

Investigating the Effect of Warm-up Exercises FIFA 11+ on Injury Prevention for Football Athletes: A Narrative Review

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Abstract

Introduction: Football is one of the most popular sports in the world, however, the risk of injury in football players is high. So, it is necessary to do exercises that prevent injury. The FIFA 11+ warm-up program is one of the most recent injury prevention programs developed by FIFA. This program includes warm-up preparation exercises. Recently, many studies have been conducted on the effectiveness of this program in injury prevention. The purpose of this review study was to investigate the effect of FIFA 11+ training on the extent to which football players are injured and their performance. **Methods and Materials:** Using the keywords of Football, Soccer, Injury prevention, FIFA 11, and FIFA 11+ in the Google Scholar, Science Direct, and PubMed databases, related studies were searched from 2002 to 2019. Finally, 6 studies had the inclusion criteria. **Results:** Players who used the FIFA 11+ program reported less damage. Also, those who followed the intermittent exercise program showed a significant improvement in performance and health-related factors. **Conclusion:** FIFA 11+ training is recommended as a type of warm-up exercise due to its ease of use in soccer athletes, as it has been shown that doing this exercise program can significantly reduce the risk of injury in footballers.

Keywords: Athletes, Football, Injury, FIFA 11

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Introduction

Football (soccer) is one of the most popular sports in the world. There are about 400 million football players at different levels in 208 countries (1). Statistics from the International Football Federation demonstrates that the number of people playing in the world of football is 270 million (2). According to the results of previous types of research, the prevalence and risk of injury in this sport is high because this exercise requires a high level of physical fitness (3). Researchers have reported more injuries in this sport than in other ball sports (4). The prevalence of injury among male soccer players is estimated as much as 10 to 35 injuries per 1000 hours of play. This means that every professional male football player suffers a performance-limiting injury approximately every year (5). Most football injuries (60 to 90%) occur in the lower limbs, especially the ankles, knees, and thighs (6). Moreover, some other injuries such as ligament sprain and muscle strain occur especially in

the knee and ankle, which often occur as non-collision events for the athlete. This indicates that the athlete suffers the lack of physical fitness, muscle imbalance, and fatigue (7). Previous studies show that the incidence of injury in football playing increases with age in all age groups. The average incidence of injury in people over 15 years old is between 15 and 20 injuries per 1000 hours of competition (8). Activity in football also carries a high risk of muscle and ligament injuries, although there are many cardiovascular, metabolic and musculoskeletal benefits of participating in this field (9). Given the widespread support of FIFA for this injury prevention program and its development in different countries of the world, the number of people interested in this program is increasing day by day. However, it is necessary to include the FIFA 11+ program comprehensively in the training chapters of the coaching and medical courses to develop this program comprehensively all over the world to study and research in all continents and countries (10).

Table 1. Stage 1: Running exercises, 8 minutes (starting warming up, in pairs; Path consists of 6-10 pairs of parallel cones)

Exercise	Repetitions
Running Straight Ahead	2
Running Hip Out	2
Running Hip In	2
Running Circling Partner	2
Running Shoulder Contact	2
Running Quick Forwards and Backwards	2

Table 3. Stage 3: Running Exercises, 2 minutes (End of heating)

Exercise	Repetitions
Running across the pitch	2
Running bounding	2
Running plant and cut	2

The FIFA 11 exercises program consists of three steps with 15 specific exercises (Tables 1, 2, and 3 summarize the various steps performed). Techniques need to be performed correctly and with an emphasis on maintaining the correct posture of the body.

These exercises emphasize maintaining the correct alignment of the lower limbs, the correct position of the knees, and performing exercises in a soft and slow manner. This exercise program should be done at least twice a week. At least 10 to 12 weeks should be repeated to achieve beneficial results from this exercise program (11). On the other hand, studies have shown that these exercises may reduce the risk of injury in sports and have a preventive aspect. Therefore, this shows the importance of these exercises in athletes. On the other hand, so far no study has reviewed the effect of these exercises. Therefore, the purpose of this research was to determine the effect of these exercises on the prevention of athletes' injuries.

Methods and Materials

The search strategy was conducted in the Google Scholar, Science Direct, and PubMed databases from 2002 to 2019 using the keywords of Football, Soccer, Injury prevention, FIFA 11, and FIFA 11+. Then, the papers were reviewed based on the inclusion criteria and exclusion criteria. The inclusion criteria included studies examining the implementation of the FIFA 11+ exercises program on male and female football players over 13 years old. Only Randomized Clinical Trial (RCT) studies were reviewed. The exclusion criteria were studies that worked on fields other than football, case reports, and studies for which only an abstract was available, and non-English-language studies.

