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PREFACE

BY: PROFESOR MONÈM JEMNI

CHAIR ISAFA

The ISAFA continues to promote the science of football and to put professionals together in the middle of the global Covid-19 crisis

It is an unprecedented time that the world is going through at this moment… 2020 will be a year to remember for generations to come, where the Covid-19 virus has put the entire world at its knees. Giant corporates, business, academic institutions, enterprises shut down and towns transformed into ghost cities. Meanwhile, scientists with different backgrounds have been working hard and against the clock to find ways to remedy to this global pandemic and to help people getting-by from day-to-day. The ISAFA has made an effort from its side to shed some light on the challenges and the opportunities this current situation has brought thanks to all its members and volunteers. Hence, this edition has included examples of good practices that few football clubs have used to overcome the confinement imposed by all countries (check the interview with Sean Malcolm and the report by Arben Asllani). Some difficulties and hurdles are also highlighted.

A variety of topics have also been included in this edition promoting the work been undertaken by several experts working behind the sciences to make football the sport that we all enjoy watching. Amongst these topics, some strength and conditioning tips, and how strength experts apply science in their daily training sessions. Some cutting-edge training technologies and procedures have also been introduced, such as the concept of apnea during repeated-sprint training. A German medical team from Stuttgart has flattened the taboo topic of addiction behaviour in footballers and related it to mental health conditions. To complete the picture, physiotherapists have added their touches and provided us with new concepts on ankle sprains and blood flow restriction for rehabilitation from Injuries.

My particular thank goes to Mr Atharva Tere who contributed with a nice article about the Indian Football Super League. A very unknown and young league but progressing really fast and strong. I have personally learned so many things about their tournament and the way they managed it to progress in a very short time thanks to his inside story.

A regular contributor in our magazine is Dr Harry Hubbal from Canada who always updates us with the over 55 years old small-sided football World Cup tournaments. The cherry on the tart in this particular edition is a statement/article from the game officials of these World Cup tournaments providing the readers with stories about their practices.

We hope you enjoy reading and sharing all these short articles.

Finally, we would like to take to thank all the active members of the ISAFA and the volunteers, together with all the contributors in this particular edition and obviously the previous ones.

Monèm Jemni

Chair ISAFA

Effective Officiating Practices for an International Masters 5-a-side World Cup Football Tournament

Brian Webster, John Gainey, Nigel Hill, Lars Corlin Christensen, and Harry Hubball

International masters tournament head referees and tournament co-chairs

Introduction: International masters small-sided football competition for 55-65+ players (e.g., 3v3, 4v4, 5v5, futsal, and competitive walking football) is not new in tournament settings around the world, however, very little is known about effective officiating practices in this context. Although FIFA, the world governing body for football, have well-established guidelines for community football (e.g., futsal, grassroots football development), currently there is not yet official FIFA guidelines (nor official customisation of rules) for small-sided football in order to meet the unique needs and circumstances for 55-65+ players at various levels of competition. In the absence of specific FIFA guidelines, international 55-65+ masters football tournament rules are typically determined by host clubs or local football organizations and implemented by qualified local referees with a knowledge of the Laws of the Game. Thus, "localized" masters small-sided football tournaments and officiating practices tend to implement rules which are familiar to local football cultures and traditions, and which are aligned with local football associations etc. Interestingly, some international masters tournaments are conducted in a similar way by simply adopting localized referees and respective rules. In contrast, "internationalized" masters small-sided football tournaments and officiating practices go far beyond localized implementation. Internationalized masters tournaments are also about the way in which the tournament is planned, implemented, evaluated, improved, and how tournament officials, teams, players and spectators (whom many have travelled across oceans, continents and countries with different masters football traditions practices) are supported within these processes. In an internationalized masters tournament context emphasis is placed on multicultural and intercultural perspectives; global trends in effective and sustainable masters small-sided football practices; and, a wider process of transcending borders, focusing on interdependence, and lessening of the influence of localized football cultures. Thus, officiating in an internationalized masters tournament context is a complex and multifaceted process. We argue that officiating practices for an international 55-65+ masters small-sided football tournament is inherently situated within broader communities of practice (including FIFA and club/organizational cultural context and political landscape, strategic priorities, access to available resources); it is socially mediated (shaped by key tournament leaders and stakeholder support including engagement by peer referees, coaches, captains and players); and, it is locally and internationally constructed (i.e., conceptions of "quality and effectiveness" will always be part of how it is adapted, understood and continually improved within contextually-bound settings).

International officiating: Action research and best practice : As part of preparation for the annual *International Masters 5-a-side Football World Cup Tournaments* hosted in European and UK venues (e.g., Denmark 2020), action research methodology is employed over a 4-month period following each tournament in order to review, revise and improve effective officiating in an international masters small-sided football tournament context. Drawing on analyses of relevant data (including multinational tournament organizing committee planning and debrief sessions; interviews with individual referees, masters players, and team leaders; match video analysis, and Head referee post-tournament reports), this paper highlights key findings for effective officiating (including refereeing with customised rules) in an international 50-65+ masters small-sided (3v3, 4v4, 5v5 and competitive walking football) football context.

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Results

* Effective officiating practices in international 50-65+ masters small-sided football tournaments should integrate unique local (e.g., traditions, environment, facilities, small-sided football culture), regional (e.g., national football association guidelines), and international (e.g., responsive to languages, multiculturalism, diverse masters small-sided football traditions, etc) participation needs and circumstances.

* A multinational tournament organizing committee (including host club/organization leaders), an international tournament program, qualified multinational officials and customized 55-65+ small-sided football rules provide a critical foundation for both quality assurance and quality enhancement in an international 50-65+ masters small-sided football tournament context. For example, in the absence of specific FIFA rules for 55-65+ masters small-sided football (3v3, 4v4, 5v5 futsal and walking football), we argue that qualified multinational referees (including ESL consideration) with research-informed and customised 55-65+ small-sided football rules is critical for effective officiating in an international 55-65+ masters small-sided football tournament. The following international small-sided football rules for the *International Super Masters Tournament*

http://faculty.educ.ubc.ca/hubball/worldcupMASTERS/tournament2020.html were adapted from various small-sided football organizations around the world (e.g., *AMF & FIFA Masters/ Seniors 5v5/Futsal, Star Sixes Football, "The Dutch Way: 4v4 SSG Method", 3v3 TSS Masters Canada, 3v3 Kick it USA, 3v3 Soccer UK, Walking Football Association England, European Legends Walking Football*) and without any advantage to any single club/ nation/region or international masters team – these customised rules provide fairness and simplicity for all participating international teams (some without ESL), and equally important, for officiating multinational referees. Essentially, these customised international 55-65+ masters small-sided football rules focus around key tournament competition issues: players' age eligibility; customised dimensions of goalposts, pitches and game formats; players' safety, disciplinary sanctions; multiple substitutions, and team points scoring system.

* Rules - Rules must be forwarded months in-advance for international team captains to distribute to their players (and translate as necessary) for question and answer sessions prior to the tournament. Team captains must ensure that their players arrive knowledgeable about the international tournament rules and small-sided games format. Rules should also be posted on the international tournament website (including rationale) and reinforced prior to tournament kick-off.

* Multinational tournament officials' should be engaged in team briefings in-advance of/during and post-tournament games regarding officials' planning and reflection pertaining to tournament-specific format, rules, and game management issues. This engagement was key to refereeing quality, cohesion, and consistency throughout the international masters tournament experience. Further, effective referee and team captain communications played a key role for developing camaraderie and enjoyment, as well as to keep competition behaviors within acceptable limits and maintain the spirit of fair play for all international 55-65+ teams and players. Thus, officials are viewed as integral to the international masters tournament community. Many reunions, friendships, and better understandings about complex officiating experiences are formed as a result of this annual 2-day international masters event.

* On-going research, development and dissemination (e.g., symposia poster displays) of evidence-based officiating are key to effective practice in this international masters small-sided football context. For example, referee performance quality (including fitness, positioning and game-management) aided tournament officiating credibility, decision making and match control. While walking Football was a new concept to some 65+ teams, and others who had played it had seen many variations to the rules applied (especially interpretations of non-running/ fast walking!), feedback from the 2019 tournament, indicated that walking football players would benefit from a referees pre-kick off role-play demonstration about what would be allowed, and what would not be allowed regarding consistent interpretations (one foot on the ground at all times when) of fast walking versus running (on or off the ball). Furthermore, following the May 2020 tournament in Denmark, this issue will be evaluated, as well as, the 2-day sequencing order for 65+ games and subsequent modifications prior to the 2021 tournament in Brussels.

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Summary

Our research in an international 50-65+masters small-sided football tournament context suggests that a multinational tournament organising committee; an international tournament program; and, qualified multinational officials with customized rules provide a critical foundation for both quality assurance and quality enhancement. Further, effective officiating in this international context does not just happen organically, rather it evolves through strategic planning, facilitation and evaluation. Insights from this article will assist international masters tournament leaders and referees to enhance the quality of international 50-65+masters small-sided football tournaments.

