

TEAM PHYSICIAN IN ELITE FEMALE FOOTBALL

– Written by Suzanne A.E. Hurman, Spain

O JOGO BONITO FEMENINO

The (more) Beautiful Game – women's football in the 21st Century. O jogo bonito feminino has risen at the speed of light during the past decade. It's an exciting time in female football with endless opportunities. Let's go on a journey! Developments in the recent past of the women's game, the elite female football world these days, a look into the bright future and all of this related to the medical world. Content based on state-of-the-art available scientific evidence and my personal view grounded on experience in the elite football field over the last decade.

One of the most visible evolutions is the number of spectators in the stadiums. As UEFA Venue Medical Manager at the Weuro 2017 we were super excited the final sold out and 28.127 fans watched Orange Lionesses become the new European Champions. During the next, 2022, Women's UEFA Euro final at the iconic Wembley stadium a record crowd of 87.192 fans were cheering on the Lionesses' victory. A few months before we played the UEFA women's Champions League quarter finale and for the first time a women's team played a match in front of fans at the Camp Nou with a world record crowd of 91.553 spectators. Within a few weeks this brand-new world record has been smashed already by a total of 91.648 spectators in the stands, the current record

ever since. Records have been scored, both in real life as on screen.

Does this increase in visibility pay off in more financial resources and opportunities? Can we see this reflected in medical care? What does this mean in terms of women's football medicine, advancing the health and performance of women's football players? Which scientific evidence is available nowadays on this topic? What do we know about injury related risk factors in elite female football. Load? neuromuscular factors? Let's zoom in to specific topic's related to the daily practice as a team physician in elite female football.

TEAM PHYSICIAN

As a team physician you take care of the physical and mental condition and medical care of the professional football players. You are responsible for the organization and functioning of the medical staff and the point of contact for the technical staff and the management regarding medical matters. In the interest of the individual player and the team, you also have an advisory function, with respect for the privacy of the individual player¹. A more detailed overview can be found in Table 1. This part of the job as a team physician is no different in elite men's football compared to elite women's football, nevertheless, the daily practice on the floor

is certainly different in specific aspects. The accents in our day-to-day work are distinct. Nevertheless, in the end it returns to the same final goal; winning games, league titles, cup trophies and the cup with the big ears. Which means for the medical staff, the pursuit of the greatest possible player availability within health boundaries. Our mission is to ensure as many healthy training hours and matches as possible. To achieve this, we place extra focus on the state-of-the-art treatment of elite athletes and on reducing the risk of injuries and illnesses. Training and performing on a healthy way are of the utmost importance for both the short and the long term². There is general recognition of increased injury risk to players who are consistently exposed to match overload. However, the wider effects of workload on players' capacity to train, develop, recover and remain mentally resilient, or to have sufficient time for their families, remains largely ignored. This is a critical issue for players' health and for the sustainable development of football³. The absence of injuries and the availability of the player to play matches is of great importance not only for the health of the individual player, but also for the success of the entire team. The UEFA Champions League injury study showed us already 10 years ago, the importance of lower injury rates because of

the association with increased points per league match, higher final league ranking and success in the UEFA Champions League or Europa League⁴.

RISK FACTORS

To prevent injuries, we first have to get clear which risk factors we are facing, which of them are non-modifiable risk factors and which we can modify. Followed by determining evidence-based prevention interventions. As non-modifying risk factors in football we have: player position, previous injury, age, genetics, sex, competitive setting, shoe-surface interaction, pre-season knee complaints specific for female footballers and early sport specialization. On the other hand, we have the modifiable risk factors and our opportunities for prevention by effective interventions. Neuromuscular factors and load are the modifiable risk factors⁵. It is often said the women's game should not be compared with the men's game. This comparison, at the medical field, is unavoidable at this time. My personal experience is based on 6 years elite men's football, in 3 different countries, and 4 years in the elite women's game. I had the opportunity to combine 2 years men's and women's elite football at the same club, followed by working two seasons fulltime at elite female football at another club in a different country. At the moment I am back at the men's field. One of the first and most striking differences that caught my attention is the clinical recovery from muscle injuries in elite female football. The physical examination improves much faster and the return to play criteria are met sooner, resulting in the fact that a player is sooner availability again for the coach. Let's zoom into the available evidence in the field of the modifiable risk factors of injuries, load and neuromuscular factors, to get to know more about the specific injuries in female football.

LOAD

Competition calendar

On average the Women's Champions Leagues club of last season, 2021/2022, had 17 training sessions and 3.9 matches each month⁶. In comparison, the men's CL teams have on average 18 training sessions and 5.6 matches each month⁷. This concerns the matches that are played in a club context, for individual football players national team duty is added. Last season, Real

Madrid CF Femenino played 52 matches (30 League, 10 Champions League, 3 Copa de la Reina, 1 Supercopa, 8 friendly matches/tournaments).

