Case report

A 47 year old man, a champion power lifter weighing 97 kg, suddenly collapsed in pain while doing a power lift. The injury (recorded on video) occurred while he was squatting with the weight across his shoulders but before he started to push upwards. He was in pain and unable to extend either knee.

Examination showed palpable gap in the suprapatellar tendon of the left knee a similar palpable gap was felt on the right knee in the infrapatellar region.

Past history included several steroid injections in his shoulders but he never had systemic steroids or injection locally into or around his knees. There was no systemic disease that could account for the injuries. His serum urate, cholesterol, urea and electrolytes, and erythrocyte sedimentation rate were all within normal limits.

Surgical exploration confirmed tendon ruptures. On the right, the tendon was avulsed from its tibial insertion extending through the expansion to the medial and lateral collateral ligaments. The cruciate ligaments were normal. The left quadriceps tendon ruptured just above the insertion to the patella. Repairs were done primarily with absorbable sutures.

Postoperatively, the left knee was immobilised in plaster cylinder for 48 h and the right knee for two weeks. A continuous passive motion machine was used to mobilise each knee once out of plaster.

The range of movement at nine weeks was 0-85 degrees and 0-110 degrees on the right and left respectively. Full flexion had been achieved in both knees at twenty two weeks.

Discussion

Bilateral simultaneous rupture of either the infrapatellar tendon or the quadriceps tendon is rare. There are demographic differences in the occurrence of quadriceps and patellar tendon ruptures.¹ The exact mechanisms resulting in ruptures are different and results of treatment are more favourable with patella tendon ruptures. Though bilateral quadriceps tendon rupture or patella tendon rupture have been known to occur, there is no recorded incident of simultaneous rupture of patella tendon and contralateral quadriceps tendon in a healthy patient. There has been a reported case of a similar condition in a patient with renal insufficiency.³

Quadriceps tendon rupture, commoner over 40 years of age, is usually the result of age related diffuse tendon degeneration or degenerative changes in the knee.^{4 5} It is rare in athletes.

Patella tendon ruptures occur in athletes who are usually under 40 and are then due to massive flexion forces of knee extension in the presence of forced contraction of the quadriceps. They may also be due to local involvement of tendons in systemic diseases such as gout, hyperlipidaemia, systemic lupus erythematosus, or rheumatoid arthritis, or in patients given systemic or local steroid injections.^{2 6}

McMaster⁵ showed in 1933 that normal tendons do not rupture with stress, but detach at the osseotendinous or musculotendinous junction where the vascular supply is most at risk and the ability to repair injuries impaired. Scanpinelli,⁶ in discussing the vascular supply of the tendon, says that ruptures of the tendon substance are uncommon. Zernicke *et al*⁷ found that normal tendons could rupture at stresses greater than 17.5 times body weight. These kinds of repetitive stress occur in power sports like weight lifting.

The contralateral quadriceps tendon rupture was probably the result of age related weakening of the tendon. Our patient's age had exceeded the threshold for increasing incidence of degenerative ruptures. The stress of weight lifting may have tilted the balance in favour of earlier rupture.

As power sports and body building become more popular, and the age at which these sports are played is further stretched, the combined effect of stresses around various muscle groups and aging may result in unusual combinations of tendon ruptures and other injuries.

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Unusual patellar tendon injury in an adolescent runner with generalised ligamentous laxity

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Abstract

A case is reported of an acute traction injury of the patellar tendon in a boy of 14

with joint hypermobility. Such injuries are unusual but early diagnosis and surgical repair lead to a good long term out-

come. In adolescents participating in sports, the awareness of the possibility of a rare knee extensor mechanism injury is essential for a successful outcome.

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Key terms: patellar traction injury; joint hypermobility; adolescence

Acute traction injuries of the patellar tendon occur infrequently during childhood and adolescence. They are usually sustained during sporting activities such as competitive running or the takeoff or landing phase of a jump. Before the fusion of the tibial tuberosity apophysis with the shaft (at 16 to 19 years), the proximal tibial growth plate is the common site of failure of the knee extensor mechanism, resulting in avulsion of the tibial tuberosity. We report a case of an adolescent with a spontaneous complete stripping of the distal end of the patellar tendon from its tuberosity attachment, with no bony avulsion. It is interesting that the characteristics of the hypermobility syndrome (HMS) whose benign nature has been questioned recently, were present in this boy.

