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Prevalence and Mechanism of Injuries in Male Beach Soccer Players

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ABSTRACT

Introduction: One of the preventing injuries methods is recognizing common injuries in sports and causative factors of injury. The aims of this study was to investigate the injuries of beach soccer players in terms of prevalence and mechanism.

Methods: The present study is a Cross-sectional and descriptive research that was conducted as a field study. Forty players were selected randomly from two teams of the Yazd province in premier country league that took place in 2019. For recording prevalence and mechanism of injuries, the modified injury report form by Fuller et al. (2006) was used. The SPSS software version 25 and the chi-square test at a significance level $P < 0.05$ were used for statistical analysis.

Results: In total, the most common injuries of beach soccer were in lower extremities (%69.84), and for injury severity, %31.75 were severed injury, and in terms of the type of injuries, the strain was the most of the injuries occurred (%33.33). The amount of injury during the match (%60.26) was higher than the time of training (%39.68). The degree of contact injuries %73.02 was significantly higher than non-contact injuries %26.98 ($p < 0.05$).

Conclusion: Most of the injuries in beach soccer are caused by playing bare foot and lack of shoes and guards on the legs and feet, and then on the knee. Contact of players is one of the main sources of injury in beach soccer, which is likely to be effective in preventing injury by changing training, implementing proper techniques, and improving performance factors by using injuries preventive programs.

Keywords: Prevalence, Mechanisms, Injury, Beach Soccer

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Introduction

Beach soccer is derived from soccer but the different technical and legal features which lead to beautiful and acrobatic movements that make it aggressive, full contact, attractive, and most popular in the world (1).

This sport has grown very fast since 1992, with its popularity now spreading to more than 130 countries. The reason for this popularity can be found in the fact that beach soccer is a fun sport that is suitable for young and old players, and the men and women, professionals, and amateurs players were enjoyed. This new game by different and exciting movement is more attractive for people (2).

Beach soccer, the same as soccer, is a contact sport that requires physical skills, physical, technical and tactical attributes that the incidence of injury in the sport has increased (1). One of the most important factors that determine the longevity of active sport age is the number of the injuries of each player.

One of the most important injury prevention factors that can be mentioned are exercises that help improve exercise-related performance and prevent them from injuries. But some of these exercises are also associated with injury itself, and finding exercises that increase the ability of the athlete to be less likely to be injured or unsafe is one of the major concerns of the athletes and their coaches (3).

In the literature soccer and futsal, and their movements and injurious factors are well researched, but little studies have been done on beach soccer (4). Beach soccer, is branched of soccer, but it is technically and time of playing close to futsal, and in terms of the surface of the playing field and sand features, it makes it a unique discipline. Lake of foot covering and shin guards should be added to these factors (4).

In this sport, players are not allowed to wear shoes, but it is possible to use wrist bandages around the ankle, foot, and wearing glasses to protect them. Thus, naturally, it must involve different types of injuries with different mechanisms.

Due to the wide incidence of injuries, teams have to pay any costs to restore the injured athlete to a proper state of health. Moreover, in some injuries, the individual may need to rest for more than a month in order to recover and this wasted time are not economical in professional soccer. Study and analysis of the incidence of injuries and risk factors for health is the foundation of prevention plans (5). It has thus been discussed as a necessity in medical congresses that athletes must become more familiar with the causes and mechanisms of injuries, especially young athletes who are more exposed to injuries due to their physical, motor, and psychological characteristics (6).

Injuries not only threaten the health of the players but also waste millions of dollars annually from countries. Statistically, in the studies of soccer, prevalence rates were estimated at 1.5 to 2 acute injuries per 1000 hours of training or competition, and in Europe, it is estimated that there will be 32,000,000 injuries a year, which will cost approximately 250 to 400 million euros (7). In Iran, there is little statistical reporting of the exact prevalence of injury and risk factors and time lost in beach soccer which there are only two studies, one on women soccer players (1) and the other conducted by our research group on data from over 6 years ago male players in Yazd province teams. There is a national league (4) that has undergone changes in rules and regulations, including ball, during this period, as well as the level of players' play, and the level of skill and technique and tactics of beach soccer has improved significantly internationally. The foreign studies reported an overall prevalence of injury to all beach sports in Asian, Japan, and Spain competitions (8, 9, 10).

