

PERONEUS LONGUS TENDON RUPTURE REPAIR: Case Presentations

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INTRODUCTION

Peroneus longus tendon ruptures are less common than peroneus brevis ruptures and therefore in the literature often receive less attention. This type of rupture can occur acutely or chronically, often seen in conjunction with the pes cavus foot type and sometimes associated with an os peroneum (1-11). The os peroneum is present in 20% of the population and by definition is located within the peroneus longus tendon, most commonly at the level of the lateral or plantar cuboid tunnel (1-11). When an os peroneum is present, it can be the area of failure for the tendon. Ruptures often occur at or near the cuboid tunnel and/or at the os peroneum if present. If there is rupture at or through the os peroneum, it is common to see tendinosis proximal to the rupture or fracture site. In addition, the distal peroneus longus rupture segment is often either inaccessible or minimally accessible at the cuboid tunnel, making primary repair difficult to achieve even if a tendon graft is utilized (1-11). If there is fracture through the os peroneum, the proximal segment can retract towards the ankle and can get wedged at the peroneal tubercle with the patient presenting with an enlarged peroneal tubercle area clinically.

While primary repair of the peroneus longus has been reported, more often the proximal tendon is either inserted into bone (cuboid or calcaneus) or tenodesed to the peroneus brevis tendon. Many advocate the latter procedure, particularly if the patient has a pes cavus foot type since some possible elevation of the first ray may be beneficial. This essentially converts the repair to a peroneal stop procedure (1-11).

DIAGNOSIS

The patient may present with lateral foot and/or ankle pain with or without a history of injury. Occasionally, they may present with pain at the plantar insertion site at the first metatarsal base and medial cuneiform. As a full rupture often occurs at the cuboid tunnel, pain tends to localize to this area and proximally, sometimes patients report pain all the way up the lateral leg in line with the peroneal tendons or coursing along the plantar foot to its insertion site. However, other areas of tearing can include at the level of the fibular groove and peroneal tubercle (1-11).

Decreased plantarflexion of the first ray may be noted

clinically. If a fracture of the os peroneum has occurred with proximal retraction of the fragment, an enlarged peroneal tubercle area may be present. Radiographs can demonstrate the presence of an os peroneum, fracture, and if the fragments are displaced. Displaced fracture fragments typically indicate a full rupture of the peroneus longus tendon. Additional diagnostic studies include ultrasound, magnetic resonance imaging (MRI), and endoscopy (8).

TREATMENT

Conservative treatment is varied, but often includes at least some period of immobilization. If conservative management fails, the patient is symptomatic, and/or there is significant separation of the os peroneum fracture fragments, surgical repair is recommended. Options for repair include primary repair of the peroneus longus tendon, anchoring of the proximal segment into the cuboid or calcaneus, fixation of the os peroneum fracture, and tenodesis of the peroneus longus to the brevis. Generally, if tenodesis is performed, the tenodesis should be performed several centimeters proximal or distal to the fibular groove to prevent irritation or subluxation in this area. In addition, some consideration should be given to operative reconstruction of aggravating or causative factors such as a cavovarus foot, lateral ankle instability, ankle varus, and peroneal subluxation (1-11).

CASE PRESENTATIONS

Case 1

A 76-year-old woman presented to the office with pain to the outside of the left foot and ankle. The original injury occurred after turning her ankle twice in the same day. She had experienced a very sharp pain mostly to the outside of the left foot and ankle after the second episode. She still had pain despite conservative treatment of fracture boot immobilization and ankle bracing. Pain on palpation was present along the peroneal tendons, particularly at the plantar cuboid area of the left foot. Radiographs demonstrated an apparent fracture of an os peroneum with retraction of the fragments proximally and distally, this likely indicated a rupture of the peroneus longus. MRI indicated a likely rupture at the cuboid tunnel with longitudinal tear of the peroneus longus tendon. The peroneus brevis appeared unaffected (Figures 1A-1F).

