

Suggested improvements to the 11+ as identified by coaches, players, strength and conditioning staff and medical staff in New Zealand Football

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ABSTRACT

The aim of this study was to investigate the experience with the 11+, attitudes towards injury prevention, and potential improvements to the 11+ and the delivery of injury prevention strategies within football. A qualitative study design was used to investigate the views of four stakeholder groups (players, coaches, strength and conditioning staff and clinicians). Twenty-two adults participated (nine women; median age 35.5 years). Participants were purposively recruited and were based in New Zealand. They represented various levels of football, including different genders, ages and levels of play. Focus group interviews were conducted, which were recorded, transcribed and subject to thematic analysis. Four key themes were identified: understanding of the 11+ injury prevention warm-up, content of an ideal injury prevention programme, structure of the programme and education, adherence and dissemination. The study found that while participants appeared to have good awareness of the existing 11+ programme and an interest in injury prevention, adherence and enthusiasm towards the programme was limited. Participants highlighted a number of elements that may help shape the development of a new injury prevention strategy, including a desire to retain many of the elements of the 11+ and to have a proven programme. Participants wanted greater variety, more football-specific elements and to implement a new strategy throughout a session, rather than being seen as a stand-alone warm-up. Whether the intervention should also include strength-based exercises, or whether this should be promoted outside of a football training session, was less certain.

INTRODUCTION

Football is the most popular sport in the world, with more than 265 million participants globally, including 100 000 professional players.¹ Playing football has health benefits with reduced rates of non-communicable diseases among those who participate regularly.² Unfortunately, there are also negative health impacts. For example, it is thought that, on average, each player has two injuries per year.³ In addition to the morbidity associated with the diagnosis and treatment of these

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ The 11+ is a validated injury prevention strategy that has been shown to be an effective way to reduce football-related injuries in a research setting.
- ⇒ The uptake of the 11+ outside a research setting has been universally poor, limiting its efficacy.

WHAT THIS STUDY ADDS

- ⇒ Stakeholders within football have an interest in injury prevention and in trying to implement strategies to reduce the risk of injury within a football training session and have identified clear weaknesses of the 11+ programme.
- ⇒ There is interest in developing a strategy that can be implemented into a football session, that has variation in delivery and involves football-related activities and movements.
- ⇒ A new implementation strategy that incorporates feedback from players, coaches and strength and conditioning staff is suggested.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ The results of the current study could be used to help develop a new injury prevention strategy that could be used in community football incorporating feedback and engagement from the end user.

injuries, there are a range of other negative impacts. These include time away from school or work,⁴ loss of sporting opportunities⁵ and the possible long-term physical consequences of injuries.^{6 7}

There are a range of injury prevention programmes and initiatives that have been designed to reduce the risk of injury in sport. The 11+, a warm-up programme designed specifically to reduce football injuries, is one of the most studied and well known of these programmes.⁸ Randomised controlled trials have shown that when done regularly the 11+ can lower injury risk by 40%, improve functional balance, enhance neuromuscular control and improve measures of performance.^{9–11} These benefits are greatest when

the programme is done regularly, ideally a minimum of twice per week. While the programme has demonstrated clear benefit within a research setting, it has been less successful in real-world settings.^{12 13}

New Zealand Football (NZF) and the country's seven regional football federations have partnered with the national accident insurer, the Accident Compensation Corporation, and FIFA to implement a nationwide roll-out of the 11+.¹² Despite this collaboration being almost 10 years old, many football coaches still do not implement the warm-up programme or do not implement it fully. There are many potential reasons for this, including poor adherence, reduced player enjoyment and engagement and a lack of awareness of the programme. One potential reason for this is that the 11+ was developed by medical experts, with limited input from others such as players, coaches and fitness staff.⁸ These stakeholders are ultimately the ones who participate and deliver the programme. A successful implementation requires engagement from a range of stakeholders including players, coaches, clubs and sporting organisations as well as the broader football community.^{14 15}

The aim of the current study was to evaluate the experience of four stakeholder groups with the 11+, their attitudes towards injury prevention, and to identify potential improvements to the 11+ and the delivery of injury prevention strategies within football.

