

S P O R T S NUTRITION



Dietary recommendations to support the health and performance of elite female match officials



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Introduction

Sports Nutrition for elite female match officials

Professional women's football has experienced a resurgence. Research led by the Union of European Football Association (UEFA) reported that there are over 1.27 million female players now registered across Europe, with growth especially prevalent in players under the age of 18. The professional game is growing in line with these findings, with the number of professional and semi-professional female players increasing by 119% over a period of five seasons (UEFA, 2016). The increased number of professional players, alongside the amplified media coverage, have been key drivers in promoting competition, and subsequent focus on performance. These advances in the professional women's game would not be possible without the corresponding development and provision of elite female match officials.

The emphasis is on the elite match official to keep pace with the evolving physical and cognitive demands of professional women's football. In response, UEFA facilitate training practices aimed at improving match official specific performance. The UEFA expert group statement on nutrition in elite football identifies that nutrition plays a valuable role in optimising performance and maintaining overall health throughout the season. Thus, appropriate nutrition practices can be integrated to support training adaptations and help the preparation, performance and recovery from matches.

The science underpinning sports nutrition is developing at a fast pace. Match officials must be attentive to new developments, as well as aware of the misinformation abundantly available. In partnership with the Gatorade Sports Science Institute (GSSI), UEFA have provided fundamental education on a 'food first' approach to supporting health and performance. This handbook is a product of this partnership, with the aim of providing practical nutrition guidelines specific to the needs of elite female match officials.



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PHYSICAL AND COGNITIVE DEMANDS OF ELITE FEMALE REFEREES

Physical demands



Distance covered per half: **5-6 km**

Average % of max heart rate during a match: **79%**

Activity changes per match: **1,412**

Distance covered per game: **10-12 km**

Metres covered per minute of a match: **105 m**

Change in activity every: **4 secs**

Distance covered during high intensity activities: **1-3 km**

Changes of direction per match: **800**

Hours of training per week: **5-7 hrs**

Cognitive demands



Technical decisions per match:

200



Game-related decision every:

2.2 secs



Number of decisions per match:

1,612

CHAPTER 2

Daily Nutrition Requirements

All the foods and fluids you consume provide nutrients which have specific roles in your body. Nutrients that are required in larger quantities are called macronutrients, these include carbohydrate, protein and fat. Nutrients for which daily intake is needed in smaller amounts are called micronutrients, these are vitamins and minerals. Different foods contain different quantities of macro- and micronutrients. The aim of this chapter is to provide a guide around how to structure your diet to eat sufficient quantities of a variety of foods. It will help you to meet your macro- and micronutrient requirements to support your health and performance.

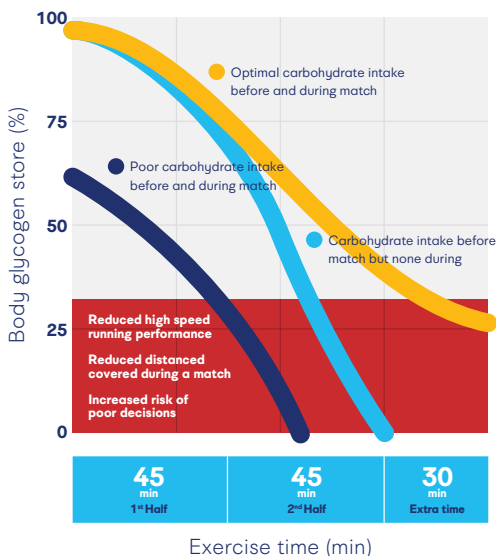
Carbohydrate

Carbohydrates include all the sugars and fibre in your diet. Fibre cannot be digested to provide energy but is important for your general health. It is recommended to eat 25 grams of fibre daily. Fibre intake can help to promote satiety, improve gastrointestinal function and support a healthy gut microbiome. The other forms of carbohydrate are digested and absorbed to be stored or used to generate energy. Each gram of carbohydrate provides 4 kcal of energy.

Carbohydrate is stored as glycogen in the muscles and the liver and is used as the main source of energy during high intensity running. During training sessions or matches, your body will use up these glycogen stores, and sometimes they may even become depleted. When glycogen stores run low, your body will begin to fatigue and feel tired which can result in an inability to keep up with play and impaired decision making.

The glycogen stores in your body can be manipulated by both diet and exercise. Increasing your glycogen stores before exercise (by consuming carbohydrate containing foods) and providing carbohydrate during exercise can delay fatigue and improve performance during training sessions or matches.

Glycogen utilisation during a match



Serving size, carbohydrate content and fibre content of foods and drinks



Sweet potatoes
 Serving size: 130 g
 Carbohydrate: ~30 g
 Fibre: ~4 g



Standard potatoes
 Serving size: 145 g
 Carbohydrate: ~26 g
 Fibre: ~3 g



Couscous
 Serving size: 150 g (cooked)
 Carbohydrate: ~56 g
 Fibre: ~5 g



Wholewheat pasta
 Serving size: 180 g (cooked)
 Carbohydrate: ~50 g
 Fibre: ~7 g



Gatorade Thirst Quencher
 Serving size: 500 ml (1 bottle)
 Carbohydrate: ~30 g
 Fibre: 0 g



Brown rice
 Serving size: 180 g (cooked)
 Carbohydrate: ~46 g
 Fibre: ~3 g



Banana
 Serving size: 1 medium
 Carbohydrate: ~30 g
 Fibre: ~2 g



Oats
 Serving size: 50 g (uncooked)
 Carbohydrate: ~30 g
 Fibre: ~4 g






Wholemeal bread
 Serving size: 80 g (2 slices)
 Carbohydrate: ~30 g
 Fibre: ~5 g

Daily carbohydrate recommendations

The recommended amount of carbohydrate to eat per day can be calculated based on your body mass (BM) and is dependent upon the intensity, duration and type of exercise being performed. The aim is to ensure you eat sufficient carbohydrate to support your working muscles, central nervous system and other body processes.

Daily carbohydrate intake recommendations

- 
3-5 Rest day or low intensity activities
 - 
5-7 Moderate exercise (e.g., 1 hour per day)
 - 
6-8 Moderate-high intensity exercise (e.g., 1-3 hours per day) or match day
- g/kg BM/day

Your carbohydrate intake recommendations will differ between a rest day and a match day. The recommendations also allow for individual goals, for example performance or body mass loss. To the left, you can see an overview of daily carbohydrate recommendations dependent on the exercise you are to complete. The table below shows how the recommendations may differ depending on the phase of the season.

Carbohydrate periodisation/ weight management

The amount of carbohydrate within your meals can easily be altered on a daily basis to help meet your carbohydrate recommendations. This can also help with weight management. Use the information on the next page to help you alter your carbohydrate intake depending on the exercise you are completing. This is also known as carbohydrate periodisation.

Daily carbohydrate intake recommendations throughout the season

The range accounts for individual goals

Phase of training	Goals	Suggested daily carbohydrate range (g/kg BM)
Pre-season training	Increase aerobic and anaerobic fitness Increase / maximise strength, speed, power for performance and injury prevention Increase lean mass / reduce fat mass	4-8
In-season training	To maintain aerobic / anaerobic fitness To maintain strength, power, speed To maintain lean body mass	3-8
In-season training (congested fixture periods)	Restore muscle function as quickly as possible Promote glycogen resynthesis Alleviate mental fatigue	6-8
Off-season training	To minimise the loss of aerobic and anaerobic capacity To minimise decrements in strength, power, speed To minimise decreases in lean mass and increases in fat mass	<4

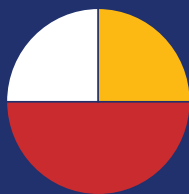
How to periodise carbohydrate intake based on activity levels



Rest day or low intensity activities



Moderate exercise
(e.g., 1 hour per day)



Moderate-high intensity exercise or match day
(e.g., 1-3 hours per day)

- Carbohydrates
- Lean Protein
- Fruits & Vegetables



Examples of how to increase carbohydrate intake to meet the recommendations

g/kg BM/day	Breakfast	Lunch	Dinner
3-5	<p>bowl of porridge with berries</p>	<p>chicken salad and a banana</p>	<p>fish with roasted vegetables</p>
5-7	<p>+ a banana</p>	<p>+ bread rolls</p>	<p>+ a rice based salad</p>
6-8	<p>+ plus yogurt and granola</p>	<p>+ a side of potatoes</p>	<p>+ a large glass of orange juice</p>

Protein

Proteins are composed of amino acids, which are used as the building blocks for growth and repair, helping you to adapt to the demands of training and matches. Each gram of protein provides 4 kcal of energy. Amino acids are classified into two groups: essential and non-essential. Non-essential amino acids are produced by your body, however essential amino acids (EAAs) are not which means it is important to consume them in your diet. Foods which contain all of the EAAs are known as 'complete' dietary proteins. Examples include: dairy, red meat, fish, poultry, soy and quinoa. If you are following a vegan or vegetarian diet, protein sources can be combined, such as rice and beans, to provide all EAAs.

Timing of protein intake throughout the day



● Signifies when protein (~20-30 grams) should be consumed

Serving size and protein content of foods



0% Fat Greek Yogurt
Serving size: 200 g
Protein: ~21 g



Semi-skimmed milk
Serving size: 200 ml
Protein: ~7 g



Salmon fillet
Serving size: 100 g (1 fillet)
Protein: ~23 g



Chicken breast
Serving size: 100 g (1 breast)
Protein: ~31 g



Egg
Serving size: 2 medium
Protein: ~13 g



Tinned tuna
Serving size: 60 g
Protein: ~15 g



Chickpeas
Serving size: 120 g (½ can)
Protein: ~10 g



Whey protein isolate
Serving size: 30 g
Protein: ~25 g



Soybean
Serving size: 100 g
Protein: ~15 g

Daily protein recommendations

As a match official, you require protein to support adaptation and muscle repair in response to training and matches. The recommended daily intake is between 1.2-2.0 grams of protein per kg of your body mass. Protein intake should be regularly (every 3-4 hours) and evenly (~4-6 portions) distributed throughout the day (i.e. in meals and snacks), in combination with appropriate quantities of other macro- and micronutrients. As a guide, each meal/snack should contain roughly 20-30 grams of protein (see above). In addition, consuming 30-40 grams of protein before sleep can aid with overnight recovery.

Daily protein intake

1.2-2.0
g/kg BM/day

For a 70kg match official

84-140g

Fat

Fats are an essential macronutrient within your diet because they are important for health and optimal functioning of your body. Each gram of fat provides 9 kcal of energy. Dietary fats can be divided into three categories: saturated, monounsaturated and polyunsaturated. Most fat sources contain both saturated and unsaturated fatty acids, but in different amounts. Below you can see examples of saturated and unsaturated fat sources. Foods with high unsaturated fat content are considered to

be healthier than high saturated fat foods. Excess consumption of foods high in saturated fats can raise cholesterol which can increase the risk of negative health consequences. In addition, a high fat intake can increase the risk of accumulating excess body fat which may not be favourable to match official performance.

Dietary sources of fat

Saturated



Butter



Cheese



Cured meat



Fatty cuts of meat

Monounsaturated



Almonds & pecans



Avocados



Olive oil



Nuts

Polyunsaturated



Fish



Sunflower oil



Flax seeds



Vegetable oils

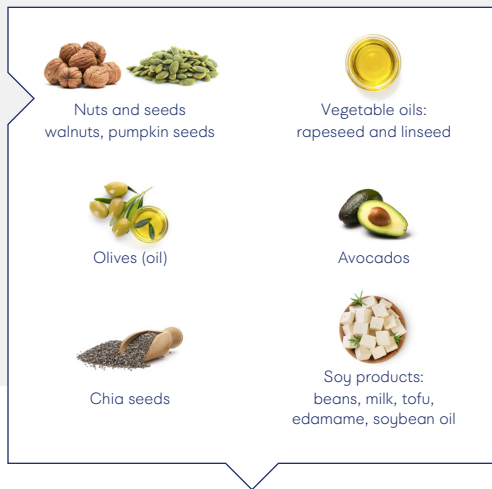
Omega-3 fatty acids

Omega-3 fatty acids are a type of polyunsaturated fat. They are classified as essential which means that they cannot be made by your body, and so you must consume them in your diet. These boxes show examples of dietary sources. Omega-3 fatty acids may also have benefits on exercise recovery and the maintenance of muscle mass during injury.



Salmon, mackerel, sardines, trout, herring, kippers

Fish



Nuts and seeds
walnuts, pumpkin seeds



Vegetable oils:
rapeseed and linseed



Olives (oil)



Avocados



Chia seeds



Soy products:
beans, milk, tofu,
edamame, soybean oil

Non-fish alternatives

Vitamins and minerals

Vitamins, minerals and trace minerals are known as micronutrients. They are essential for many bodily processes to help maintain health and performance. Vitamins aid growth and development, and are also essential for some metabolic reactions. Although some vitamins are involved in energy pathways, they are not direct providers of energy. Most vitamins are required to be obtained from the diet because the body cannot produce them in large amounts, with the exception of vitamin D which can be made from sunlight and dietary sources.