Table 2. Stage 2: Strength, plyometric, balance, 10 minutes

Stage 2 : Strength, plyometric, balance, 10 minutes	
Exercise	Repetitions
The Bench:	
Level 1: static	3×20-30 sec
Level 2: alternate legs	3×20-30 sec
Level 3: one leg lift and hold	3×20-30 sec
Sideways Bench:	
Level 1: static	3×20-30 sec (each side)
Level 2: raise and lower hip	3×20-30 sec (each side)
Level 3: with leg lift	3×20-30 sec (each side)
Hamstrings	
Level 1: Beginner	3-5
Level 2: Intermediate	7-10
Level 3: Advanced	12-15
Single-leg Stance	
Level 1: hold the Ball	2×30 sec
Level 2: throwing ball with partner	2×30 sec
Level 3: test your partner	2×30 sec
Squats:	
Level 1: with toe raise	2×30 sec
Level 2: walking lunges	2×30 sec
Level 3: one leg squats	2×30 sec (each leg)
Jumping	
Level 1: vertical jumps	2×30 sec
Level 2: lateral jumps	2×30 sec
Level 3: box jumps	2×30 sec
Stage 3: Running Exercises, 2 minutes (End of heating)	
Exercise	Repetitions
Running across the pitch	2
Running bounding	2
Running plant and cut	2

Results

A total of 29 related articles were obtained in the initial search among articles published from 2002 to 2019 in these three databases among which 8 papers were in the form of Systematic Review and 21 papers were in the form of RCT. Finally, 6 papers conducted in different countries were found to be eligible in the field of football injury prevention after reviewing the titles, abstracts, and full text of the articles. All of these papers investigated the effect of FIFA 11+ exercises on preventing football injuries. These types of research showed that athletes who used FIFA11 + exercises to prevent injury had a lower injury rate than those who did not perform any preventive training.

Table 4. Characteristics of the studies included in the review study

Study	Study design	Participants' Characteristics	intervention time	Intervention groups	The dependent variables	Results
Owoeye (12)	RCT	414 male players aged 14 to 19 years old from the African League	20 minutes and 2 sessions per week for 6 months.	Two groups; The first group was the intervention group with warm-up exercises FIFA11 +the, second group was the control group of the usual warm-up method.	rate of injury in the lower limbs and the whole body as well as the severity of the injury	The risk of whole body injuries was significantly lower by 41% and lower extremity injuries by 48% in the intervention group. There was no significant difference between the two groups in the severity of injuries.
Silver (13)	RCT	1525 American male football players 18 to 25 years old	20 minutes and 2 sessions per week for 8 months	Two groups; The first group was the intervention group with FIFA11 + warm-up exercises, the second group was the control group, the usual warm-up method.	incidence rate of injury	The risk of injury was 46% lower in the intervention group than control group.
Steffen (14)	RCT	2092 Canadian female football players aged 13 to 18 years old	2 to 3 sessions per week for 4.5 months	Two groups. The control group performed FIFA11+exercises with training through the website, and the intervention group performed FIFA11+exercises under the supervision of an instructor.	injury risk	Injury risk was lower in the intervention group but the difference was not statistically significant.
Hammes (15)	RCT	265 45-year-old veteran male footballers	One session per week for 9 months	Two groups. The first group was the intervention group with FIFA 11+ warm-up exercises and the second group was the control group with the usual warm-up method.	injury incidence and severity of injury	Injury risk was not significantly different between the two groups, but high-intensity injuries were significantly lower in the intervention group.
Steffen (16)	RCT	2092 Norwegian female football players aged 13 to 18	15 minutes and one session per week for 8 months	Two groups. The first group was the intervention group with FIFA 11 warm-up exercises and the second group was the control group with the usual warm-up method	injury risk	Injury risk was not significantly different between the two groups.
Longo (17)	RCT	121 professional male basketball players 13 to 19 years old	3 to 4 sessions per week for 9 months.	Two groups. The first group was the intervention group with FIFA 11+ warm-up exercises and the second group was the control group with the usual warm-up method.	rate of injury in the lower limbs and the whole body as well as the severity of the injury	The rate of total injuries as well as the severity of injuries in the intervention group was significantly lower than the control group.

