

Reconstruction of the chronic rupture of achilles tendon with peroneus brevis tendon augmentation

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Abstract

Achilles tendon ruptures have been estimated to be one of the most common tendon ruptures. End to end suturing of ruptured edges in fresh tears is gold standard, but the optimal management of chronic ruptures of the Achilles tendon is surgical reconstruction. We present our method of reconstruction for the chronic rupture of Achilles tendon using peroneus brevis through a standard para- midline incision. The management of tears of the Achilles tendon by peroneus tendon transfer is safe but technically demanding. It offers good recovery, even in patients with a long-term neglected rupture. This tendon transfer being a vascular dynamic structure allows complete excision of scar tissue along with degenerated and calcific tendon and poses less chances of skin flap complications with excellent functional outcome.

Keywords: Achilles tendon ruptures, reconstruction, peroneus brevis transfer, neglected TA rupture.

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INTRODUCTION

About 20% of complete ruptures of the AT are diagnosed late. The management of chronic ruptures of tendo Achillis is usually different from that of acute rupture as tendon migrates upwards due to contracture and scar tissue grows between ruptured ends¹. This gap between ruptured ends is bigger in our patients due to habit of squatting which brings the foot in a dorsiflexion, widening the separation.⁴ The blood supply to this area is relatively poor, and the tendon ends have to be freshened to allow healing. Due to the increased gap, primary repair is not generally possible. Operative procedures for filling this gap include flap tissue; turn down using flaps, local tendon transfer, and autologous hamstring tendon harvesting. The peroneus brevis transfer being a vascular

dynamic structure allows complete excision of scar tissue and good tensional strength, was graft of choice.⁵

CASE REPORT

55 years old male patient came with complaints of difficulty while walking since 4 months. On examination, plantar flexion at ankle was absent, and Thompson's squeeze test and Matles test were positive. X rays were done and revealed no abnormality. USG showed chronic rupture of right tendoachillis. During procedure, pre-operative anatomical markings were done at the palpable tendon defect, at both malleoli and the base of the fifth metatarsal. A lateral para median incision was taken just alongside the tendon. Sural nerve was identified and retracted carefully.



Figure 1: Proximal stump exposed, sural nerve identified

The small distal Achilles tendon stump at calcaneal attachment was identified and the end was freshened up. The proximal tendon was mobilised from the above, adhesions were divided, and further soft tissue release anterior to the soleus and gastrocnemius was done to minimize the gap between the two tendon stumps. The end of this stump was freshened up too. The tendon of peroneus brevis was harvested through mini incision at base of 5th Metatarsal. It was detached from the attachment and then was confirmed through the main incision by pulling the proximal part so that the tendon of peroneus brevis only could be withdrawn. The muscular portion of peroneus brevis was then mobilized proximally to allow increased excursion of the tendon of peroneus brevis, and tendon was pulled out through proximal incision.



Figure 2: Peronius Brevis tendon harvested through a stab incision at base of 5th Metatarsal

The posterior tuberosity of the calcaneum was well exposed for drilling. A transverse portal was drilled through the tuberosity from medial to lateral side. The withdrawn peronius brevis tendon was then sutured to lateral border of proximal and distal stump with heavy absorbable sutures and some non absorbable sutures and was passed through the drilled hole from lateral to medial side. It was then sutured again to medial borders of distal and proximal stumps to complete a rectangle.



Figure 3: Peroneus brevis sutured to proximal and distal stump with absorbable and non absorbable sutures

The stability was confirmed by slight dorsiflexion and plantar flexion of ankle. Closure was done with vicryl 2.0 and ethilon 3.0 of both the wounds taking a complete precaution of viability of skin and covering the tendoachillis to prevent further complications like adhesions. Ankle joint was further immobilized with an

above knee dorsal slab with ankle in 20 degrees of plantar flexion. Suture removal was done on 15th day post operatively. Slab was converted into a below knee cast for 5 weeks. Cast was removed 5 weeks later and full weight bearing was allowed. The wound was completely healed and squeeze test was negative with active plantar and dorsiflexion at the end of 6 weeks.



Figure 4: Active plantarflexion and dorsiflexion at the end of 6 weeks

DISCUSSION

Achilles tendon is one of the most frequently ruptured tendon and no other tendon suffers complete rupture more often.^{5,6} The incidence of spontaneous complete rupture of achillis tendon has risen steadily in last few decades due to increased sedentary life style and intermittent participation in recreational sports. Upto 25% of all cases are misdiagnosed with serious consequences to the patient.^{7,8} The site of tendon rupture is usually 2 to 6 cm above the tendon insertion into the calcaneum, which is a relatively hypovascular area as shown by angiography studies of Lagergren and Lindholm^{9,10}. Age related changes result in stiffness and loss of elasticity predisposing to rupture. The practice of treating retrocalcaneal bursitis and tendoachillis tendinitis with local steroid injection is quite widespread. Instead of injecting the drug in the bursa or around the tendon in mesotendon, the injection given directly in the substance of tendon weakens collagen fibers and predisposes to rupture. Many authors claim that fresh rupture of the tendon can be managed conservatively, and have similar results with conservative and operative treatment when range of motion, strength, power and function levels are evaluated.^{11,12} Achilles tendon reconstruction with peroneus brevis as we did in our case is beneficial in patients with chronic rupture. It leaves minimal or no objective plantar flexion weakness following the procedure, and has minimal re-rupture rates. Peroneus brevis also fulfils many of the essential criteria for tendon transfer as the tendon has an acceptable strength of 116.2 N/mm, cross sectional area of 19.5 cm² and an elastic modulus of 149.7 N/mm², compared to an ultimate tensile load of 1724 N, has similar line of pull and has adequate excursion, and is expendable.^{13,15} It was also

easily identified distally inserting into the tubercle of the base of the fifth metatarsal, so we didn't have to create a large incision. The reconstructed gastro-soleus-achilles tendon complex stretches with increased loading and range of movement exercises during rehabilitation. Also, the tendon we used is a dynamic and vascular structure, hence full strength is regained and that too earlier as compared to use of fascia. Peroneus brevis is having muscular part up to lateral malleolus and hence the muscle part will be facing towards suture line so even if skin necrosis occurs, there will be early granulation over the muscle and hence less chances of infection. This will allow early healing and less scarring^{2,3}. The tendon passing through the hole in the bone is better and securely anchored. Following surgery, the ankle was kept in 20° of equinus to prevent disruption of the reconstruction. Vascularity of the soft tissues is maximal at 20° of plantar flexion, and at 40° of plantar flexion the blood supply of the skin is reduced by 49%. Therefore, the tightness of the repair may influence wound healing.¹⁶ To summarize, The management of acute and neglected subcutaneous tears of the Achilles tendon by peroneus tendon transfer is safe but technically demanding. It affords good recovery, even in patients with a neglected rupture of 6 weeks to 9 months duration, though Patients with a neglected rupture are at a slightly greater risk of postoperative complications. It provides a living, dynamic and vascular reinforcing structure in chronic and neglected rupture of tendo-achillis with minimum complications.

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