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Osteochondritis Dissecans of the Femoral Condyles

Long-term Results of Excision of the Fragment

Allen F. Anderson,* MD, and Michael J. Pagnani, MD

From The Lipscomb Clinic, Nashville, Tennessee

ABSTRACT

Nineteen patients with 20 osteochondritis dissecans lesions were evaluated between 2 and 20 years after excision of a partially detached (grade III) or loose (grade IV) fragment from the femoral condyles. Evaluation with the Hughston rating scale for osteochondritis dissecans revealed one excellent result, four good, four fair, six poor, and five failure results. Eleven patients had developed osteochondritis dissecans before skeletal maturity. In contrast to what has been stated in the literature, the results in these patients were no better than in those who developed osteochondritis dissecans as adults. The short-term results of excision are good, but the long-term results are extremely poor. Consequently, we recommend bone grafting and replacement of the fragment when it is technically possible because the long-term results are better than those after excision.

Osteochondritis dissecans occurs secondary to an insult that causes avascular necrosis of the subchondral bone. If the fragment fails to revascularize, the bone resorbs, causing progressive deterioration of the fragment. The articular cartilage degenerates and eventually splits around the periphery of the lesion, allowing the fragment to be displaced into the joint.

Excision of the fragment has been the most common method of treatment for osteochondritis dissecans when a loose or separated fragment exists.^{1,6,7,10,13-15} More recently, other treatment methods have been advocated, including removal of the fragment and drilling of the crater,⁸ replacement and stabilization of the fragment

with internal fixation,^{11,15} bone grafting,^{2,10} and allograft replacement.⁹

The purpose of this study was to review our experience with excision of the fragment in patients with osteochondritis dissecans.

MATERIALS AND METHODS

Between 1973 and 1991 we treated 137 patients with osteochondritis dissecans of the knee. The diagnosis was made roentgenographically in all patients. Twenty-six of these patients with 27 lesions were treated by excision of the fragment. Seven patients were lost to followup. The remaining 19 patients with 20 lesions were evaluated 2 to 20 years after treatment. The average length of followup was 9 years. The lesion was excised in 3 knees with failure results after previous surgery and in 17 where the fragment was loose or deteriorated. There were 15 men and 4 women. The average duration of symptoms before excision of the fragment was 3.8 years.

The original AP, lateral, and tunnel roentgenograms were used to classify the lesions by the anatomic and roentgenographic criteria of Cahill and Berg⁵ (Table 1). Sixteen of the lesions were on the medial femoral condyle and four were on the lateral femoral condyle (Fig. 1). The medial femoral condyle lesions ranged from 1.5 × 1 cm in diameter to 4 × 2.5 cm in diameter. The lateral femoral condylar lesions ranged from 2.5 × 2.5 cm in diameter to 3 × 4 cm in diameter. The stage of pathologic deterioration of the lesion was graded according to the criteria of Ewing and Voto.⁸ Sixteen of the fragments were grade IV, or loose bodies, and four were grade III, or partially detached.

The results were evaluated by the criteria of the International Knee Documentation Committee² (IKDC) and the Hughston rating scale for osteochondritis dissecans.¹¹ Clinical examination and AP, lateral, and tunnel roentgenograms were performed on each patient at followup.

* Address correspondence and reprint requests to Allen F. Anderson, MD, The Lipscomb Clinic, Saint Thomas Medical Plaza, Suite 1000, 4230 Harding Road, Nashville, TN 37205.

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TABLE 1
Description of Findings and Outcomes for All Patients