The FIFA Research and Evaluation Group developed a FIFA 11 warm-up program to prevent injury in 2004. The main purpose of this program was to strengthen the muscles of central stability, increase neuromuscular control, and increase agility and ability of football players. Steffen et al. evaluated the effect of this injury prevention program on 14 to 18 years old girls. The results of this research did not show any difference in the incidence of general injuries in the two groups. The researchers mentioned the reason for no different due to the lack of proper acceptance of the program by coaches and players (16).

Steffen et al. (14, 16) as well as the Hammes et al. (15) did not showed positive results from FIFA11+ exercises. The results of studies with positive effects of FIFA11+ exercises on football players are shown in Table 4. This exercise program consists of three stages with 15 specific exercises (Tables 1, 2, 3 summarize the different steps of doing these exercises).

Discussion

FIFA 11+ exercises are recommended in different countries of the world due to its ease and effectiveness. The results showed that the teams that implemented the FIFA 11+ program had between 30 and 70% less injuries (9, 18). In addition, the implementation of the FIFA 11+ program was associated with a 35% reduction in sports injuries as well as improvement in functional and motor aspects of athletes (19). Soligard *et al.* (20) obtained positive results for FIFA training. They conducted 1.3 exercise sessions per week and repeated the exercises for 10 weeks. They concluded that the risk of lower limb injuries in young 13 to 17 years old female soccer players decreased (20). In a previous review, the results showed that FIFA 11+ could reduce injury in football players who play as amateurs or entertainers (18). Another review study also showed that FIFA's warm-up program could reduce the risk of injury in football players by 30% (9).

The effectiveness of the FIFA 11 + program in reducing lower limb injuries indicates the effectiveness of these injury prevention exercises in athletes. Some RCT studies also have showed the injury prevention programs that target football players can also decrease injuries (21, 22). Four studies reported that the implementation of FIFA 11+ program leads to a statistically significant reduction in the risk of injury (12, 13, 18, 19, 23). Two studies did not report a significant reduction in the incidence of injury after the implementation of this program (14, 15). The lack of compliance of the intervention group for the accurate implementation of this program has been mentioned as one of the reasons for the lack of a significant effect following the implementation of this program (16). Another reason for the failure of this program in these two studies was the small number

of exercise sessions and the small number of samples (15). The differences in the characteristics of the participants can also explain the differences in the findings in these studies. Injury patterns and risk factors for injury are affected by gender, age, and level of play and weather conditions, and differences in geographical location. For this reason, the effect of a warm-up program such as FIFA 11+ may vary in various communities. One of the important points in studies related to FIFA 11+ exercises is the duration of these exercises. The minimum time required to expect positive results from these exercises is 10 to 12 weeks (8). However, there is no standard period for performing these exercises in studies, and it varies from a number between 4.5 months to 9 months.

Generally, the results of the studies showed FIFA 11+ reduced the incidence of sports injuries in football players at least 30%, which included 60% for hamstring injuries, 48% for knee injuries, 41% for thigh and groin injuries, and 32% for ankle injuries. The best results of FIFA 11+ are obtained by doing two exercise sessions a week during the season, which should be performed under the supervision of trained coaches. Complete information is not available about the possible side effects of doing this type of exercise (18).

While the FIFA 11+ program seems to be a useful and effective program in reducing the risk of injury at the amateur level, it is necessary to make changes in this exercise program in the field of progress of these exercises by increasing the volume and intensity of exercises with more emphasis on more important harmful factors such as deep sense exercises. Therefore, football players can also play an important role in reducing the risk of injury at higher levels. So far, more than 5,000 coaches from around 40 countries have been trained on implementing FIFA + (11). Convincing coaches in all FIFA member federations to implement this program and evaluate its results is a major challenge.

Conclusion

The evidence indicated that a warm-up program based on FIFA 11+ exercise can reduce the rate of injury in male and female football players, which also improve athlete function. Given the large number of people who play football, FIFA 11+ can be considered as a major intervention in reducing the risk of injury in athletes. This program can have a significant effect on minimizing potential negative consequences, such as direct and indirect health care costs and the lost time productivity of athletes and teams. Finally, the issues related to the proper training of coaches and athletes should be considered as important factors in the success of this program.

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Both authors made substantial contributions to the conception, design, analysis, and interpretation of data.

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