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Transection of the Common Peroneal Nerve During Harvesting of Tendons for Anterior Cruciate Ligament Reconstruction

A Case Report

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Reconstruction of the anterior cruciate ligament with use of harvested hamstring tendon is a common surgical technique. We present a case of complete transection of the common peroneal nerve as a complication of this procedure. The case highlights the importance of careful operative technique as well as timely exploration of a nerve that ceases to

Fig. 1
Intraoperative photograph. The proximal neuroma and distal stump can be seen, held together by adventitia (CPN = common peroneal nerve; Tibial N. = tibial nerve).

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function following a surgical procedure over the course of that nerve. The patient was informed that data concerning the case would be submitted for publication.

**Case Report**

A twenty-eight-year-old woman with anterior cruciate ligament deficiency and an unstable knee underwent an arthroscopically assisted right anterior cruciate ligament reconstruction with use of autologous hamstring tendon. She was previously fit and active and working as a livery manager until she sustained an injury to her knee during a skiing accident. The procedure was described by the experienced operating surgeon as entirely routine. Both the semitendinosus and gracilis tendons were harvested. A Linvatec (ConMed Linvatec, Swindon, United Kingdom) blunt-ended tendon stripper was used to harvest the tendon grafts. A tourniquet inflated to 350 mm Hg of pressure was applied to the thigh for eighty minutes.

Immediately postoperatively, the patient was noted to have a painless common peroneal nerve palsy. The patient had a history of sciatica, so initial investigation included magnetic resonance imaging of the lumbar spine, the results of which were normal. Neurophysiological studies two months postoperatively, however, confirmed a complete lesion of the common peroneal nerve, with loss of conduction and fibrillation potentials in sampled muscles.

The patient was referred to our care three months after the anterior cruciate ligament reconstruction. The common peroneal nerve palsy was deep and complete. A strongly positive Tinel sign was elicited in the midportion of the thigh, and there was weakness of the lateral hamstrings in the affected limb. A pressure sore had developed as a result of the application of a rigid ankle-foot orthosis to insensate skin to facilitate walking after the development of the peroneal nerve palsy.

Exploration of the posterior aspect of the midportion of the thigh was undertaken through a midline incision that was centered over the level at which the Tinel sign was elicited. The sciatic nerve was identified slightly distal to the midportion of the thigh, and the tibial and common peroneal divisions of this nerve were found to be separate at this level, which is not an uncommon finding. The positions of the common peroneal and tibial nerve divisions, although separate, were in the anatomically normal location. The common peroneal nerve division was traced proximally and, 20 cm proximal to the tip of the fibula, it was found to be completely transected. A firm proximal neuroma was connected to a distal glioma by a thin band of tissue. Retraction of the nerve endings was lessened by preservation of this part of the adventitia, but no bundles were seen traversing the lesion (Fig. 1).

Intraoperative nerve stimulation of the tibial nerve division elicited a good response in the muscles of the leg, and a normal compound nerve action potential was recorded. There was no conduction across the lesion of the common peroneal nerve or in the distal segment of the nerve.

Sixty centimeters of sural nerve was then dissected, and a nerve graft was performed with use of six lengths of graft, each 8 cm in length, to bridge the gap between the two ends of the common peroneal nerve. The lower limb of the patient was then immobilized with the knee in 70° of flexion, and flexion was gradually reduced over the course of six weeks.

Nine months following the nerve repair, there was little clinical improvement; however, electromyography demonstrated nascent and polyphasic units against a background of fibrillation, suggesting early reinnervation of muscle units within both divisions of the common peroneal nerve. At fifteen months following the nerve repair, the patient demonstrated normal strength in the hamstrings against “full” resistance applied by the examiner (Medical Research Council grade 5). Peroneal muscle strength was measured in both limbs with a digital force transducer (Penny and Giles, Christchurch, United Kingdom), and, on attempted eversion of the foot, peroneal muscle strength of the injured limb was found to be reduced by 50% in comparison with that of the uninjured limb. No active function was present in the tibialis anterior on.
attempted foot dorsiflexion, and sensation in the distribution of the common peroneal nerve remained abnormal. The knee was stable, as indicated by a grade-1 Lachman test and a negative pivot shift test. As a result of the nerve injury, however, the patient was still unable to do any activity other than walking, and she needed to use a lightweight ankle-foot orthosis to provide dynamic support for a drop foot. At two years following the injury, no further recovery of nerve function had occurred. The patient may require a tibialis posterior tendon transfer in the future if there is no further clinical improvement.

Discussion

To our knowledge, this is the first report of transection of the common peroneal nerve during harvesting of tendons for an anterior cruciate ligament reconstruction. Vardi described neurapraxia of the common peroneal nerve that occurred during the harvesting of hamstring tendons for an anterior cruciate ligament reconstruction; the patient in that case recovered without treatment. Pagnani et al. described the anatomic considerations when harvesting the semitendinosus and gracilis tendons for anterior cruciate ligament reconstruction, pointing only to the risk to the saphenous nerve and its branches. The lateral position of the common peroneal nerve suggests that it is a structure that is unlikely to be at risk during this procedure (Fig. 2).

Techniques of hamstring tendon harvesting vary among surgeons, but usually a small oblique incision is made approximately 5 cm distal to the medial joint line of the knee. The subcutaneous tissues are incised, and the superior medial corner of the pes anserinus is folded down to identify the tendons underneath. Fascial bands are divided, freeing the tendon before the tendon harvester is attached. The harvester is then passed up each tendon in turn, into the proximal portion of the thigh, and the tendon is stripped of its muscle belly and removed. When positioning the harvesting device, visualization of the distal portion of the tendon and the direction of its proximal extension is crucial in avoiding injury to surrounding structures, as is palpation of the proximal portion of the tendon. The application of appropriate tension during harvesting holds the tendon in position so that harvesting in a linear direction is possible, and a controlled force on the instrument is also essential to avoid unnecessary proximal extension of the harvester once the tendon is stripped. The use of blunt-ended tendon harvesters may lessen the risk of transecting other structures but does not completely avoid this complication. Use of a tourniquet during the harvesting of hamstring tendons may tether the nerve so that it has limited capacity to be pushed aside by a blunt-ended instrument.

There has undoubtedly been an element of bad luck involved in this case; however, nerves are clearly at risk during closed tendon-harvesting procedures. Bonney stated that “If there is an incision over the line of a main nerve and if, after operation, there is complete paralysis (including vasomotor and sudomotor paralysis) in the distribution of that nerve, speculation is unnecessary: the nerve has been cut, and there will be no recovery unless it is explored and repaired.” This statement holds true even when there is no visible scar; when the operation has been performed blindly over the nerve, prompt exploration is indicated. In the case of our patient, the level of the Tinel sign was an important indicator to the nature of the injury.

References