



Minimally Invasive Repair of Acute Achilles Tendon Rupture

- Podiatric surgeons at Penn Medicine are now performing minimally invasive repair for acute Achilles tendon rupture.

The strongest, thickest tendon in the human body and the tendon most likely to rupture, the Achilles tendon is essentially a biomechanical cable originating in the muscles of the calf and drawn proximally at a 90° angle over the heel bone, which acts as a rigid fixed pulley. When an applied force exceeds the tendon's tensile capacity, as during abrupt flexion of the ankle, the Achilles will rupture. Certain antibiotics, steroid use, tendinopathy and other degenerative disorders are known to increase the risk of Achilles tendon rupture, but the leading cause of injury remains trauma, typically during athletic activity in men 30 to 50 years of age.

Repair of acute (<4wks) Achilles tendon rupture is a deliberative process involving the extent of injury, type of rupture (insertional or proximal), vascular or neural compromise of the tendon, and other physiologic concerns, each of which may influence method and approach to repair. Although formerly patients were often managed by nonoperative means (i.e. extended non-weight bearing in a plantarflexed cast), accelerated rehabilitation by surgery has been shown to substantially reduce tendon re-rupture.

In an effort to further improve upon healing time, patency of repair, and reduction in rate of recurrence, Podiatric Foot and Ankle Surgeons at Penn Medicine have introduced minimally invasive repair for Achilles tendon rupture. By comparison to open repair, minimally invasive Achilles tendon repair has been reported to have fewer postoperative complications and a much faster return to baseline physical activity.¹

References

DeVries JG, et al. Clin Podiatr Med Surg 2017;34:251–262



► **Figure 1:** Sutured closure following minimally invasive percutaneous repair (Arthrex PARS w/ FiberWire) of complete rupture of the left Achilles tendon.

CASE STUDY

JG, a 28-year-old man, was referred to the Chief of Section of Podiatry/Foot and Ankle Surgery at Penn Medicine Plastic Surgery from his community hospital emergency department following a suspected complete rupture of his left Achilles tendon following a club football game.

At Penn Medicine, JG had a positive Thompson-Doherty test and an MRI, which showed complete rupture of the Achilles tendon with a 2.5 cm gap. He was placed in a Jones compression dressing and posterior splint for edema control and deemed appropriate for surgical intervention. After JG reviewed all of the conservative and surgical treatment options with double board certified Foot and Ankle surgeon Albert D'Angelantonio, DPM, FACFAS, he elected to proceed with a minimally invasive percutaneous Achilles tendon repair.

The Procedure: Following established preoperative measures, including general anesthesia and a pneumatic left mid-thigh tourniquet at 350 mmHg pressure, a transverse 2 cm incision was made proximal to the left Achilles tendon injury and carried down through the subcutaneous tissues. Vascular and neurovascular structures were identified and safely compressed or retracted from the surgical field. The tendon was found to be ruptured both posteriorly and anteriorly at its most anterior surface; it was then clamped at the proximal and distal margins and the paratenon freed both proximally and distally.

At this point, an Arthrex PARS Jig was passed through the paratenon, clamping the proximal portion of the tendon, and a #2 FiberWire passed through it and pulled through the tendon complex to lock it medially and laterally. Next, the same procedure was followed to establish locking mechanisms on the medial and lateral margins of the distal tendon complex. The tendon was then completely reapproximated with the foot in maximal plantar flexion at the ankle level, and excellent apposition of the ruptured tendon noted, with no evidence of recurrent rupture. The plantaris tendon was left intact. The wound was flushed with copious amounts of normal sterile saline. The pneumatic ankle tourniquet was deflated. Excellent hemostasis was obtained.

Continued on back



► **Figure 2:** Absence of inflammation or edema and near complete healing at the site of percutaneous repair of complete left Achilles tendon rupture.

CASE STUDY *(Continued from cover)*

Next, the Achilles repair was reinforced with #0 Vicryl in an over and over fashion. Closure was then initiated, with #3-0 Prolene suturing of the paratenon in a simple interrupted fashion. JG's lower extremity was cast in slight gravity plantar flexion at the ankle, well-padded to all bony tuberosities, and he was safely transported to the post anesthesia care unit.

Recovery: JG tolerated the procedures and anesthesia well; no complications were encountered and blood loss was minimal. He was discharged to home the next day, and at his one, three and six-month follow-up visits, reported a satisfactory return to normal activity, with no residual evidence of pain, edema, or recurrence at the site of injury.

ACCESS

Penn Plastic Surgery Perelman
Perelman Center for Advanced Medicine
South Pavilion, 1st Floor
3400 Civic Center Boulevard
Philadelphia, PA 19104

Penn Plastic Surgery Woodbury Heights
1006 Mantua Pike
Woodbury Heights, NJ 08097

Penn Plastic Surgery Cherry Hill
Penn Medicine Cherry Hill
1865 Route 70 East
Cherry Hill, NJ 08003

FACULTY TEAM

The nationally recognized specialists of the Penn Medicine Plastic Surgery Division of Foot and Ankle Surgery provide a full spectrum of personalized, state-of-the-art Podiatric Foot and Ankle care for an eclectic array of patients of all ages. Penn Foot and Ankle Surgery works closely with other specialists and departments at Penn Medicine and serves as a regional referral center for physicians in the Philadelphia region.

Performing Minimally Invasive Repair of Acute Achilles Tendon Rupture

Albert D'Angelantonio, III, DPM, FACFAS
*Chief of the Section of Podiatry/Foot and Ankle Surgery,
Penn Medicine Plastic Surgery
Fellowship Director, Lower Extremity Reconstruction
Assistant Professor of Clinical Surgery*

Other Podiatric Providers at Penn Medicine

Brett Chatman, DPM
*Instructor of Surgery
Podiatric Surgery and Medicine*