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Case Report

Use of autologous tendon of Hamstring in the treatment of irreparable lesions of peroneus tendon. Case report and literature review

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Abstract

The treatment of severe lesions of peroneus longus and brevis tendons is a challenge for orthopedists, and little is described in the literature about the epidemiology. Most of the articles focus on single lesion of one of the tendons, rarely describing what to do when both are severely ill. This case report will show and discuss a surgical technique for when both tendons are injured.

Level of Evidence III; Case Report and Literature Review.

Keywords: Autografts; Fibula; Foot deformities; Hamstring tendons.

Introduction

The peroneus muscles are the evertor and pronator muscles of the foot[1]. They reside in the lateral compartment of the leg and originate in the superior third of the posterior fibula and are divided at least in the longus and brevis. Still, sometimes there is a peroneus quartus tendon at the level of the ankle and hindfoot[1]. Their tendons have a common synovial sheath approximately 4 cm proximal to the tip of the lateral malleolus and a path in the retro malleolar groove where the brevis is anterior to the longus[1]. In this path from the lateral malleolus trough the calcaneus there is a region with low blood supply where most of the lesion of the peroneus tendon tend to happen.

Peroneus tendon tendinopathy is a frequent pathology in the activity of ankle and foot specialists. However, the actual incidence is unknown because the only available data come from two cadaveric studies[2–5]. Its pathology is widely associated with microtraumas and ankle sprains, also the position of the hindfoot as cavo-varus increases the overload of the tendon[2–15].

However, the presentation with severe simultaneous injury of both tendons ends up being an exception; for this reason, the literature focuses mainly on the treatment of the mild injury of one of the tendons[3,16].

While in the acute phase of the disease it can be managed with orthosis and physiotherapy, the chronical presentation tends to need a surgical treatment. When the lesion is small in the peroneal tendon (less then 50%) it can be debrided, however when is more than this the tendon need to be respected[4,17,18].

There are several techniques to treat these irreparable injuries of both peroneals tendons, the most traditional being

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local transfers with longus flexors of the hallux[4,5,16]. The use of grafts for reconstruction has been increasing, and in the literature, the most documented is allograft. The idea of using a hamstring tendon (HT) autograft for peroneus tendon (PT) reconstruction came from the observation of specialists who used this tendon for knee ligament reconstruction without major harm to the donor site[19]. This technique has been previously reported in the literature, demonstrating its validity[2,4,19,20].

This study describes one patient who was operated on with the hamstring autograft technique in 2020, a 59-year-old female. And we did a literature review on the treatment of severe simultaneous injury of both peroneal tendons.

Case description

Presentation of patients

The patient was a 59-year-old female. Complaint of bilateral pain in the feet at the lateral edge in the peroneus region with no history of trauma. On foot examination with cavo-varus, no signs of overload. She had movements of eversion preserved but painful on the tendon region, with no pain in the subtalar joint.

On radiography, there were no other significant findings and no sign of arthrosis in any joint (Figure 1A-C). The ankle resonance of the patient showed a significant cystic lesion in the brevis PT in the region between the tip of the fibula between the peroneus retinaculum, and a total lesion of the longus PT was observed with retraction of the same to the region of the superior peroneus retinaculum (Figure 2A-B) On the resonance of the leg, a good quality of the peroneus musculature was verified without liporeplacement.

Figure 1. Weightbearing radiograph image of the first patient. A) an AP view of the foot; B) Saltzman view of the leg; C) Lateral view of the foot.

Surgical technique

Patient positioned in lateral decubitus or ventral decubitus. First, an incision was made in the ipsilateral popliteal region 3 cm below the joint interline. Visualized the tendons of the pes anserine and located the HT. The tendon was released with a stripper to the proximal and distal for graft removal. The graft was prepared by removing muscle fibers from the tendon. Then the graft was tubularized with Vicryl 1 (Figure 3A-C).

Then an incision was made at the posterior edge of the fibula on the region of the PT (3-5 cm superior to the tip of the fibula), where it could see booth tendons and their lesion. A second incision was made at the lateral edge of the foot in the base of the fifth metatarsal region, identified the brevis PT, and resected it from its insertion. There was the necessity for a third incision on the tip of the malleolus to help release adhesions and remove the tendons (Figure 4A-C).

