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Anterior Tibialis Posterior Tendon Transfer for the Treatment of Foot Drop Secondary to Common Peroneal Nerve Palsy: A Two-Case Series

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Abstract **Case Series**

Introduction: Foot drop secondary to common peroneal nerve (CPN) palsy is a disabling functional impairment that significantly affects gait. When neurological recovery is inadequate and conservative treatment fails, posterior tibial tendon (PTT) transfer represents a surgical option aimed at restoring active ankle dorsiflexion. The objective of this study was to report the functional outcomes of this procedure using the Watkins technique. ***Materials and Methods:*** This descriptive study involved two patients presenting with foot drop secondary to severe CPN injury, which was iatrogenic in one case and traumatic in the other. Preoperative assessment revealed complete loss of active dorsiflexion, with a muscle strength grade of 0/5 in the affected foot. Following failure of conservative treatment, both patients underwent anterior PTT transfer with fixation to the medial cuneiform. The postoperative protocol consisted of immobilization in a below-knee cast for 45 days, followed by progressive functional rehabilitation. ***Results:*** Improvement in walking ability was observed in both patients. At postoperative assessment, active dorsiflexion remained limited, with muscle strength graded at 3/5. A pes planovalgus deformity also developed in both patients. Postoperative follow-up periods were nine and eight months, respectively, after which both patients were lost to follow-up. ***Conclusion:*** Anterior PTT transfer using the Watkins technique appears to improve gait function in patients with paralytic foot drop secondary to severe CPN injury. However, limited motor recovery and the occurrence of pes planovalgus highlight the need for prolonged clinical and biomechanical monitoring. Further studies involving larger patient populations and long-term follow-up are required to better define the functional outcomes and complications associated with this technique.

Keywords: Foot drop; common peroneal nerve; tendon transfer; posterior tibial tendon; Watkins technique; pes planovalgus.

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1. INTRODUCTION

Foot drop secondary to common peroneal nerve (CPN) palsy, also known as paralytic foot drop, is characterized by loss of ankle dorsiflexion, resulting in significant functional impairment during walking. This condition is particularly associated with frequent toe catching on obstacles and the need to maintain knee flexion when climbing stairs. This functional deficit progressively leads to the development of several compensatory mechanisms, including hip and knee flexion contractures and spinal torsion, allowing patients to swing the affected lower limb while preventing the toes from contacting the ground [1].

In trauma patients, this condition mainly occurs following CPN injury, with knee trauma being the leading cause. Indeed, CPN palsy is observed in 10% to 40% of knee dislocations or bicruciate ligament injuries. Furthermore, it represents the main indication for posterior tibial tendon (PTT) transfer, accounting for 54% to 89% of the indications for this procedure according to the literature [2]. Therefore, in cases of persistent foot drop secondary to CPN palsy, tendon transfer represents a therapeutic option aimed at restoring ankle dorsiflexion.

Several surgical techniques have been described for the management of paralytic foot drop. However, their outcomes may remain suboptimal, particularly because of the complexity of certain procedures and the risk of complications. Tendon transfer therefore appears to be a relatively straightforward technique that may

provide durable functional results. Nevertheless, recovery of muscle strength following transfer remains variable, and the functional outcomes reported in the literature are still controversial, with no clearly established consensus to date [2,3].

The aim of this study was to report the functional outcomes of posterior tibial tendon transfer to the anterior tarsus in the treatment of paralytic foot drop secondary to common peroneal nerve palsy.

2. MATERIAL AND METHODS

Patients' presentation

This descriptive study involved two patients presenting with foot drop secondary to severe common peroneal nerve injury, which was iatrogenic in one case and traumatic in the other. Both patients underwent anterior posterior tibial tendon transfer during the period from November 4, 2025, to August 20, 2026.

Case 1

The first patient was a 29-year-old woman being followed by the oncology department for Ewing sarcoma, with no significant previous surgical history. She was referred for the management of a tumor mass located on the lateral aspect of the left knee.

