

Unit 1 - Physical Preparation 1 - Fitness for Match Officials

Unit Outline

Nominal Time

This unit is completed as 'home study' and should be done prior to attending the course.

Aims

- To encourage you to accept responsibility for your own physical preparation.
- To provide some basic knowledge of physical fitness components and methodologies.

Learning Outcomes

At the completion of this unit you will be able to:

- set short term goals for your personal fitness levels;
- implement a range of basic training exercises;
- understand the importance of hydration, warm-up, cool-down and injury management.

Fitness to Officiate

Referee organisations and competition administrators may require referees to meet specified fitness standards to officiate in their competitions. Your referee organisation can provide this information to you.

These fitness tests are usually performed using the standard FIFA fitness tests. Information on the FIFA fitness tests are located in the FFA *Laws of the Game* publication.

Hydration for Referees

Based on information and resources from FFV's Talented Officials' Program

During training and matches, referees naturally generate heat leading to a rise in body temperature. A rise in body temperature can be both detrimental to performance but also contribute to fatigue. Our bodies attempt to compensate for rising temperature by sweating.

When referees do not consume enough fluids during training and matches to compensate for these sweat losses, dehydration can quickly occur. As little as 2% of body weight has been shown to affect performance - in a 70kg referee, 2% is as little as 1.4 kg. This may not sound much but in a single training session or match a referee can easily lose up to 4% of their body weight.

Many referees do not deal adequately with dehydration, and in fact never fully rehydrate after training or a match. This leads to referees taking part in further training sessions already in a dehydrated state exposing themselves to a greater risk of injury.

When you are dehydrated, you will feel thirsty, however, thirst is not a good indication of needing to take fluids on board. By the time you feel thirsty you are already dehydrated. Some other symptoms of dehydration include thirst, dizziness, confusion, anxiousness, worry, dry lips or mouth, headache or poor coordination.

Symptoms of Dehydration

There are a number of things that an individual referee can introduce to training and matches that will provide a relatively accurate indication of their hydration status, and how much fluids need to be consumed to get back to normal hydration levels.

Establishing Hydration Status

Knowing how much fluids have been lost is important in rehydrating the body. There are a couple of easy ways of monitoring hydration levels. Known as the **WUT** method, these tests will provide a simple and accurate method of monitoring hydration status:

- **Weigh** referees before and after training and matches. Wearing as little clothing as possible - the difference will be weight lost due to sweating.
- **Urine Colour Chart** can be used to monitor the colour of your urine. Generally, the darker the urine, and the less you urinate, the more dehydrated you are.
- **Thirst** - the absence of thirst does not mean that you are not dehydrated. However, if you are already thirsty then you are already dehydrated and need to drink.

Each referee can complete a hydration table such as the one below to maintain their hydration status:

Record of Body Weight, Urine Colour and Thirst

Loss of >1% of body weight, urine colour of 4 - 8 or persistent thirst indicates possible dehydration. If any 2 of these occur dehydration is likely.

For any four week period during the season keep a diary based on your body weight, urine colour and thirst. List three days each week. We recommend either Friday, Saturday and Sunday or Saturday, Sunday and Monday depending on which days you referee.

Date	Weight		Weight Change	Thirst?	Urine Colour	Comments	Urine Colour Chart
	Yesterday Morning	This Morning					
							1
							2
							3
							4
							5
							6
							7
							8

To complete the table, it is necessary to record your weight each morning. Monitor any change in body weight (that would not be explained by attempting to lose weight). If there is greater than a 1% change there may be a case of lost fluids. If you are thirsty, it is likely that you are already slightly dehydrated. Monitoring the colour of urine provides a good indication of being dehydrated. The target is to achieve numbers 1, 2 or 3. Numbers 4 and 5 suggest dehydration, with colours 6, 7 and 8 indicating severe dehydration.

Rehydrating

For each kg of weight lost through sweat replace with 1.5 litres of fluids. Remember that along with water, electrolytes are also lost through sweat - water alone will not replace these electrolytes. Sports drinks contain both carbohydrate for energy and electrolytes. Ensure that your sports drink has a carbohydrate level of 6 - 8%.

