

FIFA®

FIFA FEMALE HEALTH PROJECT SNAPSHOT



FOREWORD

The FIFA Women's World Cup 2023™ is the biggest women's sporting event in the world. With more than 1.7 million fans filling the stadiums and 2 billion watching from around the globe, the spotlight will well and truly be on women's football, female athletes and the evolution of the women's game. This World Cup also gives us a unique opportunity to track the growth of the game, both on and off the pitch. We have already seen great indicators of this growth in the domestic leagues and continental competitions, as well as in the commercial interest and increased exposure.

With this in mind, FIFA aims to accelerate all areas of the game with a particular focus on female athletes' health, well-being and performance.

Despite the continued growth in women's football and the wealth of data regarding men's sport, there is still a lack of scientific literature on female athletes. Much of the research on women's football to date has focused on the physical characteristics of female players and encompasses variables such as age, body height and weight, as well as physical fitness profiles. There is little information about how female hormones affect training stimuli and overall performance. The need to better understand female players is key, as the landscape of the women's game continues to develop and the demands of the game increase.

Over the past two years, FIFA has thoroughly investigated the current research landscape and has created a narrative review of women's health and well-being. This review has enabled FIFA to develop the framework for the FIFA Female Health Project, which will include educational resources to support the relevant stakeholders, including member associations, players, coaches, multidisciplinary teams (MDTs – including sports scientists, nutritionists, strength and conditioning professionals, psychologists, medical staff, etc.) and the broader footballing community.



FIFA's aim is to optimise every female footballer's health, well-being and performance and to improve knowledge of women and girls in football at every level of the game.

Sarai Bareman
Chief Women's Football Officer
FIFA Women's Football

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INTRODUCTION

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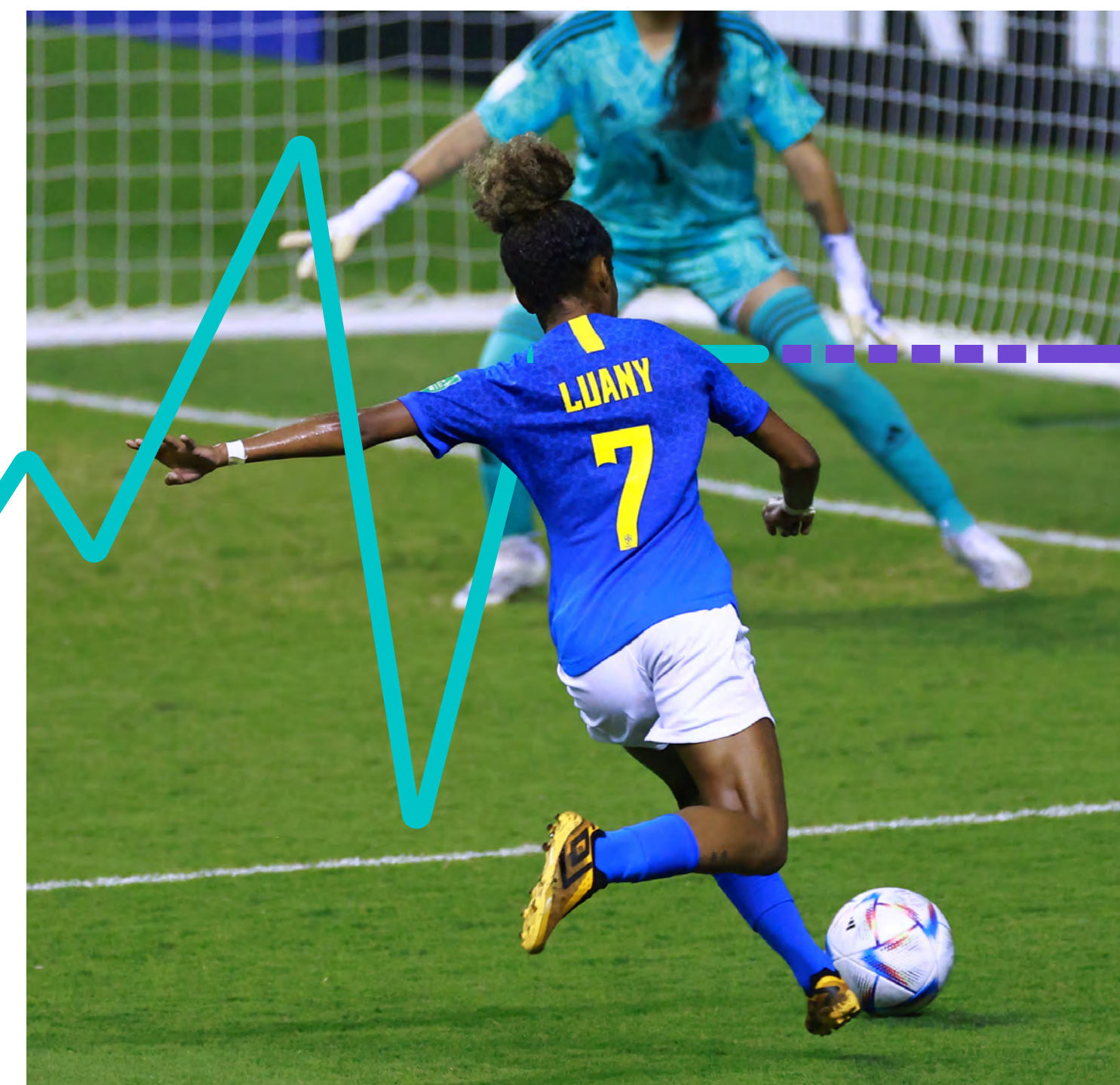
The women's game has grown exponentially over the past decade, particularly at the elite end of the game. As we embark on the ninth edition of the FIFA Women's World Cup™ and look back on that growth, we see that the demands on players have significantly increased, both on and off the pitch.

As these demands increase, it is critical that the support surrounding female athletes also evolves. The notable lack of research and data dedicated to the women's game and to the specific factors that need to be understood when working with female players is an issue that must be addressed.

It is for this reason that FIFA has embarked on the FIFA Female Health Project, an all-encompassing overview of the female athlete and the environment and support that she needs in order to perform at her best.

This snapshot showcases the **key differences between female and male athletes** and allows us to better understand what we already know and what we still need to investigate when it comes to **female athletes to improve the training and playing environments** in which girls and women participate.

It is crucial that all stakeholders understand female players' needs and have evidence-based strategies in place to empower players, coaches and MDTs to understand how to support their players' needs. The following information is an excerpt from the content of the FIFA Female Health Project that will be available soon to all FIFA stakeholders and the wider footballing community.



OUR EXPERTS

OUR EXPERTS

The FIFA Female Health Project is a critical part of FIFA’s global Women’s Football Strategy, which aims to grow participation, enhance the commercial value and build the foundations of women’s football.

A strong knowledge of how to train and prepare female athletes and to provide the holistic support they need based on research and data is fundamental to achieving FIFA’s strategic goals.

In order to obtain this knowledge and to continue developing the research needed, FIFA is working with leading experts and doctors in female health, physiology and exercise medicine. This team, brought together by FIFA, will contribute to the Female Health Project as experts in their respective fields. With their knowledge, the framework for this project has been developed and can be passed on to all stakeholders in the women’s game in digestible, practical formats that are suited to the different needs of the football community.

We would like to introduce you to these experts and their fields of expertise to give you an overview of the depth and breadth of knowledge that underpins this project.



Dr Deidre Anderson

Dr Deidre Anderson AM is an outstanding social scientist and leader who has worked with a variety of organisations and individuals. She has held executive positions at both international and national level within elite sport and the private sector. Deidre has been acknowledged worldwide for her contribution to elite athletes. She was recently awarded an Order of Australia (AM) in the 2022 Queen’s Birthday Honours list for her contributions to both tertiary education and sport.



Dr Amy Bender

Dr Amy Bender is the Founder and Principal Sleep Strategist at Sleep In To Win and an Adjunct Assistant Professor of Kinesiology at the University of Calgary, which is the number-one sport science school in North America. She received her PhD and Master of Science degrees in Experimental Psychology from Washington State University, specialising in sleep EEG. Dr Bender completed a Mitacs postdoctoral fellowship at the Faculty of Kinesiology at the University of Calgary, where she helped to develop the only validated sleep screening tool for athletes and implemented sleep optimisation strategies for numerous Canadian Olympic and professional teams.



Emma Brockwell

Emma Brockwell is a pelvic health physiotherapist. She treats women of all ages with all women’s health-related conditions. She is passionate about pre- and post-natal rehabilitation and the menopausal years. She specialises in supporting women during their pregnancies and enabling women back to exercise post-partum. She has worked at elite sport level for the Harlequins women’s rugby and Chelsea women’s football teams. She is on the clinical scientific advisory board for The Active Pregnancy Foundation and is an associate member of the Perinatal Physical Activity Research Group.



Dr Georgie Bruinvels

Dr Georgie Bruinvels is an Honorary Senior Research Fellow at University College London and a research scientist and the Female Athlete Lead at Orreco. Georgie's applied and research focus is centred around better understanding female physiology and, in particular, focusing on how the hormonal fluctuations throughout the menstrual cycle impact physiological, physical and psychological readiness. Georgie works across a wide range of both team and individual sports, including with Olympic and national-team athletes.



Lissette Cornejo

Lissette Cornejo is an accomplished registered dietitian with a Board Certification in Sports Dietetics. Holding a Master's degree in sports performance, she has worked with a variety of professional organisations and athletes throughout the year, most recently with Inter Miami CF. She is currently the head of the Performance Nutrition Department at the Milwaukee Brewers.



Ivi Casagrande

Ivi Casagrande is a high-performance coach and consultant. She is currently the High-Performance Coach for the Brazilian women's national team, Sport Scientist Lead with Lewes FC women and is also part of the Human Performance Council for Under Armour. Ivi also works as a technical expert for both FIFA and UEFA. Holding a Master's degree in Exercise Physiology, Ivi has worked in both the American and English women's football leagues and has coached the Orlando Pride in the NWSL and Brighton women's football team in the WSL.



Dr Michiko Dohi

Dr Michiko Dohi is a sports physician and diagnostic radiology specialist. She is currently a Specially Appointed Professor at the College of Sport and Wellness at Rikkyo University and both men's and women's Japanese national-team doctor. She is a medical committee member of FIFA, the AFC and the JFA. She is also an Executive Board Member, vice chairwoman of the Sports Committee of Japan Olympic Committee (JOC) and member of the Scientific Commission of the International Sports Medicine Federation (FIMS).



Dr Margie Davenport

Dr Margie Davenport is a Professor in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta in Canada. She holds the Christenson Professorship in Active Healthy Living and is the Director of the Program for Pregnancy and Postpartum Health (www.exerciseandpregnancy.ca). Margie has published over 150 peer-reviewed papers related to physical activity/exercise during and following pregnancy. She was the chairwoman of the Society of Obstetricians and Gynaecologists of Canada (SOGC)/Canadian Society for Exercise Physiology (CSEP) 2019 Canadian Guideline for Physical Activity throughout Pregnancy.



