Racing In The Heat

Jennifer Hutchinson has some tips on how to get acclimatized for your next hot race

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Who opened the oven door! Race season is heating up and so is the great outdoors. Anyone who has raced in Hawaii, Arizona or in any other notoriously toasty Ironman conditions is aware that how well one can take the heat can determine who has a great day or who goes home unfulfilled. Successful racing in hot conditions depends on how well the body is able to adapt to the heat (acclimatization).

This month's article will provide a brief review of how heat impacts the body during training and racing, and provide tips to help you race well when the heat is on. Next month I'll review more specific hydration and nutrition issues associated with racing in the heat.

Body Heat Regulation 101

During training, core body temperature rises and the body must release this heat, otherwise heat illness can occur. Normal body temperature is 98 degrees Fahrenheit and can elevate to 102 degrees during training. To keep from overheating, the body must dissipate heat. During triathlon, heat regulation is managed mainly through evaporation and convection. Heat loss through evaporation of water (sweating) accounts for 85 to 90 per cent of heat loss during training in hot and dry conditions. In hot and humid conditions, evaporative cooling is limited due to the high moisture content of the air. Basically the air will not allow the sweat to rapidly dry from the skin, which greatly increases the risk of overheating. If humidity is high (> 50%) the ability to release body heat is compromised and the risk for heat illness rises. The ability of convection (the conduction of heat to or from air or water) to lower body temperature depends on air conditions and humidity. Cool water applied to the skin and air passing over the skin (on the bike) can help the body transfer heat and lower core body temperatures.

The key to preventing heat illness (through improved body heat regulation) and optimizing performance is knowing and preparing for the environmental conditions commonly seen on race day. This can be accomplished through the process of heat acclimatization.

What is heat acclimatization?

It is the process by which the body makes physical adaptations to better respond to physical activity in the heat. It occurs only after repeated bouts of heat stress from training that is sufficient to increase core body temperature and produce a significant amount of sweat.

Heat acclimatization has a number of benefits. You feel more comfortable at a given pace while racing in the heat. Your core body temperature and heart rate for a given training intensity will be lower. The onset of sweating and the amount of sweat produced increases, thereby improving heat transfer, but the electrolyte concentration of sweat decreases.

Failure to even partially acclimate to the heat prior to a race can result in increased cardiovascular strain, increased perceived effort and increased risk for heat illness.

How long does it take to get acclimated to the heat?
According to Dr. Lawrence Armstrong, the author of Performing in Extreme Environments, it takes 10 to 14 days to see full (~95%) physical benefits. Acclimatization occurs in phases. The initial exposure to training in the heat may cause weakness, dizziness and other signs of heat stress. Over the next three to six days, an athlete should expect to feel much better due to a decrease in exercise induced heart rate and decreased perceived effort. It should be noted that blood volume expands during this period, so do not be shocked if scale weight increases slightly. Additionally, after about four days of training in the heat, the body makes additional adjustments by decreasing the sweat electrolyte concentration.

After one week of training in the heat, sweat rate increases, but this is greatly dependent on the environmental conditions (hot and humid vs. hot and dry). Heat acclimatization is specific to the climate. This is an important point some athletes miss. If an athlete trains in hot and dry conditions, they will still have to get acclimated to racing in hot and humid conditions because their sweat rate will be greater under these conditions. Some would argue that athletes that train in hot and humid conditions who race in hot and dry conditions are better prepared because their bodies are adjusted to the heat but their sweat rate may be less since their body heat regulation will be mostly through evaporation.

How long do the benefits of heat acclimatization last?
The benefits of acclimatization are said to last seven days and then begin to decline with aproximately 75 per cent of the gains lost by three weeks once heat exposure is stopped. To maintain the benefits of acclimatization you only need to expose yourself to the heat two times per week with exercise intensity greater than 50 per cent of your VO2 Max for up to 60 minutes in duration.

What's the difference in racing in a hot and humid climate compared to a hot and dry climate? How does this impact your hydration plan?
In hotter and dryer conditions there is little or no change in sweat rate. The reason is due to the high rate of cooling as a result of sweat evaporation from the skin. Athletes who establish their sweat rate under these conditions should be confident in balancing their fluid intake with output. Athletes who come from hot/humid environments and race under hot/dry conditions must be very careful. These athletes will not see the usual sweat dripping from their skin the way they do under humid conditions, and may perceive they need less fluid. This is not the case and these athletes should closely adhere to the hydration plan they've established under the humid conditions.

In hot and humid conditions, there is a significant increase in sweat rate. Sweat is only effective for cooling if it evaporates. Since high humidity greatly reduces or prevents evaporation, the sweat stays in a fluid state on the skin and the risk for increase elevated core temperature and risk for heat illness rises. Athletes who train under hot/ humid conditions are usually accustomed to the vast amounts of sweat lost, and the greater volume of fluid needed, to maintain hydration status. It is the athletes that come from mild climates or hot/dry conditions that tend to suffer the most and need time to acclimate to the heat and humidity. It is fair to say that these athletes will most likely need to consume more fluid then they are accustom to during the race in order to maintain adequate hydration state.

Tips to help you prepare to race in the heat:
· Include some of your training sessions during the warmer parts of the day. These should be easy to moderate intensity workouts of up to one hour in duration. For the athletes I coach, I have them start some of there runs at the same time of day they anticipate starting the run segment of the race. Closely monitor weight changes during these training sessions and use the data to help dial in your race day hydration plan.

· Try to mimic the racing environment in training. If you are in a milder climate than where you will be racing, you can layer on additional breathable clothes (no plastic suits!) to create warmer conditions. Training indoors with additional layers of clothes and the heat turned up can assist the

body in the acclimatization process.

· Get to the starting line optimally hydrated. Consume enough non alcoholic, non caffeinated liquids in the days leading up to the race so that you are visiting the restroom every few hours.

· Know your sweat rate and reevaluate when the environmental conditions change. Aim to consume adequate fluid to keep weight loss on the bike to a minimum and to less than two per cent on the run.

· Keep your cool. Wear light colored clothing made of a moisture wicking fabric to help draw water away from the skin. Apply cold water to your head and neck or place ice in your running cap.

· If you have not been able to get fully heat acclimated before the race, know that you will mostly likely need to consume more fluid and electrolytes during the race. A conservative increase is 4-8 oz more liquid per hour.

The bottom line: if you want to be able to race well under either conditions, you need to train or simulate training under these conditions AND understand how your fueling strategy may be impacted by the changing conditions. More on fueling for the heat next month.

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