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EDITORIAL



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New technologies to be witnessed at the FIFA World Cup, Qatar 2022

After, many years of preparation FIFA is finally delivering its 22nd edition of the World Cup in Qatar between the 20th of November and the 18th of December 2022. It is the first played in the Arab and Muslim world, hence it was subjects to endless opinions, criticisms, and campaigns of pros and cons. However, one thing would be sure of is the fact that the edition would witness some of the state-of-the-art new technologies to be applied in and out of the pitches.

Qatar has prepared a colossal infrastructure to welcome visitors from the roads to the transporting systems and further to entertain the public and fans in and out of the stadiums. It has invested in eight stadiums, each one is different from the other. Seven of them are sustainable, although some would be transformed into something else after the games and one, (stadium 974) is entirely built with shipping containers and modular steel frames. It will be dismantled after the World Cup; hence it will be the first-ever fully demountable stadium in the history of World Cups.

Apart from the stadium's cooling systems that have drawn lots of ink, this World Cup edition will witness the usage of a new technological ball. Al Rihla (translated from Arabic and means the trip), is a revolutionary ball that contains a Suspension System in the centre with a motion sensor. The sensor will be sending real-time data to VAR officials in support of FIFA's new Semi-Automated Offside Technology. This latter, together with a dozen of video analysis camera systems will enable the officials to make a swift decision about the offside and to display 3D video animation live in the stadiums and on TV. This is the first time-ever that a World Cup edition would apply this technology. Nonetheless, none could deny the lengthy research and trails that our colleagues biomechanics and engineers have undertaken to come up with such a new technology.

Hundreds of scientists and young-to-confirmed entrepreneurs backed up either by research grants or by spinning/incubating institutions have come up with new technological ideas to apply between different entities. It is intriguing to know whether some would be used during the games. As such, a coach-player communication system made specifically for football teams has been trailed by several clubs. It allows coaches to pick single or multiple players to communicate with immediately through an application on their smartphone.

Artificial intelligence would also be used during the games and with the fans. Some would assist accessibility to the visually impaired users to feel the action for themselves, rather than listen to someone else's commentary. Others would convert digital content around the World Cup into braille language. According to the organisers, facial recognition technology will also be used during the games to monitor Spectators.

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A big role plays all the match analysis of the teams and working for the media. Soccer analysis during the World Cup in Qatar, both during the game and in preparation for the opponent (game plan), follow-up, or training (game concept), is now indispensable in all European leagues and national teams. Involved were also "Data Scientists" who are only busy writing and validating algorithms to develop their games according to the Catalan philosophy. Today, the coaching staff in many national teams is supplemented by so-called "assistant coaches game analysis". These individuals usually work more closely with head coaches than head coaches work with athletic trainers and sports psychologists. This demonstrates the value of game analysis and the need for continuing education to become a game analyst. In 2015, the German Sport University offered the first master's degree program in "Match Analysis" to address this practical need. Another example: a lot of information about opposing players/teams is used to prepare for national team matches. For example, past penalty kicks are analyzed to provide crucial information to the shooter and goalkeeper to increase the probability of a penalty being awarded or held.

To sum up, new technologies will be deployed at FIFA World Cup 2022 in Qatar and may end up making the difference between winners and losers without fans and media consciously noticing.





Glocalising Qatar’s World Cup 2022 through memorising the ghutra



Irene Theodoropoulou

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Introduction: The State of Qatar will host the World Cup 2022 from the 20th of November until the 18th of December 2022. Since the FIFA awarded the right to host this football event the state of Qatar back in December 2010, the Supreme Committee for Delivery and Legacy (SC), which is the organizing committee of the event, has made strategic use of the elements of the male Qatari national dress, in order to give this event a glocalised flavour, namely a locally-based globalized (Roudometof, 2016) version of the tournament. It did so by highlighting the fact that this is the first time that the World Cup is held in Qatar, in the Middle East and in the Arab world in general. At the same time, by blending football with elements of the Qatari identity (Theodoropoulou, 2022), the organisers wish to highlight the presence and role of the game in the country, especially in its most recent history. Against this backdrop, this paper demonstrates how elements of the male Qatari national dress are used to brand the World Cup 2022 in a way that does justice to the (Gulf) Arabic identity and that the organizers wish to infuse.

Football enjoys a special place in Qatar’s history. “Tembah,” a local version of the game, has been popular for centuries. Mirroring Qatar’s growth and evolution, it is interesting that football, as we know it now, was first played by workers in the country’s oil industry. Since those days, the sport has enjoyed tremendous growth, reaching every corner of the Qatari society. Today, football is beloved across the country, from the smallest neighbourhoods, when children delight in kicking a ball through makeshift goalposts, to the stadiums where Qatar’s National and club teams have offered their primarily local audiences with their many laudable successes over the years. The most recent one of the latter is the first place in the 2019 Asian Football Cup, where they beat Japan in the finals. From the be-

ginning of its existence as an independent State, Qatar has demonstrated decades of football development and achievement, which are branded in the context of the World Cup 2022 through strategic use of various elements of the male national dress.

The male Qatari national dress consists of the thobe, the ghutra, and the iqal (Image 1). The thobe is a pristine white long robe-like clothing or tunic that covers the whole body from the wrists right down to the ankles. The top half of the thobe is tailored like a shirt but reaches down to the ankle and is loose-fitting. A pair of loose white trousers called the sirwal is always worn under the thobe.



Figure 1. Male Qatari dress (front and back)

Iqal refers to a piece of clothing, which looks like a ring of wool or fabric placed over the head. It is worn over a piece of fabric called “ghutra”, or “shemagh” or “kuffiah” (Al-Hamad, 2021: 30) to hold it in place. The ghutra is generally made of cotton, either plain or lightly embossed with patterns, and it is warm during summer and winter.

Usually, in winter Qahtani men wear a Kashmiri shawl, namely a coloured wool fabric, which carries broad patterns in brown, green, blue, orange and other colours. The shawl is usually associated with affluent men who buy these imported goods from an elite merchandise from India.

Under the ghutra, men in Qatar and in the Gulf, wear the “qahfiya”, namely a wool or cotton head – cup. Some varieties of the qahfiya have small holes that mainly cover the top of the cap. Qahfiya is worn on a daily basis, even when men remove their water and Iqbal at home, and children may put it on when they play outdoors with their friends without wearing the ultra and eagle. One of the functions of the qahfiya is to help young boys to become accustomed to covering their heads in public.

On top of the ghutra, Qatari men wear the “iqal”. The word “iqal” in Arabic means “binding” and “controlling.” This means controlling the mind where thoughts and perceptions reside, because the iqal is seen as a symbol of self-control and restraint. The term is also used by camel herders when they bind

the camels’ legs to not wander away. It is usually made of wool or fabric braids. Both of these pieces form the common headwear worn not the only by Qataris but also by Arabs of the Gulf in general. Overall, it is seen as an emblem of maturity and the equanimity, which encourages young boys to wear it and show to their community that they have become mature men. Worn on top of the ghutra, the iqal is seen as a marker of honour, and when a man is insulted or dishonoured, he would wear the iqal on his neck until he regains his honour.

Given the importance and the symbolic meanings associated with well-established values in Qatar, it is not accidental that the ghutra and iqal have inspired a number of iconic landmarks and branding elements of the World Cup 2022.

More specifically, one of the 8 stadiums that will host some of the 64 matches of the World Cup 2022, al-Thumama Stadium, draws its architectural inspiration from the qahfiya leitmotif (Image 2).



Figure 2. Al-Thumama Stadium

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The stadium itself represents the qahfiya, which has many different social meanings.

The most significant and emblematic one is that this stadium takes the qahfiya shape and appearance and translates it into the architecture language. As such, the stadium represents a light and transparent building that floats above the ground level. The stadium takes form as a lightweight woven fabric and decorative embroiders that result in a close and well-known reference for Qatari spectators, inviting them to join and play a key role over the matches that will be held in that stadium. Other meanings attached to the qahfiya include the qahfiya as a vessel of the mind, a sign of protection and respect, a deep relationship with family values, and the role of male children in the Qatari family. It is also a “symbol of dignity and independence – an analogy for Qatar and the surrounding region” (I Love Qatar website, n.d.).

According to the SC spokespersons, “Al Thumama Stadium is a nod to the past, while offering an exciting glimpse into Qatar’s tomorrow.” In Arab culture, the qahfiya forms an important part of every young boy’s pathway to adulthood. As such, it is an arena that symbolizes Qatar’s youth, the country’s emergence as a major player on the global sporting scene, and the shared Arab heritage that inspired its creation.

Apart from al-Thumama stadium, the mascot and the emblem of the FIFA World Cup Qatar 2022™ have both been inspired by the male Qatari national dress, and they have been designed strategically to highlight the distinctive Qatari identity that the organizers wish to give to the event. More specifically, La’eeb (meaning “very skilful player, in the Gulf Arabic dialect), which is the mascot of the mega event, draws his design from the Qatari ghutra and iqal, based on the aforementioned symbolic meanings but, according to his designers, he is not supposed to have an anthropomorphic shape (Image 3); on the contrary, “La’eeb can be a figment of your imagination.

He is whoever a football fan wants him to be.” For a mascot meant to be figment of someone’s imagination, FIFA still managed to find many adjectives used to describe it, including “courageous”, “uplifting”, “fun”, “playful”, “mischievous”, “youthful”, and an “adventurous spirit.”



Figure 3. La’eeb (the FIFA World cup 2022 Mascot)

As part of the promotional campaign before the World Cup 2022, the youthful character of La’eeb has appeared across billboards, skyscrapers and merchandise across Qatar as the face of the tournament. As such, he represents not merely a marketing tool that personifies the country on a global scale, but encompasses a cultural identity that goes beyond the football pitch.

Finally, the emblem of the World Cup is the infinity sign (Image 4), which contains swooping curves of the emblem representing desert dunes, and the unbroken loop depicts both the number eight – representing the tournament’s host stadiums and its compact character – and the infinity symbol, reflecting the event’s interconnected nature, fusing tradition with modernity. Overall, the emblem symbolises the legacy of the FIFA World Cup Qatar 2022™, and it will continue to inspire and accelerate development in Qatar, the region and globally, well after the tournament comes to an end. The woollen shawl, which forms the base of the shape of the emblem, is intricately embroidered with symbols that represent Arab and Asian culture – a nod to the first World Cup in the Middle East and Arab world, and the second in Asia. It is traditionally worn by people from across the region during winter, and it symbolises people’s unification around the globe.



