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Rectus Femoris Distal Tendon Tear: A Case Report

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Abstract **Case Report**

Background: Distal rectus femoris tendon tears are uncommon but well-recognized injuries in athletes, particularly those involved in sports requiring explosive kicking movements. Diagnosis relies on clinical examination supported by ultrasound and MRI, which provides superior soft tissue characterization and guides surgical decision-making. ***Case Presentation:*** We report the case of a 22-year-old professional football player who presented with acute anterior thigh swelling following a forceful kicking motion with no ball contact. Emergency MRI demonstrated a complete distal rectus femoris tendon tear with proximal muscle retraction, a fluid collection along the empty tendon sheath, and intact adjacent vastus muscles. Surgical repair was performed with satisfactory functional outcome. ***Conclusion:*** MRI is the gold standard for evaluating distal rectus femoris tears, accurately depicting the degree of retraction and tendon integrity. In competitive athletes with complete tears, surgical repair is recommended to restore optimal quadriceps function and allow return to sport.

Keywords: Muscle tear; Rectus femoris; Quadriceps; MRI; Sports injury; Surgical repair.

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Introduction

The rectus femoris is the most superficial and centrally positioned muscle of the quadriceps group, playing a critical role in both hip flexion and knee extension. Its proximal attachment consists of two heads: a direct tendon originating from the anterior inferior iliac spine (AIIS), and an indirect tendon arising from the supra-acetabular fossa. These converge to form the conjoint tendon. Distally, the muscle inserts via the anterior lamina of the quadriceps tendon into the superior pole of the patella.

Isolated distal rectus femoris tears are relatively rare compared to proximal injuries, yet they represent a significant cause of morbidity in competitive athletes. The most common mechanism is a forceful eccentric contraction during a kicking movement, particularly when the attempt is made without contact with the ball — the so-called "shoot in a vacuum" mechanism. This leads to a sudden, uncontrolled lengthening of the muscle-tendon unit under high load, resulting in failure at the weakest point.

Clinical diagnosis is based on the characteristic presentation of anterior thigh pain, swelling, and a palpable mass proximal to the patella. Imaging, particularly MRI, is essential to confirm the diagnosis, quantify the degree of tendon retraction, and plan the appropriate management strategy. We present the case of a young professional footballer with a complete distal rectus femoris tendon tear, illustrating the typical MRI features and the rationale for surgical management.

Case Presentation

A 22-year-old professional male football player presented to our department with acute onset of pain and swelling over the anterior aspect of the right thigh. The injury occurred during a training session when he attempted a forceful kick but made no contact with the ball. He reported an immediate sharp pain in the anterior thigh, followed by rapid swelling and difficulty extending the knee against resistance.

On physical examination, a tender, firm mass was palpable on the anterior aspect of the mid-thigh, corresponding to the retracted muscle belly. A distal soft tissue defect was appreciated just proximal to the patella, consistent with disruption of the distal tendon. Knee extension was significantly weakened, though partially

preserved due to the intact vasti muscles. Neurovascular examination was normal.

Ultrasound examination revealed retraction of the myotendinous junction with discontinuity of the distal tendon and a subaponeurotic fluid collection at the site of injury. Emergency MRI of the right thigh was subsequently performed for definitive characterization.

MRI findings were consistent with a complete distal rectus femoris tendon tear. Coronal T2-weighted sequences (with and without fat saturation) demonstrated proximal ascent and retraction of the muscle belly, with complete absence of the distal tendon at its expected insertion site (Figure 1). The vacated tendon sheath was replaced by a fluid collection showing marked T2 and STIR hypersignal, more conspicuous on fat-saturated sequences. Axial T2 images confirmed that the rectus femoris was not identifiable at its anatomical position due to myotendinous retraction, with the tendon sheath entirely filled by fluid effusion (Figure 2). Sagittal T2 fat-saturated images delineated the isolated distal tendon lesion with proximal muscle retraction, and importantly showed that the injury was confined to the rectus femoris tendon with no involvement of the adjacent vastus muscles (Figure 3).

Given the degree of retraction and the high functional demands of the patient as a professional athlete, surgical repair was indicated. The patient underwent primary tendon repair under general anaesthesia. The retracted tendon stump was identified, mobilised, and secured back to the patellar insertion using non-absorbable sutures with bone anchors. Post-operatively, the patient was placed in a knee immobiliser for four weeks, followed by a progressive rehabilitation programme. At six-month follow-up, he demonstrated full range of motion and was able to return to competitive sport.

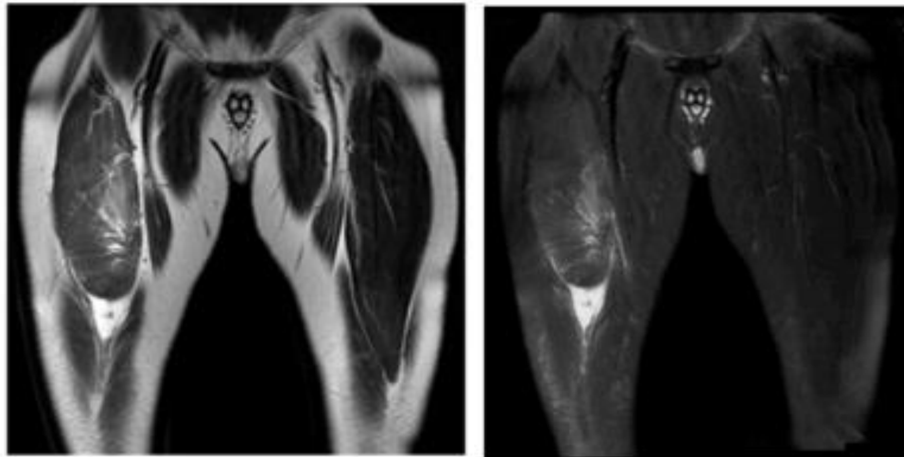

Fig. 1a — T2 coronal without fat saturation
Fig. 1b — T2 coronal with fat saturation