To help reduce the muscular damage caused by training and matches it is best if you consume a source of protein along with your sports drink. Some sports drinks contain a source of protein, however if yours does not, try to consume something light prior to your post-training meal such as a chicken or turkey sandwich. If you do not have access to sports drinks, your post-exercise meal can help replace lost electrolytes. An easy way to make your own sports drink is to combine 200ml of orange squash (concentrated orange), 1 litre of water and a pinch of salt (1g). Mix all the ingredients together and keep chilled - drinks are absorbed more quickly if they are cool rather than ice cold.

What can a referee do to encourage good hydration habits?

- For each match and training session, bring your own drinks bottle. Don't rely on taking a drink when a player is getting treatment or when players are taking fluids on board.
- Make time for regular fluid breaks during a training session.
- Have a supply of extra fluid bottles in a cooler in the car after training and matches.

Combating Dehydration

- Monitor your hydration status using the WUT Chart above.
- Aim to drink 2 litres of fluids each day as part of your regular routine.
- Drink additional fluids before, during and after training and matches.
- Aim to drink 200 - 500ml of fluids 2 hours before a match - remember many referees begin training or matches already in a dehydrated state (try to sip 125-250ml every 15-20 minutes to top up fluid levels).
- Begin to replace any fluids lost during training or a match immediately afterwards by drinking at least 500ml of fluids.
- Electrolytes, such as sodium or potassium will help rehydration.
- To completely rehydrate, consume 150% of the amount of fluids lost - for each 1Kg of weight lost, consume 1.5 litres of fluids.
- Avoid alcohol or caffeine containing drinks until you have completely rehydrated as they can increase urine output.

1. What are key signs of dehydration?

2. If you lose 2 kg of weight during a match we recommend you replace that with ...

Why?

Any other notes?

Cooling Strategies for Referees

Dr Jeff Steinweg (FFA Head of Medical Services until 2014), provided the following information to assist all our match officials regarding cooling strategies on hot days.

Start the match hydrated. It is only possible to absorb 150-250mls of fluid every 15 minutes i.e. 600 - 1000mls per hour but fluid loss may be 2 to 3 times this amount. Dehydration leads to difficulty sweating which is the body’s main method of keeping cool in the heat. Light coloured urine and maintenance of normal weight are the best indicators of normal hydration. Thirst is a poor indicator of hydration and occurs when the body has already lost about 1.5 litres of fluid.

Maintain hydration during the match (and after). Drink at every opportunity, including during any drinks or injury break. Arrange for drinks to be available on the sideline or with the team trainers. A combination of water and sports drinks should be used. For exercise lasting > 1 hour, electrolyte replacement (e.g. sports drink) is recommended.

Limit the warm up.

Precooling. If the body is as cool as possible at the start of the match, it will take longer to heat up. Use the cooling strategies.

Cooling Strategies

1. **Cold drinks.** Bring very cold drinks. This cools the body from within. Also check if one of the teams can provide you with an iced drink e.g. slushee.
2. **Fan.** If an air conditioned dressing room is not provided, bring a fan. Wetting your face, arms and legs while standing/sitting in front of a fan will also help cooling.
3. **Ice towels.** Precool a towel in an ice bath. Wrap this around your neck.

What to bring

1. **Esky** - for ice and drinks
2. **Ice** - to cool drinks and towel.
3. **Towel** - medium size to be iced.
4. **Drinks** - bottles of water and sports drinks ~ 4 litres
5. **Fan** - easily portable, when air conditioning not available.

Exercise Recommendations and Guidelines

Sports Medicine Australia provides a number of football-specific and general information that will assist referees. More detailed information can be found at sma.org.au.

Referees are Athletes - An Overview to Optimising Physical Performance

The information in this section was written specifically for this program by Vasili Parhas in April 2011. Vasili is a Registered Physiotherapist and holds an FFA Senior Football coaching licence. He worked with Adelaide United in their inaugural season and played for Campbelltown City Soccer Club in the South Australian Super League.

Fitness & Energy Systems

Concentration & decision making ability improves as fitness improves. It is important to develop a holistic approach to fitness by maximizing the body's ability to harness all three energy systems:

- ATP-PC (Creatine Phosphate) - e.g. short bursts of energy such as sprinting 100m or less
- Anaerobic (Lactic Acid) - e.g. more sustained bouts of sprinting such as 400m or repetitive bouts of intense effort for less than two minutes
- Aerobic - e.g. during longer periods of exercise (>5 minutes) this system is dominant

During a football match, the body uses all three energy systems concomitantly and to varying degrees. Conditioning programs should reflect this.

