Football as Medicine

Treatment as fun

cities changing diabetes

FOOTBALL IS MEDICINE

SDU

Contents

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Introduction

Non communicable diseases (NCDs), such as cardiovascular diseases (CVD), cancer and diabetes, are the leading cause of death worldwide. The major risk factors for CVD are hypertension, obesity and type 2 diabetes, with poor dietary choices and sedentary lifestyles identified as the chief contributors underpinning these conditions. Fortunately, all these illnesses can be effectively addressed with timely improvements to diet, recourse to pharmacological treatment, and physical activity.[1-4]

Addressing the treatment gap

While treatment uptake through healthy eating and medication has seen considerable success worldwide, physical activity as an effective intervention for NCDs has been less prolific. A primary reason is that people living with obesity and type 2 diabetes are reluctant to exercise. Common barriers include age, the stigma around body weight, and a lack of viable opportunities.[5] Despite the capacity of exercise to provide enjoyment, mental and physical stimulation and social interaction – as well as obvious health benefits – target populations appear to remain reluctant to embrace its benefits.[6,7]

Football as Medicine represents a novel approach to motivating people with NCDs to be more physically active. By organising treatment for people with prediabetes, obesity, type 2 diabetes and other NCDs around football – a fun, sociable and high-intensity activity – broad-spectrum health effects can be realised among those key groups. Furthermore, as an activity practised by groups of similarly-afflicted individuals, Football as Medicine increases the chances that practitioners will adhere to a physically active lifestyle over the long term.

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The Football as Medicine concept

Football is one of the most popular sports in the world, with around 500 million players estimated to be playing recreationally every week.[8] As a result, football facilities are widely available in villages, towns and cities in countries all around the globe. Given football's widespread appeal and low cost, it is in many ways the ideal vehicle for carrying a physical health intervention to combat the NCDs outlined above.

With its combination of aerobic high-intensity interval training (HIIT), endurance training and strength training, only 60 minutes of football twice a week can induce wide-ranging health effects across a lifespan. Moreover, this kind of all-in-one training stimulates important physiological areas such as metabolic fitness, musculoskeletal fitness and cardiovascular fitness, providing myriad health benefits that can drastically reduce the prevalence of NCDs such as type 2 diabetes, hypertension, osteopenia and prostate cancer.[9-11]

The approach

The Football as Medicine model is simple and effective. Sessions are structured around 1-hour training sessions consisting of a thorough warm-up with various balance and strength exercises, followed by pair-based ball exercises and small-sided drills (2 vs 2 to 5 vs 5). To increase the enjoyment and safety of the participants, there is no tournament structure and no player selection ahead of matches—this is an important element that prioritises individual participation and social inclusion, as opposed to rigorous competition.

The simple and flexible structure of the Football as Medicine concept makes it applicable across diverse social settings and adaptable across participant groups regardless of age, sex, socioeconomic background and skill level.[12-14]

By using Football as Medicine, the clinical setting normally associated with seeking medical help is replaced with football pitches, fresh air, and open skies. In these alternative non-clinical environments, new paths to discuss health issues can be facilitated.

Background to the challenge

People with type 2 diabetes or prediabetes also have a higher prevalence of other serious health complications, such as poor physical fitness, obesity and several cardiovascular deficiencies.[15] These pathological conditions are partly related to lifestyles such as physical inactivity and poor nutritional habits. Thus, feasible and efficient exercise protocols in combination with nutritional therapy are warranted in this population.

Engaging in physical exercise can dramatically help at-risk population groups from deteriorating further, and football training has been shown to be effective in preventing and treating type 2 diabetes.[16,17] In addition to the physical benefits of physical exercise, regular football training induces broad-spectrum health effects in various groups, including improvements in mental health.[9-11]

The first pilot studies of Football as Medicine were initiated in 2003 by a research group in Denmark led by Peter Krustrup, a professor in exercise physiology. The pilot studies included observational studies on movement patterns, exercise intensity and the health benefits of football training for untrained youngsters, “Old Boys” club teams, and Denmark’s national homeless team. Remarkable results led to the initiation of the first randomised controlled trials (RCTs) in 2006. This work kickstarted a long journey in establishing football as an effective broad-spectrum prevention, treatment and rehabilitation strategy for a wide range of patient groups.

Since Professor Krustrup’s initial research, interventions using Football as Medicine have proliferated in a wide variety of environments worldwide.

Health outcomes

The health outcomes associated with regular football training are broad-spectred and impressive, independent of age, sex and prior experience with sporting activities. It should be noted, however, that the effects vary according to the frequency, intensity and organisation of the training sessions, emphasising the importance of implementing evidence-based recreational football concepts for optimal effects and safety.