Pt	Knee	Age (years)	Physis	Length of symptoms	Previous Surgery	Additional Surgery	Followup (years)	Surgical findings	Grade ^a	Condyle	Cahill location ^b	Size (cm)	IKDC ^c	Hughston scale
1	R	16	Closed	6 months	4 years earlier repair lateral meniscus		5	Loose	IV	MFC	2 C	1.5 × 2	Severely abnormal	Poor
2	R	44	Closed	7 months	1 year earlier medial meniscectomy	Arthroscopic debridement	6	Loose	IV	MFC	2&3 A & B	2 × 3	Severely abnormal	Failure
3	L	36	Closed	7 months		Arthroscopic debridement and lateral meniscectomy	5	Soft partially detached	III	LFC	4-5 C	3 × 4	Severely abnormal	Failure
4	R	14	Open	3 years		Arthroscopic debridement × 3	14	Partial	III	MFC	2-3 BC	1-2	Abnormal	Poor
5	R	20	Closed	6 years		Arthroscopic removal of loose body	12	Loose body	IV	MFC	2-3 BC	2	Severely abnormal	Poor
6	R	19	Closed	1 year		Arthroscopic debridement	14	Multi loose bodies	IV	LFC	4-5 BC	3	Severely abnormal	Poor
7	R	18	Closed	2 years	1. Drilling 2. Open bone graft and pin		2	Loose	IV	MFC	2-3 BC	2.5	Nearly normal	Fair
8	R	15	Closed	3 years	Drilling and excision of discoid lateral meniscus	Arthroscopic debridement	5	Loose	III	LFC	4-5 BC	3	Severely abnormal	Failure
9	L	17	Closed	3 months			6	Soft partially detached	III	MFC	2&3 B	2	Normal	Excellent
10	L	30	Closed	11 years		Arthroscopic debridement	2	Loose	IV	MFC	2&3 B	2.5	Nearly normal	Good
11	L	17	Closed	4 years			2	Loose	IV	MFC	2&3 B	4	Nearly normal	Good
12	R	18	Closed	19 months			2	Loose	IV	LFC	4 BC	3	Abnormal	Poor
13	R	25	Closed	2 years		Arthroscopic debridement and loose body	12	Loose	IV	MFC	2&3 B	1.5 × 2	Abnormal	Poor
14	R	14	Closed	3 years	Drill & pinned	1. Arthroscopic debridement & loose body removal	20	Loose	IV	MFC	2&3 B		Nearly normal	Fair
	L	20	Closed	10 years		2. Arthroscopic debridement	13			MFC			Nearly normal	Fair
15	R	20	Closed	2 years			20	Loose	IV	MFC	2&3 B	2.5	Severely abnormal	Failure
16	R	28	Closed	6 years			3	Loose	IV	MFC	2&3 B	2	Abnormal	Fair
17	L	17	Closed	7 years			9	Loose	IV	MFC	2&3 B	2	Normal	Good
18	R	15	Closed	5 years		Arthroscopic debridement	17	Loose	IV	MFC	2&3 B	2	Severely abnormal	Failure
19	R	20	Closed	7 years			4	Loose	IV	MFC	3 B	1.5 × 1	Nearly normal	Good

^a Grade refers to Ewing and Voto classification.⁸

^b Cahill location refers to location of the lesion on the femoral condyles.⁵

^c IKDC, International Knee Documentation Committee score.

Preoperative and postoperative roentgenograms were compared to document the progression of degenerative changes.

Before the advent of arthroscopy, a small arthrotomy was used to remove the fragment and curette or drill the crater in eight knees. The remaining 11 patients were treated arthroscopically.

RESULTS

There were no known inter- or postoperative complications. At the time of followup, only five patients could participate in strenuous activities without significant symptoms. Eleven patients had pain with activities of daily living, and the remaining three patients had pain with light activities. According to the subjective questionnaire of the IKDC scale, four patients had normal knees, three had nearly normal, three had abnormal, and nine

had severely abnormal knees. Preoperative roentgenograms revealed a normal joint space in all 20 knees. Postoperatively, when graded by the IKDC roentgenographic criteria, six knees had normal roentgenograms, six had mild degenerative changes, and eight had moderate degenerative changes. When evaluated with the Hughston scale for osteochondritis dissecans, one knee was rated excellent, four good, four fair, six poor, and five failed. When rated on the overall IKDC scale, two knees were rated normal, six nearly normal, four abnormal, and eight severely abnormal. Ten of the 20 knees required additional arthroscopic surgery for debridement or removal of loose bodies.

The results for the patients who developed symptoms before skeletal maturity were compared with those of the patients who were adults when the symptoms started. Eleven patients developed symptoms before skeletal maturity (average age, 11.9 years) (Table 1). Three of these

