

Treatment of chronic injury associated with Achilles insertional tendinopathy using posterior ankle arthroscopy

Tratamento da lesão crônica associada à tendinopatia insercional do Aquiles com auxílio da artroscopia posterior do tornozelo

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ABSTRACT

Ruptures of the calcaneal tendon, when neglected, cause marked disturbance to gait and support at the tip of the foot. Most causes of pain in this region are related to overload injuries. Previous studies have shown that surgical treatment is the best option for chronic injuries. The purpose of this report is to describe a new endoscopic surgical technique used for treatment of chronic injury of the calcaneal tendon by reconstruction with flexor hallucis longus tendon transfer and fixation with an interference screw at the calcaneus in an elderly diabetic patient with signs of Achilles insertional tendinopathy.

Level of Evidence V; Therapeutic studies; Expert opinion.

Keywords: Rupture, Achilles tendon, Arthroscopy/methods; Surgery.

RESUMO

As rupturas do tendão calcâneo, quando negligenciadas, acarretam distúrbio marcante da marcha e do apoio na ponta do pé. A maior parte das causas de dor nessa região está relacionada a lesões por sobrecarga. Estudos prévios demonstram que o tratamento cirúrgico é a melhor opção frente às lesões crônicas. O objetivo deste relato é descrever uma nova opção de técnica cirúrgica endoscópica para tratamento de lesão crônica do tendão calcâneo reconstruído com transferência do tendão flexor longo do hálux e fixado com parafuso de interferência no calcâneo em paciente idosa diabética que apresentava sinais de tendinopatia insercional do Aquiles.

Nível de Evidência V; Estudos Terapêuticos; Opinião de Especialista.

Descritores: Ruptura; Tendão de Aquiles; Artroscopia/métodos; Cirurgia.

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INTRODUCTION

Ruptures of the calcaneal tendon, when neglected, cause marked gait disturbance with loss of function and quality of life, including difficulty walking long distances, standing on tiptoes and climbing stairs^{1,2}. Surgical treatment is challenging because the gastrocnemius-soleus complex undergoes muscle hypotrophy, tendon retraction and fibrous tissue formation, resulting in a large gap after debridement^(1,2).

Several surgical techniques have been proposed including VY advancement, tendon elongation and allogeneic or synthetic grafts⁽¹⁾. Among these, flexor hallucis longus (FHL) transfer is widely used, with good results^(1,2). Few studies have evaluated FHL transfer specifically for neglected calcaneal tendon injuries⁽³⁾, with most studies evaluating mixed cases of tendinopathy and neglected injuries. The advantages of using the FHL include that it is the second-strongest plantar flexor after the gastrocnemius-soleus complex and has anatomical proximity with the vascularized muscle belly and contractile force on the same axis of the calcaneal tendon, as well as the technical ease of transfer⁽¹⁾.

The most commonly described techniques involve two access routes (long graft through an intraosseous tunnel)⁽⁴⁾ or a single route (short graft fixed with an interference screw)^(5,6). The former is associated with greater morbidity of the second medial plantar incision, increased surgical time and risk of medial plantar nerve injury and greater loss of plantar flexion strength of the hallux due to graft removal at Henry's knot⁽⁵⁾. The latter technique is performed with a single route and graft fixation with an interference screw, but it requires a wide central longitudinal or posteromedial longitudinal incision^(5,6), which may lead to skin-related complications.

We present a new surgical technique that allows harvesting the FHL graft using a posterior arthroscopic approach for the treatment of a neglected calcaneal tendon injury in an elderly patient with chronic signs of Achilles insertional tendinopathy.

CASE REPORT

This study was approved by the institution's Research Ethics Committee.

A 79-year-old female patient with type II diabetes complained of pain in the posterior region of the leg for approximately two years and was unable to stand on tiptoe and climb stairs. She had a history of calcaneal tendon rupture treated conservatively with an equinus cast for approxima-

tely 45 days but without success. A physical examination revealed no ankle or right foot swelling, the presence of a palpable gap at approximately 5cm from the Achilles insertion, a positive Thompson test for injury and difficulty performing the tiptoe maneuver. Surgical treatment was indicated, involving reconstruction of the calcaneal tendon with transfer of the FHL extracted endoscopically, combined with treatment of the insertional tendinopathy with a dorsal calcaneal spur (Figure 1).

The patient was positioned in ventral decubitus under general anesthesia combined with sedation. The endoscopic technique performed was the same as that described by Van Djik et al.⁽⁷⁾. Portals were made adjacent to the calcaneal tendon. The posterolateral portal was made at a level slightly above the tip of the lateral malleolus. A vertical incision and blunt dissection toward the first interdigital space were performed.

