Complications of Bioabsorbable Anchors in the Calcaneus: A Case Series

Sara E. Lewis, DPM
Jasmine N. Neal, DPM
Alan S. Banks, DPM

INTRODUCTION

Bone anchors are commonly utilized to attach soft tissue to bone. Bioabsorbable materials were developed to overcome the pitfalls of metallic anchors including loosening, migration, and metallic artifact seen on postoperative imaging. Initial anchors consisted of polyglycolic acid (PGA), now however, many other materials have been used including polylactic acid (PLA), poly L/D-lactide acid (PLDLA) and biocomposite (1). Metallic anchors used today consist of titanium alloy and nitinol.

Bioabsorbable implants are widely used for rotator cuffs, shoulder labrums, Achilles tendons, and other lower extremity tendon injuries. Outside of foot and ankle research, there have been reported complications of osteolysis, chondrolysis, and synovitis. Within the foot and ankle literature, complications are scarcely reported, but of those reported, osteolysis and sterile abscess formation predominate (1). At our institution 3 cases with similar complications have been observed. This case series presents our experience with removing bone anchors secondary to complications following Achilles reattachment for retrocalcaneal exostectomy.

CASE 1

A 54-year-old man underwent surgery for removal of a bone spur on the left heel in February 2012 with the use of 3 bone anchors. One month later, in March 2012, he ruptured his left Achilles tendon and underwent a second surgery for primary repair of the tendon. Shortly after, his incision dehisced and was positive for Methicillin Resistant *Staphylococcus aureus* (MRSA). Subsequently from March 2012 until November 2012, the patient underwent 2 incision and drainage procedures and 7 weeks of intravenous (IV) antibiotics. Additional failed treatment modalities included hyperbaric oxygen treatment and 6 Dermagraft applications. In November of 2012, the patient presented to our institution and underwent aggressive and extensive debridement of the Achilles tendon and posterior calcaneus with removal of degenerative tissue and bone anchors. The patient then underwent a left Achilles tendon revision with Z-plasty and reattachment. The patient healed uneventfully.

CASE 2

A 48-year-old woman underwent surgery for removal of a bone spur on the right heel in March 2015 (Figure 1). The patient exhibited a wound dehiscence 6 weeks after surgery. She was admitted to our institution in November 2015 with 3 draining communicating tracts from the bone anchors, subsequent chronic osteomyelitis, and sepsis due to MRSA infection. The patient was placed on IV antibiotics. She was then referred to the senior author who performed removal of the bone anchor including attached suture from the posterior right heel in January 2016. She has since healed.

Figure 1A. Clinical view showing a pustule at the posterior Achilles.

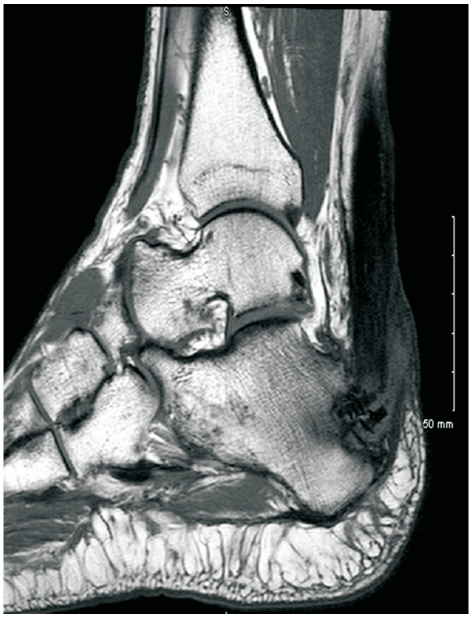


Figure 1B. Lateral magnetic resonance image showing a sinus tract.

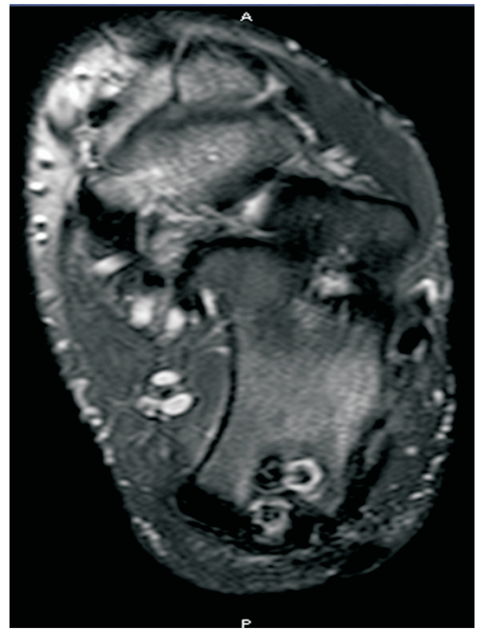


Figure 1C. Magnetic resonance image showing a sinus tract.