If you are consuming a well-balanced and varied diet to meet the demands of exercise, it is likely that you are consuming enough vitamins and minerals through dietary sources. Exceptions may be if you are following a restricted or low calorie diet, or if you are vegan or vegetarian. In some circumstances, dietary supplementation of vitamins and minerals may be required. In this circumstance please follow the guidelines on dietary supplementation in Chapter 7.



Vitamin A

Helps with vision and fighting infection



Food source(s): Seafood, orange and green vegetables i.e., carrot and spinach



Vitamin C

Important for bones, skin, muscle growth and immune function



Food source(s): Fruit and vegetables



Vitamin D

Maintains bone strength and important for the nervous system



Food source(s): Fish (i.e., salmon and mackerel), egg yolk

Also obtained through sunlight (see Chapter 7)



Vitamin E

An antioxidant important in protecting against cell damage



Food source(s): Sunflower seeds, nuts, vegetable oil, broccoli

Key references:

Burke, L. M. (2003). The IOC consensus on sports nutrition 2003: new guidelines for nutrition for athletes. *Int J Sport Nutr Exerc Metab* 13(4): 549-552.

Collins J et al. UEFA expert group statement on nutrition in elite football. Current evidence to inform practical recommendations and guide future research. *British Journal of Sports Medicine* 2021;55:416.

Loucks, A. B. (2004). Energy balance and body composition in sports and exercise. *J Sports Sci* 22(1): 1-14.

Meyer, N. L., J. Sundgot-Borgen, T. G. Lohman, T. R. Ackland, A. D. Stewart, R. J. Maughan, S. Smith & W. Muller (2013). Body composition for health and performance: a survey of body composition assessment practice carried out by the Ad Hoc Research Working Group on Body Composition, Health and Performance under the auspices of the IOC Medical Commission. *Br J Sports Med* 47(16): 1044-1053.

Thomas, D. T., K. A. Erdman and L. M. Burke (2016). "Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance." *J Acad Nutr Diet* 116(3): 501-528.

Daily nutrition requirements:

Carbohydrate: <https://www.gssiweb.org/en/sports-science-exchange/All/carbohydrate>

Protein: <https://www.gssiweb.org/en/sports-science-exchange/All/protein>

Body composition: <https://www.gssiweb.org/en/sports-science-exchange/All/body-composition>

Health: <https://www.gssiweb.org/en/sports-science-exchange/All/athlete-health>

Resources:

Recovery: <https://performancepartner.gatorade.com/>

DAILY NUTRITION REQUIREMENTS

Health

Performance

Body Composition

Carbohydrate

Daily energy needs and fuel for performance

3-5 Rest day/low intensity

5-7 Moderate intensity

6-8 Moderate-high intensity
g/kg BM/day



Guide for plate portions

- Carbohydrates
- Lean Protein
- Fruits & Vegetables

Activity Levels
=
 Carbohydrate Intake

Dietary sources of carbohydrate



Protein

Recovery and adaptation

1.2-2.0
g/kg BM/day

For a 70kg match official

84-140g



Dietary sources of protein



Fat

Health and well-being

Dietary sources of fat

Include as part of a healthy, balanced diet

Good options include unsaturated fat and omega-3 fatty acids





Preparation

CHAPTER 3

Good nutrition preparation will help you to perform at your best whilst either officiating a match or completing a training session. It is equally as important to know which foods to ingest before exercise, as it is to know which foods to limit. Your nutrition strategies should be developed to suit you, and be practiced regularly. Consistency in your diet will help incorporate recommendations into your individual routine. This chapter aims to provide you with the confidence in finding nutrition and hydration choices that work for you, that will benefit your performance helping you to feel

“ready” at kick-off. Preparing your sports nutrition for a match should be as important as preparing the rest of your match day equipment.

This chapter will explain key nutrition considerations to help you prepare optimally for high intensity or prolonged training sessions, and matches.



3-4 hours before high intensity or prolonged training, or a match

During high intensity or prolonged training or during a match, your main fuel (energy) source comes from carbohydrates. Therefore, it is recommended that 3-4 hours before a training session or match, you consume a meal containing 2 grams of carbohydrate per kilogram of your body mass. This is to ensure that you begin your training session/match with adequate muscle energy stores. For example, if you weigh 65 kilograms, you would need to consume 130 grams of carbohydrate in your pre-exercise meal. Below you can see the carbohydrate content of different items. You can tailor these recommendations to suit your individual needs and preferences.



Serving size and carbohydrate content of foods

	Sweet potatoes Serving size: 130 g Carbohydrate: ~30 g		Standard potato Serving size: 145 g Carbohydrate: ~26 g		Couscous (cooked) Serving size: 150 g Carbohydrate: ~56 g
	Pasta (cooked) Serving size: 200 g Carbohydrate: ~72 g		Basmati rice (cooked) Serving size: 200 g Carbohydrate: ~65 g		Oats (uncooked) Serving size: 100 g Carbohydrate: ~60 g
	Wholemeal bread Serving size: 80 g (2 slices) Carbohydrate: ~30 g		Banana Serving size: 1 medium Carbohydrate: ~30 g		Noodles (uncooked) Serving size: 100 g Carbohydrate: ~70 g

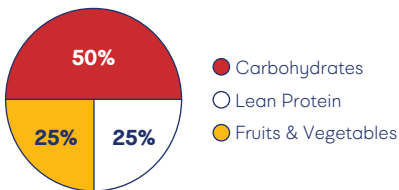
Carbohydrate

3-4 hours prior to a training session/match:

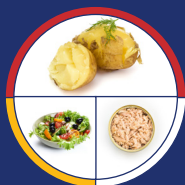
_____ body mass (kg) * 2 g = _____ g

In practical terms, your pre-training/match meal should have at least one source of good quality carbohydrate, which is a significant part (aim for at least 50%) of your meal. Some ideas for pre-training/match meals using this principle can be seen below:

Guide for plate portion



Example pre-training/match meal options



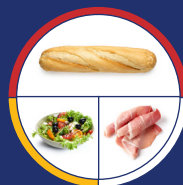
Jacket potatoes with topping and small salad



Rice with fish and vegetables



Pasta with topping plus garlic bread and vegetables



Baguette with filling and small salad

Within 60 minutes before training/match



Prior to a training session or match, you may wish to consume an additional source of carbohydrate within the 60 minutes beforehand. For example, on a match day, this might be just before or just after the warm-up. This intake of carbohydrate helps preserve the stores of energy in your body as you begin to exercise. You should aim to consume ~30 grams of easily digestible carbohydrates. Examples are shown below. Whichever source of carbohydrate you choose, make sure you practice it in training first.

Snacks containing ~30g of carbohydrate



Large banana



Gatorade Thirst Quencher



Quaker 'Porridge To Go' Bar



2x slices of white bread



2x scotch pancakes



3-4 rice cakes with jam

Foods to limit/avoid

High Fat

Eating high fat foods prior to a training session or match may cause stomach discomfort because fat slows the rate at which food is emptied from your stomach. Try to limit the amount of high fat food items in your pre-training/match meal e.g., processed meats, fried foods, creamy sauces, cheese and pastries.

High Fibre:

Consuming too much fibre prior to a training session or match may also cause stomach discomfort during exercise (e.g., bloating, gas, abdominal pain) in some, but not all, match officials. This is because fibre takes a long time to digest, which means it may still be sat in your stomach as you commence a training session or match.

If you experience the symptoms listed above when beginning a training session or match, swapping these foods for lower fibre alternatives (e.g., white bread/pasta/rice) in your pre-training/match meal may help to alleviate symptoms.

It is important to note that fibre is a very important part of your diet (see Chapter 2). Therefore even if you experience symptoms during exercise, it should only be reduced strategically around training sessions and matches, and not eliminated entirely from your diet.

Examples of foods high in fibre



Wholegrain bread and cereals



Wholewheat pasta



Lentils



Brown rice



Beans



Raw vegetables

Hydration

To ensure that you begin training sessions and matches hydrated, please see the 'Before exercise' section in Chapter 6. In short, you should slowly drink ~5–7 mL of fluid per kg of your body mass with your pre-exercise meal. If no urine is produced, or if your urine is dark or highly concentrated, slowly drink more fluid (~3–5 mL per kg of your body mass) about 2 hours beforehand.

Fluid

4 hours prior to exercise, alongside meal:

_____ body mass (kg) * 5 mL = _____ mL

TO

_____ body mass (kg) * 7 mL = _____ mL

2 hours prior to exercise:

(if needed, i.e., if urine is low in volume and dark in colour)

_____ body mass (kg) * 3 mL = _____ mL

TO

_____ body mass (kg) * 5 mL = _____ mL

Caffeine

If used appropriately, caffeine can enhance performance by reducing perceptions of effort, maintaining exercise intensity, enhancing repeated sprint performance and improving cognitive function. Whilst its impact has not been directly researched in football match officials, it is reasonable to recommend consuming caffeine prior to officiating due to its potential benefits on both physical and cognitive performance.

Caffeine intake is recommended in milligrams per kg of your body weight. Match officials may benefit from lower doses equivalent to 1-2 mg per kg of body weight, consumed approximately 45-60 minutes prior to a training session or match. Higher doses are 3 mg of caffeine per kg of body mass. However, consuming too much caffeine can have adverse effects (e.g., headaches, anxiety, confusion, irritability) which could impact your performance as a match official. If you choose to ingest caffeine before matches, start by ingesting a low amount (e.g., ~1 mg per kg of body mass) prior to a training session and evaluate your responses (both physically and cognitively). Increase the dose in small increments until you find what works for you. Once you have done this, you could then consider using it prior to a match.

Caffeine

~45-60 minutes prior to a training session / match:

_____ body mass (kg) * 1 mg = _____ mg

_____ body mass (kg) * 2 mg = _____ mg

There are various ways in which caffeine can be consumed. Coffee is a convenient and appetising option. It can be difficult to know the caffeine content of coffee because many factors influence this including the brewing method, the type of bean and the quantity of coffee grounds used. Caffeinated sports nutrition products (e.g., tablets, gums or gels) will state the caffeine content on the packet, and therefore you will know the exact amount that you are consuming. If you are using caffeinated gum, this can be ingested immediately before exercise. However, please make sure you take out and dispose of gum before beginning exercise.

If you choose to use caffeine prior to a match, please consider the time of kick-off. Following intake, caffeine will remain in your system for at least 3-5 hours, which can have an impact on your sleep. Therefore if it is a late kick-off, you may want to consider adjusting your caffeine intake. Consuming caffeine in the 45-60 mins before exercise is optimal, however consuming it further away from exercise will still have benefits too.

Examples of dietary caffeine sources



Coffee



Caffeine tablets



Caffeine gum



Sports gel containing caffeine

Nutrition preparation pre-match

Preparing your sports nutrition for the match should be as important as the rest of your match day equipment. The information below provides some practical tips to ensure that you are “kick-off ready”.

Kit bag

prepare evening prior to the game



- Gx patches
- Drinks bottle
- Sports beverage
- Pre-game and half-time fuel
- Snack bars/fruit
- Recovery options
- Caffeine (drinks flask or caffeine tablets, gum etc)
- Carbohydrate rich bars in case food options are not appropriate when travelling

Pre-match meal



If preparing at home:

- Prepare serving size as suggested (this will also help you to visualise your needs for other occasions when you are travelling)
- Prepare multiple servings and freeze for other occasions
- Aim to have at least 2-3 pre-match options to avoid boredom
- Plan your shopping in advance so that appropriate food is available

If travelling:

- Where possible, check that food is available at the venue or hotel
- Check local cuisine and avoid any 'new' foods before a match
- Be mindful of your individual needs and how you can meet these
- Check if local tap water can be drunk (if it can't then buy bottled water/fill your drinks bottle in advance)
- See Chapter 10 for more tips

Key references:

Ali, A., J. O'Donnell, A. Foskett & K. Rutherford-Markwick (2016a). The influence of caffeine ingestion on strength and power performance in female team-sport players. *J Int Soc Sports Nutr* 13: 46.

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Williams, C., & Rollo, I (2015). Carbohydrate Nutrition and Team Sport Performance. *Sports Med.* 2015;45 Suppl 1:S13-S22.