Next, a 5-mm arthroscopic cannula was introduced with a blunt trocar inside, in the same direction, until the talus was contacted. The posteromedial portal was then made near the medial border of the calcaneal tendon at the same height as the posterolateral portal. Blunt dissection was performed in the direction of the previously inserted cannula, at a 90° angle between them, until the tip of the forceps touched the cannula, which was used as a guide. A 4-mm arthroscope was inserted through the posterolateral portal, and a 3.5-mm shaver was inserted into the posteromedial portal. Debridement of fatty tissue was performed between the calcaneal tendon and the posterior ankle capsule, lateral to the FHL tendon.

After the FHL tendon was identified (Figure 2a), the maximum ankle plantar flexion maneuver was performed to relax the tendon and obtain the greatest possible graft length before performing the tenotomy (Figure 2).

A 3-cm incision was made in the posteromedial region of the ankle, and the proximal stump of the calcaneal tendon was located. After opening the fascia between the superficial and deep posterior compartments, the FHL muscle belly was identified, which is pulled to facilitate the distal tenotomy of the tendon arthroscopically. We then removed the muscle with its tendon through this route to prepare the graft (Figure 3) with Vicryl 2® thread and Krakow suture (Figure 4). Next to the insertion of the calcaneal tendon, a 3-cm transverse incision was made, with a small "L" shape in the distal and medial portions. Insertional spurs from the calcaneal tendon and the posterosuperior prominence of the calcaneus were removed, and the degenerated distal stump of the calcaneal tendon was resected through this access route.

Tenodesis of the FHL was performed on the proximal stump of the calcaneal tendon, and passage of the graft through the site where the original calcaneal tendon was located was performed by pulling it through the transverse distal route. Distal fixation was performed with a 7.0-mm

interference screw in the calcaneus at 45° angulation at the site of the previous insertion of the calcaneal tendon by traction through the plantar aspect of the calcaneus (Figure 5).

The site was cleaned, sutured by layers and then dressed. An equinus cast was applied and maintained for two weeks.

After this period, an orthopedic boot with a 3-cm heel was used for another four weeks but with maximum active mobility and dorsiflexion of 90°. Partial weight-bearing was allowed with the use of crutches for one week. Only one contralateral crutch was used in the second week, and the

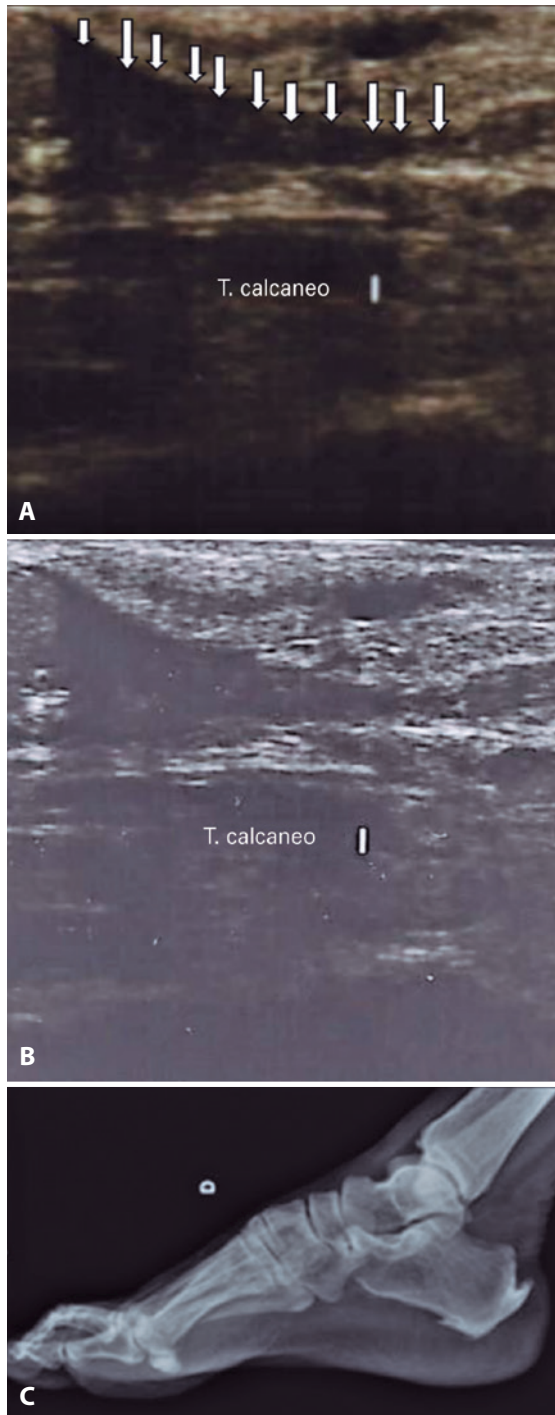


Figure 1. A. Diagnostic ultrasound images showing rupture of the calcaneal tendon. B. Pre-operative X-ray showing the dorsal calcaneal spur.

Source: Author's personal archive.

