

Playing tennis in very hot or humid conditions is very demanding for the body and there are associated risks of developing heat-related problems. The combination of production of body heat through tennis and other effects like high temperature, high humidity, ultraviolet and infrared rays and clothing lead to increases in core temperature and large fluid and electrolyte losses through sweating (*figure 1*). Although an increase in the body's core temperature is normal during exercise and in general a desirable effect (warming-up), if the increase is too large it can negatively effect performance. If the core temperature is too high this can also have negative health consequences.

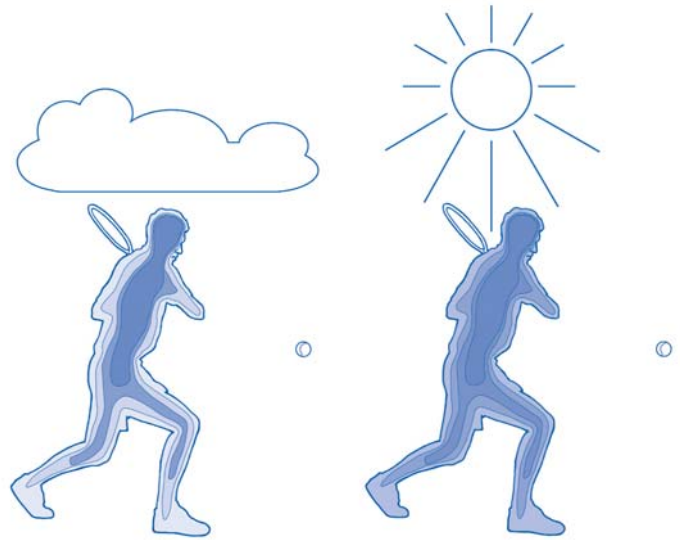


figure 1. The body temperature rises while playing tennis in the heat.

What are the possible heat-related problems?

Cramp

Cramp is a painful and uncontrolled muscle contraction. Cramp most commonly effects the muscles that are used intensively during playing tennis, like the thigh and calf muscles. The most common cause of cramp is the loss of fluids and electrolytes through sweating.

Fainting

Fainting can occur directly after stopping playing tennis if the player does not perform an adequate cooling down or from standing for a long time while in the sun. The cause is a fall in the blood pressure, which is caused by a pooling of blood in the blood vessels in the legs, because the leg and gluteal muscles have stopped propelling blood back to the heart.

Heat Exhaustion

If the body temperature rises and the dehydration worsens then heat exhaustion can occur. Extreme fatigue, dizziness, headache and excessive sweating are all symptoms of heat exhaustion. The heart must pump the blood to the skin in order to cool down but must also supply blood to the hard working muscles. If the total amount of blood available to the heart is reduced through sweating and dehydration then the heart rate will rise and the blood pressure will fall giving rise to the symptoms.

Heatstroke

Heatstroke or hyperthermia is a dangerous and life threatening condition. It is what happens if heatstroke progresses with a further increase in body temperature and dehydration. The fluid losses and heat lead to a decrease in the circulation in the skin to maintain the circulation in the brain and vital organs. It can be recognised by a hot, dry skin, a rapid pulse and a high body temperature (sometimes in excess of 41 degrees Celsius/106 degrees Fahrenheit). The player may be confused and display irrational behaviour. Hyperthermia can lead to epileptic insults and fatal damage to the nervous system and internal organs.

First Aid

Cramp

If a muscle feels like it is about to cramp up then gentle stretching and shaking loose should be performed. Drinking an isotonic sports drink can help by replacing lost electrolytes and fluid.

Fainting

If a person faints they should be laid flat on their back and their legs should be elevated. As soon as they recover they should rest in a cool place and be given something to drink. Fainting can also be caused by a cardiac problem, such as arrhythmia and this should always be considered, especially with older players.

Heat Exhaustion

The treatment consists of stopping playing tennis, drinking an isotonic sports drink and cooling the body using ice in the groin region, armpits and the neck.

Heatstroke

In cases of heatstroke it is important to cool the player down as quickly as possible and give fluids immediately. An ambulance should be called because transport to the hospital is always necessary.

Preventing heat-related problems

Heat-related problems are (partly) preventable if one drinks well, chooses the right clothing and takes adequate and timely cooling measures. Here is a list of important tips to help prevent heat-related problems.

- **Drink regularly**

Start to drink during the warming-up and continue drinking between games. In a match lasting longer than 1.5 hours it is advisable to use an isotonic or hypotonic sports drink. This will also replace electrolytes (salts in the blood) as well as carbohydrate. A general rule of thumb is to drink one glass (150 ml) every 10 to 15 minutes dependant on age, the temperature and the intensity of the match or training. Avoid drinking concentrated drinks with a lot of carbohydrates (hypertonic drinks). This can cause nausea and can draw fluid into the bowel instead of being absorbed. You can also make your own sports drink by dissolving a half teaspoon of salt and 60-80 grams of sugar (15-20 sugar cubes) in one litre of water.

- **Urine colour**

The correct fluid balance in the body can be checked using the colour of the urine. If your urine is very light or clear then the fluid balance is good. Dark, concentrated urine means that you are dehydrated and that it is necessary to drink more fluids.

- **Weight**

Weighing yourself before and after a match or training is another way to check your fluid balance. A loss of 3% of the body weight (2 litres of fluid for somebody who weighs 70kg) will already have a negative influence on performance. Problems are usually worse after a few days of a tournament because of progressive dehydration. It is important to keep replenishing these fluid losses within 24 hours.

- **Salt**

During sweating salt is lost along with the water and this must also be replaced. This can be done by adding a little more salt than usual while cooking and using products that contain lots of salt (tomato juice, canned vegetables, soup or sports drinks).

- **Salt tablets**

In general it is not advisable to use salt tablets and if used, only in combination with lots of water. During sweating more water is lost than salt and using too much salt can cause problems.

- **Clothing**

The choice of clothing is important in preventing heat-related problems. It is best to choose light, breathable and loosely woven fabric so that sweat can evaporate more easily. Wrist and headbands can also be used to keep the palms dry and prevent sweat getting in the eyes.

- **Ultraviolet (UV) rays**

UV-rays can damage the eyes and cause skin cancer. Wearing a cap keeps the head cool and shades the face and neck. If there are problems with reflection off the court surface or serving into the sun then sunglasses or darkened contact lenses offer protection. This is important for long-term eye health.

- **General fitness**

Along with all the above-mentioned preventative measures, a good general fitness is also important. Fitter players sweat more quickly and more profusely than unfit players and this keeps the body cooler. This extra sweating makes it especially important to drink enough.

- **Age and illness**

Children, the elderly, obese players and players who have been ill (with fever or diarrhoea) are more susceptible to heat related problems. It is advisable to restrict playing in the heat to a minimum and it is important to pay special attention to drinking and eating properly. This also applies to players who have had previous problems in the heat.

- **Adapting the training**

Try and train in the morning or later in the day when it is very warm to avoid the hottest part of the day. Take a break every half an hour and rest in the shade while using ice wrapped in a towel to cool the back of the neck.

- **Extreme heat**

During extreme heat, the tournament organisation can decide to postpone or halt the match or allow a ten-minute break between the second and third set.

- **Acclimatisation**

If travelling to a hot place to play, don't train too hard on the first day. Take a few days to build up the intensity of the training. This period of acclimatisation allows the circulatory system and the body temperature to adjust to the new surroundings.