Distal rupture of semitendinosus tendon

Clinical History:
An amateur soccer player experienced a painful crack along the posteromedial aspect of the right knee during sprinting. The semitendinosus tendon was neither visible nor palpable on physical examination. Knee movements were preserved; no instability was clinically appreciable.

Imaging Findings:
A MRI of the knee, performed a week after the event, showed distal detachment and retraction of the semitendinosus tendon, which was irregularly thickened and inhomogeneous (Fig. 1-4); a small fluid collection circumscribed the tendon; oedema of the surroundings was also evident (Fig. 2, 4).

Discussion:
Injuries to the hamstring tendons and muscles are common in sprinting sports. In high level athletes with a hamstring strain MRI evaluation is positive in 68-81% of cases. The biceps femoris long head is more commonly involved (66-87% of cases), whereas semimembranosus and semitendinosus injuries are both found in 32-37% of cases; the biceps femoris short head is less frequently involved and only in distal injuries [1, 2]. In approximately one third of patients MRI reveals lesions of more than one tendon or muscle; hamstring strain is proximally located in half of cases, distally in 40% of cases, whereas midhamstring strain, involving muscle only, occurs in approximately 10% of cases [2].

Rupture of the distal semitendinosus tendon is rare, but probably underestimated, likely because of inadequate MRI examinations; history reveals pain or minor injury predating the rupture in 15% of patients only [1]. Tendonitis or intrasubstance tear are likely predisposing factors to complete tendon rupture [3].

Semitendinosus tendon retraction, degenerative changes of the tendon, decrease muscle volume and oedema are appreciable on MRI in acute/subacute phase; atrophy of the muscle belly and some degree of fibrosis, arranged in a concentric onion-like fashion circumscribing the tendon on axial imaging, can be observed in chronic rupture [1, 4, 5].

Hamstring injury diagnosis can be clinically easy to achieve; the role of imaging is essential to establish severity and
extension of the lesion [2]. Ultrasound is very competitive with MRI in diagnosing hamstring injury. Advantages of ultrasound are low cost, rapid investigation time, possibility of dynamic examination, comparison with contralateral thigh and knee, spatial resolution, and diagnostic accuracy despite retained metallic objects.

Nevertheless, beyond inherent diagnostic sensitivity, MRI of the thigh and knee plays a pivotal role in grading hamstring injury, the prognosis relying on the following findings [2]:
- number of muscles or tendons involved;
- injury location for each muscle or tendon (origin avulsion, proximal myotendinous junction, muscle belly, distal myotendinous junction, insertion avulsion);
- cross-sectional percentage of each lesion on axial MRI;
- tendon or muscle retraction;
- associated signs of chronic tendinopathy;
- craniocaudal sagittal extent of the lesion.

MRI investigation is also mandatory when associated traumatic lesions of the knee should be ruled out and for therapeutic management, especially in preoperative planning, when the orthopaedist dictates indications for surgery.

**Differential Diagnosis List:** Distal semitendinosus tendon rupture, Distal semimembranosus tendon rupture, Complex hamstring injury

**Final Diagnosis:** Distal semitendinosus tendon rupture

**References:**


**Figure 1 a**

**Description:** Distal third thigh level: the semitendinosus tendon (yellow arrow) is slightly thickened and inhomogeneous. A small fluid collection surrounds the tendon. **Origin:** Ospedale San Bortolo, Vicenza, Italy
**Description:** Femoral condyles level: more evidence of inhomogeneity of the semitendinosus tendon (yellow arrow). **Origin:** Ospedale San Bortolo, Vicenza, Italy
**Description:** Articular level: split of the semitendinosus tendon (yellow arrow); gracilis tendon (curved arrow) and sartorius muscle (asterisks) are normal. **Origin:** Ospedale San Bortolo, Vicenza, Italy
Description: Tibial plateau level (semitendinosus tendon - yellow arrow; sartorius muscle - asterisks; gracilis tendon - curved arrow). Origin: Ospedale San Bortolo, Vicenza, Italy
Figure 2

Description: Fluid collection surrounding the ruptured semitendinosus tendon (yellow arrow). Origin: Ospedale San Bortolo, Vicenza, Italy
Figure 3

Description: PD MRI: rupture of the semitendinosus tendon (yellow arrow). Origin: Ospedale San Bortolo, Vicenza, Italy
**Description:** T2w FS MRI: strain of semimembranosus myotendinous junction (white arrow); stump of the semitendinosus tendon (yellow arrow). **Origin:** Ospedale San Bortolo, Vicenza, Italy
Figure 4

Description: Retraction of the ruptured semitendinosus tendon (yellow arrow). Origin: Ospedale San Bortolo, Vicenza, Italy
Description: Distal tendon stump (yellow arrow). Origin: Ospedale San Bortolo, Vicenza, Italy