



MIDWEST
ORTHOPAEDICS
AT RUSH

Outcomes of Bioabsorbable Screw Fixation for Stable Osteochondritis Dissecans Lesions

Ryan Quigley MD, Landon Frazier BS, Sachin Allahabadi MD, Katie McMorrow BS, Zach D. Meeker BS, Jimmy Chan MD, Kyle R. Wagner BS, and Brian J. Cole MD MBA

Midwest Orthopaedics at Rush University Medical Center
Poster # 91



**I (and/or my co-authors) have
something to disclose.**

**Detailed disclosure information is available via:
AAOS Disclosure Program on the AAOS website at
<http://www.aaos.org/disclosure>**



JOFFREY ★ BALLET
CHICAGO



Objectives



- To evaluate the clinical and radiographic outcomes of patients who have undergone bioabsorbable screw fixation for intact, stable grade I and II osteochondral dissecans (OCD) lesions.



Materials & Methods



- **Retrospective review of a prospectively maintained database from 2010-2020.**
 - **Inclusion criteria:**
 - *Primary internal fixation of stable grade I and II OCD*
 - *The use of a bioabsorbable screw(s)*
 - *Minimum 2-year clinical follow-up*
 - *Minimum 1-year postoperative radiographs*
 - **Evaluation of patient-reported outcome measures (PROs), failures, complications, and adverse events related to the implant.**
-

Materials & Methods



Table 1. Arthroscopic Classification of Osteochondritis Dissecans (Guhl's Classification²³)

Arthroscopic Appearance	Grade
Irregular softening of cartilage, no fissure. Stable lesion.	I
Articular cartilage fissured. Stable lesion.	II
Displaceable and defined fragment, still attached by cartilage. Unstable lesion.	III
Loose body and defect in articular cartilage. Unstable Lesion.	IV

Materials and Methods



Surgical Technique

- Arthroscopic approach
 - Retrograde drilling is typically performed to produce vascular channels to enhance the healing effect
 - 3 mm × 22, 24, or 26-mm Bio-Compression solid enhanced poly-l-lactic acid (PLLA) screw (Arthrex Inc.; Naples, Florida)
 - One point of fixation is preferred, when two or more implants are used, they are spaced to not converge upon another or cause fracture
-

Results

Patient Demographics

- 25 knees among 24 patients were identified, of which 24 knees in 23 patients (96%; n = 24/25)
- Follow-up of 6.36 ± 3.42 years (range: 2.0 - 12.7)

Characteristic	Reoperation free, N = 21 ¹	Failure, N = 3 ¹	P-value
Female sex	5 (24%)	1 (67%)	1.00 ²
Age	15.2 ± 3.2	17.7 ± 1.5	0.203 ³
BMI	24.3 ± 5.6	23.6 ± 1.9	0.828 ³
Smoking status	0	0	NA
WC	0	0	NA
Knee laterality (left)	12 (57%)	1 (67%)	0.576 ²
Symptom duration (years)	0.92 ± 0.90	1.19 ± 1.58	0.660 ³
Physcal Status (open)	14 (66%)	1 (33%)	0.533 ²



Results

Intraoperative Findings



- Patients who failed primary surgical treatment with bioabsorbable screw fixation did not differ in demographics, arthroscopic findings, or surgical treatment from those who had successful treatment

Characteristic	Reoperation free, N = 21 ¹	Failure, N = 3 ¹	P-value
OCD arthroscopic grade			1.00 ²
1	16 (76%)	2 (67%)	
2	5 (24%)	1 (33%)	
Lesion location			1.00 ²
MFC	16 (76%)	2 (67%)	
LFC	5 (24%)	1 (33%)	
Lesion area (cm ²)	2.0 ± 0.62	2.5 ± 0.67	0.208 ³