Pre-exercise nutrition: <https://www.gssiweb.org/en/sports-science-exchange/All/carbohydrate>

Resources:

Pre-exercise nutrition: <https://performancepartner.gatorade.com/>

PREPARATION

Practice in training

Work towards recommendations over time



3-4 hours before



Meal containing 2 g of carbohydrate per kg of body mass

Carbohydrate content at least 50% of your meal



Slowly drink ~5-7 mL of fluid per kg of body mass alongside meal



2 hours before



~3-5 mL of fluid per kg of body mass if no urine produced/urine is dark or highly concentrated



within 60 min before



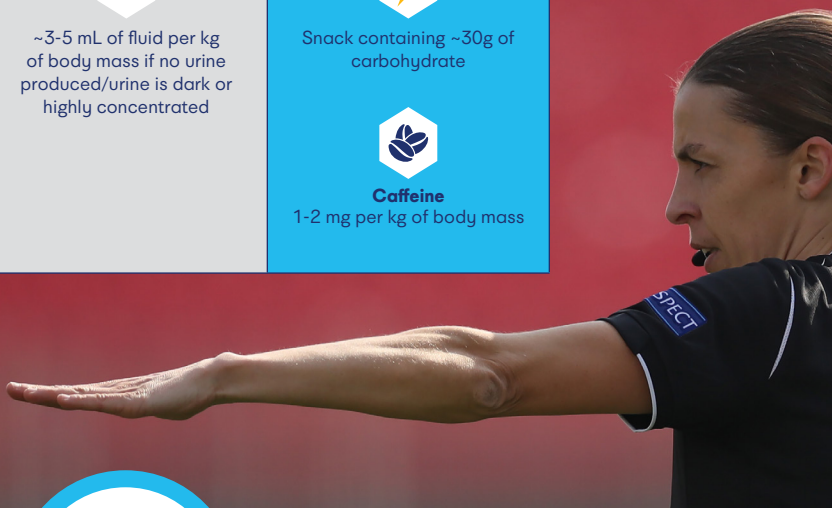
Snack containing ~30g of carbohydrate



Caffeine
1-2 mg per kg of body mass



Kick-off ready



Kit bag

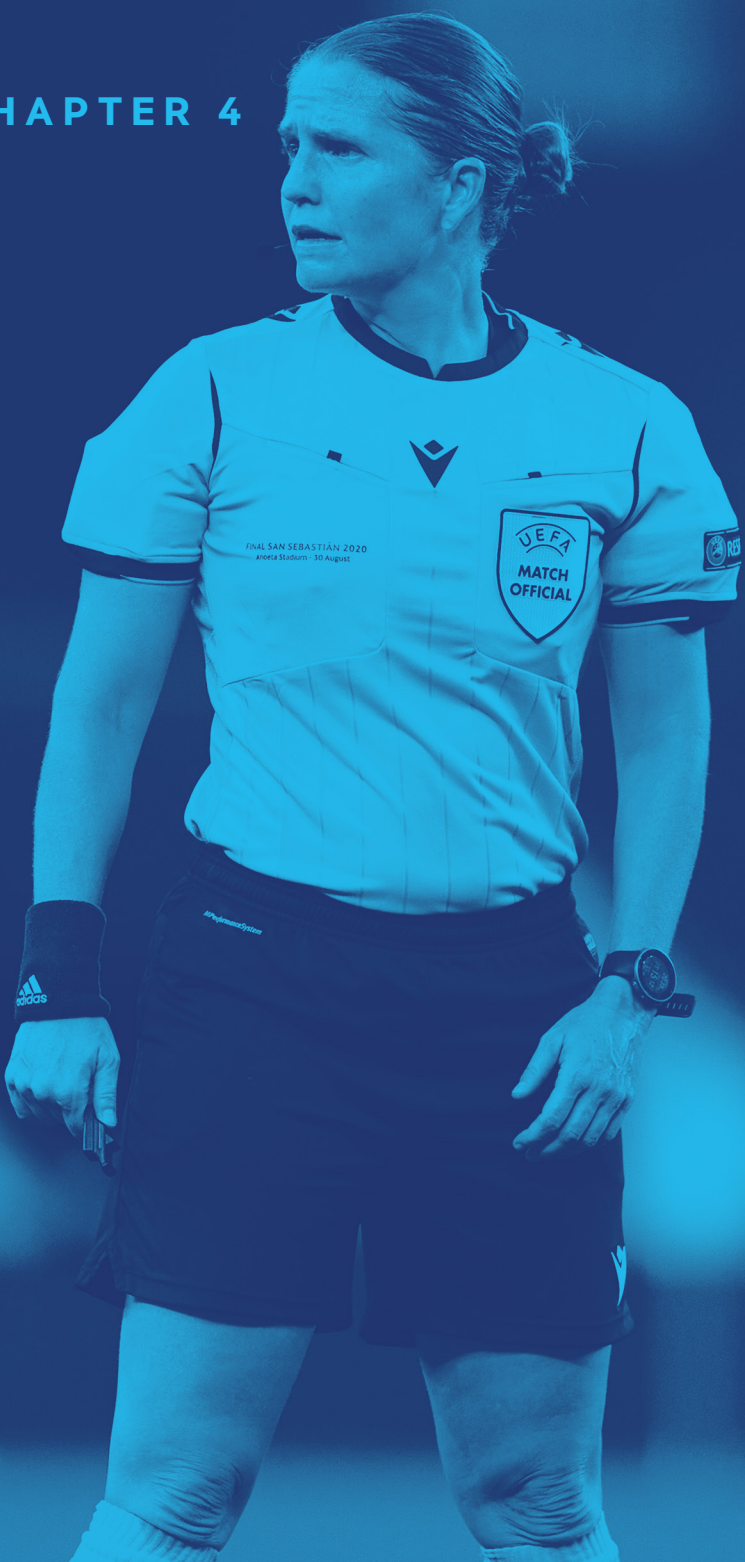
prepare evening prior to the game

- Gx patches
- Drinks bottle
- Sports beverage
- Pre-game and half-time fuel
- Snack bars/fruit
- Recovery options
- Caffeine (drinks flask or caffeine tablets, gum etc)
- Carbohydrate rich bars in case food options are not appropriate when travelling

Plan your shopping in advance and prepare ahead of time. Check that food is available at the venue or hotel. Check local cuisine and avoid any 'new' foods before a match.



CHAPTER 4



Performance

PERFORMANCE

Nutrition guidelines to maintain physical and cognitive performance during a match. Modify to your individual needs and preferences.



IMPORTANT



Modify your fluid intake depending on weather conditions.

↑ temperature = ↑ sweat rate = ↑ fluid requirements

Use Gx patch and sweat rate calculations to help understand individual fluid needs in different weather conditions.



Sip on fluids during breaks in play.

Do not share drinks bottles with players or other match officials.

TIME



Hydrate using individual recommendations



Hydrate using individual recommendations



Consume ~30g carbohydrates*



45 MINS



FINAL WHISTLE



FINAL WHISTLE



Apply 2nd Gx patch
(patch is over half full)



Scan 1st/2nd Gx patch



Practice match day fuelling strategies during training sessions. (At least 2-3 weeks before competition).

Build up to the recommendations, your gut will adapt.

Experiment with different options.



*See the next page for 30g carbohydrate options

PERFORMANCE

~30g

Aim to ingest ~30 g of carbohydrate before the match and at half-time. This strategy helps preserve your store of energy and maintain your performance until the end of the match. The options below all provide ~30 g, however they can be mixed and matched to meet the 30 g target e.g., ½ sports drink + ½ banana.



Sports drink
(Contributes to hydration plan)



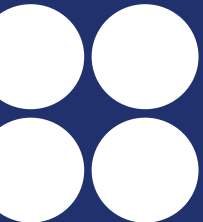
1
Ripe banana



Sweets / confectionery
(Check carbohydrate content)



Sports gel
(Consume with water / hydration plan)



4
Rice cakes
(Check carbohydrate content)



Cereal bar
(Check carbohydrate content)



Combine your carbohydrate intake with your individual fluid requirements. This is why sports drinks are a good option because they provide both fluid and carbohydrate.



Recovery

CHAPTER 5

The use of recovery strategies after training sessions and matches will help your body to be ready to go again before your next bout of exercise. From a nutrition perspective, there are three important recovery factors to focus on: refuelling your energy (carbohydrate) stores, repairing your muscles, and rehydrating your body. These nutrition strategies will compliment and maximise the benefits from the other recovery modalities such as foam rolling, ice baths, sleep, compression garments and massage.

Consistency in your recovery after training sessions and matches will be beneficial to your overall health and performance as a match official. This chapter will explain key nutrition considerations to optimise and speed up your recovery after training sessions and matches. It is important to note that recovery strategies are especially important during periods of fixture congestion, during heavy training blocks and during tournaments such as the Women's European Championships.

Recovery strategies

 Nutrition	 Foam rolling and stretching	 Ice bath
 Sleep	 Compression garments	 Massage
 Sauna/jacuzzi	 Contrast therapy 5x 36°C for 4 minutes to 16°C for 1 minute	 Active recovery e.g., cycling, walking

The three key priorities to optimise your recovery from a nutrition perspective are: (1) Refuel, (2) Repair and (3) Rehydrate. You can remember these as the '3 R's'. Each are explained in detail below.

 <p>Refuel</p>	 <p>Repair</p>	 <p>Rehydrate</p>
--	---	---

Refuel ▶ Carbohydrate

During a training session or a match, your body will use glycogen (carbohydrate) stores for energy. Your glycogen stores will reduce during exercise and therefore they need to be replenished afterwards. This can be achieved by eating carbohydrate rich

foods (see Chapter 1). This will 'refill' your glycogen stores for when your next training session or match begins. It can take up to ~24 hours to fully replenish your glycogen stores after a training session/match, depending on the intensity and duration, which

influences how low your glycogen stores become.

Ideally, you should consume a snack containing carbohydrate after finishing your training session or match, within 30 minutes if possible. Following this, you should aim eat a meal which contains carbohydrate (see below for examples), ideally within ~2 hours. If you are required to perform again in the 48-72 hours after a match or high intensity and/or long duration training sessions, aim to increase your daily carbohydrate intake as directed in Chapter 1.

High carbohydrate snacks for immediately after exercise



Banana



Bread/toast



Sports drink



**Cereal bar/
flapjack**



**Cereal/
granola**



Rice cakes

Repair ▶ Protein

Following a training session or match, your muscles need to repair and remodel to help you to adapt to the demands of exercise. Consuming protein after training sessions or matches helps your muscles to rebuild and repair (also known as muscle protein synthesis). To maximise muscle repair and adaptation after a training session or match, you should aim to consume approximately 20-30 grams of protein at regular intervals (i.e., every couple of hours). Following a training session or match, you can do this by having:

- **High protein snack (alongside your high carbohydrate snack) soon afterwards**
- **Meal high in protein (and carbohydrate) ~2 hours afterwards (see below for examples)**
- **Ensure that you incorporate protein rich foods into your meals for 24 hours afterwards**

Examples of 20-30g of protein



200g of yogurt



1 chicken breast



1 fillet of fish



3-4 eggs



1 tin of fish



150g of tofu



**1 pint of cow's or
soya milk**



**150g of
soybeans**



**1 scoop of
protein powder**

Example recovery meals



Pasta with sauce

Carbohydrate: Pasta
Protein: Meat in the sauce
e.g., beef mince or chicken



Rice/noodle based stir fry

Carbohydrate: Rice/noodles
Protein: Meat, tofu or fish in
the stir fry



Jacket potatoes with filling

Carbohydrate: Potato
Protein: Filling e.g., tuna,
beans, chicken



Sandwiches with filling

Carbohydrate: Bread
Protein: Filling e.g., lean
meat, egg, tuna

You may wish to use protein powder during recovery from training sessions or matches. Use those that contain whey or soy protein wherever possible, because they are considered a 'complete' source of protein.

Sleep is often an under-utilised recovery occasion. Consuming protein before going to sleep is beneficial for overnight recovery.

For example:



Hot chocolate



Bowl of yogurt



Cottage cheese on crackers

Practical considerations

A common method to meet all recovery requirements is to consume a protein shake (ideally made with milk) or smoothie after exercise. These are good options because they contain the fluid, protein and carbohydrates to kick start your recovery in one go. Milk and chocolate milk are also good options for post-exercise recovery beverages for the same reason. If you have the resources, prepare a smoothie beforehand or buy a ready to drink beverage to take with you and ingest after your training session or match.



Sports drinks contain fluid and carbohydrate to help you begin rehydrating and refuelling, and they also contain electrolytes which help to retain the fluid you drink. Sports drinks are designed to pass quickly from the stomach into the body so they are a good option post-exercise. Beverages often provide a convenient option as they can be easier to sip on at your own pace if you do not have the appetite for food.

Rehydrate ▶ Fluids

Rehydration is an important part of the recovery process in order to replace fluid lost during exercise. The aim is to completely replace fluid and electrolyte losses prior to the start of the next training session or match. You can obtain personalised post-exercise fluid requirements by using the Gx patch, or by using the guidelines set out in Chapter 6. In summary, begin to rehydrate immediately after exercise by sipping on water, a sports drink or a protein shake.

In most situations, normal eating and drinking practices will replace water and sodium that has been lost. However, if dehydration is severe (>5% of body mass) or if rapid rehydration is needed (< 24 hours before next training session or match), it is recommended to drink 1.5 L of fluid for each 1 kg of body mass lost.

