

The Effect of Playing Position on Injury Risk in Male Soccer Players: Systematic Review of the Literature and Risk Considerations for Each Playing Position

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Take-Home Points

- Playing positions haven't been extensively evaluated as an injury risk factor in elite, non-elite, and youth soccer (football).
- Different playing positions may have different injury rates and patterns due to different load, different movement patterns, and peculiar combination of anticipated and non-anticipated (reactive movements).
- The existing literature suggests that goalkeepers seem to be at lower general injury risk if compared to outfield players in male soccer (football).
- There is also a tendency towards strikers (forwards) to be at higher risk of match (but not training) injuries. This result is however not consistent between all the studies considered and should be interpreted cautiously.
- When studying injury risk in male soccer match and training injuries should be considered separately and playing position should be evaluated as a potential predictor of injury incidence.

Soccer, known worldwide as football, is the most common practiced sport worldwide. Soccer is also a complex contact sport with a substantial injury risk,¹ that is well documented in the current literature. According to a recent systematic review, general injury incidence in male soccer ranged from 2.0 injuries to 19.4 injuries per

1000 hours of exposure in youth male soccer and from 2.48 injuries to 9.4 injuries per 1000 hours of exposure in elite male soccer.¹ It is also well established that the injury risk is greater in matches than training.¹ Soccer's injuries are well known to be a socioeconomic burden for elite, youth, and recreational players.² Different authors have underlined the problem that nowadays the game is faster, and players need to have a better physical performance as they are subjected to important efforts both metabolically and biomechanically during match play. In the last decades, thanks to different research groups involved with professional soccer,³ there has been an increasing interest in soccer injuries' epidemiology and for preventative measures.⁴ A deep comprehension of injury epidemiology is in fact the first necessary step for successful preventative measures. Regarding a possible correlation between playing position and injury incidence, there is a lack of consensus in the literature. Player position (goalkeeper [GK], defenders, midfielder [MF], or striker) may affect injury risk, as different roles are associated to different intensity during match play⁵ and experience different combination of anticipated or non-anticipated movement patterns.⁶ Previous authors underlined that few studies have evaluated a possible influence of playing position on injury incidence and severity.⁷

The main goal of this systematic review is to present the existing evidence regarding the influence of player position on injury incidence in male soccer and to present practical considerations on each field position in relation to the injury's risk.

Methods

Data Sources and Selection Criteria

We searched the Medline database for key terms and their variations to identify appropriate studies on injury epidemiology in soccer and specific player position influence. The keywords included: injury epidemiology soccer [OR] injury epidemiology football; position specific injury epidemiology soccer [OR] football. We limited our search to originally published English-language research articles.

Relevant data were extracted for study characteristics to ensure the included studies met certain criteria. The inclusion criteria were prospective design with minimum 6-month observational period, exclusively male soccer players' cohorts, reported injury incidence, and documented player position in correlation with a measure of injury risk.

As stated above, we only included studies on male soccer. We also did not consider studies limited to a single injury type, considering only studies analyzing and documenting all injuries. We did not exclude studies on youth soccer but we didn't consider studies on ≥ 2 more sports or mixed male and female studies.

Data were extracted by an author (FDV) and qualitatively controlled by another one (BM). Controversy were solved through discussion or confrontation with another author (LL).

Results of the included studies are presented only qualitatively because of different methodologies we encountered in documenting the potential effects of player's role. Some studies reported differences in injury incidence within groups, others reported the proportion of injuries for each subgroup.

Results

Study Selection

Of the 1609 potential items we found in the existing literature, 102 full-text articles were screened for eligibility. Only 11 papers met the inclusion criteria and were included in the systematic review, including 2 studies on youth soccer and 9 studies on adult soccer (**Figure 1**). Five of the selected studies tracked only match injuries, while the remaining 6 studies presented data on both match and training injuries. As a matter of fact, the effect of player position was not so commonly evaluated or at least reported in the existing literature. Studies' characteristics and main findings regarding player's position are reported in **Table**.

General Injury Risk and Playing Position

Of the 11 studies included for qualitative synthesis, 5 studies reported no significant effect of player's position on general risk of injury,⁷⁻¹¹ 3 studies reported a greater risk in forwards,¹²⁻¹⁴ 1 study reported a greater risk in MFs,¹⁵ 1 study reported a greater risk in forwards and central defenders,⁸ and finally 1 study reported a significant lower risk in GKs.¹⁶ Additionally, 2 more studies reported GKs to be at the lowest injury risk,^{12,13} another study reported GKs to have lost the lower number of matches,⁸ 1 study didn't consider the GK position in the analysis due to the low number of injuries,¹⁷ limiting the analysis on the outfield positions.

