Injury rate in professional football: A systematic review

Mirza Ibrahimović a, Emir Mustafović b, Denis Čaušević a,*, Haris Alić a, Eldin Jelesković a, Munir Talović a

a Faculty of Sport and Physical Education, University of Sarajevo, Sarajevo, 71000, Bosnia and Herzegovina
b Football Club Sarajevo, Academy FC Sarajevo, Sarajevo, 71000, Bosnia and Herzegovina
*Corresponding Author Email: denis.causevic@fasto.unsa.ba
DOI: https://doi.org/10.34256/ijpefs2126
Received: 03-05-2021, Revised: 28-05-2021; Accepted: 03-06-2021; Published: 06-06-2021

Abstract: The goal of this paper is to determine the injury frequency rate in professional football players in leagues and national competitions by analyzing existing papers. We have chosen 21 articles according to the PRISMA method from the Google Scholar, ResearchGate, Scopus, and Web of Science databases that fit both inclusion and exclusion criteria. We have discussed the following four segments based on the content of the selected papers: 1) An analysis of the injury frequency rate on the level of national teams, 2) An analysis of the injury frequency rate in club leagues, 3) A comparison of the injury frequency rate in matches and in practice, and 4) An analysis of the injury frequency rate in male versus female football players. The paper concludes that major national team tournaments have the highest injury frequency rate and that the probability of injury is four to five times higher in a match than in practice. The injury frequency rate in female players is lower than in male players regardless of the type of competition (national teams or leagues).

Keywords: Injuries in football, Injury frequency, Injury rate, Professional football players

Mirza Ibrahimović, MA is currently a Ph.D student in Kinesiology. Currently, he works as a Teaching Assistant at the Faculty of Sport and Physical Education, University of Sarajevo. Award-winning student by the Rector of University. His current research focused on Football, Volleyball, Sport performance, Physical Education and conditioning in football (soccer).

Mustafović Emir, MA is a Ph.D student at Faculty of Sport and Physical Education on University of Sarajevo, Bosnia and Herzegovina. Master in injury prevention in football. Works as Strength and Conditioning coach in FK Sarajevo U19 team. Part of scientific team of Faculty of sport and Physical education in Sarajevo. Interested in areas of strength and conditioning, injury prevention, monitoring and managing of training loads in football (soccer).

Dr.sci. Denis Čaušević, received Ph.D in Kinesiology. Currently, he works as a Teaching Assistant at the Faculty of Sport and Physical Education, University of Sarajevo. He is also an Associate Editor of International Journal “Homosporticus”, and reviewer of several Sport Sciences Journals. His current research focused on Basketball, Football, Sport performance, Training, Physical Education and Sport. nator of Motor Control Research Laboratory at TWU Dallas.

Prof.dr. Haris Alić, currently, he works as a Associate Professor and Dean at the Faculty of Sport and Physical Education, University of Sarajevo. Author of five books and over 50 scientific and professional papers. He is educator at UEFA programs at Education center in Football Federation of Bosnia and Herzegovina and he holds UEFA A Licence. His current research focused on Training,
The specificity of injuries, definition of injury, sport demands and posture control. The term “injury” is important secondary thing in football. During the match, the player is about which the player will not be able to perform football activities [6]. A large number of injuries can directly impact the results of the team [7]. 82.9% of injuries in football players fall under the lower extremities, of which 68.5% are acute injuries, and the riskiest injuries in terms of missing time are knee injuries, while muscle and tendon injuries are the most common injuries of the lower extremities [8]. An interesting difference can be observed in Dutch football, where more injuries among amateurs occur in practice, while more injuries among professionals occur in matches [9]. A high degree of risk is present in professional [10], amateur [11], and youth [12] football. Strength and proprioception training have a significant influence on injury prevention in football [13-18], as do balance exercises, neuromuscular control, and posture control exercises [19]. Some of the most popular comprehensive prevention programs for football players are FIFA 11+ and HarmoKnee [20, 21]. The latest research has also shown that muscle injuries of the lower extremities are successfully prevented by additional eccentric strength exercises [22], and this type of exercise can also lead to an improvement in jumping ability and linear speed [23]. This type of training should be performed at the start of the week, given how eccentric exercises create ruptures in muscles, which can influence game performance [24]. Gender does not have a significant impact on injury prevention, even if anatomical differences between genders are the cause of different anatomical locations of injuries, as well as the specificity of injuries [25]. In general, the number of injuries in men and women is decreasing over time [26, 27].

The paper aims to analyze existing papers and determine the injury frequency rate in professional football players in leagues and national team competitions.

2. Methods

The paper is designed as a review according to the PRISMA method [28]. The following databases have been searched: Google Scholar, ResearchGate, Scopus, and Web of Science indexed journals. The following keywords have been used while searching for papers, „injuries in football,” „injury frequency in football,” and „epidemiology of injuries in football.” During the selection of the papers for analysis, only papers published in the last ten years (2010-2020) have been considered (21 total articles). Three criteria were used for the inclusion of papers: it is about football, it is about professional football players, and it discusses injury prevention.
frequency. The following exclusion criteria were used: amateur and youth football, not original papers, researching other aspects of injuries - not frequency, review articles.

