

# **The Vanishing Leg Swelling: A Rare Case of Muscle Herniation**

## **Abstract:**

Muscle hernias of the lower limb are rare clinical entities resulting from focal defects in the deep fascia that permit protrusion of underlying muscle fibers. They are frequently underdiagnosed because of intermittent presentation and nonspecific findings. We report a case of a 34-year-old male with symptomatic tibialis anterior muscle herniation presenting as an intermittent swelling over the left shin. Dynamic ultrasonography demonstrated a 2 cm fascial defect with muscle protrusion during contraction. The patient underwent primary fascial repair with 2-0 polypropylene sutures. Postoperative recovery was uneventful, and no recurrence was noted at three months. This case highlights the importance of dynamic imaging, appropriate defect size assessment, and individualized surgical planning. A brief review of etiology, classification, and treatment strategies is discussed.

**Keywords:** Muscle hernia, Tibialis anterior, Fascial defect, Dynamic ultrasonography, Leg swelling, Primary repair.

# Case Report

## Introduction

Muscle herniation of the lower limb is an uncommon condition characterized by protrusion of muscle tissue through a defect in the overlying deep fascia. It most frequently involves the tibialis anterior muscle due to its superficial location and vulnerability to fascial weakness. **Although exact epidemiological data are limited due to underreporting, the condition is considered rare and is more commonly observed in young, physically active males and athletes [1,4].**

**Muscle hernias may be congenital, resulting from inherent fascial weakness, or acquired secondary to trauma, repetitive exertion, chronic compartment pressure elevation, or previous surgery [2,5]. Clinically, patients present with a swelling that becomes prominent on standing or muscle contraction and disappears at rest — the so-called “vanishing swelling.” Because of this intermittent nature, the condition is often misdiagnosed as lipoma, varicosity, soft tissue tumor, or vascular malformation. Dynamic ultrasonography plays a crucial diagnostic role by demonstrating fascial discontinuity and muscle protrusion during contraction [6].**

We report a case of symptomatic tibialis anterior muscle hernia treated successfully with primary fascial repair **due to low-resource setting** and discuss etiological factors, defect size classification, and surgical decision-making.

## Case Presentation

A 34-year-old male presented with intermittent swelling over the anterior aspect of the left leg for six months. The swelling was associated with mild discomfort during prolonged walking and exertion.

### Patient Profile

- **Occupation: Office-based administrative worker**
- **Activity level: Moderate (daily commuting and recreational walking)**
- **Lifestyle: Predominantly sedentary**
- **Weight: 78 kg**
- **BMI: 25.4 kg/m<sup>2</sup>**

There was no history of trauma, surgery, or similar swelling in the past. The patient denied high-intensity athletic training. There was no history of connective tissue

disorders, metabolic diseases, or neuromuscular conditions. Family history was negative for hernias or collagen disorders.

Given absence of trauma and positive exertional symptoms, the hernia was presumed to be acquired due to chronic microtrauma and fascial weakness rather than congenital.



**Figure 1:** Clinical Photograph of the swelling.

A soft, non-tender, reducible swelling measuring approximately  $3 \times 2$  cm was noted over the mid-anterior aspect of the **right** leg, approximately 8 cm proximal to the ankle joint. The swelling became prominent on standing and active dorsiflexion of the ankle and disappeared completely in supine position with muscle relaxation. Overlying skin was normal. No cough impulse was present. Distal neurovascular status was intact.

## **Investigations**

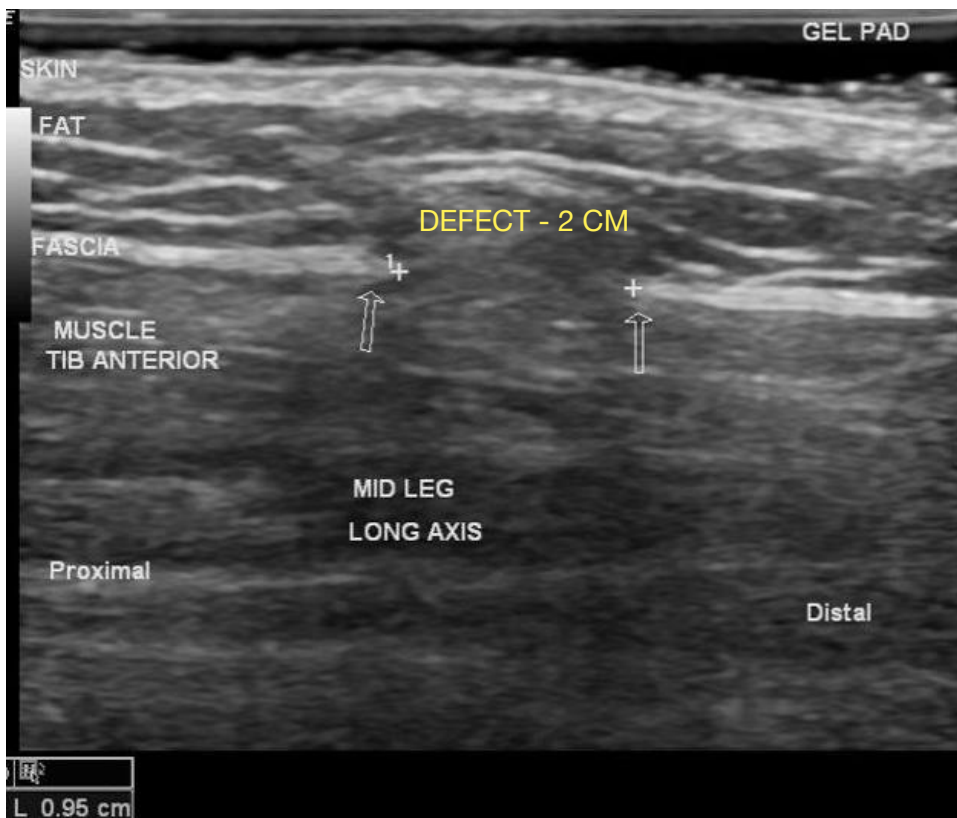
Routine laboratory investigations were normal.