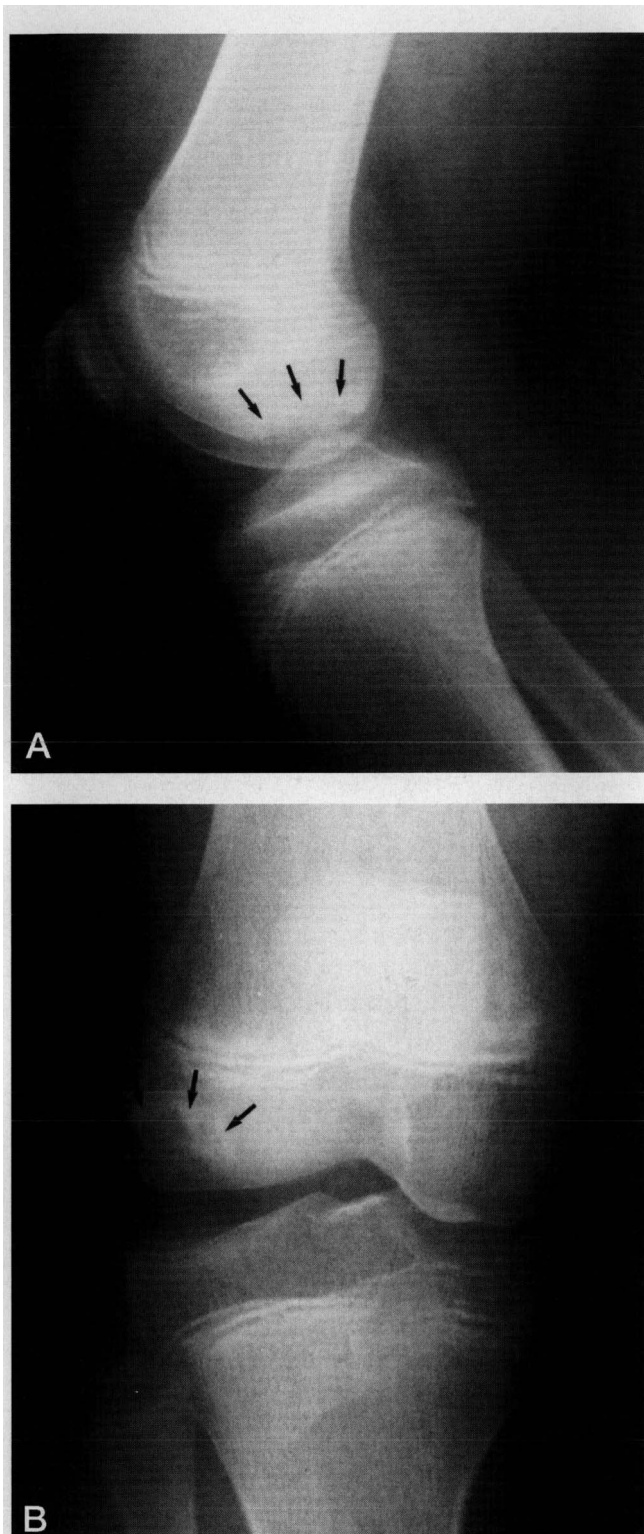


Figure 1. Lateral (A) and AP (B) roentgenograms of patient No. 8 reveal osteochondritis dissecans of the lateral femoral condyle (arrows).

patients had failure results after arthroscopic drilling of the lesion when they were skeletally immature. The fragment displaced after an average duration of 5 years (Figs. 2 and 3). In this group, three knees were rated good, three fair, three poor, and two failure.

Nine patients developed symptoms after skeletal maturity (average age, 24 years). The results in this group, one excellent, one good, one fair, three poor, and three failed, were just as bad but not worse than the results in the younger group.

DISCUSSION

The treatment of osteochondritis dissecans depends on the patient's age and the degree of deterioration of the fragment. Logic would dictate that preservation of the articular cartilage should be the primary objective of treatment.^{4,5,11,13} Even so, replacement of a lesion that has deteriorated into several fragments may not be feasible, and even experienced surgeons may be discouraged by the unpredictable result of replacing a loose lesion that has marginal articular cartilage.

For the above-mentioned reasons, excision of the fragment was a common practice^{1,7,10,14,16} that, even now, has advocates. Denoncourt et al.⁶ treated 37 patients with arthroscopic removal of the fragment and curettage of the crater. They reported complete "healing" in 10 cases after evaluation with a second-look arthroscopic procedure, and they recommended this method of treatment in adults and possibly children who have failed results after nonoperative treatment. Similarly, Ewing and Voto⁸ excised the fragments and drilled the crater in 29 patients. They reported a satisfactory result in 72% of their patients.