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In a nutshell, through the resemiotisation of core elements of the male Qatari dress, especially the ghutra and the iqal, namely their material transformation (Iedema, 2003), a strategic attempt has been made by the organizers of the World Cup 2022 to glocalise the mega event through the introduction to the outside world of values, which are at the cornerstone of the Qatari identity, are in alignment with the global culture of football, and as such will also highlight Qatar's legacy to the Middle East and to the rest of the world.



FIFA WORLD CUP Qatar 2022

Figure 4. Emblem of the FIFA World Cup Qatar 2022™

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Peer review of coaching in international amateur/grassroots 50-65+ small-sided football contexts



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Introduction: Peer review of coaching (PRC) in amateur/grassroots 50-65+ small-sided football settings is an effective method for [often volunteer] peer or mentor coaches to provide systematic and constructive evidence-based feedback for each other in order to continually develop and enhance the quality of their coaching practices. Essentially, PRC entails various feedback activities that can be conducted in informal or formal ways, and is a collaborative, reciprocal, and immersive form of coach education and development. This article draws on a multinational coach's collaboration in diverse amateur/grassroots 50-60+ small-sided football coaching settings. In these contexts, PRC has fostered a community of coaches; sustained unique coaching innovations; and enhanced the quality of amateur/grassroots 50-65+ small-sided football programs and tournaments in local and international settings. Specifically, PRC was deployed to further enhance international 60+ small-sided football tournament design and implementation; to enhance 60+ team selection, team defence and team offence strategies for international competition; and to enhance multinational referee development for officiating in a 60+ world cup football event. Very little research has examined effective PRC strategies in amateur/grassroots 50-65+ small-sided football contexts. As part of preparation for the 60+ International Masters 5-a-side World Cup Football Tournament at the Home of FIFA, Zurich Switzerland, 2022, action research methodology was employed in order to assess effective PRC strategies in diverse 50-65+ small-sided football contexts. For example, in these settings, PRC data collection and analyses focused on coaching observations, analysis of program literature and website documentation, team/group video analysis and performance outcomes, coach's debrief and feedback sessions and, key insights from a representative sample of participating international tournament

team leaders. This paper highlights key findings for effective PRC strategies in diverse amateur/grassroots 50-65+ small-sided football contexts.

Strategic educational inquiry (SEI) is a flexible, systematic, and rigorous approach to practitioner research and is particularly effective and efficient for coach leaders and administrators in complex AGFO settings. Depending on the nature of organization-specific research objectives, SEI can draw upon an eclectic range of research methodologies in order to provide relevant evidence-based data for quality assurance and enhancement purposes, i.e. to sustain state-of-the-art coaching program innovations, improvements, and/or high impact program outcomes. Grounded in interdisciplinary research and case study methodology using multiple case design, this article highlights key findings and practical examples of applied SEI for quality assurance and enhancement purposes in diverse AGFO coaching contexts .

Practical considerations and examples for conducting PRC in diverse amateur/grassroots 50-65+ small-sided football contexts.

Prior to engaging PRC in these football contexts, key considerations for coaches should include:

- Clarify the purpose for conducting PRC in your setting?
- Clarify appropriate criteria for conducting PRC in your setting?
- Clarify appropriate data collection sources for conducting PRC in your setting?
- Clarify appropriate standards and ethical principles for conducting PRC in your setting??
- Clarify appropriate sessions and feedback expectations for conducting PRC in your setting?



Appropriate criteria for conducting PRC in your setting

Various PRC criteria frameworks for effective coaching have been documented in the sports science literature and include the following examples:

- Knowledge of the game (tactical, technical, rules, current issues)
- Coaching enthusiasm, ethics, integrity, role model
- preparedness (for individual sessions and for overall program)
- communications skills
- interpersonal skills
- motivational skills
- team development skills
- player development skills
- quality of coaching programs, tournaments, events
- engagement in continual coaching professional development

Appropriate data collection sources for conducting PRC in your setting?

Various PRC data collection sources can be utilised to measure effective coaching. Data sources (quantitative and qualitative) must be appropriate and sensitive to assessing a broad perspective of coaching practices, including evidence about coaching context, coaching process, coaching outcomes, and coaching impact within the organisation. For example:

- Number of coaching sessions offered by the coach at various levels,
- observations and video analysis of coaching sessions,
- current program literature and/or program website documentation,
- team and player development performance outcomes,
- coaching dossier,

- player-centred program feedback evaluations,
- coach's debrief and feedback sessions by internal and/or external reviewers

Appropriate standards and ethical principles for conducting PRC in your setting?

Making constructive judgments (e.g., excellent, outstanding, good, average, poor OR exceeds/Meets/Does Not Meet Organizational Expectations) on aspects of a colleague's coaching practice (evaluation) is typically the most challenging, yet most valuable dimension of PRC in amateur/grassroots 50-65+ small-sided football coaching contexts. Thus, judgements for PRC in these unique amateur/grassroots 50-60+ small-sided football settings, should be conducted with professionalism (including confidential) and based on agreed criteria, evidence-based data collection (e.g., see above examples to select from), and constructive in terms of specific suggestions for further improvement to enhance the quality of a coach's practice.





Strategic PRC initiative in diverse amateur/grassroots international 50-65+ small-sided football contexts

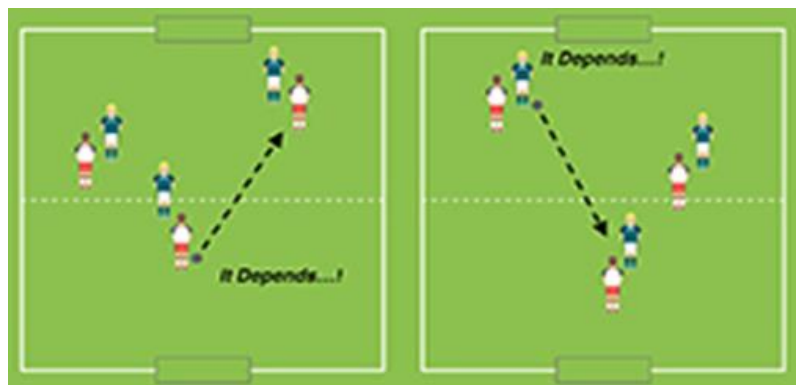
As a result of a multinational coach's collaboration, a strategic PRC initiative has sustained the development and implementation of an annual 2-day amateur/grassroots international masters small-sided football world cup (2006-2022). This annual event has been hosted at excellent football venues throughout Europe and the UK. In 2022, it will be hosted at the Home of FIFA, Zurich, Switzerland. For example, the strategic PRC initiative has contributed to the customisation of this event and team preparation in order to meet the state-of-the-art football needs (e.g., physiological, mental, social emotional) and circumstances of amateur/grassroots 60+ international masters players and officials. Specifically, in this context, strategic PRC has customised the following: team, player and referee development initiatives; small-sided game design and tournament format (including hybrid multinational rules such as length of pitches, flying substitutions, duration of individual games and total game-time per team per day); small-sided game disciplines (5-a-side, 4-a-side, and competitive walking soccer, team penalty shoot-out competition); and, the tournament social component for amateur/grassroots 60+ multinational teams, players and officials

Summary: PRC experiences in diverse amateur/grassroots 50-65+ small-sided football contexts suggest that this is an effective method for providing systematic, constructive and responsive feedback for coaches to continually develop and enhance the quality of their coaching practices. In addition to contex-

tually-bound coach education and development [for often volunteer coaches], PRC can foster a community of coaches and organizational culture for coaching excellence and innovation in amateur/grassroots 50-65+ small-sided football programs. Key football organizational supports are required to enable effective PRC experiences such as explicitly recognizing the value, benefits and time for PRC; and providing access for coaches to digital video recorders, technology-enabled coach education, and immersive mentoring support.

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Mental health benefits of seniors' 50-65+ small-sided football: Coaching implications in local and international contexts



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Introduction: Ageing populations around the world have resulted in a significant growth of seniors' (over-50s-65s) small-sided football in local and international settings. In these contexts, small-sided football is typically played in diverse formats (e.g., 3v3, 4v4, 5v5, 6v6/ futsal and walking football), and at various levels of competition (Hubball & Garcia, 2022). The physiological benefits of small-sided football have been well documented in seniors' 50-65+ football contexts, however, very little is known about mental health benefits and related coaching implications in these settings. Drawing upon coaching experiences and health program planning, implementation and evaluation research (Green et al, 2022) in diverse local and international seniors' (50-65+) small-sided football settings over a 3-year period, this article highlights key findings and practical coaching strategies to enhance mental health benefits of seniors' small-sided football initiatives.

Mental health is part of a broader and interconnected concept of wellness which also includes physical, emotional, social, spiritual, and environmental health components (Gayman et al, 2017). For example, the World

Health Organization (WHO) defines mental health as “a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community.” Mental health can be considered both as an antecedent and a consequence of sport participation (Faulkner et al., 2021). Participating in small-sided football might lead to positive mental health benefits. Feeling mentally healthy may be important to initiate and sustain participation. Meeting the unique mental health needs and circumstances of seniors' 50-65+ players in diverse grassroots small-sided football contexts is a complex, bidirectional, and multifaceted process. We argue that coaching strategies to facilitate mental health in these settings is inherently situated within broader communities of practice (including organizational/club/team cultural context, levels of support); it is socially mediated (shaped by program leaders/coaches and peers' support); and, it is personally constructed. In other words, it is the process of participating in football contexts that is important for mental health benefits.