Conditioning programs should also encompass resistance (e.g. weights- strength, power) and flexibility (e.g. stretching-static, dynamic, PNF) training. These are important factors in preventing muscle atrophy (loss), maintaining muscle and joint integrity, and promoting good postural bio-mechanics. Implementing the right type, duration and frequency of the above training processes is critical to maximizing performance (e.g. when to do static stretches vs dynamic stretches vs PNF stretches & free weights vs bodyweights).

Tip For a tailored, evidence-based conditioning program, seek advice from an Exercise Physiologist or Sports Physiotherapist. These Allied-Health Professionals can provide a comprehensive assessment of your needs and assist you in setting specific goals and achieving Key Performance Indicators.

Training Guidelines

Should incorporate all facets of match requirements (try and replicate what happens during a match). Consideration should be given to developing the following key elements:

- **Speed-** being able to cover ground quickly is essential (being in the optimal position to make a decision). This can involve varying distances, typically from between 5m to 50m. Sprint training is simple and effective. Can use cones for point-point sprints and 'ladders' to promote co-ordination and recruitment of fast-twitch muscle fibres.

Tip Speed can be improved by using correct running technique. Where possible, seek advice from an appropriately qualified athlete or running coach to improve your efficiency.

- **Agility-** ability to change direction at speed (e.g. getting out of the way of a pass or player). Can be practiced easily using cones or sticks (e.g. 'slalom' runs)
- **Power-** vertical/horizontal. Plyometrics such as bounding and hopping are an effective way of developing power (e.g. having to quickly jump over a ball or get up off the ground after a slip to reach the play).

- **V02max-** a strong base of cardiovascular fitness is crucial in being able to sustain performance for 90-120 minutes. This requires the body to use oxygen as efficiently as possible. Developing an adequate aerobic capacity is helpful during off-season (e.g. 1km-3km time-trials, Interval Training). Match conditioning is a very effective way of improving V02max so longer distance running can often be tapered off once officiating in matches begins.

Tip Use a variety of protocols/tests to regularly measure your performance. For example Heart Rate monitoring, Beep Test, Vertical Jump, Timing Gates, 5-10-5 Shuttle.

Pre/Post-Match exercises

Appropriate warm-up and cool-down procedures are integral to maximizing and sustaining match-day performance as well as preventing injury.

Pre (approx. 30 mins)

- Begin by optimizing blood flow and heat to working muscles with 10-15 minutes of light aerobic activity (e.g. jogging forwards/backwards/sideways/diagonal forwards& backwards, skipping). As you begin to move with more freedom, incorporate some more 'dynamic' movements (e.g. knee-lifts, lunges, heel raises, hip rotations)
- Once heart rate and body temperature is increased and muscles feel warm, progress to 'dynamic stretching' for 10 minutes (e.g. leg swings - forwards/backwards/sideways, hip rotations - standing/supine/prone, half squats, arm circles).

Tip Seek advice from an Exercise Physiologist or Sports Physiotherapist to ensure you are adopting appropriate technique with dynamic stretching.

- Following completion of dynamic stretching, progress to doing some match-related activities at a higher intensity for 10 minutes (e.g. some long and short sprints, faster changes in direction, faster-paced backwards running)

NB: All bodies react differently to certain exercises and protocols. Within the framework of best practice, try and adopt a routine that works best for you by enabling you to move as freely as possible once the match begins. This may take some time to develop and may entail some bespoke activities.

