The 11+ Injury Prevention Programme (2008–2016)

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66.1 Introduction

Football is the most popular sport worldwide and is played on amateur or recreational level by almost 300 million people. While football can be considered a healthy leisure activity, football, as a contact team sport, entails also a certain risk of injury. The medical treatment of football-related injuries can have a significant socio-economic impact in terms of related healthcare costs [1]. In 1994 FIFA realised their responsibility towards player's health and safety and founded its FIFA Medical Assessment and Research Centre (F-MARC) in order to create and disseminate scientific knowledge on various medical topics in football, to reduce football injuries and, thus, to promote football as a health-enhancing leisure activity [2]. The chapter presents the theoretical background, development, scientific evaluation, implementation and dissemination strategies of FIFA's injury prevention programmes ("The 11, The 11+ or FIFA 11+"), under the leadership of F-MARC (1994–2016), in order to provide a role model of how an international sports governing body can make its sport safer.

66.2 Development of Injury Prevention Programmes

The first scientific study on injury prevention in football was published in 1983 [3]. In the next 20 years, only few authors reported stud-

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ies on prevention of football injuries. In 2000 F-MARC conducted its first study on prevention of football injury in male Swiss youth teams, showing 21% fewer injuries in the intervention compared to the control group [4]. The interventions were focused on improving the structure and content of the training by educating and supervising the coaches and players. The prevention program included general interventions such as improvement of warm-up, regular cool-down, taping of unstable ankles, adequate rehabilitation, promotion of the spirit of fair play and ten sets of exercises designed to improve coordination, stability of ankle and knee, flexibility and strength of trunk, hip and leg muscles. Based on the experiences with this pilot study and in cooperation with international experts, F-MARC developed in 2003 a simple injury prevention programme for amateur football players called "The 11".

"The 11" comprises ten evidence-based or best-practice exercises (core stability, balance, dynamic stabilisation and eccentric hamstring strength) and the promotion of Fair Play. The programme was designed to reduce the most common football injuries (ankle and knee sprains, hamstring and groin strains). It can be completed in 10–15 min and requires no equipment other than a ball. "The 11" was implemented in two countrywide campaigns (Switzerland and New Zealand) in cooperation with the national accident insurance company and the national football association [1].

In Switzerland, the implementation of "The 11" and its effects on the injury rates were evaluated by an independent research institute. Four years after the launch of the programme, teams that included "The 11" as a part of their warm-up had 11.5% fewer match injuries and 25.3% fewer training injuries than team that warmed-up as usual [5]. In New Zealand the implementation of "The 11" resulted in an 8.2 dollars of return of investment (per invested dollar) for the national accident insurance company after 7 years [1].

In two controlled randomised studies (RCTs) on "The 11", no statistical significant effects were found in terms of injury prevention in male and female players. Compliance issues and exercise dosage were discussed as the main points of concern [1]. Based on experiences with "The 11", "PEP" (Prevent Injury and Enhance Performance) Programme [6] and other exercised-based programmes to prevent football injuries, an advanced version ("The 11+, later called FIFA 11+") was developed in 2006 together with the OSTRC and the Santa Monica Orthopaedic and Sports Medicine Research Foundation. "The 11+" is a complete warm-up programme with running exercises in the beginning and at the end to activate the cardiovascular system and specific preventive exercises focussing on core and leg strength, balance and agility, each of three levels of increasing difficulty (to providing variation and progression). It takes about 20–25 min to be completed and requires a minimum of equipment (a set of cones and balls) (Fig. 66.1). "The 11+" should replace the usual warm-up few times a week [1].

As from 2007, different research groups worldwide evaluated the preventive and performance effects of this basic prevention programme [7].

