

Implementation of Autologous Adipose Graft from the Abdomen for Complete Fat Pad Loss of the Heel Following a Traumatic Open Fracture Secondary to a Motor Vehicle Accident: A Case Study

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Abstract : Introduction: This study explores the potential applications of autologous pedal fat pad grafting as a minimally invasive therapeutic strategy for addressing pedal fat pad loss. Without adequate shock absorbing tissue, a patient can experience functional deficits, ulcerations, loss of quality of life, and significant limitations with ambulation. This study details a novel technique involving autologous adipose grafting from the abdomen to enhance plantar fat pad thickness in a patient involved in a severe motor vehicle accident which resulted in total fat pad loss of the heel. Autologous adipose grafting (AAG) was used following adipose allografting in an effort to recreate a normal shock absorbing surface to allow return to activities of daily living and painless ambulation. Methods: A 46-year-old male sustained multiple open pedal fractures and necrosis to the heel fat pad after a motorcycle accident, which resulted in complete loss of the calcaneal fat pad. The patient underwent serial debridement's, utilization of wound vac therapy and split thickness skin grafting to accomplish complete closure, despite complete loss of adipose to area. Patient presented with complaints of pain on ambulation, inability to bear weight on the heel, recurrent ulcerations, admitted had not been ambulating for two years. Clinical exam demonstrated complete loss of the plantar fat pad with a thin layer of epithelial tissue overlying the calcaneal bone, allowing visibility of the osseous contour of the calcaneus. Scar tissue had formed in place of the fat pad, with thickened epithelial tissue extending from the midfoot to the calcaneus. After conservative measures were exhausted, the patient opted for initial management by adipose allograft matrix (AAM) injections. Post operative X-ray imaging revealed noticeable improvement in calcaneal fat pad thickness. At 1 year follow up, the patient was able to ambulate without assistive devices. The fat pad at this point was significantly thicker than it was pre-operatively, but the thickness did not restore to pre-accident thickness. In order to compare the take of allograft versus autografting of adipose tissue, the decision to use adipose autograft through abdominal liposuction harvesting was deemed suitable. A general surgeon completed harvesting of adipose cells from the patient's abdomen via liposuction, and a podiatric surgeon performed the AAG injection into the heel. Total of 15 cc's of autologous adipose tissue injected to the calcaneus. Results: There was a visual increase in the calcaneal fat pad thickness both clinically and radiographically. At the 6-week follow up, imaging revealed retention of the calcaneal fat pad thickness. Three months postop, patient returned to activities of daily living and increased quality of life due to their increased ability to ambulate. Discussion: AAG is a novel treatment for pedal fat pad loss. These treatments may be viable and reproducible therapeutic choices for patients suffering from fat pad atrophy, fat pad loss, and/or plantar ulcerations. Both treatments of AAM and AAG exhibited similar therapeutic results by providing pain relief for ambulation and allowing for patients to return to their quality of life.

Keywords : podiatry, wound, adipose, allograft, autograft, wound care, limb reconstruction, injection, limb salvage

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