METHODS

A qualitative study design using four focus groups (players, coaches, strength and conditioning staff and medical staff) was conducted. Thematic analysis was used spanning the constructionist and positivist paradigms.¹⁶

Participant recruitment

To be included in the study, potential participants had to have been actively involved in organised football over the previous 12 months. Participants were sourced from different geographical locations, experience and injury levels. Recruitment of participants was facilitated by NZF and by Axis Sports Medicine Specialists, a FIFA Medical Centre of Excellence. Both NZF and Axis were asked to identify potential participants. Participants were purposively recruited between October and December 2021. Having been nominated, all participants were approached via email by NZF and were invited to participate. Those who were willing to participate were then sent a participant information sheet containing more detailed information about the study and a consent form. Participants signed a consent form prior or on the day of the focus group allowing for all discussions to be recorded.

Focus group protocol

Each of the focus groups followed the same protocol with two sections (box 1). The first section focused on

Box 1 Focus group questions

First set of questions

- ⇒ Do you think a warm-up is a significant and important tool to reduce and prevent injuries?
- ⇒ Do you think the 11+ is effective?
- ⇒ What do you think the issues with implementation are?

Second set of questions

- ⇒ Regarding the 11+, what specifically goes well and what doesn't go well?
- ⇒ Are there any exercises or activities that you think are missing?
- ⇒ Are there any exercises or activities that you would like to remove or change?
- ⇒ Do you think that the activities should be the same every session?
- ⇒ How do you think that we could best incorporate these exercises or activities into a training session?
- ⇒ How do you think we could best incorporate the exercises or activities into a match day warm-up?
- ⇒ What could improve implementation of this?

experience with the 11+ and the value of injury prevention strategies within a football training session. The second part dealt with suggestions of improvement to the 11+ warm-up programme. This protocol was based on findings from earlier work.^{17 18}

Procedure

Each of the focus groups was conducted by the same moderator (MLF) and lasted a minimum of 1 hour. The primary researcher (CW) attended all focus groups and took comprehensive notes. The focus groups were conducted via an online videoconferencing platform, Zoom (San Jose, California). Each session commenced with an introduction and explanation of the session. Each participant was given time to ask any questions and to introduce themselves. The questions were designed to be open ended. The participants were given enough time to discuss each question thoroughly until no more opinions were mentioned. During each session the moderator actively encouraged all participants to offer their views. The moderator then thanked the participants and closed the session.

Data analysis

Data analysis was conducted by the primary researcher. Discussions were recorded and the audio was transcribed. Thematic analysis was then used to deductively and inductively identify patterns or themes within the data.¹⁹

During the initial coding phase, these deductive themes served to guide the search for data of interest. The primary researcher systematically worked through the data using inductive analysis. A six-phase framework for doing a thematic analysis was used (box 2).¹⁹ All data were read and re-read to become familiar with it and early impressions were documented using notes. Each part of the data relevant to any of the questions was then coded into shorter, more meaningful sections. Open

Box 2 The six stages of thematic analysis¹⁹

- ⇒ Phase 1: familiarising yourself with your data.
- ⇒ Phase 2: generating initial codes.
- ⇒ Phase 3: searching for themes.
- ⇒ Phase 4: reviewing themes.
- ⇒ Phase 5: defining and naming themes.
- ⇒ Phase 6: producing the report.

coding, that is, developing and modifying the codes while working through the coding process, was preferred to preset codes.²⁰ The codes were examined to identify the preliminary themes.¹⁹ A preliminary theme represented several codes that fitted together and provided some specific, significant information.²⁰ These themes were mostly descriptive. Preliminary themes were then associated with all the data that supported it.^{19 20} The final themes were defined based on a review of preliminary themes.

