TIBIAL NERVE MISTAKENLY USED AS A TENDON GRAFT

REPORTS OF THREE CASES

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We describe three patients in whom the tibial nerve was used, in mistake for the plantaris tendon, to repair a ruptured calcaneal tendon. The tendon repair was successful in all cases, but despite attempted reconstruction of the nerve, no patient had any motor recovery although two regained some protective sensation.

Plantaris is a vestigial muscle arising deep to the lateral head of the gastrocnemius and inserting via a long slender tendon into the medial side of the calcaneum. When present it is an excellent source of tendon graft, especially when long grafts are needed. We describe three cases in which the tibial nerve had been mistakenly obtained with a tendon stripper and used to repair a ruptured calcaneal tendon.

CASE REPORTS

Case 1. A 17-year-old man ruptured his right calcaneal tendon when jumping from a height. The following day this was repaired with a 40 cm 'plantaris' graft obtained through ankle and upper-calf incisions using a tendon stripper. After operation the patient lost sensation in the sole of his foot and was unable to flex his toes. These symptoms were ignored for six weeks, but an EMG then showed a proximal tibial nerve injury. The patient was referred to us when repeat EMG studies at six months showed no improvement. He had nearly normal plantar flexion.

His leg was explored eight months after the original operation. The plantaris tendon was intact and there was a large neuroma of the tibial nerve in the popliteal fossa (Fig. 1). The branches to the soleus and the medial head of the gastrocnemius were intact but there was a 33 cm defect, the distal end being within the flexor aponeurosis at the ankle.

Fig. 1

Case 1. The large neuroma on the proximal stump of the tibial nerve found in the popliteal fossa.

Cable grafts were sutured to 50% of the proximal nerve stump using the contralateral sural nerve, the ipsilateral lateral cutaneous nerve of the leg and the medial cutaneous nerve of the forearm. Two years later the patient has protective sensation in the area of the medial plantar nerve but no motor recovery of the toe flexors.

Case 2. A 56-year-old man ruptured his right calcaneal tendon playing sport; repair on the following day used a graft obtained with a tendon stripper. Four days postoperatively, he complained of paraesthesia of the sole of his foot. A plaster change, steroid injections, massage and, at two months, a tarsal tunnel release failed to relieve his symptoms.

At five months continued loss of sensation on the medial side of the foot led to EMG studies which were thought to confirm tarsal tunnel syndrome with paralysis of the short flexor muscles of the foot. At reoperation the distal stump of the tibial nerve was found within the flexor retinaculum, and the patient was referred to us for reconstruction.

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He had cold intolerance with severe sympathetic dystrophy, no sensation within the distribution of the tibial nerve and no active toe flexion. Tinel's sign was strongly positive in his upper calf. At his fourth operation a 20 cm segment of tibial nerve was reconstructed with two cable grafts from the contralateral sural nerve. There was no plantaris.

Eight months postoperatively he had no advancing Tinel's sign and no relief from pain or cold intolerance. He has not worked since his injury.

Case 3. A 40-year-old man ruptured his right calcaneal tendon playing tennis. Again, an early repair used a 'plantaris' graft. Postoperative septicaemia delayed the diagnosis of a sensory defect in the sole of his foot.

After confirmatory EMG studies, the calf was explored four months later. The plantaris tendon was present, and the tibial nerve was seen to be woven into the calcaneal tendon, leaving a 35 cm defect in the nerve. Both sural nerves were used as cable grafts.

Two and a half years later he has some hyperaesthesia of the medial side of his foot, but no motor recovery.

DISCUSSION

The plantaris tendon is absent in 7% to 18% of limbs (Daseler and Anson 1943; Harvey, Chu and Harvey 1983); and this cannot be diagnosed by clinical examination, although it can be imaged by ultrasound. The tendon passes between the muscle bellies of the gastrocnemius and soleus and is usually inserted with the

calcaneal tendon into the calcaneum. Occasionally, its insertion may be directly into the calcaneal tendon and in one-third of cases it is 0.5 to 2.5 cm in front of the calcaneal tendon (Harvey et al 1983). The plantaris tendon is never deep to the flexor retinaculum at the ankle. Even if the retinaculum is opened by an inexperienced surgeon the appearance of the nerve and the adjacent vessels should alert him to his error.

Inadvertent resection of the tibial nerve is a devastating surgical complication, causing loss of sensation of the sole of the foot, with all the attendant neuropathic problems. Primary nerve grafting offers the best chance of recovery, using the sural nerve from the other leg, to preserve sensation in the lateral border of the damaged foot.

Reconstruction of the tibial nerve unfortunately has a poor prognosis, especially with so large a defect. There was no motor recovery in any of our patients, but one has a hyperaesthetic sole, and another has protective sensation. The third has no nerve recovery. All three patients will have to follow a strict regime of foot care for the rest of their lives.

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REFERENCES

- Daseler EH, Anson BJ.** The plantaris muscle: an anatomical study of 750 specimens. *J Bone Joint Surg* 1943; 25:822-7.
- Harvey FJ, Chu G, Harvey PM.** Surgical availability of the plantaris tendon. *J Hand Surg* 1983; 3:243-7.