3. Results and Discussion

Based on Figure 1, we can see that 21 papers have been used for results analysis (Table 1). All of them have fulfilled the inclusion criteria and were considered for the processing of results.

The papers have been published in various scientific magazines, and they can be found in indexed databases. By analyzing Table 2, we can conclude that the papers had similar goals, but they differ in the types of competitions and the countries where the competitions take place.

Injuries have been an integral and indispensable part of football since its inception, and they remain just that even today in modern football. They have a huge impact on team quality because they can knock players out of action for a longer or shorter period of time, depending on the severity of the injury, which directly affects the team's performance on the field and results [49]. By analyzing papers that have fulfilled the inclusion criteria, we have concluded that the injury frequency rate in male and female football players is the highest in major national team tournaments [29, 30, 32]. Multiple factors influence such a high number of injuries in national team competitions: fatigue based on studies by Gaulrapp [48] and Lehneret et al. [50]), quality of the field and of the officiating, especially in competitions in Africa based on studies by Akodu et al. [31], and the significance and the fatigue of players during those matches.

A significantly lower number of injuries, as far as national team competitions go, was recorded in the 2016 European Championship in France [33]. On the other hand, club league competitions have a significantly lower injury frequency rate [34, 8, 47]. A somewhat higher injury frequency rate was recorded in the Italian Serie A [44].

This data is not surprising if we consider that this league has a decades-long reputation for being rougher than the rest and that the defensive aspect is a key part of the strategy. The importance of officiating in matches is once again highlighted as an important indicator of the frequency of injury.
| No | Title                                                                 | Year   | Authors                | Journal                                      |
|----|----------------------------------------------------------------------|--------|------------------------|----------------------------------------------|
| 1  | Injury surveillance in the world football tournaments 1998-2012       | 2013   | Junge and Dvorak       | British Journal of Sports Medicine           |
| 2  | Epidemiological study on professional football injuries during the 2011 Copa America | 2013   | Pedrinelli et al.      | Revista Brasileira de ortopedia              |
| 3  | Incidence and characteristics of injuries during the 2011 West Africa Football Union (WAFU) Nations Cup | 2012   | Akodu et al.           | African Journal of Medical and Health Sciences |
| 4  | Football injuries during the 2014 FIFA World Cup                      | 2015   | Junge and Dvorak       | British Journal of Sports Medicine           |
| 5  | Injury study report-EURO 2016 France                                  | 2016   | Ekstrand               | UEFA                                         |
| 6  | Epidemiology of injury in English professional football players: a cohort study | 2018   | Jones et al.           | Physical Therapy in Sport                    |
| 7  | Injuries in professional male soccer players in the Netherlands: a prospective cohort study | 2015   | Stubbe et al.          | Journal of Athletic Training                 |
| 8  | Injury incidence of a Spanish elite female Soccer team during a competitive season: A case study | 2014   | Mallo                  | JMED Research                               |
| 9  | UEFA elite club injury study Season 2012/2013 report                 | 2013   | Ekstrand               | UEFA                                         |
| 10 | UEFA elite club injury study Season 2013/2014 report                 | 2014   | Ekstrand               | UEFA                                         |
| 11 | UEFA elite club injury study Season 2014/2015 report                 | 2015   | Ekstrand               | UEFA                                         |
| 12 | UEFA elite club injury study Season 2016/2017 report                 | 2017   | Ekstrand               | UEDA                                         |
| 13 | Injury profile of a professional soccer team in the premier league of Iran | 2010   | Hassabi et al.         | Asian Journal of Sports Medicine             |
| 14 | The incidence of injuries and exposure time of professional football club players in the Premier Soccer League during football season | 2016   | Calligeris et al.      | South African Journal of Sports Medicine     |
| 15 | Epidemiology of football injuries in Asia: A prospective study in Qatar | 2012   | Eirale et al.          | Journal of Science and Medicine in Sport     |
| 16 | Injuries in professional male football players in Kosovo: a descriptive epidemiological study | 2016   | Shalay et al.          | BMC Musculoskeletal Disorders                |
| 17 | Epidemiology of football(soccer) injuries in the 2012/2013 and 2013/2014 seasons of the Italian Seria A | 2016   | Falase et al.          | Research in Sports Medicine: An International Journal |
| 18 | An examination of injuries in Spanish Professional Soccer League      | 2014   | Salces et al.          | The Journal of Sports Medicine and Physical Fitness |
| 19 | Incidence of injuries among professional football players in Spain during three consecutive seasons: A longitudinal, retrospective study | 2019   | Gijon-Nogueron et al.  | Physical Therapy in Sport                    |
| 20 | Incidence of Injuries in French Professional Soccer Players           | 2011   | Dauty and Collon       | International Journal of Sports Medicine     |
| 21 | Injuries in Women's Soccer: A 1-Year All Players Prospective Field Study of the Women's Bundesliga (German Premier League) | 2010   | Gaulrapp et al.        | Clinical journal of sports medicine: official journal of the Canadian Academy of Sports Medicine |
Table 2 A list of papers with their goals, results, and conclusions