Mental health benefits and coaching implications for seniors' 50-65+ small-sided football

The coach plays a critical role in establishing process conditions that are conducive to facilitating mental health benefits in seniors' small-sided football. For example, our field research (pre-during and post-pandemic) in local and international seniors' (50-65+) small-sided football settings suggested that effective coaching strategies enhanced participants' motivation, excitement, purposeful play and enjoyment, personal and social responsibility, self-esteem, feelings of well-being, joy for reunions with fellow participants, sustained excitement for the next time of playing, as well as, reduced issues such as stress, loneliness, anxiety, depression, frustration, grumpiness and negativity levels. Further, in many cases, effective coaching strategies in these unique seniors' football contexts were reported to contribute to, and further develop, participants' football-related mental skills such as goal setting, time management, inter-personal communications, organization, concentration, focus, arousal management, visualization, and problem-solving abilities. Facilitating mental health in unique seniors' football contexts was not limited to an isolated event, rather it occurred effectively over time and required strategic, iterative and responsive coaching approaches. No one size fits all.

of competence, autonomy, and social connectedness among participants is key for promoting sustained participation in seniors' (50-65+) small-sided football and reliably enhancing mental health (Faulkner et al., 2021). The following examples of effective coaching strategies to enhance mental health were observed in local and international seniors' (50-65+) small-sided football contexts:

- Responsive program/competition programming and scheduling for seniors' (50-65+) players in order to sustain a critical mass and regular high participation turn-outs. For example, provide options for a limited number of short bite-size-chunk program duration and frequency sessions, modi-

fied and multiple short duration game-periods, seasonal indoor and outdoor football sessions, intra and inter-team tournaments, group field-trips, and guest speaker/coaching sessions;

- Create a positive and supportive seniors' social/team environment. For example, learn names of all seniors' participants and also something interesting about each player/participant; frequently check-in with senior participants regarding program/team processes, progress, as well as relevant information and input on program/team website including sharing of relevant pictures and social media;
- Involve seniors' players/participants in decision-making throughout training, programming and/or competition processes (i.e., player/participant-directed) rather than simply providing instruction (i.e., coach-directed) is likely more effective. For example, invite seniors' players/participants to contribute to session set-up and clean-up of equipment, as well as team organizational processes;
- Facilitate pre-during and post-session social interactions for seniors' players/participants. For example, in addition to above program/team contributions, it is important to enable seniors' players/participants to engage in frequent drink and social game-breaks which often enables good-humoured banter to discuss missed shots, fouls, questionable referee decisions, age-related aches and pains, as well as team mates' misguided support for rival professional football teams!



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- Foster a strong sense of team/group identity. For example, use common group/team uniforms, mix and match internal squad teams, as well as facilitate fair and equal team selections. Set the “tone” for fun, fair and challenging team games. Assist the group/team to strategically progress through iterative and cyclical stages of group development;
- Celebrate informal and formal team, and individual achievements (e.g., football successes, celebration of life memorial tournaments for former players who have died or suffered serious illness, team fund raising etc.) with communal drinks and snacks.

Summary: Longitudinal data in diverse seniors’ small-sided football settings suggest that mental health benefits provide a critical foundation for enhancing and sustaining seniors’ participation in grassroots 50-65+ small-sided football. In these contexts, mental health benefits do not just happen organically, rather they evolve through careful planning and facilitation of responsive coaching strategies. Grounded in interdisciplinary research and case study methodology using multiple case design, insights from this article

will assist coaches and program leaders to enhance mental health benefits of seniors’ (50-65+) small-sided football programs.

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The effect of dynamic functional insoles on optimizing foot function: A case report

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Introduction: The foot. It is a highly complex functional organ of balance and propulsion. It acts not only as the foundation for the rest of the body, but also, its function affects every other motion in the body. It has two prime functions which are a loose adaptor and a rigid lever.

Clinical biomechanics. Clinical gait analysis with kinematic and kinetic systems is necessary to better understand foot function and dynamic structure of the foot. And also this helps to find the source of the pathomechanics

Chain reaction biomechanics. Motion of the feet causes movement up the kinematic Chain Reaction to the knee, hip, and spine. It is important to learn about the complexity of the feet. But, it is essential to appreciate the practical simplicity of the feet during functional movements.

Landing biomechanics. Malalignment or dysfunction of the foot can increase the risk of landing-related trauma such as anterior cruciate ligament injury, particularly in female soccer players. But dynamic functional insoles can help alter landing mechanics in ways that can decrease that injury risk.

Dynamic functional insoles. They are designed based on dynamic gait analysis data using foot plantar pressure measurement systems. They help normal foot function while preventing excessive ones. Therefore

they can be used without time restrictions. Dynamic functional insoles can help with injury prevention, faster recovery from injury and performance improvement. And also they can reduce the risk of re-injury.

Case report

He was 35 year old male with on the sole of the feet, occasional pain in the knee and hip joints.

Kinetic gait analysis was made by Materialise footscan system. The measurements were made using a 2m long footscan plate in a special 12m running track. The running protocol was applied 6 times in such a way that running starts 6 meters before the plate and finishes 4 meters later. Thus, it was ensured that he reached his own running speed on the plate and continued at the same speed. Analysis and insole design were made by footscan v9 software and the system recommended dynamic functional insoles were given in a week.

When the insoles were delivered to him, he was told to come for control in 10 weeks.

When he came to the control, he said that his complaints were completely gone in a week after he started using insoles, then with insoles, he started running 10.000 meters four times a week and playing soccer two times a week. The same analysis was performed again with the same system. A significant improvement in plantar load distribution and as well as improvement in dynamic foot type was observed compared to first analysis (Figure 1).

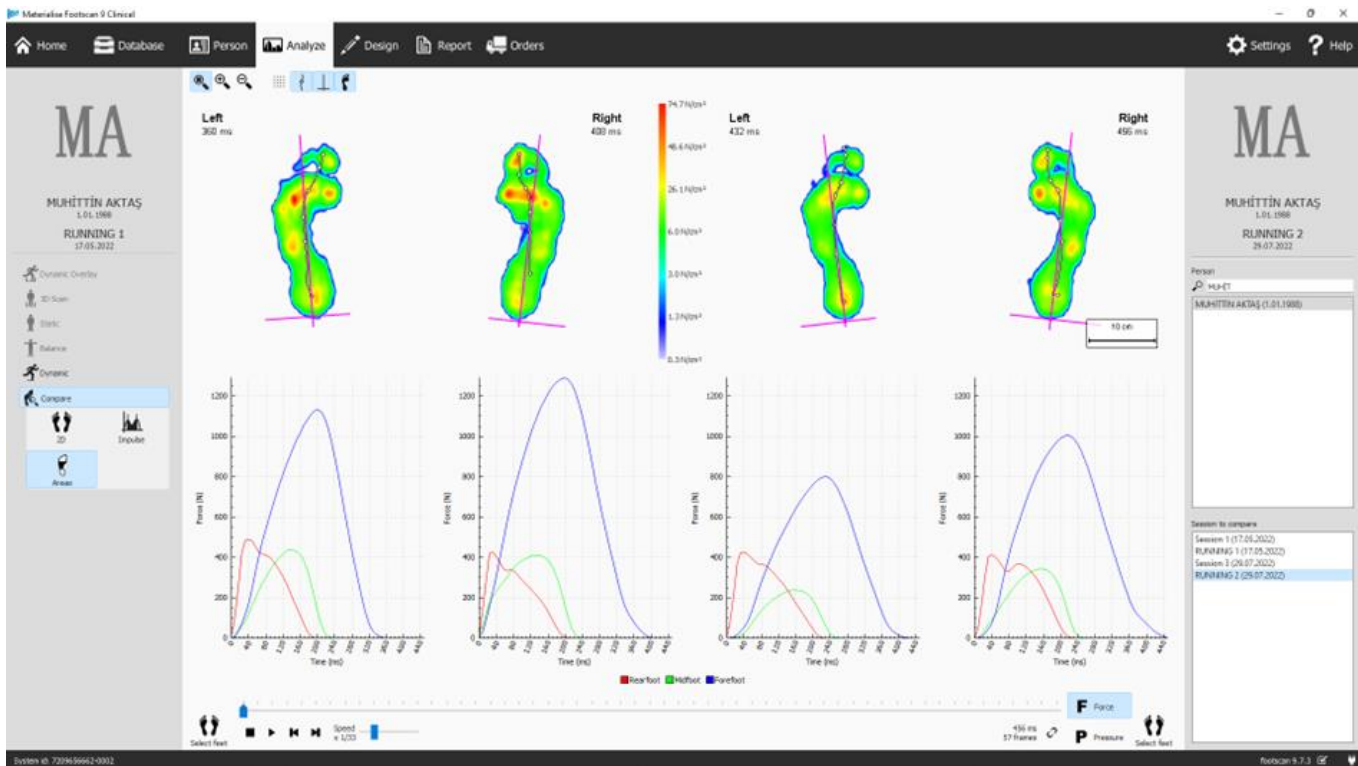


Figure 1: Improvement in the plantar rearfoot, mid-foot, forefoot loads distribution and as well as improvement in dynamic foot type after 10 weeks of wearing dynamic functional insoles

Summary

The foot is a highly complex functional organ. Therefore, dynamic kinetic and kinematic foot analysis is needed to fully understand the foot and to design dynamic functional insoles.

Foot biomechanical problems (pathomechanics) can be better solved with biomechanical solutions. One of them is dynamic functional insoles.

This case study has given important clues that the benefits of dynamic functional insoles can occur in a shorter time as the daily usage time increases.

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SADA Insight: AI for Sport Media and Events From South Africa 2010 to Qatar 2022

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Introduction: SADA Insight: AI for Sport Media and Events was borne out of a research project about “Sentiment Analysis on FIFA World Cup Qatar 2022 Using Artificial Intelligence and Twitter” by Dr. James She, Dr. Kamilla Swart and their teams in Hamad Bin Khalifa University (HBKU). This project was initially funded by the Supreme Committee of Delivery and Legacy and CyPhy Limited, and later on collaborated with Michael Linley, Victoria University, and Dr. Othman Al-Thawadi, Qatar University. The technology, methodology and system from this research can provide us the ultrafast AI-based Sentiment Analysis, Search, Statistics and Alerts on various aspects of a sport mega-event like the FIFA World Cup. Hence, the media channels, reporters, organizers and even individual professionals could acquire an almost real-time summary and timely ideas about wide-ranging topics and incidents perceived by the public about a sport event.

Social media is an important source for retrieving public sentiment, with Twitter one of the most popular international platforms for social media. More than 400 million tweets are posted every day on Twitter, and more than half a billion tweets were obtained in the previous World

Cup. This large dataset allows the public reaction to an event like the World Cup to be analyzed, providing information on public perceptions and attitudes. This research investigates the relationship between the sentiment based on Twitter tweets and the World Cup 2022.

“The unique capabilities of our AI technologies and Data system - SADA, developed in this project are the ultrafast access and continuous insights about the sentiments for different aspects of a mega sport event by analyzing the growing amount and complex content of tweets. So far, over 1 million tweets highly relevant to the World Cup event, as the first in the community, are collected and analyzed. The AI system, SADA, will collect more highly-related tweets every day, and then continuously analyze and report the sentiments of the identified concepts and keywords from newly accumulated tweets containing text, emoji or even user shared images later on using advanced machine learning techniques and system technologies,” highlighted Dr. James She, the project lead .

