Effects of the FIFA 11+ injury prevention program on lower limb strength and balance

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Abstract:

The purpose of this study was to evaluate the effects of the injury prevention program FIFA 11+ (level 2) application, on lower limb balance ability and strength, as an effective approach of reducing injury risk in male soccer players. Thirty-two players were randomly divided into two groups (N = 16 each), one control group (CON group), and one training group (INT group). The INT group followed the FIFA 11+ injury prevention program, 3 times per week for 8 weeks. The CON group continued the usual warm-up. Biodex Stability System was used to assess balance ability in both groups at baseline and after the completion of FIFA 11+ program. Additional isokinetic knee joint moment measurements (concentric flexors/extensors and eccentric flexors) performed at two different angular velocities, first at 60°/s and then at 180°/s. Statistical significant differences were found, after the completion of the FIFA 11+ training program, in stability index (total and anterior – posterior) ($p < .05$), in concentric and eccentric flexors strength ($p < .05$) and conventional H/Q ratio ($p < .05$). Application of the FIFA 11+ injury prevention program for 8 weeks can improve lower limbs balance ability and hamstrings muscle strength, elements which are very important for prevention of hamstring muscle strains and lower limb ligament injuries in soccer.

Key Words: soccer, balance, strength, training, injury prevention.

Introduction

Soccer is the most popular sport in the world. The number of people playing soccer is close to 270 million (FIFA, 2007). In addition soccer is a high-intensity intermittent contact sport, with many dynamic and explosive movements (Dellal et al., 2011; Owen, Wong, McKenna, & Dellal, 2011). These factors lead to an increased muscle fatigue and a substantial risk of injury (Dellal, Lago-Penas, Rey, Chamari, & Orhant, 2015; Dupont et al., 2010). Fatigue or overload of muscles during a game leads to an increase of injuries in the last 15 minutes of each half of the match (Woods et al., 2004). This notion is supported by experiments showing that hamstrings muscles strength decreased at the end of the first and second half (Marshall, Lovell, Jeppesen, Andersen, & Siegler, 2014).

As concern the injuries during soccer games, most injuries affected lower extremity 70%, the ankle (19%), lower leg (16%) and head/neck were the predominantly injured body parts (Junge & Dvorak, 2013). Also, Eirale, Farooq, Smiley, Tol and Chalabi (2013) listed professional player's injuries for one season and found that more than 1/3 of all injuries were muscular injuries, with hamstrings injuries to have the highest rate. Similarly, Häggglund, Waldén and Ekstrand (2013) supported that 30% of all injuries were at the posterior thigh muscles, with Ekstrand et al., (2011) reported that injury rate was 0.5 to 1.5 times / 1000 hours of participation in soccer. These rates of injuries in soccer are not just random. The majority of these injuries occur during running or sprinting with eccentric contraction of these muscles, in an attempt to slow down the extent of the knee (Heiderscheit et al., 2005; Schache, Wrigley, Baker, & Pandy, 2009).

The benefits of warm-up are known for preparation and protection of athletes' body before participating in sports (Subasi, Gelecek, & Aksakoglu, 2008). It is widely accepted that a “good” or “appropriate” warm-up programme should be able to improve performance (via post activation potentiation, decrease in stiffness, rise in core temperature and resting oxygen consumption (Bishop, 2003). An adjustment of warm-up with specialized exercises can lead to injury prevention (Mandelbaum et al., 2005; Waldén, Atroshi, Magnusson, Wagner & Häggglund, 2012).

The International Federation of Association Football (FIFA), through the Medical Assessment and Research Centre has developed a comprehensive soccer warm-up program, the FIFA 11+, to reduce the incidence of soccer injuries (F-MARC, 2013). It is a complete warm-up package that can replace the typical

soccer warm-up before the training (Bizzini et al., 2013). The main objective of this program is the training of neuromuscular control, proper posture and control of the body during the exercises (Bizzini, Junge, & Dvorak, 2011). According to a recent survey, the participation of young players in the injury prevention program FIFA 11+ for six months and a frequency of 2 times / week resulted in a reduction in total injuries to 41% and a reduction in overall injuries of the lower limbs up to 48% (Owoeye, Akinbo, Tella, & Olawale, 2014). In addition, higher participation in the FIFA 11+ program can improve functional balance and significantly reduce the risk of injury to the lower limbs (Steffen et al., 2013). In light of the above considerations, the aim of the present study was to investigate the effects of the injury prevention program FIFA 11+ (level 2) application, on lower limb balance ability and strength, as an effective approach of reducing injury risk in Greek soccer players.

