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Mechanisms of Severe Lower Limb Muscle-Tendon Injuries in Professional Soccer Players: A Video Analysis of 72 Cases

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Faculty Disclosure Information

- Nothing to disclosure.

Background

- Muscle-tendon injuries are common in football (soccer), as every team can expect suffering 15-18 muscle-tendon injuries per season[1,2]
- A significant portion (11%) are severe causing more than 28 days absence[1]
- The incidence of muscle-tendon injuries is higher during matches[1]

Background

- Muscle-tendon injuries can dramatically impact team performance, economy, and players' careers[3,4]
- Understanding the mechanisms behind severe muscle-tendon injuries in professional soccer players is crucial for development of prevention and treatment strategies
- The aim of this study was to investigate these mechanisms using systematic video analysis

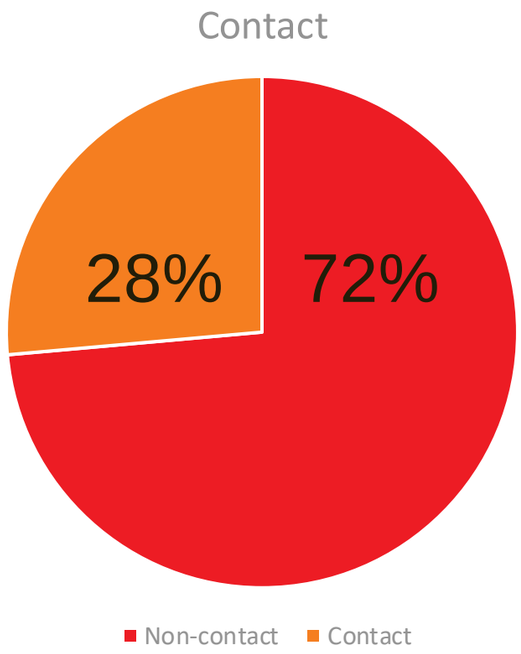
Methods

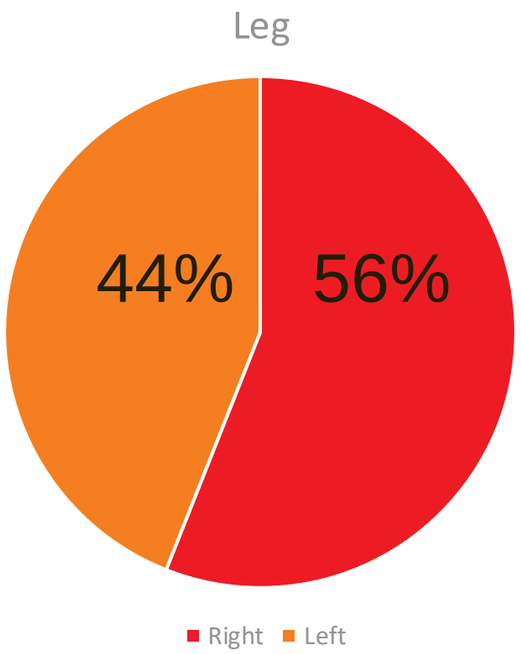
- We included male elite level soccer players with acute severe muscle-tendon injury in lower limb during match play from different countries
- Injuries led to a consultation of a single orthopaedic surgeon specialized in muscle-tendon injuries
- All injuries caused >28 days of absence
- Systematic video analysis of injury mechanisms and situations was performed

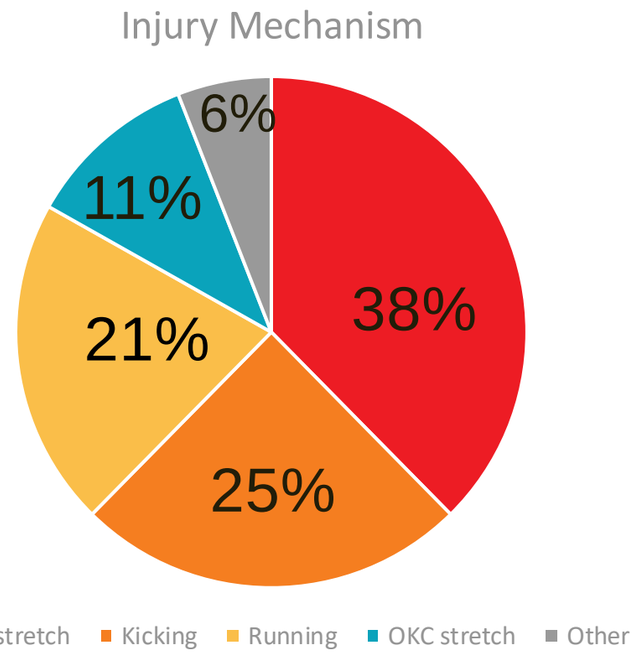
Subjects

- 72 cases
- Median age 26 years
- Injuries occurred between September 2017 and August 2024
- 23 hamstring, 22 rectus femoris, 20 adductor longus, 5 Achilles tendon, 2 patellar tendon injuries

Results (all injuries)







CKC = closed kinetic chain

OKC = open kinetic chain

Hamstring injuries

- 43% occurred during closed kinetic chain stretching movements
- Running (35%) and open kinetic chain stretching (22%)
- Non-contact (61%)

Rectus femoris injuries

- Kicking (82%)
- Non-contact (91%)

Adductor injuries

- 70% occurred during closed kinetic chain stretching
- Running (15%) and open kinetic chain stretching (15%)
- Reaching for the ball (70%)
- Non-contact (65%)

Achilles and patellar tendon ruptures

- All Achilles injuries were non-contact during sprinting or a quick step backwards
- All patellar tendon ruptures occurred during direct contusions when knee hitting the ground

Conclusions

- Severe lower limb muscle-tendon injuries in professional football (soccer) primarily occur due to non-contact mechanisms, most frequently during closed kinetic chain stretching movements, kicking, or running
- The typical injury mechanisms differ based on the specific muscle involved
- These findings can guide prevention strategies and highlight the need for appropriate management and rehabilitation protocols

References

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[2]Ekstrand, J., Bengtsson, H., Waldén, M., Davison, M., Khan, K. M., & Hägglund, M. (2022). Hamstring injury rates have increased during recent seasons and now constitute 24% of all injuries in men's professional football: The UEFA Elite Club Injury Study from 2001/02 to 2021/22. *British Journal of Sports Medicine*, *57*(5), 292–298.

[3]Verrall, G. M., Kalairajah, Y., Slavotinek, J. P., & Spriggins, A. J. (2006). Assessment of player performance following return to sport after hamstring muscle strain injury. *Journal of Science and Medicine in Sport*, *9*(1–2), 87–90.

[4]Hickey, J., Shield, A. J., Williams, M. D., & Opar, D. A. (2014). The financial cost of hamstring strain injuries in the Australian Football League. *British Journal of Sports Medicine*, *48*(8), 729–730.