For full recommendations and detailed information, see Chapter 6.

It is important to recognise that it is natural not to feel hungry after exercise. A lack of appetite after a match is however a barrier to meeting nutrition recommendations to support your recovery. If this is an issue, there are strategies you can use to ensure that you still recover. After exercise, sip on fluids and do not be in a hurry or feel pressure to begin eating. You can wait 10-20 minutes after the exercise has finished for the blood to be redistributed from the exercising muscles to the gut before starting your recovery food or beverage. Do not be in a hurry or feel pressure to begin eating.

These guidelines are to "optimise" and "speed up" your recovery. The need to recover quickly depends on when you are next required to perform. In usual circumstances there is plenty of time to refuel, repair and rehydrate in the days prior to your next match so you will be ready to perform at your best again.



Recovery smoothies

Mix and match the ingredients to create a smoothie which contains carbohydrate, protein and fluid... the perfect post training session/match recovery snack!



Protein

- Protein powder
- Milk powder
- Yoghurt



Carbohydrate

- Fruits: Banana, apple, mango, pineapple, orange, strawberry, cherries, blueberries
- Honey
- Frozen fruit
- Dried fruits



Fluid base

- Water
- Fruit juices (adds carbohydrate)
- Milk (adds protein)
- Soy milk (adds protein)
- Almond milk
- Oat milk

Match day recovery timeline

General recovery strategies

Nutrition recovery strategies

MATCH DAY



Compression garments



Sleep

Use strategies in Chapter 9 to improve sleep quantity and quality after a match

Within 30 min afterwards

Snack high in carbohydrate and protein

Within ~2 hours afterwards

Meal high in carbohydrate and protein

Rehydrate post-game with fluids

Milk based drinks, a protein shake or a sports drink are good options

+1
MATCH DAY



Foam rolling and stretching



Massage/physio treatment (if required)



Active/gym recovery



Bath/jacuzzi/sauna/contrast therapy

Ensure meals contain sufficient and high quality carbohydrate and protein sources

Continue to rehydrate with fluids

Sip on fluid and monitor hydration status

Key references:

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Resources:

Recovery: <https://www.gssiweb.org/en/sports-science-exchange/All/recovery>

RECOVERY

Performance

Adaptation

Health

After matches and intense training:

Refuel

- Carbohydrate snack within 30 mins
- Carbohydrate rich meal within 2 hours
- Continue to consume carbohydrate rich meals for 24 hours



Repair

- Protein snack (20-30g)
- High protein food source in meals for 24 hours afterwards
- Pre-sleep protein



Rehydrate

- Sip on fluids
- Aim to drink 125-150% body mass losses
- Combine fluids with meals / food



Post Exercise

Shake, milk or smoothie



Match Day



Match Day + 1

Supported by additional strategies

CHAPTER 6



Hydration

Your body is approximately 60% water. The water in your body is critical for many processes such as regulating your blood volume and blood pressure. Without water you would not be able to transport oxygen and nutrients to your brain and working muscles.



Approximately 60% of body mass is water






Another important role of water is to regulate your body temperature. Your muscles generate heat when you exercise which causes your body temperature to rise. In response, you sweat to dissipate body heat. The evaporation of sweat from the surface of your skin is the primary mechanism which cools your body. Thus sweating is important to prevent sharp rises in core body temperature, which could lead to reduced performance and premature fatigue.

Sweat losses can be large, particularly during high intensity training or when refereeing matches in warm conditions. When fluid intake is less than sweat losses, a body water deficit, or dehydration occurs. Both referees and assistants can experience dehydration during a match. However, fluid losses will be greater when refereeing due to the greater distances covered.

Dehydration (>2%) has been found to impair aerobic performance, and thus your ability to keep up with play. Importantly, dehydration (>2%–3%) is associated with impaired cognitive performance, mood, vigilance-related attention as well as mental “readiness”. Thus impacting key domains relevant to decision making and successful match official performance.

The purpose of this chapter is to provide a guide to inform daily fluid requirements. Fluid recommendations for training and matches will be provided as well as tools to monitor your own fluid losses during exercise.

Factors that affect sweat rate

 <p>Exercise intensity and duration</p>	 <p>Body mass</p>	 <p>Temperature</p>	 <p>Clothing and equipment</p>	 <p>Training and heat acclimation status</p>
---	--	--	---	--

Daily fluid requirements

Normal hydration is typically maintained through habitual eating and drinking practices. Your body has superb biological controls which determine how much fluid you retain or pass as urine. However, your fluid requirements are individual and will depend on a variety of factors, including body size/composition, personal sweat rate, daily life demands and environmental conditions. Importantly, exercise can disrupt your fluid balance. Fluid requirements will be increased as the exercise

intensity, exercise duration or external temperature increases. It is common for people who exercise to not fully rehydrate afterwards, which can negatively influence future physical and cognitive performance. Therefore, it is recommended that you monitor your own hydration status, recognise the signs of dehydration and adjust your fluid intake depending on your needs.

Daily monitoring of hydration

Indicators of your hydration status include body weight, urine and thirst. Morning nude body weight can be a useful indicator of hydration status. Normal morning body weight can be established by regular measurements over a duration of several days. This may be particularly useful during tournaments. If body weight has decreased by more than 1% the morning after a

match, this is likely a consequence of changes in body water. This change could be accompanied by a dark urine colour, low urine volume and feelings of thirst. Therefore, you can monitor your urine colour, urine volume and how thirsty you feel and use these as indicators of hydration status. Fluid intake can then be adjusted accordingly.

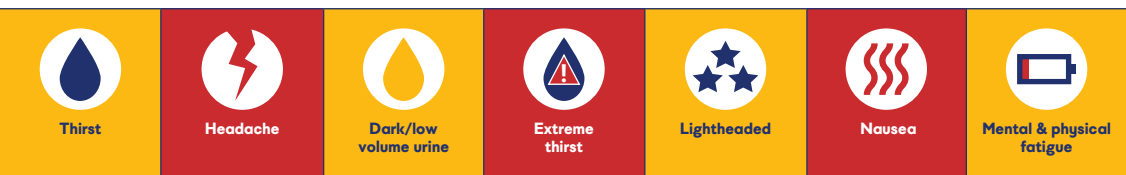
Urine colour chart



How thirsty do you feel now?



Recognise the signs of dehydration

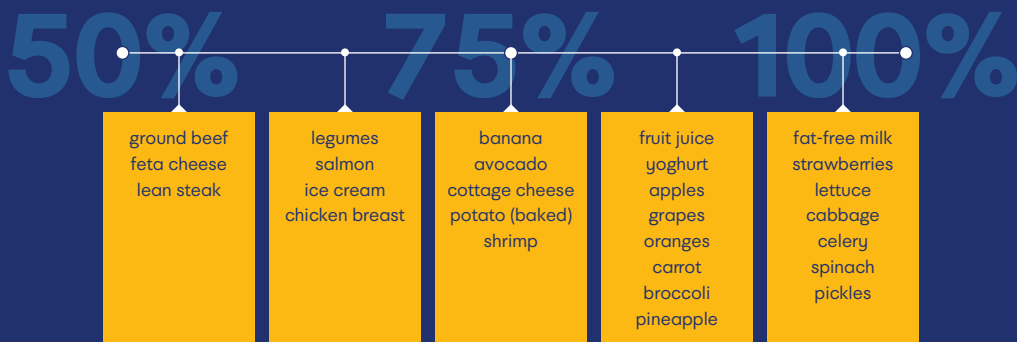


Daily fluid intake

All foods and fluids contribute to your daily fluid intake. It is recommended to drink with meals to help the retention of the fluid consumed. Most beverages contain >85% water. All beverages will contribute to your fluid intake, including tea and coffee. The small diuretic effect of caffeine, will not offset the overall fluid gain achieved by consuming the drink. However, some drinks are better suited for different occasions. For example, fizzy or highly concentrated drinks are not recommended before

or during exercise as they increase the risk of gastrointestinal complaint. It is recommended not to consume caffeinated drinks late in the evening as they may impact your sleep. A list of drinks and general guidance is provided on the next page.

Approximate water content of foods



General advice around common beverages

Common beverages	General advice
Water: Still or sparkling	Drink water with all meals. Keep a drinks bottle close to you throughout the day. Drink 5-7 ml of water per kg of body mass with meals around 4 hours before the start of a match.
Milk: Skimmed, whole	Avoid close to the start of exercise. Good option as a post-exercise recovery beverage (see Chapter 5).
Sports drink	Good choice for before, during and after intense or prolonged exercise (e.g., training sessions and matches). Practice intake during training sessions. Sports drinks containing carbohydrate are not necessary for low intensity or short duration (<60 min) exercise.
Fruit juices	Do not consume too close to exercise or during exercise as they increase the risk of stomach upset.
Colas: Pepsi/Pepsi Max	Enjoy on social occasions. Avoid close to exercise and late in the evening. Zero sugar options recommended if body composition is a priority.
Tea (hot/iced), Coffee	Consider coffee 1 hour before matches to support performance. Avoid after meal time occasions because caffeine can inhibit iron absorption. Avoid late at night because it may negatively impact sleep (see Chapter 9).
Energy drinks (caffeinated, high sugar)	Avoid drinking late in the evening because they may disturb sleep. Do not over consume. May be considered in the hour before exercise.
Protein recovery shakes	Ingest post-exercise to maximise adaptive response to training and matches. Contributes to fluid, electrolyte and muscle recovery.
Alcohol	Enjoy responsibly. Avoid on days prior to matches and when recovering between matches.

Hydration during training sessions and matches

Before exercise

Fluid intake before training sessions and matches is important in determining how well hydrated you are before exercise. The aim is to begin exercise hydrated but avoid feeling bloated or that you constantly require the toilet.

As a guide, slowly drink beverages (~5–7 mL per kg of your body mass) around 4 hours before the start of a training session or match (see page 34). This should be combined with your “pre-match meal” to support your performance. This should allow time

for the body to absorb the fluid required and pass out any excess. If no urine is produced, or your urine is dark or highly concentrated, slowly drink more fluid (~3–5 mL per kg of your body mass) about 2 hours before the event. Drinking beverages that contain sodium (such as sports drinks) and/or with small amounts of salted snacks or sodium-containing foods will help your body retain the consumed fluids.

The Women's EURO 2022 will be played in temperate to warm conditions.



Leigh Sports Village

- Capacity: 12,000
- Wigan & Leigh
- 13-19 °C

Manchester City Academy Stadium

- Capacity: 7,000
- Manchester
- 13-21 °C

Old Trafford

- Capacity: 73,000
- Manchester
- 13-21 °C

New York Stadium

- Capacity: 12,000
- Rotherham
- 13-22 °C

Bramall Lane

- Capacity: 30,000
- Sheffield
- 13-21 °C

MK Dons FC

- Capacity: 30,000
- Milton Keynes
- 16-22 °C

Brentford Community

- Capacity: 17,000
- London
- 14-23 °C

Wembley Stadium

- Capacity: 90,000
- London
- 14-23 °C

Brighton & Hove Albion FC

- Capacity: 30,000
- Brighton & Hove
- 14-20 °C

St. Mary's Stadium

- Capacity: 32,000
- Southampton
- 13-22 °C

During exercise

Acute changes in body mass over the course of exercise can be used to measure fluid lost as a consequence of sweating. It is recommended to measure pre- and post-exercise body mass (in minimal dry clothing or nude, if possible) to calculate your sweat losses during training and matches of various intensities, durations, and environmental conditions. The boxes on the next

page will help you to do this. The more you repeat this process, the better profile you can create to build your individual drinking plan.

**1 kg of body mass loss
= 1 litre of fluid loss**

The aim is to avoid a significant body mass deficit (i.e., more than 2%). However, it is also strongly recommended that you avoid any body mass gain. If this occurs you are drinking too much during exercise and your fluid intake should be reduced accordingly.

Your sweat also contains sodium. The sodium content of sweat and corresponding losses during exercise vary depending on the individual. During exercise, consuming a beverage with sodium (such as a sports drink) helps replace sweat sodium

losses and also stimulates thirst. Sports drinks also contain carbohydrate which help the uptake of fluid in the gut and support your physical and cognitive performance during a match.

During a match, your opportunity to drink is often limited to half-time. Make the most of opportunities during breaks in play to sip on fluids. Prepare your individual drinks bottle in advance and do not share bottles with colleagues or players to reduce the risk of passing infections.

Fluid

4 hours prior to exercise, with pre-exercise meal:

_____ body mass (kg) * 5 mL = _____ mL

TO

_____ body mass (kg) * 7 mL = _____ mL

2 hours prior to exercise:

(if needed, i.e., if urine is low in volume and dark in colour)

_____ body mass (kg) * 3 mL = _____ mL

TO

_____ body mass (kg) * 5 mL = _____ mL

Sweat rate calculator:

To calculate your sweat rate, follow all of the steps. Knowing your sweat rate will inform your fluid intake recommendations during exercise.