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Team performance analysis in advanced 55-65+ small-sided football contexts

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Introduction: Advanced-level 55-65+ football is aimed at high performance, elite, select or representative veteran teams from professional football clubs, National Football Associations, governing bodies, and/or community football clubs involved in age-specific amateur masters competition. The significant growth of advanced 55-65+ small-sided football competition (e.g., 5v5, 4v4, 3v3, walking football) on customized mini-pitches with multiple and short duration game periods is reflected in a wide range of regional, national and international tournaments (Hubball et al, 2018a). In this context, high levels of commitment and ability are expected of selected players and coaches. For example, advanced 55-65+ small-sided football competition involves: high levels of competitive game intensity and dynamic box-to-box football action; high levels of fitness (though significantly shorter running distances), ball skills and number of touches with the ball; high levels of execution of technical and tactical principles; and, high levels of team and player accountability for decision-making and impact during defence and attacking plays. While passion for football, and health and wellness outcomes are core participation motives for advanced 55-65+ players', there is increasing interest in performance analysis (PA) and strategically aligned team and player development. Grounded in interdisciplinary research and practical experiences with high performance masters teams, this article provides a conceptual framework for performance analysis and practical examples to enhance strategic team and player development in advanced 55-65+ small-sided football contexts.

Performance analysis (PA):

PA provides a strategic foundation to maximise team development and performance in advanced 55-65+ football. Given varying levels of support and limited resources, PA can foster a networked and evidence-based team improvement culture. PA is shaped by context-specific frameworks, including cultural (e.g., consider Brazilian versus German world views), organizational (i.e., club, institutional perspectives), coaching (i.e., signature practices), methodological (i.e., how we know what we know), and ethical (i.e., confidentiality, anonymity, conflict of interest) considerations. For example, action research methodology engages football organizations, coaches, teams and players through a systematic and cyclical process of inquiry that involves criteria/ hypotheses testing, planning, data collection, analysis, and monitoring of evidence-based transformational practice/improvements (e.g., strategic team selection, competitive practices, team cohesion, team defence, team offence). Depending on the foci for PA, useful combinations of mixed methods data sources can include:

- Quantitative physiological measures (e.g., aerobic capacity/VO2 max, anaerobic threshold, heart rate recovery, step counts, % body fat).
- Relevant team documentation (e.g., historical team development reports, player selection criteria, performance statistics archive, team budget/resources, training facilities, competition rules, team website).
- Focus group interviews (including club/team coach leaders, players, support staff) in face-to-face venues or by using online video conference platforms.
- Team performance video recordings and vignettes.
- Semi-structured feedback surveys from players and coaches pertaining to team and player development processes.
- Coaching plans, observations, and field notes.

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Customizing the application of these methods for a particular 55-65+ team setting, needs and competitive circumstances is essential for optimal use in PA. The following iterative PA framework (Figure 1) has been applied to enhance strategic team development and performance for small-sided masters football competition in local, regional and international settings.

Performance analysis framework to enhance strategic team development and performance in advanced 55-65+ small-sided football contexts

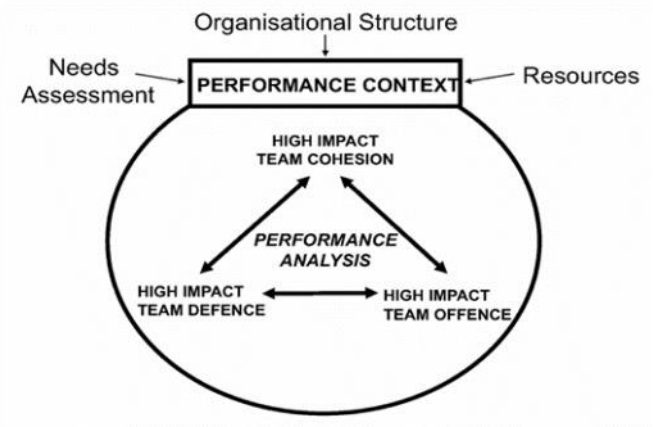

Figure 1. A performance analysis framework to enhance strategic team development and performance in advanced 55-65+ small-sided football contexts

High Impact Performance Context (HIPC). Grounded in evidence-based practice, this takes into account key competition factors (e.g., age and squad size restrictions; level, format, frequency and duration of games; opposition team strengths and weaknesses; team performance history, travel and team registration costs), as well as organizational and political structures (e.g., club/team mission, goals, priorities, leadership personnel, access to available club/team resources, incentives and rewards) that shape and support strategic team selection and aligned team and player development. For example, in addition to key positional roles and interchangeable spare players for deployment of various small-sided football team shapes, criteria for strategic team selection of the best available players can include high levels of the following: tournament-specific fitness capability, position-specific skill competence, competitive spirit, and determination to succeed especially in the face of adversity.

High Impact Team Cohesion (HITC). For example, framed by HIPC factors, HITC goes far beyond basic principles of good teamwork (i.e., positive team dynamic, interpersonal communications, cooperation, mutual support). In addition to team practice sessions designed to sustain team determination, resilience and confidence to succeed especially in the face of performance/injury set-backs and adversity, HITC includes evidence-based team meetings to discuss team goals, game-plans and debriefs, as well as relevant online activity such as team video analysis.

High Impact Team Defence (HITD). For example, framed by HIPC factors, HITD expands basic principles of team defence (i.e., delay, depth, communication, support, balance), and includes opposition team-specific HITD game-plans, and intensive defence practice simulations such as 3v3, 1v2, 2v3, 3v4 challenges, fast transition and high-press man-to-man or zone marking, set-piece plays, and HITD video vignettes).

High Impact Team Offence (HITO). For example, framed by HIPC factors, HITO expands basic technical and tactical principles of team attack (i.e., fast transition, penetration, communication, support, width, mobility, creativity), and includes opposition team-specific HITO game-plans, and intensive offence practice simulations such as 3v2, 2v1, 4v2 overloads set-piece plays, and HITO video vignettes.

Drawing on each component of the framework, for example, and aligned field data (e.g., team game-plan meetings and debrief sessions, team performance video recordings, coach's field notes), successful 55-65+ masters world cup teams have rated their team performances using a simple quantitative 1-10 scale combined with discussion about related team strengths, weaknesses, and improvement plans. Further integral to this process, customized player development initiatives for individuals in key positional roles were strategically aligned with each component of the framework in order to maximize unique team contributions toward HIPC, HITC, HITD and HITO.

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Summary: Longitudinal data over a decade suggest that PA and its practical application, when combined with critical coach leadership and adequate team/club support, organised a high impact team unit (including strategic player selection, HITC, HITD, HITO) around issues that are responsive to the performance context for advanced 55-65+ small-sided football. Specifically, timely coaching (framework-specific) interventions throughout key stages of team development in the build-up towards, and during the International masters 5-a-side world cup tournament ensured the practice environment closely simulated the competition setting; engaged coach and players in a networked team-improvement community; and, enhanced performance, whereby the sum of the 'whole' far exceeded that of the sum of the 'individual' parts. PA, however, is not a panacea for strategic team development since problems can arise from inadequate support, time, commitment and expertise required of volunteer coaches.

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Effects of performing Hip Thrust and Back Half Squat on physical performance of young footballers

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Keywords: strength training; team sports; jump; sprint .

Introduction: Football is characterized by short-term high-intensity activities such as accelerations, decelerations, changes of direction and jumps (Abade, Gonçalves, Leite, & Sampaio, 2014) which means that developing neuromuscular performance is key to improve players' physical profiles. Under this scope, strength training routines should consider the direction of force application, meaning that players may benefit overall from exercises performed in different force-vectors and planes (Randell, Cronin, Keogh, & Gill, 2010). According to the force-vector theory, exercises performed in the anteroposterior force-vector (e.g. hip thrust) may effectively improve sprint performance, while exercises performed in the axial force-vector (e.g. squat) have stronger transference to vertical jump (Contreras, Vigotsky, Schoenfeld, Beardsley, McMaster, Reyneke, et al., 2017). However, most of the studies under this scope have been mainly focused on closed environment short-term programs and little is known about the impact of manipulating the number and type of force-vector exercises during in-season real-world scenarios. The aim of this study was to investigate the effects of adding Barbell Hip Thrust and Back Half Squat exercises to a 20-week in-season general strength training program on jumping and sprinting performance of youth football players .

How did we do it? Twenty-four elite male under-17 soccer players with no experience in strength training participated in this study. Control group (n=8) performed a general strength training program that included free weights (bench press, unilateral row, and barbell upright row), eccentric-overload (versa-pulley diagonal trunk rotation) and body weight (front and lateral isometric planks) exercises once a week during 20-weeks of in-season. Vertical (n=8) and Horizontal (n=8) groups' routines additionally included a specific exercise performed in a vertical - back half squat - or horizontal vector - barbell hip thrust -, respectively. Players' physical profile assessment included vertical jump, horizontal jump and linear sprint capacity. Training loads progressively increased from 3 sets of 8-10RM in week one to 3 sets of 4-6 RM in the last week, with exercises being performed at maximum concentric velocity.

What did we find? When confronting control vs. intervention groups, the squat group improved in all jump tests (squat jump, 4.5%; ±4.4%; countermovement jump, 4.9%; ±4.1%). On the other side, hip thrust group presented unclear results in vertical performance.

