

## HEAT

Exercise and in particular playing tennis in the heat can be potentially harmful and even life threatening to the individual. This section aims to give a brief overview of what happens to someone in these circumstances, how to avoid significant complications and how best to prepare for playing tennis in hot weather.

When playing tennis in a warm environment, the body gains heat through metabolic processes which allow the muscles to contract and move the player around the court, as well as from solar radiation, and conduction and convection from objects warmer than the body - for example the court surface.

Evaporation of sweat provides the major physiological defence against overheating in humans. Heat is transferred to the environment as the sweat is vaporised from the surface of the skin.

This cools the skin and in turn cools the warm blood which has been shunted from the interior of the body to the skin. Sweating commences soon after the start of any exercise and the rate of sweating increases directly in proportion with the ambient temperature.



The amount of sweat vaporised depends on a number of factors including the surface area exposed to the environment, the temperature and humidity of the ambient air, and convective air currents around the body, for example how windy it is.

However, humidity is the most important factor. On days of high humidity there is already a high-water content in the air and this makes the evaporation of the sweat harder to take place.

For this reason, playing in a hot and humid environment presents the greatest challenge to maintain the core or internal body temperature below 40 degrees Celsius. Humans can only survive core temperatures above 41 degrees Celsius for short periods and the body (brain) must limit the rise or stop exercising before this core temperature is reached.

### **Risk Factors for Heat Exhaustion in Tennis**

- Fitness – less fit individuals are at greater risk of heat illness. Therefore it is important to perform adequate conditioning and fitness training prior to undertaking any practice or competition in a hot and/or humid environment.
- Acclimatisation – certain physiological changes occur when an individual practices or plays in hot and humid conditions regularly. In particular sweating occurs earlier and in an increased amount with less sodium (salt) content. Overall these changes produce a more efficient heat loss.

Individuals who are travelling from a cold to warm environment should allow at least seven to ten days to acclimatise. Initially training sessions should be light and of a short duration (15 to 20 minutes) and at least two to four hours of daily heat exposure is required.

- Wear appropriate clothing – clothing should be loose fitting to allow circulation of air between the shirt and body and be light coloured to reflect the radiant solar heat. From a physiological point of view, changing into a dry shirt will slow heat loss until the shirt becomes wet through.
- Alter playing and training times - if possible practice and competition times should be moved to avoid the hottest part of the day which is typically between 11.00am and 3.00pm. However often the temperature will continue to rise until 5pm and this should be taken into account.

- Drink appropriate fluids before and during play - some players can sweat up to four litres/hour but are only able to absorb a maximum of one to one and a half litres/hour of fluid. Significant dehydration (greater than 5% body weight) can impede heat loss, cardiovascular function and performance.

One easy way to check whether an individual has drunk enough before playing is that the urine should be clear and dilute. It is recommended that 500 ml of water is drunk in the half hour before a match and 100 to 200 ml is drunk at the change of ends during competition.

Cooler fluids (around 5 degrees Celsius) are emptied faster from the stomach than body temperature fluids. Sports drinks should have a concentration of no more than 7 to 8% carbohydrate as any more than this can reduce the rate of emptying from the stomach.

A small amount of salt in the sports drink may be beneficial to offset losses through sweat. However, in most situations drinking water during a match will suffice.

- Younger and older tennis players may be at more risk and extra precautions should be taken when organising competitions for these age groups. Obesity is also a significant risk factor for heat exhaustion.
- Should not play tennis or exercise when they are unwell, in particular when they have a fever or are suffering from a gastrointestinal illness which may mean that they start playing mildly dehydrated.
- Finally, certain drugs may also increase the risk of an individual suffering from a heat illness and a player should discuss this with their local doctor before undertaking any exercise in the heat.

### **What to do if a player appears to be affected by heat exhaustion**

If a player experiences any light headedness, headaches, dizziness, or feels 'wobbly' in the legs, then this may be a sign that they are having difficulty in coping with playing in the heat.

At this point players should ensure that they are drinking enough cool fluids and having adequate rest intervals. If players experience more serious symptoms, such as nausea (with or without vomiting) or passing out, they should stop exercising immediately, be removed to a cool area, and the legs should be elevated. They should commence drinking cool fluids. Recovery is often swift with no complications.

The player should not return to the court for that day. A medical assessment may be recommended if the symptoms do not subside quickly or other problems emerge.

In summary players, coaches and tennis officials including umpires should be aware of the potentially catastrophic consequences of playing in the heat. Steps should be taken to minimise the risk of heat exhaustion to players (and officials). The above advice contains simple measures to achieve this.