Tenodesis of the proximal stump of the peroneus tendons was performed with Vicryl 2.0. Sutured the graft in the tenodesis with the pulvertaft technique with Vicryl 2.0 and then finalized with a suture with Monocryl 5.0. The peroneus retinaculum tunnel was used to pass the tendon graft. Sutured the distal portion of the tendon graft in the distal

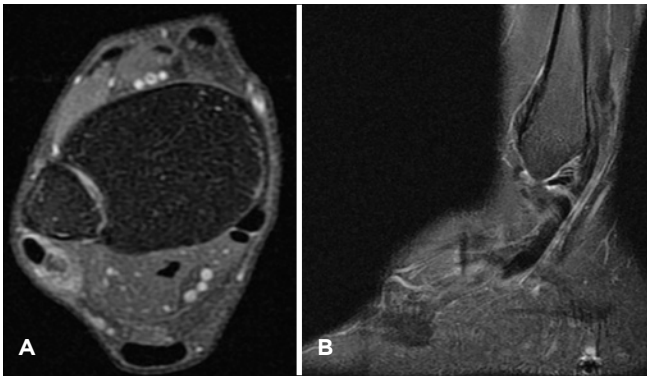

Figure 2. A-B) MRI first patient in an axial and a sagittal cut showing the lesion on the peroneals tendons.

fragment left over from the brevis peroneus tendon with an anchor 3. 5mm fixed at the base of the fifth metatarsal and finalized with a suture with Monocryl 5.0 (Figure 5A-C).

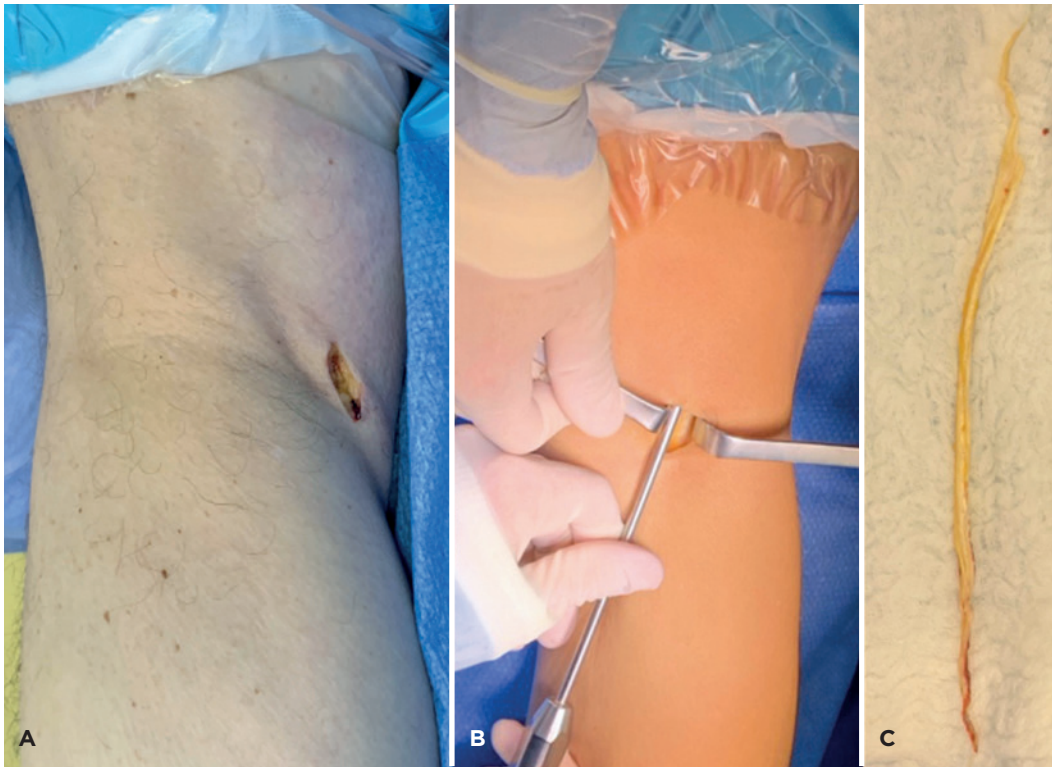

Figure 3. A-C) Show the knee incision, the semitendinosus extraction and the graft acquired.

Figure 4. A-C) Show the incision on the ankle and the foot for the tenolysis of the peroneal tendons and the disease tendons.