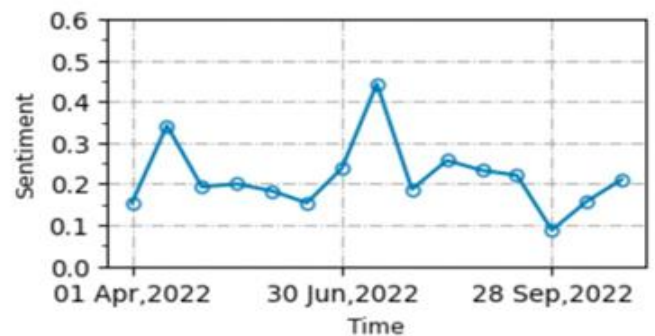
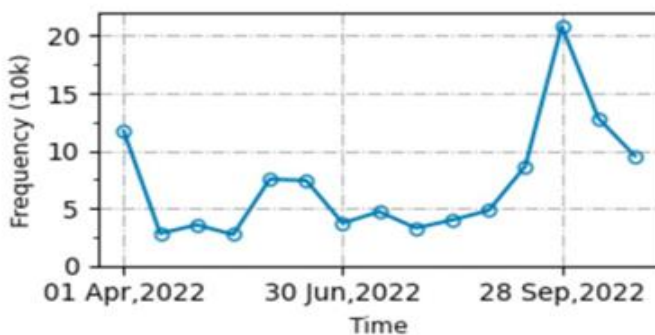


Figure 1. Tweets Numbers and Positive Sentiments about the FIFA World Cup Qatar 2022



Keyword Frequency

Official keywords:
 k1 : FIFAWorldCup
 k2 : Qatar2022

Observed keywords:
 k3 : football world cup
 k4 : qatar world cup
 k5 : soccer world cup
 k6 : worldcup2022

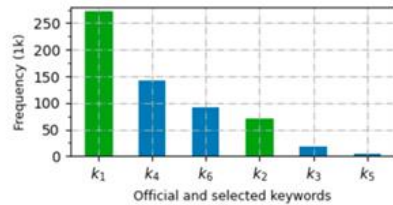


Fig. 3 – Tweet count contains the keywords

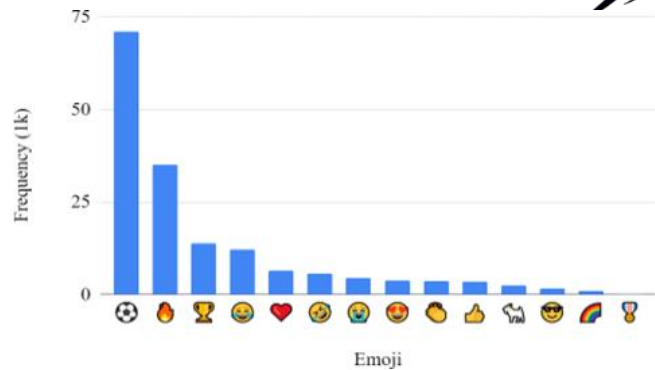


Figure 2. The Frequency of Hashtag/Keywords and 14 Most Used Emojis in Tweets Related to the World Cup identified by SADA Insight

These tweets are only collected with the relevant hashtags or keywords about the Qatar World Cup 2022. Through our AI and data-driven SADA system and the derived methodologies, we discovered the sentiments and fun facts of some features important to the sentiments about the period before the World Cup. The result shows that people are positive about the upcoming World Cup. Other breakthroughs and powerful features of the SADA system include the intelligent analysis of social media languages, daily mobile alerts, and summarized insight of total and daily tweet amount, average sentiment, and smart information visualization. “We are excited about the capability of SADA system and the generated insight to assist with better management and decision-making across all phases of event bidding, planning and implementation,” expressed Dr. Othman Al-Thawadi. “Moreover, SADA system and the produced insight has applicability across different types and sizes of special events, ranging for sport to even non-sport, mega- and annual sport events,” he added.

“The initial groundwork of this project was a legacy of the 2010 FIFA World Cup, and the 2022 FIFA World Cup has presented an opportunity to evolve the analysis of public sentiment using AI technologies and massive data from social media that can provide real-time insights in order to create smarter events,” underscored Dr. Kamilla Swart, who initiated the 2010 FIFA World Cup Research Agenda and has been part of several research initiatives aimed at enhancing knowledge of sport mega

events in the Middle East North Africa region, and Qatar in particular.

For future work, the collaborative project team will investigate the public sentiments by advancing novel AI, data and system technologies from HBKU to help discover other key aspects or even predicting the golden ball winner of this World Cup. For example, football players’ sentiment could reflect their on-field performances, and the higher the sentiment could help us to track and predict the winner. Since many tweets can involve complicated sentences, and even contain trending multimedia content like emojis, images, or even video, the involved AI technologies, system, and methodologies in SADA is envisioned to provide much more accurate and earlier insight about the public’s sentiments of any mega sport event faster than hearing your sound echo!

Learn more about us below, and follow for further information on Twitter [@SADAInsight](#)

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Applied Artificial Intelligence and Data Science in Football Conditioning



Alireza Amani

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Introduction: In recent years, data science and artificial intelligence have been two influential factors in the growth and development of various sciences, and new technologies have been developed based on these sciences. Always receiving information and data can help humans in making logical decisions, and if we are faced with a lot of data, artificial intelligence will help humans here to make the best decision (Ratiu et al., 2010).

Today, football is more than a sport. Today's football has influenced various aspects of human life and therefore many investments have been made in this sport. We continue to see that the World Cups of these years are known as one of the biggest events in the world and all eyes are on it during these competitions.

Data science and artificial intelligence can help coaches and athletes to perform at their best on the field. We have some valuable data on football, and if these data are not ignored, we can use them to improve performance (Tuyls et al., 2021). In this article, we focus on the physical performance of football players, which affects the athlete's performance on the field. In fact, here we are dealing with their data, and this data has to be received, processed, and decisions made in a very short period of time. For example, if a professional team has training 3 times a day, it may sometimes be necessary to receive and analyze one or more players in a few minutes in order to make the best decision for that athlete for the next training session on the same day.

We give an example. The speed set repetition in strength training of the players in the morning session is sometimes recorded by the VBT (Velocity Based Training) device in strength and power training. You have a limited time to receive and analyze the data of each player. If we encounter a significant drop in the movement speed of a player in several moves, we must look for the reason. Nutrition, psychological factors,

chronic injury, jet lag, and maybe other factors play a role here such as overtraining. Undoubtedly, this player will be prone to injury today. The best decision for this athlete should be made for that day. Undoubtedly, one or more trainers with human limitations will not be able to receive and analyze these data within a few minutes or even a few hours to make a good decision.

Based on the previous example, let us solve the problem systematically. The VBT devices that are connected to the athletes in the training hall save the speed of the exercise in each movement and send it to the main server. This data is sent to each player separately. At the same time, the smart wear will report the pulse rate and the duration of the pulse reduction after each exercise and send it to the central server. According to the science of physiology, athletes with higher preparation have better recovery speed or heart rate reduction speed. Also, in terms of movement execution speed, this variable has a strong relationship with physical fitness. Any reduction in this factor can be caused by many factors such as overtraining, which if not paid attention to in time, will affect the team's results.



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The data is sent to the server online through the sensors. The volume of receipt data is large and will need to be processed based on artificial intelligence technology. Artificial intelligence applications based on programming languages such as Python come to our aid in this field (Pantazopoulos & Maragoudakis, 2018). The data of each player is checked separately with the performance history of the same player and compared to the average performance of the team in the same session and the average of the team in the specified period of time. This analysis is based on several different data, including some field tests that were taken in that training session (such as the maximum oxygen consumption test and the maximum anaerobic power test) and variables received by smart sensors such as heart rate, recovery time, speed and the ability to perform the movement is received for each player. This data should be compared for each player and in each variable, eventually becoming a standard score compared to himself, and other teammates, and sometimes based on the opposing team's data (if available).

The received data will tell the trainer what exercises and activities should be done for the next training session to reduce the risk of injury. The performance of the player and the team will increase during the week or month so that the best results for the team can be obtained as a result. The body of doubt, if this data needs to be received and analyzed for decision-making with this number of players every day and every training session, will be beyond human capacity. This is where data science along with technologies derived from artificial intelligence comes to the aid of Strength and Conditioning coaches to bring out the best performances from their team.

This article briefly examines the application of data science and artificial intelligence in strength and conditioning and physical preparation of football athletes, and similar applications can be used in analyzing the performance of football players from a tactical point of view, which is currently based on data science technology and sensors. GP is in use.

Today, sports scientists are facing a new field called data science and artificial intelligence. If this field of science does not connect with the science of sports, there is no doubt that the teams will not get the necessary results on the field. There is room for this interdisciplinary department to open its place in universities and sports science researchers will quickly enter this field of science and use it in various sports, including football.

Although data science and artificial intelligence can help us in receiving and analyzing data in football, the decision to implement decisions should be based on human intelligence (Lexcelent, 2019). In sports and especially in football, many factors are involved except the data that can be obtained with artificial intelligence, and therefore it is not possible to base training programs completely on the basis of artificial intelligence, and human intelligence will always be the decision-maker and adjuster of the programs

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High-intensity interval training combined with blood-flow restriction predominantly alters anaerobic capacity in endurance-trained athletes



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Keywords: HIIT, VO₂max, anaerobic capacity, NIRS, peripheral adaptation.

Introduction: The development of several determinants of performance throughout the training phases in sports that require a high number of physical qualities as well as tactical and technical components, such as soccer, could be challenging. In this context, training methods optimising the development of concurrent physical qualities can be of great interest for coaches and sport scientists.

One of these methods, blood flow restriction (BFR), is gaining interest among the sporting world. Training with added BFR consists of exercising while a pressure is applied to the exercising limb via a pneumatic cuff, elastic cuff or tourniquet in order to restrict blood flow to active skeletal muscles which greatly modifies the local metabolic (Figure 1). BFR has been shown to increase strength and muscle mass when combined with low resistance exercises, but may also enhance VO₂max (Held et al., 2019) and aerobic (Paton et al., 2017) and anaerobic (Park et al., 2010) performance when combined with aerobic exercise training. Some authors even reported that BFR combined with aerobic training increases muscle strength, muscle mass and aerobic capacity simultaneously (Abe et al., 2010; de Oliveira et al., 2016). It is yet unclear by which mechanisms these improvements occur, but it is speculated that BFR could increase muscle oxidative capacity during aerobic training (Ferguson et al., 2021) and stroke volume (Abe et al., 2010).

