INPLASY

Video-based analysis of muscles injuries in Professional Football: A Systematic Review with Meta-analysis

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ADMINISTRATIVE INFORMATION

INTRODUCTION

*R*eview question / Objective This systematic review aims to investigate the mechanism inciting the muscle injury through video analysis in professional football players. Additionally, to explore situational patterns factors underlying muscle injury. To this end, the proposed systematic review will address the following question: What are the main outcomes that are commonly recorded through video analysis when an muscle injury occurs in the lower extremity in football players during competition matches?

Rationale Muscle injuries is a common injury for a football (soccer) player (1). Specifically, muscle injuries represent 31% of total injuries with about 0.6 muscle injuries per player each season (2). Despite efforts by researchers and clinicians to mitigate the risk of muscles injuries, this type of injuries might be increasing at a rate of 2.3% per year (3), due with the greater physical demands of football over the last several decades (4). In addition, the prevalence of muscles injuries, frustration can be intensified by a high risk of reinjury at a rate of 12–31% (2,5,6). Understanding the mechanisms leading to an injury is an essential step in injury prevention (7). Video analysis has been the valid instrument (8) used to analyse and describe the injury context and the kinematics of injuries (9-11). Some video analysis studies have been published investigating mechanisms and situational patterns muscles injuries sustained by male football players during match competition (12-15). Although these studies are well performed, differences in the number, and level of play of the players included in these studies along with disparity in geographical region and data collection procedures may have clouded the current understanding of the mechanisms and situational patterns muscles injuries in professional males football players. Altogether results in a lack of knowledge about which are the main

characteristics that evoke muscles injuries in this population. On this wise, it is important to understand the inciting situation in which the injury occurred, and the methodology involved in the outcomes' collection. To the authors' knowledge, there is no published or recorded review dealing with the analysis of the mechanism and situational pattern of muscle injury recorded by video analysis in professional football players. This will help to optimize the design of physical tests, and prevention and rehabilitation programs.

Condition being studied The present systematic review will address the situations and mechanisms that lead to muscle injuries focused on the mechanism type injury, the situational pattern how mucle injury occur and contextual factors. Regarding mechanism type injury, we will consider if the injury has been suffered without contact, with indirect contact or direct contact, and the task inciting the muscle injury. Regarding situational pattern factors of muscle injuries, in hamstring, quadriceps, adductor, and calf muscles will be covered. Regarding contextual factors, the distribution of muscle injury across the match, season, pitch location, and player characteristics will also be considered.

METHODS

Participant or population The present systematic will include professional football players.

Intervention The studies will have to include muscle injured football players. Specifically, their injuries must have been recorded through the video.

Comparator No applicable.

Study designs to be included The design of the articles included will be a video-based analysis of injury context/mechanism/event.

Eligibility criteria Based on the PEO strategy (16), it will be as follows:
- Population: Football players from 18 years onwards.
- Exposure of interest: Mechanisms/contexts/ events inciting muscle injury.
- Outcome. Video-based analysis.
Exclusion criteria:
- Articles are written in other languages than English or Spanish.
- Articles that are reviews or case reports.
- Articles were excluded if another football code instead of soccer was investigated.

- Articles were excluded if another method instead of video analysis was used for recording muscle injury context.

Information sources The databases that will be used in the present systematic review will be PubMed, Scopus, Embase, SPORTDiscus and Web of Science. Additionally, a complementary manual search will be performed on the references list from the systematic review on the topic to avoid missing potential eligible articles.

Main outcome(s) The main outcomes of the review will be the situations and mechanisms that lead to muscle injuries focused on the mechanism type injury (i.e., no contact, indirect or direct contact and the task inciting injury), the situational patterns how muscles injures occur (i.e., kinetic chain, kicking)) and contextual factors (i.e., position, distribution across the match, season, and pitch location) analyzed through video. We will register these outcomes through the different methods employed by the articles. Nonetheless, if an article provides two methods for the same outcome, the one most used by the studies will be selected.

Quality assessment / Risk of bias analysis The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist extension, and the STROBE Sports Injury and Illness Surveillance (STROBE-SIIS) will be employed to assess the risk of bias of the studies included (17).

Strategy of data synthesis Descriptive statistics and frequency distributions of the outcomes will be reported. Subgroup analysis will be performed on the contextual factors previously mentioned.

Subgroup analysis Subgroup analyses will be performed through meta-regression analysis if the number of studies available for each outcome is higher than 10, as recommended by Borenstein et al. (18). If not, subgroup analysis based on the median score will be averaged. Subgroup analysis will be performed on the contextual factors previously mentioned.

Sensitivity analysis Independent reviewers conducted data extraction, and inconsistencies were resolved by consensus. Extracted data included name of the first author and year of publication, design of the included studies, and the level of evidence. In terms of characteristics of participants, data such as sample size, country of football players, competitive level, and type of muscle injury. Heterogeneity will be evaluated

using the I2 statistic, which represents the percentage of total variation across all studies due to between-study heterogeneity. All statistical analyses will be carried out using the statistical software package R V.2.4.1 (The R Foundation for Statistical Computing) and the 'metafor' package.

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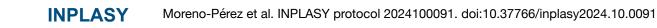13. Klein C, Luig P, Henke T, et al. Nine typical injury patterns in German professional male football (soccer): a systematic visual Video analysis of 345 match injuries. Br J Sports Med. 2021;55:390-396.
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