Dr Sinéad Dufour

Dr Sinéad Dufour is an Associate Clinical Professor in the Faculty of Health Science at McMaster University. She teaches and conducts research in both the Schools of Medicine and Rehabilitation Science. Her current research interests include conservative approaches to managing PFD, pregnancy-related pelvic-girdle pain, and interprofessional collaborative practice models of service provision to enhance pelvic health.



Dr Anthony C. Hackney

Dr Anthony C. Hackney (“Tony”) is a full professor at the University of North Carolina – Chapel Hill in the Department of Exercise & Sport Science, with a joint appointment in the Department of Nutrition –School of Public Health. His research focuses on the influence of exercise training on the reproductive system of women and men. He has over 300 published research papers, book chapters, seven books on exercise physiology-endocrinology, and is a Fellow of the National Academy of Kinesiology. His latest book is *Sex Hormone, Exercise and Women*.



Shona Halson

Professor Shona Halson is the Deputy Director of the SPRINT Research Centre at ACU’s School of Behavioural and Health Sciences. Prior to this, she was the Head Recovery Physiologist at the Australian Institute of Sport for over 15 years and has led the Recovery team at three Olympic campaigns with the Australian Olympic Committee. Her research focuses on sleep, recovery and fatigue and she has published over 170 peer-reviewed articles and multiple book chapters. Shona provides consultancy services to the Australian Open Tennis Tournament and Nike as well as several national and international professional sporting teams.



Dr Amal Hassan

Dr Amal Hassan is a Sport and Exercise Medicine Consultant Physician in London, England, based at the Institute for Sport, Exercise and Health (ISEH) where she specialises in Female Athlete Health. She is a lower school physician at the Royal Ballet School White Lodge, and the Harlequins FC women’s team doctor. Amal trained in Bristol, completing an intercalated undergraduate degree in Bioethics before completing her medical degree and graduating in 2010. She was awarded membership of the Royal College of Physicians in 2014 and undertook a Master’s degree in Sports Medicine and was awarded a distinction, before commencing higher specialist training in Sport and Exercise Medicine in London. She completed her training in 2021 after having her two children and whilst lecturing in Sport and Exercise Medicine at University College London (UCL) as a faculty member.



Glyn Howatson

Glyn Howatson is a Professor in Human and Applied Physiology at Northumbria University in the UK. His research interests predominantly lie in the optimisation of human performance where he focuses on understanding the stress-recovery-adaptation continuum using training and nutritional interventions to manipulate human physiology and behaviour. Glyn has published over 230 peer-reviewed papers and book chapters, which he uses to apply research findings to the “real world” and develop meaningful impact in sport. His work has contributed to supporting numerous international athletes that include European, world and Olympic medallists.



Dr Johanna Ihalainen

Dr Johanna Ihalainen (PhD, Exercise Physiology) is a senior lecturer in the science of sports coaching at the University of Jyväskylä, Finland. She also works at the Finnish Institute of High-Performance Sport KIHU as an expert in sport science. Her research focuses on female exercise physiology (i.e. the effects of endogenous and exogenous hormones on athletic performance) and the effects of low-energy availability on an athlete's health and performance. She conducts several research and RDI projects aiming to improve athlete health and performance.



Michelle Lyons

In her clinical career as a women's health physiotherapist, since graduating from University College Dublin, Michelle Lyons has worked with female athletes at all levels and on integrating pelvic health and sports medicine into sport. She completed her postgraduate studies in health coaching and nutrition at the University of Galway and fosters an integrative approach to menopausal health, particularly pelvic and musculoskeletal issues. She is ardent about educating women's health professionals at both postgraduate conferences, for example with the International Continence Society, but also at grassroots level with the Gaelic Athletic Association. She lives in Ireland but teaches and consults nationally, internationally and online.



Dr Ritva Mikkonen

Dr Ritva Mikkonen, PhD (Science of Sport Coaching and Fitness Testing) is a Senior Lecturer in Exercise Physiology at the Sports Technology Unit, Faculty of Sport and Health Sciences, University of Jyväskylä, based in Vuokatti, Finland. Her research focuses on female exercise physiology including the effects on endogenous hormone profile on sport performance and health as well as the effects of low-energy availability on health and performance in athletic populations. Other areas of research include hypoxia and concurrent strength and endurance training.



Dr Nonhlanhla (Noe) Mkumbuzi

In her clinical career as a sports physiotherapist, Dr Noe Mkumbuzi has served Zimbabwe's national men's, women's and youth rugby, netball, football and Olympic teams. She also has teaching experience from institutions in Zimbabwe, South Africa, Anglophone Southern Africa and the United Kingdom. Currently, she splits her time between teaching and research at Northumbria University (UK), Midlands State University (Zimbabwe) and Nelson Mandela University (South Africa), and consultancy work.



Dr Sophia Nimphius

Dr Sophia Nimphius is the Professor of Human Performance and Pro-Vice-Chancellor (Sport) and at Edith Cowan University in Perth, Western Australia. She applies a cross-disciplinary and multidisciplinary approach to understanding athletic performance, athlete health, and injury risk with a particular focus on women and girls. Her unique multidisciplinary domain knowledge across strength and conditioning, biomechanics, skill acquisition and sociocultural factors to come together to create a motor behavioural approach to understanding movement.



Dr Charles Pedlar (Charlie)

Dr Charles Pedlar is a Professor of Applied Sport and Exercise Science at St Mary's University, Twickenham, and an Associate Professor at UCL, London. He is also the Chief Science Officer at Orreco. Charlie is a sport and exercise physiologist and has researched several connected areas including endurance and altitude training, iron deficiency, menstrual cycle symptoms, sleep and recovery. He is also particularly interested in methods for monitoring athlete health. He collaborates on several projects internationally and is currently supervising multiple PhDs related to the female football player including sleep, menstrual cycle symptoms, nutritional interventions, cultural considerations, and determinants of ovulation and menstrual cycle length.



Dr Dawn Scott

Dr Dawn Scott has accumulated over 20 years of experience in women's football and is currently the Vice President of Performance and Innovation with Washington Spirit in the NWSL. She was previously Performance Director for Inter Miami CF in the MLS. Prior to that role she worked as Head of Performance for the USWNT for ten years, supporting the team at three FIFA Women's World Cup final tournaments (2011, 2015 and 2019) and two Olympic Games (2012, 2016). She was the Head of Exercise Science for the England women's national team for over ten years, in two separate spells, supporting the team at two European Championships (2005, 2009), one FIFA Women's World Cup (2007) and one edition of the Olympic Games (2020). Dawn is a technical advisor for FIFA, conducting the physical analysis of the 2015 and 2019 editions of the FIFA Women's World Cup final tournaments. She has recently completed her PhD thesis at Western Sydney University, developing a training model for elite female football players. She also completed a Master's degree in Sports Directorship from Manchester Metropolitan University, and holds a Master's degree in Sports Nutrition (Aberdeen University), and a BSc (Hons) in Sport and Exercise Science (Manchester Metropolitan University).



Dr Holly Silvers-Granelli

Dr Holly Silvers-Granelli is a board-certified physical therapist specialising in sports orthopaedic rehabilitation in Santa Monica, California. She holds a PhD in Applied Physiology and Biomechanics. She is the Research Director for the MLS and the owner of Velocity Physical Therapy, with a primary research focus on the prevention of injury in sport, ACL and hamstring injury mitigation, biomechanical assessment of injury risk, articular cartilage injury, groin and hip injury and patellofemoral disorders. She is a member of the United States Soccer Federation's Medical Team, a medical advisor to US Club Soccer, a consultant for the NFL's ACL and MCL Musculoskeletal task force, FIFA's Female Football in Medicine initiative (Zurich, Switzerland), the Aspen Institute's Project Play initiative, and the Aspetar Scientific Advisory Board (Doha, Qatar). She is deeply committed to improving the overall health and safety of the athlete.



Dr Abbie Smith-Ryan

Dr Abbie Smith-Ryan (PhD, CSCS*D) is a highly respected figure in sports science, specialising in exercise physiology, nutrition and body composition. She has made significant contributions to athletic performance and female health. As a professor at the University of North Carolina, Chapel Hill, she has published over 175 peer-reviewed manuscripts, influential books and international presentations. Her expertise has been recognised through esteemed awards, including the National Strength and Conditioning Association's Outstanding Sports Scientist of the Year (2022). Dr Smith-Ryan's impact extends beyond academia since she has collaborated with renowned companies like PepsiCo, Gatorade, Ladder, Alzchem and EXOS, offering valuable consultation and leading innovative research. Her research and consultation services have played a vital role.

