THOSE OF US WHO ARE SHOOTERS AND ATHLETES IN GENERAL AND ARE ACTIVE OUTDOORS DO NOT ALWAYS TAKE INTO CONSIDERATION RISK FACTORS SUCH AS HIGH TEMPERATURES. DUE TO A DEFICIENT NUTRITION, AN INADEQUATE INTAKE OF LIQUIDS OR TO HEAVY CLOTHING, WE CAN BECOME SEVERELY DEHYDRATED. EVEN A MILD DEHYDRATION WILL AFFECT A SHOOTER IN THE FORM OF TREMORS, FAULTY VISION AND SLOWNESS IN OUR AIMING AND SHOOTING, RESULTING IN LOSING A COMPETITION OR LOSING OUR LIVES.

In addition to affecting our physical performance, prolonged dehydration can generate fatigue, sleepiness, convulsions, dizziness, nausea, blurred vision, cramps, etc.

Let us start, then, with a few general concepts that will help us understand the problem. The regulation of body temperature is subject to physiological variables that help our body maintain a homeostasis that allow bodily processes to continue functioning. This process of thermoregulation normalizes the different temperatures at which each of the systems functions.

> THERMOREGULATION

Considering the body from a thermal standpoint, we can establish the following zones:
1) A central core that includes the cranial, thoracic, abdominal, pelvic and deep musculature cavities;
2) A peripheral field that includes the skin and peripheral muscles.

These areas have different temperatures. Thus, we can define core temperature as that of the central nucleus. The peripheral zones are insulating and contribute to thermoregulation. Our body is homeothermic; it tries to maintain a constant temperature through the production and dissipation of heat.

WHAT AFFECTS THERMAL STABILITY IN THE BODY?

The human body is subject to the same physical laws as any other object that produces heat in that it is able to gain or lose temperature.

> RADIATION

The body can radiate heat (in thermal waves) towards objects near it that are cooler, or it can obtain heat from warmer objects. In warm climates, the body can lose heat. If ambient temperature is greater than body temperature, there is a reverse gain.

> CONVECTION

The transportation of heat through the contact of air or water on the skin.

> CONDUCTION

The body loses heat through direct contact with a colder solid object.

> EVAPORATION

This is the way the body dissipates heat. Its effectiveness depends on temperature, atmospheric pressure and wind speed.

Through radiation, convection and conduction, under normal conditions, we lose 2/3 of the heat produced, but at temperatures over 30°C, evaporation through sweat is our only means of losing heat. At this temperature, heat loss is significantly affected by high humidity that does not allow sweat on the body to evaporate.

Sixty percent of the human body is made up of water: 2/3 intracellular and 1/3 extracellular. The mechanism for heat loss, i.e., sweating and evaporation, avoid hyperthermia. But, as mentioned above, evaporation depends on ambient temperature, humidity and air speed, so that the lower the temperature and humidity, the higher the evaporation. When doing physical exercises, such as walking, jogging or competing, the production of heat is faster than its elimination, thus producing a rise in body temperature. Sweat must be eliminated through evaporation so the skin can cool down. What is not evaporated is transformed into viable sweat. This process affects shooters and athletes and should be taken into consideration.

The first signs of dehydration are:
- Intense thirst
- Hot and dry body
- Dry skin and mucus membranes
- Cramps due to a loss of sodium
- Fatigue

Signs of advanced and dangerous dehydration:
- Dizziness, sweating, palpitations, lightheadedness, headache, dizziness, palpitations.
- Dizziness, fainting.
- Sudden rise in heat.
- Diminished level of consciousness.
- Lack of neuromuscular coordination.

Loss of 1% to 5% body weight:
- Cramps, dizziness, fatigued, dehydration of the skin, elevated heart rate, elevated body temperature, nausea.
- Loss of 6% to 10% body weight: headaches, lack of nutrition, tingling in legs and arms, difficulty in moving, dysfunctions of the central nervous system, and kidneys.

Loss of 11% to 20% body weight: sudden rise in heat, accompanied by acrocyanosis, headache, swelling tongue, blurred vision and loss of consciousness that may even lead to death.

WHAT CAUSES THESE EFFECTS?