To our knowledge, despite those promising results with low- and moderate-intensity aerobic exercise, no studies to date have investigated the efficacy of high-intensity aerobic exercise training (HIIT) under BFR. Therefore, the aims of the current study were to exam-

ine the feasibility and the effects of combining HIIT and BFR on anaerobic and aerobic performances. This is extremely relevant since team-sport athletes use HIIT in a variety of contexts to enhance physiological and physical qualities.

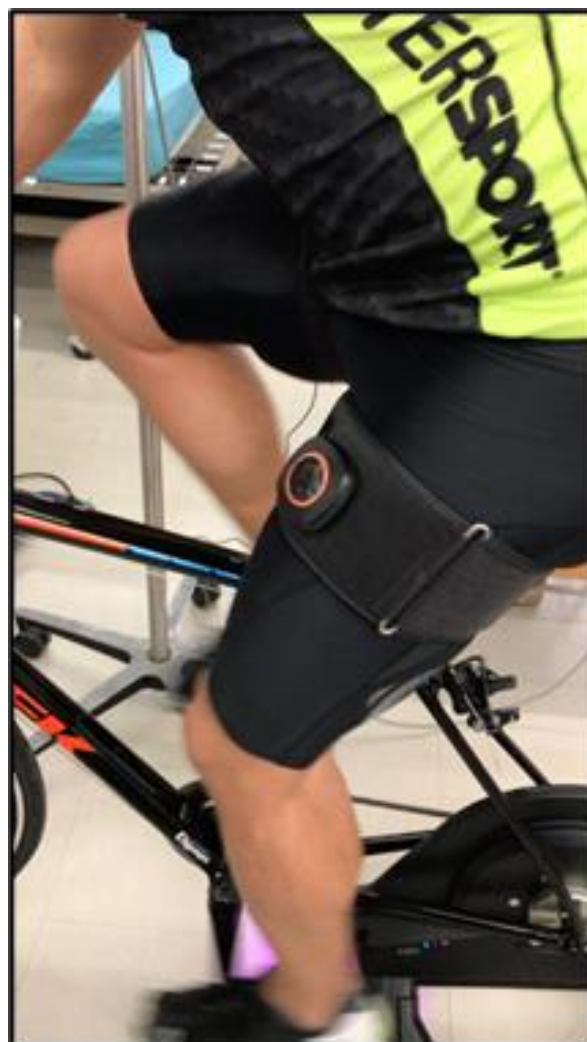


Figure 1. Application of blood-flow restriction to cycling exercise.



The study

Eighteen endurance-trained males (25 yrs-old, VO₂max: 64.6±6.8 ml/min/kg) were randomly assigned into a blood flow restricted (BFR, n=10) or control (CTL, n=8) group. Both groups included 3 HIIT sessions per week over 3 weeks into their training program (see Table 1 for detailed training intervention), and the BFR group wore inflatable cuff (9 cm width; AirBands, Newstead, Australia) on both thighs during every session. Before and after the training intervention, participants completed a maximal cycling incremental step test, a Wingate anaerobic test and a 5-km cycling time trial. VO₂max was measured during the step test and muscle oxygenation was measured via near-infrared spectroscopy during the Wingate and time-trial tests. All data were analysed with Cohen's effect sizes (ES) and t-test. The study was approved by the ethics committee of University Laval and adhered to the principles of the Declaration of Helsinki.

Results

The maximal aerobic power developed during the incremental step test (Figure 2) increased in BFR (368.3±58.3 vs 385.8±58.4 W, p=0.002, ES 0.26), but not in CTL (377.8±55.4 vs 385.5±55.9 W, p=0.14, ES 0.12). However, there was no change between

groups in the increase in VO₂max (BFR: 1.31% vs CTL: 1.99%, ES -0.08) and in the time to complete the 5-km time trial (BFR: -0.84% vs CTL: -2.18%, ES -0.16).

In the Wingate test, the mean power output increased in BFR (10.9±1.0 vs 11.2±0.9 W/kg, p=0.08, ES 0.28), but not in CTL (11.0±1.3 vs 11.0±1.2 W/kg, p=0.77, ES -0.03). The total mechanical work also increased in BFR compared to CTL (3.2%, ES 0.23, Figure 2). Additionally, changes in muscle deoxygenation were attenuated in BFR (-8.84%, ES -0.29).

These results suggest that short-duration HIIT combined with BFR elicited greater improvements in anaerobic capacity and maximal aerobic power over a three week period in endurance-trained athletes, but those improvements did not enhance performance in a time trial effort. The increases in MAP and anaerobic capacity, without a concomitant increase in VO₂max, could be explained by a greater contribution from the anaerobic metabolism and/or neuromuscular adaptations.

Take-home message

BFR can be successfully applied during a HIIT training program including 15-s efforts performed at 100% of maximal aerobic power and is well tolerated by endurance-trained men.

Week	Session	BFR (n=10)		CTL (n=8)
			Cuff pressure	
1	1-3	6 x 4 x [15s 100%MAP/15s 60W]	50% AOP	2 x 12 x [15s 100%MAP/15s 60W]
2	4-6	7 x 4 x [15s 100%MAP/15s 60W]	60% AOP	3 x 12 x [15s 100%MAP/15s 60W]
3	7-9	8 x 4 x [15s 100%MAP/15s 60W]	70% AOP	4 x 12 x [15s 100%MAP/15s 60W]

Table 1. Training protocol accomplished by BFR and Control groups, 3 times/week for 3 weeks. For the BFR group, the cuffs were inflated for the complete duration of every set, but deflated during the inter-set rest. Inter-set rest duration: 3min30s for both groups. MAP = Maximal aerobic power. W = Watts. s = seconds. AOP = arterial occlusion pressure, measured at baseline with a hand-held Doppler (MD6, Hokanson, Bellevue, WA, USA).

This training regime can lead to greater adaptations in maximal aerobic power and anaerobic capacity compared to HIIT alone. Coaches and practitioners can consider implementing this method to elicit greater peripheral adaptations within a relatively short time frame.

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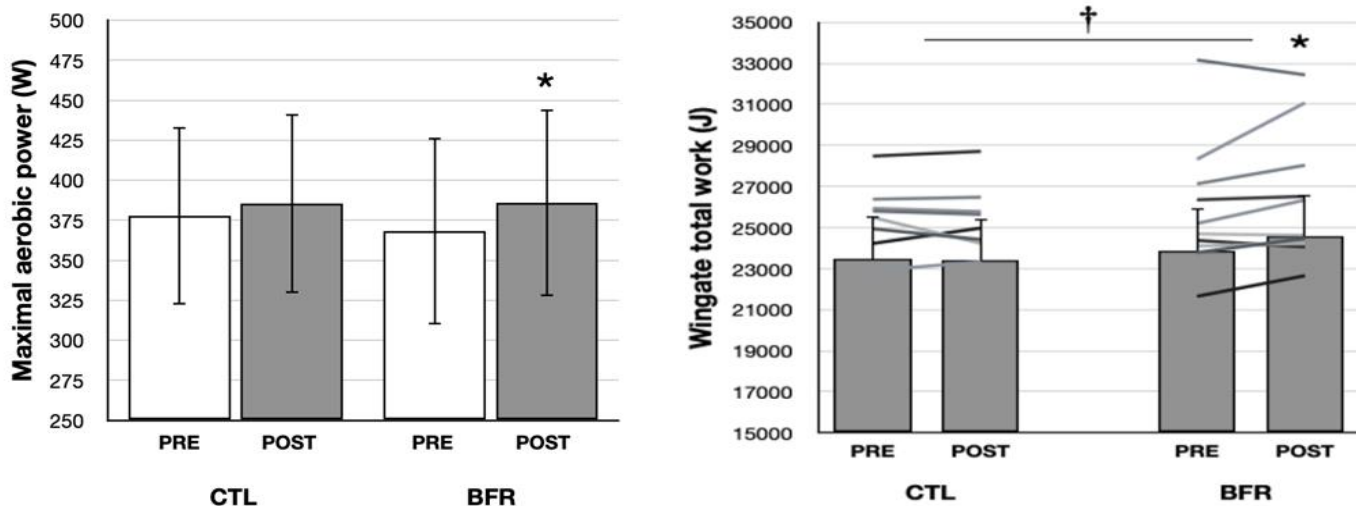


Figure 2. Average and individual values of maximal aerobic power (left panel) and total mechanical work (right panel) developed during the Wingate test before and after 3 weeks of high-intensity interval training with (BFR) or without blood-flow restriction (CTL). *: clear pre-to-post difference in BFR. †: clear difference in pre-to-post changes between CTL and BFR.

Adding BFR to HIIT training sessions

When applying BFR, the venous outflow from the limbs must be occluded, but not the arterial inflow. Therefore, oxygen can still reach the active muscles but the buildup of metabolic byproducts increases compared to free-flow exercise. However, pressure selection to achieve this depends on varied factors, such as limb girth, cuff width, and can be delicate to evaluate. To date, the safest and most optimal way to proceed is to measure the pressure required to completely occlude blood flow in a given situation with the use of an ultrasound doppler, and then employ 40-80% of that pressure during exercise. In athletic populations, the optimal parameters of aerobic training with BFR are still unclear, but it appears that the total time under restriction should be around 5-20 minutes per session, with a frequency of at least 9 sessions over 2-3 weeks to achieve benefits.

Acknowledgement

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A practical recommendation for taper in football

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Introduction: Football training sessions and competitive matches are known to induce a heavy strain on football players (Fessi et al. 2016). Therefore, maintaining a high training load throughout the season might result in excessive fatigue, injuries, and impairment of performance (Fessi et al. 2016). Consequently, coaches have to adopt effective recovery strategies between training sessions and carry out a short-term reduction of training load at the end of each mesocycle (Moalla et al. 2020).

The short-term progressive reduction of training load is known as ‘tapering’; an attempt to reduce the physiological and psychological stress of training to maximise performance after an intense training period (Bosquet et al., 2007; Vachon et al. 2021). It has been demonstrated previously that tapering may induce improvements in performance during individual (Bosquet et al., 2007) and team sports (Vachon et al. 2021). Literature provides limited evidence of taper in football. Recently, Beltran-Valls et al. (2020) reported a significantly improved in muscle power, acceleration, and lower stress levels after 2-week of taper in which training volume was 50% reduced. Figueiredo et al. (2019) also observed an increase in intermittent running performance after a 2-week overload followed by a 1-week taper, in which training volume was reduced by 60% with no change in intensity and frequency. In junior football players, Krespi et al. (2018) found that 4 weeks of exponential tapering is associated with a 6% improvement in medium running distance and 26% in sprinting during matches. However, 4 weeks of linear taper is associated with a 5.5% improvement in medium running, and 21.7% in sprinting during matches.