Cardiovascular

Increase in **aerobic fitness**

Reduction in mean arterial **blood pressure**

Improvement in **heart structure and function**

Metabolic

A positive effect on **glycaemic control**

Improvement in **blood lipid profile**

Reduction in total **cholesterol**

Decrease in **plasma glucose, total body fat mass and android fat mass**

Musculoskeletal

Increase in **muscle strength**

Increase in **leg- and whole-body bone mineral content**

Improvement in jump and **stairclimbing performance**

Increase in **femoral shaft bone mineral density** and **total hip bone mineral density**

Improvement in **bone formation markers**

Implementing for success

Five case studies

Five case studies from Denmark, the Faroe Islands, Brazil, the US, and Portugal are presented on the following pages. Researchers in each locale were all similarly trained in the Football as Medicine concept. However, the rollout of the intervention differed in each case. The adaptability of the Football as Medicine model is one of its most important hallmarks and reasons for its success.

Shortened presentations of the case studies follow. Full descriptions can be accessed by visiting citieschangingdiabetes.com.

ACCESS FULL CASE DESCRIPTIONS

Denmark

Football as Medicine for female and male patients in Denmark

Following pilot studies in 2003 and 2006, a 2011 Danish research initiative recruited sedentary men aged 35–60 with type 2 diabetes for 24 weeks of small-sided football games for 60 minutes twice a week. Each session consisted of five 10-minute games interspersed with 2 minutes of passive rest. The results of the study revealed that 24 weeks of football training appeared to positively affect glycaemic control, increase aerobic fitness, decrease mean arterial blood pressure, and improve heart structure and function. Furthermore, plasma glucose, total body fat mass and android fat mass decreased.[18,19]

In 2012, a new RCT was set up to test the feasibility and health effects of introducing regular football practice for men with prostate cancer undergoing androgen deprivation therapy.[20] After just 12 weeks of recreational football 2–3 times per week, lean body mass, muscle strength, leg- and whole-body bone mineral content and bone formation markers were improved. After 32 weeks, femoral shaft bone mineral density, total hip bone mineral density, and jump and stairclimbing performance were also shown to have increased.[21,22]

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The effect of empowered participation

Aside from the compelling physiological results, the Danish qualitative data also revealed that participants generally regarded the training as an opportunity to regain control and responsibility for their health.[23] Furthermore, a rarely seen long-term adherence to exercise interventions was observed, as eleven participants continued self-organised football training for 4.5 years after the completion of the RCT.[24]

The role of football fitness in Denmark today

Every municipality in Denmark has implemented Football as Medicine and provides this service for both healthy people and those at risk of or living with a chronic disease. More than 400 football clubs have engaged in this implementation, corresponding to approximately 25% of all football clubs in Denmark.

Key learnings

To secure successful implementation, sustaining the high-quality approach of Football as Medicine is important. An important contribution to this element is the Football as Medicine coaching courses. By providing this education potential coaches with pedagogical and health professional knowledge, and little or no prior experiences in football, can easily and at a low cost be qualified to delivering training to patients, increasing the amount of Football as Medicine coaches.[25]

Faroe Islands

Football Fitness for women and men with prediabetes in the Faroe Islands

In the Faroe Islands, researchers sought to investigate whether football training combined with dietary advice was a more efficient treatment protocol for peoples with prediabetes than dietary advice alone. The research project was initiated in 2015 by the Faroese Professor in exercise physiology, Magni Mohr, and was a collaboration between the Faroese Diabetes Association and Faroese Football Association.

Football as Medicine in the Faroe Islands

For this project, 55 prediabetes individuals aged 55–70 volunteered to participate in the research. The study aimed at investigating how the health effects of 16 weeks of football training and dietary advice compared to the effects of a dietary advice alone on men and women with prediabetes.

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The results showed that a combination of football and dietary advice promoted better metabolic, cardiovascular and bone health in men and women with prediabetes than providing dietary advice alone.[26,27] Moreover, the positive fitness and health adaptations occurred completely independently of skill level and gender.[28]

Key learnings

The researchers in this investigation identified a number of crucial factors that underpinned the success of this intervention. Firstly, providing multiple opportunities for participants to attend training during the week was important for ensuring overall adherence. Secondly, keeping the training simple with minor control and a great amount of small-sided game time increased the enthusiasm of the players and increased the likelihood of them wishing to play more. Third, the use of follow-up phone calls to participants when they missed training sessions was found to help with accountability and attendance.