The following are considered risk factors:

- Environmental (including temperature: 26°C or higher and high relative humidity);
- Acclimatization factors (towards exposure to hot and humid environments);
- Physical activity (that raises body temperature);
- Medicines (antipruritics, antibiotics, diuretics and sedatives);
- Dermatological lesions that interfere with sweating (psoriasis, porphyria);
- Nutritional (alcohol ingestion that vasodilates the skin producing excessive heat elevation).
- Eating excessively.
- A lack of adequate hydration.
- Inadequate or excessive clothing.

RECOMMENDATIONS

The shooter or athlete must keep well hydrated, drinking 500 ml of water one hour before his/her arrival to the shooting range or field, and the 500 ml, which he/she should continue to drink 500 ml of fresh water every 30/45 minutes or follow this formula: weight x 0.2 (for example, if one weighs 70 kg, it would be 70 x 0.2 = 14 kg every 15 minutes).

The body beverage is water and adding carbohydrates is only effective in activities that last for more than 60 minutes (chilled fruit juice, water with glucose and electrolytes at a concentration of 10%).

Every year, the American College of Sport Medicine publishes recommendations for the prevention of sports under high temperature conditions:
1) Drink plenty of liquids before, during and after exercising (become accustomed to doing this during training).
2) Avoid intakes and alcohol, which have a diuretic effect. Avoid carbonated drinks.
3) When one feels thirsty it is already too late: this feeling appears when one has already lost 1% body weight. It is advisable to sip water constantly in order to avoid reaching this stage.
4) Never start an activity when one is dehydrated (dark urine) or when one has a fever.
5) Keep head wet during the activity and showerv immediately after to aid in lowering body temperature, however not with cold water.
6) Wear light, fresh cotton clothing in light colors.
7) Avoid going out or walking during the hours when the heat is at its peak.

Never restrict the amount of water you drink in order NOT TO SWEAT. Remember that sweating is transpiration that was unable to evaporate and claims a sign of dehydration.

PRECAUTIONS

- Wear loose garments in light colors.
- Wear a cap, hat or bandana in light colors on your head.
- Try to walk in the shade, even if you have to go out of your way to do so.
- Cover your body from the sun or wear a sunblock with an SPF of +15.

THINGS NOT TO DO

- Expose the body to high temperatures after having eaten a large meal.
- Drink carbonated or alcoholic beverages for hydration, as these only worsen the condition.
- Carry out your busiest activities during the hours when ultraviolet rays are strongest (11 a.m. to 3 p.m.).

WHAT TO DO IN CASE OF DEHYDRATION

- Have the person lie down in a fresh, dry place in the shade.
- Loose his/her clothing and allow the skin to come into contact with the air.
- Have air currents blow over tous and head.
- Provide slow sips of fresh water.
- Gradually provide small quantities of conbo water.
- When the person begins to recover, allow him/her to sit and then stand slowly, never suddenly.

In the last few years, research has shown that ergogenic beverages can aid in recovery, but if there are none at hand, a liter of water with 2.5 g of salt to 2.5 liters of cold sugar or a few drops of the juice of a lemon to make the taste more pleasant, can fulfill exactly the same function.

In fact, this is the beverage that I recommend athletes sip slowly during a competition or during demanding physical activities. Mineral water, salt, sugar and lemon, in the proportions mentioned above, provide adequate hydration with minerals and sugar that can help compensate for the loss of these substances during physical activity.

ATTENTION

If the person starts to transpire a sticky sweat and his/her skin later becomes dry, he/she begins to tremble with cold and his/her pulse is accelerated but weak. The person is close or in a state of shock and medical attention should be sought immediately. When this occurs, it is clear that one was not paying attention to the first signs of dehydration.

Remember that many accidents are preventable. Each of these steps is critical: a person in charge of the first-aid kit, a cellular phone with the most important phone numbers in cases of emergency in the zone, and taking a good first-aid course are all important factors for the success of our athletic activities.

Regarding high temperatures, it is not a matter of changing the historic customs of our readers, but for them to take into consideration that small modifications in our habits prior to an activity can visibly improve their psycho-physical performance as athletes and shooters.

Biographies

Ricardo Soto
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