

Successful Fixation of Traumatic Articular Cartilage-Only Fragments in the Juvenile and Adolescent Knee: A Case Series

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INTRODUCTION:

Pure chondral fragments of the knee are often treated with excision due to the longstanding belief that they have little or no healing potential. However, there may be reevaluation of that concept as some are now considering fixation of traumatic chondral-only fragments in young knees, but little data remains to guide treatment. Therefore, the purpose of this study was to determine if surgical fixation of chondral-only fragments in the juvenile knee results in an adequate healing response with successful radiographic and clinical outcomes.

METHODS: Data were collected on 16 skeletally immature patients treated with fixation of chondral-only fragments with a minimum of 1-year follow up to radiographic healing. Patients were selected by the operating surgeons based on the quality and size of the chondral fragment. Radiographic imaging was reviewed and analyzed. Demographic data, lesion characteristics, surgical procedure details, complications, and postoperative history were assessed by review of medical records. Clinical follow up was conducted at a mean of 3.5 years. Validated patient-reported and surgeon-measured outcomes were collected pre-and postoperatively.

RESULTS: The mean age of our patient cohort was 14.9 years. The mean size of the repaired defects measured 3.2 cm². Within the mean follow-up time of 42.3 months (range, 15-145 months) there was one clinical failure with loosening of the chondral fragment and the need for reoperation. At final follow up, patients had a mean IKDC score of 95.2 (IQR, 94.3 – 100), a mean score of 11.5 (IQR, 11.5-16) on the Marx Activity Rating Scale, a mean 95.81 (IQR, 93.5-95.81) KOOS, a mean 16.94 (IQR, 11.5-26) HSS Pedi-FABS, a mean 93.75% (IQR, 90-100%) PROMIS physical health score, a mean 90% (IQR, 88.75-100%) PROMIS psychological health score, and a mean score of 5.69 (IQR, 4.75-7) on the Tegner Activity Scale. All patients who were pre-injury engaged in sports returned to the same or higher level of competition except 1.

DISCUSSION AND CONCLUSION: Our study indicates that primary repair of pure-chondral injuries with internal fixation can be a successful treatment option in selected patients. Radiographic and clinical results at final follow up suggest that reintegration of the cartilage fragment is achievable and leads to excellent clinical function and a high return-to-sports rate.



Figure 1. Six arthroscopic images showing the location of the chondral fragment in the knee joint.

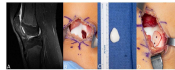


Figure 2. Three images showing the surgical approach and fixation of the chondral fragment.

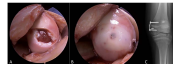


Figure 3. Two arthroscopic images showing the chondral fragment after fixation.

Parameter	Mean	SD	Min	Max	IQR
Age (years)	14.9	2.1	11	18	13-16
Sex (Male/Female)	10/6	-	-	-	-
Defect Size (cm ²)	3.2	1.5	1	6	2-4
Follow-up (months)	42.3	25.1	15	145	30-60
IKDC Score	95.2	3.1	94.3	100	94.3-100
Marx Activity Rating Scale	11.5	0.5	11.5	16	11.5-16
KOOS Score	95.81	1.2	93.5	95.81	93.5-95.81
HSS Pedi-FABS Score	16.94	5.4	11.5	26	11.5-26
PROMIS Physical Health Score	93.75%	3.25%	90%	100%	90-100%
PROMIS Psychological Health Score	90%	1.25%	88.75%	100%	88.75-100%
Tegner Activity Scale	5.69	1.1	4.75	7	4.75-7

Table 1. Summary of patient demographics and clinical outcomes.