

# Clinical and Functional Evaluation of Tendon Transfer Procedures for Foot Drop Correction

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## Abstract

**Background:** Foot drop is a disabling condition characterized by weakness or paralysis of ankle dorsiflexors, resulting in difficulty during walking and impaired gait mechanics. Tendon transfer procedures are commonly performed to restore active dorsiflexion and improve functional mobility in patients with irreversible peroneal nerve palsy. The present study aimed to evaluate the functional and clinical outcomes of tendon transfer procedures in patients with foot drop.

**Materials and Methods:** This prospective observational study was conducted among 40 patients with foot drop undergoing tendon transfer surgery over a period of 18 months. Patients with irreversible foot drop secondary to traumatic or neurological causes were included. Functional outcome was assessed using ankle dorsiflexion power, gait improvement, patient satisfaction, and American Orthopaedic Foot and Ankle Society (AOFAS) score. Statistical analysis was performed using SPSS software, and  $p < 0.05$  was considered statistically significant.

**Results:** Significant improvement in ankle dorsiflexion and gait pattern was observed following tendon transfer surgery. The mean AOFAS score improved significantly from preoperative to postoperative follow-up. Most patients achieved satisfactory functional recovery and improved walking ability. Better outcomes were observed in patients undergoing early surgical intervention and postoperative physiotherapy. Minimal postoperative complications were reported.

**Conclusion:** Tendon transfer procedures provide effective functional restoration in patients with foot drop and significantly improve gait and quality of life. Early diagnosis, appropriate patient selection, and structured rehabilitation are essential for achieving favorable surgical outcomes.

**Keywords:** Foot drop, tendon transfer, peroneal nerve palsy, posterior tibial tendon transfer, gait improvement, orthopaedic surgery.

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## Introduction

Foot drop is a neuromuscular condition characterized by inability or weakness in active ankle dorsiflexion, resulting in difficulty during ambulation and abnormal gait pattern.[1] Patients commonly present with high-stepping gait, foot slapping, frequent tripping, and impaired balance.

Foot drop significantly affects mobility, functional independence, and quality of life. The condition commonly results from injury to the common peroneal nerve, lumbar radiculopathy, traumatic nerve injury, poliomyelitis, leprosy, compartment syndrome, or central

neurological disorders.[2] Among these causes, traumatic peroneal nerve palsy remains one of the most frequent etiologies encountered in orthopaedic practice.

Initial management of foot drop includes conservative measures such as physiotherapy, ankle-foot orthosis (AFO), electrical stimulation, and nerve repair procedures where feasible.[3] However, in cases with irreversible nerve damage or failed nerve recovery, tendon transfer surgery is considered the treatment of choice for restoring active dorsiflexion.

Posterior tibial tendon transfer is the most commonly performed tendon transfer procedure for foot drop correction.[4] The procedure involves rerouting the functioning posterior tibial tendon to the dorsum of the foot to restore active ankle dorsiflexion during gait. Tendon transfer improves walking ability, reduces dependence on orthotic devices, and enhances functional mobility.

Several tendon transfer techniques including circumtibial transfer, interosseous transfer, and split tendon procedures have been described in the literature.[5] Successful outcomes depend on proper patient selection, adequate muscle strength, flexible deformity, surgical technique, and postoperative rehabilitation.

Functional outcome following tendon transfer is commonly assessed using gait analysis, dorsiflexion power, patient satisfaction, and validated scoring systems such as the American Orthopaedic Foot and Ankle Society (AOFAS) score.[6] Early surgical intervention combined with physiotherapy has been associated with improved postoperative functional recovery.

The present study was undertaken to evaluate the clinical and functional outcomes of tendon transfer procedures in patients with foot drop.

### **Aim of the Study**

To evaluate the clinical and functional outcomes of tendon transfer procedures in patients with foot drop.

### **Materials and Methods**

This prospective observational study was conducted over a period of 18 months in the Department of Orthopaedics at Rama Medical College and Research Centre among patients diagnosed with foot drop undergoing tendon transfer surgery. A total of 40 patients with irreversible foot drop secondary to traumatic or neurological causes were included in the study. Patients aged above 15 years with persistent foot drop for more than 6 months and adequate muscle power of the posterior tibial tendon were included. Patients with rigid ankle deformity, active infection, severe vascular disease, or inadequate follow-up were excluded from the study.

Detailed clinical history regarding etiology, duration of foot drop, associated neurological deficits, and previous treatment was recorded. Clinical examination included assessment of muscle power, ankle range of motion, gait abnormalities, sensory deficits, and tendon function. Preoperative functional assessment was performed using the American Orthopaedic Foot and Ankle Society (AOFAS) score.