Results

Concomitant Procedures

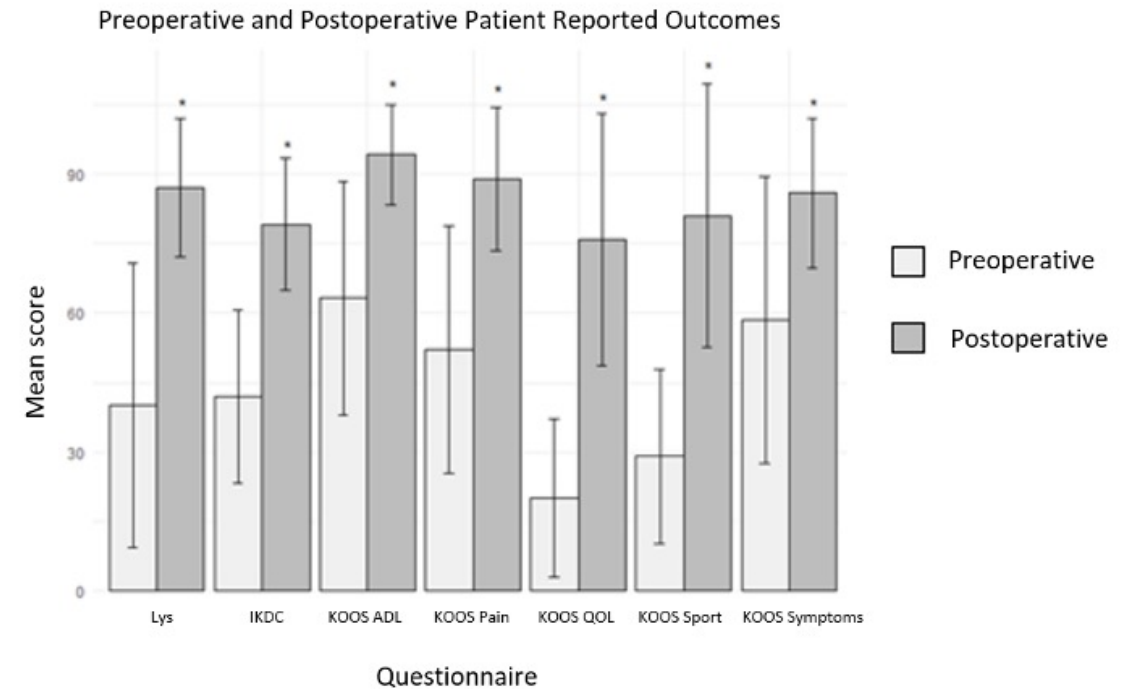


Characteristic	Reoperation free, N = 21 ¹	Failure, N = 3 ¹	P-value
Concomitant procedures			
Separate site ACI biopsy	1 (5%)	0	1.00 ²
Separate site microfracture	1 (5%)	0	1.00 ²
Separate site loose body removal	1 (5%)	0	1.00 ²
Suprapatellar pouch release	0	1 (33%)	0.125 ²
Plica excision	2 (9.5%)	1 (33%)	0.343 ²
Synovectomy	0	1 (33%)	0.125 ²
Separate site microfracture	1 (5%)	0	1.00 ²
Retrograde drilling	14 (66%)	3 (100%)	0.530 ²
None	5 (24%)	0	1.00 ²

Results

Patient-Reported Outcomes

- Eighteen patients in the reoperation free group (86%) had available PROs
- Improvements in all PROs ($p < 0.05$)
- Mean postoperative
 - *Lys* 87.1 ± 14.9 , *IKDC* 82 ± 14.2 , *KOOS ADL* 96.2 ± 9.1 , *KOOS pain* 91.3 ± 9.1 , *KOOS QOL* 79.5 ± 27 , *KOOS sport* 83.6 ± 28.4 , and *KOOS symptoms* 89.3 ± 13.7



Results



Radiographic Outcomes

20 patients (21 knees) (84% follow-up) received post-operative radiographs at an average 3.64 +/- 3.15 years following their index procedure