***Figure 1.* Coronal T2-weighted MRI sequences without (a) and with fat saturation (b) demonstrating proximal ascent and retraction of the rectus femoris muscle belly. The distal tendon is absent, replaced by a fluid collection in T2 hypersignal**

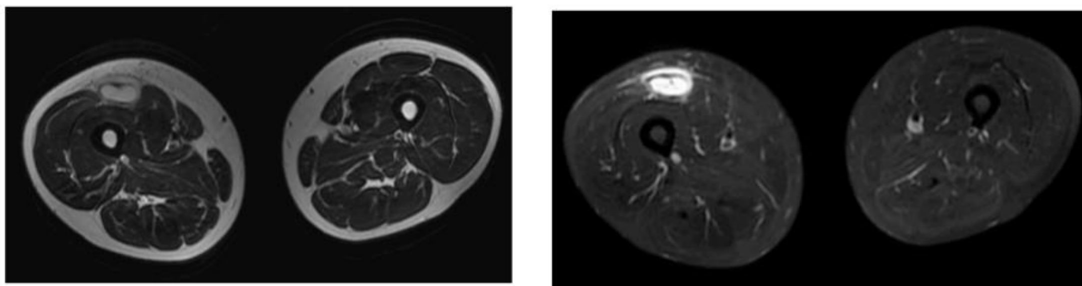

Fig. 2a — T2 axial without fat saturation **Fig. 2b — T2 axial with fat saturation**

***Figure 2.* Axial T2-weighted sequences without (a) and with fat saturation (b). The rectus femoris is absent from its anatomical position; the tendon sheath is distended with fluid effusion. The vastus muscles show normal morphology bilaterally**

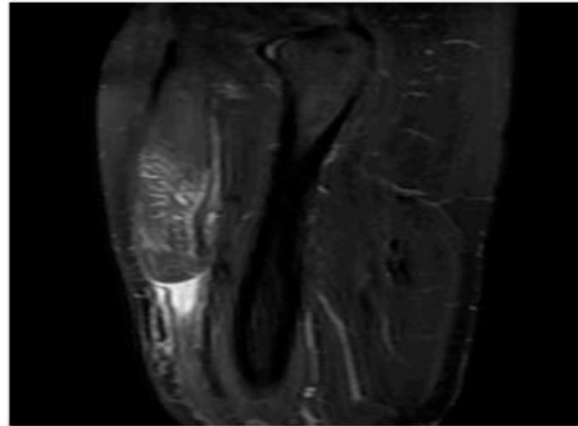

Figure 3: Sagittal T2 fat-saturated MRI sequence. Isolated distal tendon tear of the rectus femoris with proximal muscle retraction. The injury is confined to the tendon; the adjacent quadriceps components are intact

DISCUSSION

Rectus femoris tears most commonly occur at the proximal musculotendinous junction or involve the proximal tendon of origin. Distal tendon tears, as seen in our patient, are considerably rarer and are predominantly encountered in athletes engaged in sports with high kicking demands, such as football, rugby, and martial arts [1]. The eccentric overload mechanism during a missed kick — where maximum muscle activation occurs without the dampening effect of ball contact — places exceptional stress on the distal musculotendinous unit.

Clinically, the injury presents with anterior thigh pain, a palpable proximal mass (retracted muscle belly), and a distal soft tissue defect. While the vasti muscles provide partial compensation for quadriceps function, there is notable weakness in resisted knee extension, which is functionally limiting for high-performance athletes.

Ultrasound can rapidly confirm the diagnosis by demonstrating tendon discontinuity and haematoma formation, but its sensitivity is limited for assessing the full extent of muscle retraction and concomitant lesions. MRI remains the imaging modality of choice, offering superior characterisation of the musculotendinous structures, accurate quantification of retraction distance, and assessment of the integrity of the remaining quadriceps components [1]. The severity of the injury can be graded using the classification system proposed by Ekstrand *et al.,*[2], which stratifies muscle injuries based on cross-sectional involvement and guides return-to-play decisions.

The typical MRI appearance — as demonstrated in our case — consists of proximal ascent of the muscle belly on coronal sequences, replacement of the distal tendon by a T2/STIR hyperintense fluid collection, and an empty tendon sheath on axial images. The fat-saturated sequences are particularly valuable as they accentuate the oedematous and haemorrhagic changes that might be underestimated on standard T2 sequences [1]. The preserved signal and morphology of the vastus muscles confirm the isolated nature of the tear, with important implications for functional deficit assessment and surgical planning.

Management is guided by the severity of the tear, the degree of retraction, and the functional demands of the patient. Conservative management with physiotherapy may be appropriate for partial tears or in non-athletes. However, in competitive athletes with complete tears and significant proximal retraction — as in our case — surgical repair is widely recommended to restore optimal quadriceps power and achieve a reliable return to sport [2]. Early surgical intervention, before scar tissue formation and muscle contracture, facilitates tendon mobilisation and improves outcomes.

CONCLUSION

Distal rectus femoris tendon tears are rare but clinically significant injuries in competitive athletes. MRI provides the definitive diagnosis and characterises the full extent of injury, including the degree of muscle retraction and integrity of adjacent structures. In professional athletes with complete tears, surgical repair followed by structured rehabilitation enables a return to competitive sport. This case illustrates the typical imaging findings and underscores the importance of prompt diagnosis and early surgical management in this patient population.

Patient Consent Statement

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief upon request.

Conflict of Interest:
The authors declare no conflict of interest.

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