All patients underwent tendon transfer surgery using posterior tibial tendon transfer technique under standard aseptic precautions. Postoperatively, patients were immobilized in a below-knee cast followed by structured physiotherapy and gait training after cast removal.

Patients were followed regularly for assessment of ankle dorsiflexion, gait improvement, muscle strength, patient satisfaction, and postoperative complications. Functional outcome was evaluated using postoperative AOFAS score and clinical gait assessment.

Statistical analysis was performed using SPSS software version. Continuous

variables were expressed as mean  $\pm$  standard deviation and categorical variables as frequencies and percentages. Student's t-test and Chi-square test were used for analysis. A p-value less than 0.05 was considered statistically significant.

### Results

A total of 40 patients with foot drop underwent tendon transfer procedures during the study period. The mean age of patients was  $32.6 \pm 10.4$  years. Male predominance was observed, accounting for 70% of the study population. Traumatic common peroneal nerve injury was the most common cause of foot drop followed by post-polio residual paralysis and lumbar nerve injury. Significant improvement in ankle dorsiflexion and gait pattern was observed following tendon transfer surgery. Most patients demonstrated improved walking ability

and reduced dependence on ankle-foot orthosis during follow-up. The mean AOFAS score improved significantly from preoperative assessment to final postoperative follow-up.

Patients undergoing surgery within one year of onset of foot drop showed comparatively better functional outcomes. Structured postoperative physiotherapy contributed significantly to gait rehabilitation and muscle retraining.

Postoperative complications were minimal and included superficial wound infection, mild residual inversion deformity, and transient ankle stiffness in a small number of patients. No cases of tendon rupture or major neurovascular complications were observed. Overall, satisfactory functional recovery and patient satisfaction were achieved in the majority of patients following tendon transfer surgery.

**Table 1: Baseline Characteristics of Study Population**

Variables	Total Patients (n=40)
Mean Age (years)	$32.6 \pm 10.4$
Male	28 (70%)
Female	12 (30%)
Mean Duration of Foot Drop	$11.2 \pm 4.6$ months
Right Side Involvement	24 (60%)
Left Side Involvement	16 (40%)

**Table 2: Etiology of Foot Drop**

Etiology	Number of Patients	Percentage
Traumatic Peroneal Nerve Injury	22	55%
Post-Polio Residual Paralysis	8	20%
Lumbar Nerve Root Injury	6	15%
Leprosy	3	7.5%
Compartment Syndrome	1	2.5%

**Table 3: Functional Outcome Following Tendon Transfer**

Parameters	Preoperative	Postoperative	p-value
Mean AOFAS Score	$54.2 \pm 8.6$	$82.8 \pm 7.4$	<0.001
Active Ankle Dorsiflexion	Present in 4 (10%)	Present in 34 (85%)	<0.001
High-Stepping Gait	40 (100%)	6 (15%)	<0.001
Dependence on AFO	36 (90%)	5 (12.5%)	<0.001

**Table 4: Postoperative Complications**

Complications	Number of Patients	Percentage
Superficial Wound Infection	2	5%
Residual Inversion Deformity	3	7.5%
Ankle Stiffness	2	5%
Tendon Rupture	0	0%
Neurovascular Complications	0	0%

### Discussion

The present study evaluated the clinical and functional outcomes of tendon transfer procedures in patients with foot drop. Significant improvement in gait pattern, ankle dorsiflexion, and overall functional mobility was observed following surgery.

Traumatic common peroneal nerve injury was the most common cause of foot drop in the present study. Similar findings have been reported in previous orthopaedic studies evaluating tendon transfer procedures.[7]

Posterior tibial tendon transfer remains the preferred surgical technique for correction of irreversible foot drop because of its reliable muscle strength and favorable biomechanical advantage.[8] In the present study, most patients achieved satisfactory restoration of active ankle dorsiflexion and reduced dependence on orthotic support.

The mean AOFAS score improved significantly following surgery, reflecting improvement in pain, function, and gait mechanics. Similar improvements in functional scores have been reported in previous studies evaluating posterior tibial tendon transfer.[9]

Early surgical intervention and structured postoperative physiotherapy were associated with better outcomes in the present study. Physiotherapy plays a critical role in muscle retraining, gait rehabilitation, and prevention of postoperative stiffness.[10]

Postoperative complications were minimal and manageable. No major complications such as tendon rupture or neurovascular injury were observed. Proper patient

selection, meticulous surgical technique, and postoperative rehabilitation are essential for successful outcomes following tendon transfer procedures.

### Conclusion

Tendon transfer procedures provide effective functional restoration in patients with irreversible foot drop and significantly improve gait mechanics, ankle dorsiflexion, and quality of life. Posterior tibial tendon transfer remains a reliable surgical option with favorable functional outcomes and low complication rates. Early surgical intervention combined with structured physiotherapy is essential for achieving optimal postoperative recovery.

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