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Considering horizontal jump, squat group presented an improvement of 7.5%; ±2.7%, whereas hip thrust intervention promoted improvements of 13.0%; ±4.8%. Also, small improvements were observed in 10 -m for squat group (-1.6%; ±2.0% decrease in sprint time), while the hip thrust group presented a moderate effect (-3.0%; ±1.8%). The same trend was showed for 20-m test, as squat group improved with a moderate effect and hip thrust group showed a large effect.

Practical applications for football S&C routines:

This study shows that adding squat or hip thrust exercises to general in-season strength training enhances both jumping and sprinting performances of youth football players. Interestingly, if considering the effects of back squat on jump performance, hip thrust promoted a greater transference to sprinting. Nevertheless, it should be noticed that both exercises enhance sprinting performance to a greater extent.

These results show that in real-world scenarios, performing just one extra strength exercise per week may result in significant and specific physical enhancements according to the particular force-vector characteristics of the exercise.

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The Lateral Ankle Sprain, the Syndesmosis and the Physiotherapist _ Part 1 - Anatomy

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Introduction: The injury to the ankle syndesmosis is usually believed to be less frequent at only about 10% of all ankle injuries (Boytim, Fischer, & Neumann, 1991; Brosky, Nyland, Nitz, & Caborn, 1995) but has a poorer prognosis with delayed return to play and ongoing dysfunction and disability in about 40% for up to six months post injury (Boytim et al., 1991; Gerber, Williams, Scoville, Arciero, & Taylor, 1998). More recent and larger scale epidemiological studies suggest that the so-called "high ankle sprain" may account for up to 25% of all ankle injuries in sports (Hunt, George, Harris, & Dragoo, 2013) possibly due to increased use of imaging and therefore better recognition. In these two papers we will first describe the relevant anatomy of the syndesmosis, and then in part 2 we will describe a new test (the "Bilateral inversion test") which we believe will assist clinicians in better identifying syndesmotic injuries as distinct from lateral ankle sprains, as well as assisting in clinical decision making for conservative and surgical care.

Anatomy: The distal tibio-fibular joint, also called the syndesmotic joint, is a small fibrous joint that distally connects the medial convex triangular surface of the fibula to the lateral concave triangular surface of the tibia (fibular notch) and is maintained by a group of strong ligaments providing a lateral support and completing the ankle mortise (Yuen & Lui, 2017). This arrangement provides for a stable trochlea which holds the talus allowing simple sagittal plane ankle movements such as walking up to more stressful rotational loads incurred during sport (Ebraheim, Taser, Shafiq, & Yeasting, 2006).

The stability of this this joint is ensured by 5 principal ligaments and tissues which connect the tibia and fibula (Vopat, Vopat, Lubberts, & DiGiovanni, 2017)

Anterior Inferior Tibiofibular Ligament or AITFL: This the most anterior ligament and has a multilayered structure in a trapezoidal shape. It has an accessory ligament (Basset's ligament) which runs inferiorly and parallel to it. The AITFL is the primary stabilizer of the syndesmosis joint, with 35% of the joint's stability attributed to it (Yuen & Lui, 2017).

Posterior Inferior Tibiofibular Ligament or PITFL: The strongest ligament of this joint connecting posteriorly the fibula to the tibia. The PITFL is rarely injured and if it is injured it's typically the last ligament to be affected and its injury is indicative of a severe injury. Along with the Transverse ligament the PITFL contributes about 40 to 45% of the stability of the joint (Switaj, Mendoza, & Kadakia, 2015).

Transverse ligament or TL: Also called the deep PITFL, the TL is a thick and roundish structure. This ligament acts as "labrum" to increase the posteroinferior rim of the tibia and is situated deep and anterior to the PITFL. It contributes about 33% to the stability of the syndesmosis joint. There is controversy as to whether the PITFL and the TL distinct structures or not (Yuen & Lui, 2017).

Interosseous Ligament or IOL: Constitutes the lower part of the interosseous membrane. The IOL has a pyramidal shape and plays the role of a spring to control the minor separation of the mortise during dorsiflexion especially at heel strike (Yuen & Lui, 2017).

Interosseous Membrane or IOM: Is a broad fibrous sheet which runs mostly downward from the tibia to the fibula and connects these two bones for most of their length. Together with the IOL it acts as a buffer during weight bearing transferring about 6 to 15% of the total load from the tibia to the fibula during normal walking (Lin, Gross, & Weinhold, 2006).

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While the **Deltoid ligament** is not usually considered as a component of the syndesmosis joint, it contributes effectively in the stability of the mortise by its strong resistance to the lateral migration of Talus bone (Hunt, Phisitkul, Pirolo, & Amendola, 2015).

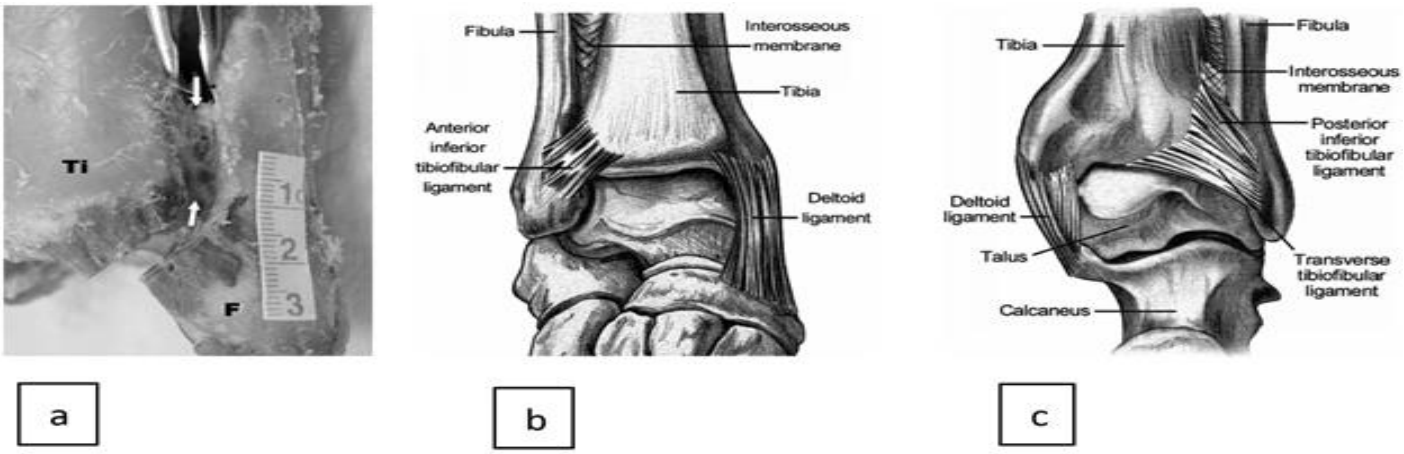

Figure 1 (a) Anterior view of a left the Syndesmosis showing the Interosseous ligament (white arrows). The AITFL and PITFL are cut, the tibia (Ti) and fibula (F) were separated to aid visualization (Ebraheim et al., 2006). (b) Anterior view of the syndesmosis (Norkus & Floyd, 2001) (c) Posterior view of the syndesmosis (Norkus & Floyd, 2001)

Biomechanics of the syndesmosis joint: Stereo X-Ray examination during weight-bearing and external rotation showed the fibula to be firmly fixed to the tibia with very minimal movements of rotation and translation in normal subjects during weight bearing and external rotation (Beumer et al., 2003), while external rotation of a 7.5N-m in non-weight bearing displaced the lateral malleolus up to 2.5 mm medially, up to 3.1 posteriorly, and externally rotated it by 2° to 5°(Beumer et al., 2003)

When the ankle moves from plantarflexion to dorsiflexion the lateral malleolus only moves 1.25 mm laterally and externally rotates 2°(Peter, Harrington, Henley, & Tencer, 1994). It should be noted however that as the talus moves laterally by 1mm the contact surface of the tibiotalar is decreased by 42%(Ramsey & Hamilton, 1976). After a deltoid ligament section the diastasis increases up to 3.7mm(Close, 1956). Disruption of the syndesmosis and the deltoid ligament decreased the tibiotalar contact surface and increased its contact pressure by 40% and 36% respectively(Burns, Prakash, Adelaar, Beaudoin, & Krause, 1993). These findings highlight the importance of an intact deltoid for syndesmosis stability.