Step 1: Calculate sweat loss

<div style="border: 1px solid #ccc; padding: 5px; width: fit-content; margin: 0 auto;"> Pre-exercise body mass _____ kg </div>	-	<div style="border: 1px solid #ccc; padding: 5px; width: fit-content; margin: 0 auto;"> Post-exercise body mass _____ kg </div>	+	<div style="border: 1px solid #ccc; padding: 5px; width: fit-content; margin: 0 auto;"> Fluid intake _____ L </div>
=				
_____ Sweat Loss (1 kg body mass lost = 1 L fluid lost)				

Step 2: Exercise time

_____ hrs

Step 3: Calculate sweat rate

(Sweat loss _____ L) / _____ hrs = _____ L/h

Sweat rate in different conditions:

Cool

≤15°C

_____ L/h

Temperate

16 - 26°C

_____ L/h

Warm

≥27°C

_____ L/h

Gx

The Gx patch measures your sweat rate and sweat composition. Thus, the Gx patch removes the need to weigh in and out after exercise. In addition, recommendations are provided for fluid intake once the patch has been scanned.

Gx sweat patch instructions:



Apply

- Clean inner left forearm (ideally using an alcohol wipe).
- Let the area dry for 30 seconds.
- Apply the patch to your inner left forearm, 2-3 inches below your elbow crease with the "G" facing towards you.



Train / Referee

- Wear the patch during a single training session (e.g., running or strength training, not both), or a match. During a match, if the orange channel is over half full at half-time, scan the patch and then apply a second patch for the second half.
- The orange channel will fill with sweat. Do not let it fill completely.



Scan

- Scan the patch immediately after exercise (not after cooling down) in a well-lit area, whilst the patch is still on your arm. Make sure it scans completely before removing the patch.

After exercise

Rehydration is an important part of the post-exercise recovery process. By using the Gx patch, or weighing in and out after exercise, you can calculate your fluid requirements. The aim is to completely replace fluid and electrolyte losses prior to the start of the next training session or match. After exercise, sip on water or sports drinks. Allow 10-15 min for blood to be redistributed from the exercising muscle to the gut before ingesting food or protein shakes.

In most situations, water and sodium can be replaced within normal eating and drinking practices with no urgency. Drinking a beverage with sodium or eating sodium-containing snacks/foods helps replace sweat sodium losses, stimulate thirst and retain the ingested fluids. You should aim to drink 120-150% of fluid losses after exercise. You can see how to calculate this on the next page.

However, if dehydration is severe (>5% of body mass) or rapid rehydration is needed (< 24 h before next training session or match) the recommendation is to drink 1.5 L of fluid for each 1 kg of body mass loss.

The replacement of fluid and sodium should be combined with your other recovery priorities. Therefore, you should also consume carbohydrate and protein, either within fluid (e.g., shakes) or within post-exercise meals to replenish depleted energy stores and promote muscle adaptation.

Calculating post-exercise fluid requirements

Pre-exercise body mass _____ kg 70 kg	-	Post-exercise body mass _____ kg 69.2 kg	=	Body mass loss _____ kg 0.8 kg
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Body mass loss _____ kg 0.8 kg	×	120-150%	=	Fluid to consume post-exercise _____ L 1-1.2 L
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Red = Example

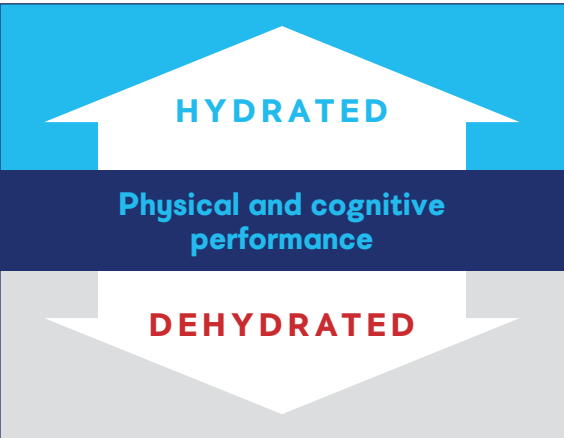
Key references:

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Resources:

- Hydration: <https://www.gssiweb.org/en/sports-science-exchange/All/hydration-thermoregulation>
- Hydration: <https://performancepartner.gatorade.com/>
- Online fluid loss calculator: <https://www.gssiweb.org/toolbox/fluidLoss/calculator>

HYDRATION



Monitoring

Adjust food and fluid intake

4 hours
before exercise

5 - 7 ml of fluid per kg of body mass
(with meal)

2 hours
before exercise

3 - 5 ml of fluid per kg of body mass
(if urine is dark or low volume)

After exercise

120-150% BM loss

Combine with nutrition recovery strategies

During exercise

Limit dehydration to 2% of body mass

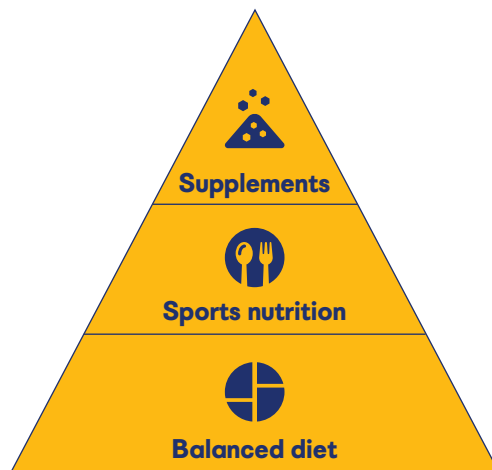
OR



Dietary Supplements

CHAPTER 7

If you consume a healthy, varied and balanced diet (Chapter 2), there is often no need to consume dietary supplements. Your nutrition should be based around a 'food first' approach, with supplements used only when deemed necessary to support health and/or performance. In all cases, dietary supplements should be consumed to "supplement" a healthy balanced diet, never as a replacement. There are certain dietary supplements that may be beneficial to you as a female athlete due to the supporting scientific evidence advocating a benefit to health and/or performance. This chapter aims to provide guidance on those dietary supplements which may provide benefits, and how they can be used safely. It is important to emphasise that the use of dietary supplements depends on individual needs and preferences, and use should always be guided by a qualified professional.



Safety and quality assurance

The nutrition supplement industry is not well regulated. This brings a number of risks that need to be mitigated. Quality assurance is essential to ensure safe supplement use. Therefore, decisions on dietary supplementation should be based on a careful analysis and guided by a qualified professional i.e., sports nutritionist, sports dietitian or a sports medical doctor.

There are thousands of supplements on the market, however only a handful are supported by scientific evidence. The decision to use a dietary supplement should align with the World Anti-Doping Association (WADA) code. It is your responsibility to ensure that

you use supplements safely and minimise the risk of them containing prohibited substances.

There are a number of quality assurance programs available, including "Informed Sport" and "Kölnener Liste". These organisations batch test samples provided



by manufacturers for the presence of WADA prohibited substances. If you are to use a supplement, it is recommended that the product manufacturer uses one of these quality assurance programs. However, whilst these programs provide considerable protection, they are not an absolute guarantee of supplement quality.

Supplement safety



Get advice from a qualified professional



Only use supplements in line with the WADA code



Only buy supplements that use a quality assurance program



Do not exceed recommended doses

Creatine

Creatine is an amino acid which is mainly located in your muscles as well as your brain. Supplementing the daily diet with creatine (creatine monohydrate) may be beneficial to female match officials because it can improve high intensity intermittent exercise performance. Creatine may also help to increase muscle strength and power in response to training.

Interestingly, there is also emerging evidence that creatine may benefit cognitive function, an important consideration for match official performance. Foods such as fish and red meat contain creatine, but in small amounts. This is why specific intake protocols are recommended to achieve the quantities required to induce performance benefits.

Cycling creatine supplementation

You may wish to ‘cycle’ creatine supplementation throughout the season. This is because it takes weeks for body creatine stores to return to baseline levels once stopping supplementation. If you do this, then you may wish to take creatine during specific stages of the season e.g., pre-season and congested fixture schedules. This figure shows how you could cycle creatine throughout the season.



Consideration

A potential side effect of supplementing your diet with creatine is a slight increase in body mass due to increased water retention. However, this response is individual and may not be as evident in females compared to males.

Iron

Iron is an important mineral for all athletes, including female match officials. This is because iron has several important roles in the body including the transport and delivery of oxygen, energy production, cognitive function and immune function. This highlights why iron is critical for

performance, and why an iron deficiency, which is not uncommon in female athletes, could potentially have detrimental impacts. The signs and symptoms of an iron deficiency are shown on the next page.



Heart palpitations



Tiredness, lethargy, fatigue



Poor recovery



Reduction in performance



Paleness



Shortness of breath



Lack of energy

Signs and symptoms of iron deficiency

As a female match official, you are at a greater risk of being iron deficient in comparison to the general population. This is because regular exercise can increase the likelihood of an iron deficiency. Around 35% of female athletes have an iron deficiency, versus around 5% of the general population. In 2013, FIFA carried out a blood analysis on 42 female World Cup referees and found that 47% had low iron levels.

There are certain factors which can increase the likelihood of an iron deficiency:

- **Female athletes**, in particular those who regularly menstruate because blood losses are higher.
- **Following a plant-based diet**, because iron from plant-based foods is not absorbed as well by the body compared to animal-based foods.
- **Insufficient energy intake**, because iron intake is more likely to be insufficient to support the demands being placed on the body.

Preventing an iron deficiency

To **prevent** an iron deficiency, you should use a 'food first' approach to ensure that you are consuming sufficient amounts of iron in your diet. A nutritionist/dietitian can advise you on this by carrying out a dietary assessment. Iron is poorly absorbed by the body, in particular from plant-based foods. Iron

absorption (from foods or supplements) can be improved by optimising the timing of iron intake around certain foods. Consuming foods that contain vitamin C alongside iron-rich foods can enhance absorption. Calcium containing foods and caffeine can inhibit iron absorption, and therefore they should not be

consumed in close proximity to iron-rich foods (if your aim is to optimise iron absorption). In addition, to maximise absorption, iron-rich foods/supplements should be consumed either as far away from exercise as possible OR within 60 minutes following completion of morning exercise.

Vitamin C containing foods e.g., oranges, orange juice, peppers, kiwis, strawberries

Consuming iron-rich foods/supplement as far away from exercise as possible OR within 60 mins following completion of morning exercise

Calcium containing foods e.g., milk, yogurt, cheese

Caffeine e.g., tea, coffee

Enhances iron absorption

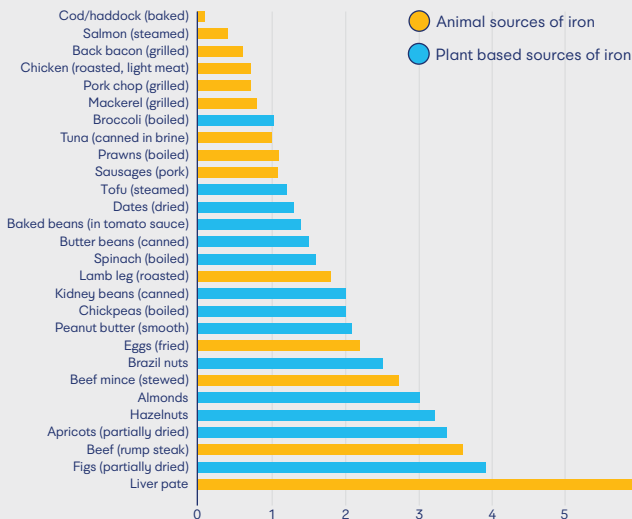
Impairs iron absorption

(if consumed in close proximity)

Guidance

The recommended daily intake of iron is ~14-18 mg per day. This graph shows dietary sources of iron, and how much iron each source contains. If you are experiencing some of the signs and symptoms of an iron deficiency, then you should book an appointment with your Doctor/Sports Doctor to have your iron status assessed. Supplementation may be prescribed if a clinical deficiency is identified. However, dietary adjustments may be recommended first. If you are severely iron deficient, then the medical professional may prescribe you with a stronger supplement or in some rare cases an iron injection.

Iron (mg) per 100 grams ▶



Vitamin D

Vitamin D is important for maintaining many aspects of health which can impact on your performance as a match official, including bone health, muscle function and immune health. The main way that vitamin D is obtained is through sunlight exposure (~80-90%), with only ~10-20% obtained through your diet. Vitamin D

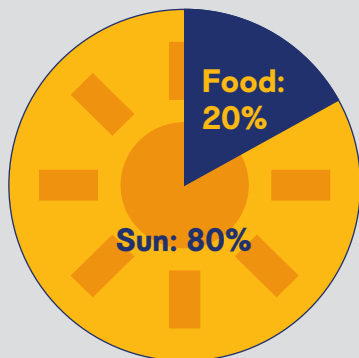
deficiencies are common in both athletes and the general population, in particular during the winter months when sunlight exposure is reduced. In a study carried out by FIFA on female World Cup referees, they found that two-thirds had low vitamin D status.

