Sports And Performance Nutrition

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Week-02

Lecture-10: Hydration and electrolytes

Hydration underpins athletic performance. Let's understand hydration better. What is the function of water, water balance, the importance of correct hydration strategies for athletes. What are the recommendations for water consumption and what can dehydration mean for an athlete. What is the universal solvent in the body from the blood that carries the oxygen to the glucose that needs to be carried to a working muscle. All the transportation is dependent on water.

A body itself is made up of 60 to 70% water and in children even more. Trained athletes in fact also contain more water in their body because of the higher lean body mass. Unlike adipose tissue, lean body mass or muscles hold more water. Water forms protection around the joints.

Water is a part of the mucous membrane and also protects the joints which can be a very important part for an athlete. Other than aiding digestion and transporting these nutrients, water also has a very important function of excretion be it the urine or the faecal matter to the sweating. Important organs as the heart and the brain are also surrounded by a layer of water. The food we eat and the fluids we consume is of course a source of our water intake. But did you know that through some chemical reactions even from our breath, food is broken down and water is a byproduct of these metabolic reactions though it accounts to a very small amount.

As food is broken down and energy is being released, the body also generates heat. This can be the deciding factor of the exercise capacity for an athlete. When the energy or the currency ATP is being used, this generated heat can increase the body temperature. Equate water intake can support sweating mechanisms where the evaporation process can help dissipate this heat thereby lowering the co-body temperature where an athlete can prolong his exercise. Thus, water has a very very vital role to play in the thermoregulation for athletes if there is inadequacy in the water intake.

The increase in the co-body temperature make the athlete very fatigued and lower his exercise capacity. Not only the sweating or the physical strain that an athlete goes through, even a small dehydration of 1% can lower the cognitive ability or the thinking for an athlete. So if an athlete wants to stay sharp and have clear reasoning, who would have thought that water can be also equally important. Thus, by consuming very calculated amounts of water, an athlete can lower rate of perceived exertion thereby prolonging his exercise duration. For an athlete, an ideal state of hydration is called euhydration where the intake of the water balances the loss of water from sweat and urine.

Many times we also see athletes over consuming water and that can lead to hyper hydration and typically in my practice, I do notice that the athletes do not take care to consume enough water and that can be hypo hydration. When the lost body fluids through sweat and urine is not replaced during the workout, that can lead to loss of body fluids and that is dehydration. There are several parameters that can influence the hydration status of an athlete. The sport itself and the position in which that athlete is playing can be a huge determining factor. The amount of time that an athlete is expected to play, the intensity with which he needs to run, what is his sporting gear? Does he have to wear heavy jackets or does he have to wear helmet? What are his other requirements of the sport? Is it an indoor sport or an outdoor sport and the ability to take water through the training or the game? For example, in games as football and cricket, you have to wait for the stipulated time to rehydrate either at half time or during the water break.

Based on all of these, the athlete can lose on an average of half to one litre of sweat during a training time. In hot and humid weather, obviously the athlete is going to sweat more and the needs for hydration becomes more crucial. Similarly, if you go into higher altitude or you are practicing a high altitude training, you have to ensure that you have to hydrate well. You will lose water through respiration. So ensuring good hydration strategy can improve exercise.

Similarly, acclimating to the weather can help you to improve your hydration status. Young children have not fully developed the thermoregulatory mechanisms. They mainly rely on the blood to flow through the entire body to help cool the core body temperature. Some studies have already suggested that young athletes are typically dehydrated because they fail to ensure good hydration practices. If they are dehydrated, automatically the lower blood volume is compromised in taking care of the cooling mechanism.

As children have lower sweat rates, it is very important to practice U-hydration and ensure children consume water hours before the training and not just during the training to avoid the heat stress. As children sweat less, to rely on the evaporation of the sweat to cool the body which is found in adults is not possible. As mentioned earlier, consuming adequate fluids even during intense exercise can support the blood circulation in young children so that the body temperature can be cooled off through this. Even in special individuals, there is already a challenge of restricted water intake. This can make the heat regulation even more difficult.

So in addition to consuming fluids, other cooling mechanisms as using a chilled towel as a cooling assistance can be useful here. What are the recommendations of water consumption? On an average, 5 ml per kg body weight of water is recommended even before you start your training. So for an individual say of 50 kgs, 5 into 50 is approximately 250 ml of water and 250 ml is just a glass of water. During exercise, it is recommended to consume about 150 to 250 ml of water. Again, it's about half to one glass of water every 15-20 minutes provided the sport has an allowance to drink water during the game.

If the workout or the training period is less than one hour, even consuming plain water will suffice but if the intensity of the workout is higher, if the training period is more than 45 minutes to one hour, consuming chilled fluids along with added carbohydrates and some salts can help hydration. Then we'll discuss how to prepare an isotonic drink with 6% carbohydrates and similarly incorporating the salt. If it is a competition then definitely sports drink can be a very convenient option to ensure hydration during the match. Do remember the sports drink

contain phosphoric acid and that can corrode the enamel. So always remember to consume sips of water which is called as water chasing after consuming a sports drink.

Post workouts, the recommendation of water intake is the same amount of weight you have lost as sweat loss. For example, if you're 50 kgs and you lost 1 kg after the training, you need to make sure approximately you consume about 1 litre of water. You don't have to rush to consume the entire litre of water in one go. You can consume sips of water through a course of 1-2 hours to make up for the sweat loss. Planning hydration before, during and after your training can not only optimize your training, can prevent heat stress and injury.

A dehydrated athlete not only puts a lot of strain on his heart for circulation but also then has to rely on the muscle glycogen for energy. In hot and humid conditions, several times you will notice an athlete cramp. The cramps can be due to several reasons but one important aspect can be the lack of fluids. Dehydration can increase heat cramps and increase the risk of injury. From headache, nausea to being disoriented.

If you do not take care and ensure immediate hydration that can even lead to a heat stroke, so can you rely only on thirst for you to suggest if you need to drink water or not? For an athlete this is definitely not recommended. Relying only on thirst is not the ideal practice for an athlete. So following the recommended hydration guidelines to plan your water intake before, during and after along with the stipulated amount of carbohydrate and with electrolytes such as salt which contains sodium can be the most useful to enhance performance. In my practice I am often again asked should I just consume eight glasses of 8 ounce water? Well for a training day an athlete may have much higher demand than this but yes if it is a non-training day each to their own and dehydration can be very individual and as long as the athlete is comfortable and can gauge his urine color which we will also discuss in just a bit you can adapt to your hydration requirement to suit your need. To summarize athletes need to focus on good hydration strategies.

Consuming fluids before, during and after can prevent dehydration and the risk of heat injury. For longer duration of workout consuming your water along with six to eight percent of carbohydrates can help you absorb water thereby improving hydration. Similarly when you work out more than one hour adding half teaspoon of salt for every litter of water can help you retain the body water of fluids as sodium holds the water and prevent dehydration. Thank you for listening. For an athlete the most important thing is the hydration level.

So I always keep a water bottle with me and keep hydrated myself during my competition during my training or during my travel also and the second most important thing for me is recovery.