

Utility of Bioabsorbable Fixation of Osteochondral Lesions in the Adolescent Knee

Outcomes Analysis with Minimum 2 year Follow-up



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Introduction

Osteochondral lesions (OCL) in the knee are commonly encountered in the pediatric and adolescent population and include osteochondritis dissecans and traumatic osteochondral fractures.¹⁻⁴

Treatment for these conditions depend on the lesion's location, size, stability and the severity of symptoms. Procedures range from microfracture/marrow stimulation, osteochondral autograft / allograft, autologous chondrocyte implantation to, when amenable, osteochondral lesion fixation.³⁻⁴

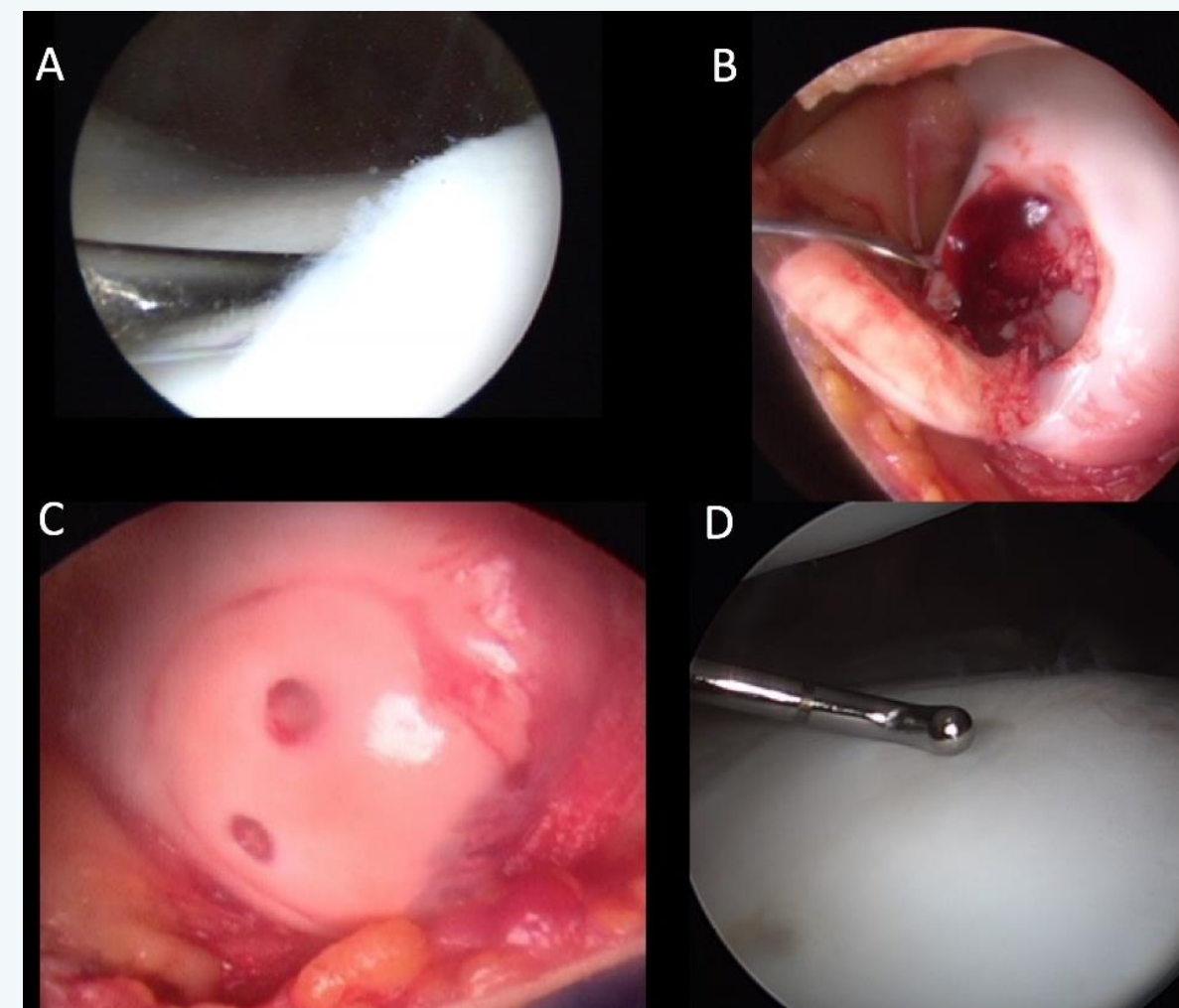
The goal of fixation is to preserve the native cartilage and promote healing of the osteochondral layer and subchondral bone. Fixation is commonly done with metal implants that often require a second surgery for implant removal.² Bioabsorbable implants are an alternative to metal and may provide stable fixation and obviate the need for a second procedure.