Brazil

Football and diet for women and men with type 2 diabetes in Brazil

Among Brazilian 20–79-year-olds, approximately 15.7 million people have diabetes.[29] The prevalence of type 2 diabetes is especially high and, along with important risk factors such as obesity, is gradually increasing.

Football as a hedge against diabetes in Brazil

Given Brazilians' love of football, the introduction of this popular national pastime as a form of physical exercise to hedge against the risks of type 2 diabetes was identified by researchers as a viable health intervention. By using this popular activity in combination with dietary advice and proper diabetes management, researchers hypothesised that the risk of secondary diseases in people with type 2 diabetes could be reduced.

The intervention

In 2012, researchers in Brazil developed an intervention of recreational football combined with a calorie-restricted diet targeted at Brazilian men and women with type 2 diabetes. For this, middle-aged men and women with type 2 diabetes were recruited from Basic Public Health Units and the Hospital das Clínicas in São Paulo. They were 48–68 years old, obese (BMI ~33 kg/m^2), and with glycosylated haemoglobin (HbA1c) of 7.3%. They had all been diagnosed with type 2 diabetes for approximately 7 years and were free from complications such as diabetic nephropathy, diabetic retinopathy, and cerebrovascular and cardiovascular disease. Training sessions were provided three times per week for 12 weeks and consisted of friendly small-sided games.

Results

The combination of regular football practice with a calorie-restricted diet led to improved blood glucose control; a 10% increase in aerobic fitness; a markedly improved lipid profile; identical fat mass reduction to that achieved by a calorie-restricted diet alone (3.4 kg vs. 3.7 kg).[30]

Participant perspectives

All the participants started this intervention as overweight and sedentary individuals who could not imagine themselves playing football again. However, as they became familiar with the training regime, they reported positively on the feeling of playing football and exercising.

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Atlanta, US

Recreational football for hispanic men with prediabetes

One-third of the US adult population is estimated to have prediabetes and be at high risk of developing type 2 diabetes. Among this risk group, Hispanics have a 12.5% type 2 diabetes diagnostic rate and a 50% higher death rate compared to non-Hispanic Whites.[31,32]

The US National Diabetes Prevention Program (NDPP) is a classroom-based programme designed to encourage prediabetes sufferers to adopt a sustainable lifestyle of healthy diet, physical activity, and a 5–7% reduction in body weight. The programme has been successful in reducing the incidence of type 2 diabetes,[3] but Hispanic men are poorly represented in the program and have low adherence[33] making prevention efforts targeted this subgroup highly warranted.

In 2018, researchers in exercise physiology and nutrition teamed up to develop and implement a football-based adaptation of the NDPP programme mentioned above. They decided to concentrate their efforts particularly on the feasibility of delivering a football-based health intervention for Hispanic men living in Atlanta, Georgia.

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Methods

The intervention consisted of two phases. In the first phase, participants took part in 'pre-football conditioning', which occurred twice a week for the first 12 weeks.

Thereafter, training shifted to a period of 'football maintenance' whereby participants trained once a week for the following 12 weeks.[34]

Supporting group cohesion

For additional social support, participants were encouraged to bring along family members to the sessions. Participants therefore often arrived at practice with their wives and children, who would walk around while the men played, or play their own games beside the football fields. At the end of the 24-week intervention, the families hosted a barbecue next to the football fields for everyone to enjoy.

Key learnings

Among other things, this study highlighted the importance of cultural sensitivity and demonstrated how Football as Medicine can be adapted to reach target populations. For example, running this intervention in both English and Spanish, and inviting participants to bring their families along to training sessions were both effective details that helped to underpin its success.

Portugal

Walking football for men with type 2 diabetes in Portugal

As a branch of Football as Medicine, walking football is currently being investigated as a potential tool for increasing participation and improving public health. This Portuguese case is based on a community-based real-life explorative study of walking football.[35]

Diabetes in Portugal

Portugal is among the top 5 countries in Europe with the highest prevalence of diabetes. In 2021, the age-adjusted prevalence of diabetes in the adult population (25–79 years old) was 9.1% (IDF, 2021). According to national health data, the prevalence is higher in men than in women (12.1% vs 7.8%) and 23.8% higher in elderly compared to younger individuals.[36]

Walking football

As football is an intermittent activity with bouts of high aerobic intensity and multiple intense actions, there is a concern that football-related injuries could hamper the overall benefits of applying football training for all, especially among elderly members of the population.[9-11] To accommodate this risk, Portuguese football clubs have developed walking football for their veteran players. Walking football follows the same general rules as regular football, but does not allow players to run or have physical contact, and the ball must always be played below the players' average waist height.[37]

ACCESS THE FULL CASE

The intervention

In 2017, Brito and Mendes initiated a study investigating the feasibility and safety of community-based walking football provided to 50–70-year-old Portuguese men. The study was supported by the FIFA Research Scholarship 2018 and the Portuguese Foundation for Science and Technology. Walking football training sessions took place 3 times per week (on Mondays, Wednesdays and Fridays) for 60-minutes at a time over a 12-week period.