66.3 Evidence of Injury Prevention for 11+ in Female and Male Players

The efficacy of the 11+ was first proven in young female players, which was similar for "PEP" (Prevent Injury and Enhance Performance), a non-contact ACL prevention programme. A significant reduction (up to 50%) of injuries was found in young female players in large RCTs, when the warm-up exercises were performed at least twice a week [8, 9]. In both studies the role of compliance was documented, showing a further reduction of injury risk in those players with higher adherence to the programme. Recently a similar impact of the 11+ was reported in two RCTs involving male players [10, 11]. Owoeye

Fig. 66.1 Vicente del Bosque, coach of the Spanish national football team (World Cup winner 2010), promoting "Los 11+" together with Mario Bizzini (*left*) and Jiri Dvorak (*right*), Madrid, December 2010

et al. [10] found a significantly lower (ca. 40%) incidence of injuries in young Nigerian male players, and Silvers-Granelli et al. [11] reported similar results in American male NCAA Division I–II players—when performing the programme regularly (2–3×/week). These four RCTs impressively showed how a basic injury prevention programme, with proper player compliance, significantly reduces injuries both in female and male amateur football. Two recent systematic reviews on structured neuromuscular warm-up programmes underline the evidence behind the preventive effects of the 11+ in youth amateur football [7]. A recent systematic review and meta-analysis concluded that the 11+ has a substantial injury-preventing effect by reducing football injuries in recreational/subelite football by 39% [12].

In other age groups, especially in children (below 14 years of age), there is a paucity of research in injuries and their prevention [13]. Researchers [14] formulated the basis for preventive strategies in children playing football, and after developing an adapted "11+ Kids" programme [15], F-MARC conducted a large multicentre intervention study (four European countries), which showed an impressive overall reduction (by ca. 50%) of injuries in children performing the 11+ Kids exercises [16] (Fig. 66.2).

Fact Box 1
The 11+ prevention programme reduces the top four most prevalent football injuries: hamstring by 60%, hip/groin by 41%, knee by 48% and ankle by 32% (level 1 evidence-based information form the last systematic review and meta-analysis) [12].

Fig. 66.2 Demonstration of 11+ KIDS exercises at the CBF (Confederacao Brasileira de Futebol) headquarters, Rio de Janeiro, August 11, 2016

66.4 The Referees

The match officials are an important but often unrecognised part in football. In modern football, referees (especially at elite level) are exposed to considerable amounts of match and training loads. While several (but to a lesser extent than in players) studies have addressed different aspects of performance and training, recently the associated injury risk in referees has been investigated. Based on the their specific injury profile and on the successful 11+, a "11+ Referee" injury prevention programme for referees and assistant referees has been developed and pilot tested [17]. The programme is being distributed worldwide (since 2013) within the FIFA refereeing courses and can be accessed online (http://fifamedicinediploma.com/courses/referee/).

66.5 Performance and Warm-Up Effects of FIFA 11+

"Which are the performance benefits of such exercises?" is one of the most common questions by football coaches, when exposed to a so-called "injury prevention programme". Various studies have investigated the performance effects of the 11+ in male and female players. A RCT 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 [18]. Others [19] showed significant better functional balance in Canadian young female players performing the 11+ during a season in another RCT. Other studies found improved knee strength ratios, static/dynamic balance and agility skills in Asian male players after performing the 11+ warm-up for an

average time of 2 months. A pre-post study in Italian male amateur players showed how 11+ induces similar physiological responses as other published warm-ups [20]. Recently two studies showed how 11+ exercises can trigger core and hip musculature activation, therefore improving neuromuscular control (Fig. 66.2). Other studies have found positive performance enhancement effects of the 11+ in male futsal players [20].

While epidemiological data are available in professional football, almost no prevention studies in elite-level players have been published so far. Recent published surveys on the preventative strategies in premier league clubs and national teams showed that some most of the rated preventive exercises were components of the 11+ programme [21, 22].

66.6 Development of an Implementation Strategy

From the beginning of F-MARC activities in injury prevention, the coach—especially at lower levels—was identified as the key instigator in performing injury prevention programmes with her/his players. The successful countrywide campaign in Switzerland was the first example demonstrating how a basic injury prevention programme can be disseminated and implemented at large scale in amateur football through coaching education [5]. For the countrywide campaign in Switzerland, "The 11" was integrated in the coach education of the Swiss Football Association (Schweizerischer Fussballverband (SFV)) using a "teach the teacher" strategy or "cascade approach". All instructor coaches of the SFV were educated by sports physical therapists on how to deliver the programme to the coaches in their licencing or refresher courses. During a period of 3 years, 5000 licenced amateur coaches were subsequently instructed on performing "The 11" with their teams and received the information material [5]. The same strategy was used in New Zealand, where "The 11" was implemented as part of the "Soccer Smart Program". In Belgium, the introduction of the 11+ (via coaching courses by the National Football Federation) together with other preventive policies (i.e. no matches if weather conditions are bad) has led to an overall reduction of football-related injuries [7].