RESULTS

Four focus groups were conducted (table 1). Participants represented different levels of the game and included a current national team manager (head coach), a national team player as well as those involved with community and youth football. Medical staff professions included sport and exercise physicians, a primary care doctor and physiotherapists. A current involvement with either a senior international or professional football team was deemed to constitute ‘elite’ involvement.

Thematic analysis identified four key themes. The first theme, *The understanding of the 11+ injury prevention warm-up*, was based on the participants’ discussion of their experience participating in and delivering the 11+. The second theme, *Content of an ideal injury prevention programme*, resulted from discussions about the role of the warm-up, the needs of each stakeholder and feedback about what they would like to incorporate. The third theme, *Structure of the programme*, was based on a discussion about practical considerations including the duration of the injury prevention strategy, the rigidity of the current 11+ programme and how the elements could best be incorporated into a training session. The fourth theme, *Education, adherence and dissemination*, was based on the participants’ ideas on implementation, including

how to disseminate information about a programme and how to improve adherence.

Theme 1: the understanding of the 11+ injury prevention warm-up

In each of the focus groups, participants believed that a warm-up and injury prevention strategies were important. There appeared to be a general willingness to participate in these programmes and the majority of participants reported having used the 11+ programme.

Coach: Yes, I think so. I think on most coaching licenses I’ve been on that have had someone for football have come along and talked everyone through it. I think the coaches come away with some semblance of an understanding of what they should be delivering.

Player: I really like it as a warmup, I think it’s super easy and basically I like the fact that I know that it’s proven to reduce injuries.

Many of the participants either had little understanding of the ‘Part 2’ strength exercises or did not think that these exercises should be included in a football warm-up. As a result, these elements were rarely done or delivered by study participants.

Strength and Conditioning (S+C): I always thought it was interesting because you’re doing a lot of those movements [Part Two exercises] in your gym sessions anyway, so I usually just take them out.

Coach: I’ve never seen Part Two. So I’ve only ever seen, I think it’s six, eight minutes at the start, two groups in a line, two lines going around the cones, doing the running movements and all that, opening the gates and stuff. I’ve never seen 10 minutes of planks and things like that, nor whatever it is that I don’t understand.

Player: We just do the running things with the cones and it only takes a few minutes and then it’s done.

There was good understanding of the potential of the programme to reduce the risk of injury. Participants believed those participating at a community level were less likely to complete a warm-up and to know about the 11+ due to a range of issues including a lack of time and the feeling that it was not ‘cool’.

Player: I’d say just changing that for social teams just that social stigma around warming up, quite often you turn up and if you’re the one person warming up you kind of look like a dick, you look like you’re out there as a pro. And I’d say that’s probably one of the number one reasons people don’t warm up on a social team is because you look like an idiot if you’re going to warm up before you play five a side at futsal.

Theme 2: content of an ideal injury prevention programme

There was universal agreement that the ‘physiological’ element of the warm-up (the ability to increase the

Table 1 Focus group participants

Category	n	Age range (average age)	Gender: female n (%)	Level: elite n (%)
Players	7	27–53 (34)	5 (71.4)	3 (42.9)
Coaches	4	23–67 (41)	0 (0)	2 (50)
Strength and	5	26–49 (35.6)	1 (20)	3 (60)
Medical	6	29–64 (47)	3 (50)	2 (33.3)

players' heart rate, warm up muscles and to get the players moving) was an essential element of a football warm-up. There was a desire to retain the proprioceptive elements, especially among the strength and conditioning (S+C) and medical participants. This was generally regarded as being an essential element, alongside the running activities.

Medical: The shoulder bump exercise in the 11+ to me is one of the most important preparatory drills, especially before a game.

S+C: I think, looking at it, the things that you get plenty of in the game are the top block [Part One] and the bottom block [Part Three], the things that are most important for that injury prevention side of things, which especially at the community level, people won't be as accustomed to doing, is definitely the plyometric stuff, the balance stuff, the hamstring strengthening exercises.