Material & methods

Study design

Study was a parallel, two-group, pre-post, randomized controlled trial. Using a restricted blocked randomization where each block corresponded to a team, the players were randomized within each team in the two groups (control vs. "FIFA 11+") using a computer generated sequence. Allocation and randomization were completed by one of the researchers without any contact or knowledge of the players. Therefore, no allocation concealment mechanisms were necessary. Two external fitness coaches were assigned to each team for administrating "FIFA 11+", and for checking the warm-up and assisting the coach during the normal warm-up (control group) in order to prevent contamination bias. Contamination was also controlled for by interviewing the players and staff regarding the warm-up components before the study, and by asking a research assistant to supervise the warm-up routines and physical training prior to the commencement of the study. The same research assistant made unannounced and random visits to the teams during the study to check the correct execution of the study protocol (Impellizzeri et al, 2013). The experimental procedures complied with the Helsinki declaration of 1975 and were approved by the Ethical Committee of the Democritus University of Thrace. All the participants were informed about the study, and they gave their written informed consent.

Participants

The study was conducted on 32 young male soccer players (age 19 ± 1 years; body mass 72 ± 6 kg; body height 178 ± 6 cm; mean $\pm$ SD) participating in the young championship of the first Greek division. The participants were free of serious injuries in the lower limbs for the past year. The experimental procedures complied with the Helsinki declaration of 1975 and were approved by the Ethical Committee of the Democritus University of Thrace. The participants were randomly divided into two subject groups ($n=16$ each), one control group (CON group), and one intervention group (INT group) that performed FIFA 11+ injury prevention program. The participant's characteristics are shown in Table 1.

Interventions

Control Group

The traditional warm up involved a combination of running, stretching, technical exercises with the ball and small sided games. The total duration was about 20-25 minutes.

Intervention group

The players of this group performed the warm-up program FIFA 11+ (level 2). The "level 2" is the second level of difficulty of the program FIFA 11+ (www.f-marc.com/11plus). Before the beginning of the study, the group participated in a two day course (including a theoretical part and a practical part of FIFA 11+ exercises). Therefore, it decided to reach the second level of difficulty of the program FIFA 11+, because players performed correctly for the requested time the exercises of the level 1, so they could proceed to the next level of difficulty. The players performed "The FIFA 11+" (level 2) three times a week for eight weeks replacing their normal warm-up routine. The mean duration of the protocol was about 20-25 minutes.

Measurements

Muscle strength and balance ability was assessed in all subjects at baseline and after the completion of the 8-week intervention program.

Isokinetic Measurement

For the isokinetic measurement used an isokinetic dynamometer (Isoforce, TUR GmbH, Berlin, Germany). Participants were stabilized at a seated position on dynamometer's chair by pelvic strapping with their back slightly reclined, their thighs well supported on the seat and with their hands around the chest. The axis of rotation of the dynamometer was aligned with the femoral condyle of the knee. Also, the special lever arm was adjusted according to the length of the tibia and eventually adjusted above the ankle, over the medial malleolus. The test's knee range of motion of the subject was defined 0° (full knee extension) to 90° . After a five min warm-up on an ergometer (50 - 100W), followed by 10 minutes of active stretching of the lower limbs (Rahnama, Lees and Bambaecchi, 2005), concentric peak torque (PT) of knee extensors and flexors were measured. Testing included one session of three maximal knee extension/flexion repetitions at each tested speed ($60^\circ/\text{s}$ and $180^\circ/\text{s}$) in a random order, separated by one minute rest intervals. Also, eccentric measurements of knee flexors muscles consisted of three maximal contractions at $60^\circ/\text{s}$. Eccentric trials were performed as discrete movements in a single direction (i.e. non-reciprocal). Participants recovered passively for one minute

between series of measurements. The highest value tested for each velocity was recorded. Three minute rest was given for machine resetting and evaluation the other leg. The intra-class correlation coefficients for repeated measurements ranged between 0.92% and 0.94%.

