

From the University of Mississippi Medical Center Division of Public Affairs

## UMMC EXPERTS SHARE ADVICE ON HYDRATION DURING EXERCISE-INTENSIVE SPORTS

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JACKSON, Miss. – It's the mantra drilled into the heads of coaches and athletes for decades: Drink plenty of water so you won't get dehydrated.

But in the wake of a Mississippi high school football player's death in which hydration and low sodium levels were issues, experts at the University of Mississippi Medical Center are sharing advice on understanding what athletes should drink, how much, and when. They've begun reaching out to coaches, parents and the medical community to ease concerns about athletes taking part in athletic or exercise-intensive events.

A piece of valuable advice they can give to athletes, many of whom must be physically active in brutal heat?

"Your body is going to tell you, when you're thirsty, that you need to drink," said Dr. Alan Jones, UMMC professor and chairman of the Department of Emergency Medicine.

As athletes sweat during physical activity, they lose both water and sodium that exists naturally in their body. So, it's important that they maintain normal levels of sodium and water by consuming adequate amounts of fluid during exercise events to replace what they have lost. "Drink appropriate amounts of fluid, not excessive amounts," said Dr. Luis Juncos, UMMC chief of nephrology and professor of medicine and physiology.

Because most drinks contain low amounts of sodium, if athletes drink too much fluid, their sodium level can become abnormally low, Juncos said. That creates a medical condition referred to as hyponatremia that can be dangerous, and in rare instances, deadly. Extreme manifestations of exercise-associated hyponatremia can lead to cerebral edema, or swelling of the brain.

A number of factors, ranging from an underlying medical condition to drinking too much water during endurance sports, can lower a person's sodium level, shifting water into the brain. The brain swells, increasing pressure on the skull and causing brain cells to die.

What, then, is too little hydration, and what is too much? The optimum scenario is to replace the fluids you've lost, not much more and not much less, UMMC physicians say.

And that can be a slippery slope, Jones said. "It's not a one-size-fits-all scenario," Jones said. "Heat-related illnesses are very unpredictable. It's hard to predict who will get in trouble, and who won't."

Said Dr. Hartmut Uschmann, UMMC associate professor of neurology and director of the Neuroscience Intensive Care Unit: "Hydration before, during and after exercise needs to be individualized. Hydration

needs and fluid losses vary greatly between individuals as well as within a given individual for different circumstances, climatic conditions and other poorly understood personal factors.”

A key player in sodium levels and the elimination of water from the body is the kidney, Juncos said.

Under normal circumstances, he said, kidneys will eliminate water as it's taken in. But if someone drinks liquids too quickly, the kidneys may not be able to keep up, especially if there is a rise in the hormone vasopressin, which can be increased by heat, stress, and dehydration. It can depress that organ's natural ability to adequately eliminate water, Juncos said. “That makes the water build up in your body and dilutes the sodium so that you have hyponatremia,” he said.

Such overhydration usually occurs during endurance events such as marathons and long-distance cycling or swimming where athletes are active for hours on end. But when a high school football player experiences hydration and sodium level issues, “it exemplifies the fact that it can occur at other times,” Jones said.

Players and coaches can monitor proper hydration and the presence of normal sodium levels by examining a player's urine, Uschmann said. If the urine is amber or darker, the player might not be getting enough fluids. If it's light straw-colored or all but clear, that generally means the player is hydrated.

The best way to determine if an athlete is overhydrated or underhydrated, Uschmann said, is to know his pre- and post-exercise weight and how much fluid he consumed in between. “If dehydration is suspected, fluids should be administered in measured amounts,” such as in sips or cups, he said. “With severe dehydration, that should take place intravenously at a medical facility.”

If overhydration is suspected, Uschmann said, don't give the athlete fluids, even if urine output is low. If the athlete is showing symptoms, he should be transferred immediately to a medical facility, Uschmann said.

“There's the assumption that drinking more is good, so keep on drinking, but the truth of the matter is that guidelines suggest that if you have continuous activity where you are sweating and losing body water and salt, to replace it with about one-half to one liter per hour,” Jones said. “More than that is not necessary.”

“To put it into perspective, it used to be that we'd normally lose a couple of percentage points of our weight during (strenuous) exercise,” Juncos said. “Now, it's common for people to gain weight during exercise because they're drinking so much. This is where the problem lies.

“People say, ‘How much is too much?’ That depends on your body,” Juncos said. “Our goal should be for our weight to not change during exercise.”

Said Uschmann: “To be more scientific, the athlete should not lose more than 1 to 2 percent of body weight during prolonged exercise. However, the athlete should not gain any weight, either. If this is the case, too much fluid was consumed.”

The most common-sense approach, Jones said, is that “one should always enter an exercise or physical activity with normal body hydration.

“That requires you to have consumed fluids several hours before the activity begins to enable fluid absorption and urine output, and to have time for equilibrium to return to normal,” Jones said. “If you have a lot of activity during the week leading up to the event, then you have to maintain hydration during that time period.

“There’s a lot of variability in how much individuals sweat, and the concentration of that sweat. Go by the guideline of ‘all athletes should drink to thirst, but not excessively.’ If they appear to be tired or anything outside of what’s normal, they need to be allowed to rest and only return to exercise if they feel back to their normal self.”

And, Uschmann said, parents and coaches shouldn’t think that sodium- and carb-laden sports drinks are better than water for replacing sodium lost through sweating. “Consuming sports drinks for the belief that their electrolytes will replenish gives a false sense of security,” he said. “The end result can be the same: overhydration with dilutional hyponatremia.”

Said Juncos: “Gatorade, water, Pedialyte – it’s all the same. People think they’re safer when they drink Gatorade, but they’re not. Water has no sodium, and the others contain only small amounts of sodium.” The concentration of sodium in the body is seven times higher than that in sports drinks, Juncos said.

A person’s body, Jones said, is an amazing machine. And the old saying of “If you feel thirsty, you waited too long” is nonsense, Juncos said.

If a parent or coach suspects an athlete is experiencing hyponatremia – especially if they’re showing signs such as vomiting, headache, or an altered level of consciousness -- they shouldn’t administer liquids, Uschmann said. Instead, transfer the athlete immediately to a hospital where their sodium levels will be quickly measured.

DO’s and DON’Ts of sports hydration:

- DO drink to thirst. If you’re thirsty, your body is telling you it’s time to drink.
- DO drink several hours before sports activities, but not excessively, to maintain normal body hydration.
- DO replenish liquids during a game or practice, but only as needed for regular hydration.
- DON’T drink large amounts in a short period. Your kidneys may not be able to excrete the excess water.
- DON’T believe that sports drinks adequately replace sodium. They don’t.
- DON’T take lightly dehydration or overhydration symptoms such as nausea or cramping.

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