Static ultrasonography did not reveal any abnormality.

Dynamic ultrasonography during active dorsiflexion demonstrated:

- A focal fascial defect measuring approximately 2.0 cm
- Herniation of tibialis anterior muscle fibers through the defect

- No vascular abnormality



**Figure 2:** Dynamic ultrasound image of the swelling showing a defect size of 2 cm.

The defect size (2 cm) classified it as a **small-to-medium defect** based on available literature.

### **Diagnosis**

Based on clinical examination and dynamic ultrasonographic findings, a diagnosis of muscle hernia of the left anterior compartment of the leg was made.

### **Management and Outcome**

Given symptomatic presentation and cosmetic concern, surgical repair was planned.

Under spinal anesthesia, a longitudinal incision was made over the anterior compartment of the left leg, centered over the palpable defect. Careful dissection was carried through subcutaneous tissue, preserving superficial veins and cutaneous nerves.

Intra-operatively:

- A 2 cm transverse defect in the deep crural fascia was identified
- The underlying protruding muscle was confirmed to be tibialis anterior
- Muscle fibers bulged through the defect during passive dorsiflexion.



**Figure 3:** Intraoperative image showing fascial defect

#### Muscle Reduction Technique:

The protruding tibialis anterior muscle fibers were gently reduced using blunt digital pressure while maintaining the ankle in slight plantarflexion to relax the muscle.

No ischemic changes were observed.

The fascial defect was closed using interrupted 2-0 polypropylene (Prolene) sutures placed without excessive tension to prevent compartment pressure elevation.

No drain was placed.

The wound was closed in anatomical layers.

Postoperative recovery was uneventful.

- Limb elevation: Advised for 5 days
- Partial weight-bearing: Day 2
- Suture removal: Day 12
- Physiotherapy: Gentle ankle mobilization exercises from Day 7
- Return to work: 3 weeks postoperatively

The patient was discharged on postoperative Day 2.

At 3-month follow-up, the patient was asymptomatic with no recurrence.

## **Discussion**

Muscle hernias are rare and often overlooked causes of anterior leg swelling. The tibialis anterior is most commonly involved due to its superficial location and relatively weak fascial covering [4,7].

### Etiology and Risk Factors

Muscle hernias may be:

- Congenital: Fascial weakness at perforator vessel entry points
- Acquired: Trauma, chronic exertion, raised compartment pressures, prior surgery
- 

Risk factors include:

- Repetitive physical activity
- Athletes (especially runners)
- Occupational strain
- Fascial defects > 2 cm
- Improper primary repair

Recurrence is more likely in larger defects (>4 cm) or when repair is performed under tension.

### Diagnostic Considerations

Dynamic ultrasonography remains the gold standard investigation because static imaging may miss intermittent protrusion [6]. MRI may help in equivocal cases but is not routinely required.

## Treatment Decision-Making

Management depends on:

- Symptom severity
- Cosmetic concern
- Defect size
- Activity level

Asymptomatic cases may be treated conservatively with compression stockings.

**Direct repair:** Best suited for small (<2–3 cm) defects. Simple closure of the fascial defect can be effective, especially for smaller defects, as was performed in this case. However, it may carry a risk of recurrence or, in rare instances, compartment syndrome if excessive tension is applied.

**Fasciotomy:** Preferred in large or congenital defects to avoid compartment syndrome. Either open or minimally invasive fasciotomy decompresses the compartment and is particularly advocated in congenital hernias or when larger fascial defects exist. Minimally invasive techniques have shown good mid-term outcomes with high return-to-activity rates and low complication profiles.

**Mesh repair:** Indicated in larger (>4 cm) defects or high-demand athletes [3]. Synthetic mesh placement has been used successfully for larger defects, especially in athletes, providing structural support and reducing recurrence risk.

**Autologous grafts:** Used when synthetic material is contraindicated Tissue grafts (e.g., fascia lata) can also be harvested for defect closure, particularly where synthetic materials are contraindicated.

No universal gold standard exists. Treatment must be individualized.

Dynamic ultrasonography often allows precise measurement of the fascial defect, which can influence management strategy. Previous case reports have documented defects ranging from approximately 4.5–9.5 mm on dynamic US [2,3,16] and up to 1.5 cm on MRI [4]. In smaller defects (<1 cm), direct fascial repair has been reported with good outcomes [12], whereas larger defects have been managed with mesh repair or grafting to avoid tension and lower risk of compartment complications [8].”

## Informed Consent

Written informed consent was obtained from the patient for publication of clinical details and images.

## **Conclusion**

Tibialis anterior muscle herniation is a rare but important differential diagnosis of intermittent leg swelling. Careful history, dynamic examination, and ultrasonography are essential for accurate diagnosis. Defect size assessment assists in guiding surgical planning. Primary fascial repair is safe and effective for small-to-medium defects when performed without tension **in a low-resource setting**.

**Limitations of this report include short follow-up duration and lack of long-term recurrence data. Future studies with standardized defect size classification and comparative outcome analysis of different surgical techniques are warranted.**

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