One Stage Cartilage Repair

One Stage Cartilage Repair Using a Hyaluronic Acid-Based Scaffold With Activated Bone Marrow-Derived Mesenchymal Stem Cells Compared With Microfracture: Five-Year Follow-up

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This is a groundbreaking European study, with five-year results, demonstrating the superiority & durability of stem cell surgery (not just injection) to microfracture. This study will now be carried out in the US. -Kelly Cunningham MD

Background: Articular cartilage injury is frequently encountered, yet treatment options capable of providing durable cartilage repair are limited.

Purpose: To investigate the medium-term clinical outcomes of cartilage repair using a 1-stage technique of a hyaluronic acid-based scaffold with activated bone marrow aspirate concentrate (HA-BMAC) and compare results with those of microfracture. A secondary aim of this study was to identify specific patient demographic factors and cartilage lesion characteristics that are associated with superior outcomes.

Study Design: Cohort study; Level of evidence, 2.
Methods: Fifty physically active patients (mean age, 45 years) with grade IV cartilage injury of the knee (lesion size, 1.5-24 cm²) were treated with HA-BMAC or microfracture and were observed prospectively for 5 years. Patients were placed into the HABMAC group if the health insurance policy of the treating institution supported this option; otherwise, they were placed into the microfracture group. Objective and subjective clinical assessment tools were used preoperatively and at 2 and 5 years postoperatively to compare treatment outcomes.

Results: Significant improvements in outcome scores were achieved in both treatment groups at 2 years (P < 0.001). In the microfracture group, 64% were classified as normal or nearly normal according to the International Knee Documentation Committee (IKDC) objective score at 2 years, compared with 100% of those treated with HA-BMAC (P < 0.001). Normal or nearly normal objective assessments in the microfracture group declined significantly after 5 years to 28% of patients (P = 0.004). All patients treated with HA-BMAC maintained improvement at 5 years according to Lysholm, Tegner, IKDC objective, and IKDC subjective scores. Tegner, IKDC objective, and Knee injury and Osteoarthritis Outcome Score (KOOS) assessments demonstrated higher scores in the HA-BMAC treatment group compared with microfracture at 5 years. Lysholm and IKDC subjective scores were similar between treatment groups at 5 years. Poorer outcomes in the microfracture group were demonstrated in cases of lesions larger than 4 cm² and nonsolitary lesions. Age greater than 45 years, large size of lesion, and treatment of multiple lesions were not associated with poorer outcome in patients treated with HA-BMAC.

Conclusion: Repair of chondral injury using a hyaluronic acid-based scaffold with activated bone marrow aspirate concentrate provides better clinical outcomes and more durable cartilage repair at medium-term follow-up compared with microfracture. Positive short-term clinical outcomes can be achieved with either microfracture or HA-BMAC. Cartilage repair using HA-BMAC leads to successful medium-term outcomes independent of age or lesion size.

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