The patient initially underwent a diagnostic biopsy. One month later, surgical excision of the tumor was performed. The postoperative course was complicated by the development of foot drop related to common peroneal nerve palsy. Surgical management with posterior tibial tendon transfer was performed on November 4, 2025.

Case 2

The second patient was a 26-year-old man with no significant medical history who was admitted for progressive weakness of right ankle dorsiflexion that had been evolving over a five-year period.

The symptoms developed following a road traffic accident in which the patient, a motorcyclist, was struck by a vehicle. The accident resulted in an open injury to the right knee, with a lateral wound and functional impairment of the peroneal muscles. Posterior tibial tendon transfer was performed on December 16, 2025.

2.1. Preoperative Assessment

The preoperative clinical examination included inspection of the lower limbs (Figure 1), assessment of joint range of motion, muscle strength testing of all lower-limb muscle groups, and sensory examination. Muscle strength was assessed according to the international Medical Research Council (MRC) scale, ranging from 0 to 5.



Figure 1: Preoperative appearance of foot drop

In addition to muscle strength assessment, preoperative functional evaluation of the ankle was performed using the American Orthopaedic Foot & Ankle Society (AOFAS) score and the Foot and Ankle Outcome Score (FAOS), as presented in Table I.

The AOFAS score is a composite clinical score, assessed by both the physician and the patient, that evaluates the ankle and foot on a scale of 0 to 100 based on pain, function, and alignment. Higher scores indicate better ankle function.

The FAOS is a self-administered questionnaire used to assess the impact of a condition on ankle and foot function, with scores ranging from 0 to 100. Higher scores indicate better function and fewer symptoms.

Table I: Preoperative functional assessment

Assessment	Case 1	Case 2
AOFAS score	60	65
FAOS score	Significant dependence	Significant dependence
Segmental muscle strength	0/5	0/5

Standard radiographic assessment revealed no bone or joint abnormalities that could contraindicate the procedure. In both patients, electromyography (EMG) demonstrated severe CPN involvement, with symptoms persisting for more than ten months.

Initially, both patients underwent conservative treatment consisting of postural orthoses and functional rehabilitation with muscle strengthening exercises. In the absence of significant functional improvement despite this management, the indication for tendon transfer was established.

The duration of foot drop before surgery was ten months in Case 1 and five years in Case 2.
Neither patient had previously undergone surgical exploration of the nerve or neurolysis.

2.2. Surgical Technique

Both patients underwent posterior tibial tendon transfer according to the technique described by Watkins.

The first step of this procedure, which consists of Achilles tendon lengthening, was not necessary in our series because both patients had satisfactory passive ankle dorsiflexion. Indeed, this step is indicated when 10° of passive dorsiflexion cannot be achieved.

The procedure therefore began with the second step of the Watkins technique. After identifying the posterior tibial tendon, it was detached from its insertion on the navicular bone through a short transverse incision (Figure 2). The tendon was then retrieved through a posteromedial approach at the distal third of the leg (Figure 3).

The tendon was subsequently directed toward the anteromedial aspect of the leg through a transosseous tunnel. Finally, it was reinserted onto the medial cuneiform using an interference screw, after appropriate tensioning of the tendon with the ankle positioned at 10° of dorsiflexion (Figures 4, 5, 6, and 7). Fixation was reinforced with periosteal sutures to reduce the risk of secondary loss of tension.

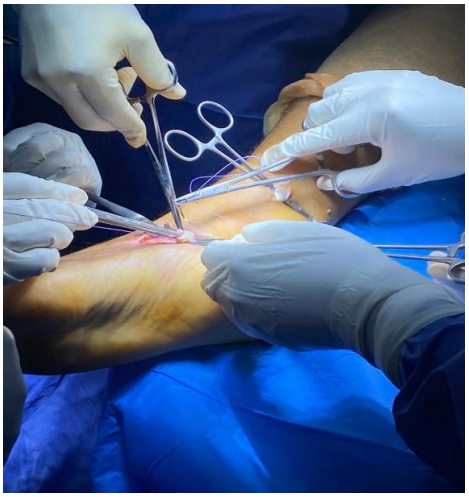


Figure 2: Intraoperative identification and dissection of the posterior tibial tendon



