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Indirect Rectus Femoris Injury Mechanisms in Professional Soccer Players: Video Analysis and MRI Findings

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Disclosures:

We have no conflicts of interests to disclose.

Background

- Rectus femoris injuries are common in sports requiring sprinting and kicking, such as football.[1]
- Only little is known about the specific injury mechanisms.[2]
- The objective was to describe the injury mechanisms and magnetic resonance imaging (MRI) findings in acute rectus femoris injuries of male soccer players using a systematic video analysis.

Design and setting

- This is a descriptive case series study of consecutive acute rectus femoris injuries from November 2017 to July 2022.
- All subjects were patients of two specialized sports medicine hospitals.

Participants

- Professional male soccer players aged between 18-40 years, referred for injury assessment within 7 days after an acute rectus femoris injury, with an available video footage of the injury and positive finding on MRI.

Methods

- Two authors completed the specific rectus femoris questionnaire based on standardized scoring forms.
- Rectus femoris injury mechanisms and their relation to rectus femoris muscle injury MRI findings were analyzed.
- Main outcome measures were rectus femoris injury mechanism (playing situation, player/opponent behavior, movement, and biomechanics) and MRI injury location.

Results

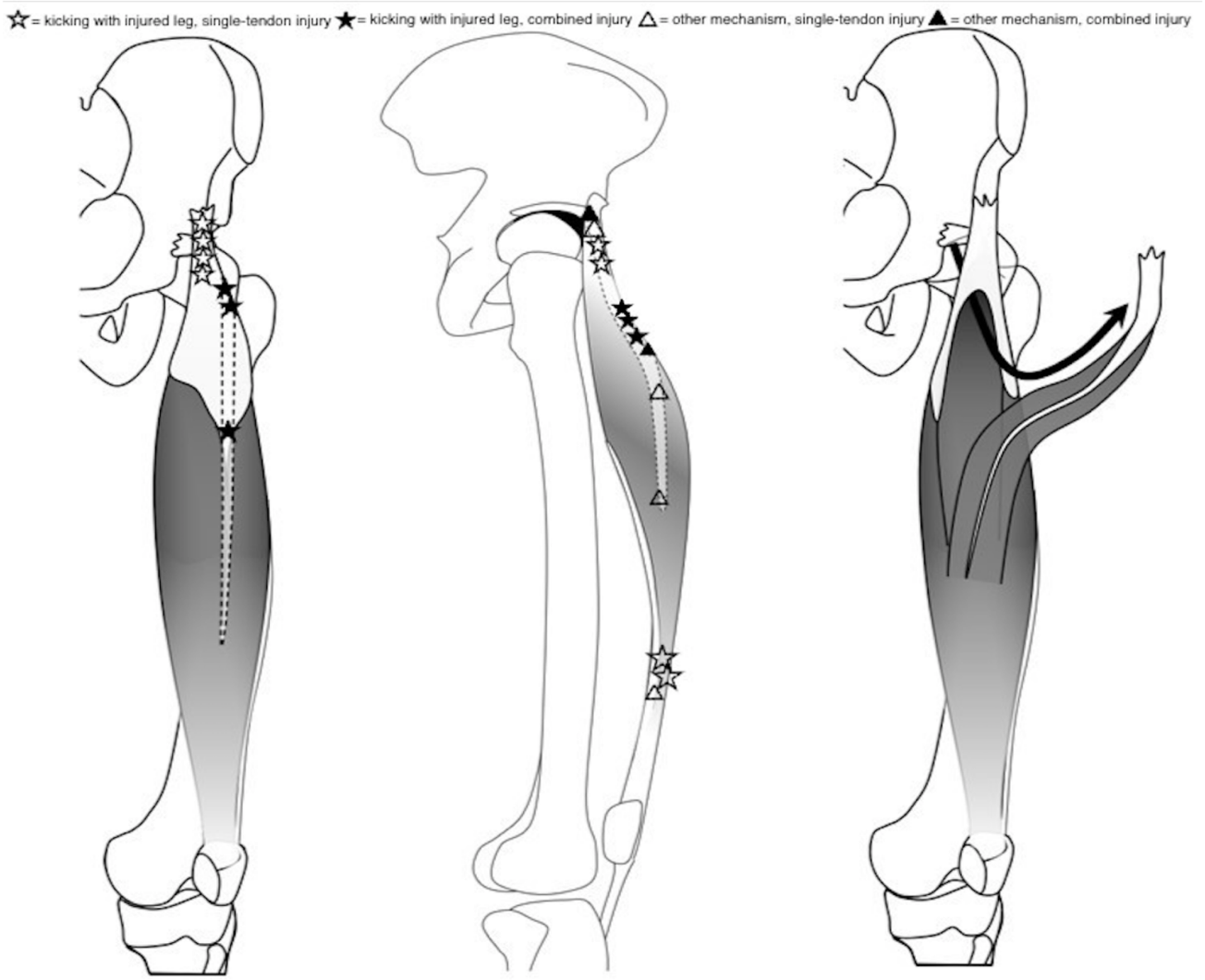
- 20 videos of acute rectus femoris injuries in 19 professional male soccer players were analyzed.
- Three different injury mechanisms were seen: kicking (80%), sprinting (10%), and change of direction (10%).
- Isolated single-tendon injuries were found in 60% of the injuries and 40% affected several locations.

A: kicking, B: sprinting, C: change of direction.

Results

- 62.5% of the kicking injuries included complete tendon ruptures, whereas both running injuries and none of the change of direction injuries were complete ruptures.
- Direct tendon was involved in 33% of the isolated injuries and common tendon was affected in all combined injuries.

Locations of injuries and their relation to injury mechanism and injury type



Injury mechanisms and MRI findings

MRI finding	Kicking	Running	Change of direction	Total
Isolated injuries	10	1	1	12
DT	4	-	-	4
IT	-	-	-	-
CT	2	1	-	3
DDP	-	-	-	-
CS	1[a]	-	1	2
Distal MTJ	3[b]	-	-	3
Combined injuries	6	1	1	8
IT + CT	2	1	-	3
IT + CT + DDP	2	-	-	2
CT + DDP + CS	1	-	-	1
CT + DDP	-	-	1	1
DT + IT + CT	1	-	-	1
Complete[c]/partial	10/6	2/0	0/2	12/8

DT: direct tendon; IT: indirect tendon; CT: common tendon; DDP: distal direct portion; CS: central septum; MTJ: myotendinous junction.

[a]The supporting leg was injured in this case.

[b]The supporting leg was injured in one of the cases.

[c]The combined injury was classified as complete, if it included at least one complete tendon rupture.

Conclusions

- Most rectus femoris injuries occur during kicking among football players.
- Most of the rectus femoris injuries are complete ruptures and involve only one tendon, but also combined and partial injuries occur.
- Kicking injuries can affect also the supporting leg and maximal sprinting can cause a complete rectus femoris rupture.

References

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2. Geiss Santos RC, Van Hellemnondt F, Yamashiro E, et al. Association between injury mechanisms and magnetic resonance imaging findings in rectus femoris injuries in 105 professional football players. Clin J Sport Med. 2021;32:e430–e435.