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Challenges in Isokinetic Testing of the Ankle and Subtalar Joint in Football Players: A Scoping Review

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ADMINISTRATIVE INFORMATION

Support - IGA of Palacky University.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 March 2025 and was last updated on 14 March 2025.

INTRODUCTION

Review question / Objective OBJECTIVE: The PCC was used to develop the review question: The scoping review aims to examine the methodological challenges and variations in isokinetic testing protocols (Concept) for assessing the ankle and subtalar joint (Context) in football players (Population). Specifically, it will explore differences in sample characteristics, familiarization procedures, testing positions, and protocols, identifying key methodological inconsistencies and considerations for optimizing isokinetic assessments in this population.

REVIEW QUESTIONS:
1. What are the common sample characteristics considered in isokinetic testing of the ankle and subtalar joint in football players, including age, sex, performance level, and limb dominance assessment?

2. What familiarization and warm-up procedures are commonly used before isokinetic testing, and how do their specifications (method, duration, intensity) vary across studies?

3. What are the methodological differences in testing positions used for isokinetic assessment of the ankle and subtalar joint in football players, including trunk and limb positioning, fixation methods, range of motion, and verbal encouragement?

4. What are the most common testing protocols used for isokinetic strength assessment of the ankle and subtalar joint in football players, considering velocities, contraction modes, movement patterns, repetition numbers, and rest intervals?.

Background Football is one of the most popular sports in the world (Griffin et al., 2020; Lakshakar,

Sathe, Sathe, & Kumar, 2022). The players perform movements with high intensity, including rapid acceleration, deceleration, directional changes, and kicking, all with significant demands on the ankle joint strength and stability (Isbilir, Zuša, Oral, & Cabuk, 2015). Unfortunately, ankle injuries are prevalent in football players. They often occur during directional changes, landings, and contact situations. The most frequent ankle injuries are lateral sprains (77%), primarily affecting the anterior talofibular ligament (73%), typically due to a sudden outward ankle movement with the foot remaining inward (Lakshakar et al., 2022). One of the key procedures that can improve the prevention of ankle injuries in football players is muscle strength testing of muscles related to ankle joint movements. Isokinetic dynamometry is considered a gold standard in this area (Dvir & Müller, 2020). Although this method is widely used in clinical and research settings, the standardization of testing protocols to enhance the reliability and ecological validity of the results is still unclear.

Rationale Because ankle injuries are common in football players and may affect their performance as well as long-term health, there is a strong need to set some prevention strategies to minimize the injury rate (Lakshakar, Sathe, Sathe, & Kumar, 2022; Subramanian et al., 2021). The strength of muscles providing ankle movements may play an important role in ankle injury occurrence. However, the effect of ankle joint muscle strength on ankle injury incidence is not entirely clear (Liu, Delaney, & Kaminski, 2022). It can be associated with a lack of standardized protocol for ankle strength isokinetic measurement (Gouveia et al., 2023). There are many factors that researchers have to consider when conducting reliable measurements, such as positioning and fixation, velocities, muscle action types, as well as familiarization prior to the testing (Liu, Delaney, & Kaminski, 2022).

METHODS

Strategy of data synthesis Databases to be searched: MEDLINE, Scopus, and Web of Science. Strategy for search in all databases: (football OR soccer) AND (isokinetic*) AND (ankle OR plant* OR dors* OR eversion OR inversion). Only the Article document type will be included.

Eligibility criteria Articles focusing on football players of any age, sex, or competitive level (youth, amateur, or professional) will be included. Only research involving isokinetic testing specific to the ankle and subtalar joints performed using an isokinetic dynamometer will be evaluated.

Source of evidence screening and selection In the first phase, two reviewers will perform title and abstract screening independently using pre-defined eligibility criteria. A third reviewer will resolve disagreements. Similar procedures will be used for full-text screening to assess the articles that passed the first phase. The wrong population and lack of isokinetic assessment of the ankle are reasons for document exclusion at this stage. Review articles will be excluded.

Data management The bibliographic details of the studies, characteristics of the study population, isokinetic testing protocols, and reported outcomes will be systematically summarized using Microsoft Excel. Additionally, thematic coding will be employed to analyze specific data.

Reporting results / Analysis of the evidence The analysis of the evidence will be performed using a thematic synthesis to identify sample characteristics and variations in methodological approaches in isokinetic testing protocols related to ankle and subtalar joints in football players. A narrative synthesis also will highlight areas of inconsistency. Where applicable, a descriptive numerical summary will present the frequency and types of methodological issues.

Presentation of the results A PRISMA flow diagram will be used to illustrate the study selection process. The results of the scoping review will be presented using a combination of narrative synthesis, tables, and graphs, including information on testing positions, familiarization procedures, angular velocities, sample characteristics, etc. The synthesis will highlight gaps in the current literature and suggest areas for future research to optimize isokinetic testing protocol for ankle and subtalar joints in football players.

Language restriction There is no language restriction.

Country(ies) involved Czech Republic.

Other relevant information None

Keywords Soccer; Strength; Foot; Injury; Testing methodology.

Dissemination plans The findings of this scoping review will be disseminated by submitting the completed review for publication in selected peer-reviewed journals focused on sports science. In addition, the results will be presented at international conferences.

Contributions of each author

Author 1 - Lucie Musialova - Drafted concept, research design, data collection, data analysis and data reporting and dissemination.
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