

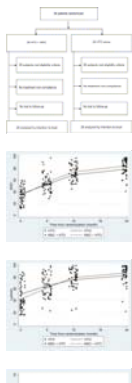
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Asian Cartilage Repair Society Original Article

## Injectable Cultured Bone Marrow–Derived Mesenchymal Stem Cells in Varus Knees With Cartilage Defects Undergoing High Tibial Osteotomy: A Prospective, Randomized Controlled Clinical Trial With 2 Years' Follow-up

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## Purpose

To analyze the results of the use of intra-articular cultured autologous bone marrow–derived mesenchymal stem cell (MSC) injections in conjunction with microfracture and medial opening-wedge high tibial osteotomy (HTO).

## Methods

Fifty-six knees in 56 patients with unicompartmental osteoarthritic knees and genu varum were randomly allocated to the cell-recipient group (n = 28) or control group (n = 28). Patients who had a joint line congruity angle of more than 2°, malalignment of the knee from femoral causes, a fixed flexion deformity, or age older than 55 years were excluded. All patients underwent HTO and microfracture. The cell-recipient group received intra-articular injection of cultured MSCs with hyaluronic acid 3 weeks after surgery, whereas the control group only received hyaluronic acid. The primary outcome measure was the International Knee Documentation Committee (IKDC) score at intervals of 6 months, 1 year, and 2 years postoperatively. Secondary outcome measures were Tegner and Lysholm clinical scores and 1-year postoperative Magnetic Resonance Observation of Cartilage Repair Tissue (MOCART) scores.

## Results

The median age of the patients was 51 years, with a mean body mass index of 23.85. Both treatment arms achieved improvements in Tegner, Lysholm, and IKDC scores. After adjustment for age, baseline scores, and time of evaluation, the cell-recipient group showed significantly better scores. The effect of treatment showed an added improvement of 7.65 (95% confidence interval [CI], 3.04 to 12.26; P = .001) for IKDC scores, 7.61 (95% CI, 1.44 to 13.79; P = .016) for Lysholm scores, and 0.64 (95% CI, 0.10 to 1.19; P = .021) for Tegner scores. Magnetic resonance imaging scans performed 1 year after surgical intervention showed significantly better MOCART scores for the cell-recipient group. The age-adjusted mean difference in MOCART score was 19.6 (95% CI, 10.5 to 28.6; P < .001).

## Conclusions

Intra-articular injection of cultured MSCs is effective in improving both short-term clinical and MOCART outcomes in patients undergoing HTO and microfracture for varus knees with cartilage defects.

## Level of Evidence

Level II, randomized controlled trial.

The authors report that they have no conflicts of interest in the authorship and publication of this article.

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