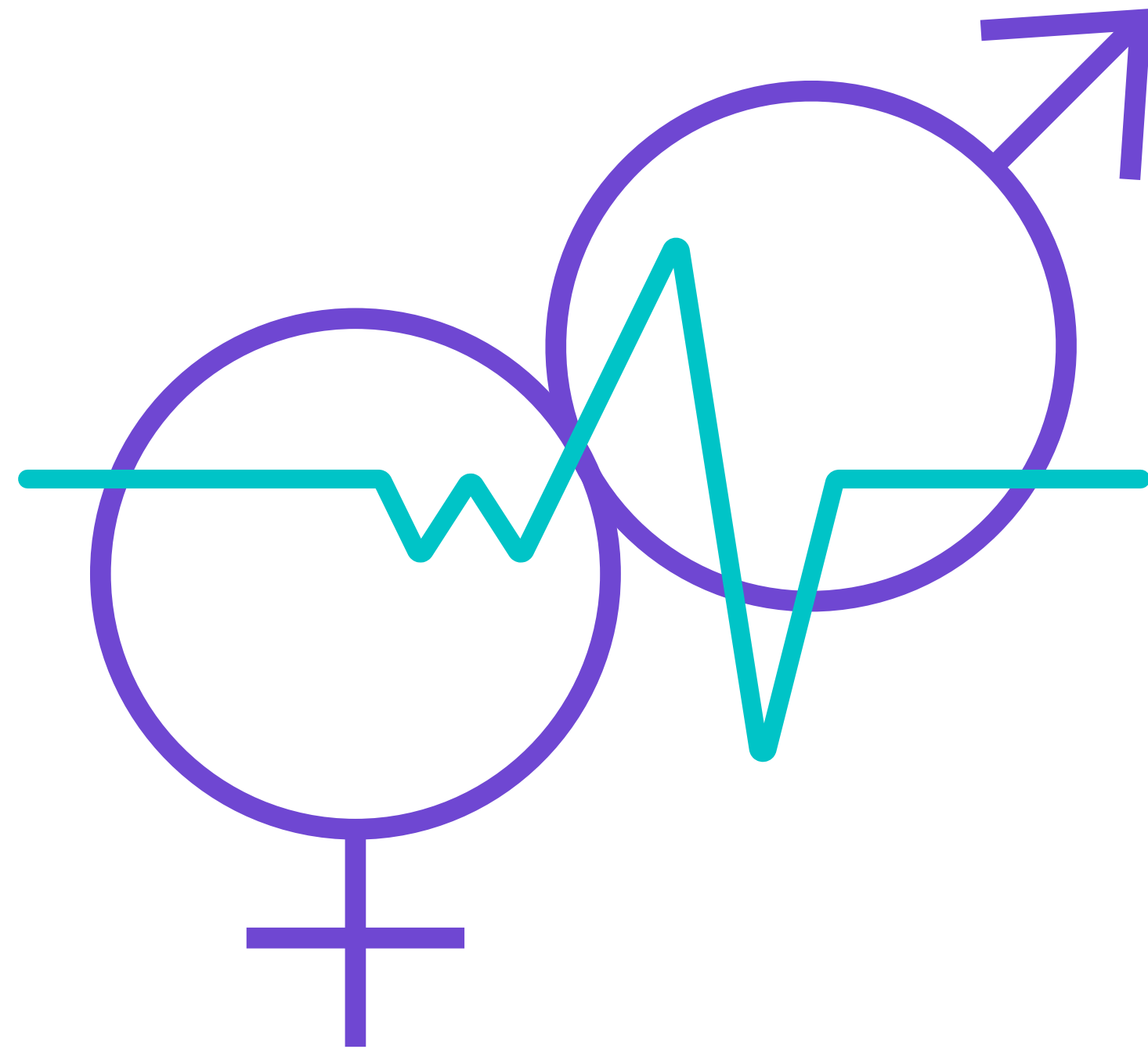


Glenn Warry

Glenn Warry has worked in professional sport for over three decades in club management and national player/coach development roles in all football codes. Glenn specialises in designing learning, development and well-being strategies that support high-performance environments for athletes and coaches, within sporting organisations, corporations and learning institutes. Glenn has created and managed programmes that support the professional development and well-being of elite athletes, within the Macquarie University Elite Student Athlete Program, Australian Rugby (State Unions/Wallabies), Football Australia (A-League Men and the Australian women's national team (the *Matildas*) and was the co-founder of Football Coaches Australia.

HEALTH, PERFORMANCE AND WELL-BEING OF FEMALE PLAYERS

SEX DIFFERENCES BETWEEN MEN AND WOMEN



There are fundamental anatomical, physiological and hormonal differences between men and women. These differences go far beyond the reproductive system and the primary reproductive hormones and can affect how women and men should be managed, both in healthcare settings and in terms of sports performance.

Males tend to have more muscle mass, a lower proportion of body fat and larger and stronger bones than women. Skeletal shape also tends to differ by sex, and this can translate into different biomechanics and movement patterns which are, in part, why predisposition to certain injury types varies between men and women.

There are some other significant anatomical differences: men have larger hearts relative to body size, a larger lung capacity, and a higher breathing rate when compared to women. Furthermore, metabolically, males tend to have a higher basal metabolic rate as a result of their greater muscle mass and different body composition (less body fat). Accordingly, they tend to have higher overall energy expenditure, which means they need more fuel. Importantly, though, there are differences in optimal macronutrient and micronutrient needs for both health and performance between men and women. For example, women need more iron than men and women utilise more fats as energy at lower intensities of exercise, both of which have implications for the dietary needs of individuals.

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However, this is significantly influenced by hormonal status and therefore varies across the menstrual cycle (as well as the whole female hormonal life cycle (Figure 1). Immune differences also exist, which can translate into altered susceptibility to certain disease types or infections, whilst neurobiological differences mean that brain activation and information processing can also vary between sexes. This can potentially influence optimal communication styles, learning environments and feedback methods. This list of differences is by no means exhaustive and, whilst it is important to appreciate that there is substantial individual variation, these points highlight the importance of learning about female physiology to train women appropriately to support optimal health and performance.

The significant changes in reproductive hormones through the female life cycle (from puberty through to post-menopause) involve a more nuanced approach to ensure optimal player care and support, and to maximise performance whilst also mitigating the risk of compromising health. Such differences need to be better appreciated.



FEMALE HORMONES

The **female hormonal life cycle** (Figure 1) is characterised by **several milestones in which sex hormones**, especially the ovarian sex hormones, **oestradiol** (a form of oestrogen) and **progesterone**, are critical. These **life stages include childhood, puberty, reproductive years**, possible **pregnancy, perimenopause** and the transition into post-menopause. The menstrual cycle typically starts between the ages of 9 and 15 years, and the menopausal transition typically starts between the ages of 45 and 55 years, although there can be variations.

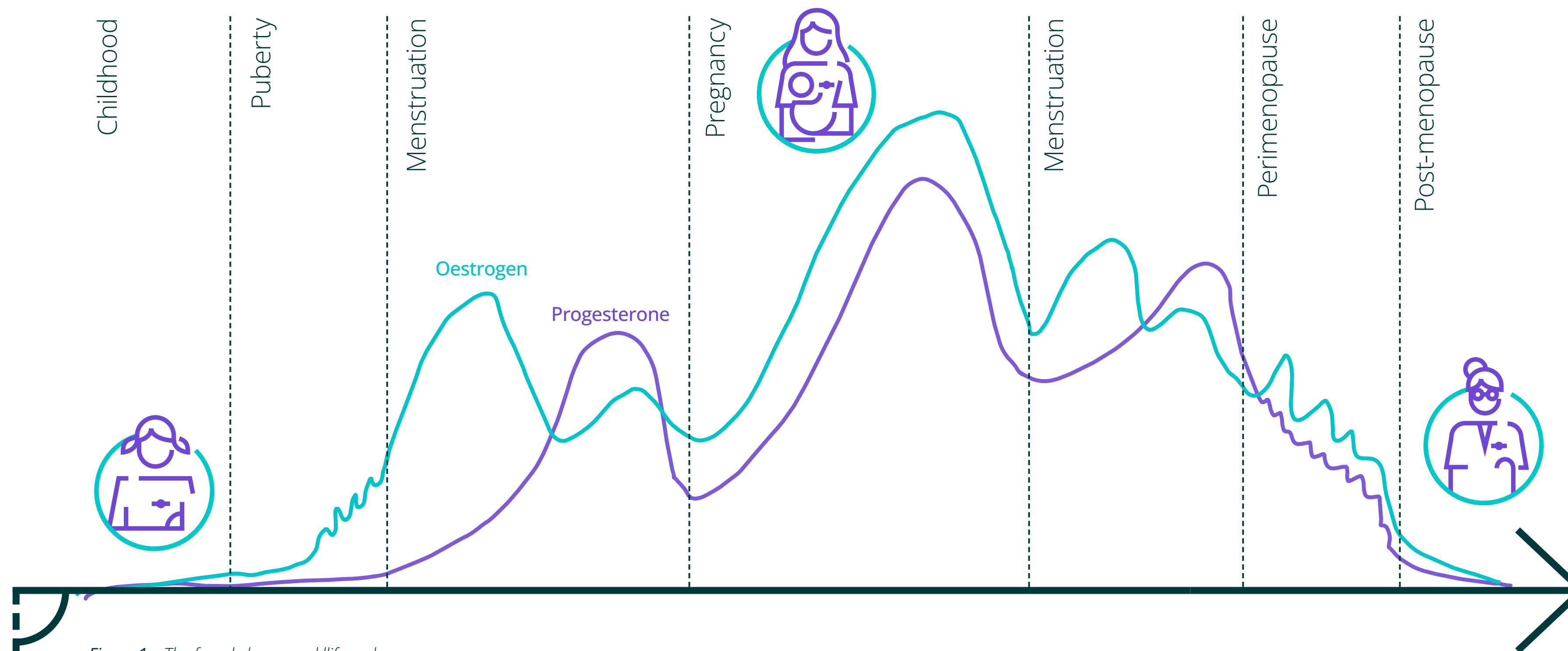
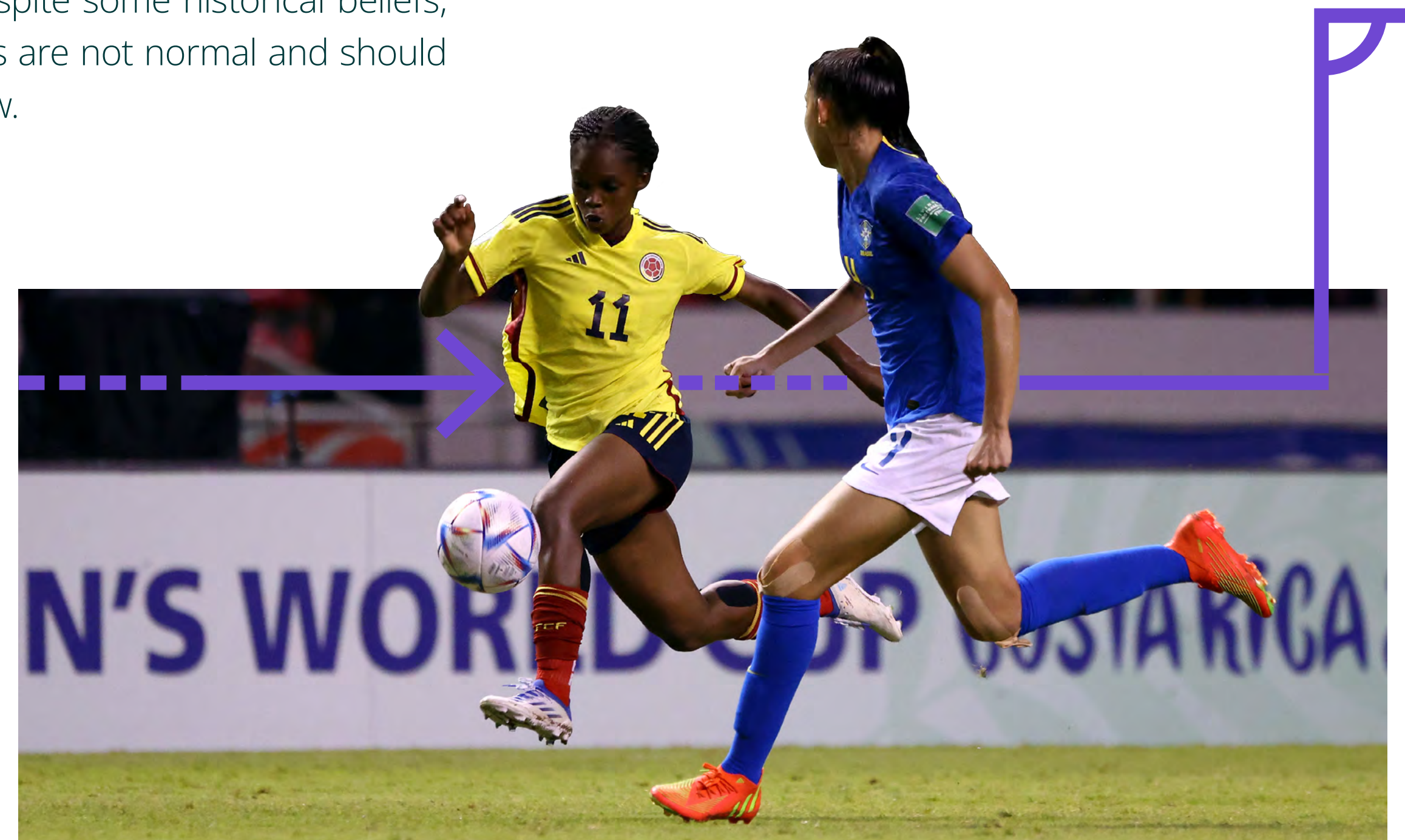