Methods

This study is a Cross-sectional and descriptive study and part of a RCT study (IRCT20180827040887N2), for indicating the prevalence and mechanism of injury in beach soccer players. Subjects were selected from 2 teams who are currently in the Premier League of

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the country (n = 40). For recording prevalence and mechanism of injuries, the modified injury report form by Fuller et al. (2006) was used (11). The questionnaire measured the type of injury, injury time, cause of injury, injured part, and injury mechanism. Time of injuries in the match was indicated in 4 periods of the game: first half, second half, third half, and or in extra time. The time to return to play was recorded in four different periods: in less than 8 days, more than 8 days, less than 30 days, and return to play more than 30 days after injury. Twenty-two types of injuries were studied which related to other factors, such as whether the injury was a recurrence, the cause of the injury, whether it was the impact of crash and contact with the other player or a ball, or it was without contact. In the demographic part of the questionnaire, such as age, height, weight, play post, dominant limbs, and history of the previous injury were recorded. The questionnaires were completed through face to face interviews and with the help of doctors and team coaches.

For statistical analysis, we used descriptive statistics such as mean, standard deviation, frequency and percent, and statistical test such as Chi square test (χ^2) to calculating the injury prevalence. The significance level of the tests was $P < 0.05$ by using the SPSS-25 software.

Results

A number of 40 players currently in the premier league country were selected as samples. The mean age of subjects was 22.6 ± 3.8 years, their mean weight was 73.5 ± 10.2 kg, mean height was 179.1 ± 4.7 cm, the mean playing history was 4.3 ± 1.9 and average attendance in the national team was 2.4 ± 1.9 years. In the last year, a total of 63 injuries were observed in 22 games. The results of this study showed that the injury rate was 57.3 per 1000 hours of the match and 33.9 injuries per 1000 hours of training, that the most injuries were in the lower extremity injuries (%69.84) which foot and toes (%33.33), followed by in the knee (%16.83) then the lumbar, sacrum, and pelvic parts were (%14.29). The injuries in anatomical regions report in Table 1.

The most common type of injury repetitively was, strain (%42.86), sprain (%23.81), then contusions, concussion, and hematoma (%19.05) (Table 2).

Table 1. Descriptive of Injuries in anatomical regions

Anatomical regions	N	(%)
Neck/cervical spine	1	1.59
Shoulder/clavicular	3	4.76
Lower back/pelvis/sacrum	9	14.29
spine/ Disc	1	1.59
Elbow/forearm	1	1.59
Hand/ Wrist/ finger/thumb	3	4.76
finger/thumb	1	1.59
Hip/groin	5	7.94
Knee	11	17.46
Ankle	7	11.11
Foot/toe	21	33.33
Total	63	100

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Table 2. Descriptive of Injuries types

Type of injury	N	(%)
Fracture	2	3.17
Dislocation/subluxation	4	6.35
Sprain/ligament injury Muscle tear	15	23.81
bursitis/strain	27	42.86
Hematoma/contusion/bruise	12	19.05
Laceration	3	4.76
Total	63	100

In terms of the type of tissue injuries, tendons (%42.86) and then ligaments (%23.81), and muscles %14.29 were the most common type of tissue injury.

The results showed that the amount of injury during the match (%68.32) was higher than the time of training (%31.68), which was the highest in the first half (%47.37) and in the second half (%21.05) had the lowest percentage of injury. The incidence of injury in outside home games (%68.42) was higher than inside house injury (%31.58). For the incidence of injury in different game results, most injuries occurred in the match which the team won the game (%60.53). The most of the injury happened at the early of the season (%49.21) than in the late of the season (%34.92) and the rest in the mid-season %15.87.

In this study, the return time to play was %31.75 of the players injured within 8 to 21 days, that means the injury was severe, followed by %26.98 of the players over 21 days (very severe) and %23.81 of players in 5 to 7 days (average) and %17.46 of injured players returned to the game in less than 4 days (mild) (Table 3).

Table 3. The severity of injury in terms of time to return to play among the players

severity of injury	(%)	return to play
mild	17.46	less than 4 days
average	23.81	5 to 7 days
severe	31.75	8 to 21 days
very severe	26.98	over 21 days

The dominant leg was %71.74, and significantly more than the non- dominant leg, %28.26.

In terms of the role of the players in beach soccer, the defenders were %42.5 as a higher and goalkeepers were %20 as lower injured in different posts.

For the mechanism of injury, results showed that %77.5 of cases were acute and %22.5 were chronic. The contact injuries (%73.02) were higher than non-contact injuries (%29.62). In non-contact injuries, inappropriate technique %23.81 and over-training accounted for 3.17 percent.

Discussion

The study aimed to investigate injuries of beach soccer players in terms of prevalence and mechanism, which was studied on 40 subjects from two professional teams in the Premier League in a season. In total, most injuries of beach soccer are in the leg, foot and toe region, which also reported in former studies (1, 10), which may be due to the lack of foot covers and shin guards, due to the rules of this sport.

