CASE REPORT

Use of a Hyaluronic Acid Scaffold to Augment Achilles Tendon Repair with Haglund's Deformity: A Case Report

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Abstract

Foot and ankle tendinopathy such as Achilles tendinopathy with associated Haglund's deformity is a common cause of posterior heel pain. We present the case of a 44-year-old female with morbid obesity with partial Achilles tearing, Haglund's prominence, and retrocalcaneal bursitis. After conservative measures failed, the patient underwent surgical resection of the Haglund's deformity, Achilles tendon detachment and reattachment with a double-row technique, and secondary tendon repair utilizing a hyaluronic acid scaffold (Integrity implant) to augment the tendon. Postoperatively, the patient progressed through staged weightbearing and physical therapy without complications, reporting no pain and demonstrating excellent early recovery at five weeks. This case highlights the successful use of a hyaluronic acid scaffold (Integrity implant) to augment a compromised Achilles tendon following surgical debridement and reattachment. The Integrity implant offers a unique biologic scaffold that may enhance tendon healing by promoting cellular migration and collagen organization.[1]

Introduction

Achilles tendinopathy with associated Haglund's deformity is a common cause of posterior heel pain, particularly in patients with biomechanical abnormalities such as equinus contracture and pes valgus or pes cavus deformity. Surgical management typically involves debridement and reattachment of the Achilles tendon; however, augmentation using scaffolds like the Integrity implant, composed of hyaluronic acid, is an emerging technique that may enhance tendon healing. Other common tendinopathies such as that of peroneal tendinopathy may benefit from the use of a structurally robust hyaluronic acid scaffold for enhanced healing potential. This case report demonstrates successful use of a hyaluronic acid-based knitted scaffold, the Integrity implant, on a 44-year-old morbidly obese female patient who presented to the clinic with right ankle Haglund's deformity with Achilles tendon interstitial tearing, tendinosis, and retrocalcaneal bursitis.

Case Presentation

We present the case of a 44-year-old female with chief complaint of right foot pain. She has a significant past medical history of morbid obesity with a BMI of 52.46. The patient reported no history of trauma or an inciting event and admits the pain progresses throughout the day, especially with weightbearing. Clinical examination demonstrated pain on palpation to posterior Achilles tendon with palpable Haglund's prominence, medial longitudinal arch collapse bilaterally with limited range of motion of ankle and equinus contracture. Weightbearing radiographs were positive for medial arch collapse, anterior break in cyma line with sagittal fault at naviculocuneiform joint, Haglund's prominence, and anterior exostosis consistent with bony block equinus of the ankle. At this time advanced imaging with MRI was warranted to assess the Achilles tendon for possible tearing and anterior ankle impingement. Right ankle MRI findings were consistent with interstitial perforation of lateral distal Achilles with mild tendinosis and retrocalcaneal bursitis.

Clinical and advanced imaging findings were discussed with the patient and after thorough discussion of risks, benefits, and complications, surgical intervention was deemed appropriate. Due to the patient being at high risk due to her BMI, surgery would consist of Haglund's deformity/ retrocalcaneal spur resection, detachment with reattachment with double row technique, and secondary repair of Achilles tendon with utilization of a hyaluronic acid scaffold to augment the tendon with advancement due to the tear.

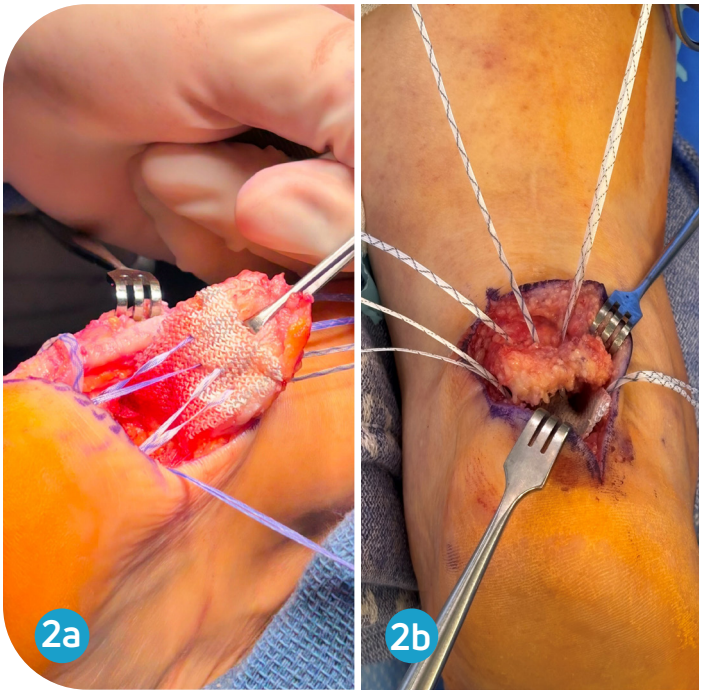
Postoperative recovery consisted of nonweightbearing with a posterior splint for week 1, followed by application of short leg cast for weeks 2 and 3. Patient was allowed partial protective 50% weightbearing with an Achilles boot and wedges with gradual progression of full weightbearing at weeks 3-4. The patient's most recent follow up was week 5 at which point she will start physical therapy and is doing well. She has no edema to the operative site and reports no pain.