Pre (20-30 mins)

- Gentle jog gradually reducing to a walk, 10-15 mins
- Gentle static stretching of all major muscle groups, 10-15 mins

Nutrition/Hydration

- **Carbohydrates** (e.g. bread, pasta, cereals, potatoes, bananas...)
 - aim for at least 60-70% of daily energy intake from Carbs
 - elevates muscle glycogen content to fuel high intensity and prolonged exercise
 - during prolonged exercise helps breakdown of fat as energy source and spares protein
- **Protein** (eggs, meat, fish, milk, vegetables)
 - aim for at least 20% of daily intake (1-1.5g per kg of body weight)
 - good for maintenance of and building muscle and helps regulate energy production
- **Fat**
 - aim to restrict this to around 20% of daily intake
 - produces energy slower than carbs and used more so in prolonged lower intensity exercise
 - used as energy source mainly in last 15 minutes of match
- **Vitamins and Minerals**
 - sustain healthy tissue and assist in regulation of metabolism and normal body function
 - generally can be adequately sourced from a well-balanced diet

NB On match day, aim to eat main meal at least 3 hours before kick-off. High carbohydrate/low GI (Glycaemic Index) foods ideal. High amounts of fibre on match-day can be counter-productive as fibre can slow carbohydrate digestion. It is also important to replenish carbohydrate/muscle glycogen levels as soon as possible post-match. This will aid recovery.

Hydration

- body is around 70% water
- up to 5% body weight can be lost through sweating during a match particularly in hot/humid conditions. If replenishing does not occur, dehydration can significantly impair performance and decision-making ability

- make a concerted effort to hydrate 12-24 hours prior to match. Ensure consumption of at least 250-500ml of water 2 hours prior to match. NB: Avoid high sugar drinks in the hour leading up to match as this can lead to hypoglycaemia.
- aim to replace every 1kg of lost body weight with 1L of fluid (water/ appropriate sports drink - Isotonic sports drinks can help rehydrate and refuel muscle glycogen stores)
- be mindful that caffeinated and alcoholic drinks can increase dehydration

Tip It is recommended that you seek advice from a qualified nutrition professional such as a Dietician. Your performance can be optimized through the tailoring of a dietary plan that meets your specific requirements.

Footwear

- Consider comfort, grip, shock-absorption, acceleration and weather conditions.
- Footwear may need to be replaced regularly.

Tip Consult a Podiatrist for an assessment of gait/lower limb bio-mechanics and advice on footwear that best meets your needs.

Some common football injuries

1. Strains/Sprains/Haematomas

- muscle tears (various grades)
- joint sprains (e.g. rolled ankle)
- 'corked' muscles (deep bruising)

2. Knee Injuries

Could be due to several causes including:

- Patella-Femoral Joint dysfunction (pain at front of knee caused by musculo-skeletal imbalance)
- Medial Collateral/Lateral Collateral Ligament injuries (caused by excessive force inwards/outwards)
- Meniscal/Cartilage tears (often caused by rapid twisting under 'load' e.g. when knee bent)
- Anterior Cruciate Ligament/Posterior Cruciate Ligament tears (can be caused by rapid hyper flexion/hyperextension/twisting)
- Patellar Tendonitis (inflammation to front of knee caused by overuse)

3. Foot/Leg Injuries

- Stress Fractures (often seen in the metatarsals (foot bones) or shin (tibia) caused by repetitive stress or an unusual stress)
- Achilles Tendonitis (overuse-type injury causing inflammation of the Achilles tendon)
- Plantar Fasciitis (overuse-type injury causing inflammation to the sole of the foot)

4. Lower Back-Pain

- most commonly due to contusions (direct blow), sprains (ligaments) and strains (lumbar and Para spinal muscles)
- more 'major' injuries include Spondylolysis (fractured vertebra) and Spondylolisthesis (fractured vertebra becomes unstable)

5. Osteitis Pubis

- inflammation of the pubic symphysis (between pubic bones at the front of the pelvis)
- can be caused by repetitive stress, overuse and biomechanical imbalances
- can be exacerbated by environmental factors such as training/playing surfaces

BASIC MANAGEMENT OF ACUTE INJURIES

Apply RICER. This means:

- R = **Rest** (prevent further damage-allow healing process to begin)
- I = **Ice** (critical in the first 48-72 hours - 15 minutes on/off as often as possible)
- C = **Compression** (e.g. compression stocking/soft bandage/tubi-grip)
- E = **Elevation** (helps reduce swelling)
- R = **Referral** (to appropriate Health or Allied-Health Professional for follow-up)

Tip For the accurate assessment and management of any sports-related injury, always consult your Sports Doctor or Sports Physiotherapist.

1. What do you think are the key aspects of fitness preparation?

2. What are the important aspects to:

a. Warming up

b. Cooling down

c. Stretching

d. Nutrition for a referee

e. Hydration for a referee