Out of the 5 studies reporting no significant effect of playing position on injury risk, 1 study found a tendency to more injuries in forward players,¹⁰ a second study found a tendency for higher injury risk in midfielders,¹⁸ and a third study found a tendency for higher risk in defenders.¹⁷ Considering only the 5 studies reporting data on match injuries, 3 reported a higher risk in forwards,¹²⁻¹⁴ while a fourth one reported a tendency for increased risk in forwards¹⁰ even if not statistically significant. On the other hand, evaluating the 6 studies reporting data on match and training injuries, most of the studies, 4 out of 6, reported no effect of playing position.¹⁷⁻²⁰ The main findings of the studies are also expressed graphically in **Figures 2A, 2B**.

Discussion

The main finding of this study is that there is substantially no agreement regarding the effect of player position on general injury risk in male soccer.

First, we must underline that not many studies have evaluated prospectively the influence of player's position on injury risk. Of the 11 selected studies, 5 (5/11) reported no significant effect of playing position,^{7,10,17,18,20} while the remaining studies (6/11)^{8,12-16} reported a significant effect of player position on the risk of injury, with various results depending on the single study. It should be noted that the 2 studies with the longest observational period (15 consecutive seasons)^{16,19} did not report any difference in injury risk considering only the outfield playing positions.

We will now review the findings of our systematic review based on player position. One of the more consistent trends that we found is the possible occurrence of different injury epidemiology in GKs compared to outfield players. One study reported a significant lower incidence of match injuries for GKs, 12.9 injuries per 1000 game hours vs 22.6 injuries per 1000 game hours of outfield positions.¹⁶ This result is remarkable, even considering the very long observational period (15 seasons). Other 2 studies, not reporting position specific injury incidence (but

proportion of injuries) also agreed on the topic.^{12,13} On the other hand, Morgan and Oberlander⁹ reported no differences between GKs and other positions. Anecdotally, unpublished Major League Soccer data regarding the most recent seasons seems to support these findings with GKs sustaining the lower proportion of injuries. By a physiological point of view, somatotype and body composition have been reported to differ between GKs and the other playing positions in young male soccer players.²¹ The uniqueness of the GK somatotype and role may reflect on a predisposition to a different pattern of injuries. Ekstrand and colleagues²² reported that GKs have a higher incidence of upper extremity fractures, the same group demonstrated a possible tendency for more head and neck injuries⁹ and a lower risk of medial collateral ligament injuries.²³ On the other hand, GKs seems to be at lower injury risk for the playing pattern differences with outfield players. The reduced distance GKs cover during the match, as well as less direct contacts with opponents, may be factors that potentially explain this finding.

In relation to forwards, 4 studies interestingly stated that forwards were at increased risk of injury,¹²⁻¹⁴ although 1 report had similar risk of injury with forwards and defenders.⁸ Most of the studies only on match injuries reported some association between forward position and injury risk (Figures 2A, 2B), so attackers may be at higher risk of match injuries when compared to the other playing positions. There are different possible explanations for this finding. First, it is demonstrated that the clear majority of soccer incidents happen in the mid-defensive zone and in the score-box,²⁴ 2 typical attackers' zones, where most of duels and tackles may happen. So, forwards may be more prone to match injuries because of the intensity of match play in their typical playing zones. Also, fast kicking and acceleration/deceleration activities of the attackers may predispose for thigh muscle injuries, accounting up to 25% of the total lay off time in professional soccer.²⁵ However, these considerations are still yet to be proven.

When considering defenders, 1 report indicated defenders (and forwards) to be at potential greater risk of injury,⁸ which is similar to the report from Shalaj and colleagues,¹⁷ although it did not report a statistically significant result. A direct playing style, with defenders and strikers being more involved in the game can potentially explain this finding. However, the specific epidemiology of defenders may be more complicated. Defenders may be predisposed to knee injuries, such as injury to the anterior cruciate ligament (ACL). In fact, Walden and colleagues,¹¹ in a video-analysis study, reported that the 77% of ACL injuries happened in defending situations. In addition, Brophy and colleagues,⁶ in another video-analysis study, reported a 73% of ACL injuries happened while defending. A likely explanation is the nature of the defender's role in soccer, reactive to the attacking team actions. Many times, defenders try high risk maneuvers while tackling the opponent, with minimal motor planning time and consciousness. This is well described by Walden and colleagues,¹¹ with the pressing mechanism ACL injury, when the injured player is pressing the opponent in the attempt to get the ball but eventually falls into a high-risk position.