Key learnings

The study showed that providing walking football to middle-aged and elderly Portuguese men with type 2 diabetes achieved a high-level of adherence (86%) and enjoyment while delivering regular light-to-vigorous exercise intensity. Beyond the objectives of the study, participants reported positive experiences, such as gaining diabetes management skills, a genuine sense of community, and improved satisfaction with life.[37,38]

Football is Medicine platform

Football as Medicine is part of the Football is Medicine (FIM) platform, established in 2018 by Professor Peter Krustrup and a group of colleagues. FIM is a global scientific forum organising various activities, including an annual conference, workshops, coaching courses, PhD courses and events. The platform has established several research networks and multicenter collaborations. Today, FIM has approximately 250 scholars from 22 countries on five continents researching and contributing to the generation of evidence about the health benefits of recreational sports.

VISIT WWW.SDU.DK/FIM

"Football is Medicine adds a new dimension to Exercise is Medicine."

"Football is a strong and important tool for global health promotion. It's versatile, effective, fun and social, and it's a global language."

"The fact that football is so popular and widespread, makes it scalable, and gives the Football is Medicine platform a unique possibility to contribute to the health of continents."

Peter Krustrup, Professor of Sport and Health Sciences

Annual Football is Medicine conference

Football is Medicine has held an annual conference since 2018.

2018	2019	2020	2022	2023	2024
1st FIM Lisbon, Portugal	*2nd FIM* Odense, Denmark	*3rd FIM* Tórshavn, Faroe Islands	*4th FIM* Doha, Qatar	*5th FIM* Atlanta, Georgia, US	*6th FIM* Florence, Italy

Sharing the science

The evidence for FIM is based on more than 175 peer-reviewed articles published across 35 international scientific journals, including five special issues, and several textbooks demonstrating that football is a social, joyful, popular and health-enhancing activity.

FIM actively publishes about the fitness, health and wellbeing effects of recreational football and other team sports. Literature outputs include books, special issues, systematic reviews and meta-analyses, editorials and original articles.

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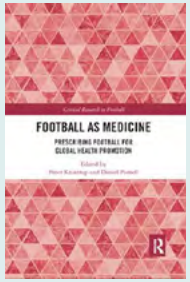
A full list of publications can be accessed on www.sdu.dk/fim.

Scientific summary

This summary demonstrates how the Football is Medicine concept can be used as an effective tool in the prevention and treatment of cardiovascular diseases, prediabetes, type 2 diabetes and other non-communicable diseases.

Football is Medicine could play an important role in global health promotion and in the prevention and treatment of prediabetes and type 2 diabetes.

ACCESS THE SCIENTIFIC SUMMARY



The book

Football as Medicine – Prescribing Football for Global Health Promotion.

The book examines the effects of football training on the three main types of fitness (cardiovascular, metabolic and musculoskeletal) and on specific target populations (for example, children, type 2 diabetes patients, cancer patients, people with mental health conditions, the socially deprived and older people). It discusses the significance of football for public health and assesses the efficacy of football interventions by clubs and community sport development programmes.

→ https://www.taylorfrancis.com/books/edit/10.4324/9780429284892/football-medicine-peter-krustrup-daniel-parnell

Special journal issues

- SJMSS 32(1), pp 1-175, 15 articles, 2022. Elite Women's Football.
  → https://onlinelibrary.wiley.com/doi/toc/10.1111/(ISSN)1600-0838.women-football
- PCVD 63(6), pp. 707-817, 13 articles, 2020. Benefits of Recreational Group Sports.
  → https://www.sciencedirect.com/journal/progress-in-cardiovascular-diseases/vol/63/issue/6
- JSHS 7(2), pp. 127-73, 7 articles, 2020. Team Sports and Health.
  → https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6180537/
- SJMSS 28(S1), pp. 1-76, 8 articles, 2018. Football is Medicine.
  → https://onlinelibrary.wiley.com/doi/toc/10.1111/(ISSN)1600-0838.football-is-medicine
- SJMSS 24(S1), pp. 1-150, 18 articles, 2014. Football as Prevention and Treatment.
  → https://onlinelibrary.wiley.com/toc/16000838/2014/24/S1
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