Balance assessment

The balance ability assessment was performed with the Biodex Stability System (Biodex Medical Systems, USA; Arnold and Schmitz, 1998; Testerman and van der Griend, 1999; Paterno et al., 2004). The participants maintained single-limb stance for 20 seconds, with the Biodex platform set to freely move by up to 20° from level in any direction. From the variance of the platform displacement (°) in the antero-posterior and medio-lateral directions from level during the test, the Biodex system computed three different indices; the total stability index (SI), anterior-posterior index (API) and the medial-lateral index (MLI) (Rozzi et al., 1999). Three test trials were carried out and the one with the lowest SI (best performance) was further processed.

Statistical Analysis

Data are presented as means $\pm$ standard deviation. For the statistical analysis of the collected data was used the statistical program SPSS Statistics 20.0 Software for Windows. Anthropometric data and attendance rates of INT and CON players were analyzed using the independent samples t-test. A two-way (2×2) ANOVA design with repeated measures was applied to examine the possible interaction between groups (11+ vs control group) and the time (pre- and post-tests) intervention phases. As for statistical significance, the Sidak Multiple Comparisons Test was conducted to determine pairwise differences. The Levene's test was employed for assessing homogeneity of variance among groups. A significant level was accepted at the 95% confidence level for all statistical parameters ($p < .05$).

Results

There were no differences between groups in all dependent variables examined at baseline. The anthropometric measures remained unaltered throughout the experimental period in both groups (Table 1).

Table 1. Anthropometric Characteristics

Variables	FIFA 11+ (mean values $\pm$ std. error)	CONTROL
Age (yrs.)	18.8 $\pm$ 0.8	19.3 $\pm$ 0.8
Weight (kg)	72.7 $\pm$ 6.5	72.6 $\pm$ 6.9
Height (cm)	179.3 $\pm$ 6.4	177.0 $\pm$ 6.1

Balance

The means of Balance measurements in pre-test and post-test of the groups are presented in Table 2. Two Way Repeated Measures Analysis for Total SI variable found statistically significant interaction between the factors time and group ($F_{(1, 30)} = 4.772$, $p = 0.037$) in the dominant and ($F_{(1, 30)} = 13.751$, $p = 0.001$) non-dominant limb. Analyzing the interaction of each (INT and CON) found a statistically significant effect of time factor only in INT group by 17% in the dominant ($p = 0.001$) and by 19% in the non-dominant limb ($p = 0.00002$). Also, statistically significant interaction found in AP SI variable in the dominant ($F_{(1, 30)} = 6.232$, $p = 0.018$) and non-dominant leg ($F_{(1, 30)} = 5.682$, $p = 0.024$). Sidak Multiple Comparisons Test results indicated significant differences between time only in INT ($p = 0.027$) by 19% in the dominant ($p = 0.0004$) and by 16% in the non-dominant limb ($p = 0.0002$). No statistically significant differences were obtained for the ML SI index in both groups.

Table 2. Balance Measurement

	Dominant			Non-dominant		
	Pre	Post	Δ (95% CI)	Pre	Post	Δ (95% CI)
FIFA 11+						
TOTAL SI	4.03 $\pm$ 1.44	3.36 $\pm$ 1.15	0.66 (0.28 to 1.05)***	4.66 $\pm$ 1.92	3.59 $\pm$ 1.57	0.08 (0.50 to 1.22)***
AP SI	3.52 $\pm$ 1.40	2.83 $\pm$ 1.44	0.68 (0.33 to 1.04)***	4.11 $\pm$ 1.79	3.47 $\pm$ 1.67	0.64 (0.33 to 0.95)***
ML SI	2.16 $\pm$ 0.65	2.08 $\pm$ 0.61	0.08 (-0.17 to 0.33)	2.45 $\pm$ 0.83	2.44 $\pm$ 0.97	0.006 (-0.34 to 0.35)
CONTROL						
TOTAL SI	3.66 $\pm$ 1.17	3.58 $\pm$ 0.99	0.08 (-0.30 to 0.47)	3.99 $\pm$ 1.42	4.05 $\pm$ 1.35	-0.56 (-0.41 to 0.30)
AP SI	3.08 $\pm$ 1.15	3.01 $\pm$ 0.90	0.75 (-0.27 to 0.42)	3.45 $\pm$ 1.39	3.31 $\pm$ 1.20	0.13 (-0.17 to 0.44)
ML SI	2.16 $\pm$ 0.62	2.25 $\pm$ 0.59	-0.08 (-0.34 to 0.16)	2.49 $\pm$ 0.98	2.36 $\pm$ 0.81	0.13 (-0.21 to 0.47)

