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# Intra-articular injection of mesenchymal stem cells for the treatment of osteoarthritis of the knee: a proof-of-concept clinical trial.

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**Erratum in**

Corrigendum: Human First-Trimester Fetal MSC Express Pluripotency Markers and Grow Faster and Have Longer Telomeres Than Adult MSC. [Stem Cells. 2017]

## Abstract

Mesenchymal stem cells (MSCs) are known to have a potential for articular cartilage regeneration. However, most studies focused on focal cartilage defect through surgical implantation. For the treatment of generalized cartilage loss in osteoarthritis, an alternative delivery strategy would be more appropriate. The purpose of this study was to assess the safety and efficacy of intra-articular injection of autologous adipose tissue derived MSCs (AD-MSCs) for knee osteoarthritis. We enrolled 18 patients with osteoarthritis of the knee and injected AD MSCs into the knee. The phase I study consists of three dose-escalation cohorts; the low-dose (1.0 × 10(7) cells), mid-dose (5.0 × 10(7)), and high-dose (1.0 × 10(8)) group with three patients each. The phase II included nine patients receiving the high-dose. The primary outcomes were the safety and the Western Ontario and McMaster Universities Osteoarthritis index (WOMAC) at 6 months. Secondary outcomes included clinical, radiological, arthroscopic, and histological evaluations. There was no treatment-related adverse event. The WOMAC score improved at 6 months after injection in the high-dose group. The size of cartilage defect decreased while the volume of cartilage increased in the medial femoral and tibial condyles of the high-dose group. Arthroscopy showed that the size of cartilage defect decreased in the medial femoral and medial tibial condyles of the high-dose group. Histology demonstrated thick, hyaline-like cartilage regeneration. These results showed that intra-articular injection of 1.0 × 10(8) AD MSCs into the osteoarthritic knee improved function and pain of the knee joint without causing adverse events, and reduced cartilage defects by regeneration of hyaline-like articular cartilage.

**KEYWORDS:** Adipose-tissue derived mesenchymal stem cells; Cartilage regeneration; Intra-articular injection; Osteoarthritis

**Comment in**

Cell manufacturing for clinical applications. [Stem Cells. 2014]

Author's response to the letter by Dr. Arjmand and Aghayan. [Stem Cells. 2014]

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