| No | Authors | The goal of the paper | Results | The conclusion of the paper |
|----|---------|-----------------------|---------|-----------------------------|
| 1  | Junge and Dvorak, 2013 [29] | Analyzing the frequency, characteristics, and changes in injuries in football players in World Cups since 1998 | A total of 3944 injuries have been reported in 1546 matches, which means 77.3 injuries in 1000 h of play, or 2.6 injuries per match. The frequency of injuries was lower in women's tournaments compared to men's. | The frequency of injuries in FIFA World Cups had a different trend between 1998 and 2002. The change could have been influenced by the style of play, officiating, and the scope and intensity of play. A strict application of the rules of the match is essential in injury prevention. |
| 2  | Pedrinelli et al., 2013 [30] | To develop a study of injuries in male football players at the 2011 Copa America competition in Argentina | A total of 26 matches have been played over a period of 17 days. Twenty-three matches lasted for 90 minutes, and three have lasted for 120 minutes for a total of 2430 minutes. A total of 26 players were injured for a total of 63 injuries. The result is 2.4 injuries per match. | The vast majority of the results from this study are consistent with the data from other studies on football injuries. The largest number of injuries was related to the lower extremities, and the most common diagnosis was a muscle injury. Most of the injuries were of a milder degree of severity. |
| 3  | Akodu et al., 2012 [31] | An estimate of the frequency and the characteristics of injuries during the 2011 WAFU Cup | Eighteen injury reports for nine matches have been completed and delivered to the research supervisor by physical therapists. Eighty-nine injuries (9.9 injuries per match) have been recorded, which means 289 injuries per 1000 hours of play. | The incidence of injuries during the WAFU Cup was much higher than ever documented in other tournaments, but the injury characteristics were similar. Additional records and analyses of injuries in African football players are needed to fully understand the nature of injuries and implement a prevention strategy in this part of the world. |
| 4  | Junge and Dvorak, 2015 [32] | An estimate of the frequency and the characteristics of injuries during the 2014 World Cup | A total of 104 injuries (1.68 per match) were recorded, i.e. 50.8 injuries per 1000 hours of play. Almost two-thirds of injuries were caused by contact. The most common were the injuries of the lower extremities (68%), followed by head/neck (19%), upper extremities (10%), and stomach (7%). | The overall injury rate decreased by 37% from 2002 to the 2014 FIFA World Cup. While the frequency of non-contact injuries has not changed significantly, injuries caused by contact or fouls have drastically decreased during that period. This may be the result of stricter officiating, as well as a better approach of the players towards fair play. |
| 5  | Ekstrand, 2016 [33] | To analyze the frequency and the types of injuries during the 2016 European Championship in France | Forty-six players have suffered a total of 49 injuries during the tournament. Thirty-nine injuries occurred during matches (80%), and ten injuries have occurred in practice (20%). The injury frequency in practice was 1.6 injuries/1000 h, and the injury frequency in matches was 22.6 injuries/1000 h. | A total of 8500 hours of player exposure was recorded during the tournament, approximately 6800 hours of practice (80%), and 1700 hours of matches, including overtime (20%). The largest number of injuries has been recorded in the group stage of the tournament, 24.1 injuries/1000 h of player exposure. |
| 6  | Jones et al., 2018 [34] | To estimate the current frequency and location of injuries in English professional football | By following 243 players from 10 teams during the 2015/2016 season, a total of 473 injuries have been recorded. That equates to 9.11 injuries/1000 h of football activity. The injury frequency is higher during | The frequency of injuries is significantly higher in matches compared to practice. Also, in the last 16 years, there has been an increase in injuries, and muscle strains are the most common injury. The hamstring is the most commonly injured muscle group. |
| # | Author(s) and Year | Study Description | Frequency and Time of Injury | Notes |
|---|------------------|---------------------|-----------------------------|-------|
| 7 | Stubbe et al., 2015 [8] | To study the frequency and the characteristics of injuries in the Dutch premier football league | Two hundred and seventeen players from eight teams took part in the study. The exposure time was 46.194 hours. A total of 286 injuries were recorded. The total injury frequency was 6.2/1000 h. The injury frequency in practice was 2.8/1000 h and 32.8/1000 h in matches | The risk of injury in the Dutch Football League is high, especially during matches. Preventive measures should focus on the most common diagnoses, i.e., the injuries of muscles and tendons of the lower extremities. |
| 8 | Mallo, 2014 [35] | To study the frequency and characteristics of injuries in elite Spanish female football players during a single competitive season | A total of 39 injuries were recorded during 7695 hours of exposure. The total injury frequency is 5.1/1000 h. The injury frequency in practice is 3.9/1000 h, and it is 14.4/1000 h | This study has shown the frequency and characteristics of injuries of elite Spanish female football players during one competitive season. The highest risk of injury was recorded at the beginning and the end of the season. Injuries to the joint, knee, and thigh were most commonly reported. |
| 9 | Ekstrand, 2013 [36] | The goal is to analyze the frequency of injuries in elite European clubs in the 2012/2013 season | The injury frequency was 3.4/1000 h in practice, and it was 22/1000 h in matches | The exposure of players during this season was 139.939 h (84% practice - 117.578 h, 16% matches - 22.361 h). The injury frequency in matches was almost seven times higher than in practice. |
| 10 | Ekstrand, 2014 [37] | The goal is to analyze the frequency of injuries in elite European clubs in the 2013/2014 season | The injury frequency was 3.4/1000 h in practice, and it was 23.2/1000 h in matches. | The exposure of players during this season was 200.000 h (85% practice - 170.000 h, 15% matches - 30.000 h). The injury frequency in practice has remained consistent, while it has increased in matches. |
| 11 | Ekstrand, 2015 [38] | The goal is to analyze the frequency of injuries in elite European clubs in the 2014/2015 season | The injury frequency was 2.7/1000 h in practice, and it was 20.5/1000 h in matches. | The exposure of players during this season was 175.000 h (86% practice - 150-000 h, 14% matches - 25.000 h). There was a decrease in injury frequency this season, both in practice and in matches. |
| 12 | Ekstrand, 2017 [39] | The goal is to analyze the frequency of injuries in elite European clubs in the 2016/2017 season | The injury frequency was 2.3/1000 h in practice, and it was 19.8/1000 h in matches. | The exposure of players during this season was 170.000 h (85% practice - 145.000 h, 15% matches - 25.000 h). The trend of injury frequency decrease has continued from the season prior. |
| 13 | Hassabi et al., 2010 [40] | The goal of the paper is to determine the frequency of physical injuries in football players in the Iranian league | The players in this study were exposed to 2352 playing hours in practice and 258 playing hours in matches. Forty-three acute injuries were recorded with a total frequency of 16.5/1000 h. The injury frequency was 11.5/1000 h in practice and 62/1000 h in matches. | Data on the frequency of injuries in this paper is within the numbers recorded in international tournaments, but the number of injuries during practice is higher than in other studies. So it can be concluded that it is a priority to find methods to reduce injuries in practice. |
| 14 | Calligeris et al., 2016 [41] | To calculate the injury frequency and time of exposure of players from a South African league team during one entire season | The total injury frequency was 14.4/1000 h. The number was lower in practice (6.6/1000 h) than in matches (88.9/1000 h). The nature of the injuries varies. | The importance of estimating injury frequency and exposure of players playing in a club must not be disregarded. It is necessary to promote a better understanding of risk factors, injury exposure, and prevention measures. |
| p | Authors                  | Year | Title                                                                 | Total injuries | Frequency rate | Seasonal trend | Risk factors | Study implications |
|---|--------------------------|------|-----------------------------------------------------------------------|----------------|----------------|---------------|--------------|-------------------|
| 15 | Eirale et al., 2012 [42] | 2012 | The goal is to study the frequency, characteristics, and patterns of injuries on the club level in Qatar | 217 injuries  | 6/1000 h       | Decreases during the season | High injury rates, thigh and ankle injuries | This research in a professional football club in Asia shows relatively high injury rates and a high rate of thigh muscle injuries. |
| 16 | Shalay et al., 2016 [43] | 2016 | The goal is to record the frequency, types, and severity of injuries in football players in Kosovo | 143 players    | 36.833 h       | Decreases from the beginning of the season to the end | High injury frequency rate, lower extremities | The overall injury frequency among football players in Kosovo is slightly below the European league average. |
| 17 | Falase et al., 2016 [44] | 2016 | The goal is to describe the epidemiology of football injuries in the 2012/2013 and 2013/2014 seasons of Italian Serie A | 272 injuries  | 7.38/1000 h    | Increases during the season | Knee injuries, age of players | Epidemiological studies on the occurrence of injuries are crucial to highlight the risk factors for injury. |
| 18 | Salces et al., 2014 [45] | 2014 | The goal of the study was to study the frequency of injuries in the Spanish professional football league and analyze the differences between practice and matches | 301 players    | 161.602 h      | Increases with time | Position of the players, team performance | Our analyses indicate that Spanish footballers are more susceptible to injuries in matches compared to practice. |
| 19 | Gjon-Nogueron et al., 2019 [46] | 2019 | The goal is to identify risk factors that may be associated with a higher frequency of injuries among elite football players in Spain over a period of three years | 301 players    | 38.8/1000 h    | Increases during the season | Location of the injury, team performance | Our results show differences in the frequency and severity of injuries depending on the position of the players, where attackers have the highest injury rate. |
| 20 | Dauty and Collon, 2011 [47] | 2011 | The goal was to investigate the frequency of injuries in 173 professional players | 217 injuries  | 6.9/1000 h     | Increases during the season | Skill level, team performance | In professional football players, the injury frequency rate did not vary significantly over the 15-season |
A higher rate of injuries in club competition is noticeable in leagues outside of Europe, in the South African Republic [41], and in Iran [40]. In this case, one previously mentioned cause of injury is confirmed, and that is infrastructure, but the financial power of clubs in those countries is also connected given how the budgets and investments of European clubs are by far the highest in the world [51]. A lower injury rate, compared to men, was determined in women’s leagues [48, 35]. This occurrence can be explained by anatomical and structural differences between men and women, but also differences in the volume and intensity of work, which is stated in the research by Ristolainen et al. [25]. Still, just because of the anatomical difference, women have a two to three times higher risk of an ACL injury [52].

