FREQUENCY OF LOWER LIMB INJURIES IN PROFESSIONAL SOCCER, RISK FACTORS AND CONSEQUENCES; A RETROSPECTIVE STUDY

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ABSTRACT

Introduction: There are many factors that can have an impact on the injury of soccer players. It is very difficult to predict all factors, so turning to prevention, collecting data on injury patterns, and designing new strategies for injury prevention among soccer players is extremely important.

Objective: To determine the condition of lower limb injuries in football players of the Premier League of Bosnia and Herzegovina

Methods: Professional soccer players competing in the Premier League of Bosnia and Herzegovina participated in a retrospective study. For this study, each soccer player filled out a questionnaire that was not standardized but was designed for the purposes of this research. Complaints about injuries during 2019 were requested, as well as insight into types of injuries, methods of treatment, use of orthoses, bandages, and the like.

Results: Out of a total of 129 subjects, 57.4 % had injuries, of which 50 had only one injury. Most respondents were injured during training (64.9 %), on normal surfaces (82.4 %). In 44.6 % of respondents, it was a non-contact, new injury, more often on the non-dominant leg, the most frequently injured were muscles. 26 of them had an operation, and the recovery of the majority lasted up to 40 days.

Conclusion: Exposure to various risk factors resulted in lower limb injuries in more than half of the respondents.

Key words: football, injury factors, injuries, outcome

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INTRODUCTION

A sedentary lifestyle and insufficient physical activity are the causes of various health problems. A sedentary lifestyle has widespread adverse effects on the human body, including increased mortality from various causes, mortality from cardiovascular disease, risk of cancer, risk of metabolic disorders, and risk of musculoskeletal disorders. Reducing a sedentary lifestyle and increasing physical activity are important for promoting public health (1).

Although exercise can result in a number of well-documented fitness and health benefits, obtaining such benefits carries the risk of exercise-related injuries. Musculoskeletal injuries often occur among participants in fitness programs, runners, athletes, and others who engage in vigorous exercise (2).

The rise in the reputation of sports, its popularity, as well as the desire for increased earnings, influence the increase in the risk of injuries among professional athletes. Improper, unprofessionally dosed activity leads to an unbalanced relationship between muscles and joints, which can result in injuries. Therefore, a better understanding of the effects of training parameters and other factors on exercise-related injury risks is needed to more carefully decide how to best achieve the benefits of exercise and prevent injury (2).

Sports injuries are associated with high direct and indirect costs, and can even lead to early sports retirement in about 24.0 % of athletes (3). The too-frequent injury of athletes results in the allocation of large amounts of money for rehabilitation. When we talk about injuries, injuries in football can be divided into two primary groups: contact, where we cannot have too much influence, and non-contact, when the athlete injures himself (4).

When we talk about contact injuries, we mean injuries that occur due to contact with an opposing player. Non-contact injuries are something that we try to influence in various ways, primarily through prevention. The North Carolina High School Athlete Injuries Study, a sample of 100 high school athletic teams conducted from 1996 to 1999, produced startling results. Three types of costs were assessed: medical, human capital (medical costs plus loss of future earnings), and comprehensive capital (human capital costs plus lost quality of life). Annual statewide estimates were US$9.9 million in medical costs, US$44.7 million in human capital costs, and US$144.6 million in comprehensive costs (5).

We are witnessing the exceptional popularity of football as a sport. It is often heard that it is a sport for the masses, but lately, it has become more than a sport. Football, or Soccer as it is called in North America, is the most popular sport in the world (6). Today, football is played at a professional level in more than two hundred countries around the world. It is interesting that according to FIFA (Fédération Internationale de Football Association) there are more amateurs than professionals. While for many football is a great love and lifestyle, for some it is just a favorite sport, for others it represents business and of course money (7).

Soccer is becoming so popular that there is even research that suggests that soccer can begin to be considered medicine. Today it turns out that Voltaire and his main character, the philosopher Zadig, were right: Football is breathtaking and can be used as therapy. Fifteen years of research have produced strong evidence showing that football is indeed a breathtaking, high-intensity, multi-purpose training exercise that is effective as physical and psycho-social therapy. In fact, football is medicine, and we are ready to act on this knowledge (8)!

There are many factors that can have an impact on the injury of soccer players. Once risk factors for lower limb injury are identified, intervention studies can be used to reduce the incidence and severity of injury, along with associated medical costs (9). Collecting data on injury patterns and related risk factors can provide important information for the design of new injury prevention strategies among athletes (4). Traumatic and lower limb overexertion syndrome injuries are common and, unfortunately, injury prediction is complex and multifactorial (10, 11). Researchers have estimated that 50 % to 80 % of injuries result from overexertion syndrome and affect the lower limbs (10-12). The too-frequent injury of football players results in the allocation of large sums of money for rehabilitation and as such represents a certain financial problem. The financial problem is not the only one, football players also face psychological difficulties resulting from injuries. The aim of this research was to determine the state of lower limb injuries in football players of the Premier League of Bosnia and Herzegovina.