Mechanism of the injury: The Syndesmosis injury mechanism varies between sports . In football external rotation is commonly described in both contact and non-contact injuries. Clinically we may see a blow to the lateral leg of a player while prone, or a direct blow by an opponent to the medial aspect of the foot (often from a defender when a player is attempting to shoot) (Norkus & Floyd, 2001). Alternately the foot may be stood on by an opponent and then the player attempts to turn their leg and the relatively fixed foot forces axial rotation at the talocrural joint. A similar but non-contact mechanism may also happen when the shoe sticks to floor (or grass) when the player is attempting to change direction. Landing-related injuries are reported in parachuting, basketball, and volleyball where excessive dorsiflexion is suspected. Finally sports where rigid ankle equipment are worn such as skiing and ice hockey are also at risk of sustaining a syndesmosis injury (Yuen & Lui, 2017). While skiers may benefit from some protection through the solid shell of the ski boot, this injury is reportedly frequent in elite professional skiers due to very high speed turns and sudden high force external rotation of the foot (Fritschy, 1989). Even at low speeds due to the long lever arm of the ski attached to the boot if a ski sticks to the snow during changing direction can cause external rotation of the leg and syndesmosis injury (Norkus & Floyd, 2001)

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Figure 2 Non-contact syndesmosis injuries may occur during skiing where the foot is pulled to external rotation by the attached ski (Norkus & Floyd, 2001) (a) or the player's fore-foot is forced to external rotation being caught in the ground (b), or when an external force is placed to the heel of a player with their toes against the ground (Norkus & Floyd, 2001)

Other mechanisms are also reported such as severe weight-bearing inversion or eversion as well as hyper-plantarflexion(Williams & Allen, 2010) .

Classification: Syndesmosis injury is classified into 3 grades with 4 types(Calder, Bamford, Petrie, & McCollum, 2016; van Dijk et al., 2016a, 2016b) which assists in deciding management (conservative or surgical).

Grade 1: an isolated partial or total lesion of the AITFL. This injury is considered stable and is managed conservatively.

Grade 2-a: a lesion to the AITFL and the IOM without any involvement of the deltoid ligament. This injury is also considered stable and managed conservatively if the deltoid ligament is intact.

Grade2-b: a lesion to the AITFL, IOM, and a confirmed lesion to the deltoid ligament. It is considered as unstable injury and should be managed surgically

Grade 3: is a frank instability with lesions affecting all ligaments of the syndesmosis including the posterior

structures and may involve the deltoid ligament as well as fractures. These frank severe injuries require surgical stabilization.

In part 2 of this series we will describe a new physical examination procedure which we believe assists in identifying syndesmosis injuries as distinct from lateral ankle sprains. We find this examination useful in clinical decision making for conservative and surgical care of these difficult injuries.

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The Lateral Ankle Sprain, the Syndesmosis and the Physiotherapist _ Part 2 - Let's solve the old problem by identifying and grading it "The Bilateral Inversion Test"

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Introduction: Clinically identifying grade 1 and 2 syndesmosis injuries as distinct from uncomplicated lateral ankle sprains is important in terms of providing a prognosis for the athlete and directing management which may require relative immobilization and different rehabilitation strategies. In Part 1 of this 2-part series we reviewed the relevant anatomy of the syndesmosis and the important structures which are involved clinically. In this part we present a description of a new clinical examination aimed at identifying the extent of injury to the syndesmosis to assist in clinical decision making including conservative and surgical care. The validation of this clinical examination test is in progress and we look forward sharing the results in due time. Unfortunately, in the absence of imaging such as MRI or dynamic ultrasound this injury remains difficult to diagnose using clinical examination alone and is easily confused with the medial and lateral ligament tears (Jenkinson, Sanders, Macleod, Domonkos, & Lydestadt, 2005). The location of any effusion doesn't appear to assist in diagnosis, and the reported clinical tests don't appear to be clinically useful(Vopat, Vopat, Lubberts, & DiGiovanni, 2017). This presents a significant problem for the clinician working in the field where these injuries are more common, yet imaging is likely unavailable.

The All-In-1 ankle test: (Bilateral Inversion Test)

Frustrated by the poor accuracy of existing physical examination procedures, we have developed a new physical examination technique which we believe helps diagnose as well as monitor progress during rehabilitation of the stable syndesmotic injuries. Firstly, we advise that definitive ankle examination should be delayed for 5-7 days to allow the inflammation to settle down and the effusion to be controlled, and mainly to allow a possible distinction between stable and unstable injuries. We believe that this examination assists in more clearly identifying the injured structures in these different ankle sprains. Hopefully this examination will be useful where imaging is unavailable. Validation of this test is ongoing with 10 ankle syndesmosis injuries correlating with MRI imaging. More work will be required including assessment on other ankle injuries and healthy athletes, however we present the technique here in the hope clinicians find this useful.

Description of the test: The patient lays supine having the knees bent to about 60° and hips externally rotated about 45°. The patient then places their postero-lateral surface of the heels on the examination table with the heels touching. The surface needs to be firm, and the examiner may need to place a wooden plate or similar under the feet if the bed is too soft.

The examiner stands at the base of the examination table facing the patient and puts their hands around the lateral sides of both forefeet (examiner right hand for left patient's foot and left examiner's hand for the right foot). In this position the examiner brings both feet together into full inversion and dorsiflexion so that big toes meet in the middle as high as possible without losing the knee-hip angle positions. Then the examiner moves their hands and inserts both thumbs between the patient's feet just proximal to the head of the first metatarsal bones so that the two bunions of the patient's feet fit between the thenar and hypothenar eminences of the examiner's hands while the remaining 4 fingers of each hand rest on the dorsum of the forefeet. The examiner then attempts to passively increase inversion. The next step the examiner's index fingers are placed along the medial side of the patient's feet to reach the medial malleolus and used to control the hindfoot Varus .

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At this stage both the anterior talo-fibular ligament (ATFL) (inverted foot) and the calcaneofibular ligament (CFL) (rear foot Varus) are passively stressed and injury here causes localized pain in these structures.

The examiner then asks the patient to fully and simultaneously contract both tibialis posterior muscles against strong manual resistance as the examiner attempts to eccentrically load the tibialis posterior muscles until the dorsum of the patient's feet touch the table (eccentric overload of the tibialis posterior).

Figure 1. Positioning of the patient and examiner's hands when applying the eccentric overload portion of the test.

In this position with this loading all the syndesmotic ligaments are stressed including the IOM and the deltoid. When the test is completed, the patient is asked to describe the different locations of pain by pointing these out, especially noting the proximal extent of any pain.

Biomechanics behind the test: The initial position of the entire foot (rearfoot and forefoot) in maximum varus and inversion allows easily the detection of an ATFL and CFL injury if any lesion to the lateral ligament complex exists if we consider that the ATFL limits the forefoot inversion and the CFL limits the rearfoot Varus.

We also clearly noted that patients with syndesmosis injury have difficulty contracting their tibialis posterior in this inner range position, demonstrating a likely painful inhibition probably from fear of initiating syndesmosis pain.

We suspect that the success of this test in stressing multiple aspects of the ankle joint relates to the structure of the tibialis posterior's both proximal and distal attachments. As the tibialis posterior muscle originates from the posterior aspect of the tibia and fibula as well as from the interosseous membrane 10 cm below the knee possibly squeezing the two bones and pulling the interosseous membrane during contraction, while the tendon has a wide area of insertions in the foot since it is inserting on all the tarsal bones except the talus and on all the metatarsal bones except the first and the fifth, its contraction effects a large force across the entire foot (Guelfi et al., 2017; Semple, Murley, Woodburn, & Turner, 2009).

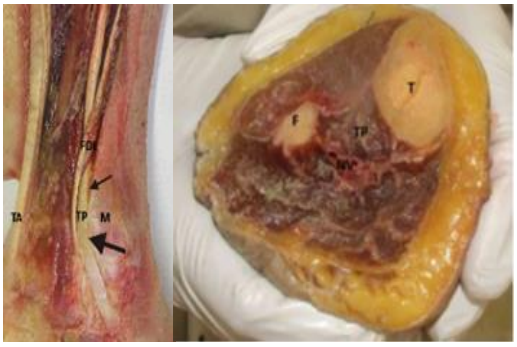

Figure 2. The tibialis posterior tendon. (Semple et al., 2009) The left image shows a medial view of the ankle showing the close relation of the Tibialis Posterior tendon (TP, arrows) to the Flexor Digitorum Longus (FDL) posteriorly and medial malleolus anteriorly (M). TA: Achilles tendon (Semple et al., 2009). The tibialis posterior tendon is rounded above the malleolus and flattens below it (gliding area). It bifurcates into 3 main components. Anterior (the largest and inserts to the navicular tuberosity), middle, and posterior (insert over all the other tarsal bones except the talus, the middle three metatarsal bones, and on the flexor hallucis brevis muscle). The right image (Semple et al., 2009) shows a cross section taken at 10cm below the knee demonstrating the origin of this muscle (posterior tibia (T), fibula (F) and the tibialis posterior muscle in cross-section (TP) along with the neurovascular bundle (NV).

We believe this test stresses all the main structures of the ankle. Clinicially the patient's reporting of pain is then confirmed through careful location palpation (Nussbaum, Hosea, Sieler, Incremona, & Kessler, 2001; Sman et al., 2015; van Dijk et al., 2016)

Rehabilitation principles: To attempt to clinically differentiate between stable and unstable syndesmosis injuries, we examine the patient's weight-bearing status due to its correlation with the severity of ankle syndesmosis injury (Porter, Jaggers, Barnes, & Rund, 2014).

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It's noted that pure axial loading (no axial rotation) doesn't harm the lateral ankle ligament complex and patients with a grade 3 lateral complex sprain can always load their ankles a few days after the injury once the effusion has settled somewhat(Kaminski et al., 2013; Vuurberg et al., 2018). Accordingly, where possible we work to load early given the benefits associated with this(Vuurberg et al., 2018). Conversely, in syndesmosis injuries weight bearing appears to overload the syndesmotic ligaments and membrane(Lin, 2006; Yuen & Lui, 2017) and should therefore be avoided.