Figure 1 – The female hormonal life cycle

The reproductive years are characterised by ongoing fluctuations of oestrogen and progesterone (Figure 1). Pregnancy, the use of a variety of hormonal contraception types and various medical scenarios can substantially alter these patterns. The non-linear increase in hormones during puberty and the non-linear decrease in hormones during the perimenopausal years pose further challenges to systemic physiology and warrant individualised and proactive approaches to the management and support of women. Whether during a typical menstrual cycle or through significant life cycle transitions, it is critical to recognise that an individual's response is unique. It is advisable to track and monitor the menstrual cycle on an individual basis to learn more about the individual, and to enable the identification of alterations in the cycle or abnormalities. It is important to acknowledge menstrual cycle dysfunctions, particularly in the athletic population where research suggests that forms of dysfunction may be more common than in the general population. The most common dysfunctions are anovulation (not ovulating), oligomenorrhoea (infrequent periods), hypomenorrhoea (light bleeding), amenorrhoea (absent periods), menorrhagia (heavy bleeding) and dysmenorrhoea (painful periods). These may all present individually or in combination. They can have causal factors such as disease processes (e.g. polycystic ovary syndrome), can be genetic, and can often be “momentary”,

reflecting a time of increased stress. The latter can be related to several factors (“stressors”), such as suboptimal nutrition, psychological stress, training load, game load, insufficient recovery, travel and other environmental factors. These can place players in a state of low energy availability, which can be associated with significantly adverse outcomes such as impaired athletic performance, increased risk of injury, iron deficiency anaemia, compromised sexual function, uterine health, fertility, bone health, cognitive measures, anxiety and mood, and their presence suggests that medical input should be sought. Importantly, and despite some historical beliefs, irregular and absent menses are not normal and should be flagged for medical review.



SYSTEMIC EFFECTS OF HORMONES

Female sex hormones have wide-ranging effects on health and can impact overall physiological function, so their actions are not isolated to the reproductive system. For example, numerous research studies, albeit mostly in non-athletes, have demonstrated the impact of hormonal changes through the menstrual cycle on metabolic action, muscle and cardiovascular function, and susceptibility to certain infections. These have the collective potential to affect wellness, readiness to exercise and recovery from exercise. Furthermore, in response to significant hormonal changes, such as in the premenstrual phase (i.e. just before a female's period) or just before ovulation, experiencing symptoms is common (these can be both positive and negative).

Research suggests that 83-93% of female athletes experience menstrual cycle-related symptoms.^{1,2} The most common symptoms include menstrual cramps, fatigue, mood changes, lower-back pain, bloating, cravings, breast pain, low energy and disturbed sleep. These

clearly have the potential to impact exercise performance, recovery and, ultimately, quality of life. Therefore, a proactive and multidisciplinary approach to management can increase player readiness and wellness. With the right preparation, and in the absence of underlying menstrual pathologies, women should be able to exercise and perform on any day in their cycle.

For best practice, an informed, female-centred, multidisciplinary approach should be applied to high-performance environments.

Whilst there is still a clear need for more research and understanding of the optimal preparation of female football players, the following sections will highlight the existing body of research evidence and the female-specific considerations for the key pillars of performance and player care.



PREGNANCY AND POST-PARTUM



Pregnancy and return-to-play (RTP) postpartum remain relatively uncommon occurrences among female athletes.

Prime athletic careers coinciding with peak fertility age; the lack of accessible information and guidance; poor experience and knowledge amongst performance and medical teams; and logistical difficulties in returning to sport whilst caring for a baby are all examples of barriers to pregnancy and RTP in female athletes.

Regardless of physical status, pregnancy is a period of substantial physiological adaptation that supports the development of a new life. These adaptations are regulated by hormones and cause wide-reaching systemic changes to help the body support the developing foetus and prepare for birth. An appreciation of these changes, their impact on exercise physiology and of possible symptoms and medical and/or obstetric complications is important when supporting players. Training objectives should be altered to reflect these where relevant. In the absence of any contraindications, there is clear evidence of the benefits of physical activity to the mother and baby during pregnancy and, as much as possible, players should be encouraged and supported to maintain activities that will facilitate RTP.

Careful planning and multidisciplinary involvement are required to ensure frequent monitoring by experienced medical professionals throughout.

As the player progresses through pregnancy, there will be an increasing need to modify activities. Mental health and well-being, pelvic floor function and preparation for birth and early post-partum recovery are some of the key considerations. The post-partum period is a critical phase for the health and well-being of mothers and newborns.

For the mother, it provides many physiological and psychological challenges, including physical and mental recovery following birth; huge hormonal changes; possible severe sleep disruption; often unpredictable and changing feeding schedules; altered family and professional relationships, to name but a few.

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HEALTH, PERFORMANCE AND WELL-BEING OF FEMALE PLAYERS

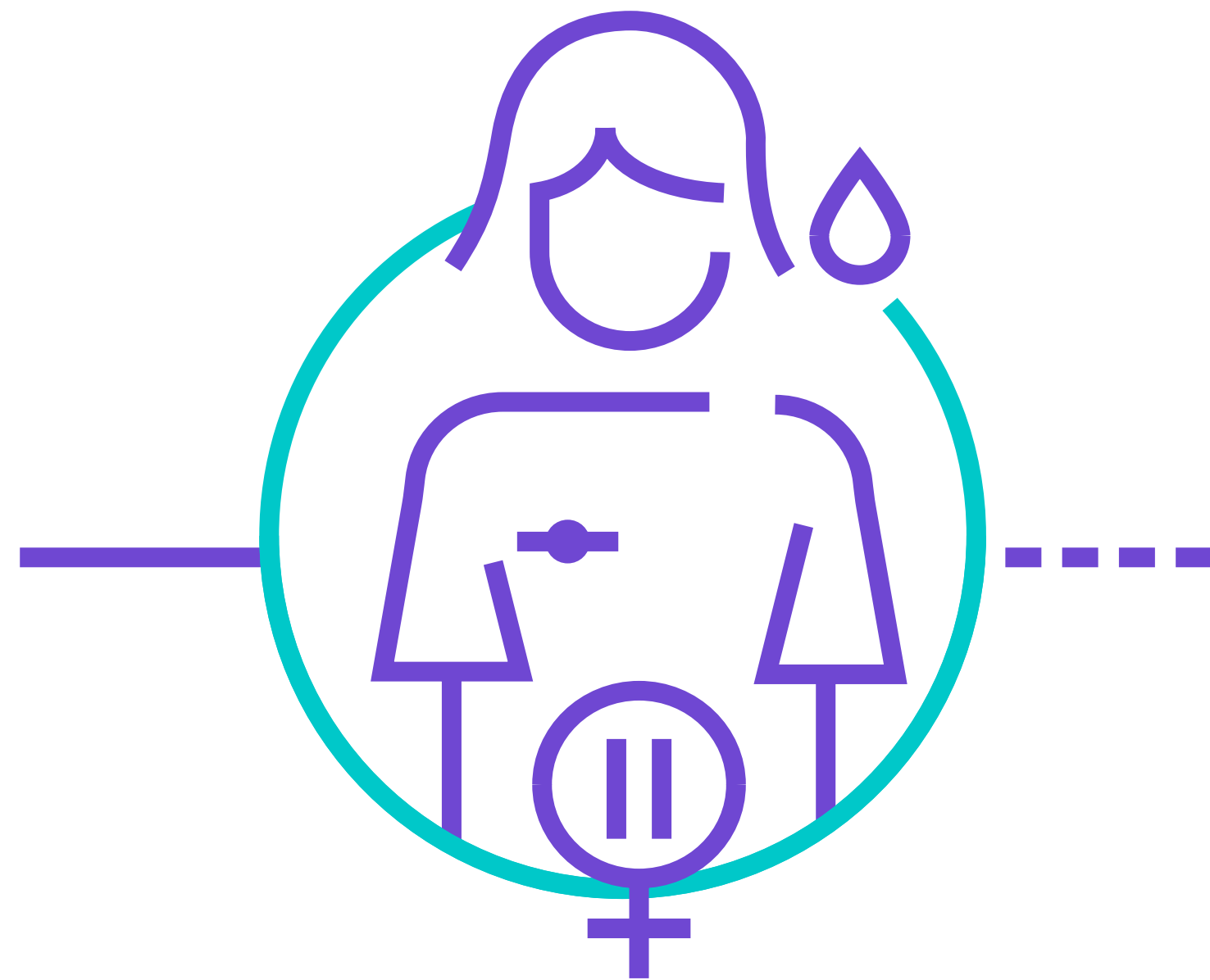
When considering returning to exercise-based activity, it is important to both anticipate and respect the potential disruption a player will face early on in their post-partum recovery. It is also important to recognise where early supportive intervention and appropriate levels of physical activity will aid recovery and prepare the player for successful RTP. The recovery timeline will vary based on a number of factors, such as the mode of delivery, complications during pregnancy or birth, overall physical and mental health and sleep/nutrition status. The RTP timeline will be influenced by early-phase recovery and the successful development of position-specific load capacity. A return to baseline performance metrics (or better) and adequately accrued workload without ongoing symptoms are required to minimise injury risk where evidence suggests many post-partum athletes return to sport early and sustain significant musculoskeletal injury. A number of more high-profile examples in football have recently demonstrated that it is possible to have children and safely return to competitive match play post-partum at top level. Access to appropriate guidance and multidisciplinary support is fundamental. Whilst data and published guidelines remain scarce in a football setting, information is emerging across various sports that can assist players and their performance-medicine teams in managing pregnancy and RTP as part of a wider, specialist MDT. It is important to recognise that each pregnancy

and each athlete is unique and, whilst key considerations can be recommended, it is essential to approach each player individually. At every stage, teams are encouraged to seek open dialogue with players and facilitate team-wide education and a normalising culture, in order to support effective, player-centred communication and clear forward planning for pregnancy and post-partum RTP as an MDT and wider sporting institution.

With all of this in mind, until recently, pregnancy either spelled the end of an athletic career, or resulted in players feeling isolated. With major advances in our understanding of the physical, emotional and social impacts of exercise in the perinatal period, mothers who are athletes can now return to their pre-pregnancy best, if not better, providing they are well supported.



MENOPAUSE



Menopause is a normal developmental transition that all women undergo as they age, marking the end of their reproductive capability.