RESPONDENTS AND METHODS

A retrospective study was conducted. 129 professional soccer players, aged 18 to 37, who compete in the Premier League of Bosnia and Herzegovina, participated in the study. The research included injuries from 2019. Each respondent filled out a questionnaire that provided insight into previous injuries, contact or non-contact, current lower limb symptoms, use of prostheses or tapes, etc. Data were collected from the aforementioned clubs, and all lower limb injuries during the past 12 months were recorded and processed. The respondents were informed about the study in an appropriate manner and only those respondents who agreed to participate were included in the study. For this study, a convenient, non-standardized questionnaire was created, which was divided into clubs and selected groups. Respondents who are under a professional contract are included in the study. All respondents signed the consent form at the end of the questionnaire. Respondents who refused the same and possible errors in data processing by the therapist were excluded from the study.

For this study, a questionnaire was created that is not standardized but was designed for the needs of this research, related to previous injuries, contact or non-contact, current symptoms of the lower limbs, use of prostheses or tape, etc. The questionnaire was distributed to all respondents who met the criteria for inclusion in the study, and

the results were analyzed. It was explained in detail how to fill out the questionnaire and enough time was left for it, i.e. one day. After that, the completed questionnaires were collected and analyzed.

RESULTS

Table 1. Basic characteristics and assessment of the current state of football players enrolled in the study, first part (n=129).

Characteristics	N (%)
Average age (range) Years	24.4 (18-37)
18-25	57 (44.2)
25-30	39 (30.2)
≥30	33 (25.6)
Average height in cm (range)	183.6 (163-199)
Average weight in kg (range)	78.7 (60-100)
Average BMI in kg/m² (range)	23.3 (19.8-27.7)
Dominant leg	
Left	28 (21.7)
Right	101 (78.3)
How many injuries have you had in the past year? (Number of football players who had only one injury)	74 (50)
The injury occurred on: ǂ	
Training	48 (64.9)
Matches	26 (35.1)
The injury occurred in: ‡	
In the first half	15 (57.7)
In the second half	11 (42.3)
The surface on which you were injured: ǂ	
Normal grass	61 (82.4)
Artificial grass	11 (14.9)
Other training surfaces	2 (2.7)
Have you renewed the injury? ǂ	
Yes	21 (28.4)
No	53 (71.6)
Use of recovery aids	
Tape	4 (5.4)
Kinesiotape	3 (4.1)
Elastic bandage	4 (5.4)

ǂ - Number of football players with injury, ‡ - Number of football players injured in the match

Table 1. shows that the average age of the respondents who participated in this research is 24.4 years. After the rehabilitation process, a certain number of respondents use aids in the training process: four respondents use an elastic bandage, four respondents also use tape, and three respondents use kinesio tape. Out of a total of 74 injuries reported by the respondents, 48 of them occurred during training, while 26 injuries occurred during the match. Out of the total number of injured (n=74), 21 respondents had a renewed injury, while 53 had a new injury.

Table 2. Basic characteristics and assessment of the current state of football players enrolled in the study, second part (n=129).

Characteristics	N (%)
It was about: ǂ	
New injury	66 (89.2)
Insufficiently healed injury from previous season	8 (10.8)
Was the injury (due to a kick from an opposing football player or was he injured himself)? ǂ	
Contact	8 (10.8)
Non-contact	66 (89.2)
Are injuries more common on the dominant leg?	
Yes	14 (18.9)
No	60 (81.1)
The part you injured: ǂ	
Muscle	33 (44.6)
Bone	11 (14.9)
Ligament	10 (13.5)
Tendon	6 (8.1)
Joint	11 (14.9)
Other	3 (4)

Did you have surgery? †	
Yes	26 (35.1)
No	48 (64.9)
What surgery did you have: ‡	
Knee	11 (42.3)
Ankle joint	2 (7.7)
Other	13 (50)
Foreign bodies where the injury occurred: †	
Left	31 (41.9)
Right	43 (58.1)
Of the diagnostic procedures (n=88) you did:	Number of tests (%)
Magnetic resonance imaging	41 (46.6)
CT	1 (1.1)
Ultrasound	35 (39.8)
RTG	11 (12.5)

† - Number of football players with an injury, ‡ - Number of operated football players

Table 2. shows that the majority of respondents had new injuries. Only 8 out of 74 injured subjects confirmed that it was an insufficiently healed injury from the previous season. As the cause of the injury, 66 respondents stated that it was a non-contact injury, while only 8 injuries were caused by contact with an opposing respondent. It was mainly about injuries to the non-dominant leg, while only 14 respondents out of a total of 74 had an injury to the dominant leg.