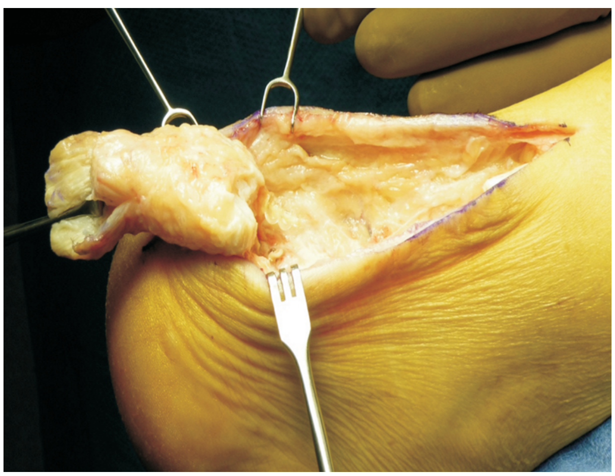


Figure 2A. Operative view showing the deficit left after excision of bone anchors and devitalized tissue. (Photos courtesy of Dr. John A. Ruch.)

Figure 2B. View of the excised bone anchor.

CASE 3

A 57-year-old woman underwent surgery for removal of a bone spur to her left heel 4 years prior. The patient had since exhibited recurrent drainage and sinus tracts from her heel. She was referred to a dermatologist who excised and primarily closed the chronic wounds unsuccessfully. In March 2016 the senior author excised the anchors, revised the posterior calcaneal exostectomy, and reattached the Achilles without the use of anchors (Figure 2).

ALTERNATE SURGICAL APPROACH

We propose an alternative approach (Figure 3) to perform a posterior calcaneal exostectomy without the use of bone anchors. The images depict an inverted T skin incision (Figures 3A, 3B). An H incision is then used for the Achilles tendon (Figures 3C, 3D). The lateral and medial tendon expansions remain intact and attached to the calcaneus. Next, the lower portion of the H is dissected off of the spur. The spur can then be removed from the entire width of the posterior calcaneus. Lastly, the H incision is then reapproximated one arm at a time with either absorbable or non-absorbable suture.

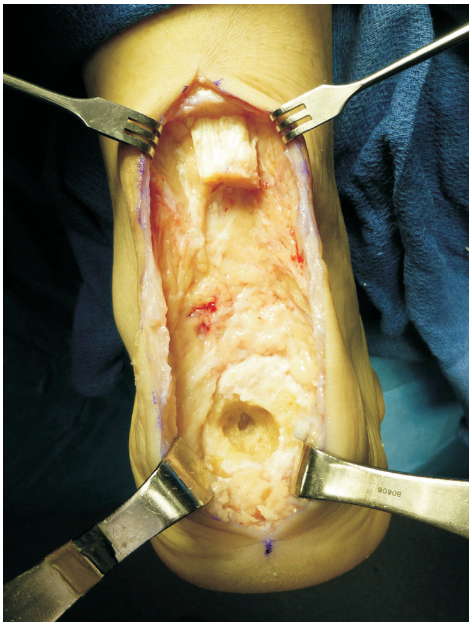


Figure 2C. View after excision of bone anchors.

Figure 3A. Inverted T incision.

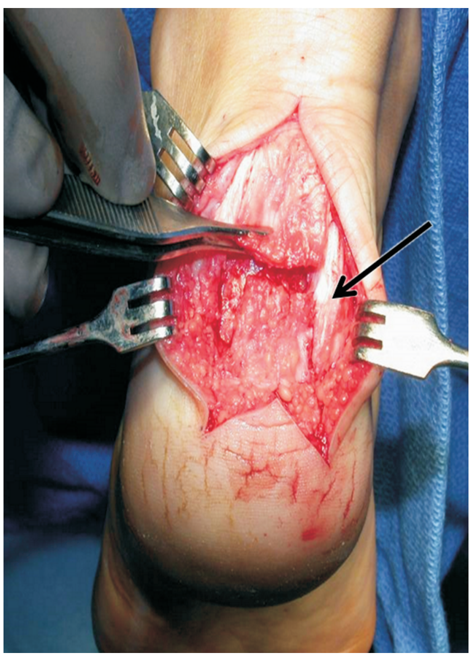


Figure 3B. Intact lateral expansion of Achilles tendon.