In all studies, many times more injuries occurred in matches compared to injuries that occurred in practice [8, 33-43, 45-48]. What is very important in the analysis of these papers is that they were done on a different sample and in different parts of the world, so the results can be generalized. One of the biggest causes of the difference in the rates of injury in matches and practice is the level of intensity that is applied. Practice usually has a lower intensity, recovery practice with players from the same team, so there’s a much higher level of fair play. Also, in the period of a dense schedule when players play 6-7 matches in 20 days, load distribution in practice is considered a prevention factor, as is the application of post-practice recovery methods (cold and hot water) [53]. In the study by Rechel et al., they recommended that protective equipment (shin pads) be used both in matches and in practice [54]. Unlike practice, matches have a much higher intensity, tempo, and charge. Players have much more motivation, they give their all and enter duels without compromise. All of that increases the risk of injury, and when you add a dense schedule of matches that players are commonly exposed to, this piece of data on the difference in injury frequency in matches and in practice becomes much clearer. It is recommended to pay attention to risky muscle regions in warm-up [54], because warm-up is also considered a prevention strategy [55], given that it has been proven that specific warm-up and cooling lower the probability of injury, especially in players with an unstable ankle [56]. What is also significant for injury prevention is the implementation of a targeted prevention program [45], given how implementing a prevention program just twice a week during the season (58 prevention practices) leads to a significant decrease in the probability of injury [57]. In general, during the preparation period, more attention should be paid to knee and ankle proprioception, eccentric strength exercises, stabilization, and stretching, while attention during the competitive period should be paid to the prevention of muscle strains through a specific team preventive program [58].

