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Outcomes of arthroscopic treatment of osteochondritis dissecans of the capitellum and description of the technique

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Hypothesis: We hypothesize that a technique for all-arthroscopic fixation of capitellum osteochondritis dissecans (OCD) lesions using suture fixation and autogenous iliac crest bone grafting offers a successful alternative to open internal fixation techniques as shown by 2-year validated patient-reported outcomes.

Methods: Our technique uses arthroscopic all-inside suture fixation with iliac crest autogenous bone grafting. The procedure was performed on 4 elite-level, adolescent athletes presenting with 5 unstable capitellum OCD lesions resulting in elbow pain, limited range of motion, and decreased ability to play. Magnetic resonance imaging showed an unstable OCD lesion, which was correlated with arthroscopy. Postoperatively, patients were evaluated by the short version of the Disabilities of the Arm, Shoulder and Hand questionnaire; Oxford Elbow and Mayo Elbow scores; visual analog scale; postoperative range of motion; and return to play.

Results: Three female patients and one male patient aged 13 to 15 years underwent the procedure. The mean final follow-up period was 2.8 years. Union was achieved in all patients, as seen on magnetic resonance imaging at a mean of 3 months. At follow-up, the mean loss of extension was 2°. Mean flexion was 153°. There was no loss of supination or pronation. The mean score on the short version of the Disabilities of the Arm, Shoulder and Hand questionnaire was 11. The mean Mayo Elbow score was 88. The mean Oxford Elbow score was 42. The mean visual analog scale score was 2. The mean time to return to play was 4 months. All patients continued to compete at an elite level. There were no infections or cases of fixation failure, and no patients required conversion to open surgery or needed revision surgery.

Conclusion: Arthroscopic all-inside fixation of unstable OCD lesions is a successful technique, facilitating athletes to return to an elite level of play.

Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Arthroscopy; elbow; osteochondritis dissecans; all inside

Osteochondritis dissecans (OCD) of the humeral capitellum is a discrete lesion representing a separation of a portion of the articular surface including cartilage and subchondral bone.[15] Although the exact etiology has yet to be determined, it is thought to result from the

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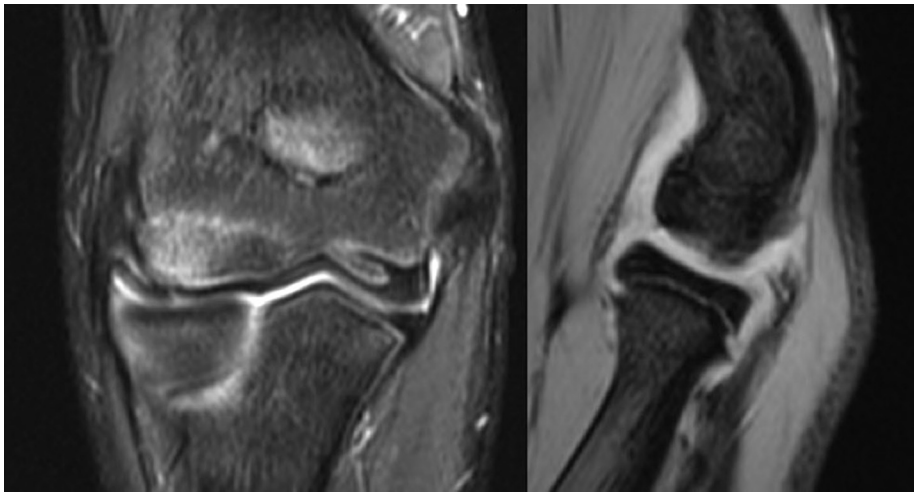

Figure 1 Coronal (*left*) and sagittal (*right*) magnetic resonance imaging cuts showing capitellum osteochondritis dissecans lesion.

compounding effects of repeated valgus load to the lateral elbow, accounting for its higher prevalence in throwers and gymnasts.[16] The repetitive microtrauma weakens the subchondral support of the articular surface and, if left unchecked, results in progressive flattening and fragmentation of the native capitellum.[2,3,5,8] Without intervention, irreversible changes, pain, restriction of motion, and limitation of activities may result.[19]

Treatment efforts have historically focused on cessation of the offending activities in hopes of allowing the body's natural healing capacity to restore the integrity of the capitellar surface. Although this has shown success in the setting of stable lesions (open physes, grade 1 lesions, almost normal motion), a substantial percentage of patients do not improve or are unable to return to previous levels of activity.[17] A trend toward early surgical management for unstable lesions or lesions that do not respond to conservative measures after 3 months has developed with an increase in arthroscopic treatment.[19,23,25]

The ultimate goal of surgical treatment is to prevent the development of arthritis and allow a return to preinjury levels of activity. Studies have shown that the results are significantly better for fixation than excision techniques, particularly in the setting of larger lesions.[1,21,22] It stands to reason that healing of the fragment yields the most reliable restoration of the articular surface with the potential for early return to play and improved long-term outcomes. Fixation methods to promote healing have included Herbert screws, pullout wires, bone pegs, and bioabsorbable pins, but limited descriptions of all-arthroscopic techniques have been reported.[7,10,11,13,14,24] We present an innovative technique for all-arthroscopic fixation of capitellum OCD lesions using suture fixation and autogenous bone grafting and report our results with standardized outcome measures after more than 2 years' follow-up.

Methods

Arthroscopic suture fixation has been performed in 4 consecutive patients at our institution with greater than 2 years' follow-up. All patients were elite-level athletes competing at the national or international level of play: 2 gymnasts, 1 baseball pitcher, and 1 lacrosse player. All presented with a complaint of elbow pain with limitation of motion and decreased play ability. Patients were evaluated for range of motion preoperatively. They were assessed for any mechanical block and questioned regarding their pain levels and preinjury and postinjury activities. A preoperative magnetic resonance imaging (MRI) scan was classified according to the criteria of Nelson et al,[12] which have been found to correlate with arthroscopic findings. Surgery was indicated in 2 patients for unstable lesions on MRI and 2 patients for failure to improve with previous surgical intervention (Fig. 1). All procedures were performed by the senior author as outlined later using either 2 or 3 mattress sutures as dictated by the lesion size.

Patients were immobilized in a long-arm cast postoperatively until healing was evident on MRI (mean, 3 months; range, 2-4 months). They were then started on range-of-motion exercises with a return to activity as tolerated over a period of 8 weeks. At final follow-up, patients were assessed for range of motion and return to play and were questioned regarding residual pain and activity levels using the short version of the Disabilities of the Arm, Shoulder and Hand questionnaire; Oxford Elbow and Mayo Elbow questionnaires; and visual analog scale.

Technique

The patient is placed in the supine position with an elbow positioner. The elbow is flexed to 90° and held over the patient's body to allow access to the posterior compartment (Fig. 2). The standard distal posterolateral portal is created 1 cm proximal and 1 cm lateral to the tip of the olecranon through a stab incision directly into the posterior compartment. A 30° 2.7-mm arthroscope is inserted and the lateral gutter visualized. The arthroscope is then carefully advanced over the distal humerus along the lateral gutter until the base of the coronoid and posterior radiocapitellar joint come into view (Fig. 3). The posterior radiocapitellar portal is