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FIFA 11+: an effective programme to prevent football injuries in various player groups worldwide—a narrative review

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ABSTRACT

In 2009, FIFA promoted and disseminated the FIFA 11+ injury prevention programme worldwide. Developed and studied by the FIFA Medical Assessment and Research Centre (F-MARC), the programme was based on a randomised controlled study and one countrywide campaign in amateur football that significantly reduced injuries and healthcare costs. Since the FIFA 11+ launch, key publications have confirmed the preventive effects of the programme and have evaluated its performance effects in female as well as male amateur football players. Furthermore, implementation strategies of this prevention programme have also been studied. The goal of this narrative review was to summarise the available scientific evidence about the FIFA 11+ programme. While FIFA continues to disseminate and implement FIFA 11+ among its Member Associations, adaptations of the injury prevention programme for children and referees have been developed and are currently being evaluated.

INTRODUCTION

FIFA 11+ was developed in 2006 in cooperation with the Santa Monica Sports Medicine Foundation (SMSMF), and the Oslo Sports Trauma and Research Centre (OSTRC), as a complete warm up programme to prevent injuries in amateur football players.[1] While the first study, a randomised controlled trial (RCT) in young female players, was published in 2008,[2] in the past years other large RCTs (in female as well as male players) have confirmed the initial findings: the FIFA 11+ warm up significantly prevents (non-contact) injuries in football.[2–5] There are now publications on various aspects of FIFA 11+ and this reflects both the important scientific background and the growing interest around this injury prevention programme for amateur football. The FIFA 11+ has also been investigated in other sports; there was a reduced rate of injury in male elite basketball players randomised to warming up with this programme.[6]

The aim of this narrative review was to examine the current evidence relating to the FIFA 11+ programme in terms of injury prevention, performance enhancement and implementation. We also discuss current developments and projects around FIFA 11+.

METHODOLOGY

Peer-reviewed journal publications on the FIFA 11+ from 9 December 2008 (date of the first published paper on FIFA 11+, at that time called 'The 11+') until 29 January 2015 were considered. The literature search strategy was not systematic, and MB screened the English language publications. A total of 25 papers were found and divided in three groups: (1) injury prevention studies, (2) performance effects studies and (3) implementation strategy studies.

FIFA 11+ INJURY PREVENTION EVIDENCE IN FEMALE AND MALE PLAYERS

The efficacy of FIFA 11+ was first proven in young female players[2 5] as was the Prevent and Enhance Performance (PEP), a non-contact anterior cruciate ligament (ACL) prevention programme.[7] Soligard *et al*[2] and Steffen *et al*[5] found a significant reduction (up to 50%) of injuries in female players aged 13–18 in large RCTs, when the warm up exercises were performed at least twice a week. In both studies, compliance appeared important—injury risk was lowest in those players with higher adherence to the programme.[2 5]

Recently, the FIFA 11+ was tested in two RCTs among male players.[3 4] Owoeye *et al*[3] found a significantly lower (approximately 40%) incidence of injuries in young Nigerian male players (aged 14–19), and Silvers *et al*[4] reported similar results in American male NCAA Division I-II players (aged 18–25) when performing the programme regularly (2–3×/week). These four RCTs showed how a basic injury prevention programme, when performed, significantly reduces injuries in female and male amateur football players. A cohort study[8] and two recent systematic reviews on structured neuromuscular warm up programmes[9 10] underscore the evidence behind the preventive effects of FIFA 11+ in youth amateur football.

In professional football, we found almost no publications relating to lower limb injury prevention.[11 12] Interestingly, in a survey on the preventative strategies in 44 teams of various premier leagues, the five most rated preventive exercises were components of the FIFA 11+ programme.[13]

In other age groups, especially in children (below 14 years of age), there is a paucity of research in injuries and their prevention.[14 15] Faude *et al*[14] formulated the basis for preventive strategies in children playing football, and after developing an adapted 'FIFA 11+ Kids' programme, FIFA Medical Assessment and Research Centre (F-MARC) is currently conducting a large multicentre intervention study (four European countries) in this area.

A recent RCT[16] evaluated FIFA 11+ in veteran male football players (mean age over 40 years) and found little effect in reducing injuries, although low training frequency and compliance

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(programme performed 1×/week) were both recognised as important limiting factors.

SPECIAL GROUP: THE REFEREES

The match officials are an important part of football. In modern football, referees (especially at elite level) are exposed to considerable amounts of match and training loads, and they suffer lower limb injury.[17–21] Based on the specific injury profile[18–21] and on the successful FIFA 11+, a 'FIFA 11+ Referee' injury prevention programme for referees and assistant referees has been developed and pilot tested.[22] While the programme is distributed worldwide (since 2013) within the FIFA Refereeing courses, an investigation on the impact of FIFA 11+ Referee in match officials at different levels is currently being conducted with the Italian Referee Association.