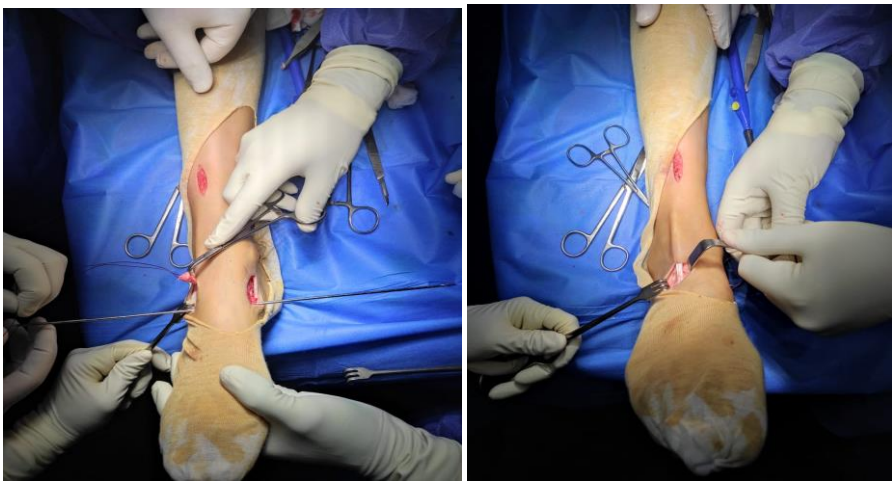
Figure 3: Detachment of the posterior tibial tendon and retrieval through the posteromedial incision



Figure 4: Transfer of the tendon toward the anterolateral region of the distal third of the leg through the interosseous membrane



Figure 5: Retrieval of the posterior tibial tendon on the dorsum of the foot



Figures 6 and 7: Fixation of the posterior tibial tendon to the tarsus

2.3. Postoperative Protocol

Postoperatively, both patients were immobilized in a below-knee cast for 45 days. At the end of this period, the cast was removed and functional rehabilitation was initiated.

Rehabilitation consisted of progressive ankle mobilization, initially passive and subsequently active, combined with muscle rehabilitation exercises. Full weight-bearing was permitted from the second postoperative month.



Figure 8: Postoperative below-knee immobilization



Figure 9: Full weight-bearing from the second postoperative month

3. RESULTS

Following cast removal and during the functional rehabilitation phase, both patients developed a pes planovalgus (PPV) deformity.

Healing of the surgical incisions occurred without complications.

Postoperative functional assessment of the ankle was performed using the American Orthopaedic Foot & Ankle Society (AOFAS) score and the Foot and Ankle Outcome Score (FAOS). Assessments were conducted at six weeks, ten weeks, three months, and six months, as presented in the tables below.

Patient satisfaction was assessed using a visual analogue scale (VAS) ranging from 0 to 100 and classified into four categories: very good, good, fair, and poor (Table IV).

Table II: Postoperative functional assessment of the ankle

Assessment	Case 1	Case 2
AOFAS – Early postoperative period	82	79
FAOS – Early postoperative period	Partial independence	Partial independence
AOFAS – End of study	93	95
FAOS – End of study	Independent	Independent

Table III: Evolution of segmental muscle strength

Assessment period	Case 1	Case 2
Six weeks	0/5	0/5
Ten weeks	1/5	1/5
Three months	1/5	2/5
Six months	3/5	3/5

Table IV: Patient satisfaction

Assessment	Case 1	Case 2
VAS score	60	65
Satisfaction category	Good	Good

Table V: Duration of patient follow-up

Follow-up period	Case 1	Case 2
Surgery date	04/11/2025	16/12/2025
End of study	20/08/2026	20/08/2026
Total follow-up	9 months	8 months
Follow-up after cast removal	7 months 15 days	6 months 15 days

