Internal Fixation of Unstable Cahill Type-2C Osteochondritis Dissecans Lesions of the Knee in Teenage Patients

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**abstract**

The treatment of osteochondritis dissecans (OCD) lesions remains controversial. We present a case series of 12 teenage patients with average 6 year follow-up after compression screw fixation of unstable Cahill Type-2C OCD lesions. Postoperatively, patients were evaluated with several functional tests and scoring systems, including Lysholm, IKDC, and KOOS. All lesions healed, and no clinical or radiographic evidence of degenerative disease was noted. No significant differences in thigh girth, range of motion, stability, or single-leg-hop distance was observed when compared to the unaffected, contralateral extremity. We conclude that this technique is appropriate and efficacious for the treatment of unstable OCD lesions.
MATERIALS AND METHODS

Through a retrospective, IRB-approved review of the surgical logs of three senior surgeons at our institution (B.R.B., C.A.B.-J., B.J.C.) for the years 1990-2002, 22 teenage patients were identified as meeting the following inclusion criteria: unstable OCD lesion; classic location; treated with internal fixation; minimum 2-year follow-up. Even though patients were identified retrospectively, data collection had been performed in a prospective manner with regular radiographic and functional evaluation. Of 22 patients, 9 patients could not be located, and 1 patient was unwilling to return for a follow-up examination, leaving 12 patients for inclusion into the study. These patients were evaluated by a single surgeon (K.F.) who was uninvolved in the patients’ prior surgical care in an attempt to minimize surgeon’s bias.

All patients had undergone pre-operative evaluation with conventional radiographs (Figure 1) as well as magnetic resonance imaging (MRI) to classify the lesion (Figure 2). Based on the system described by Cahill and Berg, all defects were described as 2C lesions located in the classic, eccentric position in the lateral aspect of the medial femoral condyle. Magnetic resonance imaging demonstrated a high signal consistent with fluid behind the fragment (Figure 2B)—a finding characteristic for unstable OCD lesions. However, lesions were not displaced out of their bed.

Patients presenting to our facility with a symptomatic, nondisplaced OCD lesion undergo an initial nonoperative treatment course aimed at decreasing joint inflammation and achieving union of the lesion. The program consists of short-term immobilization, followed by a period of ≥6 weeks of nonweight bearing. Subsequently, patients are asked to modify their activities to avoid impact-loading of the lesion. Persistent pain for >3-5 months and apparent nonunion on radiographs and/or MRI are indications to consider surgical fixation. All patients in this study participated in this protocol, and elected for surgical intervention due to failure of conservative management. One patient with a concomitant anterior cruciate ligament tear was treated acutely.

No patients had undergone prior surgical procedures for this, or any other pathologic entity of the ipsilateral knee.

All patients underwent arthroscopic or mini-open internal fixation of the OCD lesion with a compression screw. Initially, the lesions were localized through a standard diagnostic arthroscopy of all three compartments of the knee. If found to be not amenable to arthroscopic fixation, a miniarthrotomy was performed to expose the defect. The lesions were then opened to expose the sclerotic bed. Magnetic resonance imaging demonstrated a high signal consistent with fluid behind the fragment (Figure 2B)—a finding characteristic for unstable OCD lesions. However, lesions were not displaced out of their bed.

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or perforate the sclerotic surface. The lesion was reduced back into its bed, and fixed with either one or two conventional 3.5-mm AO compression screws, or standard Acutrak headless screws (Acumed, Beaverton, Ore), based on surgeon’s preference (Figure 4).

Patients were kept nonweight bearing on crutches for 6-8 weeks. Physical therapy with range of motion (ROM) exercises as tolerated and straight-leg-raising–quad-strengthening was instituted on postoperative day 1. Patients returned for follow-up after 7-10 days for suture removal. Radiographs were obtained at this visit (Figure 5), as well as after 6 weeks. Based on surgeon’s preference, screws were removed between 8 and 10 weeks, either arthroscopically or through a miniarthrotomy. Postoperatively, patients were rapidly advanced to full-weight bearing, but were restricted from impact activities for 4 to 5 months. They were observed clinically and radiographically every 3 months for 1 year.

ASSESSMENT

At follow-up, patients were assessed with several well-established and validated scoring systems. In addition, the following parameters were recorded in both legs: thigh girth, alignment, knee ROM, presence of effusion, and single-leg-hop distance. Standard anteroposterior, flexion posteroanterior, and flexion lateral weight-bearing radiographs were obtained at final follow-up (Figure 6).

Findings in the operated extremity were compared to the uninvolved, contralateral extremity with the use of the Student’s t test. The level of significance was set at 0.05.

RESULTS

Twelve patients (10 males, 2 females) were evaluated at an average of 6 years (range: 24-184 months) after surgical fixation of an unstable OCD lesion. The average age at the time of surgery was 16 years (range: 12-19 years) (Table 1). At
Fixation of unstable OCD lesions of the knee provides a stable and functional knee, even in the active teenage population. Our patients reported excellent satisfaction with their functional outcomes and an overall low morbidity at a minimum of 2 years after fixation; all patients reported that they would undergo surgical fixation again. These findings are in agreement with prior studies that have demonstrated good to excellent results in >80% of patients and excellent outcomes reported by 88% and 80% of patients, respectively; Maksimovic et al. more recent article from 2005 found healing in 14 of 15 lesions treated with Herbert screw fixation.

Further analysis of our data showed no significant differences in outcomes based on size of the lesion. Even though not statistically significant, a trend was noted towards worse outcome with longer delay before surgery.

Our study shares the limitations of prior publications, such as a comparatively small patient population. We were able to locate only 12 of 22 patients for follow-up, an issue commonly encountered in a young and geographically mobile group. Also, the age span at the time of operation was 7 years (12-19 years), thus including both skeletally mature and immature patients. Even though outcomes of OCD treatment are known to vary in these two groups, this holds mainly true for conservative management of stable lesions. Unstable fragments, such as seen in our patient population, have a low chance of healing in either age group, and we feel that our results are therefore not excessively influenced by this factor.

CONCLUSION
Arthroscopic or mini-open fixation of unstable Cahill Type-2C OCD lesions in a teenage population has demonstrated excellent patient satisfaction with low morbidity at an average of 6 years after surgery.

REFERENCES