S+C: I think that plyo component and the progression of those plyos, and then especially those landing mechanics, all that sort of stuff, is invaluable.

There were mixed views about whether the warm-up was the best place to deliver strengthening exercises. This type of training was felt to be of importance, but some participants felt this is better delivered outside of the football training session as they were less enjoyable and harder to include in a prefootball session. The S+C participants reported the exercises were difficult to implement in a football session due to the varying needs and abilities of individual players, and expressed concerns whether these exercises could be delivered safely.

S+C: ...a community-based player, I'd get them through the running. I'd get them through the quick stuff at the end, get them through some change of direction. And I'd probably bomb off the middle, if I'm being honest. If they're going to do it poorly.

Coach: Yeah. You look at some movement of Part Two like the single leg stands and vertical jumps and things like that, again, lend itself to that, we're stood up, ball each, whatever it may be, we've just done a run and then we go into our sprints and then we're away. There's something in my mind which still says, yep, this is all related, this links to this. We're away. As soon as we get on the floor and start doing planks and things like that, I'm not sure....

Theme 3: structure of the programme

All of the study participants commented on the rigidity of the current 11+ programme. This was generally felt to be a limitation of the 11+. The fixed structure was felt to have some benefit for those with less experience and to have some value with regard to mental preparation, especially on match days.

Player: I think the fact that we do it at the start of every training or whatever that almost mentally prepares me as well. I know it's physically supposed to warm you up, but I kind of get to the end of the warmup and I'm like, okay, you're ready to go.

Participants expressed a desire to add more variability and to incorporate activities and movements that were more directly related to football. Incorporating the elements of the current 11+ programme into the tactical elements of a session, using a ball or integrating the warm-up intervention into the entire training session, rather than seeing the programme as a stand-alone warm-up, was suggested. Involving high-profile coaches to develop session plans was also recommended.

S+C: I can see really good opportunities if you've got a coach and an S+C working together to deliver the nuts and bolts of this, but with the inclusion of the tactical or skill components of the warmup.

Player: I think with the sprinting part you could definitely get it out of a game with the ball involved and I think socially that's probably what most people want when they're warming up.

Medical: [Senior national team coach, name removed], devises a session plan about defending and shows community coaches and players how to deliver it. That includes some injury prevention messages and themes throughout the program.

There was a feedback that, where possible, it would be good to individualise the delivery of prevention strategies to a player's needs. When considering a more generic programme, however, the majority of the S+C, coach and medical participants felt that there might be some value in adding elements that were specific for individual target groups, for example, female players, younger players or those who have been injured before. The player group appeared less certain about the need for gender-specific strategies.

S+C: I reckon it's a great call if you show the athletes their individual work ons, strengths, weaknesses etc., the buy-in from my experience is far greater than the delivery of a generic program.

Player: Having two programs [male and female] is probably a bit woke. I don't really see the difference. Running is running sort of thing, we all have groins and we all have hamstrings, I don't really know if it's really going to be much different.

Player: I would think if you're going to have separate ones you would have to have quite a clear evidence that there is difference in the injuries and sell that story and quite clearly for people then to accept the different ones.

Theme 4: education, adherence and dissemination

Participants felt there was scope to improve adherence by changing the structure and delivery of the programme. Suggestions included providing variability, incorporating

football-specific movements and considering the delivery of the strength elements.

Each of the individual focus groups recognised the importance of the coach for the successful implementation of injury prevention strategies. As a result, engagement with coaches in the development and implementation of any new injury prevention initiative was felt essential. At the recreational level, where teams often do not have coaches, it is felt that a different strategy will be needed.

Player: Yeah, I think it would be virtually impossible [to do the 11+ or other injury prevention initiative] without coach buy in. They have complete ownership of what warm up we do, so if they weren't invested or if they want to do something different then we could give feedback on that, but ultimately the buck stops with them on what we're doing for the warmup and that's their job.