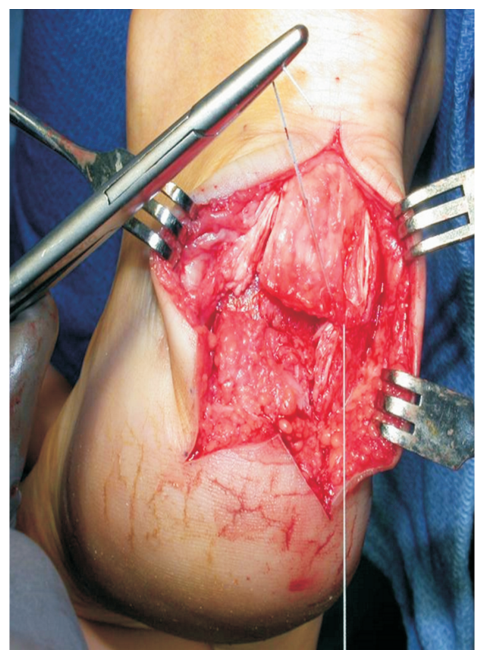


Figure 3C. Repair of the H incision.

DISCUSSION

Possible causes of complications, rates of which vary 4.7% to 41%, are multifactorial such as cellular reaction to anchor material resulting in foreign body reaction and osteolysis (2). Many surgeons continue to use bone anchors throughout the foot especially with reattachment of the Achilles (3). There are, however, alternate ways of approaching detachment of the Achilles tendon that negate the need for bone anchors. A linear or inverted Y skin incision can be used. Once the tendon has been exposed, an H type, inverted Y, T-type, or U-shaped incision can be made. When using these incisions, the lateral and medial - most portions of the Achilles remain intact. They also allow for increased proximal and distal extension, which enhances spur visualization if needed. After spur removal, the tendon can be primarily repaired because the lateral and medial tendon expansions remain intact. If further stabilization or reinforcement of the tendon is desired, intraosseous tunnels can be created.

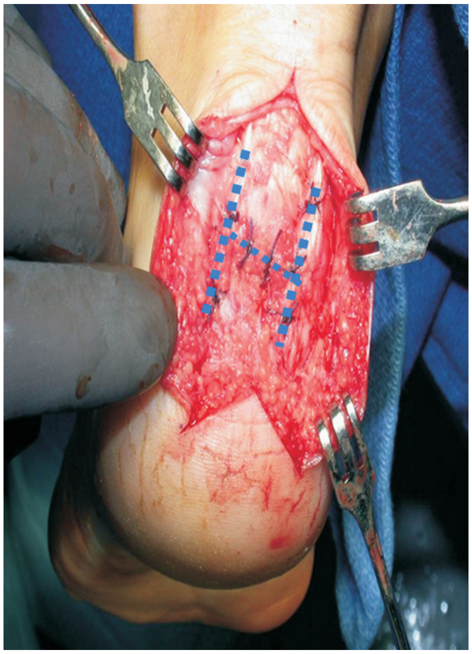


Figure 3D. Additional view of H incision repair.

Suture is then passed through the tunnels and the tendon (4). This surgical approach can provide an alternate method for performing a retrocalcaneal exostectomy without the need for bone anchors and also for revisional procedures in which a patient has infected heel bone anchors.