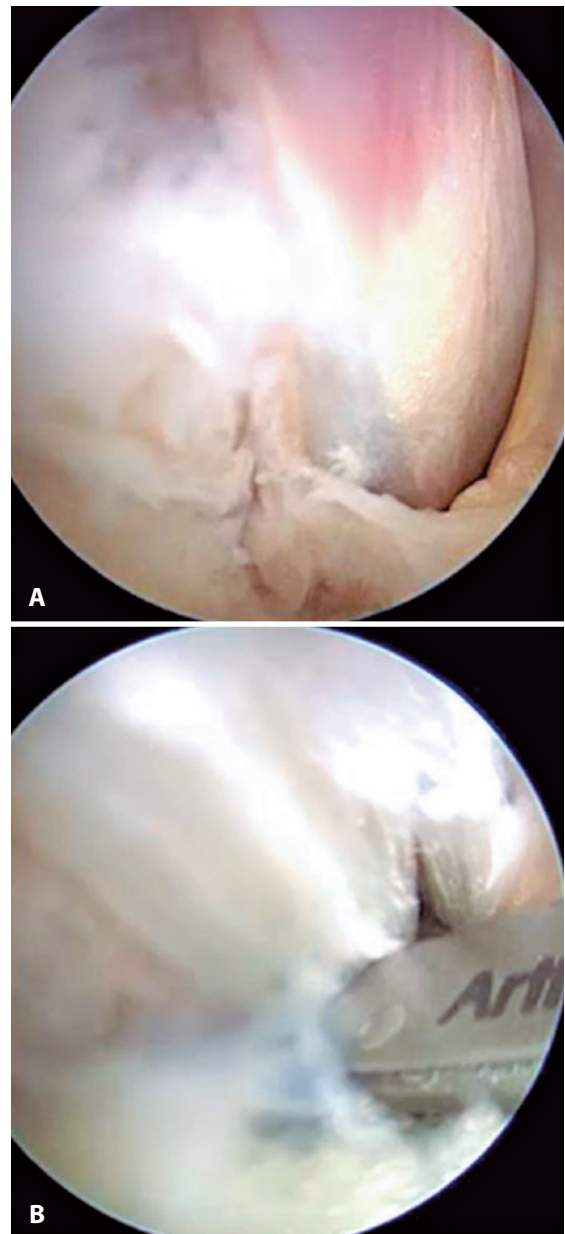


Figure 2. A. Flexor hallucis longus tendon pre-tenotomy. B. Endoscopic tenotomy of the flexor hallucis longus tendon.

Source: Author's personal archive.



Figure 3. Tenodesis of the flexor hallucis longus tendon in the proximal stump of the calcaneal tendon.

Source: Author's personal archive.



Figure 4. Flexor hallucis longus muscle with its tendon pulled through this route to prepare the graft with Vicryl 2 thread and Krackow suture.

Source: Author's personal archive.



Figure 5. Lateral X-ray of the ankle: distal fixation of the flexor hallucis longus tendon with a 7.0-mm interference screw in the calcaneus at 45° angulation at the site of the previous insertion of the calcaneal tendon.

Source: Author's personal archive.

crutches were discontinued in the third week. The patient was allowed to begin gait training at 10 weeks.

The patient showed no functional deficit, palpable gap or any skin-related problems and had a negative Thompson test. She returned to her daily activities after surgical treatment.

DISCUSSION

There are several described techniques for repairing chronic Achilles tendon ruptures. The controversy over which procedure is most indicated for reconstruction of the defect remains because no consensus exists regarding the best surgical technique.

Minimally invasive surgeries are increasingly used for the treatment of acute calcaneal tendon injuries, with low complication rates and similar results to the open technique⁽⁸⁾. However, in elderly patients presenting comorbidities such as diabetes, the potential for skin-related complications, suture dehiscence and infection is increased. Thus, minimally invasive surgeries may have an advantage over open surgeries, especially for neglected chronic injuries in this population.

The case described is highly complex due to the patient's advanced age, comorbidities and two injuries in different portions: a chronic insertional injury (insertional tendinopathy associated with dorsal calcaneal spur) and another of the middle third of the Achilles, comprising a neglected rupture. The technique described allowed a minimally invasive approach for the two injuries. Several surgical procedures have been described for treatment of both insertional and Achilles and body injuries, including endoscopic techniques^(9,10). However, we did not find studies that describe a simultaneous approach to the injuries using endoscopic FHL transfer.

The technique chosen has a great advantage in that it does not use devascularized grafts, uses minimal incisions and a transosseous fixation procedure, which confers better strength to the tendon, and requires less manipulation of adjacent soft tissue, offering better coverage for the implant. In addition, it allows the treatment of associated chronic insertional injuries. As a disadvantage, the learning curve for mastering posterior ankle arthroscopy should be considered.

CONCLUSION

The reported technique for reconstruction of the calcaneal tendon with endoscopic harvesting of the FHL graft

was effective for the patient. She presented improvement of motor function and pain at the Achilles insertion. Pros-

pective studies with case series are needed to evaluate the results of this new technique.

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