

## Autologous infusion of mesenchymal cells (MSCs) obtained from adipose tissue in the treatment of refractory knee pain from osteoarthritis: a case report

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### Abstract

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## Abstract

### Background

The use of mesenchymal cells (MSCs), due to their multi-lineage differentiation, represents an emerging treatment for osteoarthritis. MSCs are able to differentiate into different cellular lines, such as osteoblasts, chondrocytes and adipocytes, and are characterized by high plasticity, limited reproductive capacity and immunosuppressive and anti-inflammatory properties. They also release growth factors, cytokines, bioactive lipids and micro-vesicles which have several beneficial effects including an angiopoietic and anti-apoptotic action. Some studies demonstrated the presence of MSCs in many different tissues, including adipose and muscle, dermis, periosteum, synovial membrane, synovial fluid and articular cartilage. With the aim of identifying new strategies for the use of MSCs, the concept of “minimally manipulated cells” was developed, where MSCs are not expanded, but only manipulated in the operating room. Optyfat® is an innovative closed-circuit disposable device for collecting, micro-fragmenting and purifying a lipoaspirate intended for autologous implantation of MSCs without the use of enzymes or centrifuge. This technology preserves the entire architecture of the vascular-stromal niches of the lipoaspirate, increasing the bioavailability and the ability of cells to respond to regenerative stimulus.

### Case description

A 52 years old female, BMI 37, ex-smoker, with previous left arthroscopy after a road accident at the age of 18. Left knee pain that started 10 years ago, right knee pain from February 2022 exacerbated by intense physical activity, with the appearance of swelling, NRS 10/10. After intra-articular steroid injections, pulsed RDF and PENS on both knees, pain resolved on right, persisted on left, in maximum intensity. MSCs intra-articular infusion of the left knee was performed with a different technique. The final result was ineffective due to inadequate amount of tissue. Due to high-intensity pain persistence, MSCs infusion according to Optyfat® technique was repeated on the left knee with 8 ml of autologous tissue. A progressive improvement of the pain in the following months allow to a reduction and finally suspension 3 months after the infusion. At the four-month follow-up, QoL and pain intensity significantly improved.

### Discussion

MSCs intra-articular infusion with the Optyfat® is indicated in osteoarthritis in patients refractory to other conservative treatments and in early osteoarthritis of young subjects. The treatment has no particular contraindications and is suitable also in patients with comorbidities like heart disease or disease for whom prosthesis implantation is not indicated. This treatment is not recommended in patients with advanced osteoarthritis and in patients with too high healing expectations. The best clinical benefit is expected in the medium term, with the maximum result within 6 post-operative months. The available literature showed a clinical benefit also for several months.

### Conclusions

MSCs infusion by Optyfat® technique represents an effective, safe, long-lasting and minimally invasive

conservative treatment. Although it does not allow the reconstruction of worn cartilage, it is useful for preserving residual cartilage, especially if included in a protocol that includes regular physical activity and a healthy diet.