This study showed the main reason for injury was in contact with the other player (%26.98), these results were different from the previous study (1). The cause of this discrepancy might be in gender differences and also the level of players and level of matches.

The literature has been reported the highest prevalence of injuries in the knee and ankle of football players (12- 15). However, in beach soccer, feet and toes and then knee have the most prevalence of injuries respectively, which this difference can be due to the sandy field specifications. Many of the ankle and knee

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injuries occur due to landing on hard surface, or in some of them fixing the lower leg by shoes or cleats and rotating the upper leg. In the sandy field due to the soft surface, stuck and immovable foot in the sand and also imbalance landing and during shooting and contact with the opponent player, are a causality of injuries for the feet, toes, and knees. On the other hand, the unstable landing of players on this soft and changeable ground may increase the risk of lower extremity vulnerability, especially at the ankle and knee (16-18).

In this study, strain, followed by the sprain and then bruising, hematoma, and contusion were the most common types of injury. Haghighi and et.al. Also reported the same results (1). Also, in the soccer studies, the highest prevalence of injuries was reported for a contusion (5, 13, 19), which seems to be expected due to the nature of this kind of contact sports. But in the present study, strain, and sprain had the most prevalence of injuries, which can be attributed to the difference in techniques and how they were executed by the men's beach soccer players. Also, the type of exercise can be involved in accruing injuries.

Results showed most of the injuries happened on the dominant limb (%71.74), which is in line with previous studies (1). Also, there are a few similar reports in soccer (13, 14, 19, 20). However, Hawkins and Fuller (1999) also proved that injuries in the dominant body are significantly higher than the non-dominant limbs (13). It could be due to the use of the dominant leg more than the non-dominant foot in movements such as shooting, dribbling, and other clashing in the ground. Also, it has been reported that in the dominant leg the ratio of muscle strength in the hamstrings to quadriceps is lower than the non-dominant leg (20, 21), although muscle strength was not the objectives of this study, but maybe this disproportion of strength is one of the causes of more injuries in the dominant limb. The players repeatedly shoot, pass, and dribble, by the dominant leg, and this can be changed the ratio of hamstring muscle strength to quadriceps (21).

The results showed forward players and back defenders experienced more injuries, which could be due to the more contact of forward and back defender players in beach soccer. In women, beach soccer reported more injuries of the goalkeepers than the other posts (1).

The level of the game and player could be a reason for changing the prevalence of injuries, in comparison to the present study and a previous study by our research group (4) on a lower level player, the prevalence of injuries is different (cf. 4). Therefore, we suggest restudying the prevalence of injuries at least every 4 to 6 years or by changing the level of players and the games.

In terms of the mechanism of injuries, the contact injuries are more than the non-contact injuries, which was in consistent with the previous study (1), these results are according to a study of the American Committee of health and medical Sports about Young Football Players (7) and also proved by Hawkins and Fuller's study (13). However, it should be noted that beach soccer similar to soccer is a contact sport and the number of clashes is high, and this can be due to the high prevalence of contact injuries in this kind of sport (13, 22, 23).

This study was part of a RCT study and the sample size was small for an epidemiologic study, but the subjects were professional and elite players and most of them were in the world cup level. For this kind of subjects, collecting data is not easy due to some teams' and clubs' confidential policy. The prevalence of injuries in beach soccer have been studied rarely and there is not enough information. The present study in the field of beach soccer, could be mentioned as a prominent feature and strength of this study. However, due to limited access to the subjects, this study was conducted with a small sample size, which is one of the weaknesses of the present study.

Conclusion

Overall it can be concluded that most of the injuries experienced in this field of sport are due to lack of feet covering and shin guards. Beach soccer is a contact sport and these contacts are the main

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cause of injury in beach soccer, which is likely to be effective in preventing injury by changing training, implementing proper techniques, and improving performance factors by using injuries preventive programs.

Conflict of interest

This article is taken from part of the Ph.D thesis related to sports injuries and Corrective Exercises of University of Tehran-Kish International Campus and holds an ethical code number i.e. IR.YAZD.REC.1398.009.

Author Contribution

R.Sh. and H.A. performed the measurements, M.A, M.H.A, and H.A. were involved in planning and supervised the work. R.Sh, M.A, and H.A. processed the experimental data, performed the analysis, drafted the manuscript and designed the figures. All authors aided in interpreting the results and worked on the manuscript discussed the results and commented on the manuscript.

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