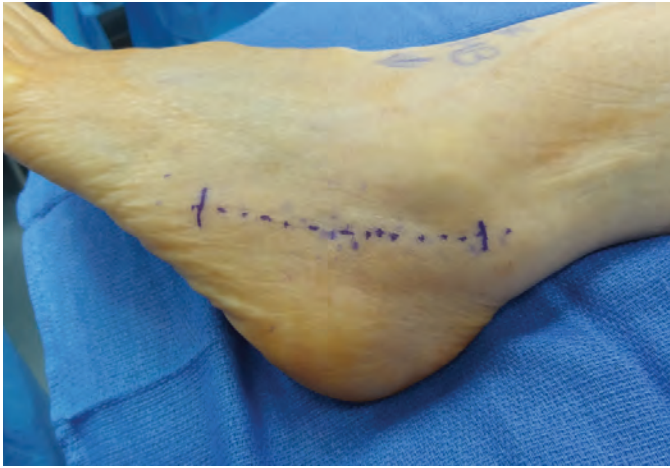


Figure 1A. Case 1, skin incision.

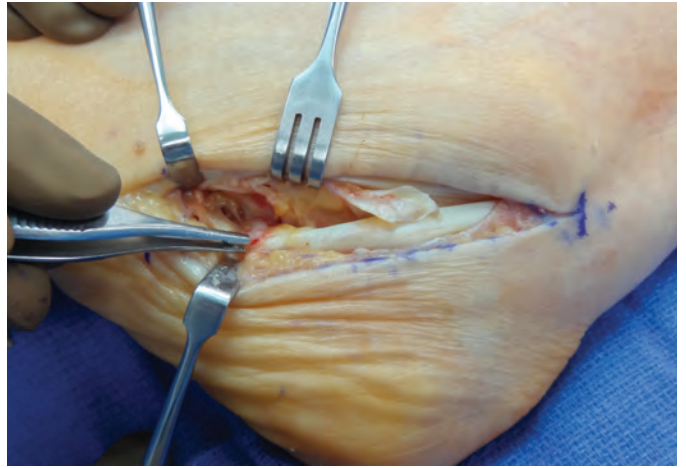


Figure 1B. Full rupture was noted just proximal to the os peroneum as noted by the pick-up.

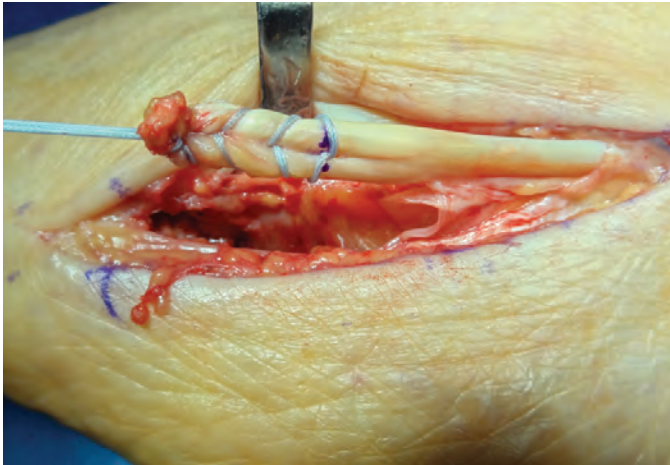


Figure 1C. Good length remained to the peroneus longus after os peroneum excision. Whip stitch was performed in preparation for anchoring of the tendon into the cuboid.



Figure 1D. Evaluating the circumference of the tendon for predrill prior to cuboid implantation.

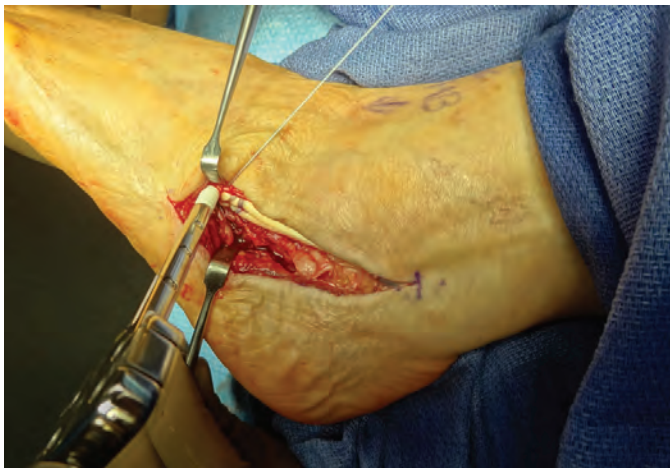


Figure 1E. Bio-tenodesis screw (Arthrex) being utilized to insert the tendon into the cuboid. Unfortunately the bone was too osteoporotic and did not securely hold the tendon into bone.