It is defined by loss of ovarian follicular function, for 12 consecutive months, that is not as a result of other medical issues. For most women, menopause occurs in the fifth and sixth decades of life. However, this can occur earlier, naturally, or due to a variety of health issues or medical interventions. Menopause is preceded by perimenopause, which can occur up to eight years prior to menopause and is marked by declining or fluctuating ovarian sex hormone levels. As with most areas relating to female health, more research is needed focusing on perimenopausal and menopausal athletes; however, the hormonal changes do warrant extra consideration to ensure athletes are being supported and prepared optimally.

The non-linear decline in ovarian sex hormones during the perimenopausal transition often results in menstrual irregularities and the onset of symptoms, with approximately 80% of women experiencing symptoms during menopausal transition, which are severe in about one third of cases. The symptoms of menopause include vasomotor symptoms (hot flushes and night sweats),

sleep difficulties, fatigue, mood changes, anxiety, palpitations, a low libido, vaginal dryness, dyspareunia (pain during sexual intercourse), bladder symptoms (frequency, urgency and incontinence), brain fog, joint/muscle pains and changes to eyes, skin, nails and hair (usually dryness). Interestingly, current research suggests that there are racial/ethnic differences in reported vasomotor symptoms. Though vasomotor symptoms are very common in Australia, North America, and Europe,^{3,4} Asian women report fewer such symptoms and African American women tend to have more frequent hot flushes compared with white women.^{4,5,6,7} These cultural differences have been explained by differences in the attitudes towards, and the significance given to, menopause, such as the extent to which menopause is medicalised or considered a natural phenomenon.³

In addition to racial and ethnic variations, the frequency/severity of hot flushes may be influenced by education level, physiological differences, genetic predisposition and diet.

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HEALTH, PERFORMANCE AND WELL-BEING OF FEMALE PLAYERS

Whilst 70% of women report vasomotor symptoms, only 30% seek medical support.^{8,9,10} This clearly highlights the need for more education and awareness of menopause-related symptoms and proactive management strategies.

Any medical intervention should be managed by medical professionals, but having a healthy balanced diet and regularly participating in physical activity are well-regarded management strategies for symptoms. Such strategies are also beneficial for cardiovascular, muscle and bone effects, amongst other things. In terms of specific exercise and nutrition guidelines to support health and performance, there are a number of proactive approaches that can be taken, based on the existing body of research. For example, including low-volume high-intensity interval training may be beneficial for improving muscle function and cardiopulmonary function. Focusing on pelvic health and incorporating specific exercises into training programmes as well as ensuring protein, calcium and vitamin D intake is sufficient to support tissue and bone health and repair are also likely to be beneficial.



STRENGTH AND CONDITIONING

Background:

Football is an intermittent, high-intensity contact sport involving technical and tactical skill, underpinned by aerobic and anaerobic physical qualities.

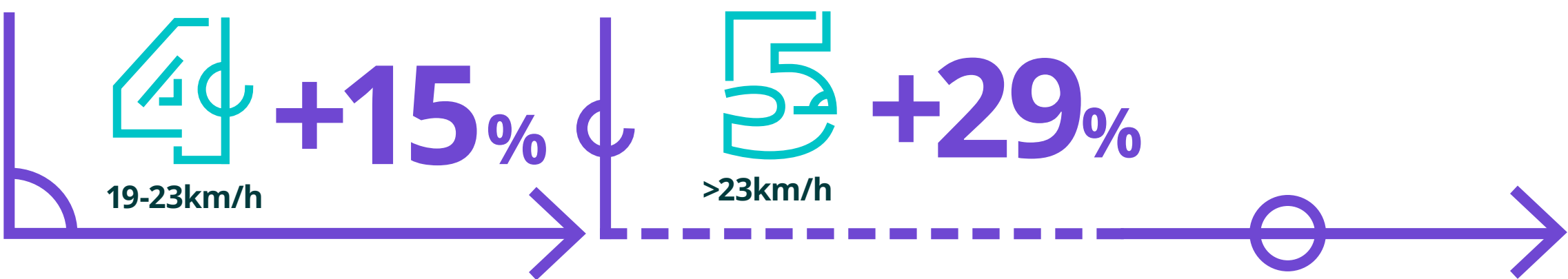
The physical, physiological and psychological demands require players to have endurance, speed, agility, strength, muscular endurance, balance and power, which are achieved through the planning and implementation of a strength and conditioning programme. Although gender equality has garnered recent attention with respect to exposure, conditions and professionalism in sport, women are largely underrepresented in the scientific literature surrounding this area. The physical match demands for elite players are increasing,¹¹ and this was highlighted in the report conducted by FIFA comparing the physical match demands of the 2015 and 2019 editions of the FIFA Women’s World Cup final tournaments.¹²

On average, players covered 29% more distance and completed more efforts in the top-speed zone in 2019 compared to 2015. Distance covered in this speed zone was 18.6-47.3% higher across all positions, and this was especially evident for wide midfield players (47.3%) compared to 2015.

It is therefore vital that coaches prepare players optimally for the increased intensity and density of match play we are seeing in the modern women’s game.



DISTANCES IN ZONES 4 AND 5
Increase from 2015 to 2019



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Female-specific considerations

On average, males have a greater quantity of skeletal muscle mass, which alongside longer segment lengths, contributes to the major performance differences, such as approximately 40% higher peak power and 30% greater mean power during sprint exercise compared to females.¹³

However, it is of interest from a football training perspective that women have a greater proportion of type I muscle fibres,¹⁴ lower glycolytic capacity and increased fat oxidation compared to men.¹⁵ Accordingly, female players likely have greater muscle oxidative capacity and lower reliance on glycolytic pathways following all-out exercise, owing to accelerated oxygen uptake kinetics (moderate intensity), enhanced mitochondrial function and higher capillary density per unit of skeletal muscle. Additionally, female sex hormone levels in eumenorrheic women can change by 100% in a 24-hour window of time,¹⁶ and it is these sharp alterations in sex hormone levels that can be associated with adverse, often detrimental, symptoms.¹⁷ These can be exacerbated if not managed carefully and proactively on an individual basis, always being mindful that a player needs to be able to play and perform on any given day.

Understanding the differences that exist in female physiology will allow clinicians, practitioners, technical staff and coaches to enhance female players' experience through a thorough recognition of their musculoskeletal and cardiovascular strengths. As we highlight the sex-related differences in football, this information will serve as a valuable tool in scientifically structuring strength and conditioning and the periodisation of training load to optimally prepare and support the individual player.



As the physical match demands of the women's game continue to evolve, it is incumbent upon the scientific community to fully embrace and understand the nuances of the female game and provide valid and reliable recommendations to the broader football community.

RECOVERY

Background:

The increasing physical demands and density of match play in the women's game¹² has meant that recovery is of paramount importance.

It is common for games to be played every three to four days for adult players, whilst some youth tournaments involve multiple games on the same or successive days (albeit with reduced playing time). Since research evidence suggests that players are still not fully recovered after 72 hours, recovery strategies are essential to accelerate players' readiness. With regular episodes of insufficient recovery over time, there is the potential for reduced performance, an increased risk of injury and potential overtraining or associated presentations of fatigue. The implementation of optimal recovery processes can lead to reduced stress and fatigue, accelerated recovery time, increased potential for physiological adaptation and optimised player readiness. The fundamentals of recovery include adequate hydration, refuelling, and sleep quality and quantity. Other modes of recovery, including cryotherapy, contrast bathing, stretching, compression, massage, meditation, pool recovery and mindfulness tools,



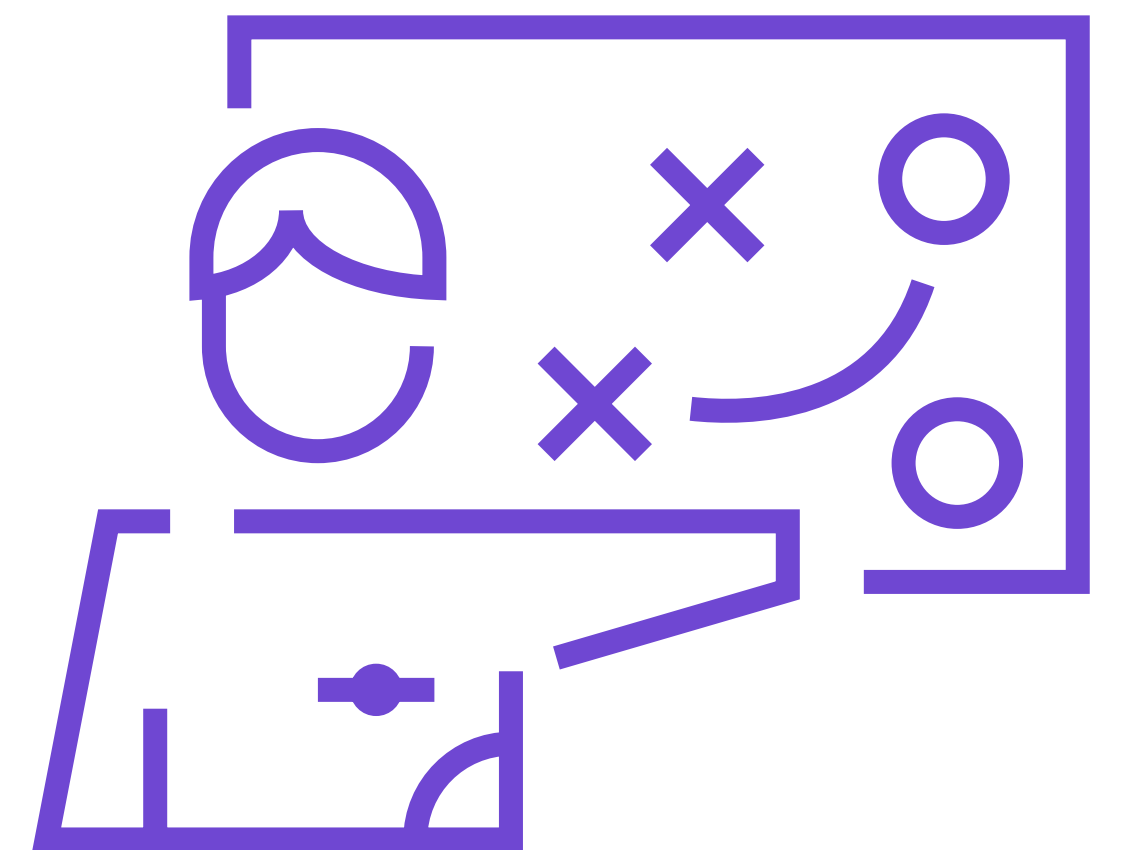
can be introduced once players have adequately executed the fundamentals. To make an informed decision on an appropriate recovery intervention, the type of fatigue and resulting performance decline (and timeline) should be determined where possible. Additionally, the “window of recovery”, the cost-benefit of the intervention and the athlete’s belief in the recovery strategy should be ascertained. The mantra of “do no harm” must be at the forefront of the intervention. It is also important to determine if an intervention is needed at all, and whether performance decrements can be adequately resolved in the time window, hence the need to consider a periodised approach to recovery strategies to ensure that adaptation windows are maximised. Player education is essential to maximise the efficacy of recovery interventions that incorporate physical, mental and emotional components. Educating athletes, coaches, parents and support practitioners will instil confidence and belief in the interventions that are applied. Whilst interventions should ideally be evidence-based, individual preference is an important consideration to increase the likelihood of a positive outcome. Recovery strategies also have the potential to indirectly reduce the presence and/or magnitude of menstrual cycle symptoms by alleviating compound stress, but these should be individualised and considered in parallel with training load, fixture congestion, travel, psychological load and other external stressors.