Travel load

The modern-day elite athlete typically competes in a number of international competitions and tournaments. This necessitates international travel not only for competition purposes, but also to attend training camps. Long-distance air travel across several time zones exposes passengers to travel fatigue and jet lag, which is suggested to negatively influence performance and susceptibility to illness. However, no link has yet been established for injuries⁸. From Kharkiv, Ukraine a distance a bit more than 3000 km to Kópavogur, Iceland a bit less than 3000km away from Madrid. Regarding league matches, games played outside of Madrid, include a minimum of one night stay in a hotel due to the travel hours which are generally made by bus or train. Exceptions aside, for example the match at Tenerife by plane, 2000 plus kilometers and 2 night's stay due to match time and commercial flight schedule. Not only the number of away-matches or travel distance is important, at the same time the covered time on the road to achieve these trips have to be taken in account concerning travel load. An interesting topic to investigate more in the women's field, the mode of travel often differs between the male and female elite teams of the same Champions League football club. Does this affect the recovery for the next match and if so, could smart improvements be made?

Absolute load, Relative load, rapid changes in load

High absolute training or competition load was identified as a risk factor for injury in male elite football⁹. According to the International Olympic Committee consensus statement on load in sport and risk of injury⁸, high accumulated loads have been shown to be a risk factor for injury in multiple sports, including football. It has been shown that women have different injury risk profiles compared with men¹⁰. Recently, a full women focused study has been performed. Lower extremity injury incidence and GPS workload data for elite female football players were investigated¹¹. There were no significant differences in player load, total distance, or high-speed

TABLE 1

1. MEDICAL CARE
A. PREVENTION
I. Medical examinations new signings
II. Nutrition
III. Doping
IV. Exercise Physiology
V. Football equipment and accommodation
VI. Bracing and taping
VII. General hygiene
VIII. Vaccinations
IX. Infection diseases
X. Adaptation to time, altitude and climate
XI. Mental training
B. DIAGNOSIS
I. Specific physical examination musculoskeletal system
II. Specific examination
1. Cardiac system
2. Spirometry
3. Allergic diseases
4. Respiratory tract infections
5. Concussion
6. Peripheral nervous disorders
7. Visual disturbances
8. Visual field abnormalities
9. Auditive impairments
III. General psychological examination
IV. Anthropometry
C. CURATIVE TREATMENT
I. Wound care
II. Injury treatment
1. Acute
2. Chronic
III. Pharmacotherapy
IV. Injection techniques
V. First aid
1. Sports accidents
2. CPR and AED
3. Acute head trauma
VI. Gastrointestinal problems
VII. Dermatological problems
2. COMMUNICATION
3. MANAGING MEDICAL TEAM
4. KNOWLEDGE AND SCIENCE
A. MEDICAL EDUCATION AND RE-REGISTRATION
5. SOCIAL ACTIVITIES
A. COMPLAINTS PROCEDURE
B. PROFESSIONAL LIABILITY
C. LEGAL POSITION TEAM PHYSICIAN
6. ORGANISATION
A. TECHNICAL STAFF
B. BOARD
C. AGENTS
D. MEDIA
E. WRITTEN MEDICAL STRATEGY
7. PROFESSIONALISM
A. MEDICO-LEGAL ISSUES
I. Privacy laws
B. EVALUATE PERFORMANCE OF MEDICAL STAFF
C. ETHICAL ISSUES

Table 1: College of Elite Football Doctors. The role of the specialist sports medicine physician in elite football. (College of Elite Football Doctors, 2015).



Image: Battle for the ball. UEFA Women's Champions League group A match between Real Madrid and Paris Saint-Germain.

distance acute-to chronic workload ratios between injured and non-injured players, regardless of the type of acute-to chronic workload ratios calculation. The prior 2-week, 3-week and 4-week accumulated player loads and accumulated total distances were significantly higher for injured players compared with non-injured players during the same time frames. The 1-week accumulated loads for all variables did not differ between injured and non-injured players, just like no differences were detected for high-speed distance at any time point.

Psychological load

A number of psychological variables may influence injury risk. Besides the negative life-event stress, personality variables and maladaptive coping strategies there are sports-related stress, for example feeling of insufficient breaks and rest, stiff and tense muscles, and feeling vulnerable to injuries⁸. In a prospective elite male study, recovery and stress parameters significantly predicted injuries in the month after the assessment¹². A recent systematic review about psychological factors and performance in women's football showed

a tendency for higher leveled players to score higher on psychological factors like mental toughness, conscientiousness, and executive functions. They also had lower levels of anxiety. Enjoyment and a perceived mastery climate were related to increased levels of performance and perceived competence. Mood was unrelated to performance¹³. Would recovery and stress parameters also be able to predicted injuries in the month after the assessment in elite female footballers?