Tendon mobility was verified. Suture the tendon sheath with a Vicryl 4.0, then suture the incision by planes and immobilize the lower limb with a short leg splint (Figure 6A-C).

Postoperative follow-up

After two days of surgery, the splint is changed for a controlled ankle movement (CAM) boot, and the patient is released to initiate active combined movements of the ankle at the pain limit for physiotherapy and rehabilitation of the patient, the protocol being two minutes of exercise every two hours. Within two weeks, full weight-bearing is released, and the patient continues to use the CAM boot for another four weeks.

Outcome

The patient has two years of follow-up after the surgery. She had no sign of complications such as an infection or needed a new intervention to treat this disease further. At her latest clinical consult, they presented a strength grade 5- for eversion, a range of motion similar to the contralateral side and none complained about the knee region.

Discussion

The combined lesion of peroneus tendons is little described in the literature. The first discussions on this topic were from

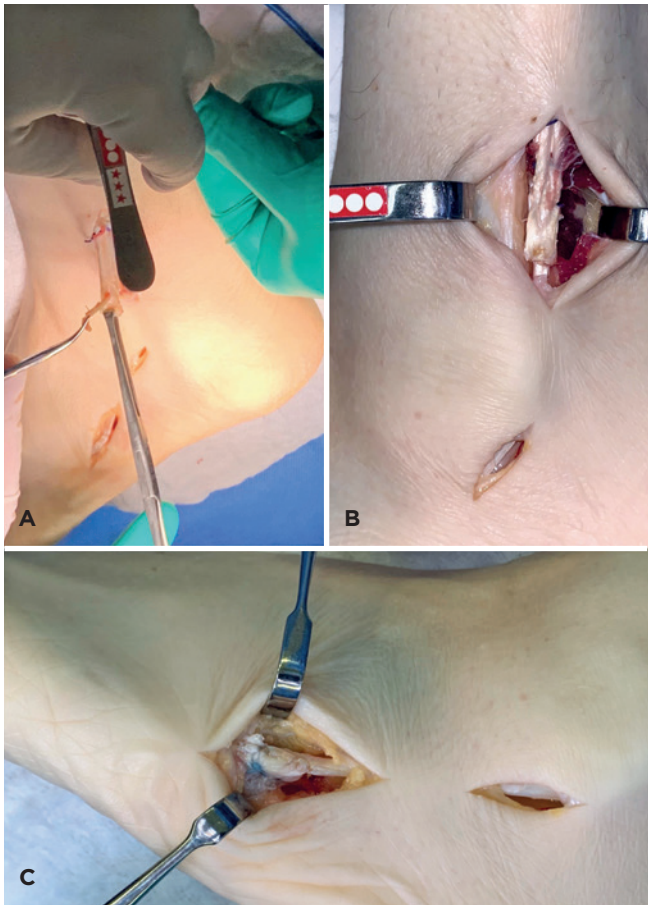

Figure 5. A) The graft through the proximal to the distal incision; B) The proximal suture of the graft to the peroneals tendon; C) Distal suture of the graft to the distal stump of the peroneal brevis.