Player: I think it's hard at the social level to get an organized delivery because generally you don't have a coach.

There was a desire to make the programme less 'medical' and to get input from a variety of stakeholders about how to approach warming up and the delivery of injury prevention strategies. Each of the groups identified a need to focus on enjoyable football experiences (at a community level) and on enhancing performance (at higher levels) rather than on preventing injury.

Medical: One of the things we've tried to do is really work closely with the coach education sort of departments, and go look, this here, this is a coach's program. It's not a medical program. This is your warmup. It's not a physio's warmup. So then we can essentially, once you give them ownership, we've found that they actually make it. They, then grab it and they take it.

Coach: Mine would be around messaging folks. So I think if we were to concentrate on the performance element of it, that's what switches more people on is performance levels as opposed to reducing injury.

While participants had good awareness of the 11+ there was a belief that many stakeholders within football had not engaged well with the programme. Integrating injury prevention messages into coaching material, developing a clear communications strategy (involving social media, educational resources and through other non-medical channels) and recruiting high-profile coach or player ambassadors/endorsers were all thought to be of value. Mandating a warm-up as part of a competition structure was also discussed.

Coach: I think kids will be more likely to follow the role model player than follow the coach that's harping on at them every day of the week. So that would be huge. I think the message from athletes to

younger athletes is so much more powerful than the coaches' message.

S+C: So I don't know if there's an opportunity in there, bringing some sort of education into the mix in terms of teaching people how to do this and creating a feedback loop, using some online tools, perhaps.

Player: A lot of people use apps, I use an app in the gym most days to find my program or whatever, if you've got it on there or somewhere you can just access it, fine.

Player: The [existing] videos are just so dry.

Online supplemental table 4 demonstrates the key themes, subthemes and some of the relevant quotes that emerged during the thematic analysis.

DISCUSSION

Four key themes emerged as a result of the thematic analysis. Each of these individual themes is summarised and discussed below.

The understanding of the 11+ injury prevention warm-up

The results of the study indicate that each of the stakeholder groups believes that a warm-up is important and that there was a desire to implement strategies to reduce the risk of injury in football within football training sessions. There was a universal awareness of the 11+ programme and good understanding about the potential injury prevention benefits associated with the 11+. Whether this group is generalisable to the broader football community is not clear as these findings are in contrast with other published findings.²¹ This awareness likely reflects recent efforts within NZF to educate stakeholders about injury prevention and may make the delivery of future injury prevention programmes easier to implement.¹² Study participants felt that community players, or those playing at a lower level, were less likely to have heard about the 11+ or injury prevention programmes more generally and were less likely to perform these programmes. There are data to support this position as the 11+ has been shown to be less effective among recreational players²² while coaches with less experience are also less likely to implement the programme.¹⁷ While the study participants knew about the 11+, there was a clear lack of uptake towards the part 2 strength exercises, consistent with published data.^{23 24}

Content of an ideal injury prevention programme

While there is good evidence to support the efficacy of neuromuscular warm-ups, it is not clear which individual elements of these programmes are the most important.^{25 26} There was universal agreement about the need to retain the physiological elements within the football training/prematch routine in future strategies. Similarly, there was also a desire to retain and implement balance and proprioceptive training. Each of the four stakeholder groups felt that the strengthening elements were important. There is good evidence to support the

effectiveness of some of the strength elements of the 11+ in isolation, for example, performing the Nordic hamstring exercise has been shown to substantially reduce the risk of hamstring injuries.²⁷ But stakeholders highlighted that these were rarely done and that they might be better implemented throughout the session, for example, between technical activities, or were better completed as part of a gym session or outside the football session. The literature provides examples where strengthening exercises have been successfully implanted into training sessions to improve adherence.²³ There is also evidence that supports moving the strength exercises to the end of a football session with this having been shown to both improve adherence and to improve the efficacy of the programme.²⁴ As a result, there is a need to consider how to implement strength-based training in future programmes.