4. DISCUSSION

The etiologies of foot drop are diverse and mainly neurological or muscular in origin. According to Merdan Orunoğlu *et al.,* [5], common peroneal nerve (CPN) injury is one of the most frequent causes. This predominance may be explained by the anatomical location of the CPN and its vulnerability, particularly as it courses around the fibular neck. Furthermore, the peroneal division of the sciatic nerve has a lower recovery potential than its tibial division. These findings are consistent with the observations in our series, in which both cases of foot drop were secondary to severe CPN injury, of iatrogenic and traumatic origin, respectively.

In this context, several tendon transfer techniques have been described to restore active ankle dorsiflexion. In our series, both patients underwent posterior tibial tendon transfer according to the technique described by Watkins.

This technique was also evaluated by F. Sangaré *et al.,* who compared the Lambrinudi-Bopp, Carayon, and Watkins techniques. According to these authors, the Watkins technique provides satisfactory functional outcomes, particularly in terms of comfort and deformity correction, and represents a reliable option for restoring ankle dorsiflexion through posterior tibial tendon transfer [6].

From a functional perspective, both patients in our series experienced a clear improvement in walking ability following tendon transfer. This improvement demonstrates the functional effectiveness of the procedure in restoring, at least partially, the foot-lifting mechanism.

However, postoperative assessment also revealed the development of a pes planovalgus (PPV) deformity in both patients. This finding is particularly noteworthy given the major role of the posterior tibial tendon in maintaining the medial longitudinal arch of the foot.

Indeed, the posterior tibial tendon plays an essential role in supporting the medial arch. Its transfer could theoretically reduce this support and promote the development of pes planovalgus. This deformity is classically described in cases of posterior tibial tendon dysfunction or rupture, but it is rarely reported in adult series involving transfer of this tendon [7].

Changes in the plantar arch following posterior tibial tendon transfer have nevertheless been reported by Nadine Sturbois-Nachef *et al.,* [7]. However, unlike the findings in our two patients, these authors mainly reported a tendency toward the development of pes cavus. This difference could be related to patient characteristics, surgical transfer techniques, or the biomechanical conditions of the foot before and after surgery. Given the small sample size of our series, this difference should nevertheless be interpreted with caution.

Regarding motor recovery, at the end of follow-up, both patients demonstrated limited active dorsiflexion, with muscle strength assessed at 3/5. This modest recovery may be explained in our series by the relatively short postoperative follow-up periods, which were nine months for the first case and eight months for the second, before both patients were lost to follow-up. This interruption of follow-up appears to have been related, in particular, to their satisfaction with the functional recovery of their ankles.

Indeed, given the progressive process of adaptation of the transferred muscle to its new function, a longer follow-up period, extending to 12 months, might have demonstrated further improvement in active ankle dorsiflexion and more complete recovery of muscle strength. Thus, motor retraining and postoperative rehabilitation play an essential role in optimizing the functional outcomes of tendon transfer.

5. CONCLUSION

Foot drop secondary to common peroneal nerve (CPN) palsy is a disabling functional sequela that significantly impairs walking ability and daily activities. When conservative treatment fails to produce a favorable outcome, posterior tibial tendon transfer represents a viable surgical option for restoring, at least partially, ankle dorsiflexion.

In our series, posterior tibial tendon transfer according to the Watkins technique improved walking ability in both patients. However, muscle strength recovery remained limited, and a pes planovalgus deformity was observed in both patients, highlighting the importance of rigorous biomechanical assessment and prolonged postoperative follow-up.

Therefore, posterior tibial tendon transfer represents a relatively straightforward and reproducible technique for the management of foot drop secondary to

CPN injury. Nevertheless, given the small sample size of our series and the limited follow-up period, further studies involving larger patient populations and long-term follow-up are necessary to better evaluate functional outcomes, muscle strength recovery, and potential changes in the medial longitudinal arch of the foot.

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