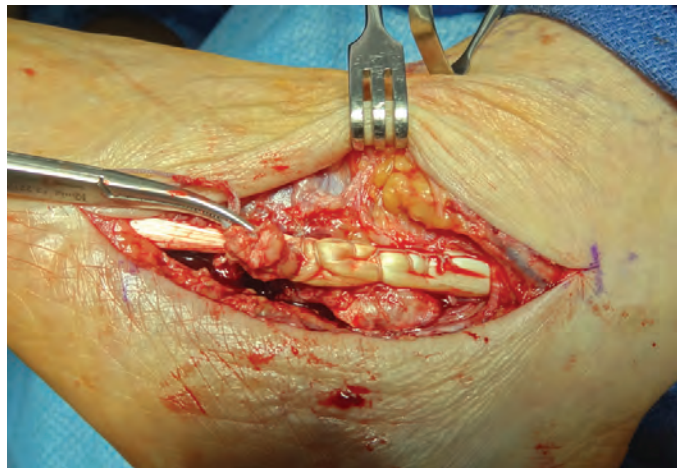


Figure 1F. Repair converted to anastomosis of the peroneus longus tendon to the intact and non-pathologic peroneus brevis tendon. Repair was well distal to the fibular groove.

The patient elected surgical intervention because of her continued pain. The surgical plan was to assess the rupture and the opportunity for primary repair. The patient was informed that the level of rupture would likely make primary repair difficult since the distal tendon segment was at the cuboid tunnel. The plan was for either anchoring of the peroneus longus tendon into the cuboid or tenodesis to the peroneus brevis tendon.

The patient was placed in the lateral decubitus position with the use of a bean bag for positioning. A thigh tourniquet was inflated after exsanguination. A skin incision was made in line with the peroneal tendons from the fifth metatarsal base to just behind the fibular malleolus. Care was taken to mobilize and retract the sural nerve. The peroneus brevis was intact without pathology. The peroneus longus was noted to be ruptured just proximal to the os peroneum and at the level of the cuboid tunnel, the distal portion of the proximal tendon segment was thickened consistent with tendinosis. Very little accessible distal tendon was noted, and primary repair was not felt to be feasible. The os peroneum was excised and a whip stitch performed at the distal portion of the proximal tendon to gather the tendon in an attempt to anchor the tendon into the cuboid with a bio-tenodesis screw (Arthrex).

Unfortunately, the patient's bone was too osteoporotic to hold the fixation. Therefore, the defect was filled with cancellous allograft bone chips, and the repair was converted to anastomosis of the peroneus longus to the peroneus brevis tendon. The proximal peroneal tendons were without pathology and it was decided to tenodesis the peroneus longus to the peroneus brevis tendon distally as it was well distal to the fibular groove. A 2-0 Fiberwire (Arthrex) was utilized for this in a running interlocking manner. The synovitis was excised and the wound was closed in layers. The patient was placed in a below-knee cast and later converted to a fracture boot. She was non-weightbearing for 4 weeks, then progressed to partial weightbearing over a 4-week period. Finally, she was converted to an ankle brace and formal physical therapy. She was discharged at 4 months postoperative and was doing well.

Case 2 (Figures 2A-2I).

This 72-year-old man had pain at the left cuboid tunnel area for ~2 years and had been treated through the years conservatively for a painful os peroneum in this area, which was confirmed radiographically. He was treated with ankle bracing, nonsteroidal anti-inflammatory drugs, and immobilization with exacerbating and remitting symptoms over that 2-year period. He had an MRI during this time, which demonstrated some tendinosis and an inflamed os peroneum, which at the time was intact. He was considering surgical removal of the os peroneum. He had been feeling ~80% better overall until he had an episode in which his

foot inverted as he was trying to catch a dish that was falling and this caused severe pain to his left foot. He fell over from the sharp pain. Pain now radiated laterally along the peroneal tendons and muscles. He also felt a snap of pain to the left foot.