In a RCT evaluating different delivery methods of the 11+ found that a pre-season coaching workshop was more effective (than unsupervised delivery, additional on-field supervision) in terms of adherence and even reduced injury risk in teams performing the injury prevention programme [9]. 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.

"The 11+" is best taught to coaches in a workshop that includes theoretical background knowledge and practical demonstration of the exercises (Fig. 66.3). After raising the coach motivation and awareness of injury prevention, the exercises should be briefly explained and demonstrated. It is helpful to select a participant to perform the exercise, while the instructor highlights the correct execution of the exercises. The participants should then perform the exercises and be corrected by the instructor(s). The participants should get "a feel" for the exercises and appreciated the challenges behind each exercises. In the second half of the workshop, each of the participants should teach at least one of the exercises to the group and get feedback on this from the instructor [1].

Fact Box 2
Information material on "The 11+" was developed, produced and made available for coaches and players. The material includes a detailed manual, an instructional DVD, posters and promotional booklet/clips. All material is available in various languages and can be accessed on http://fifamedicinediploma.com/courses/injury-prevention/.

Fig. 66.3 11+ Instructor coaching course with the Canadian Soccer Association (CSA), Montreal-Laval, October 2016

66.7 Worldwide Dissemination of "The 11+"

In 2009 FIFA started the dissemination of the programme in its 209 Member Associations (MAs). Based on the experience with the countrywide implementation in Switzerland and New Zealand, a guideline on how to implement the "The 11+" injury prevention programme at large scale in amateur football was developed. The implementation is conducted either in close cooperation with MAs or via FIFA Coaching Instructor courses coaching courses. F-MARC supports the MAs in the preparation of the educational material in the local language and the workshops for the first group of instructor in initiate the cascade training [1].

Various important national football associations (such as Germany, Brazil, Italy, Japan) integrated "The 11+" in their basis coaching curriculum or their physical training/education curriculum. Despite implementation problems, other countries followed these role models, and in general the interest towards injury prevention in football has increased over the years [1].

66.8 Implementation of 11+: The Example of Germany

The German Football Association (DFB, Deutscher Fussball-Bund), the four-time FIFA World Cup winner, is the largest MA worldwide. The DFB has for many years had a state-of-the-art organisation and knowledge at all levels of football: nevertheless, the Association (at its highest levels) decided in 2011 to promote 11+ among its nearly seven million registered amateur players. Following the cooperation with one of the German national insurance companies (Verwaltungs-Berufsgenossenschaft; VBG) and

F_MARC, the 11+ was first presented to executives and representatives of the DFB Amateur Football at a congress in Kassel (February 2012). The dissemination plan was then finalised, with the financial costs (material, course organisation, others) divided by DFB (50%) and VBG (50%). The position of a dedicated manager within the DFB was crucial to ensure the realisation of this project. F-MARC provided full support in realising the first two instructor's courses, targeting the DFB head regional coaches and the DFB head talent coordinators (October 2012). During 2013 and 2015, 45 courses were conducted in the 21 regions of the DFB, and a total of 1300 coaches were certified as 11+ instructors. This cascade training ("teach the teacher" strategy, as outlined by Junge et al. [5]) allowed the 26,000 registered clubs in DFB amateur football to be subsequently targeted (for ratio of approx. 1 instructor per 23 teams), thus making the outreach of the programme to all clubs easier.

66.9 Challenges

While the scientific evidence has proven that 11+ can prevent non-contact football injuries, its implementation in the field (as for other injury prevention programmes) remains a challenging task. FIFA has included the programme in all official coaching courses and presented this concept of prevention at several occasions in all continents. Despite numerous promotional activities in more than 80 countries and 3 FIFA Medical Conferences (Zürich 2009, Budapest 2012, Zürich 2015), so far the 11+ has been endorsed by only 20 MAs (ca. 10% of all MAs) of FIFA [7]. 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 (Fig. 66.4). Therefore, the firm commitment by a MA to realise a given implementation plan, allocating persons and resources for the 11+ "project", is

