

The Environment, Heat, And Your Response To It

Every summer I contemplate addressing the issue of **environmental factors** impacting sport performance. Little has been written in the bowling community on the topic. For some time now there seems to be a lack of attention paid to sports and athletes who compete under fewer stressful environmental conditions, yet experience these same difficulties. Such environmental factors that influence our performance include air temperature, humidity, hydration, and internal temperature control. All four have both a direct and indirect influence on your sport performance, health, and daily living. This month **BTM** will explore a hot weather discussion for bowlers that will include defining **performance inhibitors and enhancers, heat stressors, and a single preventive measure.**

As the sweltering summer rolls around and passes on by, your vulnerability to heat and humidity increase with exposure to the environment. The question of environmental factors and their effects on sport performance is often posed to those who are active under extreme environmental conditions or their exercise requires large amounts of energy expenditure (i.e., endurance in nature). Sport enthusiasts whose activity is primarily physically demanding should be aware they are usually more susceptible to heat related stressors than those of us who bowl in climate controlled environments. Although, just because we perform in a controlled environment does not negate the fact that we **can** and **do** experience the effects of heat stressors. Even beyond bowling, those of us who actively exercise place ourselves at risk of heat related obstacles each training session. Let us take a closer look at heat stress and your body's adjustment mechanism.

Temperature Regulation

Human physiology is designed so that it regulates your internal body temperature on a constant basis. The **hypothalamus**, near the base of the brain, is our built-in thermostat governing temperature control. At rest, average internal temperatures hover around 99.2 degrees F, but during activity can rise to temperatures above 108 degrees F.

Science has proven our ability to reduce and alleviate heat is less than efficient. In fact, metabolically, our bodies produce heat that becomes a liability during exercise, sport performance, and in warm weather climates. In the course of daily activity we expend energy and burn calories producing heat. By increasing training and sport performance, greater amounts of heat will accumulate at faster rates. As heat accumulates in the body, a regulatory response occurs to maintain a stable temperature. This bodily response usually results in heat transportation through the blood stream to the skin and released to the environment as sweat. Sweat evaporation into the environment has been shown to release more than 80% of the excess heat accumulated. The sweating response is one of your body's most proficient means to dissipate excess heat and maintain a constant stable temperature.

Water in the body acts as a sponge when heat is present during activity. By absorbing heat, the body's water reservoir also assists in temperature regulation enabling temporary control. Though, when water is low or absent and heat accumulates at greater rates due to increased activity, the sponging effect is neutralized. Unfortunately, our built-in heat regulating system has its faults and inefficiencies. Heat generally accumulates at rates surpassing dissipation placing an individual in danger. **In fact, the lasting effects of prolonged elevated body temperature includes:**

- Damage to the **kidney**
- Damage to the **nervous system**
- Injury to the **hypothalamus**
- Possible **brain** damage
- The early onset of **fatigue** - a bowler's enemy

Hydration - The performance inhibitor or enhancer?

Relating to hydration and the water level in the body, we must first understand and differentiate dehydration from rehydration. **Dehydration** is the loss of body water primarily due to the sweating response for temperature regulation. As discussed earlier, heat is released to the environment through sweat. During the sweating response, water is drawn from several areas of the body to help with heat dissipation that often leaves these compartments drained or low on water. Due to this compromise in water usage, the early onset of fatigue is often a result.

Studies have shown that dehydrated individuals are quite intolerant of exercise and heat stress. As dehydration **unknowingly** sets in, sport performance begins to drop off due to the fatigue factor. Dehydration ultimately reduces the time an athlete can work before exhaustion. Both the heart rate and body temperature begin to rise, valuable nutrients are lost in sweat, and other bodily functions that thrive on the valuable supply of water are compromised. The point is, during

periods of increased temperatures, humidity, or energy output, the need to maintain bodily water is far greater than any other current need.

A Single Preventive Measure

Rehydration, known as the replenishing of fluids before, during, and after activity minimizes dehydration, delays fatigue, and assists in the absorption of heat. Drinking enough fluids, whether it is cold water or sport drink, is imperative when competing in a bowling tournament or beginning your daily exercise routine. **Maintaining a constant flow of fluids into the body is the best preventive measure you can perform.** Not only does it enable you to maintain a stable body temperature and delay a sweating response, but also it fights off muscular fatigue while assisting in fat burning. Yes that's right. Water enables you to burn fat more efficiently by allowing the liver and kidneys to work at full capacity. **Therefore, to lessen the rise in internal body temperature through heat absorption, reduce the stress placed on the circulatory system, and enable efficient fat burning, cold fluids are the answer and the enhancer.**

The American Council on Exercise recommends we strive to drink 6-8 ounces of fluid every 15-20 minutes during activity. Since we have determined bowling is a physically demanding sport, it is suffice to say we accept similar recommendations. The previous information regarding heat stressors, temperature regulation and hydration should be sufficient motivation toward continual fluid ingestion. I suggest carrying a water bottle to the bowling center or exercise facility so you can sip water or a sport drink during your activity. Do not let the silent adversary of fatigue strike at the most inopportune time. Instead, prepare through prevention with proper hydration to enhance rather than inhibit your bowling performance and exercise training. Carry a water bottle at all times and drink water or other healthy fluids that enable your body to work at full capacity while maintaining its desired temperature.

Next month we will examine some knee strengthening exercises to propel your finish position.