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Heat & Hydration Considerations for Junior Tennis Players

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Issues of thermoregulation, heat illness, sport-induced dehydration are typically overlooked in the sport of Tennis, with much of the research on these topics reserved for Football and Soccer. However, due to the length of heat exposure, high metabolic rates, and duration of matches, heat and hydration directly impact Tennis performance.

Air temperatures at summer tournaments may exceed 40°C, and the wet bulb globe temperatures (WGBT), which takes into consideration humidity and the sun's radiative force may surpass the critical level of 30°C. Both the radiant energy of the sun, and the convective force of warm air moving across the body, warm the athlete. This, in addition to the physical demands of playing at a high competitive level increases body temperatures, that if prolonged, lead to decreases in performance. Cool environments allow heat to be transferred from the working muscles to the blood, which relays the heat to the skin surface, where evaporation and further convection cools the blood returning to the muscles. However, in hot, and humid environments, this thermoregulatory process is compromised, and reduces the body's ability to dissipate heat from the blood and skin surface. It is for this reason that tennis coaches, trainers, athletes and parents understand the performance effects and injury concerns of heat storage, and how to off-set them through adequate hydration and heat exposure management.

Research indicates that the avg. work to rest ratio in tennis competition is 1:2 to 1:5, where the player may be in the act of playing for only 16-27% of the total match duration, where intensity (continued right) (mean HR's avg. b/n 140-160bpm, 46-56% of VO_{2max} , blood lactate concentrations of 1.8-2.8mmol/L) is fairly high. The effect of the physiological strain shows great potential for heat production and storage. As core temperature (T_c) rises, sweat and sodium (Na) loss increases, research indicates that when body weight decreases 2% through sweat production, dehydration and fatigue set in. Sweat rates in tennis range from 0.5-2.6L/hr. Match hydration rates have been shown to be 1.0-1.6L/hr. Due to stomach emptying rates of 1.2L/hr, it can be seen that in some athletes, or in some hot conditions, it is not possible to adequately rehydrate as needed. In this situation performance decrements should be expected, as with the on-set of muscle cramps.

To help reduce one's likelihood of becoming dehydrated and cramping, fluid-electrolyte replacement / sport-drink beverages be consumed pre-, during-, and post-performance. (0.3-0.5L 2 hours pre, 0.25L 20 mins pre, 1-1.5L per hour during, and at least 0.8L per 0.45kg or 1lb lost post training). The benefits of these drinks include their concentration and ratio of salts, carbs, and water. The athlete should always be trying to cool themselves; rest during point/set/match breaks in the shade, wipe sweat off exposed skin, and wear light weight, porous clothing to assist sweat evaporation.

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