INJURIES AND PLAYER AVAILABILITY

In the Women's Champions League teams, last season, 2021-2022, 60% of the injuries were training injuries, 20% of the injuries were severe which means injuries resulting in more than 28 days' absence and 42% were muscle injuries⁶. Respectively 45%, 16% and 54% in the men's Champions League teams⁷. Of these muscle injuries in the female teams the following distribution of muscle injury location have been seen; hip/groin 25%, thigh 57% and lower leg 11%. At the men's CL teams, the same percentage of hip/groin injuries have been seen, the other categories didn't deviate a lot neither from what has been seen in the women's team, with 59%

thigh injuries and 12% lower leg. A bit more traumatic injuries have been found, 54% versus overuse injuries at the women's game, last season⁶, 58/42 is the distribution at the men's teams. 71% were non-contact injuries and 7% re-injuries, respectively 77% and 10% at the men's game^{7,6}.

Absence

The average absence for training injuries among the female teams was 22 days. For match injuries this was 26 days. Looking at the men's teams the average absence for training injuries was 18. For match injuries 21 days was the average absence^{7,6}.

On average, across all female Champions League teams, each player missed 2.4 training sessions and 0.5 matches each month because of injury⁶. On the men's side each player missed 1.9 training sessions and 0.6 matches each month because of injury⁷.

Muscle injuries

As discussed earlier, in daily practice I notice, the faster return to play after muscle injuries in female football players. When we compare male and female champions league teams again, the data shows us an average absence for muscle injuries among

the female teams was 13 days. Compared with an average absence of 21 days. If this also will be a significant difference, should be investigated in the future, but this is what we see in daily practice.

Thigh muscle injuries

Zooming in on the thigh injury at the women's elite club injury study, the mean posterior thigh injury incidence for all teams was 0.9 injuries for every 1000 hours, with an average absence of 16 days. The mean injury burden was 14 days' absence/1000 hours. On the other side of the thigh, the anterior thigh, an incidence was found of 0.8 injuries for every 100 hours. The average absence for anterior thigh muscle injuries among the teams was 11 days and the mean injury burden 9 days' absence/1000 hours.

OPPORTUNITIES FOR PREVENTION

Effective interventions

Major developments have been made in the past decades in injury prevention programmes and the scientific evidence of these programmes. One of the neuromuscular training warm-up programmes is the 11+, an effective injury prevention program developed by FIFA. Designed as a complete warm-up, it can be done in place of a regular warm-up before training/games and includes specific strengthening exercises and drills to reduce the likelihood of injuries in football players. In addition to the neuromuscular training warm-up programmes, there are also effective interventions that specifically target common football injuries, for example the Nordic hamstring exercise or adductor strengthening programme. Can we copy paste these programmes to female football, do we get corresponding results? Which injury prevention programmes are working better in women? Recently, a systematic review and meta-analysis of injury prevention programmes in 11,773 female football (soccer) players¹⁰. Low-quality evidence suggests that multicomponent exercise-based injury prevention programmes reduced overall and ACL injuries by 27% and 45%, respectively. Reductions of 17%, 22% and 29% were observed for knee, ankle and hip/groin injuries, but these imprecise findings reflect heterogeneity or lack of statistical power. Exercise-based strategies (both single-component and multi-component)

reduced hamstring injuries by 60%. A recent randomised controlled trial showed that a higher compliance to injury prevention programmes resulted in a stronger prevention effect in men, but not in the female players¹⁴. Interesting.

INJURY PREVENTION, PLAYER AVAILABILITY AND THE FUTURE

Looking into the future, is this the way to go? Of course, more research should be done to injury prevention programmes in elite female footballers, nevertheless perhaps, parallel, we should zoom out, look at the bigger pictures, think outside the

'conventional neuromuscular factors' box.

Communication

For example, previous research in elite men football have proven that the communication quality between the medical team and the head coach is associated with injury burden and player availability¹⁵. The field of female football is completely different than their counterparts one. To start with the difference in sex. The whole team is female, no need to mention this. In addition, the staff has a different composition, more female head coaches and more women in the medical team. Gender differences are



Image: FC Barcelona v VfL Wolfsburg - UEFA Women's Champions League Final 2022/23.