* $p < .05$; ** $p < .01$; *** $p < .001$

Isokinetic Measurement

The means of isokinetic assessments in pre-test and post-test of the groups are presented in Table 3. The results showed significant interaction between time with group at CON 60°/s in the dominant ($F_{(1, 30)} = 8.511$, $p = 0.007$) and significant main effect between the time in non-dominant limb ($F_{(1, 30)} = 7.163$, $p = 0.012$). The Sidak test showed that the peak torque (PT) of hamstrings were significantly increased in INT by 15% ($p = 0.00006$) and 8% ($p = 0.004$), respectively. No statistically significant differences was observed for both knee extensors at 60°/s and 180°/s, and for the knee flexors at 180°/s in both groups. Significant interaction between times with

group was found for eccentric hamstring strength in the dominant ($F_{(1, 30)} = 5.793$, $p = 0.022$) and non-dominant limb ($F_{(1, 30)} = 4.989$, $p = 0.033$). Sidak test showed that the peak torque (PT) of eccentric muscle contraction on hamstrings were significantly increased in INT by 8% ($p = 0.043$) and 6% ($p = 0.012$), respectively.

Table 3. Isokinetic Measurement

	Dominant			Non-dominant		
	Pre	Post	Δ (95% CI)	Pre	Post	Δ (95% CI)
FIFA 11+						
<i>Extensors 60°/s</i>	224.6±34.9	224.4±34.6	0,18 (-10,92 to 11,29)	230.0±31.9	231.3±31.7	-1,31 (-9,37 to 6,74)
<i>Extensors 180°/s</i>	155.3±29.0	158.7±30.4	-3,43 (-14,62 to 7,76)	156.7±24.3	156.7±21.4	0,18 (-9,94 to 10,32)
<i>Flexors 60°/s</i>	136.9±29.8	156.9±27.2	-20,00 (-28,84 to -11,12)***	130.8±25.0	140.8±26.9	-10,00 (-16,51 to -3,45)**
<i>Flexors 180°/s</i>	104.3±36.7	115.1±28.7	-10,75 (-24,50 to 3,02)	120.5±26.2	112.1±23.4	8,31 (-4,46 to 21,02)
<i>Eccentric Flexors 60°/s</i>	196.1±41.3	210.9±41.6	-14,75 (-29,01 to 0,44)*	194.3±37.9	206.3±34.0	-12,06 (-21,23 to -2,88)*
CONTROL						
<i>Extensors 60°/s</i>	212.8±44.1	209.3±32.7	3,50 (-7,61 to 14,61)	223.0±50.3	223.6±40.1	-0,56 (-8,62 to 7,49)
<i>Extensors 180°/s</i>	146.7±35.6	151.3±30.7	-4,62 (-15,82 to 6,58)	155.3±33.3	146.7±35.6	8,56 (-1,57 to 18,62)
<i>Flexors 60°/s</i>	127.4±23.8	129.5±27.0	-2,12 (-10,98 to 6,79)	112.6±17.2	114.7±15.2	-2,12 (-8,60 to 4,46)
<i>Flexors 180°/s</i>	93.2±22.6	96.5±23.2	-3,31 (-17,05 to 10,46)	86.4±23.7	92.5±17.7	-6,06 (-18,77 to 6,67)
<i>Eccentric Flexors 60°/s</i>	182.4±38.2	173.3±35.8	9,06 (-5,21 to 23,36)	168.4±32.4	166.3±40.9	2,12 (-7,08 to 11,21)

* $p < .05$; ** $p < .01$; *** $p < .001$

Isokinetic moment ratios

The means of conventional H/Q (Hcon/Qcon) and functional H/Q (Hecc/Qcon) ratio in pre-test and post-test of the groups are presented in Table 4. There is a significant main effect between the time in conventional H/Q ratio 60°/s in the dominant ($F_{(1, 30)} = 6.240$, $p = 0.018$) and non-dominant limb ($F_{(1, 30)} = 7.212$, $p = 0.012$). Sidak test showed that in INT group that ratio increased by 9% and 7%, respectively. The results did not show significant interaction between time with group or significant main effects for conventional H/Q ratio at 180°/s and functional H/Q ratio for both groups in both limbs.

