Bioabsorbable Screw Fixation for Stable Osteochondritis Dissecans Lesions of the Knee Result in Improved Clinical Outcomes

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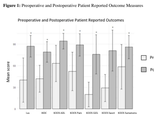
INTRODUCTION:
Osteochondritis dissecans (OCD) is a pathologic process of multifactorial etiology affecting the subchondral bone and overlying articular cartilage resulting in varying degrees of detachment and instability. Outcomes using bioabsorbable screws for unstable OCD lesions of the knee have been well-described. On the other hand, fixation of stable OCD lesions that have failed conservative management have been reported on less frequently. The purpose of this study was to evaluate the clinical and radiographic outcomes of patients who have undergone bioabsorbable screw fixation for intact, stable grade I and II OCD lesions.

METHODS: A retrospective review of prospectively collected data from a single institution was queried for patients who underwent internal fixation of stable grade I and II OCD lesions between January 1, 2010 and January 1, 2020. Patients were included regardless of the presence of concomitant procedure. Inclusion criteria consisted of: 1) primary surgery, 2) the use of a bioabsorbable screw(s), and 3) minimum 2-year clinical follow up. Radiographs were obtained at a minimum 1-year postoperatively. Patient demographics, clinical patient reported outcomes (PROs), complications, and failure rates were noted.

RESULTS: Twenty-four knees among twenty-three patients (96% follow up) were analyzed and followed for 6.36 ± 3.42 years (range: 2.0 - 12.7). Patients demonstrated statistically significant postoperative improvements for all PROs including Lysholm, IKDC, and KOOS subscales ($P < 0.05$). Three knees (12%) required a reoperation due to failure at an average 3.64 years after the index procedure. No specific complications were attributed to the use of bioabsorbable screws. Patients who failed primary surgical treatment did not differ in demographics, arthroscopic findings, or surgical treatment from those who had successful treatment.

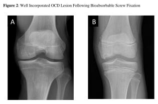
DISCUSSION AND CONCLUSION: The use of bioabsorbable screws to fix stable OCD lesions of the knee produces reliable results in appropriately indicated patients who have failed conservative management, with a low failure rate. Clinical outcomes improved significantly during the midterm follow-up period. Drilling alone ignores the remaining microscopic motion that occurs in these macroscopically stable lesions and has variable rates of success. Bioabsorbable screws should be used to compress the lesion and allow for bone-to-bone healing.

Figure 1: Preoperative and Postoperative Patient Reported Outcome Measures



Legend: Mean patient reported outcome measure scores following fixation of osteochondritis dissecans lesions. Questionnaires included are Lysholm (Lys), International Knee Documentation Committee (IKDC), and Knee Injury and Osteoarthritis Outcome Score (KOOS) subscales at preoperative and most-recent follow-up timepoints. Error bars represent standard deviation and * represent significant improvement, compared to preoperative scores ($P < .05$). Abbreviations are as follows: ADL, activities of daily living; QOL, quality of life.

Figure 2: Well Incorporated OCD Lesion Following Bioabsorbable Screw Fixation



Legend: Anteroposterior x-rays from a skeletally immature patient with a medial femoral condyle OCD who was clinically successful at 6.96 years follow-up without reoperation from (A) preoperatively, and (B) postoperatively. The postoperative radiograph is from 5.17 years postoperatively. The postoperative radiograph demonstrates a well-incorporated and healed OCD lesion following the bioabsorbable screw fixation.

Table 3: Radiographic and Magnetic Resonance Imaging of Patients Requiring a Reoperation

	Lesion Location, Size (mm), and Grade	Physeal Status	Chief Complaint Postop	Post-Operative XR and/or MRI Interpretation	Time to Failure (years)	Reoperation Procedure	Intraoperative Findings
Patient 1 18 y.o. Male	MFC, 14x16, 2	Closed	Pain and swelling after playing basketball 2.5 years post-operatively	subtle lucent changes around screw on XR; MRI shows 1.5x1 cm lucent changes, cartilage delamination, and underlying bony edema	3.92	Microfracture and debridement of right knee MFC	No evidence of screw, 8x10 mm area of cartilage delamination
Patient 2 19 y.o. Female	LFC, 14x14, 1	Closed	Initial improvement with return of symptoms while horseback riding 7 months post-operatively	MRI shows no underlying bony edema, no major changes related to the implant, or fragmentation	1.58	Left knee OCA LFC	Screw intact but not protruding, stable lesion, evidence of healing, etiology of pain unknown
Patient 3 16 y.o. Male	MFC, 18x18, 1	Open	Pain and swelling 9 months post-operatively, unknown cause	lucency around screw and fragmentation on XR; MRI with underlying bony edema, lucency around screw, some fragmentation	1.34	Right knee OCA MFC	Screw intact, no inflammatory response, new 32x18mm loose fragment

Lesion characteristics, radiographic and magnetic resonance imaging, and reoperation procedure for three patients who failed after bioabsorbable screw fixation of stable OCD lesions. LFC, lateral femoral condyle; MFC, medial femoral condyle; MRI, Magnetic Resonance Imaging; OCA, osteochondral allograft transplantation; OCD, osteochondritis dissecans; XR, x-ray.