

Articular Cartilage Paste Grafting Salvage of Osteochondritis Dissecans of the Knee: Evaluation By Clinical Outcome Measures and Magnetic Resonance Imaging

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Summary:

This study supports the efficacy of articular cartilage paste grafting for the revision and salvage of OCD lesion repairs, resulting in regenerate articular cartilage surface and subchondral bone.

Abstract:

Introduction:

Osteochondritis dissecans (OCD) of the knee is a debilitating disorder primarily affecting adolescents and young adults at a rate between 15 and 30 per 100,000[1, 2]. OCD is characterized by the separation of an osteochondral fragment from its surrounding bone and cartilage tissues. When surgical treatment by drilling, fragment fixation, OATS, or other techniques fail, the patient is left with significant deformity and disability. Investigation into the effectiveness of the articular cartilage paste grafting technique[3, 4] for the salvage treatment of OCD lesions may give surgeons helpful information for deciding on an appropriate salvage treatment for lesions that have failed to heal after surgical treatment. The purpose of this study was to evaluate the effect of articular cartilage paste grafting of OCD lesions that had failed to adequately heal in response to previous surgical treatment on clinical outcome, including subjective and radiographic assessment. We hypothesized that treatment of the OCD lesions using the articular cartilage paste grafting procedure would result in satisfactory healing and clinical outcomes.

Methods:

Seven patients, 6 male and 1 female, diagnosed with failed OCD repairs of the knee were treated by the senior author (KRS) using the articular cartilage paste graft technique. The mean age of the patients at the time of articular cartilage paste grafting was 24 years (range, 15 to 39 years). The lesions were in the medial femoral condyle in 5 cases and lateral femoral condyle in 2 cases. The mean time from surgery to the latest evaluation was 7.0 ± 3.6 years (range, 2.0 to 13.0 years). Subjective clinical outcomes were determined from the analysis of International Knee Documentation Committee Subjective Knee Evaluation Form (IKDC) and Western Ontario and McMasters Osteoarthritis Index (WOMAC) scores. Anderson's method to control for over- and under-estimation of missing values[5]. Patients' return to pre-injury sports and activities was measured using the Tegner score. The paste graft's regenerative capability was assessed objectively using 1T magnetic resonance imaging (MRI) evaluation. Evaluation of the graft was assessed using the MOCART MRI grading system[6]. Preoperative and latest follow up subjective test scores were compared by the Mann-Whitney test for non-parametric data. Continuous variables are presented as mean \pm standard deviation, categorical variables as number and percentage, and non-normally distributed variables as median and interquartile [IQR] range. Significance level was set at $p = 0.05$ for all tests.

Results:

All seven patients presented with failed OCD repairs with initial onset of symptoms between the ages of 13 and 18 (average: 14 years old). The patients had undergone an average of 2 surgeries (range, 1 – 3) to treat the OCD lesion.

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These previous attempts lasted an average of 2.1 years (range, 4 months – 7.3 years) before an articular cartilage paste graft was performed. Average preoperative lesion size was 326 ± 150 mm² (range, 143 – 575 mm²). Average lesion depth was estimated at 7 ± 5 mm (range, 3 – 17 mm) and lesion volume 2337 ± 2319 mm³ (range, 572 – 7344 mm³). There was a significant improvement from median preoperative IKDC, WOMAC, and Tegner scores. IKDC score and Tegner score showed no significant association with any of the MOCART scoring criteria and the total MOCART score.

Discussion:

Articular cartilage paste grafting is a single outpatient procedure that can be performed without customized instrumentation, fixation or hardware and is free of exogenous factors. At an average of 7 years following articular cartilage paste grafting, patients' median pain, activity, and function levels showed significant improvement as compared to preoperative levels. MRI studies using a dedicated extremity 1T unit were discordant with clinical outcomes, and therefore should not be used in isolation to determine the outcome of articular cartilage paste grafting. A 3T MRI may be more helpful. This study supports the efficacy of articular cartilage paste grafting for the revision and salvage of OCD lesion repairs, resulting in regenerate articular cartilage surface and subchondral bone.