

CASE REPORT

Traumatic tear of tibialis anterior during a Gaelic football game: a case report

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Reports of traumatic injury to the anterior lower leg muscles are scarce, with only a handful of reports of traumatic injury to the tibialis anterior. A database search of Medline, Cinhal, and Sports Discus only revealed three such cases, and they did not result from a direct sporting injury. This report documents the case of a traumatic rupture of tibialis anterior muscle in a young female Gaelic football player. It details the surgical repair and management of tibialis anterior muscle and the physiotherapy rehabilitation to full function.

Traumatic injuries to the lower limb are often associated with contact team sports. Injuries in the foot and ankle have been reported to account for up to 25% of injuries in 19 sports.¹ Cromwell *et al*² found that of a cohort of 107 Gaelic football players, 88 sustained injuries during a six month period. Lower body injuries predominated, accounting for 77% of the 88 injuries sustained, with the ankle being the most commonly injured site. Muscle injuries accounted for about 33% and tendon injuries for 16% of the recorded lower limb injuries.² However, reports of traumatic injury to the anterior lower leg muscles are uncommon in either the sporting or non-sporting populations. In particular, there are very few reports of traumatic injury leading to rupture of the tibialis anterior in the published literature. A database search of Medline®, Cinhal, and Sports Discus revealed only three such cases, of which none resulted directly from a traumatic sporting injury.³⁻⁵

CASE REPORT

A 22 year old female university student presented to physiotherapy with a five day history of difficulty in walking, following an injury sustained in a game of Gaelic football. The injury occurred as a result of the impact of kicking the ball. At the time of impact of the right foot with the ball a snap was heard, associated with an immediate onset of weakness and severe sharp pain in the anterior shin. The client rated the pain at the time of injury as 10/10 on the visual analogue scale. Immediate self management involved application of ice, pain relieving medicines, and a visit to the local doctor, who prescribed a non-steroidal anti-inflammatory drug and rest. Improvement was slow, with persisting difficulty in walking and a deep ache over the shin area, so the client sought physiotherapy treatment five days later.

Examination revealed foot drop gait, lack of active dorsiflexion, and a visibly apparent and palpable absence of the tibialis anterior tendon at the ankle. There was tenderness on palpation over the length of tibialis anterior muscle.

Immediate management consisted of rigid taping the foot into a plantargrade position using ankle stirrups, sixes, and a heel-lock; partial weight bearing gait re-education using crutches; and immediate referral to an orthopaedic surgeon. Ultrasound scans were inconclusive, but the clinical findings

were considered irrefutable evidence of a rupture, so operative management was undertaken one week after the injury.

Surgery revealed a complete traumatic tear of tibialis anterior at the musculotendinous junction. The tendon had ruptured directly from the muscle belly, which had also sustained some muscle fibre damage (fig 1). The tendon was subsequently sutured back to the muscle belly using absorbable interrupted sutures.

Post-surgical management consisted of an initial period of six weeks non-weight bearing and immobilisation in a short leg fibreglass cast, followed by four weeks in an ankle-foot orthosis with partial weight bearing. Active physiotherapy rehabilitation was begun 10 weeks after surgery. The treatment programme initially focused on normalising the patient's gait using augmented low dye anti-pronation taping to enable adequate heel strike. Balance and proprioceptive re-education was also a treatment priority during the initial stages. Talocrural joint mobilisation using Mulligan techniques⁶ to address ankle joint hypomobility was undertaken, along with ankle stability foot form exercises of co-contraction of tibialis posterior, intrinsic foot, and peroneus longus muscles. Special attention was paid to tibialis anterior muscle facilitation, and incorporated re-education using electromyographic biofeedback and other facilitatory techniques such as sweep-tap, icing, cognitive control, and copying the unaffected side. Muscle flexibility and reaction time retraining of tibialis anterior was incorporated. Proximal muscle control, especially gluteus medius control and gluteus maximus activation patterning, was also addressed. General cardiovascular endurance exercises such as cycling, swimming, and deep water running were added to the rehabilitation programme.

An ultrasound scan done three months after surgery revealed a functionally intact tibialis anterior, though there was some persistent diffuse oedema within the muscle (fig 2).

The physiotherapy programme progressed at this time to high level sports skills such as running, changing directions,



Figure 1 Rupture of right tibialis anterior muscle at the musculotendinous junction; note area of incision.