Image: Celebration after reaching Champions League spot in the very first season they have been founded. Real Madrid CF Media. Reprinted with permission.

not only visible in communication styles, also in leadership styles and influence tactics¹⁶. The highest percentage of female head coach in elite women's football we find in Korea Republic and South Africa 57%, followed closely by England 56%, Russia 50% and USA 45%¹⁷. Will be interesting to have this research done in elite female football.

Leadership style of the head coach

There is an association between injury rates and players' availability and the leadership style of the head coach in male Champions League teams¹⁸. We already highlighted the gender differences in leadership styles, just like communication. Based on the same argumentation as above mentioned it would be really interesting to execute the exact same study in elite female football clubs.

Sleep

Trying to get some sleep during a 4-hour flight after a 9pm Champions League match, to go straight to training, because in 4 days the next league match is scheduled. Which benefits are expected to be achieved through this schedule, do they outweigh the (injury and illness) risks? Argumentation is key.

In 1980 Joop Zoetemelk spoke the legendary words: "The tour is won in bed". The winner of that year's Tour de France was

one of the first top athletes to emphasize the importance of a good night's sleep. Yet, 43 years later, the sports world often seems to underestimate the importance of sleep. Sleep loss or poor sleep quality can impair muscular strength, speed, and other aspects of physical performance. Sleep issues can also increase risk of concussions and other injuries, and impair recovery following injury. Cognitive performance is also impacted in a number of domains, including vigilance, learning and memory, decision-making, and creativity. Sleep also plays important roles in mental health, which is important for not only athletic performance, but the well-being of athletes in general¹⁹. It is recommended that coaches and support staff schedule adequate recovery, particularly after intensive training periods, competitions and travel, including nutrition and hydration, sleep and rest, active rest, relaxation strategies and emotional support²⁰.

Hormonal milieu

Hot topic in the female football world, is the hormonal fluctuations and injuries. Recent systematic review and meta-analysis about the effect of the menstrual cycle and contraceptives on anterior cruciate ligament injuries and laxity, concluded that the literature suggests that

anterior cruciate ligament laxity and risk of injury may be increased in the ovulatory phase of the menstrual cycle. However, these tendencies are not seen in females using hormonal contraception. Given the rating of very low strength of evidence, additional studies are needed to address the concerns of bias and confounding²¹. Furthermore, within a team, there will always be a big natural diversity. Natural menstrual cycles are dynamic. They can vary for many reasons and in many ways. The length of the cycle, the heaviness of the period, and symptoms experienced can all fluctuate. These variations are usually normal and healthy. Additionally, in case of use of hormonal contraception there is a wide variety of them available, with their own specific characteristics. Apart from the different phases of the cycle that each individual in the team is in. Adaptation of training and offloading of individual players around their menstrual cycle can therefore be challenging, if not impossible within an every 3-days match schedule. Communication between the player and the medical staff is crucial, menstrual cycle trackers, beside the use of wellness score have an added value. Just like the use of the wellness score, personalized approach based on the individual's situation of that day are best medical practice nowadays.



Image: Pre match picture. Continuing rise of fandom of the women's game. PSV Media 2020. Reprinted with permission.

(R)EVOLUTION

As we started with the female football fandom and the (r)evolution of o jogo bonito femenino, we will also end with it. As a team physician in elite female football, it is not about fan engagement. Nevertheless, as the fanbase increase, the ability to generate revenues increase and improvement in investment into the teams' health and performance support from academy to first team can be made. A similar virtuous circle has been found in female football regarding the type of license the head coach is required to hold by the league, pitch success and revenues. There is a direct correlation between on pitch success and the level of licence that the head coach is required to hold. 42% of teams that had won the league in the last three years had head coaches that held a Pro Licence. Additionally, the teams coached by individuals who hold a Pro Licence generally attracted a greater number of sponsors for the women's team. The benefits of a higher level of licence, which may generally be indicative of greater on-pitch performance, were also seen in the broadcast and commercial revenue generated by clubs. Those with a Pro Licence generating greater revenue across both streams than those with other licences, suggesting the greater on-pitch performance can lead to greater deal values being negotiated. This suggests that improved on-pitch performance can lead to increased interest from broadcasters and sponsors and, therefore, greater financial rewards for clubs. Football's virtuous circle¹⁷. Likewise, investing in enhancing the health and performance will allow a continual improvement and evolution of the technical, tactical, physical and mental qualities of players in a similar way as we have seen the men's game evolve. The evolution women's football has been gone true is amazing, and the possibilities and opportunities for the near future even bigger. The sky, for elite female football, is the limit!

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Suzanne A.E. Huurman M.D.
Sports Physician

Real Madrid CF
Madrid, Spain

St Antonius Hospital
Utrecht, Netherlands

Dutch National Women's
Handball Team

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Contact: huurmansuzanne@gmail.com