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## Autologous adipose stem cell therapy for knee osteoarthritis: where are we now?

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### Abstract

**Introduction:** The purpose of this study was to evaluate the efficacy and safety of adipose-derived stem cell (ADSC) or stromal vascular fraction (SVF) injections for knee osteoarthritis (OA) treatment by analyzing all randomized controlled trials dealing with this topic. **Materials and methods:** The following search terms were used in PUBMED, EMBASE, Scopus, and the Cochrane Library Database on 14 November 2019: 'adipose derived stem cell' OR 'stromal vascular fraction' OR 'SVF' OR 'multipotent mesenchymal stromal cells' OR 'stem cell' OR 'derived stem cell' OR 'autologous' AND 'knee' OR 'osteoarthritis' OR 'chondral defect' OR 'randomized' OR 'controlled trial.' No time limit was given to publication date. We included randomized controlled trials (RCTs) based on the following criteria: (1) English studies; (2) patient population diagnosed with knee OA and treated with ADSCs or SVF injections; (3) comparison group treated with placebo, surgery, or adjuvant injections, such as platelet rich-plasma or hyaluronic acid. **Results:** Intra-articular injections of adipose stem cell therapy in the form of ADSC or SVF is a safe procedure for the treatment of knee OA, with good clinical and radiological outcomes in the early follow-up period (12-24 months). In addition, treatment with fat-derived cells showed a very low complication rate (16.15%) of which all were considered to be minor. **Conclusions:** ADSCs and SVF seem to produce promising good to excellent clinical results for the treatment of knee OA. However, the length and modalities of follow-up in the different conditions are extremely variable. Nevertheless, it appears that the use of adipose-derived stem cells is associated with clinical and radiological improvements and minimal complication rates. To avoid bias deriving from the use of biological adjuvants or surgical procedures, randomized controlled trials comparing ADSCs or SVF and other treatments (for example, platelet rich-plasma or hyaluronic acid injections) should be performed.

**Keywords:** Knee; adipose stem cell; osteoarthritis; randomized controlled trials; regenerative medicine; stromal vascular fraction; systematic review.

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