

Rare Occurrence of Adult Onset Tethered Cord Syndrome in a Patient Presenting with **Achilles Tendon Atrophy** Deepal H. Dalal, DPM, MS¹; Todd M. Chappell, DPM, AACFAS²; Jesse T. Yurgelon, DPM, FACFAS³

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INTRODUCTION

- Tethered cord is defined as a progressive neurological deterioration of the lower spinal cord with the medullary cone being below L2 after the neonatal period.^{1,2}
- Limited literature is available for adult-onset TCS.³⁻⁹
- Previous studies have described case reports of young patients with symptoms of plantar fasciitis and peripheral neuropathy, with significant delay between development of symptoms and diagnosis.⁴
- In atypical clinical settings, neurological symptoms can give insight into a possible undiagnosed central neurological problem. If unfamiliar, foot and ankle surgeons may overlook these symptoms.

PURPOSE

Our study describes a 36-year-old patient with adult-onset tethered cord syndrome presenting as calf atrophy and Achilles tendon pathology. These symptoms are characteristic of a tethered cord and can help future practitioners identify symptomatic TCS in the lower extremity.

Lower Extremity Workup

Neurologic Workup



Objective Findings

Treatment

- with crutches for 2 weeks.

CASE STUDY

• A 36-year-old patient with adult onset TCS presented with left calf weakness and atrophy. • Initial physical exam revealed left calf atrophy compared to the right and weakness of plantarflexory strength of the left lower extremity, specifically in the gastroc-soleus complex. Patient was unable to perform single heel raise on the left on weight bearing exam.

• Prior neurologic workup was negative with symptoms progressing over 12 years.

• In clinic, patient underwent several diagnostic examinations and with a multidisciplinary approach was diagnosed with a variant of tethered cord syndrome.

• Referral and evaluation by neurology consisted of Electrodiagnostic testing and MRI studies.

Image 1: MRI of Lower Extremity in Sagittal View. T1 (left) and T2 (right) showing a contiguous Achilles tendon with significant hypertrophy of the flexor hallucis longus (FHL) muscle belly, with increase in signal intensity visible on T2 at the posterior ankle.

• Lower extremity MRI with a contiguous Achilles tendon but loose in nature and significant hypertrophy of the flexor hallucis longus muscle belly. (Image 1)

• Spine MRI demonstrated the appearance of a low-lying medullary conus and thickened filum (Image 2-3), indicating a tethered cord with terminal lipoma. Degenerative disc was also seen at L3-L5 with stenosis. • EMG demonstrated chronic denervation in the sciatic nerve distribution and otherwise negative for any abnormalities, indicating the cause of his atrophy being the tethered cord.

• After conservative options were exhausted, arthroscopic treatment with debridement of anterior tibial osteophytes, flexor hallucis longus transfer and open Achilles Z-lengthening was performed.

• Patient remained non-weight bearing in a short leg cast for 6 weeks, and slowly transitioned to a CAM boot

• Underlying tethered cord was treated with laminectomy and resection of tethered spinal cord by neurosurgery one month after foot and ankle surgery.

Image 2: MRI of lumbar spine without contrast. T2 images showing low lying conus with transitions into thickened filum. Thickened filum terminates in hyperintense fatty lesion, indicating a lipoma, at level of S1, measuring 27mm craniocaudally, indicating tethered cord with terminal lipoma. Degenerative disc disease is also seen at levels L3-L4, L4-5.









RESULTS

- Postoperatively:
- 2 months: ¹/₅ plantarflexory strength of the left foot.
- 7 months: Doing well and able to travel to Europe. Reported being able to walk 50,000 steps per day.
- 9 months: Adequate plantarflexory strength with ability to perform a double heel raise.
- > 15 months: Functioning well, with continued therapy to strengthen his posterior muscle group. Patient reported anterior ankle impingement, for which custom inserts with heel lifts were prescribed. Patient was satisfied with his outcome and able to return to normal activities and powerlifting.
- At final neurosurgical follow up, his surgeon was pleased with his progress and noted no specific concerns. It was discussed that it can take up to 2 years for neurologic symptom resolution.



Image 3: MRI of sacrum without contrast, showing hyperintense fatty lesion, indicating a lipoma, measuring 9mm anteroposterior measurement x 10mm transverse measurement. Rounded filum measures 5.7 mm in diameter.

DISCUSSION

- TCS is not frequently seen affecting the lower extremities in the adult population.
- The vast majority of patients will show symptoms in childhood, with neurologic and/or genitourinary symptoms.
- Given his subtle and slowly progressive calf atrophy and plantarflexory weakness, the patient had a 12-year delay in diagnosis of his tethered cord. It is not unusual to see a significant delay from presentation to diagnosis given the slow course of the disease.
- Cases of TCS can often be overlooked by physicians given its nonspecific clinical manifestations making early definitive diagnosis a challenge.⁹
- Our case study highlights the importance of leading a multi-specialty workup when any doubt may arise for clinicians faced with atypical pathology.
- Patients presenting with similar symptoms can benefit from surgery, but the most important and critical step in the treatment of adult acquired TCS is the identification of the condition itself.

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