutional review board approved all study protocols. We retrospectively reviewed patients with UCA who had been observed for a minimum of 5 years and who had had arthroscopic evaluations at the time of both USO and plate removal. With informed consent obtained before the USO, we performed plate removal and second-look arthroscopy for most patients. A total of 73 patients underwent USO; of those, 69 patients underwent subsequent plate removal. Of the 69 patients, 30 had been observed for a minimum of 5 years and were included in this study (18 right wrists and 12 left wrists; 15 men and 15 women). Mean age at the time of index surgery was 37 years and mean duration of follow-up was 11 years (range, 5–19 y). We made a diagnosis based on the medical history and physical examination,[11] including the use of provocative maneuvers such as the ulnocarpal stress test. In addition, plain radiographs indicated ulnar positive variance. Finally, we confirmed the diagnosis of UCA by arthroscopy at the time of USO, which showed chondral or osteochondral lesions on the ulnar side of the carpus.

Clinical assessment

We obtained clinical data from clinical charts. The therapists as independent observers assessed the range of motion and grip strength preoperatively (both USO and removal plate) and at final follow-up. We performed a wrist evaluation on the basis of the Mayo Wrist Scoring System,[12] which included assessment of pain, functional status, range of motion, and grip strength preoperatively; and at second-look surgery and final follow-up. Every patient also filled out Disabilities of the Shoulder, Arm, and Hand (DASH) and Hand20 questionnaires for self-assessment of residual disability of the hand and arm at final follow-up. The Hand20 outcome questionnaire consists of 20 self-reported questions designed to measure upper extremity disability and symptoms, including a 10-point numeric rated scale for pain.[13] Scores for the Hand20 range from 0 to 100, with lower numbers indicating lower levels of disability.

Operative technique and arthroscopic assessment

We placed a longitudinal skin incision along the distal third of the ulna. The gap between the extensor carpi ulnaris and flexor carpi ulnaris was opened to expose the ulna. We made a 5-hole, 3.5-mm dynamic compression plate (made of stainless steel) on the volar surface of the ulna, drilled the 2 most distal screw holes, and fixed them temporarily. We made a longitudinal superficial saw cut on the ulna as a rotational marker. We removed the screws and plate and performed 2 parallel transverse osteotomies using an oscillating saw with a thin blade, removing approximately 2 to 5 mm of bone. We used saline to prevent heat damage to bone. The osteotomy site was fixed without malrotation using the same 3.5-mm dynamic compression plate in alignment with the previous marking on the ulna. Postoperative immobilization was achieved using an above-elbow cast worn for 3 to 4 weeks.

We performed second-look arthroscopy at the time of plate removal. Plates were removed at a mean of 18 months (range, 11–53 mo) after osteotomy irrespective of plate irritation. We confirmed evaluation of the TFCC by palpation with a probe at the time of ulnar osteotomy (first-look arthroscopy) and at plate removal (second-look arthroscopy). We assessed the continuity of the TFCC during the arthroscopy.

Radiological assessment

Using the wrist support developed by Nakamura et al,[14] we obtained a posteroanterior radiograph of the wrist