Authors (Krespi et al., 2018) suggested that exponential tapering produced better effects on speed, power, and endurance abilities than the linear taper protocol. But physical activities during matches in-season in professional football players have not been examined in only two published studies (Fessi et al. 2016; Moalla et al. 2020). In our document, we aimed to highlight the results of both two studies and extract practical recommendations for tapering.

Methods

Fessi et al. (2016) data were collected over 26 weeks during the 2013-2014 season in 19 professional players and Moalla et al. (2020) data were collected over the 2015-16 and 2016-17 championship seasons in 15 professional players. For both two studies, the session rate of perceived exertion was collected to assess the training load. The training load corresponds to the product of perceived effort (0–10 Borg scale) and training session duration in minutes. Match running performance was quantified by a computerised match analysis system during all matches. Players who did not participate in all training sessions or did not play for the full match time were excluded from subsequent analyses. The training program throughout both studies had been designed and carried out by the same technical staff. Weeks were divided into standard and taper weeks, as previously scheduled by the coaching staff, according to the training load carried out by the players.



**International Science
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Results

Over the 26 weeks, Fessi et al. (2016) examined 7 taper weeks and 17 standard weeks. Authors reported decreased duration and frequency of training sessions during the taper weeks (-21.7% and -18.8%, respectively; $P < 0.01$) with no change in intensity (-4.8%; $P = 0.09$). Consequently, the weekly training load decreased during the taper weeks (-25.5%; $P < 0.01$). Authors stated an increase in distance covered by intense running (+15.1%; $P < 0.05$), high-intensity running (+15.7%; $P < 0.01$), number of sprints (+17.8%; $P < 0.05$) and number of high-speed runs (+15.7%; $P < 0.05$) were observed during the seven matches played after the taper weeks.

Moalla et al. (2020) analysed the data of 50 weeks in 3 types of mesocycle blocks of 5, 4, and 3 weeks, The authors observed an increase in match running performance following a taper week achieved by reducing the frequency and duration of training sessions and maintaining training intensity. Furthermore, an increase in overall match running performance was observed in matches played after the taper weeks compared to matches played after the standard weeks during mesocycle blocks of 4 weeks for all speed ranges ($P < .05$). The increase was only observed in low intensity running ($P < .04$) and total distance, low-intensity running, and intense running ($P < .05$) in mesocycle blocks of 5 and 3 weeks, respectively. Authors reported that the greatest enhancement of match running performance was observed at mesocycle blocks of 4 weeks when the training load was decreased by approximately 18% during the tapering period. Increase in match running performance following a taper week may be explained by a number of physiological changes that may occur during tapering. It has been reported that tapering can cause hyperolemia and improve red cell production (Bosquet et al., 2007; Vachon et al. 2021) and increase oxidative

enzyme activity (Bosquet et al., 2007) which may contribute to an increase in oxygen extraction. Moreover, tapering has been shown to increase muscle strength and power by: (i) reducing muscle damage; (ii) increasing anabolism, and (iii) increasing muscle glycogen stores (Bosquet et al., 2007). Certainly, the increase in muscle glycogen and aerobic enzyme activity are crucial to improve repeated-sprint performance in soccer players (Rico-Sanz et al., 1999). Also, increase muscle strength and power following the taper can also be improved during match (Schimpchen et al., 2016). Improvement in physical activities during a game could also be due to the change in psychophysical variables associated with the taper.

Conclusion

As suggested by a number of authors a step-decreasing training load by ~25% during taper weeks through a reduction in the duration and frequency of training but maintaining training intensity were associated with a 15% increase in intense and high-intensity activities during matches in professional football players.

A period of 3 standard weeks of training followed by 1 step taper week is the optimal taper strategy when compared to different pre-taper durations. Authors reported enhancements in match running performance following taper in a professional football player. These results agree with previous studies, although infrequent, that reported enhancement in physical performance following taper in football players. As suggested and recommended by all previous study, it is mandatory to keep a high intensity and reduce the training volume and frequency.



Practical recommendation

Taper strategy induces improvements in fitness performance and matches running performance in a football player.

The percentage difference in fitness performance and match running performance after tapering might be greater when the accumulated training load during the pre-tapering is characterised by intense training and a high training load.

A period of 3 standard weeks of training followed by 1 step taper week is the optimal taper strategy during in-season.

Sports scientists and strength and conditioning coaches should consider designing taper during in-season by reducing the volume of training (~20-25%) and preserving intensity to optimise performance.

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Fostering tactical creativity in football



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Introduction: In football rehearsed action sequences (e.g., moves) often lead to creative success, however, creative tactical ideas play an important role in many cases (Memmert, 2021). For example, especially the midfield players have the task to control the developing game of the team by clever tactical decision-making behaviour. Memmert et al. (2013) from the German Sport University Cologne applied the regulatory focus theory to football. For this purpose, they investigated the effects of the two regulatory foci in terms of creative solutions in certain game situations. The regulatory focus theory of the Canadian psychologist Tory Higgins states that people – according to their motivation – process information differently: while people with a motivation promotion focus concentrate on achieving a particular goal, people with motivational prevention focus try to avoid certain events.



Theory

Research in social psychology demonstrated that promotion focus promotes creative thinking. Furthermore, a method was developed that can manipulate a person's regulatory focus: On a sheet of paper a mouse is

shown, which is in a maze.

If people are given the task of drawing a path with a pencil that the mouse can get to the cheese that is outside of the maze, the promotion focus (the focus on achievements and aspirations) is promoted.

If the task is to draw a path out of the maze that the mouse can rescue itself from an owl, then the prevention focus (the focus on safety and responsibility) is promoted.

Memmert et al., (2013) assumed that athletes whose promotion focus was stimulated in a dynamic sport situation which requires tactical creativity, show more witty, flexible, and adequate results than athletes whose prevention focus was stimulated. Their hypothesis states that footballers who draw the path from the mouse to the cheese beforehand find more creative solutions in a game scene in football than footballers who draw the path to rescue the mouse from the owl.

Experiment

30 male footballers took part in the experiment with an average age of 25,27 years, between five and 31 years of experience in football training and who spent between three to 4,5 hours per week with training.

The participants were asked to draw a path out of the maze – half of them with the instruction to guide the mouse to the cheese (promotion focus) the other half with the instruction to rescue the mouse from the owl (prevention focus).

After that four offensive match scenes that stopped at a certain point of time were shown on a screen to the participants. They should imagine they are the footballer in possession of the ball at the moment. Now they were asked to write down as many solutions within one minute how the game could continue. The participants should specify whether and how they pass the ball or shoot at the goal. After the first block of four football scenes the procedure started all over with drawing a path out of the maze – according to their first instructions- before watching four game scenes again. This procedure was repeated until each participant had looked at a total of 20 attacks and written down possible gameplays. Two experts independently rated the footballers' answers in terms of originality, flexibility, and diversity (see Memmert, 2015). For originality, each answer was given a value between one (not original) and five (very original). For flexibility, we looked how many of the previously defined seven categories (goal kick, feint and pass, dribbling, short pass, high pass, high ball, flank, or other solutions) were fulfilled. Together with the number of adequate solutions, a creativity score was calculated for each participant.



Results

Those footballers who showed the mouse the path to the cheese and whose promotion focus was consequently stimulated had more creative solutions than the participants whose prevention focus was stimulated. Manipulation of the regulatory focus has a significant impact on creativity in dynamic game situations in football. Athletes whose promotion focus has been stimulated provide wittier, more flexible, and adequate solutions during sport-specific tasks that require divergent thinking (creativity).

Practical Applications

The important point of communication processes of coaches, either on intermediate or advanced-levels, is therefore the use of reward contingencies, i.e., the prospect of winning or not winning instead of losing or not losing. Announcements of coaches should therefore sound like this: "You are more likely to play in the starting team when you solve this task and you will be less likely to play when you don't solve this task successfully." – and not like this: "Your chance to make it to the starting team decreases when you don't solve this task successfully and you will probably be in the starting team when you solve this task successfully."



Summary

Furthermore, each person has an individual regulatory focus, which means whether they generally have a motivational promotion or prevention focus. In another study (Plessner et al., 2009) footballers were asked to perform five penalty kicks. Half of them were instructed to score at least three times (promotion focus), the other half not to miss more than two times (prevention focus). Footballers whose individual regulatory focus fitted the manipulation achieved the best results. For a successful interaction with athletes during training and competition, it is important to know the individual regulatory focus each player has in order to adjust the instructions accordingly.

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Concussion in Football

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Key words: concussion, sports, football, athletes, coaches

Introduction: Concussion in sports is becoming an increasingly recognised topic amongst professionals and athletes. This is important as some concussion cases could have potentially significant consequences if not recognised and treated appropriately. The diagnosis of sport-related concussion amongst athletes has increased in the recent years due to rise in closer monitoring of head injuries. A closer monitoring of concussion can possibly be an outcome of more awareness of health effects of concussion amongst general population, coaches, trainers and athletes.

Definition: The term “concussion” is often ambiguous for patients and caregivers, and likewise for many practitioners the definition remains imprecise (Kazl et al, 2019). It relates to a type of traumatic brain injury that can be caused by a bump, blow, or jolt to the head, or by a hit to the body that causes the head and brain to move rapidly back and forth. Many of these injuries are not reported to health care clinicians, but it is estimated that 1.1 to 1.7 million sports- and recreation-related concussions occur each year in the United States (Moreno et al, 2017).

Symptoms: Mild traumatic brain injuries (mTBI) which are amongst the most common neurologic conditions, have a percentage of them who suffer from acute post-concussion symptoms that may present as somatic symptoms, cognitive complaints, emotional, and/or behavioural problems. In 10–25% of mTBI patients, post-concussion symptoms persist over time, which is often referred to as post-concussion syndrome (PCS) (Polinder et al, 2018). The most commonly reported post-concussion symptoms are headache, dizziness, decreased concentration, memory problems, irritability, fatigue, visual disturbances, sensitivity to noise, judgment problems, depression, and anxiety (Ryan et al. 2009).

Recognition: Initial side-line assessment test should be undertaken to identify athletes with concussion. Sports medicine practitioners should be cognisant of the defini-

tion, extent and nature of concussion, and should work with coaches, athletes and trainers to identify and manage concussions (King et al. 2014). The Concussion Recognition Tool 5 (CRT5) is a Pocket Sport Concussion Assessment Tool 2 that is designed to assist non-medically trained individuals to recognise the signs and symptoms of possible sport-related concussion and provides guidance for removing an athlete from play or sport and to seek medical attention (Echemendia et al. 2017).