In our experience, the results of excision are relatively good in the short term, but they worsen in time. Seven of 26 patients were lost to followup in this study. Our results may have been different if these patients had been examined, although there is no indication the results would have improved. The difference in the length of time from surgery to evaluation in this study (9 years) when compared with that in the studies of Denoncourt et al. and Ewing and Voto (less than 1 year) may account for the discrepancy in our conclusions regarding the efficacy of this procedure. If the articular cartilage is not replaced, in most cases, the long-term results will be poor.

In contrast to our results, Smillie¹⁵ and Lipscomb et al.¹³ reported good long-term results in patients who were treated with replacement and fixation of large loose fragments. In 1990, we reported a similar experience with antegrade curettement, bone grafting, and pinning of osteochondritis dissecans in the skeletally mature knee.³ Six of 10 patients with grade III or IV lesions were rated good, and the remaining four were rated fair. Although the results after replacement are better than those after excision, in some circumstances replacement may not be technically possible or beneficial.

Linden¹² concluded that children who develop osteochondritis dissecans before closure of the physis do not develop symptoms or osteoarthritis later in life. The results of this study have demonstrated quite the opposite.

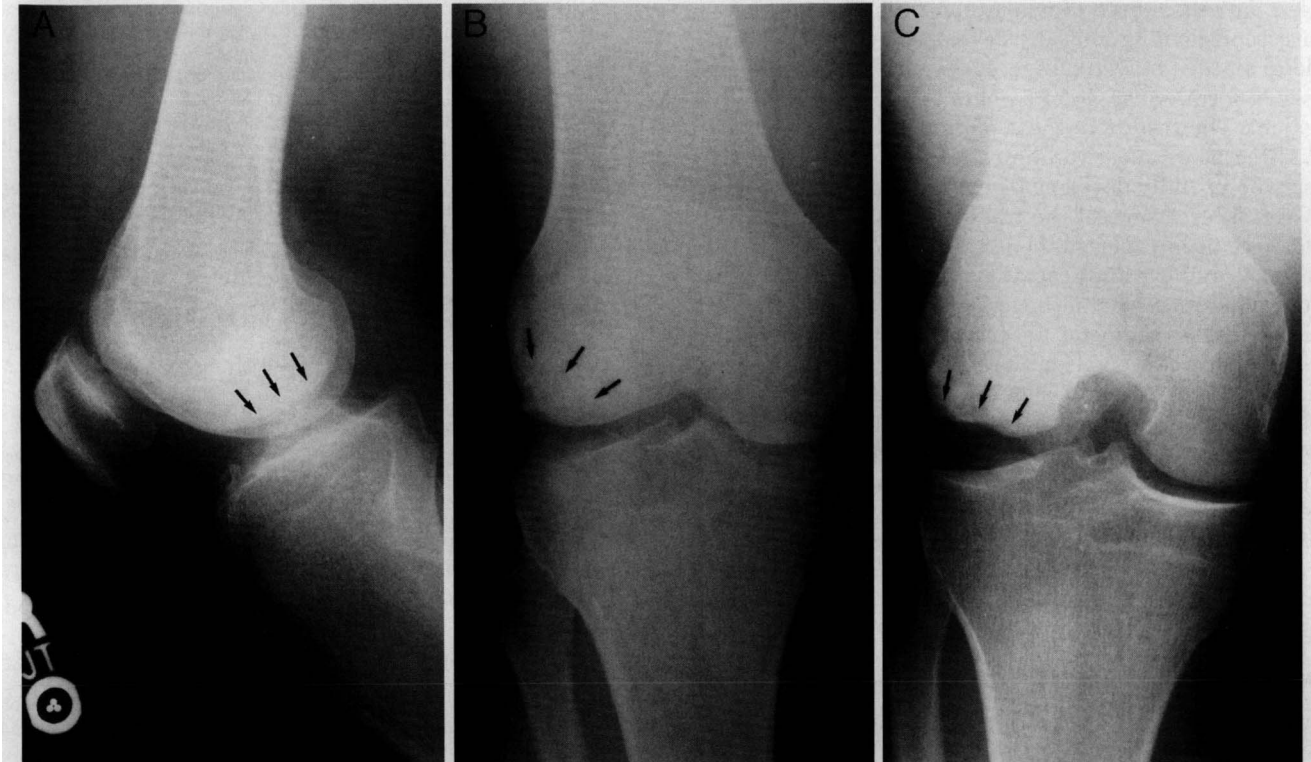


Figure 2. Roentgenograms 5.5 years after excision of the osteochondritis fragment and drilling the crater reveal a large defect in the lateral femoral condyle as demonstrated by the arrows on the lateral (A), AP (B), and tunnel views (C). A loose body may also be seen on the tunnel view (C).