- **Fifteen** (71%) patients in the reoperation free group had **well-incorporated OCD lesions** at an average 4.92 +/- 3.16 years postop
 - **Three** patients demonstrated **partial osseous integration**
 - *clinically asymptomatic at postoperative years 4.11, 2.14, and 9.41*
 - **Three** patients demonstrated **lucency** in the area of the bioabsorbable screw
 - *clinically asymptomatic at a mean follow-up of 6.26 +/- 2.14 years*
-

Results

Radiographic Outcomes



Figure 3: Well Incorporated OCD Lesion Following Bioabsorbable Screw Fixation

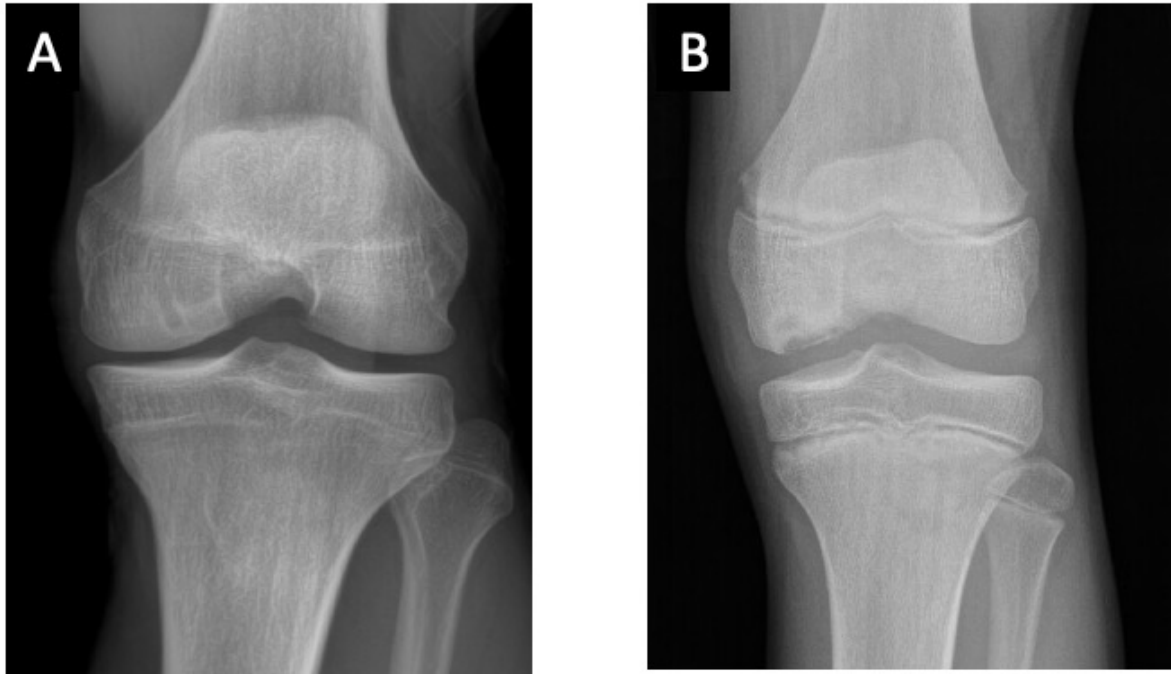
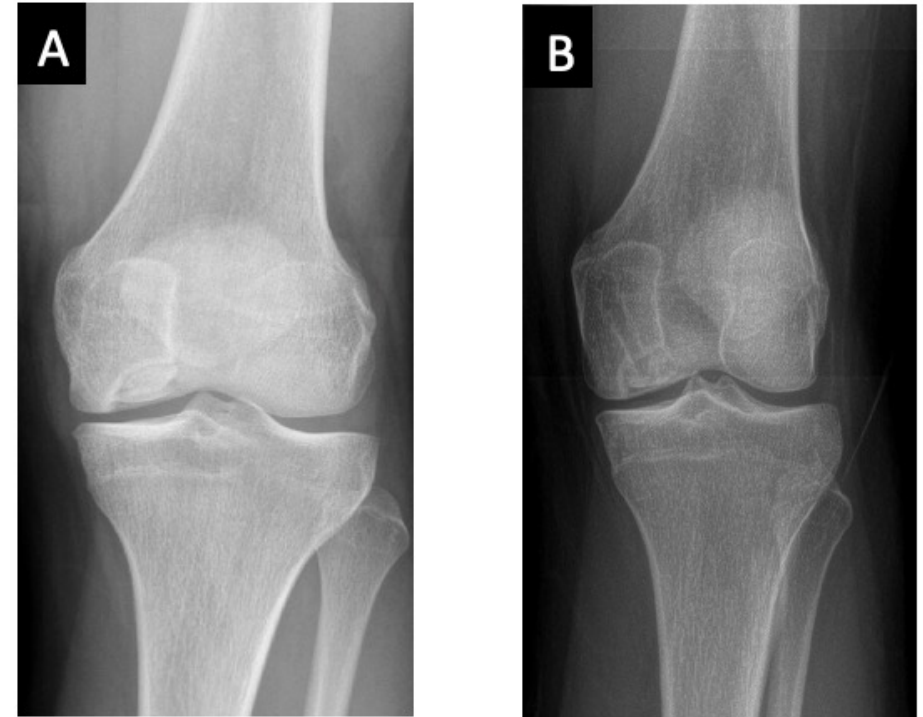