Guidance

To prevent a vitamin D deficiency, it is recommended to consume a vitamin D supplement containing 1000-2000 IU per day during the winter months (October to March). During

the summer months, a sensible amount of sunlight exposure, approximately 15 minutes per day to arms and legs, is sufficient to maintain vitamin D status.

Contributions of sunlight and diet to vitamin D status



Summer recommendations

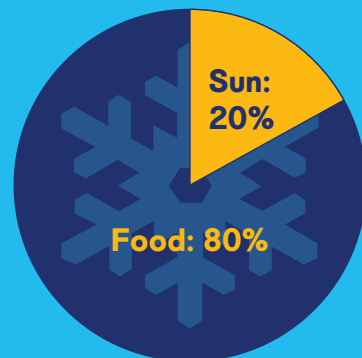
Sunlight exposure

Time: 10am – 3pm

Duration: ~15 min

Frequency: 6 days per week

Attire: t-shirt and shorts



Winter recommendations

Supplementation

Supplementation 1000-2000 IU/day vitamin D3

Difficult to obtain this amount of Vitamin D3 through foods



Do not burn

Apply sunscreen after ~15 min exposure



Toxicity is rare, but may be achieved in doses >10,000 IU/day

Protein powder

Protein is important for adaptation to exercise demands, as well as recovery. The majority of your protein intake should come from food sources (see Chapter 2), however sometimes it can be difficult to meet the elevated daily protein requirements of female match officials, particularly when travelling. Protein powder is a convenient and simple way to

increase the amount of protein that you consume in your diet to support your performance and recovery needs, if you struggle to meet the recommended daily amount through foods alone.

Guidance

Use protein powders that contain either whey or soy protein (look at the ingredients list), because both are considered 'complete' sources of protein. Protein powder can be used in a variety of ways including:

- Mixed with water or milk
- Added to foods e.g., porridge, pancakes, smoothies, yogurt
- Baking e.g., muffins, banana bread, mug cake

Use 20-30 grams (which usually equates to 1 scoop, however, check the packet instructions) at a time. If you are combining protein powder with other high protein foods e.g., milk or yogurt, then you don't need to use as much protein powder.

Calcium

Calcium is involved in many important processes in the body, for example muscle contraction and nerve functioning. Of relevance to athletes, including female match officials, calcium is very important for bone health. If you are not consuming sufficient

calcium in your diet, then your body will start to release calcium from bones, which is harmful to bone health. Therefore it is important to include calcium rich foods in your diet on a daily basis.

Guidance

The recommended daily intake of calcium is 700 mg, which you should be able to obtain through foods. If you do not currently meet this amount, then try to incorporate more calcium rich foods in your diet, for example by drinking a glass of milk alongside your breakfast, or having some

yogurt after meals. You should ensure that your vitamin D intake/exposure is optimal because vitamin D aids the absorption of calcium from foods. The need to supplement your diet with calcium should only come after review of current dietary intake by a professional.

Calcium content of foods



Whole or skimmed cow's milk

Serving size: 300 ml
Calcium: 360 mg



Calcium enriched soy milk

Serving size: 300 ml
Calcium: 360 mg



Kale (boiled)

Serving size: 100 g
Calcium: 150 mg



Orange

Serving size: 1 medium size
Calcium: 40 mg



Hard cheese

Serving size: 30 g
Calcium: 220 mg



Soya bean tofu

Serving size: 100 g
Calcium: 350-400 mg



Rice pudding

Serving size: 200 g
Calcium: 200 mg



Dried figs

Serving size: 60 g
Calcium: 150 mg



Plain yogurt

Serving size: 120 g
Calcium: 200 mg



White bread

Serving size: 2 slices
Calcium: 100 mg



Wholemeal bread

Serving size: 2 slices
Calcium: 100 mg



Sardines in oil (canned)

Serving size: 60 g
Calcium: 240 mg

Caffeine

For information on how to strategically use caffeine around performance, see Chapter 3. Caffeine can help to reduce feelings of fatigue, improve repeated sprint performance and improve cognitive function. Practice using caffeine around training sessions to find out what works best for you, prior to using it around matches. Please be aware of

consuming too much caffeine. This can easily be done, especially when travelling if coffee is readily available in hotels.

Safe supplement use

You are responsible for all of your dietary choices. Dietary supplements that are offered across the sports nutrition industry will continue to evolve. In an ever changing landscape, it is important that you make educated choices to safeguard your health and well-being. Manufacturers can use promotional materials to target athletes and encourage them to use a certain supplement. These may include appealing claims such as 'grow muscle', 'burn fat', 'increase energy', 'help you to lose weight' or 'stay healthy'. It is important to note that the scientific evidence to support these claims is often lacking. The product usually will not do what the claim states, and could be harmful to your health and performance.

Dietary supplementation should always be led by a qualified professional. It is encouraged to monitor the effectiveness of any dietary supplement program via tracking changes in either health or performance indicators. Finally, if you are to use a supplement around performance, you should aim to experiment with it during training to evaluate any potential negative side effects prior to implementing it during elite level matches.

Key references:

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Fogelholm, M. (1994). Vitamins, minerals and supplementation in soccer. *J Sports Sci* 12 Spec No: S23-27.

Manore, M. M. (2012). Dietary supplements for improving body composition and reducing body weight: where is the evidence? *Int J Sport Nutr Exerc Metab* 22(2): 139-154.

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Resources:

Dietary supplements: <https://www.gssiweb.org/en/sports-science-exchange/All/supplements>

World Anti-Doping Code: <https://www.wada-ama.org/en/resources/world-anti-doping-program/world-anti-doping-code>

AIS (Australian Institute of Sport) Sports Supplement Framework: <https://www.ais.gov.au/nutrition/supplements>

DIETARY SUPPLEMENTS

Support Health

Improve Performance

Accelerate Recovery

Safety



Get advice from a qualified professional



Only use supplements in line with the WADA code



Only buy supplements that use a quality assurance program



Do not exceed recommended doses

Benefits

Guidance



Creatine

- Can improve repeated sprint performance
- Can increase muscle strength and power
- May benefit cognitive function

- Use 3-5 grams of creatine monohydrate per day
- Cycle supplementation during specific stages of the season



Iron

- Transports and delivers oxygen
- Important role in energy production, cognitive function and immune function

- Optimise dietary iron intake, aiming to consume ~14-18 mg per day through foods
- Book an appointment with your Doctor/Sports Doctor if you are experiencing signs of an iron deficiency (tiredness, lethargy, fatigue, lack of energy)



Vitamin D

- Important for bone health
- Important for muscle function and immune function

- Summer months (April-September): ~15 minute sunlight exposure per day to arms and legs (do not burn)
- Winter months (October to March): Consume a vitamin D supplement containing 1000-2000 IU per day



Protein

- Convenient and simple way to increase protein intake
- Supports performance and recovery needs

- Use those that contain whey or soy protein
- Use 20-30 grams at a time



Calcium

- Very important for bone health
- Supports important processes in the body e.g., muscle contraction, nerve functioning

- Consume 700 mg of calcium per day through foods
- Ensure vitamin D intake/exposure is optimal because this aids calcium absorption

CHAPTER 8

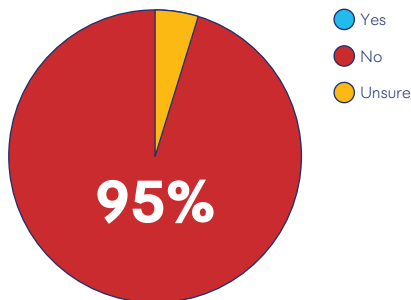
Menstrual Cycle



The menstrual cycle occurs in every female. However it is a topic that is often avoided amongst those in elite sport, despite the potential impact on health and performance. When talking about the 'menstrual cycle', it is important to emphasise that this is not just about the few days around your period, but about the whole cycle. In football little education is provided regarding the menstrual cycle. Typically, there is a large range in individual knowledge as well as comfort in discussing the topic. Therefore, the aim of this chapter is to provide information on the menstrual cycle and its relevance to you as a match official. Finally, we hope to encourage comfort in discussing the menstrual cycle to support the elite female match official network.

Response when UEFA elite female officials were asked the following question:

Have you been provided with any education on the menstrual cycle or hormonal contraceptives?



What is the menstrual cycle?

The menstrual cycle is the time between the first day of your period, to the day before your next period. The average length of a menstrual cycle is 28 days, however it differs for everybody. As a guide, a "normal" cycle can range between 21 to 40 days.

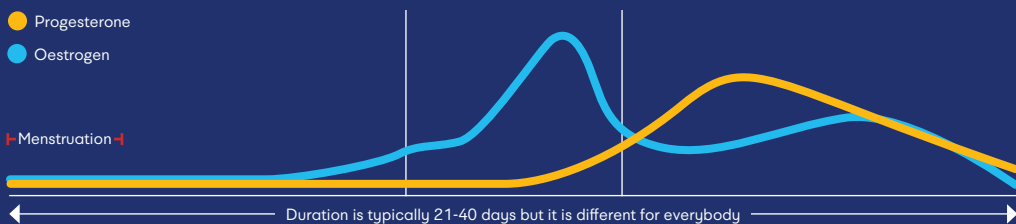
the lining of the uterus during the latter part of the menstrual cycle.

In the graph below, you can see what happens during the three main phases of the menstrual cycle:

Females have approximately 480 periods during their life time.

The menstrual cycle is controlled by two fluctuating hormones, known as progesterone and oestrogen. Oestrogen repairs, thickens and maintains the lining of the uterus, and progesterone maintains

- 1 The follicular phase** (beginning of the cycle)
- 2 The ovulatory phase** (middle of the cycle)
- 3 The luteal phase** (latter part of the cycle)



Follicular phase

● Low ● Low

Starts on the first day of menstruation and ends when ovulation begins. The body is preparing to release an egg.

Ovulatory phase

● Low ● High

Ovulation occurs, meaning an egg is released.

Luteal phase

● High ● High

Starts after ovulation occurs and ends on the first day of your next period. The uterus lining thickens in case pregnancy occurs. If no pregnancy occurs, the uterus lining sheds.

Menstrual cycle symptoms

The type and severity of symptoms experienced during the menstrual cycle largely varies between individuals, with some experiencing no symptoms and others experiencing many symptoms. Whilst symptoms can be experienced throughout your entire menstrual cycle (see below), the most likely time is in the days before your period starts due to the changes in your hormone levels which can cause physical and emotional changes. This is known as pre-menstrual syndrome (PMS). The symptoms usually improve once your period begins, and disappear a few days afterwards.

Potential symptoms during different phases of the menstrual cycle

Follicular phase	Ovulatory phase	Days just before and during period
Alertness Positivity Increase in energy levels Decrease in appetite Improved skin	Discomfort Breast tenderness Bloating Cramps Higher body temperature Increased cervical mucus Pelvic or abdominal pain	Changes in appetite Mood swings Irritability Fatigue Bloating Breast tenderness Headaches Cramps Spotty skin Lower back pain Headaches

Importance of menstrual cycle tracking

It is important to track your menstrual cycle for a variety of reasons. It can help you to notice any changes in your cycle e.g., in length or amount of bleeding, it can help you to become more in tune with symptoms that you experience and it can help you to better understand the connection between your cycle and other factors e.g., sleep, activity, energy, performance, recovery and mood. If you feel comfortable to, then you can share this information with your coach because this may help to inform your training. For example, if you notice that you always struggle to recover from high intensity sessions during a certain phase of your menstrual cycle, then you could begin to adapt your training or recovery time accordingly.

There are several ways that you can track your menstrual cycle including using phone based apps, using a diary/calendar, or simply by writing it down. It is important to note that you should track throughout your whole menstrual cycle, and not just the days that you are bleeding.

As a minimum, you should keep note of:



Days of bleeding



Bleeding amount



Symptoms



Response to exercise

Hormonal contraceptives

Contraception (birth control) comes in a range of preparations, brands and delivery methods. This section will cover hormonal contraceptives (as opposed to non-hormonal), which contain artificial hormones that influence the female reproductive system. There are many reasons why females may choose to use a hormonal contraceptive including preventing pregnancy, to manipulate their menstrual cycle or to prevent negative side effects of periods.

One of the most popular contraceptives is an oral contraceptive pill (combined pill) taken on a 28 day cycle, whereby an 'active' pill is taken for 21 days, followed by an 'inactive' pill or no pill for 7 days whereby bleeding then occurs. It is important to note that the bleeding experienced is not a 'natural' period, it is a result of the removal of the artificial hormones, and therefore it is known as a 'withdrawal bleed'. If the 'inactive' pills are skipped and 'active' pills are continuously taken in their place, then bleeding does not occur.

