

Safety Article of the Month

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Long Distance Riding: Hyperthermia & Dehydration

Body Temperature

Hot weather creates a significant risk to long-distance motorcycle riders whenever it climbs above the typical human skin temperature of about 93°F. Humans must maintain a core temperature within a few degrees of the body's 97-99°F. If body temperature exceeds by 5°, serious impairment can occur; if body temperature exceeds by 10°, death can occur.

It is difficult to maintain a safe and comfortable body temperature when the ambient temperature exceeds skin temperature. To avoid becoming overheating due to the body's own metabolism, the body needs to be in contact with or surrounded by a temperature lower than its own core temperature. That's why the maximum comfortable room temperature is typically 80°F.

Hyperthermia

Hyperthermia describes a body temperature that is higher than normal, and occurs due to failed thermoregulation. This can result in heat exhaustion, and its symptoms include, but are not limited to, muscle cramps, nausea/vomiting, dizziness, and excessive sweating. Left unchecked, this can develop into heat stroke. Heat stroke symptoms include, but are not limited to, headaches, rapid pulse, lack of sweat, and potentially, loss of consciousness.

Hyperthermia can be prevented by avoiding over exposure to hot weather, wearing clothing to prevent overexposure of skin but that has vents to allow air to flow, and by properly hydrating. Cooling clothing such as vests and bandanas can also help.

Thermoregulation

Thermoregulation is a process that allows your body to maintain its core internal temperature. The mechanisms to aid in thermoregulation are:

- Conduction** - Involves the transport of energy by means of direct physical contact in the absence of relative motion.
- Convection** - Involves the transport of energy by the means of the motion of air surrounding the body.
- Radiation** - Is the form of heat transfer that does not depend on direct physical contact with the surroundings, only on the temperature differential.
- Evaporation** - Is the mechanism associated with perspiration.

The first three mechanisms to maintain normal body temperature while riding no longer work when the air temperature exceeds skin temperature. Therefore, evaporation becomes the only available mechanism. The problem then becomes in that excessive evaporation can lead to dehydration.

Dehydration

Dehydration occurs when the body loses more fluids than it takes in, and the body doesn't have enough fluids to carry out its normal functions. Symptoms resulting from dehydration include, but are not limited to, extreme thirst, fatigue, dizziness, confusion, and less frequent and/or dark-colored urine. Complications resulting from dehydration include, but are not limited to, heat injury, urinary and kidney problems, seizures, and low blood volume shock.

Dehydration can be prevented by replenishing the lost fluids. The minimum water consumption requirements (every 4 hours) on low wind speed conditions, based on air temperature, is 12 oz. @ 80°F, 1.3 qts. @ 93°F, 2.8 qts. @ 103°F, and 1.1 gal @ 113°F (under ideal conditions with no other heat sources).

HEAT EXHAUSTION	OR	HEAT STROKE
Faint or dizzy		Throbbing headache
Excessive sweating		No sweating
Cool, pale, clammy skin		Body temperature above 103°F, hot, hot, dry skin
Nausea or vomiting		Nausea or vomiting
Rapid, weak pulse		Rapid, strong pulse
Muscle cramps		May lose consciousness

• Get to a cooler, air conditioned place
 • Drink water if fully conscious
 • Take a cool shower or use cold compresses

CALL 9-1-1

• Take immediate action to cool the person until help arrives

Heat Exhaustion / Heat Stroke Symptoms.

KEEPING COOL: EVAPORATION AND CONVECTION

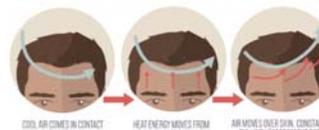
EVAPORATION

WHEN AIR TEMPERATURE IS GREATER THAN SKIN TEMPERATURE, SWEATING IS CRITICAL FOR SURVIVAL.



CONVECTION

THE TRANSFER OF HEAT BETWEEN THE BODY AND SURROUNDING AIR



Evaporation / Convection Process.

POTENTIAL DANGERS OF RIDING A MOTORBIKE DEHYDRATED

WARNING SIGNS

- Cognitive impairment:** Cognitive function that is not normal. The number of mistakes one makes in the field, or the time it takes to complete a task, is a sign of cognitive impairment.
- Water impasses:** Water impasses are the most common cause of dehydration. They occur when the body loses more fluids than it takes in. This can happen through sweating, breathing, and urinating.
- Detrimental effects:** Dehydration can lead to a variety of health problems, including heat stroke, kidney failure, and even death.
- Muscle cramps:** Muscle cramps are a common symptom of dehydration. They are caused by the loss of electrolytes, which are essential for muscle function.
- Stiff joints:** Stiff joints are another symptom of dehydration. They are caused by the loss of fluids, which makes it difficult for the body to move.
- Too much water:** Drinking too much water can also lead to dehydration. This is because the body needs to excrete the excess water, which uses up energy and fluids.
- Headaches:** Headaches are a common symptom of dehydration. They are caused by the loss of fluids, which makes it difficult for the body to regulate its temperature.
- Thirst:** Thirst is a sign that the body is dehydrated. It is caused by the loss of fluids, which makes it difficult for the body to regulate its temperature.
- Dry skin:** Dry skin is another sign of dehydration. It is caused by the loss of fluids, which makes it difficult for the body to regulate its temperature.
- Colour and lack of urine:** Dark-colored urine is a sign of dehydration. It is caused by the loss of fluids, which makes it difficult for the body to regulate its temperature.

Dehydration Symptoms.