There is no clear consensus on the weight bearing status following an ankle syndesmosis injury, and when to move from absolute non-weight bearing to gradual weight bearing and gait. Different time frames are reported ranging from 4 to 15 days(Calder, Bamford, Petrie, & McCollum, 2016; Hunt, Phisitkul, Pirolo, & Amendola, 2015; Nussbaum et al., 2001). Functional disability and time to weight bear appear to be an important sign to predict the instability and the severity of this injury as patients at an early stage will complain of generalized pain and discomfort with weight bearing, or at toe-off(Thormeyer, Leonard, & Hutchinson, 2012). Commonly they avoid heel strike weight-bearing on their forefoot seemingly to avoid the axial loading of their joint(Brosky, Nyland, Nitz, & Caborn, 1995).

In our daily clinical practice we divided our patients with grade 2 syndesmosis injury into two groups depending on their tolerance of weight bearing. We find that this is best assessed approximately 5 days post injury where some patients will tolerate standing with assistance on the injured side, while others continue to avoid transfering their body weight, under any circumstance. Clinically we have noticed that 3 seconds of single leg loading at 5 days post injury is a clinically useful indicator and we suspect that this indicates whether the mortise is stable enough to receive the bodyweight. We perform this examination by having the patient stand next to the treatment table, holding for stability, then slowly tranfering their body weight from the healthy to the injured side. This is best performed keeping the knee bent and toe touching on the healthy side for his safety and confidence. Without giving feedback, the patient is asked to stand as long as they are able however we consider 3 seconds to be sufficient to indicate ability to weight-bear. The loading time is increased proportional to the time post injury; with 5 seconds at 10 days, 8 seconds at 15 days and 10 seconds at 3 weeks. The weight-bearing status alone cannot be needs to be considered along with the bilateral Inversion Test and palpation. identifying the injured structures to be evaluated in weight bearing is indispensable to distinguish the instability.

Conclusion: We introduced in this paper a new examination test, validation in progress, for: acute isolated syndesmosis, isolated lateral ankle injury, and combined injuries. We find this particularly useful in deciding on the stability and therefore management of grade 2 syndesmosis injuries. This method of assessment appears clinically relevant in detecting all main affected ligaments and distinguishing an unstable syndesmosis. For now, we consider useful for physicians and physiotherapists working in clubs and all those who don't have quick access to imaging. We hope to share the validation results soon.

Link to video showing the test:

https://www.dropbox.com/s/qmo6t94xq7yx3rs/TEST%20Final%20Video.mp4?dl=0

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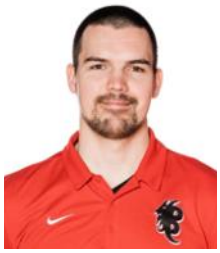

Impact of apnea during repeated-sprint training on performance and physiological adaptations

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Introduction: Soccer players typically repeat short-duration, high-intensity bouts of movement such as sprinting, interspersed with brief periods of low-intensity activity. Thus, the ability to repeat sprints (RSA) is an essential determinant of performance in matches in order to delay the onset of fatigue and maintain the initial level of performance. Research has shown that improvement in RSA can be achieved by repeated-sprint (RS) training and thus several other physical qualities can be improved such as aerobic capacity, sprint speed and jump height (Taylor et al., 2015). Recently, researchers added hypoxic stress to RS training (RSH) and observed marked improvements compared to RS training alone (Brocherie et al., 2017). The physiological adaptations associated with performance gains, especially RSA, include a greater contribution from the aerobic pathway which increases the maximum oxygen consumption (VO2max) and the re-oxygenation of the muscle allowing better phosphocreatine resynthesis (Billaut et al., 2012). However, attending a training camp at terrestrial altitude and/or using hypoxic generators require specific logistic and equipment which can be prohibitive. Performing an exercise while holding one's breath, the so-called voluntary hypoventilation (VHL) modality, can overcome this problem and democratize accessibility to RSH training.

Adding voluntary hypoventilation to repeated-sprint session : Briefly, VHL consists of breath-hold episodes at low lung volume performed during brief repeated maximal sprints. Immediately before every sprint, athletes must exhale down to functional residual capacity (passive expiration) and hold their breath while running as fast as they can for the duration of the sprint. Right after the sprint, a second exhalation can be performed in order to evacuate the carbon dioxide accumulated in lungs. This technique has been fully described by Woorons et al., (2017). Before using this modality, athletes must be familiar with the technique by gradually increasing the intensity of the effort with restricted breathing. Coaches must be attentive to the breathing pattern and must ask the athletes about the difficulty of the task. Thereafter, the trainer can add the technique to RS sessions, for example, 3 sets of 8 sprints of 6-s at maximum intensity with 24-s of passive recovery between sprints. Sprints can be performed in straight line or with changes of direction specific to soccer.

Relevance of voluntary hypoventilation : Several studies reported improvements in RSA after RS training with VHL in rugby (Fornasier-Santos et al., 2018), swimming (Trincat et al., 2017) and cycling (Woorons et al., 2019). Our data also demonstrated clear enhancement in RSA in basketball players (Lapointe et al., unpublished data). In these studies, either the number of sprints before exhaustion increases or the performance deterioration score decreases (Lapointe et al.,: -24.5 ± 27.2%, effect size (ES) -0.47 ± 0.40). The VHL technique demonstrated a practical impact on team sports by allowing a clear effect on sprint endurance. Reducing fatigue after a certain number of sprints can improve the effectiveness of the game in attack and defense while maintaining better technique and greater lucidity. It's especially interesting at the end of the game where the fate of the game is at stake.

However, the RS training with VHL did not lead to greater improvement in longer activity compared to control group. Recently, we measured maximal aerobic performance in an intermittent high-intensity test (30-15IFT-) and there was a similar improvement in both groups.

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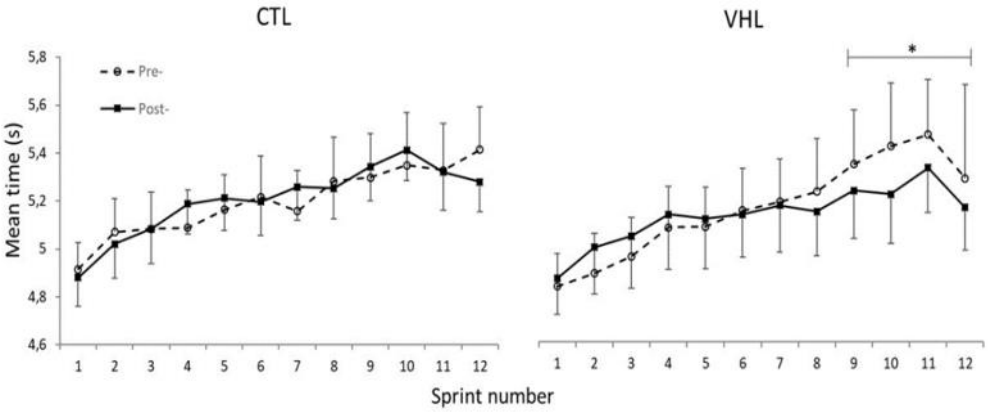

Fig. 1. Sprint time during 12 x 30-m running sprints interspersed by 30-s rest, before and after repeated sprint training in control (CTL) or in voluntary hypoventilation (VHL). (Lapointe et al., 2020)

*Data are presented as means ± SE. *, indicates small effect between groups.*

These performance improvements have been related to a greater anaerobic metabolism. In fact, training with restricted breathing induces hypoxemia (a decline in blood O2 saturation) which forces the anaerobic pathways to provide energy to active muscles. A greater muscle reoxygenation during recovery periods has also been demonstrated after RS training with VHL (Woorons et al., 2019). A better reoxygenation may facilitate the resynthesis of phosphocreatine (PCr) during short recovery periods (McMahon & Jenkins, 2002). PCr availability is highly critical to RSA and become with aerobic pathway the major sources of energy as sprints are repeated while anaerobic glycolysis contribution progressively fades (Billaut & Bishop, 2009). Training with VHL also led to a better maintenance of the initial muscle activity over subsequent sprints (+16.5% RMS) and the recruitment of higher-frequency motor units (+7.7% MPF) concomitant to enhanced sprint endurance in later repetitions. The most likely explanation would be that the better reoxygenation during recovery phases improved the metabolic milieu of contracting muscles and attenuated the reflex inhibition to subsequent stimulation by the central nervous system (Amann & Dempsey, 2008).

Take-home message :

Research has robustly demonstrated that breath-hold training enhances physiological determinants of repeated-sprint ability, which may reduce neuromuscular fatigue development at the end of a set or a game. Therefore, we encourage soccer players and coaches to incorporate this technique in their conditioning program and to explore its efficacy in soccer-specific settings (sprints running with changes of direction, and with the ball).