Female-specific considerations

There is evidence to suggest that women have greater resistance to fatigue and a superior ability to recover metabolically than men during repeated, maximal-intensity intermittent sprinting, as well as between repeated high-intensity sessions.^{18,19}

The reasons for this are likely multifactorial and, as with most areas of female performance, further research is needed to better understand the mechanism. As highlighted in the strength and conditioning section, women have a greater proportion of type I muscle fibres,¹⁴ lower glycolytic capacity and increased fat oxidation.¹⁵ Furthermore, Krustup et al. (2021) found players to have a marked glycogen depletion in both fibre types. However, this was less than previously witnessed in male players, suggesting lower muscle glycogen utilisation. The researchers also found that during intense periods of match play, muscle lactate accumulation and use of phosphocreatine were lower than in men²¹ and might contribute to shorter recovery windows.

Furthermore, reproductive hormones (endogenous and/or exogenous) can also have an effect on this and have the potential to mitigate or amplify the physiological stress response. Oestrogen has anti-inflammatory and antioxidant properties which could be beneficial in speeding up recovery times; conversely, premenstrual hormone withdrawal may present an increased challenge, as this is not only associated with adverse symptomology, which can be detrimental to recovery (e.g. sleep disruption), but also triggers the release of inflammatory biomarkers that can elongate the recovery window. However, these are likely to be highly individual, so monitoring and tracking is recommended.



NUTRITION AND HYDRATION

Background:

Nutrition is a crucial part of optimising health and performance amongst football players.

As highlighted in the recovery section, nutrition and hydration, along with sleep, are fundamental for optimal performance and recovery of players in preparation for match play.

It is now well established that food, hydration, dietary supplements and specific nutritional strategies can improve performance, accelerate recovery and reduce injury risk in football players.²²

Player performance and training adaptations are linked to the adequate and periodised intake of energy and macronutrients. The focus for players should first be on the quantity (amount of energy (kcal) consumed) and quality of nutrients (carbohydrates (fuel), protein (to rebuild and repair) and fats (to help with vitamin absorption, hormones, and fuel), to optimally fuel for and recover from training and match play.



Optimal hydration is a key factor to support peak performance during training and match play, and this becomes compromised when training and competing in environmentally challenging conditions. Numerous factors play a part in optimal hydration, such as sweat rate, environment, training intensity, duration, body size and body composition. To avoid the negative consequences associated with dehydration, providing the right type and volume of fluids and carbohydrates before, during and after training and match play can optimise a player's performance and recovery. This can be subjectively tracked by monitoring urine colour, giving players immediate feedback.

High-level training and match demands may increase the turnover rate of vitamins and minerals. Micronutrients (vitamins and minerals, specifically vitamin C, vitamin D, calcium, iron, magnesium, zinc, folate and B vitamins) are therefore vital for health, to protect against illness and for general well-being. With this in mind, ensuring a good intake of fruit and vegetables is important to meet these demands; players should aim to consume more than five portions per day. Vegetarians, vegans, and/or players who do not consume meat, eggs, and/or dairy in their diet are at risk of insufficient protein intake, vitamin B12 and iron deficiency and must be supported individually. Although a "food-first" approach is optimal, certified dietary

supplements can also be used to optimise intake, but should only be taken following consultation with a qualified dietician or medical professional.

Female-specific considerations

Most nutritional recommendations, interventions and trials have been conducted on male players. Few studies to date involve female players and more research is needed.

Not only do macronutrients and calories needed differ between men and women, but they may also differ across the menstrual cycle and the different stages of the female life cycle (premenopause, pre-/post-partum, lactation, etc.).

The changes in reproductive hormones across the menstrual cycle have been found to mediate aspects of carbohydrate and fat metabolism at rest and during exercise at different times in the cycle.²³



For example, the early follicular phase (low oestrogen and progesterone) is associated with lower muscle glycogen levels. The body is more reliant on glucose as a fuel source at this time and storage is more challenging, so increasing carbohydrate intake may be warranted, especially if training volume and intensity is high and recovery time is reduced. In the luteal phase, where oestrogen and progesterone are both high, there is a decreased ability to replenish and store muscle glycogen. This can be offset by increasing carbohydrate consumption during training and match play. During this phase, muscle protein breakdown may also be elevated, requiring more attention to pre-/post-exercise nutrition to reduce muscle soreness and optimise recovery. Additional considerations around total intake, timing of intake and specific macronutrient intake also need to be factored in around the menstrual cycle and with hormonal contraception. Hydration needs, and the onset of thirst, also vary between and within men and women.

There are changes across the menstrual cycle, with greater sweat rates occurring in the high hormone luteal phase, possibly increasing the risk of dehydration in this phase. Sweat-rate and hydration monitoring is therefore advisable. Following best practice around optimal dietary behaviours is particularly important in preparation for, and during, menstruation.



SLEEP

Background:

Sleep is one of the most underrated forms of recovery and is an essential physiological process for an athlete to recover from, and adapt to, the physical and mental demands of football training and match play.²⁴

Due to the increasing intensity and match density of match play observed, especially at elite level, recovery is even more important to prepare players for subsequent training and match play. Additionally, football presents specific sleep challenges, including frequent late-night matches and travel across multiple time zones. Managing travel fatigue and jetlag can be important factors when optimising football performance and reducing injury risk. Additionally, a dose-response relationship exists where insufficient or poor-quality sleep results in increased fatigue and negative performance outcomes. Despite there being an increased risk of sleep problems amongst athletes, there are numerous strategies that they can proactively try, including creating a sleep routine, timed bright light, reducing screen time and/or

using blue light glasses, temperature manipulation prior to sleep, cognitive behavioural therapy for insomnia, pharmaceutical aids and continuous positive airway pressure for obstructive sleep apnoea. Increased recognition of the importance of sleep from sport professionals and screening for sleep disorders and disturbances are important to contribute to optimal health, well-being and performance in athletes.

Additionally, sleep education should be implemented for individual player support, behaviour modification and ultimately to enhance the recovery cycle of players.



03

HEALTH, PERFORMANCE AND WELL-BEING OF FEMALE PLAYERS

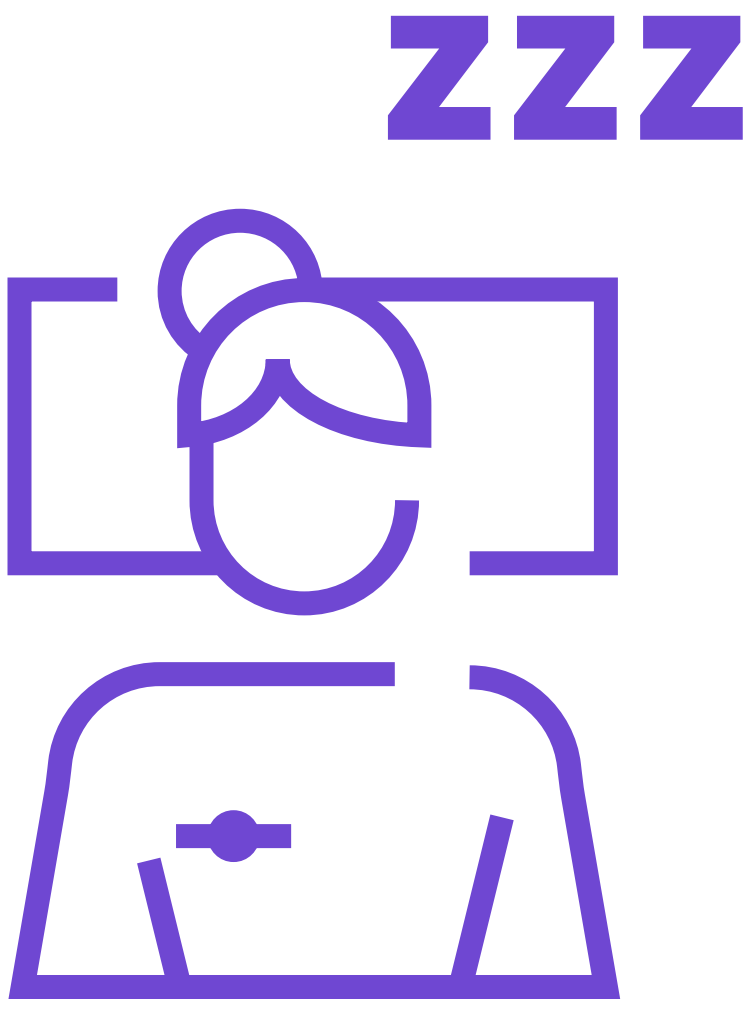
Female-specific considerations

Current knowledge about the importance of sleep is based largely on research in men.

However, sleep and circadian rhythms are altered in association with the hormonal changes in the menstrual cycle and in the presence of menstrual-associated disorders.²⁵ The cyclical variations in reproductive hormones through the female life cycle may have an effect on mood, body temperature, respiration and potentially sleep quality and/or quantity. In fact, sleep disruption and fatigue are common menstrual cycle-related symptoms reported by athletes. In addition, symptoms such as anxiety, headaches, cramps and/or breast soreness may influence sleep characteristics, and the potential discomfort associated with using sanitary products and the need to change these can also disrupt sleep. With ovulatory cycles, and with the associated changes in oestrogen and progesterone in particular, there are changes in body temperature and effects on subjective and objective measures of sleep that have been described in scientific reviews on the menstrual cycle and sleep.^{26,27}

Increased sleep latency, an increased number of sleep awakenings and reduced sleep quality in the premenstrual phase and during menstruation is commonly reported in women.^{28,29}

It is important to identify individual players who have sleep disruption and to provide support in developing individual routines in an attempt to improve sleep quality and, ultimately, improve recovery aiming to enhance performance.



