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Opportunities for Reducing Injury Rates Among Youth Amateur Football Players

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Abstract

Background: Injury rate is an important characteristic of any sport, with football occupying one of the leading positions in this indicator. Reducing injury frequency is a primary goal of sports medicine.

Objective: To evaluate the impact of the "FIFA 11+" program on the frequency and structure of injuries in amateur football players aged 15–17.

Methods: A retrospective cohort study was conducted over two time intervals of 4 months each. In the first period warm-ups before training sessions and matches were performed arbitrarily. In the second period the "FIFA 11+" injury prevention program was used. The injury incidence rate (IR), severity, and location of injuries were evaluated.

Results: The use of the "FIFA 11+" led to a significant decrease in the overall incidence rate (IR decreased from 31.9 to 17.1). At the same time, injuries decreased mainly due to moderate ($p=0.003$) and mild ($p=0.02$) injuries. Furthermore, the analysis of the injury structure within each study period revealed a significant change, showing a shift toward less severe injuries.

Conclusion: The application of the "FIFA 11+" program in the training/match process of amateur football players aged 15–17 significantly reduces the incidence rate and lowers the proportion of severe and moderate injuries.

Keywords: Incidence Rate, Injury Prevention in Football, "Fifa 11+" Injury Prevention Program

Introduction

Football is one of the most popular sports in the world, with more than 400 million people participating annually. Youth engagement in this sport is high across all countries, including Russia. As a contact sport, football occupies one of the leading positions in injury frequency. An analysis of children's and adolescents' sports injuries showed that about 75% of injuries occur in football, basketball, American football, and baseball, with the highest number of medical visits being linked specifically to football. In addition to contact injuries, athletes perform a large number of high-inertia movements during the game, which leads to an increased risk of non-contact injuries. Analysis of the football injury structure shows that approximately 60–90% of sports injuries in adolescents occur in the lower extremities, with the ankle joint, knee joint, and thigh being affected most frequently. The sustained injuries undoubtedly affect the continuity of the training process and the athlete's professional training. In this regard, methods to reduce injury rates are being developed, one of which is the "FIFA 11+" injury prevention program [1-8].

"FIFA 11+" is a comprehensive warm-up program designed to reduce the risk of injuries in football players aged 14 and older. It was created in 2006 jointly by the FIFA Medical Assessment and Research Centre (Switzerland), the Oslo Sports Trauma Research Center (Norway), and the Santa Monica Orthopaedic and Sports Medicine Research Foundation (USA). The purpose of these exercises is to reduce the number of sports injuries by developing proper body stabilization techniques, including dynamic stabilization, performing eccentric training of the thigh muscles, proprioceptive training, and plyometrics.

Study Aim: To evaluate the impact of the "FIFA 11+" injury prevention program used during warm-ups in the training process and before matches on the frequency and structure of injuries in amateur football players aged 15–17.

Study Objectives

- To evaluate the frequency and structure of injuries in amateur football players aged 15–17 during a 4-month training and match process without using the "FIFA 11+" program.
- To evaluate the frequency and structure of injuries in amateur football players aged 15–17 during a 4-month training and match process with the use of the "FIFA 11+" program.
- To conduct a comparative analysis of the obtained data.

Study Design

A retrospective cohort study was conducted to analyze injury data among teenage boys aged 15–17 years participating in the "Troparevo" district football league in Moscow. The study took place during the preparatory and competitive periods from September 2025 to April 2026. It was divided into two distinct time intervals. The first period ran from September to December 2025 inclusive, during which pre-training and pre-match warm-ups were performed arbitrarily. The second period ran from January to April 2026 inclusive, during which the warm-up before training sessions and matches was conducted using the "FIFA 11+" program.