When considering MFs, Deehan and colleagues¹⁵ found a significant higher risk in MFs in youth soccer. This result is partially according to Morgan and Oberlander¹⁸ who reported a non-statistically significant greater injury incidence in MFs. MFs are generally the players that cover more distance during a soccer match and it is logical to think that they would be predisposed to a large volume of acceleration/deceleration activities,¹⁹ potentially relating to injury risk, especially to muscles injuries. A previous study on thigh muscle injuries in youth soccer reporting higher injury risk in MFs, followed by forwards.¹⁹ Consistent with these results, another study on a mixed male and female cohort on high school soccer revealed more injuries in MFs, followed by forwards²⁶

The results of this systematic review reveal mixed reports on injury risk in relation to playing position, the more consistent results through studies was that GKs may be at lower injury risk compared to the outfield players, even if there wasn't complete agreement. One should note that in modern soccer the specific role of any player at 1 position may not be entirely consistent with another player in the same position. Within the same "position group", there may also be players with completely different qualitative playing demands (eg, wing defender and central

defender). So, even with the strongest study design, it may be difficult to give a simple and clear message about playing position and injury risk due to the variability of the playing styles and players at each position.

This study has several limitations and the results must be considered and interpreted with caution. First, we limited our search to male soccer, so the results may not be applicable to female soccer. Secondly, the interpretation of study findings wasn't easy because of the different report modalities of the different papers included in the systematic review. Finally, we included reports from a total of a 23-year time span and from different countries and continents. The game may have evolved through years and there may be differences in the style of playing within countries that potentially could interfere with injury risk.

However, this is the first paper systematically evaluating the existing literature on position specific injury risk in male soccer players. Future studies, with prospective design and a consistent method to evaluate the player position as a potential factor related to injury risk, are needed. Match and training injuries should be evaluated separately as playing position may be more related to match injury risk.

Conclusion

There is no agreement in the existing literature regarding whether or not player position influence the general injury risk in male soccer. The GKs may have a lower risk of injury if compared to outfield players.

Key Info

Figures/Tables

Figures / Tables:

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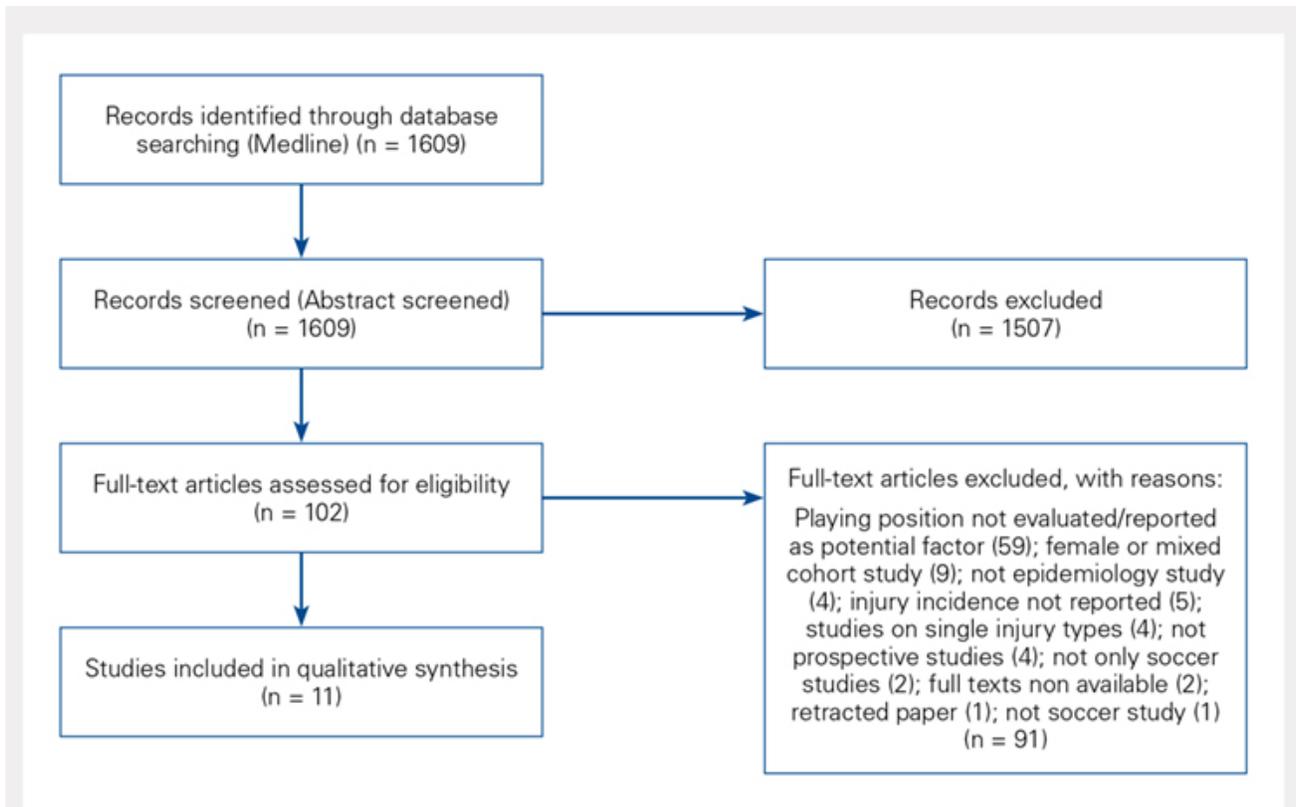
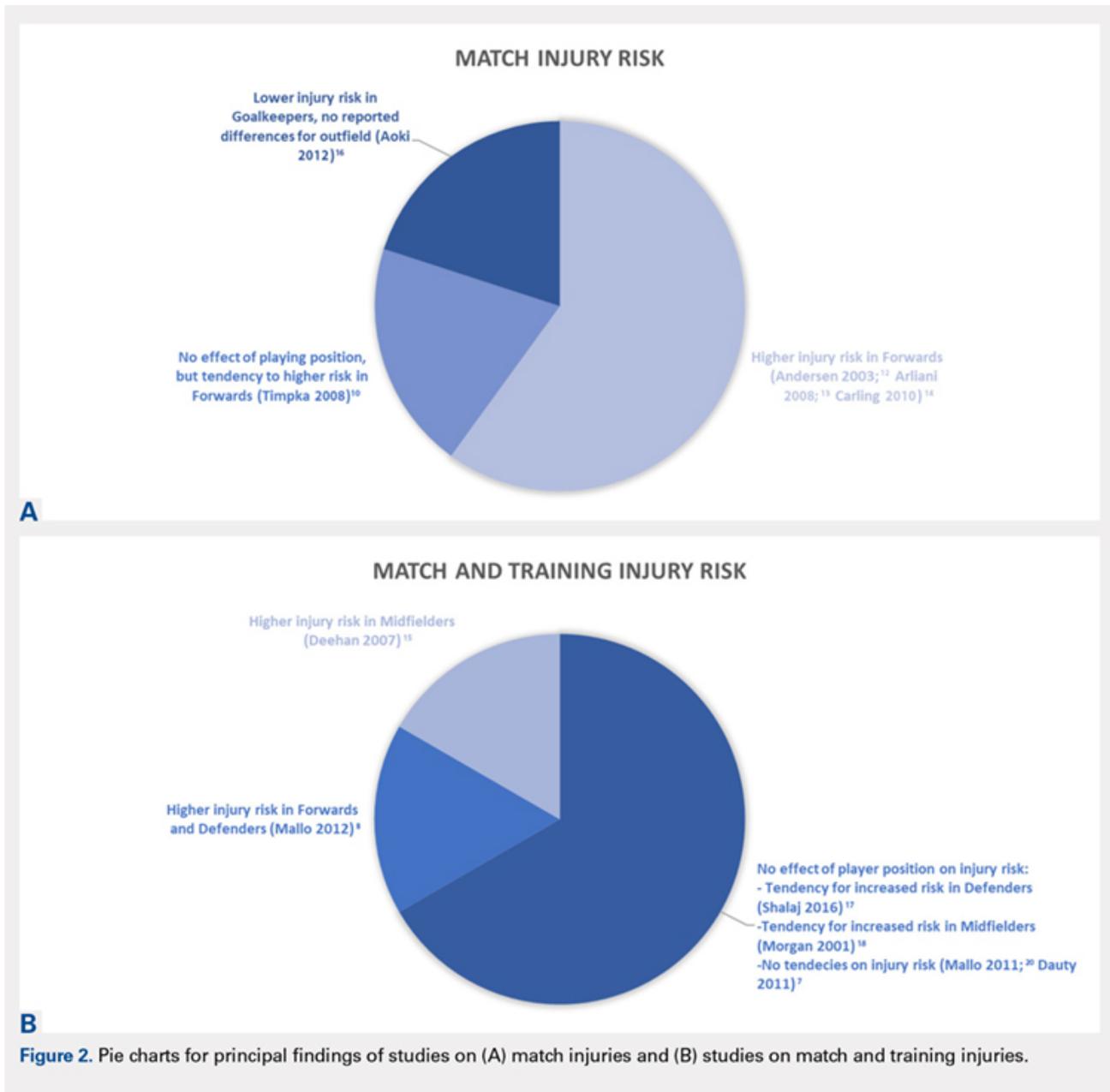