INJURY REDUCTION AND MOVEMENT

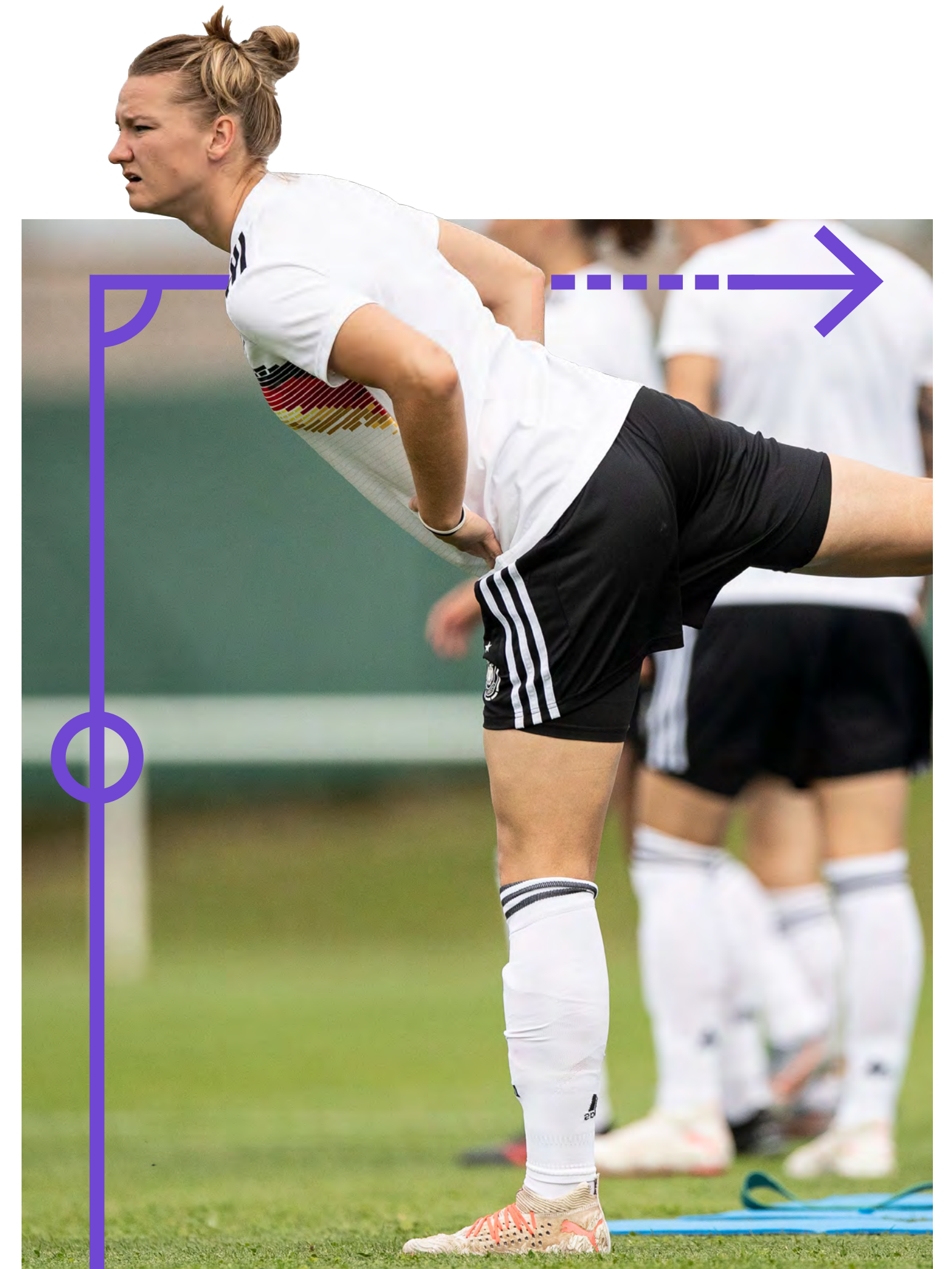
Background:

Various factors can significantly influence the development of movement and motor skills, as well as the risk of injury in female footballers. As the women's game continues to grow, it is essential to consider the psychological and sociological influences women encounter and manage. It is equally important to examine how these factors interact with physical development and game demands, affecting skill development and injury risk.

The development of a successful football programme for men or women requires a multifactorial and complex sequence of tactical, technical, physical, individual and organisational attributes. Much like football success, non-contact injuries cannot be narrowed down to a single cause. However, the system and society in which women and girls play and are developed as footballers are not the same for men and boys. Our understanding of the injuries affecting women and girls playing football must therefore begin with understanding the system in which they develop.

Additionally, it is critical to understand the interdependent components of anatomy, physiology, neurocognitive ability and learned behaviour that come together to form movement and skill in female footballers.

Due to certain sex-specific characteristics, special considerations need to be taken into account regarding breast health, the pelvic floor, and hormonal changes associated with the transition from puberty and through all stages of a women's life and their football career.



Female-specific considerations

Overall, the reported injury risk according to “time loss” for women’s football indicates that lower-limb and head/neck injuries are of the greatest concern.³⁰ Specifically, the knee, thigh and ankle have been identified as commonly injured areas.^{30,31} It is reported that women are approximately twice as likely to sustain an anterior cruciate ligament (ACL) injury.³² Furthermore, it is noted that most of the current research focuses on head/face and knee locations.³³ In collegiate women’s football, the risk of lower extremity injuries is reported to be three times higher in games than in training sessions, at rates of 11.25 injuries/1,000 game hours and 3.07 injuries/1,000 training session hours.³⁴

In elite club and international women’s football, the risk of injury is substantially higher during matches than in training, with the “time loss” match injury incidence rate reported to be six to seven times higher in games versus training.^{30,31}

Higher intensity actions during match play may be one reason for the increased injury rate. It is recommended that the intensity of training be evaluated to ensure that there is adequate preparation for the intensity of demand during match play.³⁰



A balance of training and competition with load management and recovery is important for mitigating player fatigue and injury risk, with a recommendation of a minimum of 48-72 hours between match play, as full recovery may not be achieved after 72 hours.

This same progressive development and balance will need to be considered as female football players move between levels of play. It is widely known that, as women and girls progress, there is greater demand during games in terms of total distance covered and distance covered in higher speed zones, but there is still a need for greater understanding of game demands (and therefore physical requirements) at lower levels of play.³⁵ Furthermore, the greatest challenge may be the constantly rising requirements to play at international level as the quality and intensity of the game rise for women.¹²

Given the persistently high rate of ACL injuries in female footballers, it is crucial to consider the relationship between perceptual-motor skill or the ability for footballers to use game and environmental information in conjunction with their physical capability and coordination to execute football tasks.³⁶ Indeed, the combination of increasing physical demands and the rapid increases in the skills required of footballers without the corresponding provision of long-term development creates a challenge for systems developing women and girls in football. There will be a mismatch over time between rising expectations and prior development. The provision and resources will pose a challenge for female footballers transitioning between levels of play for the years to come.

Although there is a considerable amount of research on lower extremity injuries in female footballers, there is limited data on sex-specific injuries such as those to the breast or pelvic floor.



03

HEALTH, PERFORMANCE AND WELL-BEING OF FEMALE PLAYERS

One quarter of adult women cite negative consequences relating to their breasts as a deterrent to physical activity, exercise and sport.³⁷ This number doubles in adolescent girls, with 50% of them citing embarrassment and pain due to excessive breast movement as a reason for avoiding or not enjoying exercise and/or sporting activities.³⁸ Additionally, approximately 70% of adult women in the general population experience exercise-related breast discomfort, as do 44% of elite female athletes.³⁹ Breast health and breast support are therefore important issues for women and girls in sport as well as being a general female health issue. With the pelvic floor, high-impact and high-intensity activities are considered risk factors for pelvic floor dysfunction (PFD) in female players.

It is thought that the stress and increased intra-abdominal pressure (IAP) from high-impact forces as well as neuromuscular fatigue of the pelvic floor musculature may contribute to PFD in female players.

Rebuilido's 2018 study⁴⁰ suggests that morphological changes of the pelvic floor muscles, hypermobility joint syndrome, disordered eating and displacement of the pelvic floor structures during high-impact/increased IAP may all negatively impact the neuromuscular activation of the pelvic floor muscles during sport, thus contributing to PFD.



PERFORMANCE WELL-BEING

Background:

Well-being refers to any psychological, physical and social states that are distinctively positive.⁴¹ Performance well-being in sport covers the effectiveness of the ecosystem that supports an athlete's holistic development so that success in sport and beyond can be achieved.

Collaboration between international researchers, practitioners and sport policymakers has resulted in the development of policies, standards, frameworks and models for “elite athlete well-being” (covering subjects such as dual career development, holistic athlete support, and athlete mental health and well-being).

Despite extensive research having been conducted into athlete well-being, it is strongly believed that the voices of female athletes articulating their experiences of professionalism and related employment are largely missing from the extant literature.⁴² Future research must explore and better understand the precarity in elite sport cultures and the gender-specific pressures that emerge through professionalisation and that are particularly applicable when connected to the challenges of female players pursuing professional careers within the global football family.⁴³

In addition, Day-Garner (2017) emphasised that further research into the professionalisation of the women's football game and its impact on female footballers' preparation for retirement is essential, as it could help to inform football associations about how to develop robust programmes to avoid a repetition of what has happened in the men's game in relation to poor transitions out of professional football.⁴⁴

Retirement is a significant time when professional female football players require an adjustment to their whole ecosystem, including their social, financial and physical environments.⁴⁵ It is therefore critical to build the capability of female football players to deal with this, not only for their own well-being but also to ensure that the engagement of future female coaches, administrators and officials can be sustained.



Danish, Petitpas and Hale (1993) proposed that elite athletes face “critical life events” throughout their sporting careers, including moving through the various elite pathways and adjusting to higher-level competition, coping with injuries, and, of course, transitioning into retirement.⁴⁶ Female football players are not afforded the same opportunities as their male counterparts in areas such as performance, transnational relocation, dual careers, athlete identity and foreclosure. There are added challenges surrounding pregnancy and motherhood and the professionalisation of sport that may have implications for how players choose to design their lives and handle the potential dilemma between starting a family and pursuing their career as a footballer.⁴⁷

Female-specific considerations

As women’s football transitions from semi-professional to professional status, many academics, sports organisations and countries have been developing systems to identify footballing talent very early in life and are finding new ways to nurture it. Typically, a player’s career starts in childhood, adolescence or early adulthood and can last anywhere between a few years and decades. A lifespan approach to well-being is valuable because it acknowledges the cumulative impact of events, circumstances and effects experienced during the life

course,⁴⁸ that is, what we expose young people to, can have long-term effects beyond their immediate experience in a high-performance environment.

As female footballers attempt to maximise their sporting talent, many different people and organisations become involved in their lives, all of whom have a stake in their development. This includes family and friends, club and national-team coaches and support staff, agents, teachers and employers, as well as personnel from sporting organisations and agencies, representatives from the media and the corporate sector, and the wider community. In their own unique way, each of these stakeholders can play a significant role in the player’s development. It is essential that their respective influences are understood, integrated and managed carefully.

Encouraging young professional players to embrace meaningful interests and activities outside of their sporting role (i.e. family, friends, education/professional development and other pursuits, such as faith, music and social enterprises) has multiple advantages, including direct and indirect benefits on performance.^{49,50,51}

A well-being ecosystem for women’s football that will support the sustainability of the game and broaden the life skills of the players is critical to their well-being, longevity, and performance.