The purpose of our study was to review the utility and outcomes of internal fixation with bioabsorbable implants for osteochondral lesions of the knee in an adolescent population¹⁻⁴

Methods

An IRB approved retrospective review of patients younger than 18 years of age who underwent internal fixation of an osteochondral lesion was performed. Medical records were reviewed from 2009 to 2016 for patient demographics, intraoperative details, and postoperative complications.

Inclusion criteria: osteochondral surgery with bioabsorbable fixation (Biocompression screws and/or chondral darts; Arthrex Inc. Naples, FL.) complete medical records and a minimum follow-up of 2 years with completion of validated outcome scores (Pedi-IKDC, Lysholm, and Pre/Post Tegner)



17 yo male primary procedure with open fixation of an OCL of the lateral trochlea (A-C) and second look arthroscopy (D) performed secondary to pain following trauma at

Results

There were a total of 37 adolescents that had internal fixation of an OCL with bioabsorbable implants performed by a single orthopaedic surgeon. 32 (86%) had complete functional outcome scores at a minimum follow-up of 2 years. Below are tables that summarizes our general findings.

Number of patients	32
Osteochondritis Dissecans	15
Osteochondral Fractures	17
Average follow-up (months)	59 (range: 24-111)
Average Age (years)	14.7 (range: 12-17)
# of patients requiring additional surgeries	6

	OCD	OCF	Total
Location			
Medial femoral condyle	12	1	13
Lateral femoral condyle	2	6	8
Patella	0	9	9
Trochlea	1	1	2
Size of Lesion (mm²)	382	299	322
Avg. # of implants used			
Screws	1.4	1.3	1.4
Darts	1.2	1.9	1.6

Summary of procedures based on location of injury, size of the lesion, and average number of bioabsorbable screws and darts used per case. OCD – osteochondritis dissecans. OCF – osteochondral fracture.

	OCD	OCF	Total
Lysholm	90.5 (range: 73-100)	89 (range: 59-100)	89.8
Pedi-IKDC	92.1 (range: 80-100)	84.7 (range: 62-100)	88.1
Tegner Activity Scale			
Pre	6.9 (range: 5-9)	6.4 (range: 5-9)	6.6
Post	6.9 (range: 5-9)	5.9 (range 5-8)	6.4

Average functional outcome scores at final follow-up visit. Lysholm and Pedi-IKDC scores are from a scale of 0-100. Tegner Activity Scale is from 0-10.

Patient	Dx	Location	# of screws	# of darts	2 nd operation performed
1	OCF	Patella	0	3	Manipulation under general anesthesia
2	OCD	MFC	1	2	Implant protrusion that required minimal debridement. Patient asymptomatic after secondary procedure
3	OCF	LFC	0	3	MPFL reconstruction. Second-look arthroscopy showed healed OCL.
4	OCF	Patella	2	0	Manipulation under general anesthesia
5	OCF	LFC	2	3	Planned staged ACL reconstruction. Second-look arthroscopy showed healed OCL.
6	OCD	Trochlea	2	0	Underwent diagnostic arthroscopy secondary to pain following injury. OCD was intact with minimal hypertrophic healing at margin which was debrided. Asymptomatic after secondary procedure

Table 2 – Summary of the six cases that required a return to the operating room. OCD – osteochondritis dissecans. OCF – osteochondral fracture. MFC – medial femoral condyle. LFC – lateral femoral condyle.

Discussion

As participation in youth sports ever increases osteochondral lesions in the adolescent population will continue to be a common problem that Orthopedic Surgeons encounter.

The milieu of the pediatric and adolescent knee provides an environment favorable to healing. Following the development an osteochondral lesion whether from osteochondritis dissecans or a traumatic fracture the preservation of the native articular cartilage in this population is of paramount importance.

Bioabsorbable implants offer an option for internal fixation to provide patients with stable fixation that promotes healing. The bioabsorbable capabilities of these implants avoids the need for implant removal.

We have demonstrated promising results at mid-term follow up (59 months) in an all adolescent cohort. Validated functional outcome scores were good with no revision cartilage procedures necessary at last follow-up. Longer term multi-center multi-surgeon data is still needed to further elucidate the utility of bioabsorbable implants for osteochondral lesions in the adolescent knee.

References

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