Another factor that affects injury frequency that was isolated from the analyzed scientific papers is player age, i.e. the fact that older players are more prone to injuries [44]. This piece of information points
to a necessity for volume individualization of load for older players.

A suggestion for future studies is a comparison of load in practice and in matches, and to study the significance of applying situational (integral) practice as a means of injury prevention.

4. Conclusion

Investigating the injury frequency is a complex and extensive process, but also a very important indicator in modern football. Its importance is reflected in the fact that these results show in which direction further research should go in terms of creating strategies for injury prevention. The highest injury rate was recorded in national team tournaments. Factors that affect such results are the timing of the national team tournaments, the number of matches, the infrastructure, and the officiating criteria. Unlike the national team level, the injury frequency rate in club league competitions is lower but varies depending on the quality of the league, the level of infrastructure, and the financial capabilities of the clubs. Because of the aforementioned reasons, the injury rate in elite European leagues is much lower compared to leagues in countries outside Europe, i.e. in countries where less money is invested in football. The results of these studies have shown that the style of play practiced can also affect the injury rate regardless of the conditions. An example of this is the Italian Serie A, which has a higher injury rate than other top European leagues but does not lag behind those leagues in terms of organization and infrastructure. Injuries in matches are 4 to 5 times more common in all studies compared to injuries that occurred in the training process, which is a result of work intensity, as one of the significant injury factors. Also, age significantly affects the risk of injury, where older players have a higher chance of injury.

According to the above, it is necessary to implement preventive strength and balance training. Also, the organization of matches and paying attention to the number of days between matches is very important and creating a practice environment that will be close to the ambiance and the intensity of the match, so that players create adaptation, thereby significantly reducing the risk of injury in matches. All the above conclusions are based on the results of the analyzed studies, but a detailed scientific analysis of each one is necessary for their concretization, which is a recommendation for future research.