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Blood Flow Restriction (BFR) Training for Rehabilitation from Injury

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Keywords: *exercise, hypertrophy, physical therapy, occlusion training, strength training.*

Introduction: Over the last number of years, the demands placed on footballers has increased. The total distance covered during games remains unchanged however, high-intensity actions have increased (Bush et al, 2015). Sports such as football are not without risk. For example, there is a high risk of injury at the lower extremities, with muscle injuries being the most common type (Ekstrand et al 2013). A recent report for the 2018/19 season suggests injury rates have increased in the Premier League and cost the clubs £221 million across the season league (Football Injury Index, 2019). Therefore, there is pressure for practitioners to get players back to full fitness as quickly as possible without re-injury to reduce these costs.

In the early stages following injury practitioners face a big problem. A precise rehabilitation plan has to be developed for each injury, including recommendations for sport-specific training with gradually increasing intensity, with the primary goal being to avoid exposing players to high loads too early and thus to avoid re-injury (Ueblacker et al. 2016). In addition players often report pain and swelling, thus are not able to tolerate the loads required for muscle hypertrophy and strength adaptations, limiting . the ability to improve strength and muscle qualities inearly stage rehabilitation.

BFR training for rehabilitation: BFR is a novel training method that partially restricts blood flow going into the muscle while preventing blood flow returning to the heart by applying external pressure, via a tourniquet, to the most proximal aspect of the upper and/or lower limbs, achieved using a pneumatic tourniquet system. When the tourniquet is inflated, there is compression of the vasculature resulting in an ischemic environment, which subsequently results in hypoxia within the muscle (Manini & Clark, 2009).

Phases of BFR usage in rehabilitation: There are three distinct ways that BFR can be applied in order to help the post-injury recovery phase:

Passive BFR: This is the application of BFR without exercise in order to offset muscle atrophy. Passive BFR is applied using a protocol consisting of 5 sets of 5 minutes of full restriction. Each set is followed by 3 minutes of rest and reperfusion, attenuating atrophy and strength loss (Kubota et al, 2008). This phase is applied in the first few days following injury or surgery permitting that inflammation, pain and swelling is not excessive. The addition of neuromuscular electrical stimulation (NMES) combined with BFR in this phase, has become more common. Studies combining low-intensity NMES with BFR have found increases in muscle size and strength (Natsume et al, 2015). Mitigating the loss of muscle strength and size in the acute stages of rehabilitation are necessary to perform voluntary training later in the rehabilitation process.

BFR with resistance exercise (BFR-RE): BFR with resistance exercise (BFR-RE) increases muscle strength and leads to similar adaptations in muscle size as high-load resistance training (Hughes et al, 2017). BFR-RE is combined with low-load resistance, usually between 20-40% of an individual's 1 repetition maximum (1-RM) and the pressure is applied for all sets and repetitions. Recent studies demonstrate superior results with BFR-RE following ACL reconstruction (ACLR) (Hughes, et al., 2019b) and to offset knee pain (Hughes et al., 2019a). The low-load nature of BFR-RE and the adaptations observed make it a powerful rehabilitation tool. It provides an alternative method to enhance muscle hypertrophy and strengths when heavy-loading of the musculoskeletal system is contraindicated (Patterson et al, 2017). Furthermore, recent work suggests BFR-RE may improve structural adaptations to the tendon complex despite the low-loads involved (Centner et al., 2019).

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To date, the mechanism(s) that underpin adaptations to BFR-RE have not been fully explained. Proposed mechanisms include cell swelling, enhanced muscle fibre recruitment, increased muscle protein synthesis and increased corticomotor excitability.

When range of motion is returned, BFR-RE should be introduced to accelerate muscle hypertrophy and improve strength. BFR-RE has been shown to increase muscle protein synthesis (Sieljacks et al., 2019), which increases muscle hypertrophy. This happens without the need to expose the injured or post-operative joint to heavy loads. BFR-RE may also be used to combat the reduced muscle satellite cell abundance observed during periods of unloading, such as found following ACL surgery (Nielsen et al., 2012).

Regarding strength, the early preferential recruitment of type II fast-twitch fibres (FT) at low-loads generated during BFR exercise is an essential mechanism behind strength adaptations at such low loads. FT, which are more susceptible to atrophy and activation deficits during unloading are typically only recruited at high intensities of muscular work. During BFR-RE, it appears FT are recruited earlier with a studiy demonstrating increased muscle activation during increment occlusion (Fatela et al, 2016).

BFR with aerobic exercise (BFR-AE): The ability to improve or maintain aerobic capacity is important during the rehabilitation of injured players. BFR-AE has the potential to enhance not just aerobic performance and capacity but also increase strength and hypertrophy (Slysz, Stultz, & Burr, 2016). BFR-AE is primarily used via low-level cycling or by walking on a treadmill, and similar to BFR-RT requires low intensities (40-45% VO2 max). Regardless of the mode of training, most protocols involve longer work times under restriction compared to BFR-RT (15-30 minutes vs < 10 minutes, respectively). BFR-AE can be used to maintain or even improve aerobic fitness in these early phases of rehabilitation, as well as improve strength and muscle mass outcomes. This can begin once the athlete can start to weight bear and will help maintain aerobic fitness with as little as 2-3 sessions per week.

How to implement BFR training: So how do we go about using BFR in a practical setting? Recent research suggests we should individualise the application of BFR. The pressure should be prescribed as a percentage of 'arterial limb occlusion pressure' (LOP), which represents the minimum pressure required for total arterial occlusion (Patterson et al., 2017). Exercise should then be conducted between 40-80% of individuals LOP for optimal adaptations. It is suggested to use equipment that is safe and designed for the purposes of BFR training. For a brief overview of the current guidelines on BFR application during rest and exercise the reader is referred to Patterson et al., (2019).

Conclusion / future work: In conclusion, BFR provides a low-load safe and efficient treatment modality for an athlete rehabilitating from injury or surgery. As more BFR studies are published, its use in professional sport has become more widespread. The ultimate aim as practitioners is to return the player to full training and matches without a recurrence of injury at a faster rate. BFR may allow for this if used in the early stages of rehabilitation.

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Addictive behaviour in football

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The World Health Organisation (WHO) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. As we can understand from this definition we should take into account the mental state of a person regarding the existence of resources, resilience and fulfilment, becoming a complete well-being .

In this article, we are going to focus on different kinds of addictive behaviour and the leading factors in athletes, including footballers. The close relationship between football and addiction, particularly alcohol addiction, as well as the addictive behaviours of many elite players play a crucial role in sport sciences due to the importance of mental health in sports for optimal performance and wellbeing of the athletes (Lakasing, & Mirza, 2016).

Professional athletes in general, are one of the risk groups for gambling. Moreover, current data shows that 56% of professional athletes gambled at least once in the previous year (Grall-Bronnec et al., 2016). It can cause not only financial consequences but it could also risk the success story as well as deteriorating the athlete's health a pathological state with compulsive behaviour. This state could subsequently lead to suicidal ideas and worsen the existing alcoholism and drug addiction. One of the soccer stars with gambling problems is Paul Merson, who confessed his issues with gambling to the press saying that he got rid of alcohol and drugs, but gambling defeated him. He also admitted that he was thinking about suicide every day at the time.

Health professionals and sport scientists should not underestimate the significance of substance abuse and addiction in sports. There can be different kinds of motivation for this problem including psychological dependence, stress relief, negative emotions reduction, tolerance and withdrawal (Morse 2013). One of the essential risk factor is overtraining syndrome (OTS) or overtraining, whose prevalence in elite athletes is found to be between 20 to 60% (Peluso & Guerra de Andrade, 2005). It can cause fatigue, insomnia, appetite change, weight loss, lack of motivation and concentration difficulties (Armstrong & VanHeest, 2002). In addition, it might be responsible for an athlete's addictive behaviour (Bär & Markser, 2013). That is the reason why athletes need special psychological and psychiatric care.

The importance of fulfilling a required weight category can lead to extreme weight behaviours with risky behaviours, for example, the abuse of laxatives and steroids, as in some bodybuilders (Vorona & Nieschlag 2018). Anabolic steroids are the most important sort of Performance-Enhancing Drugs, the popular doping. During the Cold War countries like the German Democratic Republic distributed such substances in young athletes to improve performance. The documentary Indictment Doping (http://hajoseppelt.de/career/): The Legacy of East German Sports shows also the football was also involved in this policy. Even if we share the opinion that doping is still not a major issue in team sports such as football, strict central doping policies has been coordinated by FIFA 20 years ago. The data presented supports that the incidence of doping in football is quite low (Dvorak J et al., 2006). This abuse of anabolic drugs is linked with anxiety, depressive status and an increased irritability. For instance, Alex Rodriguez (an American professional baseball player) admitted using steroids to compensate an increasing performance pressure to keep him at a high level (https://www.miamiherald.com/news/business/article42080511.html).

