



# Stem Cell Therapy in Osteoarthritis

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## Editorial

Osteoarthritis is the most prevalent chronic degenerative joint disease involving articular cartilage and is a frequent cause of chronic joint pain, loss of function, and disability [1]. In men ages more than 50 years, osteoarthritis represents the second leading cause of work disability. Its incidence has doubled in women and tripled in men over the last 20 years [2]. The prevalence and incidence of osteoarthritis are presumed to accelerate with increase in life expectancy & sports activity of the general population, as well as the progressive nature of disease itself [3]. Furthermore, osteoarthritis is responsible for approximately 2% of all public health expenses [4] and large indirect costs derived from productivity decrease [5].

Unfortunately, the conventional treatments available for management of osteoarthritis are more targeted towards symptoms rather than prevention, and demonstrate only modest clinical benefits [6]. Though some of them may slow down the process, there is no hope for a reversal or repair, leading gradually to more cartilage loss, as diseases progress. Articular replacement with prostheses is only recommended as the last treatment option, which strengthens the ground for further advances to seek alternative treatment options.

Cell-based therapies are promising for the treatment of osteoarthritis and have shown encouraging results both in animal and in human studies. In fact, a recent trial published in *The American Journal of Sports Medicine* demonstrated solid structural as well as clinical evidence with respect to the durability of regenerated articular cartilage after an intra-articular injection of autologous Adipose tissue Derived Mesenchymal Stem Cells (AD MSCs) [7].

In this trial which included patients with similar baseline characteristics and with symptoms over 5 years, received high doses of AD MSCs. Follow-up with serial MRI showed gradual regeneration of articular cartilage and narrowing of the medial compartment over 6 months, though signs of destruction of the regenerated cartilage were observed at 2 years. Significant decrease in Visual Analog Scale (VAS) score for pain and Western Ontario and McMaster University Osteoarthritis Index (WOMAC) scores was observed in the study, compared to baseline. The pain, symptoms, and activity of daily living sub-scores of the Knee injury and Osteoarthritis Outcome Score (KOOS) continued to increase

until 1 year; however, no further improvements were noted after 1 year.

A similar study by Devatchi et al. [8] where patients received intra-articular injection of autologous bone-marrow derived MSCs in osteoarthritic knee joints and followed over 5 year showed beneficial effect started to decline after 6 months. However clinical outcomes were still better at 5 years compared with baseline, and there were no patient who underwent knee arthroplasty, while better knee at baseline (no MSCs), continued its progression towards aggravation and at 5 years became the worse knee, as reported by patients.

Orozco et al. [9] reported another study where intraarticular injection of autologous bone marrow-derived MSCs showed improvement of the algo functional indexes at 1 year, which was maintained during the second year, and that the quality of cartilage measured by T2 relaxation on MRI was further improved at 2 years.

In all the studies, intra-articular injection of MSCs were not associated with apparent adverse events, and another randomized controlled trial by Vega et al confirmed feasibility, safety, and clinical efficacy of intra-articular injection of allogenic bone marrow MSCs over hyaluronic acid [10].

In summary, with demonstrated continued safety and promising efficacy of an intra-articular injection of MSCs, it is potential treatment for chronic osteoarthritis. The Clinical procedure is feasible and safe and requires only minimally invasive intervention without surgery or hospitalization. The results are better than those obtained with established treatments. Pain relief occurs by 3 months and increases for at least 1 year. The recovery of functional losses is less but also significant, and there is quantitative evidence of partial articular cartilage healing.

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