Flexor Hallucis Longus Transfer in a Patient with Post-polio Syndrome with Posterior Tibial Tendon Dysfunction. Case Report and Surgical Technique

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ABSTRACT
Post-polio syndrome with posterior tibial tendon dysfunction may present a flexible clubfoot and steppage gait in some patients. We describe the case of a patient who only preserved flexor hallucis longus tendon function; therefore, we decided to transfer it to the midfoot to obtain a plantigrade foot and restore dorsiflexion.
Keywords: flexor hallucis longus, post-polio syndrome, tendon transfer
Level of Evidence: IV

Transferencia del flexor hallucis longus en un paciente con síndrome pospoliomielítico con déficit de la función del tendón tibial posterior. Reporte de un caso y técnica quirúrgica

RESUMEN
El síndrome pospoliomielítico con déficit de la función del tendón tibial posterior puede presentarse con un pie equino flexible y marcha equina (*steppage*) en algunos pacientes. Se describe el caso de un paciente que solo conservaba la función muscular del tendón flexor hallucis longus y se decidió su transferencia al mediopié para obtener un pie plantígrado y restaurar la dorsiflexión.
Palabras clave: Flexor hallucis longus; síndrome pospoliomielítico; transferencia tendinosa.
Nivel de Evidencia: IV

INTRODUCTION

Post-polio syndrome is a set of disabling signs and symptoms that appear, on average, 30 to 40 years after initial poliomyelitis.[1]

Poliovirus affects the anterior horn of the spinal cord, especially the lower region of the spinal cord; therefore, it tends to damage the lower limbs more, specifically, those whose innervation corresponds to the lumbar and sacral segments of the spinal cord, that is, from L2 to S2.[2,3]

The post-polio musculoskeletal involvement is not homogeneous, either in terms of the side of the body (one leg, yes, and the other leg, no), or the different myotomes in the same limb (e.g. the involvement may be higher in the L5 than in the L4 myotome); therefore, it usually produces a greater weakness in some regions than in others, which in turn gives rise to deformities known as 'poliomyelitis sequelae'. This clearly demonstrates that poliovirus damage is often asymmetric and largely random,[4,5] and explains why the whole body is not affected to the same extent and why not all cases are the same.[6,7]

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CLINICAL CASE

A 60-year-old woman with a history of poliomyelitis in childhood consulted for gait disorder and instability of the right ankle.

On physical examination, steppage gait was observed, with a resting position of the drop foot greater than 45° (Figure 1) and without signs of contracture of the gastrocnemius-soleus complex (passive dorsiflexion of the ankle at 90° with the knee extended was achieved). The function of the gastrocnemius-soleus complex was 0, according to the modified Medical Research Council (MRC) functional strength scale. There was a lateral joint opening with marked chronic instability and the anteroposterior ankle drawer test was positive.

Muscle function test scores were 5/5 for the flexor hallucis longus (FHL) (MRC = 5) and 3/5 for the extensor hallucis longus (MRC = 3) (Figure 1). The tibialis anterior, extensor digitorum longus, peroneus longus, and peroneus brevis muscles, as well as the tibialis posterior, had no function (MRC = 0).

Figure 1. Muscle function of the flexor hallucis longus and dropped position of the foot.

Scores on the FAOQ (Foot and Ankle Outcomes questionnaire) and AOFAS (American Orthopaedic Foot & Ankle Society) scales were 71 and 72, respectively.

An electromyography revealed severe involvement of the right common fibular nerve (external popliteal sciatic nerve) with paralysis of the anterolateral muscles of the right leg. Radiographs showed mild signs of osteoarthritis (Figure 2).

Figure 2. Anteroposterior and lateral ankle radiographs Mild signs of osteoarthritis can be seen.

Surgical technique

The patient is placed in the dorsal position, and a tourniquet is placed on the root of the thigh. A medial approach is performed over the midfoot to release the FHL (Figure 3A). The tendon is extracted through a posteromedial approach to the leg (Figure 3B) and passed through the tibiofibular interosseous membrane through an anterolateral approach (Figure 3C). A final approach is made on the second wedge in the dorsum of the foot, then the distal end of the tendon is slid into the extensor retinaculum and finally inserted with an interference screw in said wedge, granting the appropriate neutrality and tension (Figure 3D).

The lateral ligament complex is stabilized by the modified percutaneous Broström-Gould technique (Figure 3E).

Figure 3. Surgical technique. **A.** Release of the flexor hallucis longus by medial approach of the midfoot. **B.** Posteromedial extraction of the tendon. **C.** Transfer of the interosseous membrane to the anterolateral region. **D.** Tenodesis to the second wedge. **E.** Stabilization of the lateral ligament.

The foot is immobilized with a short leg cast for six weeks, without weight bearing. Then, the cast is changed for a Walker boot and, at the same time, physical therapy begins. The immobilizer is removed after 10 weeks (Figure 4).

In our patient, the transfer of the FHL to the second wedge was achieved without complications. The active range of motion at six months of follow-up was 5° dorsiflexion and 10° ankle plantarflexion. FAOQ and AOFAS scores were 77 and 80, respectively. An improvement of 6 and 8 points was achieved, respectively, over the preoperative score.

Figure 4. Kinesiotherapy without immobilizer (10 weeks after surgery).

DISCUSSION

Currently, FHL transfer is widely used in Achilles tendon pathology.[8,9] In this type of neurological sequelae, most orthopedic surgeons prefer to use tibialis posterior tendon transfer.[10-12] Because this tendon was not available, transferring the only active tendon (FHL) vs. arthrodesis posed a major challenge.[13]

The tendon transfer of the FHL restored our patient's gait without splints, conserving the range of motion of the ankle joint, with greater stability in the gait and without injuries from the drag of the foot in the steppage gait.

FHL can be used successfully to restore dorsiflexion in patients with post-polio syndrome, without functional deficit of the tibialis posterior tendon.

Conflict of interest: The authors declare no conflicts of interest.

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