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In Addition, the entire world was stupefied when Lance Armstrong (the multi times winner of the Tour de France in cycling) revealed his steroid and anabolic usage for many years in order to win the Tour de France. Moreover, the literature reported hundred cases of dancers, rhythmic and artistic gymnasts who starved themselves to lose weight. Jemni (2018) reported lower leptin level in high-level gymnasts compared to patients with Anorexia Nervosa [Leptin is an ob-gene protein secreted by fat cells; it has a role in the regulation of body weight and in the stimulation of the reproductive axis (through fat)]. Similar low leptin levels associated with low body fat percentages and dysregulation of the menstruation cycles have been reported in Canadian, Greek and German gymnasts too (Klentrou & Plyley 2003; Weimann et al 1999). Eating disorder associated with amenorrhea (absence of the menstruation cycles) and with osteoporosis may lead to a condition called the "Female Triad". All these severe health conditions are caused by some mental disorders, amongst them extreme tendency to lose weight.

Alcohol is the first most widely consumed drug amongst athletes (Kontro et al., 2017). In addition, it is more common in team sports athletes than other sports. As the most popular team sport in the UK is football, football players are a high-risk group for alcohol addiction. Alcohol addiction have long term and short-term consequences. In the long run the most dangerous complication is Wernicke-Korsakoff syndrome (WKS), whose features are mental status deterioration (confused state, memory impairment), the inability to coordinate voluntary movement (ataxia), and eye abnormalities. In the short-term withdrawal syndrome can cause serious seizures, hallucinations, cardiovascular problems such as high blood pressure (hypertension) and high heart rate (tachycardia), which can lead to death.

Cannabis occupies the second position after alcohol (Briscola-Santos et al., 2016). Cannabis abuse can lead to drug induced psychosis with disorientation, hallucinations sometimes with persecutory delusions. It has been already emphasised that stigma about mental health is a barrier to help seeking in athletes, which caused many elite athletes to talk about their issues related to addictive behaviour after their professional career had ended, like the world-famous footballer Diego Maradona's cocaine addiction (Gulliver et al.,2012).

Sleeping problems because of the stress related to performance in competitions or in trainings are unfortunately a main medical consultation topic in athletes (Reardon et al.,2019). The importance of a regular sleep routine in athletes was outdated in the review of (Kirschen et al., 2018) appointing to a relationship between a long-term manipulation of sleep patterns and a change in the athletic performance. Those deprivations and extensions are often needed because of travelling and scheduling requirements. From this background, there is an increased risk in this population group to have a benzodiazepine use disorder, particularly if no lifestyle adjustments or treatment of any underlying health problems are provided. Special access to those substances within the sport employers with the risk of self-medication are a controversial topic in the sport Medicine.

Acknowledging that 65 % of professional footballers mentioned that common mental disorders - addiction among them - was a reason of temporary impairment because of the symptoms. (Gouttebarge & Kerkhoffs, 2018) A lack of preventive management and a politic of silence avoid the access to treatment and can lead to fatal consequences as the suicide of the goalkeeper Robert Enke in 2009. Currently the foundation carrying his name is doing community work for engaging football schools and clubs to implement strategies of red flags (critical symptoms like addiction) and support mental well-being projects with the focus in the peer treatment and the supportive and open approach within the community of common mental disorders. Those settings remain an exception and we encourage football clubs and communities to enhance similar initiatives with experts in addictions.

As healthcare professionals and sport scientists, it is our responsibility to make the authorities and athletes aware of the existence and prevalence of addictive behaviour in athletes.

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Furthermore, we should recognise early signs and symptoms of addiction in order to be able to prevent detrimental consequences especially, with the help of awareness and encouragement to seek help, the stigma surrounding mental illness in sports should be broken.

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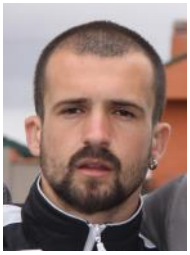

Keeping the young players active during the Covid-19 confinement

Interview with Arben Asllani Founder of A3 World

Q: How are you coping with this pandemic situation in terms of your football coaching delivery to your clients?

It has been challenging; however, challenging times bring out the best in us.

We have been engaging with our clients through Zoom, Social Media Platforms, and phone calls to keep them engaged mentally and physically. The idea has been to enhance on skills that have neglected; for example, those that play predominantly with their right foot, we are working on their left foot and vice versa. So that when we do resume to normality, they have a new skill to add to their tally and could be very valuable to their success in the game. Also, we have been working mentally on players football intelligence in terms of positional awareness and synchronization as a team through theoretical online workshops.

Q: How could you monitor the health, fitness and well-being of your clients?

Mental Health and Physical Health are key ingredients to living a more fulfilling lifestyle. We have asked our clients to list down 7 aspects of their lives they want to improve in the next 6 weeks, which has now become their 6-week challenge to themselves. We continuously have virtual sessions to help them formulate ideas on how they can achieve those targets they have set themselves. Encouragement and motivation through scientific information is how we keep mental stimulation directed at their targets, which helps mentally and physically.

Q: How do you measure progression?

So, depending on the targets they have set themselves, we will structure a progression chart to see where they have initially started and where they finish at the end of their 6-week program. For example; if their aim is to increase upper body strength, we have asked them to measure it with Press ups. So initially they will perform as many press ups for one minute on the first day of the 6-week program as their baseline measurement, and we will ask them to perform press ups for one minute at the end of the 6 weeks as their post measurements. We will then see the difference between baseline and post measurements to analyse progression. Or if they want to improve on their aerobic endurance, we have asked them to perform a 30 minutes run at their local park and measure the difference between baseline results and post results on distance covered using Apps on their phone to track their distance. Of course, we have provided them with a workout program specific to what they want to achieve as their treatment between baseline and post measurements.

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Mentally we want them to journal their daily activities for the 6 weeks on what they do and how they feel. This will allow them to look back and find out exactly what they did, how they felt at different times during the 6 weeks program. This will help them keep their mind active and create the habits necessary to stay as fit as possible during this pandemic.

Q: Are you in contact with fellow football and fitness professionals during these times?

Yes, we have a wide range of contacts, from professional sport scientists, to professional football players, coaches and mentors that we exchange ideas on creativity and challenges we can use to stimulate our clients through their pandemic personal development program. Our main aim is to develop on the areas where they feel they haven't had the time to develop previously, so that when we go back to normality, they have new skills to add to their jobs .

Q: What is the A3 World Philosophy?

A3 stands for Attractive Ambition Academy, and we offer a World class service to those that would like to achieve more in life and football. The idea is to create a mind frame of continuous learning attitude with the aim to build a character and personality that is that of giving and receiving graciously. Which we call an Attractive Ambition. As stated above, a continuous learning mindset is the difference between progressing and regressing. And of course, we all want to progress.

A3 World is Football and Personal development program to help people of different walks of life, live a more fulfilling lifestyle.

With football being the leading sport in terms of influence and audience, we use the sport to help our clients develop spiritually, emotionally, physically, intellectually and socially .

Other Comments:

We hope everyone is staying safe and staying active through this difficult time.

A3 World

Attractive Ambition Academy World

Football practice within the Covid-19 situation crises

Interview with coach Sean Malcolm (Juventus Academy Saudi Arabia)

Q: What kind of practices you are using to stay connected to our players?

Skill Challenges

We have provided descriptive videos with several exercises to ensure that players can have a training program that helps them maintain their speed and endurance, strength, ball skills and mobilization during this time of the Covid-19 confinement crisis.

My colleagues and I have filmed several skill challenges with and without ball and physical literacy for our players to continue to develop themselves at home. We have incentivized this by choosing the best videos of the players performing each weekly challenge to be uploaded onto our Instagram page.

Q: How could you ensure the Health, fitness and wellbeing of your players remotely?

Health, fitness and wellbeing

As important as physical health is, for many, there has been the challenge of maintaining one's mental health as well. We are delivering weekly webinars to stay connected with our students and monitor what the young people fill their time with. We ask them questions about how they have progressed with the exercises or challenges we have provided. We also stimulate their memories by asking about the best moments during their training sessions , tours and trips within our academy or their schools, to stimulate the limbic system (mid brain). Our aim is to keep our players feeling positive about football and looking forward to the time we eventually return.

Social media technology is indeed an important tool to keep connected our the players. Each Sunday we are open via live video calls to a wider audience including our players and parents to answer any questions they may have and offer advice on training tips, healthy eating and daily exercise and further issues.

Q: How could you monitor all these aspects remotely?

Monitoring physical performance

We are considering the possibility of using technology to monitor physical performance and even create competition for our older players to make sure they are following their daily programs. There are Apps where you can monitor different types of exercise via smartphone or tablets. This is something being utilized in many elite team environments within the professional game. I am personally not aware of any available Apps that monitor physical performance in football specifically, I feel this could be something that helps take the industry further if developed.

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Q: Are you in contact with your colleagues in Turin? And what support and guidance are they offering to you?

I am in direct contact with Mr Antonio Sacco, who is the lead performance Psychologist consultant at Juventus football club for the entire academy. He also assists the first team psychologist who works directly with Maurizio Sarri and advises us on our coaching behaviours based on the SFERA model.

Q: What is the SFERA model?

The SFERA model is based around 5 components:

Synchronicity - Mind and body connected to the task we are about to do.

Forza - Strength (self-efficacy) - believing in your own ability as a coach.

Energy - Using our energy in a balanced way at the right times to drive the intensity of the activities in place.

Rhythm - Allowing short transitions between tasks to keep a good rhythm in the session assisted by our interventions and practice design

Activation - The word used in English is enthusiasm and how we transcend that to the players we are working with.