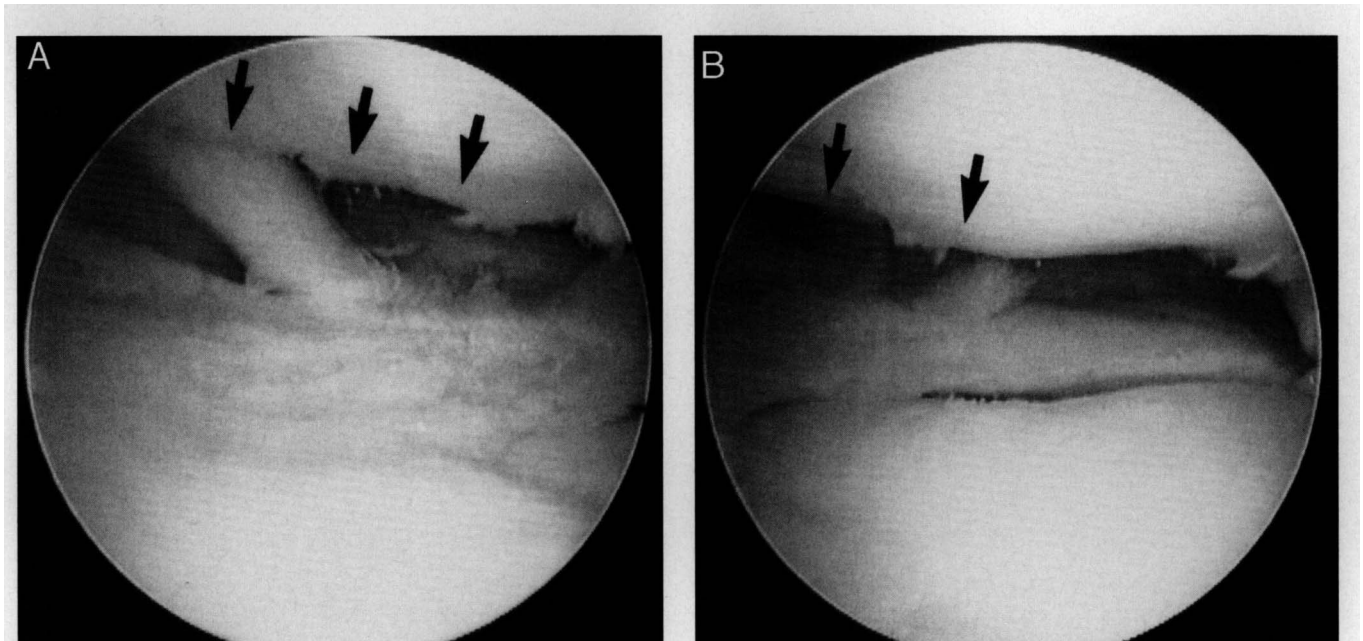


Figure 3. A and B, arthroscopic surgery was performed to remove a large loose body (patient seen in Fig. 2C). The arthroscopic view of the lateral joint space demonstrated that fibrocartilage covered the defect in the lateral femoral condyle (arrows). In addition, this patient was found to have superficial fraying of the lateral meniscus. Despite a reasonably good arthroscopic appearance, the patient had significant symptoms with activities of daily living and was rated severely abnormal.

Eleven patients, three of whom had failure results after arthroscopic drilling, initially developed symptoms before skeletal maturity (average age, 11.9 years). The symptoms persisted for an average of 5 years before removal of the fragment. The results in these patients, three good, three fair, three poor, and two failure, were no better than in those who initially developed symptoms as adults.

In retrospect, some of the fragments that were excised could have been replaced, bone grafted, and pinned. The decision to remove the fragments was influenced by the degree of deterioration in the articular cartilage, difficulty of replacing the fragment, uncertainty of obtaining a good result, and the consensus of the older literature that most patients do well after excision of the fragment. Although excision is easier and the short-term results are good, the long-term results of excision are extremely poor. Consequently, we recommend bone grafting and replacing the fragment when it is technically possible because, in our experience, the long-term results are better than those after excision.

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