FIFA 11+ PERFORMANCE AND WARM UP EFFECTS

"Are there performance benefits of such exercises?" is a common question by football coaches when exposed to an 'injury prevention programme'. In an RCT, Impellizzeri *et al*[23] found significantly better neuromuscular control (quicker stabilisation time of lower extremity and core) in Italian amateur male players after 9 weeks of FIFA 11+ practice. Young Canadian female players who undertook the FIFA 11+ during a season improved in their functional balance.[5] Performing the FIFA 11+ warm up for an average of 2 months led to enhanced knee strength ratios, as well as superior static/dynamic balance and agility skills in Asian male players.[24–28] In a pre–post study in Italian male amateur players, Bizzini *et al*[29] showed how FIFA 11+ induces similar physiological responses as other published warm ups. Recently, two studies reported that FIFA 11+ exercises can trigger core and hip musculature activation, and therefore improve neuromuscular control.[30 31] The FIFA 11+ enhanced performance (better hamstring/quadriceps strength ratios, improved jumping and agility skills) in Portuguese male futsal players.[32 33]

FIFA 11+ IMPLEMENTATION STRATEGY

The coach—especially at lower levels—has been identified as the key instigator in performing injury prevention programmes with her/his players in all F-MARC activities. The countrywide campaign in Switzerland was the first example to successfully disseminate and implement a programme through coaching education on a large scale in amateur football.[34] In Belgium, the introduction of FIFA 11+ (via coaching courses by the National Football Federation) together with other preventive policies (eg, no matches if weather conditions are bad) reduced football-related injuries.[35]

In an RCT evaluating different delivery methods of FIFA 11+, a preseason coaching workshop was more effective than unsupervised delivery and additional on-field supervision in terms of adherence, and even reduced injury risk in teams performing the injury prevention programme.[36] Delivery strategies should be further tailored to coaches (and players), as other factors (knowledge, beliefs, experience) may also influence their behaviour towards endorsing injury prevention programmes.[37]

FIFA 11+ IMPLEMENTATION: A VIGOROUS PARTNERSHIP IN GERMANY

Since 2009, FIFA has been promoting FIFA 11+ in its 209 Member Associations (MAs). Guidelines were provided for MAs to disseminate and implement the FIFA 11+ on a larger scale in amateur football successfully.[1]

The four time FIFA World Cup winner, The German Football Association (DFB, Deutscher Fussball-Bund), is the largest MA worldwide. The DFB has a state-of-the-art organisation and knowledge at all levels of football, and decided to promote FIFA 11+ among its nearly 7 million registered amateur players in 2011.

With cooperation from one of the German national insurance companies (Verwaltungs-Berufsgenossenschaft, VBG) and F-MARC, the FIFA 11+ was first presented to executives and representatives of the DFB Amateur Football at a congress in Kassel in February 2012. The dissemination plan was then finalised, with the financial costs (material, course organisation, other) divided equally by the football league (DFB) and the insurance company (VBG). A dedicated manager within the DFB was appointed to support the execution of this project. F-MARC provided full support to create the first two instructor's courses, targeting the DFB head regional coaches as well as the DFB head talent coordinators (Meschede, October 2012). During 2013 and 2014, 43 courses were conducted in the 21 regions of the DFB, and a total of more than 1100 coaches were certified as FIFA 11+ instructors. This cascade training, 'teach the teacher' strategy, as outlined by Junge *et al*,[34] allowed the 26 000 registered clubs in DFB amateur football to be targeted (for a ratio of approximately 1 instructor per 23 teams). An evaluation of the project is ongoing.

CHALLENGES

Although the scientific evidence has proven that FIFA 11+ prevents non-contact football injuries, its implementation in the field (as for other injury prevention programmes) remains challenging. FIFA has included the programme in all official coaching courses, and presented this concept of prevention at several occasions in all continents.[1] Despite numerous promotional activities in more than 80 countries and two FIFA Medical Conferences (Zürich 2009, Budapest 2012), so far, FIFA 11+ has been endorsed by only 20 FIFA MAs (approximately 10% of all MAs).

Current and past World Cup Champions such as Germany, Brazil and Japan (to cite only three), symbolise that the (political) willingness at MA executive levels is crucial in order to strongly support the message of prevention. Therefore, the firm commitment by an MA to realise a given implementation plan is fundamental. This includes allocating persons and resources for the FIFA 11+ programme. The example set forth by the DFB league in Germany, outlined above, shows that this is also feasible in a large country. Furthermore, implementation strategies at various levels, as illustrated by the RE-AIM Sports Setting Matrix,[38] and implementation drivers, are needed to plan programme adoption, implementation and sustainability.[39 40]

SUMMARY AND FUTURE DIRECTION

Since the introduction of FIFA 11+, research studies and implementation campaigns have been conducted in four continents (Europe, North America, Africa and Asia). Although some areas are still being investigated (ie, children), substantial scientific evidence supports the dissemination and implementation of FIFA 11+ as a basic injury prevention programme in amateur football. Despite the programme's success, a higher implementation can be achieved by extending the MAs' responsibilities. This would involve prioritising 'injury prevention' and thereby protecting a football player's overall health. FIFA and F-MARC will pursue the worldwide promotion of the FIFA 11+ prevention programme among MAs, with the strategic goal "to prevent football injuries and to promote football as a health-enhancing leisure activity, improving social behaviour."

What is already known on this topic?

- Performing the FIFA 11+ as a standard warm up reduces the injury risk in young female football players.
- Compliance with the programme (at least twice a week) is a key to successful injury prevention.
- The coach is the key person to promote FIFA 11+ to his/her players.
- There is limited knowledge on performance effects of FIFA 11+.

What this paper adds?

- The efficacy of FIFA 11+ to prevent non-contact injuries has been proven in young male amateur football players.
- Warm up and performance effects of FIFA 11+ have been evaluated in detail.
- The strong commitment of the national football governing bodies (Member Associations of FIFA) is necessary to implement FIFA 11+ at the country amateur football level.

Competing interests None.

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