If we are in the state of SFERA as coaches it allows the players we are working with to also develop towards their potentials.

'Coach speaks with Juventus Legend Edgar Davids about monitoring his players in his time as manager of Barnet FC'

Science applications in Football Strength and Conditioning Job – an example from Qatar

Sébastien Braillard

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"For those who visited Aspire Academy in Qatar, thy would recognize that it is one of the most amazing infrastructure in the world providing football and sport science provisions. Humbly, it is a great and unique experience for me to work in such structures with flabbergasting facilities. Through these few paragraphs I would like to share my personal point of view on the opportunities and the challenges in this context".

At the beginning of my arrival in Qatar (11 years ago), I realized that I am facing a new environment, a new culture, a new religion, heat climate, and so on… These factors made me understood that I will have to create a new way, approach to deliver my work. From the first days, I realized that the key word to success and to be able to implement my methodology of work will be ''adaptation'' and ''communication''.

As a Strength & Conditioning Coach, I need to set physical objectives for the season and individualize the work for each player. My main role is to develop strength, power, speed, agility, plyometric, endurance, flexibility/mobility of my young football players (U18) in order for them to achieve their maximum performance and full potential that aligns physical training with player's maturity through the Long-Term Athlete Development Model (LTADM) in Qatar.

In the meantime, I also realised that I would not have achieved these objectives without key aspects, such as teamwork and collaboration with the technical and medical staff.

Working together, we have the capacity to analyse and to reflect on different situations and in particular contexts in order to find innovative knowledge-based solutions to the problem. My personal strategy in this particular context was to create an integrated approach to deliver sport science by working closely not only with the medical staff to make sure that the players are healthy but also with the exercise physiologists and the biomechanists to optimize the performance of my players.

Therefore, we have been assessing the training load, the recovery strategy, the rehabilitation process in case of injuries, the return to play process and all parameters that are in relation with the performance in order to create a bridge and to allow for instance the injured player to return to training and competition as soon as possible.

It is proven that the relation between the workloads of the athletes, the injury index and the sports performance is evident so it is crucial to monitor the players during the practice during the high-performance period. For this purpose, a range of tools has been developed and applied which provides a wide range of variables to supervise the players' performance. In my case, by collecting external load using the GPS device during the training allowed me to have precise ideas on the distance run, speed, acceleration and other variables. The same data could be collected and analysed during different periods of the season enabling comparison between recovery, rehabilitation, preparation and competition phases, hence adjusting the training loads accordingly.

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The GPS also allows a real-time analysis which enables me, the technical and medical staff to have valid data and immediate feedback on what is happening on the field. However, without prior knowledge of the requirements of the competition which I call ''competition demands'', individual data could be wrongly interpreted and training loads could be inconsistent for the athletes.

In addition, I do also collect subjective data provided by the players; for instance, the Perceptive Recovery Status (PRS) is noted before each training and the Rate of Perceived Exertion (RPE) at the end of each training session. These variables allow me to have a quick and fresh feedback from the player in order to manage the training or to have an overview of the load based on perception.

I must also say that having mostly only one game per week, the local league's fixture (Qatar Football Association) allows me to plan my week without having big surprises. As Jens Bangsbo stated: ''Football is not a science, but science can help football''.

Football is a huge world where research, technology and others relevant sources of information on the practical application are evolving so quickly that I must keep myself open and up-to-date. I always say to myself, ''It's not about being the best, it's about being better than I was yesterday; so, I have to keep my eyes and ears open to constantly continue to learn in order to improve my knowledge and skills''. I must also say that opportunities for continuing development are not scares in the country; Aspetar and Aspire Academy organise regular fruitful and rich meetings, workshops and conferences where I can learn, share and exchange work philosophies and cutting-edge science and practice all together for the benefit of the players.

Inside Story from the Indian Super League

Atharva Tere

Assistant Sports Scientist and Team Analyst, Chennaiyin Football Club, Indian Super League

Rarely do we talk about Indian football in the West. It is still a mystery for many reasons, compared to cricket. These few paragraphs shed some light on my personal experience in the Indian Super League (ISL). With a particular focus on the evolution of sports science over the league's six years history.

The ISL was launched in 2014 as a second football league, played in conjunction with the existing I-League (top-flight). These two leagues were played at separate periods in the calendar season. Players, staff and managers used to interchange roles between I-League and ISL clubs. The I-League used to run in the summer season and ISL in the winter (October-December).

Better budgets and infrastructure in ISL saw players like Florent Malouda, Diego Forlan, Elano, Robert Pires, Roberto Carlos, Alessandro Del Piero coming to India. These World Cup, Champions League, La Liga and Premier League winners among others, brought with them years of experience and skills on the field. Even the coaching staff recruited by the clubs included experienced heads like Zico, Marco Materazzi, Gianluca Zambrotta and so on. Young Indian footballers developed technically and tactically due to this unique opportunity to learn from the best players and coaches.

In the first three editions of the ISL, 8 teams played 14 games over the course of 3 months with an average of 2 games every week (midweek and weekend). Due to a short season (3 months) and a relatively shorter pre-season since the players were in good shape coming over from the I-League, the emphasis was on optimum recovery between games. Back then, most clubs conducted pre-season camps in Europe, more down to promotional and exposure reasons. This did not aid in acclimatizing players to play for 90 minutes in hot temperatures of the Indian subcontinent. However, coaching staff got better playing surfaces and quality of opposition in Europe during the pre-season. As the season began, fitness coaches and sports scientists had to work around the limited level of facilities at their respective clubs (no proper training complex, hotel gyms, etc). However, due to world class foreign talent on the pitch, the average attendance at the games grew progressively in the first three seasons and ISL was ranked among leagues like Ligue 1, Serie A, La Liga as well as the MLS for stadium turnout. Young Indian players became household names and sports clubs, schools and parents started investing in and supporting grassroot football programs.

From the fourth season, the league has adopted a more financially sustainable approach as they have to follow the guidelines set by the Asian Football Confederation (AFC) in order to participate in continental tournaments. Thereon, ISL became a 10-team league and a longer schedule with players being contracted only to one club (either ISL or I-League). The number of Indian players increased in the squad as teams now could only field five foreigners on the pitch. Clubs began investing more in long-term facilities like training complex, housing facilities, gym, training, and medical equipment. The quality of foreign fitness coaches and sports scientists coming to the ISL also improved due to longer contracts and year-round involvement.

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Teams now require a proper pre-season to handle the demands of the games, especially after coming in from a long off-season. The choice of location for pre-season moved from Europe to more hot and humid countries like Thailand, Malaysia as well as Qatar, similar to the Indian climate. Investment in technology like GPS grew so that sports scientists and fitness coaches could accurately monitor their players during training and matches. Teams also bought in to the scientific approach to training and more detailed emphasis was given to recovery, nutrition, and supplementation. Greater importance was given to injury management and rehab protocols like hydrotherapy, cryotherapy, compression (Recovery Boots), etc…

Players' education by fitness coaches was critical in Indian players buying in to this new philosophy. They understood the impact of recovery and injury management on performance. All these efforts resulted in fewer incidents of muscle injuries, a greater number of goals in the last quarter of matches and greater number of Indian players fighting for a place in the national team. India's FIFA ranking improved and the team secured qualification to the AFC Asian Cup, the continent's premier international tournament, after an 8-year hiatus. It also brought a level of professionalism needed to take Indian football forward.

During my time at Chennaiyin FC over the previous two seasons, I had the privilege to work under two esteemed sports scientists - Dr. Niall Clark and Costas Rostantis. The tight knit medical department at the club consisted of the Head Sports Scientist, Head Physiotherapist, two Masseurs and me. The underlying philosophy was "every player, fit for selection, for every game and training session". This philosophy is based on:

OBJECTIVITY: Data driven approach.

COMMUNICATION: Clear chain of conversation between all members of the department and then conveying information to the coaching staff.

CULTURE: Initiating good players' habits to create a positive culture.

Practice: These were some of the practices put in place by the sports science department. The standard has been set and players were expected to meet the level of responsibility and professionalism the club demands.

Players are monitored on different aspects of physiological fitness at fixed intervals during the season. At the start of pre-season, standard anthropometric testing is conducted along with various field tests which measure aerobic and anaerobic fitness, agility, speed, and power. The same tests are then reconducted during the season. GPS is used to monitor training load during a training session. Comprehensive amounts of data are compiled over microcycles, mesocycles and the macrocycle to help make better decisions with regards to the training load that players are exposed to. Pre-activation and injury prevention is done prior to every training session. Hydration tests are conducted on a weekly basis to improve player awareness on the importance of hydration to prevent cramps and muscle injuries. As players and staff are housed in a five star hotel throughout the season, personal liaison with the head restaurant chef is also agreed to ensure suitable nutrition is provided to the players prior to training session and match days and post-match.

Finally, the players are given a maintenance program which consists of aerobic and anaerobic runs, gym and core exercises which can be done during the off-season. The result of this philosophy and culture has helped the team to avoid lots of muscle injuries compared to other teams that are on a higher budget with more staff.

Coming-up on the 20th May 2020:

Online round-table about technology in football clubs

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