Figure 1. Flow chart of study selection.

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Table. Characteristics and Main Findings of the Studies Included in the Systematic Review

Author	Year of publication	Region	No. of teams	No. of players	Age (mean)	Level	Injury type (all/specific)	Match/Training	Observational period	Incidence	Main findings related to player position
Andersen et al ¹²	2003	Europe (Norway)	14	330	Not reported	Elite	All injuries	Match	1 season (2000)	21.5 injuries per 1000 h	Strikers (Forwards) appeared to be at greater risk/Goalkeepers less involved
Aoki et al ¹⁶	2012	Asian	Not reported	Not reported	Not reported	Elite	All injuries	Match	15 seasons (1993-2007)	21.77 injuries per 1000 h	Goalkeepers had lower injury risk than field players for overall injuries 12.92 (10.99-15.09) vs 22.66 (21.82-23.52)
Arliani et al ¹³	2018	South America	Not reported	Not reported	Not reported	Elite	All injuries	Match	1 season (2016)	21.32 injuries per 1000 h	Forwards sustained the greatest proportion of injuries. Goalkeepers the lowest.
Carling et al ¹⁴	2010	Europe (France)	1	Not reported	Not reported	Elite	All injuries	Match	4 seasons (2005-2009)	40.8 injuries per 1000 h	Forwards had higher injury incidence
Dauty & Collon ⁷	2011	Europe (France)	1	173	Not reported	Elite	All injuries	Match and Training	15 seasons (1995-2009)	0.47 injuries per 1000 h	No difference according to player position
Mallo & Della ¹⁸	2012	Europe (Spain)	1	35	21,4	Elite	All injuries	Match and Training	Two seasons (2007-2008)	6.6 injuries per 1000 h	Forwards and Central Defenders sustained more injuries
Mallo et al ¹⁹	2011	Europe (Spain)	1	Not reported	24,8	Sub-Elite	All injuries	Match and Training	4 seasons (2003-2006)	10.9 injuries per 1000h	No effect of playing position on injury incidence. Goalkeepers lost the lowest numbers of matches
Morgan & Oberlander ¹⁸	2001	North America (USA)	10	237	27	Elite	All injuries	Match and Training	1 season	6.2 injuries per 1000 h	No effect of playing position on injury incidence/Midfielders non-significant trend to more injuries
Shalaj et al ¹⁷	2016	Europe (Kosovo)	11	143	23,2	Elite	All injuries	Match and Training	1 season (2013)	7.3 injuries per 1000 h	Injury incidence is not statistically different from playing positions, trend for more injuries in defenders (7.7 injuries per 1000 h vs 7.3 of midfielders and forwards)/ Goalkeepers excluded from the analysis for the low number of injuries.
Timpka et al ¹⁹	2008	Europe (Sweden)	93	1800	13 to 16	Youth Elite	All injuries	Match	1 season (2001)	2.4 injuries per 1000 h	No statistically significant effect. Tendency to increased risk in Forwards (odds ratio, 1.45)
Deehan et al ¹⁵	2007	Europe (UK)	Not reported	210	13,5	Youth	All injuries	Match and Training	5 seasons (1999-2004)	0.6 injuries per player per season	Midfielders had greater risk of injury compared to the other roles

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