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## Case Report and Review of the Literature

# Autologous Micro Fragmented Adipose Cells Therapy for Subtalar Joint Osteoarthritis – Case Report and Review of Literature

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### ABSTRACT

**Introduction:** Post-traumatic subtalar joint arthritis is uncommon and the majority results as a consequence of either an intra-articular calcaneal or talar fracture. A unique case of management of subtalar joint arthritis is described using autologous microfragmented adipose cells therapy.

**Case Report:** We presented a 48-year-old male with symptomatic left subtalar joint arthritis, which was managed conservatively with analgesia and multiple steroid injections. During surgery, fat cells were aspirated from the abdomen and transferred to the Lipogems kit for mechanical breakdown of adipose tissue for around 20 minutes. Final 10ml of the product was injected into the subtalar joint. Patient was followed up at regular intervals and Visual analogue score (VAS), Manchester-Oxford Foot Questionnaire (MOXFQ) and Foot and Ankle Ability Measure scores (FAM-ADL) were collected.

**Results:** No perioperative complications were noted relating to abdominal liposuction and intra-articular injection of lipospiate and during the follow-up period. Improvement in VAS, MOX FQ and FAM-ADL scores was noted up to 6 months of follow-up.

**Discussion:** The subtalar joint plays a central role in load transmission and movement at the hindfoot and its malalignment and arthritis lead to impaired function and pain. Intra articular injections of fat cells and their regenerative potential in degenerative joint diseases have been well documented in literature. Lipogem technique has been used in knee, hip and ankle arthritis, but it is not documented to use in the subtalar joint.

**Conclusion:** This unique case report demonstrated the successful use of a single-dose autologous micro fragmented fat cells therapy leading to functional improvement in subtalar joint arthritis with no complications.

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### Introduction

Post-traumatic arthritis of the subtalar joint is uncommon and its incidence is unknown in literature. The majority of subtalar joint arthritis results as a consequence of either an intra-articular calcaneal or talar fracture [1]. A unique case of management of subtalar joint arthritis is described, in this case report, using autologous microfragmented adipose cells therapy. Our hypothesis is that autologous micro fragmented adipose cells injection can reduce pain and improve the quality of life for patients with subtalar joint arthritis. Literature has shown some evidence of using autologous fat cells in large joints such as hip and knee

OA but there is no evidence in literature to use this technique in the management of subtalar joint arthritis [2, 3].

### Case Report

A 48-year-old male subjected with symptomatic left subtalar joint arthritis (Figure 1) was included in this case report. He had an impaction fracture of the talus 15 years ago, which was managed conservatively with analgesia and multiple steroid injections. His MR scan (Figure 2) showed degenerative arthritis of the posterior facet of the subtalar joint. Patient demographics, weight-bearing radiographs (Figure 1) and scores (Table 1) were recorded in clinic preoperatively. Visual analogue score

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(VAS), Manchester-Oxford Foot Questionnaire (MOXFQ) and Foot and Ankle Ability Measure score (FAAM) scores were compared to pre-operative baseline at 2 weeks, 6 weeks and 6 months.



**Figure 1:** Pre op weight bearing radiograph of left ankle.



**Figure 2:** MR scan, sagittal view showing degenerative arthritis of posterior facet of subtalar joint.

**Table 1:** MOXFQ, FAAM-ADL and VAS scores at baseline, 2 weeks, 6 weeks, and 6 months post treatment.

|          | MOXFQ | FAAM-ADL | VAS  |
|----------|-------|----------|------|
| Pre op   | 58    | 49       | 9/10 |
| 2 weeks  | 41    | 69       | 5/10 |
| 6 weeks  | 32    | 76       | 1/10 |
| 6 months | 33    | 74       | 1/10 |



**Figure 3:** Fluoroscopic image during surgery showing injection of fat cells in subtalar joint.

### Surgical Technique

Limited abdominal liposuction was performed using a standardized technique by a senior orthopaedic and plastic surgeon under general anaesthetic. Under general anaesthesia, a stab incision was made over the abdomen and about 1000 ml of saline was infiltrated in the abdominal fat. Lipoaspirate was collected using a handheld manual suction technique with a 3mm lipoaspirate cannula connected to a 20 mL

syringe. Lipoaspirate was then transferred to the Lipogems kit for mechanical breakdown of adipose tissue for around 20 minutes. The final 10 ml of the product was injected into the subtalar joint (Figure 3). Patient was given an abdominal binder for 2 weeks to avoid haematoma formation. Partial weight-bearing in walking boot was allowed for two weeks, with advice to avoid strenuous activities for 6 weeks. Follow-up was done at regular intervals.

### Results

No perioperative complications were noted relating to abdominal liposuction and intra-articular injection of lipoaspirate during the follow-up period. Improvement in VAS, MOX FQ and FAM-ADL scores was noted during followed-up upto to 6 months.

### Discussion

The subtalar joint plays a central role in load transmission and movement at the hindfoot, especially when adapting the foot to uneven ground surfaces. Traumatic injury to the subtalar joint disrupts normal hindfoot motion and may significantly restrict global foot function [4]. Malalignment and instability of the subtalar joint alter the load distribution within the joint complex and potentially lead to subtalar arthrosis with pain and impaired function [5]. Subtalar arthrosis is caused by many conditions, such as trauma, talocalcaneal coalition, failure of the posterior tibial tendon (PTT), isolated instability of the subtalar joint and inflammatory arthritis [6]. Isolated subtalar fusion surgery is the

treatment of choice for patients with isolated subtalar arthritis after failure of conservative measures [6].

Intra articular injections of fat cells and their regenerative potential in degenerative joint diseases have been mentioned in literature [2, 3, 7, 8]. Fat tissue is available in abundance in the body and can be easily harvested with a simple technique, thus decreasing morbidity [9]. We used the Lipogems® system to harvest, process and transfer micro fragmented adipose tissue, which is well-documented in literature [10]. The intra-articular injection of fat cells using Lipogems® technique for the treatment of knees and hips arthritis has been successfully used with improvement in short and long-term pain resolution [2, 3, 7, 8]. In a randomized clinical trial, autologous fat cells therapy was associated with clinically significant improvement in pain and function in symptomatic knee OA [2]. Another study has successfully used the micro-fragmented adipose tissue in 32 treated knees showing significant improvements in terms of pain and cartilage quality for up to 12 months [3]. Niazi *et al.* presented a case report in which they successfully used fat cells to treat end-stage ankle arthritis but this technique has not been used for the subtalar joint [11].

## Conclusion

We have presented a unique non-operative technique for treating subtalar joint arthritis with successful outcome. This study demonstrated that a single-dose autologous micro fragmented fat cells therapy leads to clinical and functional improvement in subtalar joint arthritis with no complications. This technique applied to well-selected candidates can predictably lead to substantial improvement in functional outcomes and can delay the surgical technique in young patients.

## Funding

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## Conflicts of Interest

None.

## Ethical Approval

Not applicable.

## Consent to Participate

The patient gave an informed consent for the case report.

## Consent for Publication

The authors and the patient gave consent for publication.

## Availability of Data and Materials

Not applicable.

## Code Availability

Not applicable.

## Author Contributions

All authors read and approved the final manuscript. Mr. Noman Niazi - Treating surgeon, conception and design, acquisition and interpretation of data, drafting and revising the article; Jason Wong - Treating surgeon; Prof. Anand Pillai - Treating surgeon, acquisition and interpretation of data and revising the article.

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