Clinical Cases Demonstrating Fat Pad Restoration Using a Novel Adipose Allograft Matrix*

Lawrence A. DiDomenico, DPM, FACFAS, FACFAOM, CWS, FCCWS

NOMS Ankle and Foot Care Centers, Youngstown, OH

ABSTRACT

Fat pad atrophy is the loss of adipose tissue and cushioning function. There is additional strain and pressure generated which leads to inflammation and micro-injury in the foot, causing pain and discomfort to the patient. Some causes of fat pad atrophy include aging, trauma, rheumatoid arthritis, and diabetic neuropathy.[1] A novel adipose allograft matrix (AAM) can help support fat pad restoration through host fat remodeling and neovascularization.[2] This study presents two cases treated with AAM resulting in reduced pain and improved lifestyle for the patients.

Case 1 was an 80 year old female with type II diabetes and rheumatoid arthritis. She had fat pad atrophy below the metatarsal heads of the right foot and was in pain upon weight bearing. Shoes and orthotic devices were unsuccessful. AAM was injected in the plantar aspect of her foot to help build up the fat pad. Off-loading bandages were applied to her foot post-injection. After four months, the plantar aspect of the foot was not painful and she was able to perform her routine activities without limitations.

Case 2 was an 80 year old male with peripheral neuropathy and recurring heel ulcer secondary to fat pad loss of the plantar heel. Wound closure was achieved through debridement and offloading, but the wound re-ulcerated due to underlying fat pad atrophy and bony protuberance. To rebuild the fat pad and reduce the likelihood of reoccurrence, AAM was injected into the atrophied tissue area after wound closure and off-loaded with a pad. At six months, it was stable and additional AAM was injected to help avoid surgical bony debridement in the future.

These cases demonstrate the role of AAM in assisting with fat pad restoration of adipose tissue to support cushioning, which results in decreased pain and improved quality of life.

MATERIALS AND METHODS

Adipose allograft matrix (AAM) is an off-the-shelf injectable human adipose tissue for soft tissue reconstruction. Human adipose tissue was recovered from donors, and the tissue was aseptically processed at the Musculoskeletal Transplant Foundation (Edison, NJ) according to Good Tissue Practices. Each donor was released as per <USP 71> Sterility Tests.

Two patients (80 year old female and 80 year old male) were treated with AAM to help with the treatment of fat pad atrophy. Off-loading bandages were applied post injection to reduce any pressure points.

CONCLUSION

In both cases reported, the goal of rebuilding the fat pad to prevent ongoing recurrence and reduce internal offloading was achieved. This may be attributed to the key matrix proteins that are preserved in AAM (Collagen I, Collagen III, Collagen IV, and Collagen VI).[3]

REFERENCES

[1] Gusenoff JA, *et al.* "Autologous fat grafting for pedal fat pad atrophy: A prospective randomized clinical trial." *Plast Reconstr Surg.* 2016; 138(5):1099-1108.

[2] Kokai LE, *et al.* Clinical Evaluation of an Off-the Shelf Allogeneic Adipose Matrix for Soft Tissue Reconstruction. *Plast Reconstr Surg Glob Open.* 2020; 8:e2574.

[3] Kokai le, *et al.* Injectable Allograft Adipose Matrix Supports Adipogenic Tissue Remodeling in the Nude Mouse and Human. *Plast Reconstr Surg.* 2019; 143(2), 299.

*Leneva® is a registered trademark of the Musculoskeletal Transplant Foundation.

CASE 1

Patient Information: 80 year old female with well controlled type II diabetes and rheumatoid arthritis presented with painful pre-ulcerative lesions and fat pad atrophy below the metatarsal heads of her right foot.

Patient History/Initial Examination:

- Fat pad atrophy plantar right foot.
- Painful pre-ulcerative lesion plantar right foot.
- Pain upon weight bearing
- Modifications of shoes, and orthotic management were unsuccessful in treatment.

Treatment:

- Application and insertion of 6cc of AAM to the plantar aspect of the painful pre-ulcerative lesions in an attempt to build up the fat pad.
- Offloading bandages were applied to plantar aspect of the foot x 1 week.

Outcomes:

- The plantar aspect of the foot is not painful.
- No ulcerations have occurred.
- The patient is able to function and perform her routine lifestyle activities with no limitations.

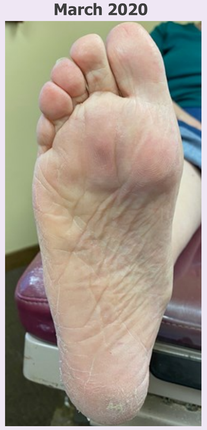
November 2019

Painful pre-ulcerative lesions plantar aspect of the foot secondary to fat pad atrophy

November 2019

Post-injection of AAM with off-loading pads

March 2020



Post injection of AAM with build-up of patient fat pad. Improvement with pain to the plantar aspect of the right foot, no pre-ulcerative lesion appreciated

CASE 2

Patient Information: 80 year old male who suffers from peripheral neuropathy, recurring heel ulcer secondary to fat pad loss of the plantar heel and a combination of a focal area of bony protuberance with increased pressure.

Patient History/Initial Examination:

- The wound was present for 8 months.
- Due to other conditions, this patient could not maintain non weight bearing.
- The wound was full thickness long standing neurotrophic ulcer of the left heel that continued to reoccur. Debridement and offloading would heal the wound, however, due to fat pad loss and proud bony protuberance, there was recurrence.

Treatment:

- Full thickness sharp debridement was performed with offloading of the wound in order to get it to heal.
- Once the wound was healed, AAM was injected into the site to recreate a fad pad into the atrophied tissue area and internally offload around the proud bony protuberance.
- One 3cc injection of AAM was injected into the target site of atrophy.
- An off-loading pad was utilized to continue to offload the area while the allogenic adipose tissue incorporated in the plantar left heel.
- The patient was given instructions to weight bear and limit activities to functional daily activities.
- At approximately 2 weeks post initial injection a small recurrence occurred. A second injection consisting of two 3cc injection of AAM was injected. At 7 months, there has been no need for additional treatment. If the wound begins to break down, then another injection will be given if the circumstances are right (no infection, wound depth etc.)

Outcomes:

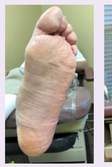
- The patient has maintained an active lifestyle and has not broken down or had a recurrence of the wound at the left heel.
- It took approximately 6 months with traditional wound care to keep the wound continuously healed. Once the wound was stable and maintained healed, one 3cc injection of AAM was injected and this was followed by two 3cc injections to proceed from the bony protuberance and fat pad atrophy in order to avoid surgical bony debridement.

May 2019
Open Wound Wall

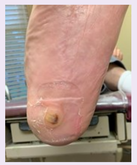
August 2019
Healing Wound

September 2019
Healed Wound

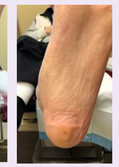
September 2019
Injecting the Wound with AAM



October 1, 2019



October 14, 2019
Mild Recurrence—
Second injection of AAM



November 26, 2019
has remained healed