Prevention and Treatment: Similar to many other health conditions, treating concussion can be done at the levels of prevention, treatment and rehabilitation. In prevention different groups of people and professionals can be educated to increase their awareness about the subject. For example, the general population can be reached out through social media such as via use of advertisements in half time of a football match, school and university students through their course works and sports participants like athletes, coaches and referees through training. The use of stronger law enforcement could be considered to reduce harsh physical contact- rough tackling for instance. All schools can be encouraged to have a concussion policy and should offer appropriate academic accommodations and support to students recovering from sport related concussion (Davis 2016).

Athletic trainers can be influential in creating a safer social and playing environment by providing an ongoing medical professional presence. They can educate coaches, parents, and athletes about appropriate sport related concussion (SRC) recognition and response and best practices for managing SRC. The approach to SRC prevention should be more than simply providing an education sheet and a video for athletes and coaches.

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Measures of the effectiveness of concussion policies and programs should extend beyond knowledge to intention, behaviours, and injury outcomes (Register-Mihalik et al. 2017).

Recognition of concussion and post-concussion symptoms are important when a serious physical contact or trauma to head occurs during a football match. This is important to reduce any harm or death which may result due to severe blow to head. The referees should not allow the players to continue the match rather have the patient investigated further for monitoring and treatment as required.

A period of cognitive and physical rest may be a useful means of treating concussion-related symptoms, whether applied soon after a concussion or weeks to months later (Moser, et al. 2012). Some studies indicate a low level exercise and physiotherapy might be helpful. A brain based rehabilitation programme to recalibrate central structures may be used to help improve functional outcomes in individuals who suffer PCS and mTBI (Carrick, et al. 2015).

Conclusion: Concussion in sports including football is important to be recognised early in order to provide the right care and support to the athletes. This would prevent athletes from further health damage. Some strategies need to be developed at the levels of prevention, treatment and rehabilitation together with increasing the awareness and education.

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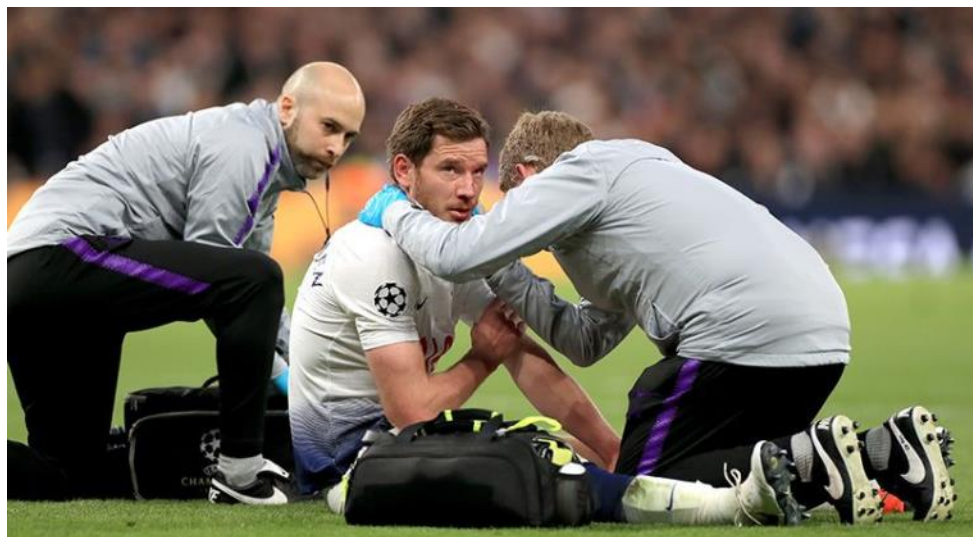
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An inside view of Chinese football; can China become a football powerhouse?



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Introduction: In the past decade the world had observed the Chinese football going from sudden growth in popularity and investment, to a stalemate in the last couple of years. Part of the reason was of course the Covid-19 restrictions, that lead Chinese football to be held behind closed doors for the previous three years, but this is only the tip of the iceberg.

When the Chinese government started investing heavily and make Chinese football popular, a lot of Chinese companies decided to also invest in football to gain political and commercial benefits (Riordan, Li, & White, 2022). With big amounts of money leaving the country to purchase foreign players, coaches or pay agent fees, and many Chinese businessmen investing in football clubs around the world, the government decided to step in and regulate this market, especially when they realised that all this money do not help Chinese football to develop in the long term. The Chinese president, Xi Jinping had confessed his ambition to win the World Cup (WC) back in 2011, and all the steps taken by the government since then, are an effort to materialize that vision (Bairner, 2018), with a goal set for 2050. It didn't take long for the Chinese Football Association (CFA) and the Chinese government to realise that spending millions in aged football players from European leagues will not improve the level of Chinese football or the chances of the Chinese national team to participate and win the WC. They started by imple-

menting rules to ensure young Chinese players will have enough playing time (eg. a number of U23 players in the starting line-up), adding salary cap for all players (including foreigners) and reducing the number of foreign players participating in a match. But the most important reform came in 2015 with "The Overall Program of Chinese Football Reform and Development" (Peng, Chen, Li, Houlihan, & Scelles, 2022).

The main target of that reform was the youth development and grassroot football and was a long-term plan of how to make China a football powerhouse by 2050. The study of Peng, Chen, Li, Houlihan, & Scelles (2022) describes in detail not only the very ambitious reforms the government tried to implement, but most importantly what is going wrong with it. They concluded that the biggest problem chinese youth football is currently facing is the overlapping responsibilities of the two dominant policies, the Ministry of Education (MoE) and the CFA, a problem that we will elaborate later.

The power of numbers

It is often very hard for people that had never been in China to understand how big this country really is, and to facilitate that, we will have a look at some numbers. The afformentioned reform in 2015 had the plan to increase the participation of people in football to 50 millions, 30 millions of which should be students and the creation of 200,000 specialised youth football schools by 2020.

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According to the Director of the MoE this target was not only achieved but doubled in the same period, in addition to 2,725 kindergartens that were selected to become specialized football schools (Peng, Chen, Li, Houlihan, & Scelles, 2022). As per the latest demographics, there are 132.5 million boys between the ages of 0 to 14. That is almost 4 times more than the same age population of the entire Europe (estimated at 34.5 millions). In other words, today in China, there are more kids playing football than there are kids living in Europe. There was a plan to build, depending on different sources, anywhere from 50,000 to 70,000 football pitches around the country back in 2015, a plan that was reconstructed to even more extreme numbers. As per the authors knowledge, the government plans to create the so call 10 football cities. In order to be considered for this project and receive funds, the city has to provide one football field per 50,000 people, among other responsibilities. Nowadays, it is hard to find a school in a major city that doesn't have at least one artificial football field. In Premier league academies there are around 3,500 boys from the age of 9 to the age of 18 every year (Kelner, 2021), while the largest residential academy in the world, the Evergrande Academy, was hosting 2,600 boys in a training ground consisting of more than 50 football pitches (Stayton, 2016). These numbers do not include the affiliated football schools that the academy used to run in the city of Guangzhou and suburbs.

Football is a numbers game, and the biggest pool of players there are to select from, the strongest the

selection can be. Unfortunately, this can be a blessing or a curse. In conversations with Chinese people it is very common to face a disbelief that China will ever become a strong football nation or win the WC. In England there are 1.5 million kids playing organized football every year, and only 0.012% (180) of them, make it to Premier League (EPL) (Romeo, 2017). If we apply the same percentage in China ($0.00012 \times 30,000,000$) we end up with 3,600 kids. Of course it is not possible to compare the level of infrastructure or the level of coaching young players enjoy in England, but then we have to consider that 66.9% of players in EPL are not English, whereas only 12.9% of players in the Chinese Super League (CSL) are foreigners. Young players in England will have less chances to enter the highest national level compared to a Chinese youngster. On the other hand, there are not enough professional teams to absorb all those players in China, as it would require 120 teams that have a full roster of 30 players just from those chinese kids of that specific generation, when China currently has about half of those in all 3 professional divisions. The main question is not if those young footballers can play professional football in China, as the current level is fairly low, therefore arguably very likely to improve in the future with the addition of the new generations, but if they can reach the highest level of football and win the WC.

Where are we today?

Culture, parents, schools

The answer to this rhetoric question is not so simple. China at the moment is not trying to develop their youth players, rather they are trying a paradigm shift to the culture of its citizens, the goal is to popularize football (ZhangLu, 2022).

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The problem is deep and is cultural. In a country that the most popular sports such as badminton and gymnastics have early specialization, parents expect their kids to become elite athletes at the age of 13. Furthermore, many people in the country believe that white skin is better than tanned, thus they prevent kids from doing outdoors activities when it is sunny, and the majority of the country is sunny 8 months in a year. In addition to that, Chinese parents believe that their kids need to have the best grades, to attend the best schools, to enter the best university, to study the choice of their parents, in order to make the family proud and become rich. In a country that more than half of the billionaires do not have a higher education, it is very common to hear that a 6 year old is too busy to have two trainings a week, because of school homework or after school activities like calligraphy, poetry, music, journalism etc. During the final exams of the year (for every class) kids go under tremendous pressure from parents and teacher to succeed, and this only gets worse when they go to middle or high school. Even for school team training, teachers will not allow the kids to go outside and practice because they have too much homework. The education system and the parents' beliefs are similar to what Europe had in the 70s and 80s where sports were viewed as low class and higher education is the ultimate prize. It took Europeans 40-50 years to reach to the point that everyone has a university degree and there are no workers for the farms, or plumbers, but due to the population of China they are already arriving to this problem within 10-15 years since the beginning of this culture (early 00s).

Most of the coaches in China did not even study a sports related degree because their parents wanted them to become engineers, accountants, or lawyers etc, when all they wanted was to work in sports.

CFA, coaches, lack of matches

Coaches in the country today are not coaching the national team players who will win the WC, but rather coaching the generation, that will have a football minded culture, and will nourish the kids to accomplice that. And this is where the problem shifts to the coaches and the CFA. Initially, with the exception of Beijing, there are no youth leagues being played in any city of China, which means that with the exception of a small percentage of the adolescent players, most kids will not have any kind of official matches experience, unless they; a) play in the school tournaments, b) join private tournaments, c) be good enough to join one of the City teams, or d) join a professional team academy. If we explore those options one by one, it becomes fairly obvious that a primary school kid, will most likely not have more than 30-40 matches in the first 7 years of his involvement in football, and that will only get worse as pressure from school will mount after the age of 12. School tournaments are held once a year in the first semester, usually in two weekends to determine the best team of a city district, with vague rules that changes every year. After that, during the second semester there will be the city tournament that involves the best teams of every district, and is also held within a period of a couple of weeks. The school tournaments only include two age groups for primary schools, U10 and U12, which means a grade 1 kid will not participate in those tournaments until he is at least grade 3, if he is good enough to join the grade 4 team.