References

[1] N. Čović, D. Čaušević, E. Jelešković, H. Alić, M. Talović, & I. Rado, Kompozicija tijela kao indikator hržinskih sposobnosti mladih nogometaša, Kondicijska priprema sportaša 15, (2017).
[2] Munir Talović, Čaušević Denis, Haris Alić, Eldin Jelešković, Dozić Enes, Šemso Ormanović, Rasim Lakota, Nermin Nurković, Niko Račković, Nedim Čović, Strength asymmetry differences between premier league and first league football referees. Acta Kinesiologica, 1 (2018) 86-92
[3] Dvorak, J., Junge, A., Graf-Baumann, T. & Peterson, L. (2004). Football is the most popular sport worldwide, American Journal of Sports Medicine, 32(1). [DOI] [PubMed]
[4] E. Mustafovic, D. Causevic, N. Covic, M. Ibrahimovic, H. Alic, E. Abazovic, & S. Masic, Talent Identification in Youth Football: A Systematic Review, Journal of Anthropology of Sport and Physical Education, 4(4) (2020) 37-43. [DOI]
[5] C. Barnes, D. Archer, A. Hogg, M. Bush, & P. Bradley, The evolution of physical and technical performance parameters in the English Premier League, International Journal of Sports Medicine, 35(13) (2014) 1-6. [DOI] [PubMed]
[6] Colin W Fuller, Jan Ekstrand, Astrid Junge, Thor E Andersen, Roald Bahr, Jiri Dvorak, Martin Hägglund, Paul McCrory, Wilhem H Meeuwisse, Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries, British Journal of Sports Medicine, 40 (2006) 193-201. [DOI] [PubMed]
[7] C. Carling, & E. Orhant, Variation in body composition in professional soccer players: interseasonal and intraseasonal changes and the effects of exposure time and player position, Journal of Strength and Conditioning Research, 24(5) (2010) 1332–1339. [DOI] [PubMed]
[8] Janine H Stubbe, Anne-Marie M C van Beijsterveldt, Sissi van der Knaap, Jasper Stege, Evert A Verhagen, Willem van Mechelen, Frank J G Backx, Injuries in Professional Male Soccer Players in the Netherlands: A Prospective Cohort Study, Journal of Athletic Training, 50(2) (2015) 211-216. [DOI] [PubMed]
[9] A.M.C. Anne-Marie van Beijsterveldt, J.H. Stubbe, S.L. Schmikli, I.G.L. van de Port, F.J.G. Backx, Differences in injury risk and characteristics between Dutch amateur and professional soccer players, Journal of Science
and Medicine in Sport, 18(2) (2014) 145-149. [DOI] [PubMed]

[10] R.D. Hawkins, M.A. Hulse, C. Wilkinson, A. Hodson, & M. Gibson, The association football medical research programme: an audit of injuries in professional football, British Journal of Sports Medicine, 35(1) (2001) 43–47. [DOI] [PubMed]

[11] N.D. Kofotolis, E. Kellis, & S.P. Vlachopoulos, Ankle sprain injuries and risk factors in amateur soccer players during a 2-year period, American Journal of Sports Medicine, 35(3) (2007) 458–466. [DOI] [PubMed]

[12] D.J. Deehan, K. Bell, & A.W. McCaskie, Adolescent musculoskeletal injuries in a football academy, The Journal of Bone and Joint Surgery, 89(1) (2007) 5–8. [DOI] [PubMed]

[13] M. Talović, H. Alić, Š. Ormanović, E. Jelešković, E. Mustafović, & D. Čaušević, Training effects of FIFA 11+ programme: a brief literature review, Acta Kinesiologica, 11(2) (2017) 51-57.

[14] H. Alić, Trenažni efekti funkcionalnih i motoričkih sposobnosti nogometaša u pripremnom i takmičarskom periodu pod utjecajem specifičnog trenažnog procesa. Doktorska disertacija. Sarajevo: Fakultet sporta i tjelesnog odgoja Univerziteta u Sarajevu (2012).

[15] D. Riva, R. Bianchi, F. Rocca, & C. Mamo, Proprioceptive Training and Injury Prevention in a Professional Men's Basketball Team: A Six-Year Prospective Study, The Journal of Strength and Conditioning Research, 30(2) (2016) 461-475. [DOI] [PubMed]

[16] E. Mustafović, H. Alić, M. Talović, E. Jelešković, & M. Ibrahimović, Effects of specific programmed training on dynamic stabilizers of the knee joint in adult amateur soccer players, Homosporitics, 22(1) (2020) 23-27.

[17] F.T. González-Fernández, & A.M. Pérez, Effect of Proprioceptive Training in Male Soccer Players, Journal of Novel Physiotherapy and Physical Rehabilitation, 7(2) (2020) 43-44. [DOI]

[18] G. Adda, O. Khaled, & W. Beboucha, The effect of proprioceptive training in injury prevention of young footballers, Journal of Sport Science Technology and Physical Activities, 17(1) (2020) 28-40.

[19] A.C. Huerta-Ojeda, D.A. Sandoval, & G.D. Barahona-Fuentes, Proprioceptive training methods as a tool for the prevention of injuries in football players: a systematic review, Archivos de Medicina del Deporte, 36(3) (2019) 173-180.