Materials and Methods

An analysis was performed on written reports from the coach and medical staff for each training session and game. These records specified the number of players, the duration of the training session or game, as well as the number, location, and severity of injuries sustained. They also included recommendations regarding the recovery period during which the player was sidelined from football activities. Sustained injuries were recorded in accordance with the FIFA Medical Assessment and Research Centre (F-MARC) consensus recommendations on injury data collection procedures in football.

Data from 14 amateur football players aged 15–17 years were analyzed. During the first 4 months, the pre-training and pre-match warm-ups lasted 25–35 minutes and included running, strength, balance, and plyometric exercises randomly selected by the coach (such as jump rope, high knees, lunges, squats, planks, and squat jumps). Following a decision by the coaching staff, the warm-ups during the subsequent 4 months also lasted 25–35 minutes but consisted exclusively of exercises from the "FIFA 11+" program.

The Incidence Rate (IR) was calculated as the number of injuries per 1000 player-hours of football exposure. The Incidence Rate (IR) was calculated using the following formula: $IR = (N / \Sigma PD) \times 1000$, where N is the number of injuries in the study group during the study period; ΣPD is the total player-hours of all training sessions/matches during the study period; $\Sigma PD = P_1 \times D_1 + P_2 \times D_2 + \dots + P_n \times D_n$, where P is the number of players participating in a single training session/match; D is the duration of a single training session/match in hours; n is the total number of training sessions/matches. Injury patterns were evaluated by anatomical location (corresponding to the injured body region) and by severity level. Severity was determined by the number of days the athlete was unable to fully train, starting from the day following the injury: Grade I – minimal (1–3 days); Grade II – mild (4–7 days); Grade III – moderate (8–28 days); Grade IV – severe (more than 28 days) [9–11].

Statistical Methods

Due to the small sample size, the non-parametric Wilcoxon signed-rank test for two related samples was used. Differences in incidence rates and the number of injuries by severity level were determined for the first and second study periods. Changes in the indicators were considered statistically significant at $p < 0.05$.

Results

During the first study period, total training and match time was 81 hours (972 player-hours), while the second period recorded 78 hours (936 player-hours). Data regarding the number and severity of injuries sustained during these periods are presented in Table 1.

Location	1st Study Period					2nd Study Period				
	n	Severity, grade				n	Severity, grade			
		I	II	III	IV		I	II	III	IV
Head	1	0	1	0	0	1	0	1	0	0
Shoulder	1	0	1	0	0	0	0	0	0	0
Forearm	1	0	1	0	0	1	0	1	0	0
Elbow	0	0	0	0	0	1	0	1	0	0
Hand	2	0	1	1	0	2	1	1	0	0
Groin region	4	0	2	2	0	2	1	1	0	0
Back	1	0	1	0	0	1	0	1	0	0
Hamstring	5	1	2	2	0	2	1	0	1	0
Anterior thigh	2	0	1	1	0	0	0	0	0	0
Knee joint	3	0	1	1	1	1	0	1	0	0
Anterior lower leg	4	0	2	2	0	2	0	1	1	0
Posterior lower leg	2	0	1	1	0	0	0	0	0	0
Ankle joint	3	0	1	1	1	1	0	1	0	0
Foot	2	0	1	1	0	2	1	1	0	0
Total	31	1	16	12	2	16	4	10	2	0

Table 1: Distribution of Injuries by Anatomical Location and Severity

As shown in the presented data, the vast majority of injuries involved the lower extremities and the groin area. Specifically, during the first study period, the highest number of injuries was related to the hamstrings (5 cases), groin ligaments and the anterior lower leg (4 cases each), as well as the knee and ankle joints (3 cases each). Severe injuries were associated with ligament damage in the aforementioned joints (1 case each). In the second study period, injury localization did not undergo significant changes—injuries to the groin area, hamstrings, and the anterior lower leg were also detected most frequently (2 cases each). However, along with the reduction in the total number of injuries, there was a shift in their distribution toward a lower proportion of severe and moderate injuries, and a higher proportion of mild and minor injuries. Notably, the number of mild injuries was the highest in both the first and second study periods. A comparative analysis of overall injury rates and injury severity during the study periods is presented in Table 2.

