

## **Does Proper Hydration Play a Significant Role in Training and Performance in Cooler Environmental Conditions?**

*By Ronald Mendel, PhD*

Now that summer is over and we are heading into the winter months, how many of you are already changing some of your exercise related habits? In particular, what is your thought process regarding proper hydration and energy needs? Even though winter (colder environmental conditions) is upon us, proper hydration and nutrition should not be ignored. In fact, you might be surprised to know that there are more environmental issues that must be addressed for athletes to maintain their performance levels in the cold than in the heat.

Here's what we know.....

Cold exposure has been shown to cause fluid losses on the order of 2-5% of body mass (O'brien et al. 1996). Many reasons have been linked to this dehydration induced by cold exposure including reduced voluntary fluid intake, poor access to water, reduced thirst sensitivity, sweating due to exercise and clothing (O'brien et al. 1996, Ramanathan 1964, Freund and Sawka 1996, Wyant and Caron 1983).

Kenefick et al. (2004) examined whether hypohydration (dehydration) altered thermoregulation and cardiovascular responses to exercise in the cold. We know that these responses are altered in the heat, but it was unclear in the cold. The data demonstrated that moderate intensity exercise while dehydrated did not alter metabolic heat production, skin temperature or heat loss. It also did not increase thermoregulatory or cardiovascular strain. Despite these findings, one thing remains clear. It is imperative to maintain hydration status even in cold environments.

From a practical standpoint, prolonged exercise in the cold can still produce heat at a greater rate than heat is lost. This will obviously lead to heat storage and a subsequent increase in core temperature. This increase in core temperature can, and will, be compounded by dehydration due to any one of the reasons noted earlier.

Ventilation (breathing) increases in the cold. Most people don't realize how much fluid is lost through ventilation even normally. So when ventilation is increased due to cooler temperatures, the amount of fluid loss just from breathing has the potential to be rather significant.

Reduced voluntary intake is also a major factor that may lead to dehydration of athletes while exercising in the cold. Athletes tend to think less about fluids and proper hydration because they don't perceive themselves to sweat as much when they train in the cooler environment, and therefore, have a tendency to consume less fluid. This may or may not be true depending on the clothing that is worn. An overall reduced sensitivity to thirst is also a contributory factor in not consuming enough fluids while exercising in colder environments.

Also of significance, and maybe even more important than hydration, is the metabolic response to training in cold temperatures. Cold exposure increases the use of carbohydrates as a fuel. Even during light exercise, muscle glycogen decreases at a faster rate in colder temperatures than warm temperatures. This increases reliance on glycogen reduces the ability to exercise at a higher intensity for extended periods of time because carbohydrates

fuel intense exercise. Therefore, ingesting fluids and carbohydrates prior to and during exercise in cooler environmental conditions seem to be quite prudent.

Let's not forget about those that take their training indoors during the cold times. Environmental conditions may more closely mimic those of summer, but one can still make the argument that hydration is still less of a concern. Because of this, athletes may not properly hydrate themselves prior to training and therefore be setting the stage for sub-optimal training. With potentially higher sweat rates during high intensity indoor training, optimal hydration, adequate carbohydrate intake and replacement of lost electrolytes still remain a priority for optimal performance. Fortunately, a product like Motor Tabs fits the bill. Don't be fooled by the weather outside - let Motor Tabs help you continue to train optimally by providing you with the proper hydration and fuel to be a winner!