Types of hormonal contraception



Combined pill

Contains artificial oestrogen and progesterone. Active pill taken for 21 days, followed by an inactive pill for 7 days.



Progestogen only pill (POP)

Contains artificial progesterone, which thickens mucus in the cervix to stop sperm reaching an egg. One pill taken every day.



Contraceptive patch

Small sticky patch which lasts ~1 week which releases artificial oestrogen and progesterone.



Vaginal ring

Small plastic ring placed inside the vagina which releases a continuous dose of artificial oestrogen and progesterone.



Implant

Small, flexible plastic rod placed under the skin in the upper arm which releases artificial progesterone.



Injection

Injection which releases artificial progesterone into the bloodstream.



Intrauterine system (IUS)

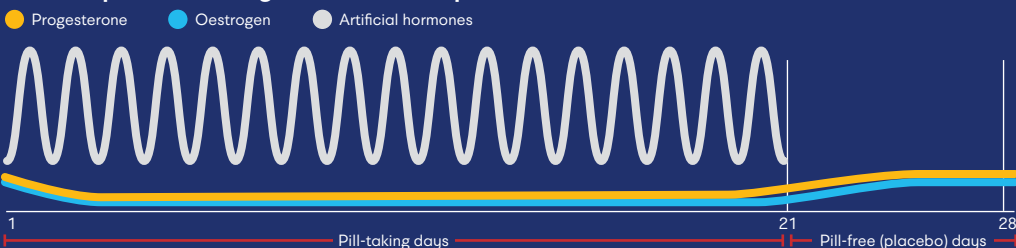
Small, T-shaped plastic device placed into the uterus which releases artificial progesterone.

Oral contraceptives reduce the amount of natural oestrogen and progesterone produced by the body because they provide artificial hormones into the body. This results in a different hormonal profile to a 'natural' menstrual cycle. The effect of oral contraceptives on exercise performance differs between individuals and therefore should be monitored on an individual basis.

Hormonal profile during a natural menstrual cycle



Hormonal profile when using hormonal contraceptives



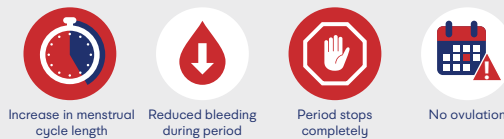
Menstrual cycle irregularities

Irregularities in the menstrual cycle (e.g., change in length of cycle, bleeding amount etc) can occur for a variety of reasons including increased stress, using a hormonal contraceptive and the menopause. In exercising females, the menstrual cycle can become disrupted due an insufficient amount of energy being consumed relative to the amount of exercise that is being performed. This is known as 'low energy availability'. When the body does not have enough energy to fuel both exercise performance as well as the bodies daily life demands, it begins to shut off processes in the body that it does not view as "essential". One of these processes is the menstrual cycle.

This can cause a range of irregularities including anovulation (loss of ovulation), 'oligomenorrhea' which is defined as fewer than 6-8 periods per year, or

'amenorrhea' which is a complete loss of menstruation (i.e., bleeding). It is important to note that disruption to menstrual cycle as a result of low energy availability is only detectable in females that have a 'natural' menstrual cycle, and not in those that use hormonal contraceptives. Whilst low energy availability is one potential cause of menstrual cycle disruption, other factors can also be responsible. Therefore you are advised to see a Sports Doctor/Doctor if you experience changes in your menstrual cycle.

Warning signs of low energy availability



Heavy menstrual bleeding (HMB)

Heavy menstrual bleeding, which is also known as menorrhagia, is when bleeding during your period is particularly heavy or prolonged. If you experience HMB, then you may find that you pass large blood clots, have to change sanitary products frequently/ have to use two types of sanitary products, have periods that last >7 days, bleed through clothes and often feel tired.



Research suggests that around one third of exercising females experience HMB

Research shows that female athletes with HMB are almost 4x more likely to feel that their period negatively impacts their training and performance. HMB can also reduce well-being and confidence, and create concern in clothing choices (a factor that is often outside of your control). In addition, those that experience HMB are more likely to suffer from an iron deficiency. See Chapter 7 for information and advice on this.

Those with HMB often do not feel comfortable in discussing this with their coach or medical staff.

However, it is important to know that help can be sought to help you manage the impact of HMB on your well-being and performance.

Nutrition and the menstrual cycle

There is no need to change your diet depending on the phase of the menstrual cycle that you are in. Instead, you should focus on optimising your daily nutrition (Chapter 2), as well as your nutrition before, during and after exercise (Chapters 3-5).

General dietary considerations in relation to the menstrual cycle are shown below.

Dietary considerations



No evidence to suggest changing your diet depending on menstrual cycle phase. Instead, focus on optimising daily nutrition.



Regular menstruation = ↑ risk of being iron deficient. Optimise iron intake in daily diet.



Low energy availability can lead to menstrual cycle disruption. Ensure daily energy intake matches daily energy demands.

Impact on performance

Every female experiences the menstrual cycle differently. Feelings and symptoms caused by the menstrual cycle, in particular during menstruation, can cause increased anxiety and distraction when officiating. This distraction may negatively impact the match experience of the official as well as their performance.

Research has investigated whether the phase of the menstrual cycle and therefore the change in hormone levels has an impact on exercise performance. There is currently no strong evidence to suggest that exercise performance is affected in all females during specific phases of the menstrual cycle. Instead, you should assess your individual performance across different phases of your menstrual cycle to work out if there are time points at which you may be impacted. This is why it is recommended to track your menstrual cycle and your symptoms during the different menstrual cycle phases. As part of this, you could also track your responses during exercise, for example in relation to energy levels, recovery time, muscle soreness, readiness to train and performance levels (both physical and cognitive).

The menstrual cycle is a topic relevant for all elite female match officials. An ambition is to begin the discussion on the menstrual cycle to challenge social taboos. Through appropriate education, we hope to support female match officials with their health and well-being in relation to the menstrual cycle.

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Resources:

GSSI SSE #215: Practical approaches to nutrition for female athletes. <https://www.gssiweb.org/en/sports-science-exchange/article/practical-approaches-to-nutrition-for-female-athletes>

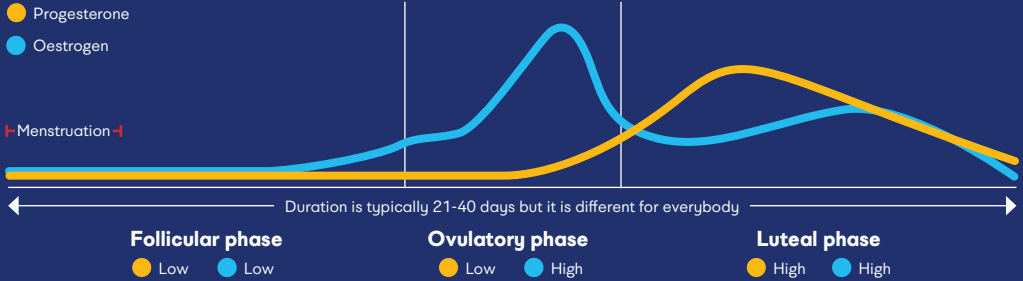
GSSI SSE #175: The female athlete – energy and nutrition issues. <https://www.gssiweb.org/sports-science-exchange/article/the-female-athlete-energy-and-nutrition-issues>

AIS: Female Performance & Health Initiative: <https://www.ais.gov.au/fphi/female-athlete-resources>

MENSTRUAL CYCLE

Important for health

Potential performance implications



TRACKING	<ul style="list-style-type: none"> Helps to notice any changes to your cycle Helps you to become more in tune with symptoms Can help to inform training 	Track: <ul style="list-style-type: none"> Days of bleeding Bleeding amount Symptoms Response to exercise
HORMONAL CONTRACEPTIVES	<ul style="list-style-type: none"> Provide artificial hormones to the body Mask natural menstrual cycle Impact on exercise performance should be monitored on an individual basis 	Contraceptives: <ul style="list-style-type: none"> Combined pill Progesterone only pill Contraceptive patch Vaginal ring Implant Injection Intrauterine system
MENSTRUAL CYCLE IRREGULARITIES	Potential Causes: <ul style="list-style-type: none"> Stress Using a hormonal contraceptive Low energy availability 	Warning signs of low energy availability: <ul style="list-style-type: none"> Increase in menstrual cycle length Reduced bleeding during period Period stops completely No ovulation
HEAVY MENSTRUAL BLEEDING	<ul style="list-style-type: none"> More likely to feel that period negatively impacts training/performance Can reduce well-being and confidence Increases likelihood of an iron deficiency 	PERFORMANCE <ul style="list-style-type: none"> Impact of menstrual cycle on performance is highly variable between individuals Track responses during/after exercise at different phases of menstrual cycle

NUTRITION	<p>No evidence to suggest changing your diet depending on menstrual cycle phase. Instead, focus on optimising daily nutrition.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> ²⁶ Fe </div> <p>Regular menstruation = ↑ risk of being iron deficient. Optimise iron intake in daily diet.</p>	<p>Low energy availability can lead to menstrual cycle disruption.</p> <p>Ensure daily energy intake matches daily energy demands.</p>
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CHAPTER 9

sleep

Although the function of sleep is not fully understood, it is generally accepted to be one of your body's most important biological functions. Getting enough sleep is essential for your performance, learning and development as well as your physical and mental health. When you sleep, many processes take place including repairing and rebuilding muscle and consolidation of memories.

Sleep

is a reversible behavioural state where an individual is perceptually disengaged from and unresponsive to the environment

The importance of sleep is highlighted by understanding the consequences of inadequate sleep. On a day-to-day basis poor sleep can lead to mood disturbance, increased risk-taking behaviour and reductions in immune function. Sleep deprivation can also increase your susceptibility to weight gain due to poor nutrition choices. Therefore, your recent sleep history can have a big impact on your day time functioning.

From a match official perspective, poor sleep is associated with impaired decision making ability and cognitive function. Inadequate sleep may also result in reduced aerobic running performance and increased injury risk through uncoordinated movement.

The purpose of this chapter will be to outline the importance of sleep for match official performance. It is important to recognise barriers to good sleeping habits so that you can work towards meeting sleep recommendations. Strategies can be utilised to enhance your sleep quantity and quality but must be adapted to suit you as an individual.

The consequences of high quality and quantity sleep versus poor quality and quantity sleep for match officials

Improved immune function

Improved muscle repair

Reduced mood disturbance

Reduced risk taking behaviour

Improved decision making ability

Improved cognitive function

Improved aerobic running performance

Decreased injury risk



Sleep Recommendations

Sleep quantity

Individuals will vary in the quantity of sleep needed. The sleep recommendation for adults is 7-9 hours. However, your sleep requirements are likely to be higher due to the physical and cognitive demands of football refereeing. As an example, some elite athletes report between 10-12 hours of sleep per day.

Nevertheless, it is common for individuals to not meet sleep duration recommendations. Sleep disturbances can occur prior to and during important competitions

as well as during normal training. Disturbed sleep during normal training may be a result of a poor routine. Football players who play in late kick-off matches have significant difficulties falling asleep afterwards. It is reasonable to assume this is the same in match officials. During competition, poor sleep can also be a consequence of excessive thinking, worrying and planning. Below you can see some common barriers to good sleep.

Restriction Not enough sleep	Disturbance Frequent waking	Hygiene Sleep pattern
Late night following evening or nighttime matches Early training sessions Jet lag Caffeine use too close to bedtime Excessive thinking/worrying/planning Poor sleep environment: lights/noise disturbance	Anxiety (alarm) New baby/family Alcohol Inappropriate hydration/fueling: nocturnal waking to use the bathroom, or waking due to hunger	Inconsistent sleep and wake times Distractions e.g., internet, TV, tablet Using phone before bed Frequent/late napping Different/uncomfortable bed/pillow

Sleep timing

The timing of your sleep is important because humans should typically be awake during the day and asleep at night. Each individual is likely to have a biological preference to be more awake at night or the morning. This is called your “chronotype”. At the extremes you can be categorised as either being a “night owl” (more active in the evening) or a “morning lark” (more active in the morning), however most people fall somewhere in between. Your chronotype can change across the lifespan with the peak in “night owls” occurring at 20 years of age.

The key for sleep timing is consistency in your wake and sleep times. Exposure to natural sun light upon waking helps to set your body's natural clock. The challenge is the variation in kick-off times which can disrupt your “normal” routine. Here the advice is

to maintain your good sleep practices in the days prior to a match and attempt to compensate for any sleep lost the following day with a targeted nap.

Napping

Napping may be beneficial for match officials who have to routinely wake up early for training/matches or life demands, or those experiencing sleep disturbances. Napping may also be used if a training session is scheduled in the afternoon or evening. Supplementing your sleep in the form of napping will likely have a positive influence on cognitive tasks following a night match where you have experienced some loss of sleep. As a guide, naps should be no more than 30 minutes in duration so that you don't fall into the deeper stages of sleep. Napping for too long or too close to your bedtime can also interfere with your regular sleep.

