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Educational Corner

Movahedi Tendon Transfer in Common Peroneal Nerve Palsy

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Background

In common peroneal nerve palsy, both superficial and deep peroneal nerves are damaged. In this situation, the patient may lose the ability to dorsiflex and evert the foot, resulting in "foot drop" and the ability to extend the toes or "toe drop" (1).

The anterior transfer of the tibialis posterior tendon (TPT) may correct the "foot drop", but it does not correct the "toe drop", and the flexion contracture of the toes may even worsen once the foot drop is corrected. Flexion deformity of the toes affect the gait pattern and it is hard to be tolerated by patients.

Percutaneous tenotomy of the long flexor tendons at the interphalangeal (IP) joints was the solution for this problem in our clinic for many years, but the patients were not satisfied at the end because they had no control over their toes (1-3). Therefore, I decided to use the long flexor tendons for tendon transfer instead of sacrificing them.

Surgical Technique

Three tendons [posterior tibial, flexor digitorum longus (FDL), and flexor hallucis longus (FHL) tendons] are transferred anteriorly through the interosseous membrane in this technique.

The operation can be performed with general or spinal anesthesia with the patient in the supine position.

Through a medial incision from the talonavicular joint to the first tarsometatarsal joint, a medial capsulotomy is performed and the TPT is exposed and cut from the navicular bone. Then, the FHL and FDL tendons are released at the knot of Henry. Thus, three tendons are now available for tendon transfer (Figure 1).

Figure 1. Harvesting flexor hallucis longus (FHL), flexor digitorum longus (FDL), and Tibialis posterior tendons through the medial incision.

Through a longitudinal incision along the posteromedial border of the tibia and 15 cm above the ankle joint, the fascia is incised and the TPT and FDL tendons are explored by moving their distal stump. They are then released and pulled proximally. Since the FHL tendon is located deep in the neurovascular bundle, the neurovascular bundle should be explored gently and protected. The FHL tendon is identified deep to the neurovascular bundle by moving its distal stump and is pulled proximally (Figure 2).

Figure 2. Flexor hallucis longus (FHL), flexor digitorum longus (FDL), and Tibialis posterior tendons released and pulled proximally above the ankle through posteromedial incision.

Over the anterolateral aspect of the tibia and slightly distal to the second incision, a longitudinal incision of about 10 cm is made. The fascia is incised longitudinally and the muscles are retracted to expose the interosseous membrane. The interosseous membrane is incised and a wide window of about 5 to 8 cm is made. In the next step, a large curved clamp is passed through this window from anterolateral to posteromedial; the tendons are grabbed and pulled one by one from posteromedial to anterolateral with a 45-degree angle (Figure 3).

The fourth incision is made longitudinally over the dorsum of the midfoot. With a long-curved clamp passed subcutaneously from this incision to the third incision, the TPT is transferred subcutaneously to the dorsum of the foot. Again, with the same clamp passed along the course of the extensor digitorum longus (EDL) and extensor hallucis longus (EHL) tendons through the superior extensor retinaculum (SER) from this incision to the third incision, the FDL and FHL tendons are transferred through the SER to the dorsum of the foot.

Figure 3. Flexor hallucis longus (FHL), flexor digitorum longus (FDL), and Tibialis posterior tendons passed through the interosseous space from posteromedial to anterolateral with a 45 degree angle.

The tibialis anterior tendon is debrided to make enough room for the FHL and FDL tendons if needed. The middle cuneiform is prepared and a dorsoplantar tunnel is made with a 7.0 mm drill bit; the TPT is transferred and passed through the tunnel in the middle cuneiform and is secured and fixed by a suture anchor or interference screw by pulling the TPT plantar wart and holding the ankle in 10 degrees of dorsiflexion. In case of the Achilles tendon tightness, a percutaneous Achilles tendon lengthening is performed to achieve 10-degree dorsiflexion. While holding the ankle in dorsiflexion and metatarsophalangeal (MTP) and IP joints in extension, the FHL is sutured to EHL and FDL to EDL tendons with 3.0 Nylon suture side to side (Figures 4-6).

Figure 4. Flexor hallucis longus (FHL) and flexor digitorum longus (FDL) passed through the superior extensor retinaculum (SER) while the Tibialis posterior tendon passed subcutaneously to the dorsum of the foot.

After hemostasis and wound closure, a bulky dressing and well-padded non-weight-bearing (NWB) short leg cast is applied in maximum ankle dorsiflexion with toes in extension.

Figure 5. Flexor hallucis longus (FHL) sutured to extensor hallucis longus (EHL) and flexor digitorum longus (FDL) sutured to EDC while holding the foot in dorsiflexion and toes in extension.

After 6 to 8 weeks, the short leg NWB cast is changed to air cast and the physiotherapy protocol is started.

Figure 6. Tibialis posterior tendon is secured in a tunnel at the middle cuneiform by a suture anchor or interference screw in maximum dorsiflexion of the ankle.

Conflict of Interest

The authors declare no conflict of interest in this study.

Acknowledgments

None.

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