Table 3. Basic characteristics and assessment of the current state of football players enrolled in the study, third part (n=129).

Characteristics	N (%)
How many days did the recovery take? †	
Under 20 days	30 (40.5)
From 20 to 40 days	21 (28.4)
0d 40 days to 3 months	7 (9.5)
More than three months	16 (21.6)
Did you have to do rehabilitation somewhere other than in the club? †	
Yes	27 (36.5)
No	47 (63.5)
In training I use: †	
Elastic bandage	4 (5.4)
Tape	4 (5.4)
Kinesiotape	3 (4.1)
Braces	2 (2.7)
None of the above	61 (82.4)

† - Number of football players with an injury

Table 3. shows the different recovery times of the injured subjects, most of them, 47 subjects, were rehabilitated in their home clubs, while 27 of them had to undergo additional treatment in other institutions.

DISCUSSION

The main purpose of this research was to find out how many injuries soccer players had in the past 12 months, during 2019. Considering that we live in a country where sports clubs are not able to allocate large funds for rehabilitation, it would be very useful to find valid tests that could help prevent injuries. This is precisely why many are turning to prevention and finding new ways to prevent a certain problem, that is, to take certain measures to prevent injuries. The too-frequent injury of football players results in the allocation of large sums of money for rehabilitation and as such represents a certain financial problem. The financial problem is not the only one, football players also face psychological difficulties resulting from injuries. Most football players go through many questions after an injury. This is where, among other things, anger, pain, and fear appear. The American Sports Medicine Association convened a panel of experts to provide an evidence-based best practice

document to assist sports medicine physicians and other members of the athlete care team in detecting, treating, and preventing mental health problems in athletes (13).

When the acute situation calms down, when the facts are looked at, then the reaction of football players can go in several directions. Some footballers direct and focus on rehabilitation, while others may worry about their position, status in the club, and finally, the financial situation, which, unfortunately, is still very important. How much we can do as individuals or as professional teams in injury prevention is the subject of several studies that have been conducted around the world. It is difficult to catch all the threads, but it would be good to minimize the possibility of injury. Through continuous research, planning, and lifelong learning and training, it should be possible to contribute to reducing the errors that occur in the preparation and training processes as much as possible. It is to be expected that in better-off countries, that is, those that invest significant financial resources in injury prevention, the results will be much better than in the environments where we live and work. Given that there are many factors that affect football players' injuries, it is necessary to record them and try to influence them part by part so that, within the limits of what is possible, we all do our best to prevent them from occurring or to the smallest extent possible. Recognizing and understanding injury risk factors is key to guiding injury-prone athletes and developing injury prevention measures (14). It is necessary to review the popular model of providing sports medicine and scientific services to top athletes, which is based on the existing reductionist multi-specialist system, which in practice lacks an integrated approach and effective communication (15).

Dealing with an injury to a football player brings certain difficulties both for the club and for the football player himself. A football player receives a certain fee for his services. If a football player cannot help the club for a long time due to injury, the consequences will be felt by both sides. Elite soccer players strive to train and compete even when they are sick or injured. Their motivation can be internal or the result of pressure from the coach and the team (15). The financial component is very important. Clubs are also financially dependent in some way on the success of the season through sponsorship contracts in such a way that the placement determines the amount of money the club receives depending on the place in the table, exit to the Euro scene, etc... Financial rewards increase the motivation of football players for better preparation for sports performances, which is proven by better-setting performance goals and more careful psychological preparation. It seems that soccer players with higher incomes are more worried about the failure of the match, which increases their anxiety, especially since it is a cognitive part and affects their sports performance (16).

Every injury leaves certain consequences for football players, whether they want to admit it or not. In the beginning, the football players are frustrated, the people inside themselves and everyone around them. In a fit of rage, they are

ready to end their careers. The document of the American Society for Sports Medicine lists numerous mental health disorders in football players: eating disorders, depression, which in extreme cases can end in suicide, anxiety and stress, sleep disorders, attention-deficit/hyperactivity disorder, and sexual disorders (17). They bring home changes in behavior, anger, and frustration, and it often happens that quarrels break out in the family of the injured party, primarily with the spouse. The fact is that an injured athlete goes through different emotional states. It is important to allow football players to complete short-term or long-term mental training conducted by a trained sports psychologist, not only at the time of failure of the athlete but also as a preventive measure against increasing cognitive anxiety (16).