Case report

A 14 year old schoolboy runner was running on an even surface, performing short distance pace accelerations. While walking soon after having completed this exercise he felt sudden pain in his left knee, followed by inability to bear any

Figure 1 Lateral x ray of the injured knee showing a high riding patella.

weight on that leg. He presented in casualty with tenderness and moderate swelling over the patellar tendon. He was unable to perform active straight leg raising. An x ray revealed a high riding patella (fig 1), suggesting a complete rupture of the patellar tendon. Surgical exploration was undertaken within 12 hours. The patellar tendon was found completely detached from the tibial tuberosity (fig 2), with no bony fragments avulsed. The tendon was repaired with conventional techniques: two layers of two vicryl sutures to the surrounding periosteum and fascia. Postoperatively a long leg plaster cylinder was applied for six weeks before mobilisation was started. The boy had a full pain-free range of movement and was able to fully weight-bear at the eight week follow up. He was running without problems when reviewed six months later. On clinical examination generalised joint hypermobility was found and a total score of eight in Beighton's nine point scale¹ of joint hypermobility criteria was measured.

Discussion

Patellar tendon traction injuries may be classified as either acute or chronic. Acute traction injuries are generally uncommon at any age, occurring most often at the inferior pole of the patella or rarely through the mid-substance of the tendon. Before the age of skeletal maturity, the equivalent injury is avulsion fracture of the unfused tibial tuberosity (proximal tibial apophysis) since the weak site of the extensor mechanism of the developing knee is the growth plate of the proximal tibial apophysis. This bony avulsion commonly presents as a subacute or (more usually) as a chronic condition such as Osgood-Schlatter's disease. It may be seen as an acute condition following direct trauma or excessive traction force, occasionally with partial avulsion of the patellar tendon as a concurrent injury,² but this is rare. Complete avulsion of the patellar tendon from its distal insertion without bony detachment has previously been reported only once, in a 14 year old boy competing in the high jump who was also treated successfully with early surgical repair.³

We report here an unusual spontaneous presentation of an acute injury which belongs to a group of injuries usually requiring a significant traction force at the moment of occurrence. In this case there was clearly no vigorous muscle contraction at the moment of tendon rupture. Ruptures of the patellar tendon can occur spontaneously, and occasionally bilaterally, in older patients, usually in association with degenerative bone, tendon (especially following local steroid injections), or connective tissue diseases. However, there was no history of any systemic disease or previous knee problems in this boy.

Another interesting finding was the presence of the hypermobility syndrome (defined as generalised ligamentous laxity in the absence of demonstrable systemic rheumatological disease). This syndrome is seen in a substantial proportion of healthy individuals with no ill effects and frequently considered an advantage in activities such as sports or dancing, where

Figure 1 Intraoperative photograph showing the complete stripping of the distal attachment of the patellar tendon from the tibial tuberosity.

greater flexibility is an asset. However an increasing number of reports have linked various musculoskeletal problems with this syndrome.^{4 5} Although any aetiological relation of the acute injury reported here with the hypermobility syndrome is rather speculative, spontaneous ruptures of the Achilles tendon have been associated with the hypermobility syndrome.⁵

Early diagnosis and surgical repair leads to excellent results in all acute knee extensor mechanism ruptures and the rare type of injury presented here followed this rule. The diagnosis may not be instantly apparent, especially in an unusual presentation with no bony avulsion and without the typical history of sudden pain and loss of function during effort in competitive sporting activities. Indeed, in a series with similar injuries in adults⁶ the rate of misdiagnosed ruptures at the initial examination was as high as 28%. Therefore, in adolescents participating in sports, the awareness of the possibility of a rare knee extensor mechanism injury is essential for a successful outcome.

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