On physical examination, the patient appeared to have an enlarged peroneal tubercle compared to his last visit and pain now ranged from the cuboid tunnel proximally to the peroneal tubercle area, left foot. The patient did have a pes cavus foot type with plantarflexed first ray, but no rearfoot varus. Radiographs confirmed fracture of the os peroneum with significant retraction of the proximal fragment to the peroneal tubercle. The patient elected to have surgical repair. We discussed surgical options of primary repair, anchoring of the tendon into bone, or tenodesis of the peroneus longus to the brevis, with the final decision to be made intra-operatively.



Figure 2A. Case 2. Radiograph prior to os peroneum fracture.



Figure 2B. Lateral view radiograph prior to os peroneum fracture.



Figure 2C. Radiograph post-injury with os peroneum fracture and fragment retraction.



Figure 2D. Lateral radiograph with os peroneum fracture and fragment retraction.



Figure 2E. The patient in the lateral decubitus position. Note the enlarged peroneal tubercle area secondary to the retracted os peroneum fragment.

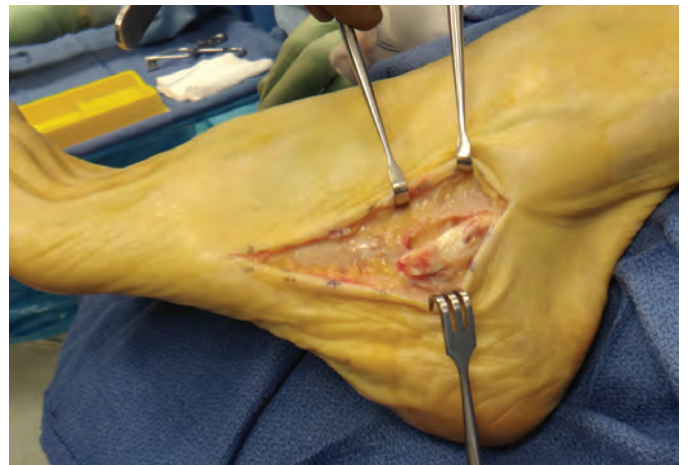


Figure 2F. Retracted proximal peroneus longus tendon segment with distal portion fracture fragment.

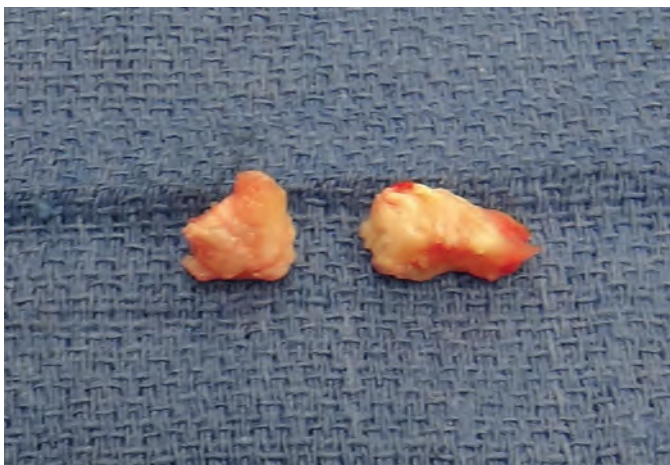


Figure 2G. The proximal and distal os peroneum fracture fragments after excision.

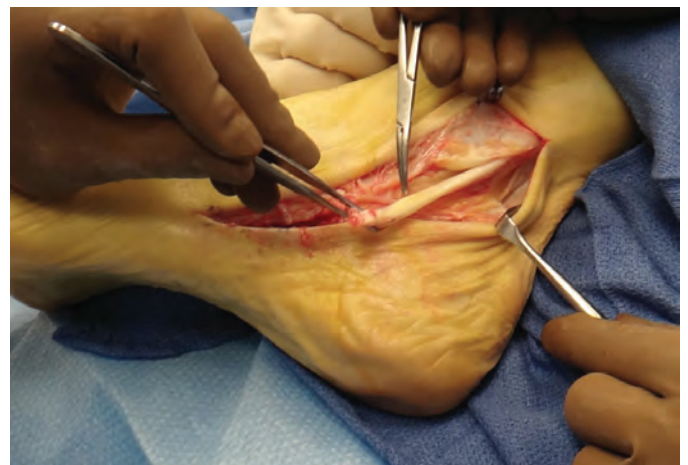


Figure 2H. Tendinosis (hemostat) noted proximal to the fracture site in the peroneus longus.