A soccer player must not feel rejected at any stage of rehabilitation, which is often the case in our region. He has to have the support of the club and he has to feel that everyone cares, that they care because they really notice. Research shows that the perception of social support has the greatest impact on the rehabilitation and well-being of injured athletes (18). Emotional and cognitive reactions of athletes after an injury, the importance of social support, the attitude of athletes towards recovery, the roles of therapists, doctors, and coaches during rehabilitation, strategies to increase adherence to rehabilitation principles, and effective communication between football players and medical professionals are extremely important (19).

The insufficient education of the football players themselves is also one of the problems we face every day. In England, research was conducted on the topic of training soccer players in the practice of injury prevention. The main gaps in awareness of injury prevention strategies among football players were identified as insufficient use of shin guards during training, inadequate nutrition before, after training, and after matches, regeneration after training and matches, and flexibility work. These shortcomings point to the need for a broader education of players about current injury prevention strategies (20). Also, training processes set by coaches and fitness trainers for soccer players are often copied from the Internet by other clubs without taking into account whether the psychophysical abilities of the soccer players are adequate to be able to follow the same programs. It should be noted that excessive and rapid increases in training load are probably responsible for a large proportion of non-contact soft tissue injuries. However, physically demanding (and appropriate) training develops physical qualities, which in turn protects against injury. This paper emphasizes the importance of monitoring the load during training, including the load for which athletes are ready (by calculating the ratio of acute to chronic load), as the best approach to the long-term reduction of training-related injuries (21).

Insufficient investment by clubs in the necessary and continuous education of the medical team, given that medicine, especially sports medicine, is constantly changing, inventing faster, more advanced methods of prevention and recovery, is

also one of the factors that can have a great impact on injuries. Research by Eyal Eliakim and colleagues shows how important it is to invest in prevention and rehabilitation. They sought to assess the effect of injuries on the performance of English Premier League (EPL) football teams and the financial implications arising from this effect. By calculating the effects of injuries on the standings, they concluded that this was reflected in the table position, and in terms of costs, they estimated that an EPL team loses an average of £45 million due to injury-related loss of performance per season. The conclusion is that professional football clubs have a strong economic incentive to invest in injury prevention and rehabilitation programs (22).

CONCLUSION

During this research, it was observed that exposure to various risk factors in soccer players can result in injuries. The research showed that more than half of the respondents had injuries on their lower limbs. Injuries can have different effects on football players, which greatly affects their quality of life. The results of this questionnaire call for a more serious approach to identifying factors that can affect injuries in both elite and recreational soccer players.

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UČESTALOST OZLJEDA DONJIH UDOVA U PROFESIONALNOM NOGOMETU, ČIMBENICI RIZIKA I POSLJEDICE: RETROSPEKTIVNA STUDIJA

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SAŽETAK

Uvod: Postoje mnogi čimbenici koji mogu imati utjecaja na ozljeđivanje nogometaša. Jako teško je predvidjeti sve čimbenike te je okretanje prevenciji, prikupljanju podataka o obrascima ozljeda i izrada dizajna novih strategija za prevenciju ozljeda među nogometašima od izuzetne važnosti.

Cilj: Utvrditi stanje s ozljedama donjih udova u nogometaša Premijer lige Bosne i Hercegovine

Metode: U retrospektivnoj studiji sudjelovali su profesionalni nogometaši koji se natječu u Premijer ligi Bosne i Hercegovine. Za ovu studiju svaki nogometaš ispunio je upitnik koji nije standardiziran, već je osmišljen za potrebe ovog istraživanja. Tražene su pritužbe na ozljede tijekom 2019. godine, te uvid u vrste ozljeda, načine tretiranja, korištenje ortoza, bandaža i slično.

Rezultati: Od ukupno 129 ispitanika njih 57,4 % imalo je ozljede od čega je njih 50 imalo samo jednu ozljedu. Najviše se ispitanika ozlijedilo na treningu (64,9 %), na normalnoj podlozi (82,4 %). Kod 44,6 % ispitanika radilo se o nekontaktnoj, novoj ozljedi, češće na nedominantnoj nozi, najčešće ozlijeđeni bili su mišići. Njih 26 imalo je operativni zahvat, oporavak kod većine trajao je do 40 dana.

Zaključak: Izloženost raznim čimbenicima rizika imala je za posljedicu nastanak ozljeda donjih udova kod više od polovice ispitanika.

Ključne riječi: nogomet, čimbenici ozljeđivanja, ozljede, ishod

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