Figure 4: Clinically Asymptomatic Lucent Changes Around Lesion in Reoperation Free Group



Results

Failures

- Three patients underwent a subsequent reoperation for failure at a mean time of 2.3 ± 1.4 years (range: 1.3 – 3.9)

Table 4: Radiographic and Magnetic Resonance Imaging of Patients Requiring a Reoperation



	Lesion Location, Size (mm), and Grade	Physcal 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

Results

Failures



Figure 5: Preoperative Magnetic Resonance Imaging of Failure Patient #3

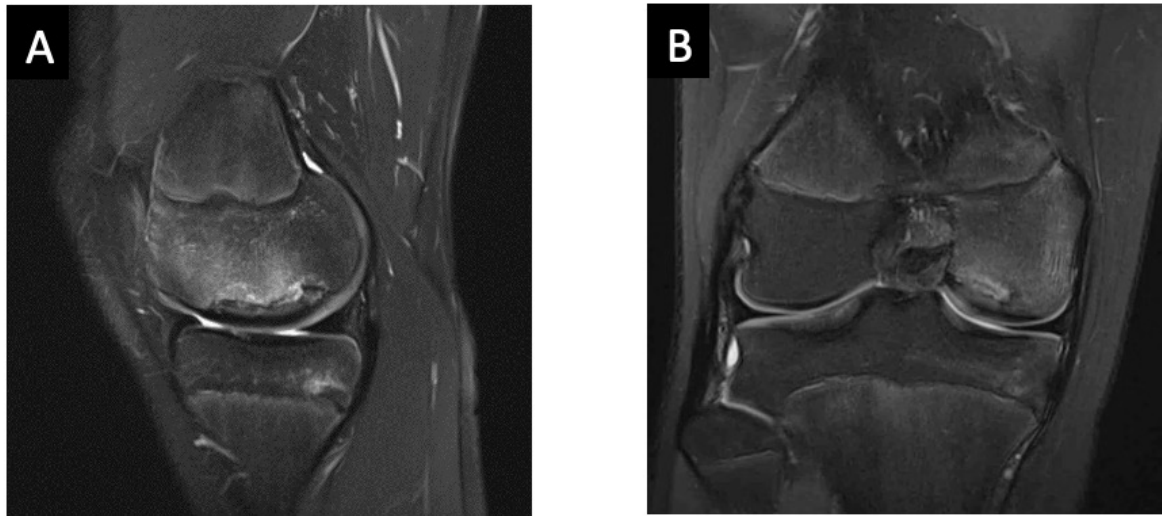
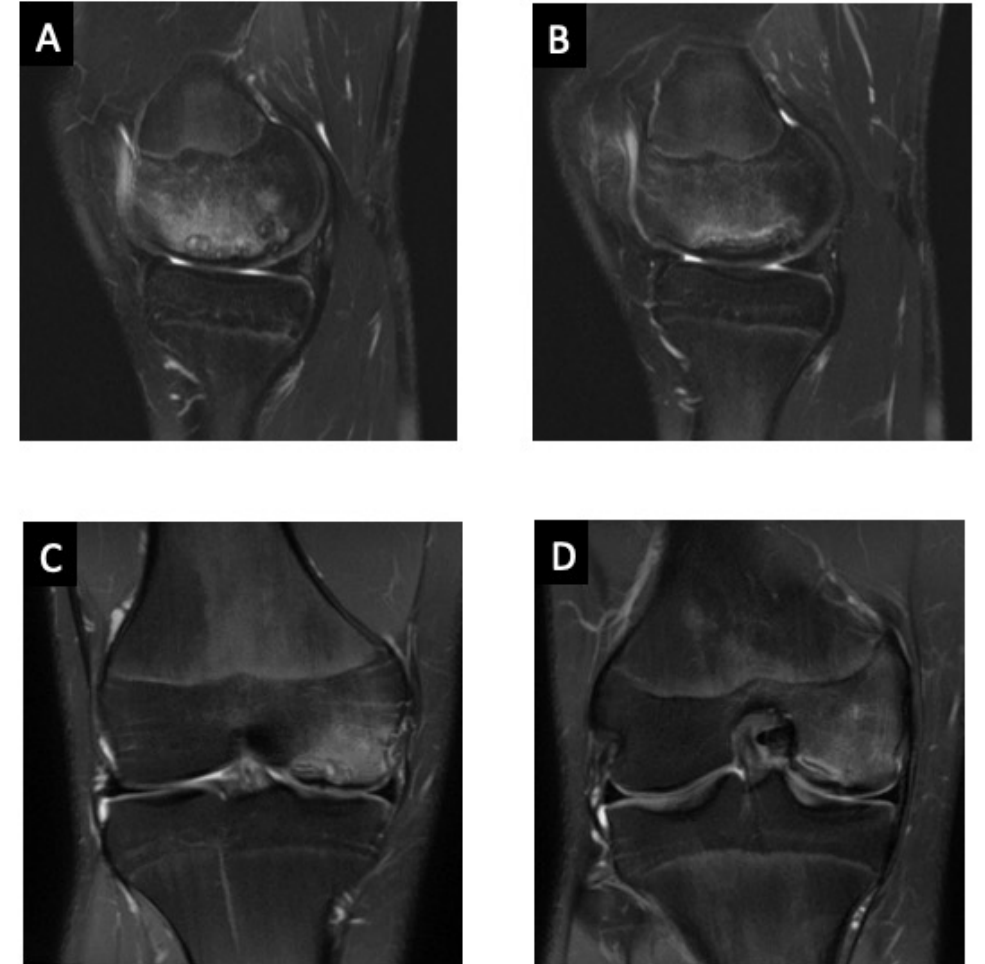


Figure 7: Postoperative Magnetic Resonance Imaging of Failure Patient #3



Conclusion



- **Excellent clinical outcomes with low rates failure were seen at mean clinical follow-up of 6.36 years.**
 - **No specific complications were attributed to the use of bioabsorbable screws.**
 - **Patients who failed primary surgical treatment with bioabsorbable screw fixation did not differ in demographics, arthroscopic findings, or surgical treatment from those who had successful treatment.**
-

Significance of the Findings



- These patients are likely symptomatic despite the absence of a grossly unstable lesion due to micro-motion that occurs during load-related activities at the bone-bone interface.
 - Drilling alone ignores the remaining microscopic motion that occurs in these macroscopically stable lesions and has variable rates of success.
 - Bioabsorbable screws can be used to compress the lesion and allow for bone-to-bone healing.
-



MIDWEST
ORTHOPAEDICS
AT RUSH

Thank you.

@BrianColeMD

BrianJCole

@BrianColeMD
