

Management of Open Chronic Tendo Achilles Injuries: A case report

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Delayed presentation of an open Tendo Achilles injury with segmental loss of tendon and soft tissue is a challenging problem for the Orthopaedic surgeon. We present a patient who presented with a 4 x 5 cm open wound and a 4cm segmental loss of the tendon 6 months after the injury. To bridge the defect in the tendon, lengthening of the proximal tendon was done using a tongue in groove sliding technique, and a reverse sural artery flap was used to cover the soft tissue defect. At 9 months follow up, the patient was able to perform a single limb toe stance. The technique and the relative merits of this simple procedure are discussed.

Key words: Achilles tendon, Sural artery flap, Bakers slide, Tendo Achilles, tendon rupture.

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Open Tendo Achilles injuries commonly occur following cycle spoke injuries or after a fall into 'Indian style' closets.¹ If patients present within 6 to 12 hours of the injury a thorough wash followed by primary or delayed repair of the tendon can be done. Management of delayed presentation of open Tendo Achilles injuries is more complex, as there is a loss of soft tissue cover in addition to the tendon defect.

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An effective surgical procedure is required to bridge the defect in the Tendo Achilles, as well as to achieve adequate soft tissue cover.^{1,2} A number of procedures have been described for reconstruction of the Tendo Achilles. These include lengthening the aponeurotic tendon either in a 'tongue in groove' fashion as described by Baker, or the V-Y technique popularized by Abraham and Pankovich.^{1,2} The other methods described for repair of neglected rupture include augmentation with the peronei (Teuffer's modification of White and Kraynick technique), or with a strip from the median raphe of the proximal tendon (Bosworth's technique).² Management of the defect in an open injury is more complex because of the associated loss of soft tissue cover. The use of vascularised extensor digitorum brevis and various composite free flaps have been described for such defects.² These require the expertise of a micro vascular surgeon.



Figure 1 Presentation of injury. Elevation of the reverse sural artery flap, with insert (A) showing the skin defect over the ruptured Tendo Achilles. The flap has been cut back to a bleeding edge.

We present the case of a patient who presented with a 4 x 5 cm open wound and a 4 cm segmental loss of the tendon six months following a fall. Following a thorough debridement, we opted to bridge the defect by lengthening the tendon with a Baker's procedure, and cover the skin defect with a reverse sural artery flap. The technique and relative merits of this simple procedure are discussed.

Surgical Procedure

With the patient in prone position, the wound was debrided and the residual skin defect measured. Swabs taken from the wound confirmed the absence of active infection.

The reverse sural artery flap was elevated before the tendon was lengthened. (Fig 1) The flap was marked proximally on the calf, with the edges 0.5 cm more than the measured recipient area.

The small saphenous vein, sural artery and nerve were cut at the proximal edge of the flap and raised along with the fascio-cutaneous flap. The deep fascia was anchored to the epidermis prior to elevating the flap, in order to prevent shearing between the deep fascia and the skin. Distally, the incision was extended up to the medial border of the wound. Laterally, the flap was raised to 7.5 cm short of the lateral malleolus, in order to preserve the perforators from the peroneal artery that supply the elevated flap. At this stage, the tourniquet was released, and bleeding from the flap edge was noted. As the bleeding from the leading edge of the flap was inadequate, the flap had to be cut back until a bleeding edge was obtained. (Fig. 1) The flap was then turned over its pedicle, and laid over the defect.

Following the elevation of the flap, the aponeurosis and tendinous portion of the Tendo Achilles was exposed. The proximal edge of the defect was freshened, and a no. 5 ethibond (ETHICON, Inc.) Bunnel suture was passed through the distal end of the tendon. Care was taken not to disturb the mesotenon near the defect. A 'tongue in groove' lengthening of the tendon was done at the musculotendinous junction. For the defect of 4 cm, a 9 cm cut was made in the aponeurosis, to ensure adequate overlap after the lengthening. Traction was applied to the tendon with the ethibond suture to lengthen the tendon, and the defect was closed with the ankle in 10 degrees of plantarflexion. (Fig. 2)



Figure 2 Repair of the tendon using a 'tongue in groove lengthening' of the aponeurosis.

There was no distal remnant of the Tendo Achilles, and hence the tendon was anchored on to the calcaneum directly. The insertion site on the calcaneum was freshened, and the ethibond suture was threaded through the calcaneum using a Beath pin, and anchored tightly onto the sole of the foot over a button. (Fig. 2) Additional bony sutures were placed between the tendon and the calcaneum.

After anchoring the tendon, the flap was rotated and sutured over the defect. Multiple corrugated drains were used under the flap to ensure good drainage. The donor site was covered with split thickness skin graft. An anterior plaster splint was applied to keep the ankle in plantarflexion. Once the sutures were removed after 2 weeks, the leg was casted in 20 degrees of flexion at the ankle for 2 months, followed by another 2 months in neutral position. The button used to anchor the ETHIBOND suture was removed at 4 months. He was then allowed to bear weight, though the repair had to be protected with a cast for another 2 months. At 9 months, he was able to perform a single limb toe stance. (Fig. 3)

Discussion

Delayed presentation of open Tendo Achilles injuries require careful repair of the tendon defect, and adequate soft tissue cover.^{1,2} Reconstruction of the defect can be challenging, as the blood supply of the Tendo Achilles at its insertion is extremely poor.³ The reconstruction of Tendo Achilles injuries require meticulous handling of the remnant segments. The mesotenon of the tendon segment near the defect should be preserved in order to maintain vascularity and achieve healing at the site of reconstruction.³ Bosworth advocated elevation of a full thickness central strip of the proximal tendon, which is turned over and sutured to the distal end of the defect. The 'turned over' section of the graft has poor vascularity, and the healing at the repair site could potentially be compromised.



Figure 3 Nine months following surgery, the patient was able to stand on one leg without support.

If the defect is bridged by lengthening the tendon proximally, the dissection of the mesotenon near the defect is less extensive, and hence the vascularity at the repair site is relatively well preserved. The repair is more biological and is more appropriate for reconstruction of the Tendo Achilles. The repair is also less bulky near the insertion site.

For protection of the reconstructed tendon, a full thickness soft tissue cover is necessary, as split thickness skin graft is unlikely to heal over the repair site.

The options for soft tissue cover include free vascularised composite tensor fascia lata flap, medial plantar flap with plantar aponeurosis or a free flap.^{1,4} These free flaps often require micro vascular expertise.

The reverse sural artery flap is a neuro-cutaneous flap that has the advantages of having a fairly constant blood supply with associated ease of elevation and preservation of major vascular trunks in the lower extremity.^{2,3} This flap is based on the distribution of the sural nerve and the retrograde perfusion is maintained by the anastomoses of the cutaneous perforating branches of the peroneal artery and the median superficial sural artery.^{2,3}

This flap remains the workhorse for soft tissue cover over the posterior distal third of the leg and heel.^{2,3} It is a relatively simple flap that can be performed by most orthopaedic surgeons.^{2,4} The Tendo Achilles slide can be done through the same incision used for elevation of the flap. The resultant flap is however, often quite bulky. Where expertise is available, an adipo-fascial flap can be used to make the repair more aesthetic.¹

Conclusion

The sliding technique for bridging defects in the Tendo Achilles followed by a reverse sural artery flap is an excellent option for management of delayed presentation of open Tendo Achilles injuries.

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