[20] A. Daneshjoo, A.H. Mokhtar, N. Rahnama, & A. Yusof, Effects of the 11+ and Harmomcnee Warm-Up Programs on Physical Performance Measures in Professional Soccer Players, Journal of Sports Science & Medicine, 12(3) (2013) 489-496. [PubMed]

[21] F. Ayala, A. Calderón-López, J. Delgado Gosálbez, S. Parra-Sánchez, C. Pomares Noguera, S. Hernandez-Sanchez, A. Lopez-Velanciño, & M. De Ste Croix, Acute Effects of Three Neuromuscular Warm-Up Strategies on Several Physical Performance Measures in Football Players, Plos One 12(1) (2017) e0169660. [DOI] [PubMed]

[22] J. Petersen, K. Thorborg, M.B. Nielsen, E. Budtz-Jørgensen, & P. Hölmich, Preventive effect of eccentric training on acute hamstring injuries in men's soccer: a cluster-randomized controlled trial, American Journal of Sports Medicine, 39(11) (2011). 2296-2303. [DOI] [PubMed]

[23] M., Hoyo, M. Pozzo, B. Sanudo, L. Carrasco, O. Gonzalez-Skok, S. Dominguez-Cobo, & E. Morán-Camacho, Effects of a 10-Week In-Season Eccentric-Overload Training Program on Muscle-Injury Prevention and Performance in Junior Elite Soccer Players, International Journal of Sports Physiology and Performance, 10 (2015) 46-52. [DOI]

[24] R. Lovell, M. Whalan, P. Marshall, J. Sampson, J. Siegler, & B. Martin, Scheduling of eccentric lower-limb injury prevention exercises during the soccer micro cycle: Which day of the week?. Scandinavian Journal of Medicine and Science in Sport, 28(10) (2018). [DOI]

[25] L. Ristolainen, A. Heinonen, B. Waller, U.M. Kujala, & J. Kettunen, Gender differences in sports injury risk and types of injuries: a retrospective twelve-month study on cross-country skiers, swimmers, long-distance runners, and soccer players, Journal of Sports Science and Medicine, 8(3) (2009) 443-51. [PubMed]

[26] S. Mufty, P. Bollars, L. Vanlommel, K. Van Crombrugge, K. Corten, J. Bellemans, Injuries in male versus female soccer players: epidemiology of nationwide study, Acta Orthopaedica Belgica, 81(2) (2015) 289-95. [PubMed]

[27] J. Ekstrand, A. Spreco, H. Bengtsson, & R. Bahr, Injury rates decreased in men’s professional football: an 18-year prospective cohort study of almost 12 000 injuries sustained during 1.8 million hours of play, British Journal of Sports Medicine, (2021) 1-9. [DOI] [PubMed]
[28] Di Palma, D., Raiola, G., & Tafuri, D. (2016). Disability and Sport Management: a systematic review of the literature. Journal of Physical Education and Sport, 16(3), 785. [DOI]

[29] A. Junge, & J. Dvorak, Injury surveillance in the World Football Tournaments 1998–2012, British Journal of Sports Medicine, 47 (2013) 782-8. [DOI] [PubMed]

[30] A. Pedrinelli, G.A.R. Filho, E. Thiele, & O. Pangrazio, Epidemiological Study on Professional Football Injuries During the 2011 Copa America, Argentina, Revista Brasileira de Ortopedia, 48 (2013) 131-136. [DOI]

[31] A. Akodu, O. Owuoye, M. Ajenifuja, S. Akinbo, F. Olatona, & O. Ogunkunle, Incidence and characteristics of injuries during the 2011 West Africa Football Union (WAFU) Nations’ Cup, African Journal of Medicine and Medical Sciences, 41 (2012) 423-8. [PubMed]

[32] A. Junge, & J. Dvorak, Football injuries during the 2014 FIFA World Cup, British Journal of Sports Medicine, 49 (2015) 599-602. [DOI] [PubMed]

[33] J. Ekstrand, (2016). Injury study report-EURO 2016 France. Zurich: UEFA https://www.uefa.com/MultimediaFiles/Download/uefaorg/Medical/02/49/97/62/2499762_DOWNLOAD.pdf

[34] A. Jones, G. Jones, N. Greig, P. Bower, J. Brown, K. Hind, & P. Francis, Epidemiology of Injury in English Professional Football Players: a cohort study, Physical Therapy in Sport, 35 (2019) 18-22. [DOI] [PubMed]

[35] J. Mallo, Injury Incidence of a Spanish Elite Female Soccer Team during a Competitive Season. A Case Study, JMED Research, 2014 (2014), Article ID 635710, [DOI]

[36] J. Ekstrand, (2013). UEFA elite club injury study Season 2012/2013 report. Zurich: UEFA https://www.uefa.com/MultimediaFiles/Download/uefaorg/Medical/02/07/01/41/2070141_DOWNLOAD.pdf

[37] J. Ekstrand, (2014). UEFA elite club injury study Season 2013/2014 report. Zurich: UEFA https://www.uefa.com/MultimediaFiles/Download/uefaorg/Medical/02/19/04/32/2190432_DOWNLOAD.pdf

[38] J. Ekstrand, (2015). UEFA elite club injury study Season 2014/2015 report. Zurich: UEFA https://www.uefa.com/MultimediaFiles/Download/uefaorg/Medical/02/28/70/88/2287988_DOWNLOAD.pdf