	Incidence Rate		Injury Severity Grade, n (%)			
	n	IR	I	II	III	IV
1 st Study Period	31	31,9	1 (3,2%)	16 (51,6%)	12 (38,7%)	2 (6,5%)
2 nd Study Period	16	17,1	4 (25,0%)	10 (62,5%)	2 (12,5%)	0
Wilcoxon test, p	0,019*	0.073	0.02*	0.003*	0,083	

*Statistically significant (p < 0.05)

Table 2: Overall Injury Rate and Severity

Thus, when comparing the two periods, a significant decrease in the overall injury incidence rate was observed following the use of the “FIFA 11+” program (IR decreased from 31.9 to 17.1 injuries per 1000 player-hours of training/matches). This reduction in injury rates was mainly driven by a decrease in moderate injuries (p=0.003) and mild injuries (p=0.02). Furthermore, the analysis of injury rates within each study period revealed a substantial change in its structure, showing a clear shift toward less severe injuries (Figure 1).

Effectiveness of the "FIFA 11+" Program in Reducing Injury Rates in Amateur Football Players Aged 15–17

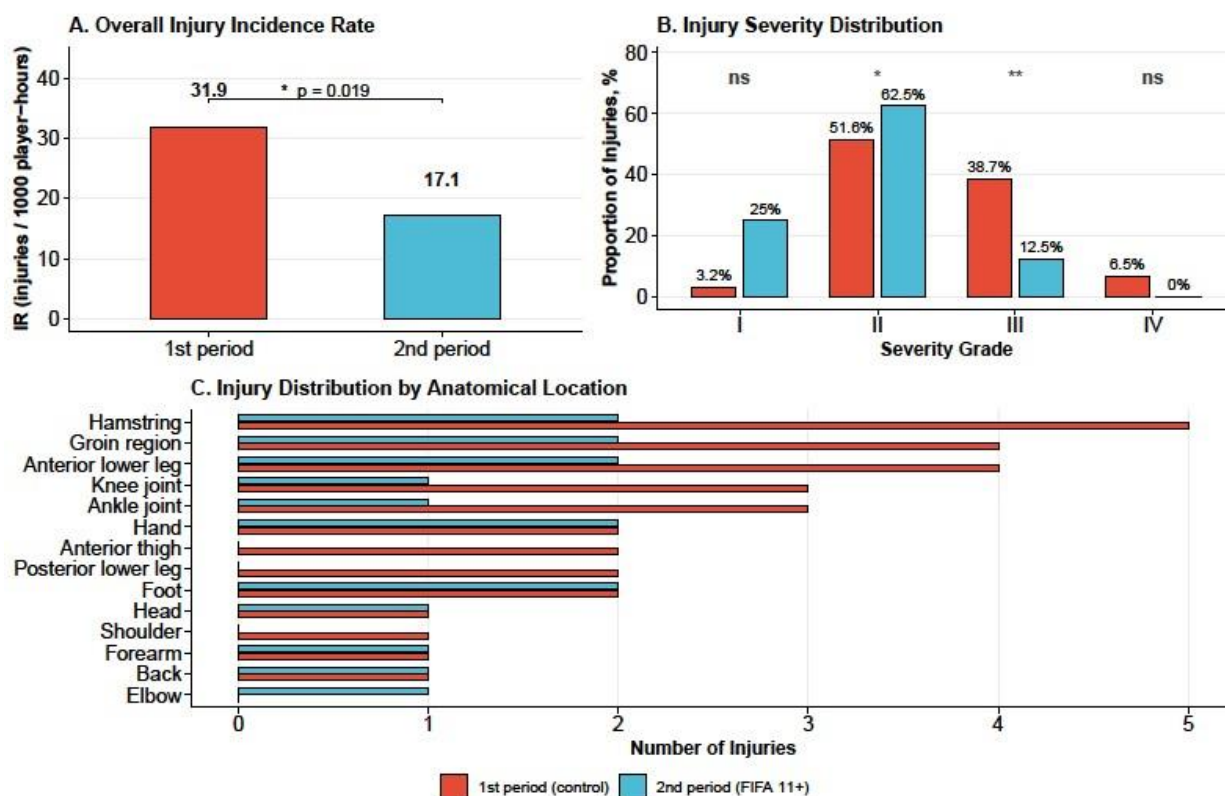


Figure 1

Discussion

Overall injury status represents an important characteristic of any sport. Concurrently, one of the primary goals of sports medicine is to reduce the probability of sustaining injuries. To achieve this goal, an international expert panel from medical research centers under the auspices of FIFA developed the "FIFA 11+" injury prevention program, designed for amateur players aged 14 and older. Numerous studies have demonstrated the effectiveness of this program in preventing injuries, particularly non-contact injuries, among football players of various age groups and skill levels. The positive outcomes of research addressing various aspects of the "FIFA 11+" program, as well as its adaptation to other sports such as basketball, drive significant interest toward a wider implementation of this exercise protocol [12-14].

In our study, a relatively high baseline injury rate was noted in the observed cohort, which could be attributed to insufficient physical conditioning of the athletes and the amateur nature of the matches. Analysis of the baseline injury structure revealed a considerably high frequency of mild and moderate injuries, aligning with data from other researchers regarding non-professional players. The primary localization of injuries involved the lower extremities and the groin area, which also coincides with literature data. Hamstring injuries occupied a leading position, potentially resulting from inadequate conditioning of the hamstring muscles. Meanwhile, severe injuries were exclusively associated with the joints of the lower extremity [15-18].