Figure 1. *Placement of the Integrity scaffold underneath the Achilles tendon.*

Surgical technique

The patient was brought to the operating room and placed on the table in a prone position where general anesthesia and local anesthetic infiltration were administered. The operative limb was prepped and draped in the usual aseptic manner. Using elevation as well as manual exsanguination, the operative limb was elevated and well-padded pneumatic thigh tourniquet inflated to 300 mmHg.

Attention was directed to the posterior aspect of the right foot where a lazy Stype curvilinear incision was made over the insertion of the Achilles tendon. Dissection on the area through the subcutaneous tissue was gained and elevation of soft tissue was accomplished. Direct detachment of the Achilles tendon off the insertion was accomplished, elevating superiorly, thus removing the retrocalcaneal spur from medial and lateral as well as the Haglund's deformity. The site of the Haglund's resection was then cauterized with Bovie to prevent regrowth. Once all were removed, attention was directed to the tendon. A longitudinal split tear of the lateral aspect was visualized then the tendon was debrided of any hypertrophic abnormal tissue then repaired. Once this was debrided, the tendon was then reattached to the calcaneus using a double row technique using two 4.75mm PEEK AlphaVent anchors and two 3.9mm PEEK Omega anchors with 1.8mm suture tape. Underneath the tendon, placement of the Integrity scaffold was fixated to enhance healing to the Achilles tendon and calcaneus (Figure 1). This implant was augmented under the Achilles tendon and sewn through the anchors in order to increase biological growth of the tendon to the bone (Figure 2a, 2b).



Figures 2a & 2b. *The Integrity implant augmented under the Achilles tendon and sewn through the anchors.*

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Once the Integrity implant was secured in place, the tendon was tied back down to the bone. A double row tied proximally was pulled down to allow tendon flush over the area of the anchors then using double row technique the tendon was secured to the back of the calcaneus (Figure 3). The two other suture tapes were attached to the anchor and then placed through the tendon medially and laterally to augment the repair site then cut flush to prevent prominence.

Figure 3. *A double row tied proximally was pulled down to allow tendon flush over the area of the anchors then using double row technique the tendon was secured to the back of the calcaneus.*

The surgical site was then copiously irrigated and wound closure was made with 3-0 Monocryl for subcutaneous tissue then 4-0 nylon for skin. The pneumatic thigh tourniquet was then deflated, and prompt hyperemic response was noted. The patient tolerated the procedure and anesthesia well without complications.

Discussion

Our case highlights the success of using a hyaluronic acid-based scaffold for augmentation of Achilles tendinopathy. The Integrity implant is a bioabsorbable scaffold composed of chemically modified hyaluronic acid (HA), a naturally occurring glycosaminoglycan known for its role in promoting cell migration, angiogenesis, and extracellular matrix organization. Hyaff-11 is Anika's proprietary breakthrough technology that is a chemically modified derivative of hyaluronic acid, making it water-insoluble, longer lasting in the body than native HA, and as it hydrolyzes, it degrades into benzyl alcohol and HA.[2] Hyaff has been used globally for more than 20 years, demonstrating safety and efficacy results. More specifically, the Integrity implant consists of 80% Hyaff augmentd with 20% PET (polyethylene terephthalate), known for strength, biostability, and support of tissue growth.[3] Its application in tendon repair serves to provide a temporary matrix that supports fibroblast infiltration and collagen deposition while minimizing local inflammation.[1] The scaffold is gradually resorbed over approximately three to six months, allowing native tendon tissue to remodel and mature while leaving minimal residual PET once Hyaff is resorbed.[1] PET is the same material comprised in typical medical suture and known for its flexibility and high tensile strength in tendon repairs. The use of hyaluronic acid scaffolds has been associated with improved tendon healing by facilitating a more organized collagen fiber architecture.[1]

Adjunctive biologic scaffolds have emerged as a promising strategy to enhance tendon healing following surgical repair. The Integrity implant, composed of solid esterified hyaluronic acid, provides a temporary scaffold that supports fibroblast migration, angiogenesis, and organized collagen deposition, while also modulating the local inflammatory response. Animal studies demonstrated hyaluronic acid may play a crucial role in the acceleration of tendon-to-bone healing which might be through inhibiting inflammation.[4] Rotator cuff repair using microfracture along with HA led to better tendon–bone healing and a subsequent increase of biomechanical strength at the repair site. Similarly,

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another study emphasized the beneficial role of hyaluronic acid derivatives in tendon and ligament tissue engineering, supporting their use in clinical applications.[5] Additional clinical studies have contributed these findings as well, reporting that hyaluronic acid improved structural integrity and accelerated tendon-to-bone healing in rotator cuff repairs.[6]

By incorporating the Integrity implant into our surgical repair, we aimed to utilize these biologic properties to augment the compromised Achilles tendon and tendon-bone interface. Early postoperative results in this patient demonstrated favorable outcomes, with resolution of pain, absence of edema, and early initiation of functional rehabilitation.

Conclusion

This case highlights the successful use of a hyaluronic acid scaffold (Integrity implant) to augment a compromised Achilles tendon in a high risk morbidly obese patient following surgical debridement and reattachment. The Integrity implant offers a unique biologic scaffold that may enhance tendon healing by promoting cellular migration and collagen organization in complex Achilles tendon repairs.[1]

References

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