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In addition to this, most coaches of the school teams are not qualified coaches, but the Physical Education teachers of the school. It is common for those teachers to be 50-60 years old, remnants of a past culture that will not hesitate to speak bad to the kids, beat them, or even have a cigarette during the trainings or matches. Furthermore, those teachers do not have at their best interest the development of the young kids in mind, rather their only purpose is to win the matches and bring success to the school and themselves. As a result, there are primary schools, that are labeled as “football schools”, and will have training twice a day for two hours each session, from grade 1 to grade 6, every day of the week, with kids mainly focusing on improving their techniques, such as ball control, dribbling and shooting. Those kids, when graduate from primary school will face the problem that they do not really enjoy playing football, as it was never a really fun activity, therefore when they have the chance they will choose to quit, and even if they don't, they will have to start learning basic tactical skills and decision making, since their training for the past 6-7 years did not involve any team work, small sided games, or any other skillset that will be necessary for them to progress to the next level.

Private tournaments are usually held during holidays, and most commonly finish within a few days, with teams playing two or even three games a day. It is not hard to fathom, why none of the above will vastly improve the amount of matches a youth football player will experience during the most important years of his development. The remaining two options

are not much better either. Professional academies will play matches with each other, during some period of the year when the CFA decides that they can all gather and play, due to pandemic restrictions, but only for age groups of U13 and above, which means primary school kids are once again left out in the cold.

Confusion and overlapping responsibilities

This brings us to the option of the city teams, plural! One city team selection is from the MoE, under the responsibility of the local education bureau. Those teams they do not play official matches and just do trainings with the purpose of being selected from a better Middle school. The second city team is selected by the CFA, under the responsibility of the local FA. Those teams will play matches with the other city teams of the same province and the winners will participate in the national tournament once a year. Needs to be addressed that a child cannot participate in both city teams, but needs to choose one of them depending on his long term goals. On the side of all this confusion, there is also the existence of private academies, that have no options on playing matches unless joining a private held tournament. Of course it is important to note that a player cannot participate in multiple of those teams, and most usually will choose just one option, without necessarily that option being the one the kid really wants, but rather the one that is forced on him by external factors. For example, a kid that joins a private academy at the age of 5 and starts learning, improving and enjoying himself, will be forced by the school to join their team at the age of 10, to help the school win the tournament, leaving little to no time for him to continue the coaching methods he started with, and brought him to that level.



Then comes one of the city teams, that will take him from his school for most of the trainings to join their team, leaving the kid with little time to attend the school team that was forced upon him, and no time to join the private academy that he really wants to play for.

One might think that participating in a city team with the top players of the city is the best for the players development, and would be correct to think likewise, although the Chinese reality is different. It is not uncommon for very good players to be left outside the city teams (both of them), as either they didn't join at the time of the trials, or no one spotted them as scouting is not very usual practice in the country. Adding to that, there is a certain level of bias and corruption within the selection methods, ending up with two "city teams" that are not better than the best schools or elite academies. Which brings us to the coaches who are coaching those teams.

Coaches education and foreign coaches

The coaching licenses in China start from level E, to A, and finally Pro licence. Up to very recently, there was not a clear difference between the coaching licenses content as even at D level, the coaches were being taught of 11v11 game, rather something useful for the grassroots football. This problem had been addressed recently but it would be years before we see the changes in the levels of grassroots football or school teams. Most of the selection team coaches are Chinese, with very low qualifications and education level, usually selected from their past experience as football players. When the decision is taken to choose a foreign coach, the requirement is usually to be a UEFA Pro license candidate. That eventually creates another problem, as there is no need to use a coach of high qualifications at such young age groups. Most of the youth coaches in Europe do not have higher than an A-license, which is also hard to get in most countries, where Pro license is almost impossible. The aforementioned requirements disqualify a huge number of coaches due to some belief that the higher coaching qualification makes a better and more suitable coach for the kids.

Indications for a bright future

Despite all those abysmal or ephemeral obstacles, Chinese football is making colossal improvements during the past decade. With the amount of money the government is throwing into infrastructures, the number of kids currently involved in organized football, and the very high level of talent that even the current generations have, it seems extremely unlikely that the goal of becoming a powerhouse by 2050 will not be achieved. It is a safe guess that the Chinese football will be considered as one of the best, maybe not on a national level, as it is highly improbable that will overcome the top European leagues, but rather on an international level and national team level, with many players participating in the top leagues and the CSL being considered as one of the best and most competitive leagues in the world.

Conclusion

In conclusion, although there are many issues to be solved before China can be considered a strong football nation; from the culture of parents and teachers, to the education of coaches and players, to the clarification of responsibilities of different departments, to the creation of clear pathways for the kids to reach to a professional level, and finally the creation of a scouting method that will be objective and centralized, a pyramid for the selection of players for one unique and common city team, that will feed the province team, from where the players of the national team can be selected. Yet, the amount of kids currently playing football in the country, and the dedication of the government towards the target of making China the strongest national team in the world, makes it mathematically impossible that these goals will not be achieved within the next two to three generations. No matter how long time it will take for Chinese football to fix all those issues (although they have proven to be fast in spotting the problems and intervening), it is unrealistic to believe that a country with almost unlimited resources to invest, and a population bigger than Europe and South America combined, where the 13% of the total global population 0-14 lives, where more boys are involved in playing football than boys live in Europe, will not eventually make the dream of winning the WC come true.



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Excluding Heading in Youth Soccer. A step for reduce future injuries or an unnecessary prevention?



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Introduction: Heading the ball is a very common aspect of football. It can happen anytime during a game from defenders, midfielders, attackers and rarely from goalkeepers. Due to the increasing number of head injuries that occur during football matches, there is a huge discussion from sport scientists whether the exclusion of headers would reduce the potential rate of short-term and long-term risk. An evaluation study (Koerte et al., 2015) examined long-term effects of repetitive subconcussive head impacts (RSHI) in former professional football players without a history of concussion (mean age 46.9 – 7.9 years). The study findings suggest a possible association between RSHI from heading the ball in football and neuroinflammation in former professional football players, compared to controls (14 athletes, mean age 46.9 – 7.9 years, participating in non-contact sports). This observation has the limitation of a small sample, so further research on the topic should be held. Data findings from a wide range of samples, (Andersen et.al., 2004) took videotapes and injury information for 313 of the 409 matches played in the Norwegian 2000 season and Icelandic 1999 and 2000 season. The video analysis revealed 192 heading incidents (18.8 per 1000 player hours). Of the 297 acute injuries reported, 17 (6%) were head injuries, which corresponds to an incidence of 1.7 per 1000 player hours (concussion incidence 0.5 per 1000 player hours). The most frequent injury mechanism was elbow to head contact, followed by head-to-head contact in heading duels. In most of the elbow to head incidents, the elbow was used actively at or above shoulder level, and stricter rule enforcement or even changes in the laws of the game concerning elbow use should perhaps be considered to reduce the risk of head injury. These findings report that head injuries are not the most frequent injury in football and a specific head injury can happen in a variety of incidents in a match, not only when an aerial duel happens. In

a football career of an individual there is a huge amount of time under contact with other body parts also.

Heading in Football Status and the younger ages

It is known that heading results in 25–30% of concussions in football, but research on the effects of football heading has resulted in contradictory and inconclusive findings (Kontos et.al. 2017). Recently the UEFA Heading Study Department assessed the real-life magnitude of the heading incidents in children's and youth football in eight European countries with different football cultures. In this study, one match per team was recorded by video for 480 different teams from eight European countries (2017/18-2018/19). Plus, one training session was recorded for 312 teams. (Beaudouin et.al, 2020). Heading incidence rates (IR) per 1000 match/training hours were calculated. Under-10 teams carried out the lowest average number of headers per match (8.8), followed by Under-16 female (17.7), Under-12 (18.4), and Under-16 male (35.5). Total number of headers per match and team varied between countries. 80% of the total number of headers were single intentional headers, 12% heading duels, 3% unintentional headers by getting hit, and 5% others (trends apparent in all age groups). The lowest number of headers per training and team was found in Under-10 females (21.3), followed by Under-16 females (34.1), Under-12 (35.8), and Under-16 males (45.0). Thus, it seems that sex and age play a significant role on the frequency of technical patterns used by players. In 267 football matches played during an international youth football tournament with players from both sexes (11-19 years) were observed to collect data (Sandmo et.al., 2020).



Results showed that males headed more frequently than females (2.7 vs 1.8 headers/player hour; $P < .001$) and heading rates increased with age ($P < .001$). So, the question is, how can we prevent this incident? Should we exclude heading the ball in the young ages or teach them how to perform it properly? In a current study (Quintero et.al.2020) behaviour skills training (BST) was evaluated as a method to teach correct heading techniques to youth football players. The results showed that BST increased the percentage of correct steps for each player based on a task analysis of heading. Based on social validity questionnaires administered to players and the coach, BST was rated as an acceptable form of training. After the final training session, experienced coaches rated each player as having improved from baseline to training.

Considering all the above, there is no sufficient findings which indicate an important correlation between heading the ball and chronic impacts in head health, as this action is not very frequent during the game and an injury in the head can happen in a variety of ways, even when the game is not played in the air. For younger athletes, since this phenomenon is reduced as the age declines, a methodical teaching behaviour could enhance heading technique and reduce further injuries. It is true that the game has changed and evolved rapidly the last 10-15 years. Substitutes increase, VAR and cooling breaks made football more sustainable and functionable. However, technical attributes contribute to the impressive and unique nature of the most famous sport in the world.

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Table 1. Recommendations and suggestions

Age	Methods	Heading Training focus more on:	Suggestions
9-12 years	Teaching proper heading technique	Technique-Behaviour Skills/Proprioception	-Static Headers, -Lightweight balls
12-16 years	Include headers in different game situations	Technique-Behaviour Skills/Proprioception/ Strength	-Focus on timing -Heading on different directions -Position Related Heading
Senior Teams	Use headers with no restrictions	Proprioception/Strength	-Different game situations -Performance (ex. Scoring, Preventing a goal)



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