Nutrition and sleep

No pills, vitamins or drinks can replace good sleep. From a nutrition perspective, consuming caffeine close to bedtime can hurt your sleep, so avoid coffee, tea, caffeinated soda/pop and chocolate late in the day. Nicotine and alcohol will also interfere with your sleep. Follow rehydration and recovery guidelines after a match but avoid drinking large volumes of fluid before bed, which will cause you to wake during the night. Ingesting protein prior to sleep (Chapter 5) presents an opportunity to maximise your recovery after a match or when completing daily intensive training. Establishing a routine every night before you go to bed teaches your body the signals that it's time to sleep.

Monitoring sleep

You can monitor your sleep by keeping a simple sleep diary in which information on bedtime, wake-up time, total sleep time, activities performed before going to bed and perceptions of sleep quality can be very useful. Many electronic devices such as smart rings, phone apps and watches now offer capabilities to monitor sleep quantity and quality. However, the quality of the results will vary between devices. Beyond the gold standard (polysomnography), actigraphy, which involves wearing of a wristwatch to detect movement during sleep is considered the next best method to monitor sleep.

The sleep practices of elite female match officials is unknown. Wearing actigraphy devices during competitions such as the Women's European Championships allows us to better understand sleep habits of elite female match officials. Improving our knowledge will allow us to provide personalised feedback and better tailor recommendations to the needs of match officials.

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Resources:

- GSSI SSE #167: Sleep and Athletes. <https://www.gssiweb.org/en/sports-science-exchange/Article/sse-167-sleep-and-athletes>
- The National Sleep Foundation has excellent resources including diaries for adults and teens, which can be helpful to gain insight into sleep habits: <http://www.thensf.org/>
- The Centre for Sleep has an Athlete Sleep Screening Questionnaire which provides recommendations once you have filled it out: <https://centreforsleep.com/education-and-awareness/athlete-sleep-screening-questionnaire/>

Recommendations to achieve a good night's sleep



Establish a sleep and wake time and stick to it, coming as close as you can at weekends. A consistent sleep schedule will help sleep quantity and quality.



Make your room a sleep haven. Keep it cool, quiet and dark. If you need to, get eyeshades or blackout curtains. Let in bright light in the morning to signal your body to wake up.



Aim to make activities at night calming, especially following a match to counteract your already heightened alertness:

- Avoid your TV, computer and phone in the hour before you go to bed.
- Stick to quiet, calm activities. Try taking a bath or shower, or reading a book.



If worrying at night, try keeping a diary or to-do lists. By jotting notes down before you go to sleep, you may be less likely to stay awake.



Naps can help pick you up and make you work more efficiently, if you plan them right. Avoid napping for too long or too close to bedtime.

SLEEP

Mood

Physical & Cognitive
Performance

Nutrition Choices

7-9h
per night



Consistent bed time
and wake up time



Establish routine



Go "screen free"
~1.5 hours before
bedtime and
silence phone



Avoid caffeine
close to bed



Ensure dark
comfortable room

Napping

20-30 min



Avoid too
close to bed



CHAPTER 10



Travel

Travel is an integral requirement of your role as an elite match official. Officiating matches involves frequent domestic and international travel, which encompasses the time spent in transit between destinations, as well as overnight stays. Travel is an occasion to be enjoyed, due to the opportunity to meet new people and experience new cultures. However, travel often disturbs your normal routine and as such presents several challenges to achieving your daily nutrition goals. The aim of this chapter is to recognise the challenges posed by travel and provide strategies to help cope with the demands. The main objective is to protect your health when travelling.

Travel demands

Data gathered by UEFA indicates that elite match officials spend on average 9 hours per week travelling between destinations. The mode of transport varies depending on the competition. For international travel, officials may drive to the airport, board the flight, then require a taxi or train to arrive at the final destination. Overnight stay are required for some matches, at hotels of varying quality.

Match officials can spend up to 40% of nights throughout the year away from home.

When officiating matches in extreme environmental conditions, the cardiovascular, thermoregulatory, metabolic and perceptual strain is intensified. For example, heat exposure is a widely recognised risk, with increased sweat loss and dehydration presenting a threat to performance and health. Conversely, exposure to cold and high-altitude environments stimulates water loss through urine, increased respiratory water loss and reduced thirst, again increasing the risk of dehydration (Chapter 6). Unfortunately, congested competitive schedules mean that you often don't have the time to acclimatise to the conditions in which you must officiate.

The good news is that each step of travel presents an occasion where nutrition strategies can be utilised, to help support your health and performance independent of the destination.

The first step:

It is good to begin any travel in a good physical condition. Below, you can see some top tips for prior to travel, as well as some nutrition items to pack.

Prior to travel:

- Maintain your usual exercise and sleep routine prior to travel (Chapter 9)
- Avoid exotic or unfamiliar foods in the day beforehand
- Avoid excess intake of alcohol the evening prior to travel as this can affect your food choices
- Plan ahead to reduce stress
- Organise travel documentation and allow 'buffer' time to reduce stress when travelling

Nutrition items to take when travelling:



- **Empty drinks bottle**
can be taken through the airport and filled in the terminal
- **Chewing gum**
helps to avoid eating due to boredom and also avoids getting a dry mouth
- **Snacks for coach/train/plane**
good choices and usual foods
- **Rehydration sachets**
in case of dehydration
- **Hand sanitiser**
to maintain good hygiene

During travel

During travel we advise that you follow your normal nutrition routine, as closely as possible. Make good choices and adjust your intake depending on your needs. Most travel involves sitting down. Depending on the duration of travel, your overall energy expenditure may be reduced significantly. This occurs more frequently during long haul travel, but even domestic commitments can result in hours sat down when you would usually be active. If this is the case, avoid large meals, instead choose "lighter" options e.g., salad based meals, and ensure you have fruit to snack on if hungry. This may be different if you are travelling the day before a match (i.e., MD-1) where you need to make sure your nutrition choices support your match preparation (Chapter 3).

During travel, begin the journey hydrated and monitor your hydration status during the journey (Chapter 6) so that you can adjust your fluid intake accordingly. Try to avoid drinking an excess of beverages such as coffee or alcohol that may interfere with your sleep on arrival to the destination. Choose other hot drink options if they are available such as mint or fruit flavoured teas. Your mouth is your first line of defence against infections, therefore you should avoid getting a dry mouth when in transit, especially if in a shared space. Sipping on fluids regularly and chewing on gum to stimulate saliva helps with this.

During air travel, move and stretch often. Compression socks are a good option for long haul flights and if flying back late after a match to help your recovery.

Gut health

It is common to experience gastrointestinal (stomach) upset when travelling. In preparation for travel and during travel you may consider using probiotic yoghurts daily. Probiotic foods can help strengthen your gut health, reducing the risk of stomach upset and speeding up recovery should upset occur. If you do experience gastrointestinal upset, this can result in a loss of fluid and electrolytes. Therefore, sipping on a sports drink can help with recovery. You can also pack rehydration salt sachets, as a "just in case".

Hygiene

It is important to maintain good hygiene standards during travel to reduce the risk of illnesses and infections. Below are some top tips to help with this.

Good hygiene whilst travelling



Wash/sanitise your hands before each meal occasion (including snacks). This is the most effective way to reduce the risk of picking up illnesses when travelling.



Be aware of 'touch points' on public transport e.g., handles, rails, door push pads and public pens. Wash/sanitise hands after contact.



Check the quality of local water before your travel. Drink from bottled water if required.



Wash fruit thoroughly before eating.



Try to 'fist bump' instead of shake hands.

International travel

Your physical performance is likely to be reduced following long-haul travel (>10-15 hours) across multiple time zones (>2-5). Jet lag results from the desynchronisation of your body clock, disrupting your sleep patterns and external day-night cues (Chapter 9). These changes are also associated with reduced mood and motivation and are likely to negatively impact your officiating performance for up to 72 hours following travel. The severity of jet lag is proportional to the number of time zones crossed and the cumulative sleep loss. Although this is less relevant for the Women's EURO 2022, it is important for your other international commitments.

There are several strategies which can reduce the impact of jet lag (see below). The priority is to focus on improved sleeping behaviour and this should always be considered first. This is because daylight is the most powerful external regulator of your body clock.

Strategies to reduce the impact of jet lag



Before you arrive:

- Slowly adjust your body clock to align to the destination time zone in the days beforehand
- Shift your sleep/wake times and mealtimes gradually to reduce the total adjustment that is required at the destination
- As a guide, one day should be allowed for each hour of time difference, to fully adjust



When you arrive:

- Adjust your watch and routine to the local time as soon as you arrive
- Seek natural daylight when you wake up
- Consume caffeine (e.g., tea, coffee) in the afternoon during periods of drowsiness to help you to stay awake until normal sleep time
- Pharmacological sleep interventions are available, but any prescription should be overseen by a medical doctor

Challenges

The nature of travel will mean that you are often subjected to timetables and schedules that are not ideal for your match preparation. Below we have identified some common challenges followed by some advice:

Match day -1 often requires travel that results in a late arrival to the destination. It can be a challenge to fuel properly on this day.

If your normal eating has been disturbed on MD-1 then do not worry. On arrival to the destination aim to prioritise sleep. Consider a milk based drink prior to sleep. You should have opportunity to fuel sufficiently the next day prior to kick-off by following the guidance in Chapter 3.

On match days, some games do not finish until late, pushing travel later.

On these occasions, prepare food that you can eat during travel after the match. Follow the recovery guidance in Chapter 5. It is important to note that after a match you should be allowed sufficient time to recover before being expected to perform again. If travel disturbs your sleep/wake times, then compensate for this by targeted naps (Chapter 9).

Match day +1 schedules often involve an early departure from the hotel. This makes it difficult to meet recovery and daily nutrition goals.

On this occasion, plan and pack the day before travel. Instead of waking early to have breakfast, if available, pack/order a takeaway breakfast from the hotel. This can then be eaten during travel and at a time closer to your usual breakfast.

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TRAVEL

Protecting your health

Preparing to perform



Domestic



International



Overnight

Preparation

Ensure that you have everything you need

Pack

- Gx patches
- Drinks bottle
- Pre-game and half-time fuel
- Snacks bars / fruit
- Recovery options
- Caffeine

Good snacks for travel

- Oat/rice cakes
- Nut/seed mix
- Dried fruits
- Cereal bars/flapjacks
- Electro tabs
- Sport Kitchen Meals

Gut health

- Avoid unfamiliar foods the day before and day of travel
- Daily probiotic yoghurt

Sleep and stress

- Aim for >8 hours each night
- Slowly adjust body clock to destination time zone
- Plan ahead to reduce stress

Travel day

Arrive in a good physical state

Meals

- Consider mealtimes at destination (before/after match)
- Modify your meal size and composition if appropriate
- Avoid excessive caffeine and alcohol

Hygiene

- Wash/sanitise hands regularly
- Avoid shaking hands
- Be aware of 'touch points' on transport

Hydration

- Begin the journey hydrated
- Monitor hydration status
- Adjust fluid intake accordingly

Travelling long haul

Strategies to minimise the impact



- Slowly adjust to time difference beforehand (~1 day per hour of difference)



- Monitor hydration status throughout



- Consume caffeine in the afternoon if feeling drowsy to help stay awake until nighttime



- Plan mealtimes during travel and consider food availability



- Use compression socks during the flight



- Adjust watch and routine to local time upon arrival

About the authors



Caroline Tarnowski

Caroline is a Scientist for the GSSI international team, based in the UK. Caroline completed her Bachelor's degree in Sport and Exercise Science and Master's degree in Sports Nutrition, both at Loughborough University (UK). Throughout her degrees, Caroline completed research projects related to the topics of carbohydrate ingestion, fluid balance and sweat rates. Upon completion of her MSc, Caroline was employed as the Lead Nutritionist at the University of Birmingham where she worked with elite scholarship athletes. During this time, she also completed a research project investigating energy availability in female athletes, which is an area that Caroline is passionate about. Caroline's current role with GSSI involves sport nutrition support for Gatorade partners, as well as managing and supporting GSSI service engagements internationally.



Dr Ian Rollo

Dr Ian Rollo is a Principal Scientist at GSSI and head of GSSI International. He is a visiting research fellow at Loughborough University (UK). Ian earned his Bachelor's degree from Birmingham University in Sport and Exercise Science and Master's degree from Loughborough University in Exercise Physiology. In 2009, Ian received a PhD from Loughborough University under the supervision of Professor Clyde Williams, OBE. Ian is an accredited Practitioner on the Sport and Exercise Nutrition Register. His current role involves providing sports science and nutrition support for professional football clubs such as FC Barcelona and Manchester City FC. He continues to author publications in peer reviewed journals and deliver invited presentations globally.



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SPORTS NUTRITION

Dietary recommendations to support the health and performance of elite female match officials

