Anatomic Reconstruction of Complete Peroneus Longus Tendon Rupture Using Tendon Allograft and an Intraosseous Midfoot Tunnel: Case Study with Midterm Follow-up

Statement of Purpose

Complete tendon rupture can cause long-lasting deleterious effects to the function of the foot and ankle. While primary end-to-end repair remains the goal, large defects that include avulsion from the tendon’s insertion makes this approach not feasible. Use of tendon allograft can be used to augment the tendon and bridge the gap; however, the course of the tendon may make anatomic re-alignment difficult through the soft-tissues without causing iatrogenic trauma. We present an alternate solution by means of an intraosseous tunnel through which the allograft augment is passed, restoring anatomic function.

Literature Review

The use of tendon allograft, such as the semitendinosis tendon, has been well reported in the literature for the repair of large tendon defects. Many different approaches have been recorded regarding securing the graft to both ends of the native tendon and to bone. However, little has been reported about the technique utilized to re-establish an anatomic tendon course and attachment with large proximal retraction of the tendon.

Case Study

We present an otherwise healthy 54-year-old female who was treated through conservative measures at an outside facility over the course of several months for peroneal tendonitis. Additionally, she complained of pain to her third metatarsal-cuneiform and fourth metatarsal-cuboid articulations and received two separate local corticosteroid injections over the course of several months which provided significant pain relief allowing her to begin training for a triathlon. She suffered a significant inversion ankle injury and felt an immediate painful popping sensation to the lateral ankle. Initial MRI findings were positive for a complete tear of her peroneus longus tendon with avulsion from its insertion to the first metatarsal base and retraction of the proximal portion to the retro-malleolar space. She then underwent surgical exploration of the tendon tract which revealed findings that correlated to the MRI as well as an intact peroneus brevis tendon. The tendon defect was too large for primary repair and tenodesis was determined to be the next course of care should allograft tendon use fail. First, a semitendinosis allograft was secured to the proximal stump of the peroneus longus tendon by the Pulvertaft weave technique. Next, to re-establish the tendon’s anatomic insertion site and avoid iatrogenic trauma to regional neurovascular structures, an intraosseous tunnel was created through the midfoot tarsal bones. The tendon allograft was passed through this tunnel from lateral-to-medial and the distal aspect with secured to the medial cuneiform with a cortex screw bone anchor.

Figure 1: Magnetic resonance imaging showing the complete rupture of the peroneus longus tendon with proximal retraction at the retromalleolar level.

Figure 2: A-D: Intra-operative image intensification. (A) Semitendinosus allograft with locking non-absorbable suture prepared for passage through the intra-osseous tunnel. (B) Semitendinosus allograft following passage from medial to lateral through the intra-osseous tunnel. (C) Repair of the peroneus longus tendon rupture with semitendinosus allograft for restoration of the anatomic insertion. (D) Insertion of the semitendinosus allograft into the dorsal-medial aspect of the medial cuneiform. (E) Intra-operative photograph with drill in place at the dorsal medial midfoot demonstrating the appropriate site to increase the course of the peroneus longus tendon.

Analysis and Discussion

As demonstrated through this case presentation, the use of an intraosseous midfoot tunnel allows for the recreation of anatomic course and insertion of a complete peroneus longus tendon rupture. This technique allows the avoidance of vital neurovascular structures located in the planter vault of the foot while maintaining physiologic tension and function. Mid-term results are promising and long-term surveillance will provide additional insight to efficacy of the above approach.

Results

The patient remained non-weight bearing but was allowed to begin passive range of motion exercises in a removable boot at three weeks post-operative. At six weeks post-operative she was able to weight back to supportive shoe gear and full weight bearing. At 62-month follow-up the patient retains exceptional pain free muscle strength with proper antagonistic function between the tibialis anterior and peroneus longus muscles, as well as, a stable first ray.

References

8. Thomas S. Roukis, DPM, PhD, FACFAS, Brent Fuerbringer, DPM (PGY 2) Gundersen Medical Foundation.