REFERENCES

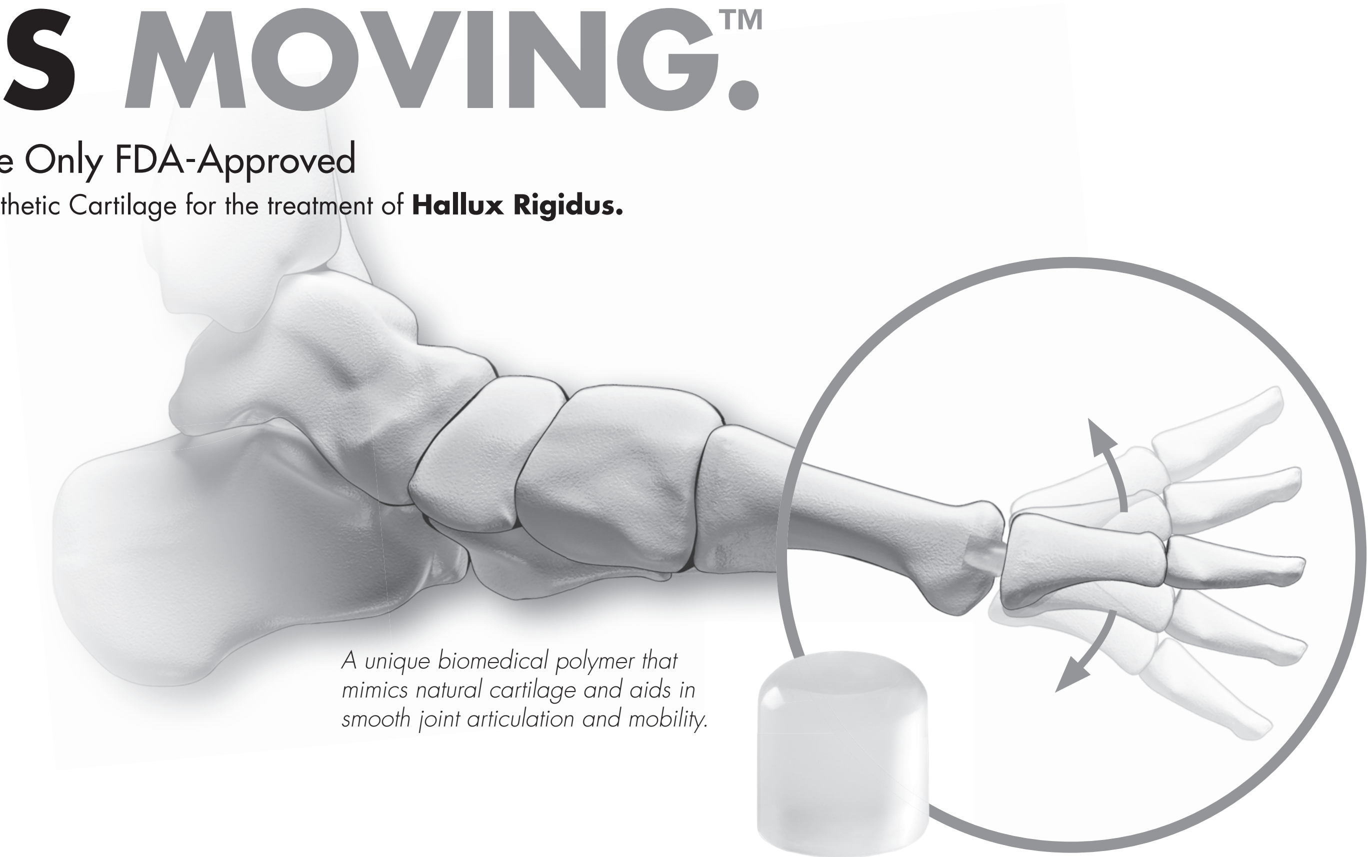
1. Kim SH, Kim DY, Kwon JE, Park JS, Oh JH. Perianchor cyst formation around biocomposite biodegradable suture anchor after rotator cuff repair. Am J Sports Med 2015;43:2907-12
2. McCarty LP, Buss D, Datta M, Freehill M, Giveans MR. Complications observed following labral or rotator cuff repair with use of poly-l-lactic acid implants. J Bone Joint Surg 2013;95:507-11.
3. DeVries JG, Summerhays B, Gueshistorf D. Surgical correction of Haglund's triad using complete detachment and reattachment of the Achilles tendon. J Foot Ankle Surg 2009;48:447-51.
4. Co AY, Ruch JA. Another technique for resection of posterior calcaneal spurs. Podiatry Institute Update. Podiatry Institute, Tucker, GA; 2005, pp. 45-7.

CARTIVA®
Synthetic Cartilage Implant

THE DIFFERENCE IS MOVING.™

The Only FDA-Approved

Synthetic Cartilage for the treatment of **Hallux Rigidus.**



THE DIFFERENCE IS DATA.™

Backed by Level 1 Clinical Evidence

from the largest randomized study ever conducted for the treatment of **Hallux Rigidus.**

-93%	+168%	+50%	96%
REDUCTION IN PAIN[1]	FUNCTIONAL IMPROVEMENT[2]	RANGE OF MOTION[3]	PATIENT SATISFACTION[4]

1. A substantial and clinically meaningful reduction in pain using the Visual Analog Scale (VAS) was experienced by subjects in the Cartiva group at every follow-up visit through 2 years. Cartiva subjects demonstrated a 93% reduction from a score of 68 at baseline to 5 at 2 years. **2.** Functional activities were evaluated using the validated Foot and Ankle Mobility Measure (FAAM). Substantial improvement was observed for Cartiva subjects throughout the 2-year follow-up period with a 168% improvement observed in the sporting activities scale. **3.** There was a substantial and clinically important improvement in active dorsiflexion motion in the Cartiva group, restoring motion to levels which are documented in the literature to be needed for normal walking gait while experiencing