Figure 2I. 2-0 Fiberwire utilized to anastomose the peroneus longus to the peroneus brevis tendon proximal to the fibular groove.

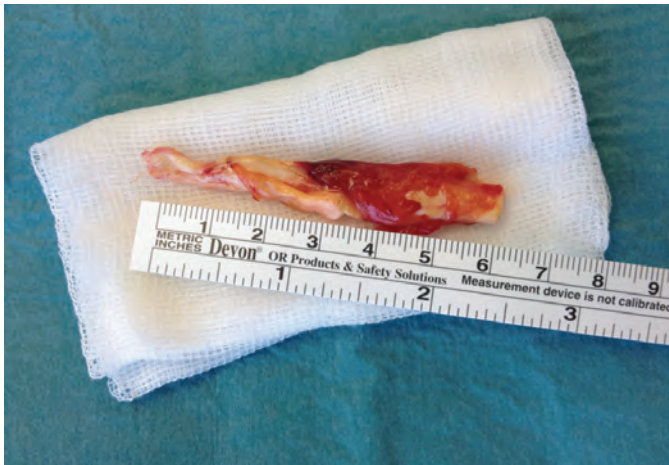


Figure 3B. Excised peroneus longus segment prior to anastomosis proximally of the peroneus longus to the brevis.

The surgery was performed with the patient in the lateral decubitus position with a bean bag for positioning. A thigh tourniquet was inflated, and the incision was made in line with the peroneal tendons from the fifth metatarsal base to just below the fibular malleolus. The sural nerve was identified and retracted throughout the case. The peroneal tendon sheath was opened over the peroneus longus proximally and distally. The proximal fragment was wedged into the peroneal tubercle. The distal fracture fragment was located just lateral to the cuboid tunnel and the distal tendon segment was barely visible. The fractured os peroneum fragments were excised. The peroneus brevis had no disease. The remaining peroneus longus was evaluated and tendinosis was noted just proximal to the fracture site. This could be a potential re-rupture site and given his pes cavus foot with plantarflexed first ray, it was felt that excising the diseased portion with anastomosis of the peroneus longus to the brevis proximally was the best course of action. The incision was lengthened proximally for exposure. The peroneus longus was excised to ~3 cm proximal to the fibular groove. A 2-0 Fiberwire



Figure 3A. Case 3. Peroneus longus rupture with diseased tendon noted proximal to the rupture.



Figure 3C. Anastomosis proximally of the peroneus longus to the brevis.

(Arthrex) suture was utilized to anastomose the longus to the brevis utilizing a Krakow-type interlocking stitch. The synovitis was excised, and the wound was closed in layers. The postoperative course was the same as was described in Case 1.

For rupture repair only, the patient is placed into a below-knee cast and was non-weightbearing for ~4 weeks. This was followed by a period of partial weightbearing in a fracture boot for several weeks. The patient will gradually progress to ankle bracing and formal physical therapy per the physician's discretion. Of note, both patients were placed on Lovenox for 3 weeks with no side effects or wound problems.

Case 3. (Courtesy of Dr. med Kai Olms). The patient is a radiologist who had an ankle sprain after playing tennis. The pain and swelling of the lateral ankle did not resolve. The pain was centered at the sole of the foot. MRI revealed a peroneus longus tendon rupture. Dr. Olms elected to perform a peroneus longus to peroneus brevis transfer (Figures 3A-3C).

Case 4. (Courtesy of Dr. med Kai Olms). In this patient, there was an intra-operative finding of a split tear of the peroneus brevis and an avulsion rupture of the peroneus

longus. The procedure was suture repair of the peroneus brevis and tenodesis of the peroneus longus to the peroneus brevis (Figures 4A-4D).



Figure 4A. Case 4. Avulsion rupture of the peroneus longus.



Figure 4B. Split tear of the peroneus brevis also noted intra-operatively.



Figure 4C. Suture repair of the peroneus brevis split tear and tenodesis of the peroneus longus to the brevis performed proximally.



Figure 4D. Surgical view of the repair.

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