[39] J. Ekstrand, (2017). UEFA elite club injury study Season 2016/2017 report. Zurich: UEFA https://www.uefa.com/MultimediaFiles/Download/uefaorg/Medical/02/49/97/62/2499762_DOWNLOAD.pdf

[40] M. Hassabi, S. Mortazavi, M.R. Giti, M. Hassabi, M.A. Mansournia, & S. Shapouran, Injury Profile of a Professional Soccer Team in the Premier League of Iran, Asian Journal of Sports Medicine, 1 (2010) 201-208. [DOI] [PubMed]

[41] T. Calligeris, T Burgess, M Lambert, The incidence of injuries and exposure time of professional football club players in the Premier Soccer League during football season, South African Journal of Sports Medicine, 27 (2015) 16. [DOI]

[42] C. Eirale, A. Farooq, F. Smiley, J. Tol, & H. Chalabi, Epidemiology of football injuries in Asia: A prospective study in Qatar Journal of Science and Medicine in Sport, 16(2) (2012) 113-117. [DOI] [PubMed]

[43] I. Shalay, F. Tishukaj, N. Bachi, H. Tschan, B. Wessner, & R. Csapo, Injuries in professional male football players in Kosovo: A descriptive epidemiological study, BMC Musculoskeletal Disorders, 17 (2016) 338. [DOI] [PubMed]

[44] L. Falase, P. Valle, & B. Federico, Epidemiology of football (soccer) injuries in the 2012/2013 and 2013/2014 seasons of the Italian Serie A, Research in Sports Medicine, 24 (2016) 1-7. [DOI] [PubMed]

[45] J.N. Salces, P. Carmona, D. Moliner-Urdiales, L. Gracia-Marco, & M. Sillero-Quintana, An examination of injuries in Spanish Professional Soccer League, The Journal of Sports Medicine and Physical Fitness, 54 (2014) 765-71. [PubMed]

[46] G. Gijon-Nogueron, M. Torrontegui-Duarte, J.M. Morales-Ascencio, & A. Luque-Suarez, Incidence of injuries among professional football players in Spain during three consecutive seasons: A longitudinal, retrospective study, Physical Therapy in Sport, 41 (2019). 87-93. [DOI] [PubMed]

[47] M. Dauty, & S. Collon, Incidence of injuries in French professional soccer players, International Journal of Sports Medicine, 32(12) (2011) 965-969. [DOI] [PubMed]

[48] H. Gaulrapp, A. Becker, M. Walther, & H. Hess, Injuries in Women’s Soccer: A 1-Year All Players Prospective Field Study of the Women’s Bundesliga (German Premier League). Clinical
M. Hägglund, M. Markus Walden, H. Magnusson, K. Kristenson, H. Bengtsson, & J. Ekstrand, Injuries affect team performance negatively in professional football: an 11-year follow-up of the UEFA Champions League injury study, British Journal of Sports Medicine, 47(12) (2013) 738-742. [DOI]

M. Lehnert, M. De Ste Croix, P. Stastny, E. Maixnerova, A. Zaatar, M. Botek, R. Varekova, K. Hulka, M. Petr, M. Elfmark, & P. Lipinska, The influence of fatigue on injury risk in male youth soccer players, Palacký University Olomouc (2019). [DOI]

G. Dupont, M. Nedelec, A. McCall, D. McCormack, S. Berthoin, & W. Wisloff, Effect of 2 Soccer Matches in a Week on Physical Performance and Injury Rate, American Journal of Sports Medicine, 38(9) (2010) 1752-1758. [DOI] [PubMed]

J. Rechel, E.E. Yard, & R.D. Comstock, An Epidemiologic Comparison of High School Sports Injuries Sustained in Practice and Competition, Journal of Athletic Training, 43(2) (2008) 197-204. [DOI] [PubMed]

A. Woods, P. Bishop, & E. Jones, Warm-Up and Stretching in the Prevention of Muscular Injury, Sports Medicine, 37(12) (2007) 1089-1099. [DOI] [PubMed]

O.E. Olsen, G. Myklebust, L. Engebretsen, & R. Bahr, Injury mechanisms for anterior cruciate ligament injuries in team handball: a systematic video analysis, American Journal of Sports Medicine, 32(4) (2004) 1002-1012. [DOI] [PubMed]

J. Mallo, & A. Dellal, Injury risk in professional football players with special references to the playing position and training periodization, The Journal of Sports Medicine and Physical Fitness, 52(6) (2012) 631-638. [DOI]

Funding
No funding was received to carry out this study.

Ethics approval
This study was approved by Institutional ethics committee.

Authors Contribution
All the authors equally contributed to this work and approved of the final version of this manuscript.

Does this article screened for similarity?
Yes.

Conflict of interest
The authors have no conflicts of interest to declare that they are relevant to the content of this article.

Informed consent
Written consent was obtained from the participants.

About The License
© The Author(s) 2021. The text of this article is open access and licensed under a Creative Commons Attribution 4.0 International License.