Figure 2 Ultrasound of tibialis anterior three months after operation.

accelerating/decelerating, jumping, and hopping. The client wished to return to touch football, which involves no kicking. Five months post-surgery, tibialis anterior muscle power was slightly reduced in the inner range, at grade 5 minus on the five point scale, with the muscle tending to fatigue easily. The client was able to return to full function within five months after the injury, and at this time could run 5 km four times a week and swim 1500 m daily.

DISCUSSION

There have been no previously reported cases of an injury to the musculotendinous junction of the tibialis anterior muscle. However, musculotendinous junction injuries have been reported in the hamstring muscle group.⁷ In trying to identify the risk factors for hamstring muscle strain injuries, Orchard⁸ reported that intrinsic factors such as past muscle injuries are more predictive of future muscle strain injury than extrinsic factors. In the present case there were no identified predisposing intrinsic factors such as previous injury to any other muscle group. However, the client had reported a history of recurrent ankle sprains bilaterally. As reported by Freeman,⁹ 10–30% of individuals who sustain ankle sprains suffer from chronic symptoms. Watson¹⁰ investigated a possible relation between sports injuries and pre-existing biomechanical defects in players of various codes of football over a 24 month period. He found that the incidence of ankle, back, knee, and muscle injuries was influenced by the presence of defects of body mechanics. It is thus possible that there were residual defects in the client's body mechanics resulting from recurrent ankle sprains. It could be hypothesised that there may have been talocrural joint hypomobility with a resultant joint and muscular restriction in plantarflexion, predisposing the right foot and ankle to further injury.

A lack of warm up before playing may also contribute to sports injuries and in particular to muscle tears. Saffran *et al*¹¹ found that isometrically preconditioned muscles of the lower leg of rabbits (including tibialis anterior), showed an increase in elasticity of the musculotendinous unit and stretched to a greater length from the resting position before failing than muscles where no warm up had taken place. When failure did occur it did so most often at the musculotendinous junction, as in the present case. The client did report a lack of warm up before playing Gaelic football in this particular game and could thus have been further predisposed to the rupture of tibialis anterior.

Surgical repair is often the treatment approach taken in cases of muscle and tendon tears. Surgery in this case took place eight days after the injury, with a good surgical outcome. Machani *et al*⁴ reported an avulsion of tibialis anterior from its origin in a subject caught in a conveyor belt. It was tacked back to its original site as soon as it was

Take home message

- Traumatic tears of the tibialis anterior muscle during sports have not often been described but may be more common than was formerly believed.
- This report describes a traumatic injury to the tibialis anterior. It emphasises the need for accurate diagnosis, prompt surgical referral, and physiotherapeutic rehabilitation in such cases, and identifies risk factors to prevent further injury.

diagnosed, which was a few days later (the precise interval was not reported). The patient had a good outcome with some weakness of grade 4 muscle power at four months post-surgery. In another case,³ the injury occurred as a result of a traffic accident, with both the tibialis anterior and the peroneal muscles being avulsed from their origin, and this was diagnosed at surgery a few days later (again the number of days was not reported). The muscles were restored to their origin surgically, and the patient had only a slight limp two years post-injury. An unusual case of a tibialis anterior tear reported by Velan and Hendel⁵ needed repair by augmentation of the extensor hallucis longus. The patient was 52 years old and developed a large gap between an end-to-end tear of the tendon two months after a methylprednisone injection to that site. The surgical outcome was satisfactory, with the patient returning to athletic activity three months later.

The injury in this report occurred when the subject kicked the ball in a Gaelic football game. Though there have been no other known reports of traumatic tears of the tibialis anterior during sports, it is possible that other kicking sports such as rugby football and soccer may be associated with a risk of a similar injury. It is also possible that tibialis anterior tears may be more common than has been reported.

It is always of paramount importance that players undertake musculoskeletal screening tests before starting to play a sport, to ensure there are no predisposing factors that may increase their chances of injury. Players also need to ensure adequate warm up before play to further reduce the risk of injury.

The client in this report responded very well to surgery and rehabilitation, achieving return to full function. This case emphasises the need for early accurate diagnosis and prompt surgical referral in traumatic musculotendinous tears, and appropriate physiotherapeutic follow up in order to achieve the best possible outcome in rehabilitation.

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