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Hydration Status and Thermoregulatory Responses in Drivers During Competitive Racing

Stock car drivers are exposed to high ambient temperatures prior to-, and during competition, further complicated by the fact that they are encapsulated in protective clothing; however, the hydration status of these drivers has not been determined. Purpose: To quantify the degree of fluid losses during a competitive event in hot conditions. Methods: Nine male stock car drivers (30-39 yr, 178-183 cm, 83-89 kg) were studied during a Pro Series Division NASCAR race. Sweat rate (SR) and dehydration was determined via nude body weights (BW) pre- and post-race. SR calculations included ~40 min of pre-race activity and ~20 min of racing. Results: Urine loss was considered fluid loss and BW was corrected for fluid and food intake. Pre-race BW was 81.5-88.5 kg and decreased to 81.1-88.5 kg post-race ($p=0.001$). BW loss post-race was 0.77-3.0% and average sweat rate was 0.63-0.4 L \cdot h⁻¹. Intestinal core increased from 38.0-38.4°C to 38.5-38.4°C post-race ($p=0.001$). Skin temperature increased from 35.8-36.9°C to 36.9-38.0°C post-race ($p=0.001$), whereas the core-to-skin temperature gradient narrowed from 2.2-0.9°C to 1.6-0.9°C, pre to post-race ($p=0.001$). Heart rates (HR) post-race were 89-100% of the drivers' age-predicted maximum HR. Conclusion: Fluid losses during competitive racing can be significant, particularly when SR is extrapolated to longer duration events. Without a fluid replacement strategy, fluid losses for these drivers may exceed 3% BW and could negatively impact driving performance.

Biography

Dr. Lara Carlson is an Associate Professor in the Department of Physical Therapy at the University of New England. Carlson also has a faculty appointment with the U.S. Department of Veterans Affairs. Outside the classroom, Carlson was a U.S. ranked hammer thrower qualifying for four USA Outdoor Track and Field National Championships. Carlson is a Fellow of the American College of Sports Medicine, a recipient of the New England ACSM (NEACSM) Honor Award, and was elected President of the NEACSM for an unprecedented second term in their history. Her research interests include the effects of exercise on immune responses, and motorsports physiology.

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