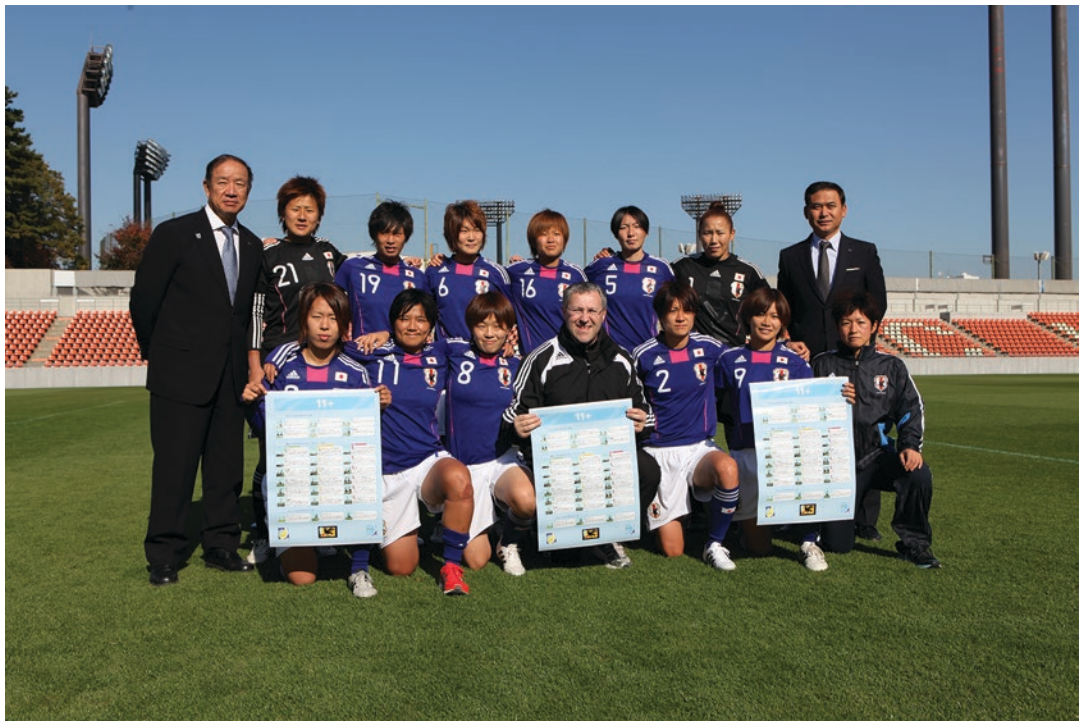

Fig. 66.4 The Japan Football Association (JFA) was the first MA to endorse 11+. The JFA women national football team (winner of the 2011 Women's World Cup) promoting 11+, Tokyo, November 2011

fundamental. The example by the DFB in Germany, as 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 [23], and implementation drivers are needed to plan programme adoption, implementation and sustainability.

Fact Box 3

The political willingness at the National Football/Soccer Associations executive levels is crucial in order to strongly support the message of prevention. Therefore, firm commitment to execute a given dissemination and implementation plan, allocating persons and resources for the 11+ project, is fundamental.

Conclusion

Since the introduction of the 11+ (or FIFA 11+), research studies and implementation campaigns with this programme have been conducted in four continents (Europe, North America, Africa and Asia). While some areas are still being investigated (i.e. children), substantial scientific evidence supports the dissemination and implementation of the 11+ as a basic injury prevention programme in amateur football. Although important results have been achieved, a lot still remains to be done, especially in prioritising "injury prevention" in the overall enhancement of the health of football players within the MA's responsibilities. The two countrywide campaigns in Switzerland and New Zealand represent successful examples of injury prevention in amateur football: not only the incidence of football injuries can be reduced, but also the health-related costs can be impressively diminished.

Take Home Message

- The 11+ programme can effectively reduce soccer injuries (non-contact) by 39% in recreational and subelite soccer players.
- Reduction of the four most prevalent soccer injuries—hamstring, hip/groin, knee and ankle injury: 60%, 41%, 48%, 32%, respectively.
- Regular performance of the programme is the key to ensure its preventive effects.
- Injury prevention should be an important piece of the overall soccer training.
- Coaching and players education is crucial.
- Dissemination and implementation should be further facilitated by all relevant parties in football (clubs, academies, associations, confederations).

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