Structure of the programme

There was a strong interest in changing the structure of the 11+. While it was felt that the physiological and proprioceptive elements fit well into a football warm-up, the majority of participants favoured incorporating the injury prevention strategy into activities conducted during a football session, rather than delivering them all within a structured warm-up programme. There was also a universal interest in trying to make the activities more relevant to football, for example, by adding a ball or by implementing the movements into technical or tactical activities. These opinions appear consistent with both current practice in high-level football and other available evidence, where modifications to the programme are common.^{17 28}

There was a strong interest among the S+C group to try to individualise the delivery of injury prevention strategies based on players' specific needs. There is some support for this approach in the literature.²⁹ Unfortunately, while it may be possible to identify individual risk factors for injury, there is currently limited evidence to support the effectiveness of these individualised injury prevention strategies.^{30 31} It is unlikely that this form of targeted approach would be viable at a population level, where access to S+C and coaching support is limited. There was some interest in developing targeted strategies for women and youth players; however, this was not supported by participants in the player group (although they would support this approach if there was a clear demonstrated need). It should be noted that there is an existing programme for players under the age of 12 years³² and that existing programmes do appear to be effective in female players.^{11 33} There is a clear need for more research due to limited evidence regarding both injury incidence and prevention in female players and in time it may become clear that different strategies are needed.³⁴ Given that there is a lower reported rate of injury among younger players, injury prevention programmes may be less of a priority in this group.³⁵

Education, adherence and dissemination

While many of the participants suggested recruiting high-profile players and coaches as ambassadors it is not clear whether this is an effective strategy.^{36 37} It has been suggested that using community ambassadors, those who are playing or involved at a similar level as the intended participants, might be more relatable and therefore more effective.³⁸ There was also a feedback that existing resources were poor, a view that is supported in the literature.³⁹ Improving the quality of, and access to, educational resources may be a way to address the lower level of awareness of current programmes among community players. Involving the intended recipients in the development of future resources and in the development of a dissemination strategy also appears sensible. There was also a strong desire to explore digital delivery strategies. There is evidence that these strategies may be useful tools and, despite the widespread use of these platforms and tools, that they are currently underused.^{39 40} Using technology, for example, data collected on smartwatches and wearables, may be an opportunity to individualise future programmes. Making the injury prevention strategy mandatory by incorporating it into a competition structure was also suggested. This strategy has been implemented in community netball where time for an injury prevention warm-up has been built into the delivery of youth netball.⁴¹ This delivery strategy may be an option in some community settings but may be difficult to implement or regulate in most environments.

Limitations

One of the primary strengths of the current study is that it investigates the views of a range of different stakeholders within football, across different levels of the game. The views of the end user have generally not been well considered in the development of many injury prevention strategies, including the 11+. The qualitative study design is another strength as this allows a flexible and in-depth analysis of participants' views when compared with a quantitative study design.¹⁶ There are also a number of limitations. First, there were only four stakeholder groups, and they were all based in one country. Second, it is not clear whether these findings are generalisable to the broader football community and this should be considered when translating our findings to other contexts or countries. Involving those who may have administrative role to play in implementing the findings could also be considered in future research.

CONCLUSIONS

The current study indicates there is widespread interest in trying to reduce the risk of football-related injuries in New Zealand and in trying to deliver injury prevention strategies within a football training session. While there is good awareness of the current 11+ programme, participants do not complete the programme regularly and have identified a number of barriers to implementing the current programme. The findings of the current study

suggest that an optimal programme should have variety in delivery, should include football-related movements and ideally would be incorporated into a session (rather than being a stand-alone warm-up programme). Participants believe that a new programme should primarily address the needs of community players. Based on the results of this study, a new delivery strategy, incorporating feedback from stakeholders within the game, especially coaches, is needed to improve the uptake of the programme.

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