‘Fat fracture’ – a physical sign mimicking tendon rupture

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The imaging techniques available to aid the diagnosis of ruptures of tendo Achillis, the rotator cuff and the tendon of tibialis posterior in rheumatoid patients are well described. However, ruptures of tendon or muscle at other sites are uncommon and may be overlooked. Diagnosis is often made by localised tenderness, swelling and a lack of active movement associated with a palpable defect. Clinical examination may be inconclusive and can be aided by imaging studies. We report two cases in which ruptures of a tendon were suspected, and ultrasound imaging demonstrated the palpable defect to be a cleavage plane in the subcutaneous fat – a ‘fat fracture’.

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Tears of muscle or tendon should be suspected in patients who present with pain, swelling and impaired active movement of a joint. A gap in the tendon may be palpable, but the diagnosis is often overlooked because of pain, localised oedema and haematoma in the gap. We report two cases in which rupture of a tendon was suspected clinically. Ultrasonography, however, demonstrated the underlying tendon to be intact, with the presence of an overlying defect in the fat. Unnecessary surgery was avoided.

Case reports

Case 1. A 26-year-old man sustained a direct blow to his anterior distal thigh during a tackle while playing rugby football. He was unable to continue the game but was able to walk. Clinical examination showed that the distal thigh was bruised and swollen and a transverse palpable gap was felt close to the proximal pole of the patella. Examination of the knee showed an effusion and an extensor lag. He was suspected of having an incomplete tear of the tendon of quadriceps. Plain radiographs revealed no abnormality and diagnostic ultrasound (7 Mhz transducer; Hoka Co Ltd, Tokyo, Japan) was undertaken. It showed that the extensor mechanism was intact, but that there was significant surrounding soft-tissue oedema. The clinically palpable gap was due to a cleavage plane in the subcutaneous fat (Fig. 1). He was treated conservatively with rest, ice and physiotherapy. In view of the significant soft-tissue injury he was advised not to resume full sporting activity for one month.

Case 2. A 17-year-old man who was involved in a road-traffic accident sustained posterior dislocation of a hip and a head injury which required him to be paralysed and ventilated. Significant swelling was noted around the left deltoid region with an obvious indentation in the soft tissues; there was no clinical or radiological evidence of bone injury. Disruption of the deltoid was suspected, but active movements were impossible to assess. Diagnostic

Fig. 1
Longitudinal ultrasound scan showing the intact quadriceps tendon with overlying 'fat fracture' extending superficially.
ultrasound demonstrated the deltoid muscle and its attachment to be intact, but showed surrounding soft-tissue swelling and a defect in the subcutaneous fat (Fig. 2). It was not treated and he made an uneventful recovery.

Discussion

Disruption of the extensor mechanism of the knee is a rare, and often overlooked, injury which may occur from a variety of different causes including direct sharp or blunt trauma, metabolic and collagen abnormalities, injection of corticosteroids, repeated microtrauma and fatty degeneration. Complete rupture of the tendon of quadriceps usually occurs 1 to 2 cm proximal to the superior pole of the patella, with partial or incomplete ruptures at this site or at the musculotendinous junction. If clinical examination reveals a palpable gap in this region, and the ability to extend the knee against gravity is impaired, it is likely that the diagnosis can be made. In the acute setting, localised swelling, bruising and tenderness may make deep palpation of a defect of the tendon difficult, and pain and the presence of a haematoma or haemarthrosis may inhibit extension of the knee.

No cases of disruption of the deltoid muscle or its distal attachment have been reported, although spontaneous disruption of the origin associated with massive tears of the rotator cuff is common.

In cases in which clinical examination is difficult or inconclusive further imaging is useful. Diagnostic ultrasound scanning is a quick and accurate method of diagnosis, and the completeness of a rupture can be assessed. Early operative treatment of complete rupture of the quadriceps appears to influence outcome.

The two cases which we report here (Figs 1 and 2) demonstrate the benefit of ultrasound imaging, by showing the palpable defect to be a cleavage plane in the subcutaneous fat. We are unaware of any previous reports of such findings and advocate that the physical and radiological signs be designated ‘fat fracture’.

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References