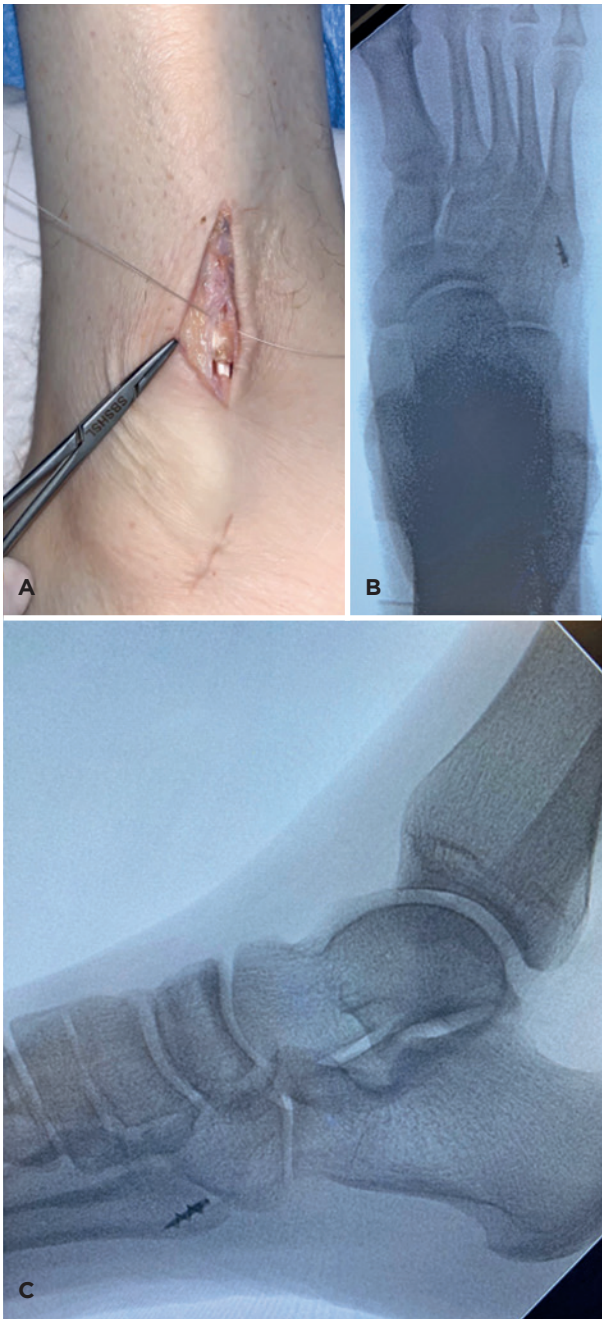

Figure 6. A-C) Closening technique of the peroneal retinaculum and final fluoroscopy.

1998, when Krause and Brodsky created a classification for the treatment of peroneus lesions[11,16].

The first treatments were done through tendon tenodesis and kept the least affected PT and tubolized, however, often the patient maintained the complaint of ankle pain, this can only be done when there is enough tendon left[4,17,18]. Most authors recommend at least 50% of the diameter of the tendon should have good quality.

The next technique to be described in the literature was the use of allografts for the treatment of these sever lesions[5,16]. This allowed for maintaining good mobility and stability of the ankle, significantly improving pain, when there is not enough tendon to tubolize it self. However, there is the problem of availability and the cost of tissue banking for donation and the chance of cross-infection due to the use of donor cadaver tissue[2–4,18,20–24]. Not all doctors have access to a tissue bank for this, and in some places the availability is scarce and the cost for the surgery can skyrocket.

Another technique also described for these patients is the transfer longus flexor of the hallux[16,17]. With the advantage of being activated in the same phase of the gait, and have similar size of one of the tendons. However, his vector is not the same as that of the PT, and patients lose the strength of eversion and stability of the ankle with the change of direction of the tendon and since only one of the function of one of the tendons is reconstruct with this[5,7,20,25-29].

That way, Ellis and Rosenbaum[5] described a hamstring autograft technique for peroneus. For this, it needs the muscular fibers of the PT to be of good quality, without liposubstitution. The remain of the injury tendons needs to have enough excursion in the shaft and good quality tissue so it will allow the graft to work. The use of this graft allows for maintaining the forces of ankle eversion without alteration or losing the function of another foot and ankle tendon, which can be very important for high demand athletes, and if necessary can recreate both tendons since the size of the graft tends to be bigger than the defect, and if necessary it can be extracted the semitendinosus and the gracilis.

Cody et al.[24] demonstrated that removing the HT to treat foot and ankle pathologies brings minor injury to the knee. There was a statistical difference with knee flexion deficit, but without clinical relevance.

The first descriptions of this technique suggested a large incision of 8-12 cm along the entire path of the PT[2–4]. However, it is possible to perform this procedure with only two small pathways, one in the posterior part of the tip of the fibula and the other near the base of the fifth metatarsal, and to use the peroneus retinaculum as the tunnel for the passage of the graft, as demonstrated in case. In the patient, a third incision was necessary between this to release adhesions of the brevis PT.

As the cavo-varus of the hindfoot tends to aggravate the pathologies of the peroneus, osteotomies for correction are often associated with the treatment of severe lesions of the peroneus[16].

Peroneus injury is a common pathology for foot and ankle specialists, but when there is a severe injury of both tendons, there is no consensus on how to proceed. The use of autograft is a technique that may be a good option for these cases with a minimally invasive approach, and in our patients, provided improve the pain and allows to maintain the mobility of the subtalar joint.

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