To be successful, the focus of the football ecosystem will need to be on understanding and engaging several key stakeholders, including the World Players Association, FIFPRO, confederations, member associations and respective national football player associations, players, coaches, parents, sporting organisations and academic researchers. Vital elements of this collaboration include a strong female player voice combined with evidence-based practical application, as well as an accessible delivery platform that engages and educates players, coaches and administrators. Achieving these objectives will be further discussed in the full player well-being research paper.

TOP TIPS

04

TOP TIPS

1

Female health and performance education should be made accessible to everyone involved in the women's game. This should not be restricted to players and medical or female staff.

2

Through education, players should be encouraged to take ownership of their health, performance and well-being.

3

Female health should not be regarded as a barrier to exercise, nor should it be a topic that cannot be discussed. A safe space for communication around female health should be created. We must normalise the conversation.

4

Players should be encouraged to track their cycles and learn more about their own bodies and should be educated on what is normal and when something may be untoward.

5

An optimal strength and conditioning programme should embrace an individualised and sport-specific approach and should consider the athlete's training age, maturation status, skill level, current level of play, strength imbalances or weaknesses, menstrual status and injury history.

6

Education is key to helping the players understand the recovery process and has an impact on behaviour change to make the right choices at the optimal time.

7

It is necessary to ensure players are educated on the fundamentals of recovery, encompassing nutrition, hydration and sleep.

04

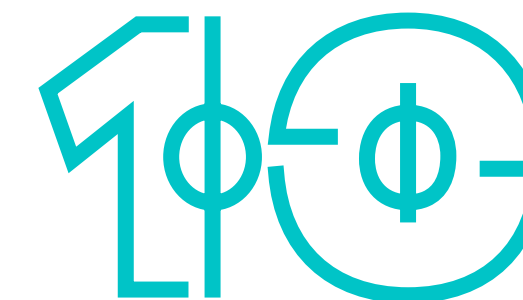
TOP TIPS



Players should be encouraged to be consistent and develop a bedtime routine, including powering down screens, ensuring the bedroom is optimal for sleep (such as temperature, black-out curtains, comfortable bed, mattress, pillow and bedding, lavender aroma/oil, no bright light/TV/phone), avoiding caffeine and relaxing the mind.



Players should be provided with simple education on fuelling for, and recovery from, training and matches. It should be noted that nutritional and hydration needs may change due to fluctuations in oestrogen and progesterone levels (whether natural or synthetic).



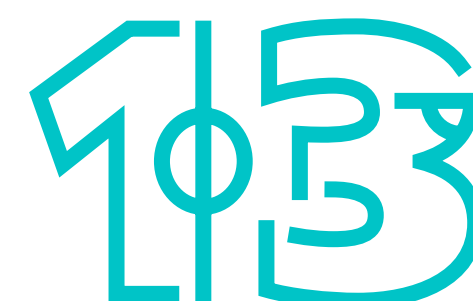
Navigating puberty can be challenging for players and their coaching staff. This is an essential part of development, and specific support and education are needed, particularly as it is more common for people to turn away from sport during this time.



Family planning, pregnancy and parenthood should be normalised. Sports organisations, coaches, staff and players need to work together to create an environment where pregnancy and being a parent are valued, celebrated and appropriately supported.



Menopause is not a disease and does not require treatment unless symptoms affect the quality of life.



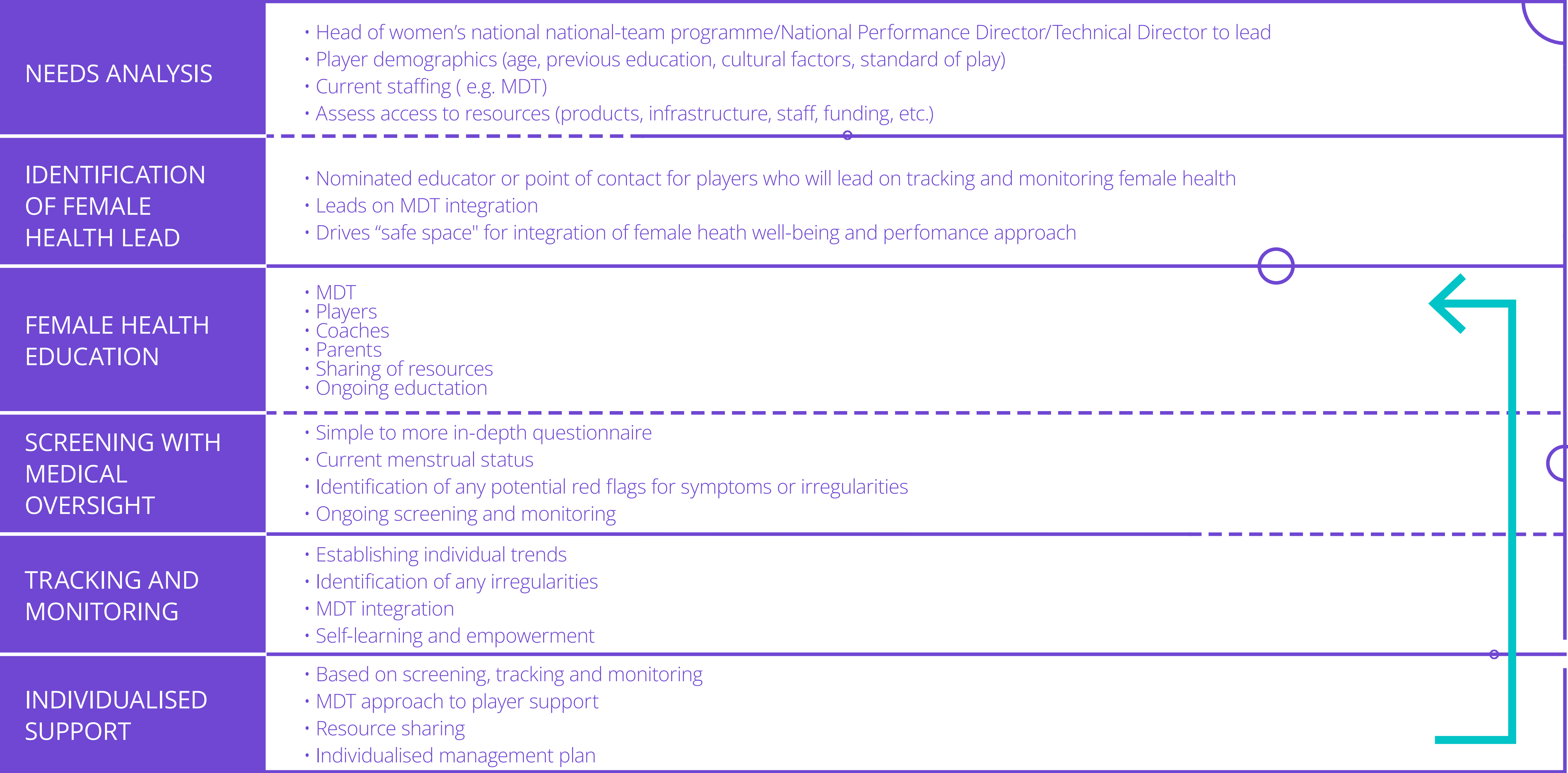
Consideration should be given to female-specific requirements, including having toilet access, adequate sanitary facilities (e.g. bins and handwash), access to menstrual hygiene products, clothing to allow for potential leakage and access to well-fitting sports bras.

CASE STUDY

APPLIED EXAMPLE OF MONITORING FEMALE
HEALTH IN THE TRAINING ENVIRONMENT

05

CASE STUDY



Below is a case study of a women’s national team that takes account of the health, well-being and performance of female players in the national-team programme. All identification markers have been removed.

05

CASE STUDY

NEEDS ANALYSIS	<ul style="list-style-type: none">• Senior women’s national national-team programme: the majority of players had no female health, well-being and performance education• MDT: doctor, coach, assistant coach, physio, sports scientist, etc.• Sanitary products available, waste disposal is adequate, no funds for blood testing or sleep monitoring and a limited nutrition budget
IDENTIFICATION OF FEMALE HEALTH LEAD	<ul style="list-style-type: none">• A female sports scientist was chosen to be the female health, well-being and performance lead• She started reviewing female health well-being and performance resources that were available and developed a journey for education for all team members (players and all staff)
FEMALE HEALTH EDUCATION	<ul style="list-style-type: none">• The female health, well-being and performance lead customised the material provided to meet the needs of their environment• The female health, well-being and performance lead delivered education to the rest of the MDT and players• Follow-up resources were shared with the MDT and players• Ongoing education and support for the MDT and players
SCREENING WITH MEDICAL OVERSIGHT	<ul style="list-style-type: none">• Players completed a short questionnaire (including questions related to mental health history and current status, hormonal contraception and symptoms)• A couple of potential medical concerns were flagged to the doctor for follow-up, who liaised with the players and referred back to the rest of the MDT when required• A plan was put in place for ongoing screening and refinement of player symptom management
TRACKING AND MONITORING	<ul style="list-style-type: none">• Players were educated on the importance of why and how to track their cycles (both endogenous and exogenous)• Some players took a few months to get into the regular habit, but good compliance was achieved by having the female health, well-being and performance lead monitoring this• The female health, well-being and performance lead regularly updated the MDT on any observable patterns or concerns (e.g. significant changes in cycles) and identified when a player may be entering a historically problematic phase
INDIVIDUALISED SUPPORT	<ul style="list-style-type: none">• The female health, well-being and performance lead works with the MDT to support the players on an individual basis to proactively manage symptoms and work with the players’ cycles• Players are involved in this process and are empowered to be proactive to support their cycles and implement this approach with their club and national teams

FUTURE DIRECTIONS

FUTURE DIRECTIONS

1

INFORM: FIFA is **committed** to developing a digital platform with information, education and resources on how to support, develop and prepare female players. The aim of the platform is to make such information accessible and to improve evidence-based knowledge dissemination.

2

RESEARCH: The demand for knowledge in female football has outpaced the current empirical evidence base⁵³ and it is vital that stakeholders commit the funding, time and resources to support further research to identify key elements impacting the health, training, preparation and recovery of female football players. This can be even more impactful by engaging more coaches, players and key stakeholders in research question development.

3

EDUCATION is key in all elements of player preparation and support to enable the players to understand their own bodies. This includes educating coaches, MDTs, parents/guardians and the players themselves. The key focus should be to “educate to empower” the players to understand and take ownership for their own health, preparation and performance.

4

DISSEMINATION of knowledge regarding female player preparation and support is crucial. Additionally, the inclusion of such focused information in coaching licences would mean that the wider community of players, coaches and support staff would have access to evidence-based knowledge and application, enabling us to support female players across the whole life cycle.

5

Be open to **CHANGE**. For too many years we have trained and supported female players based on research conducted in relation to male players/populations. It is time for change and that time is now. Collectively, we can do so much to better support our growing number of female players and ultimately support and train women as women. We need to normalise conversations around female health and embrace this, using it to our advantage instead of ignoring it or being fearful of discussing it. It is not a weakness; it is a strength.

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