As a result of implementing the "FIFA 11+" program, the overall injury rate significantly decreased, which aligns with findings from numerous researchers. Injury localization did not undergo substantial changes. Although lower extremity injuries still played a leading role, the frequency of injuries to the hamstrings, groin area, lower leg, and joints dropped significantly. This reduction could reflect the specialized warm-up and conditioning these structures receive during the "FIFA 11+" program.

Concurrently, the injury structure underwent significant changes, characterized by a complete absence of severe injuries and a reduced frequency of moderate injuries, alongside an increased proportion of mild and minor injuries. This shift could be attributed to increased physical strength in the athletes, improved proprioception, and the development of skills for body position control and load redistribution across the ligamentous and joint apparatus. Our findings align with the results of a study by Marques C. et al., which demonstrated that injury severity directly depends on the players' training and professionalism levels. Our data also closely concur with the research results published by Soligard T., Silvers-Granelli H. and Thorborg K. Thus, the use of the "FIFA 11+" program made it possible to reduce the overall injury incidence rate in the study group and shift its structure toward less severe injuries.

Conclusion

The application of the "FIFA 11+" injury prevention program as a warm-up routine in the training and match process of amateur football players aged 15–17 significantly reduces the incidence of injuries and lowers the proportion of severe and moderate injuries.

Author Contributions

Conceptualization, E.M.; Methodology, M.A.; software, E.M.; formal analysis, E.M.; investigation, E.M.; resources, E.M.; data curation, E.M.; writing-original draft preparation, E.M.; writing-review and editing, M.A.; supervision, M.A. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

Ethical review and approval were waived for this study due to its retrospective nature and the lack of direct contact with the participants. Data processing was performed on anonymized, aggregated reports to protect participant identity.

Informed Consent Statement

Participant consent was waived due to the retrospective nature of this study and the absence of direct contact with the participants. Data from the information reports were processed in an aggregated format without identifying the individual participants.

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Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

FIFA - Fédération Internationale de Football Association

IR - Incidence Rate

F-MARC - FIFA Medical Assessment and Research Centre

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