Table 4. Conventional and Functional Ratio

	Dominant			Non-dominant		
	Pre	Post	Δ (95% CI)	Pre	Post	Δ (95% CI)
FIFA 11+						
<i>H/Q 60°/s</i>	0.64±0.13	0.70±0.08	-0.66 (-0.11 to -0.01)*	0.60±0.06	0.64±0.06	-0.03 (-0.06 to 0.003)*
<i>H/Q 180°/s</i>	0.69±0.18	0.70±0.16	-0.01 (-0.10 to 0.08)	0.75±0.20	0.69±0.09	0.05 (-0.04 to 0.14)
<i>Hecc/Qcon 60°/s</i>	0.84±0.15	0.90±0.15	-0.05 (-0.12 to 0.002)	0.84±0.17	0.85±0.16	-0.01 (-0.06 to 0.04)
CONTROL						
<i>H/Q 60°/s</i>	0.59±0.08	0.61±0.11	-0.02 (-0.07 to 0.02)	0.51±0.09	0.53±0.07	-0.02 (-0.05 to 0.007)
<i>H/Q 180°/s</i>	0.62±0.11	0.68±0.15	-0.05 (-0.15 to 0.04)	0.65±0.19	0.70±0.15	0.05 (-0.14 to 0.04)
<i>Hecc/Qcon 60°/s</i>	0.86±0.16	0.82±0.16	0.04 (-0.02 to 0.10)	0.78±0.12	0.75±0.15	0.02 (-0.02 to 0.08)

* $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

The present study evaluated the effect of the program FIFA 11+ injury prevention in the balance and strength of lower limbs on players. Specifically, it evaluated the impact of this program in balance indicators, concentric strength of anterior and posterior thigh muscles and eccentric strength of hamstrings muscles. Also, the knee flexor/extensor strength ratios were calculated. According to the results, the team participated in the FIFA 11+ program showed statistically significant differences in both total stability indexes (SI) and the anterior-posterior index (AP). Also, statistically significant differences were observed in concentric strength of the rear thigh muscles and conventional H/Q ratios of both lower limbs for players who participated in FIFA 11+ program. More specifically, the implementation of this program for 8 weeks resulted in statistically significant improvement of the total stability index (SI) and anterior-posterior index (AP) for the dominant and non-dominant leg, respectively. The results of this study agree with those of Steffen et al. (2013) which showed that

participation in this program and particularly the increased participation has resulted in improved functional balance of young soccer athletes. Also, the surveys of Impellizzeri al. (2013) and Bizzini et al. (2013) showed that the use of the FIFA 11+ resulted in improved dynamic balance of players.

Also, in this study appeared statistically significant difference in concentric strength of the rear thigh muscles in both the dominant and non-dominant limb. Specifically, after applying the FIFA 11+ program presented improved concentric strength of hamstring muscle at 60°/s, about 15% for the dominant and 8% for the non-dominant limb. These results are in accordance with those of Impellizzeri al. (2013), who after applying the FIFA 11+ part 2 found an increase of 5.9% of the concentric strength of hamstrings. However, their research found an increase of 7.1% of the concentric strength hamstrings at 180°/s. In contrast to the present study results, Brito et al. (2010) found bigger improvements in concentric strength of the hamstrings at 60°/s, 20.4% for dominant and 14.6% for the non-dominant limb, respectively. Also, in their research presented an increase of 15% of the concentric strength of hamstrings for non-dominant limb at 180°/s. On the other hand, Daneshjoo et al. (2013) found improvement of hamstrings at 60°/s, about 22% for the dominant and 22.3% for the non-dominant limb, and at 180°/s 21.4% and 15.7% in both limbs, respectively.

The implementation of the FIFA 11+ program in the intervention group had resulted in significant increase of the eccentric strength of the rear thigh muscles. Especially, eccentric muscle strength was significantly increased by 8% in dominant and by 6% in non-dominant limb. These results are contrary to those of Daneshjoo et al. (2013), which found no statistically significant changes in eccentric strength of the rear eccentric thigh muscles at an angular velocity 120°/s. However, Brito et al. (2010) found a statistically significant increase of the eccentric strength of specific muscles of the non-dominant limb at 30°/s. Also, Impellizzeri et al. (2013) in their research found an average change of 5.9% of the eccentric strength of the rear thigh muscles of players participating in the FIFA 11+, but these results are not clear. An increase of hamstrings eccentric strength has significant benefits for the soccer players. It can improve the hamstrings flexibility absorbing more energy during deceleration running and reducing the likelihood of the hamstring muscle injury (Stanton & Purdham, 1989). In the present study, except the strength ability of the anterior and posterior thigh muscles evaluated knee flexor/extensor strength ratios. These are important in preventing injuries in soccer. It is known that the strength of quadriceps to that of hamstrings should be 3:2 or 0.66 (Steindler, 1955), similarly a ratio H/Q in 0.60 can be used to prevent injury or recovery tool (Baltzopoulos & Brodie, 1989; Kannus, 1994). The H/Q or conventional ratio with values ranging from 0.50 to 0.65 is necessary to prevent injuries of the posterior thigh muscles (Clanton & Coupe, 1998; Orchard, Lord, & Garlick, 1997). Also, the functional ratio (i.e. the eccentric force of hamstring to the concentric force of the quadriceps) is often used in football. This ratio provides relevant information about the functioning of the knee during the game (Holcomb, Rubley, Lee, & Guadagnoli, 2007). An ideal ratio Hecc/Qcon calculated to be 1:1 or 1.00 (Aagaard, Simonsen, Magnusson, Larsson, & Dyhre-Poulsen, 1998; Aagaard, Simonsen, Trolle, Bangsbo, & Klausen, 1995). Indeed such values can minimize the anterior displacement of the tibia in injured knees (Li, Maffulli, Hsu, & Chan, 1996).

In the present study found statistically significant changes in the conventional ratio at 60°/s in the dominant and non-dominant limb. Specifically, the dominant limb was observed a change of approximately 9% and 7% in non-dominant. In contrast, the conventional ratio at 180°/s did not show statistically significant changes in both limbs. However, the most important is that the change of conventional muscle ratio fluctuated in the range proposed in the literature to prevent injuries to the lower extremities. Brito et al. (2010) found that after implementation of the FIFA 11+ only the conventional ratio at 60°/s in non-dominant limb changed significantly, about 14.8%. The same results are supported by Daneshjoo al. (2012) with the conventional ratio at 60°/s of the non-dominant limb to change significantly. Nevertheless, in both studies the implementation of FIFA 11+ resulted in improvement of the conventional ratio of both limbs, with rates tended to 0.60.

In addition, the FIFA 11+ group improved the functional muscle ratio; however, the changes that occurred at both limbs were not statistically significant. Conversely, Brito al. (2010) in their research examined the ratio of eccentric strength of hamstrings at 30°/s per the concentric strength of quadriceps at 180°/s and found a statistically significant change in the non-dominant limb. On the other hand, Daneshjoo al. (2012) examined the functional muscle ratio at an angular velocity 120°/s, even finding statistically significant reductions in both the dominant ($p < 0.05$) and non-dominant limb ($p < 0.01$). A possible imbalance in the functional ratio has been shown to increase the likelihood of injury (Askling, Karlsson, & Thorstensson, 2003; Croisier, Ganteaume, Binet, Genty, & Ferret, 2008; Fousekis, Tsepis, & Vagenas, 2010). However, in this study the values of the functional ratio of players who participated in the FIFA 11+ probably are ideal for preventing injuries. According to the survey of Duty, Potiron-Josse and Rochcongar (2003) after isokinetic evaluation of players were observed that the functional ratio was about 0.80 for uninjured and 0.60 for the injured players. However, the norms they need special treatment and should not be generalized to all the players, since many factors affect prices of the functional ratio (Greig, 2008; Small, McNaughton, Greig, & Lovell, 2010).

Conclusions

The implementation of Injury Prevention Program FIFA 11+ (level 2), with 8 weeks duration and frequency 3 times per a week, were effective in increasing the balance ability, the concentric strength of the rear

thigh muscles and conventional muscle ratio of soccer players. Taking into account the high injury rate in soccer and the need of injury prevention strategies, FIFA 11+ appears to be effective for soccer players. A country-wide campaign and implementation of the FIFA 11+ among soccer players may be pursued by soccer experts across Greece in order to help minimize the risk of injury on soccer players.

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