Sports And Performance Nutrition

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Lecture-11: Practical implications of hydration

If you recollect, for those athletes who work out for a duration of less than 1-hour, consuming plain water will be enough. However for those athletes who have longer training duration, who sweat and lose electrolytes, their water and the lost electrolytes and most importantly as their blood sugars are getting lowered and after about 1.5 to 2 hours even the liver glycogen is dipping. It is very important for athletes to replenish the carbohydrates and the easiest way of doing that can be by adding the recommended amount of carbohydrate in your water. An isotonic drink is the ideal way to consume fluids. It contains a similar amount of carbohydrate that is also found in your body.

Adding carbohydrates to your fluids also enhances the absorption of water thereby aiding hydration. So for an athlete isotonic drinks are the best way of consuming fluids without causing any stomach discomfort or gut distress. For some athletes who need a refreshing drink if they work out for smaller duration about even half hour, a hypotonic drink which contains less than 6% of carbohydrates can suffice. A hypotonic drink typically will contain over 8% of sugars and this can definitely cause a bit of disturbance.

The absorption of concentrated amounts of carbohydrate solution can lead to a bit of stomach discomfort thereby causing gastric distress. For athletes who train in a very hot and humid climatic conditions or when the weather can be very warm the temperature of the water itself can improve the intake. The working muscle which is burning a lot of ATP we have already learnt also generates heat and this heat can cause central fatigue by increasing the core body temperature. These athletes find it very difficult to sustain their training. Cool and chill fluids can not only sometimes improve the taste of the water but these cooling liquids can also lower the core body temperature thereby delaying fatigue.

In endurance athletes even ice slush can enhance exercise capacity. An athlete not necessarily has to focus on consumption of chill fluids during an exercise. These fluids can also be consumed 1 or 2 hours prior to the workout if you are already expecting to train in a very hot environment. For those athletes who don't really enjoy drinking plain water adding some taste to the water can really encourage them to consume more water. Now we already know that adding 6 to 8% of carbohydrate which is roughly about 1 teaspoon of heat palm jaggery or jaggery in every 100 ml of water can help the body retain water.

Similarly adding salt to the same water can also improve the taste of the water and improve its intake. Sometimes athletes oversee the impact of simple hydration which can improve your exercise ability. A loss of even 2 to 3% of your body weight in sweat loss can not only take a toll on your body but can also lower your cognitive abilities. We know from several conclusive studies that dehydration in athletes can lower performance both physically and mentally. Did

you ever wonder that the menthol mouthwash could have some athletic advantages? We have some studies suggesting that just by using the menthol mouth rinse it has certain cooling effect on the neurons and that can lower the rate of perceived exertion in athletes.

There are also few athletes who lose excessive amount of not just sweat but a lot of sodium and they call the salty sweaters. You will sometimes notice residue of salt on clothing after training or for those athletes who practice endurance exercise can be benefited by some other hyper hydration strategies. Hydration protocol using food grade of glycerine or glycerol can help athletes to hydrate better. An average of 1 gram glycerol with 25 ml of water per kg body weight can be consumed 1 or 2 hours before the endurance training or if you want to retain more water in the body couple it with sodium for maximum benefits. This can ensure the body retains more water by lowering the urine output thereby delaying dehydration.

So, you have taken measures to ensure a good hydration protocol. Is there a way to check your hydration status? There are also some equations that use some basic math about water intake, your urine output and your body weight and that requires a bit of effort and that can be complicated for an athlete. So, the simple way to ensure your hydration is to track your urine color. When I ask an athlete what was your urine color after a workout I am surprised that many athletes don't pay attention to their urine color at all. If the urine color is very close to being transparent you obviously consume too much water and that's not desirable either.

A slight hue or a pale yellow urine is a good sign of hydration. The darker the urine color gets it indicates it is hypertonic concentrated. So, please be aware after a training session when you pass urine or in the process of micturition pay a close attention to what is the urine color and ensure it remains as pale as possible. Particularly early morning urine color which is also extremely dark can be an indication of dehydration. The first thing you need to do thereafter is obviously consume a lot of water.

There is another simple way to track your hydration status without having to worry about equations and calculations. You weigh yourself before training and weigh yourself after you finish your training. For example, an individual of 50 kgs has lost 1 kg of sweat. So, that's a deficit of 1 kg. Simply you need to consume the equal amount of water that is lost as sweat loss which is roughly about 1 liter.

You can also opt to consume 1 to 1.5 percent. So, for every kg lost if you are training in a very hot and humid environment you can also plan to consume about 1.5 liters over 1 to 2 hours. Do remember you can add the carbohydrates and also the electrolytes such as the salt especially if you have back to back training.

By adding carbohydrates and the salt you prevent the dilution of the body fluids and ensure better hydration. Well, have you ever heard of training dehydrated? For those athletes who are planning for events in very hot and humid environment and want to acclimate can emulate the similar conditions by training also in a similar environment. So, by deliberately training dehydrated you are allowing your body to adapt to those conditions. So, the heat acclimation can actually in due course of time lower your sweat and sodium loss. In an ideal scenario you want to restrict the loss of sweat to about 2 percent of your body weight.

For 100 kgs that is 2 kilos. So, for a 50 kg individual that will be 1 kg loss of sweat. For those who are exercising in cooler environments the sweat loss can stretch up to 3 percent of the body weight. If you remember we have already discussed in the regular scenario if an athlete

had to be dehydrated beyond 3 percent that can lead to a lot of cardiovascular strain and increase the risk of heat injury and illnesses in athletes. For those athletes who are looking for training adaptations training dehydrated can improve their anaerobic capacity do ensure for rehydration adding carbohydrates and electrolytes as salt can improve your hydration.

This addition of carbohydrate and sodium as I reiterate can be very useful for those athletes who have multiple training sessions through the day and for those master athletes who enjoy an occasional drink here is a reminder that alcohol is a diuretic it dehydrates you. So, for those athletes who are looking to maximize their glycogen recovery and hydration please steer clear from alcohol consumption post your training. We have been talking about the importance of sodium now how much sodium should an athlete consume on an average about 50 millimoles per liter which is roughly about a half teaspoon of salt can be a useful and a simple guide for athletes to use during their training. Sports rings can be very useful especially in a competitive setting some other typical fluids that are used is milkshakes and also tender coconut water. American college of sports medicine also gives you the simple method to ensure hydration using your pre-exercise to your post exercise weight and consuming 1 to 1.

5 times of that liquid. A similar example here for a 60 kgs of a reference man losing 1 kg of body sweat ensure about 1.5 litters if you would like to target 1.5 percent of fluid intake. Do remember over drinking plain fluids can sometimes not work in your favor that is where the understanding of electrolytes can be very useful.

The most important electrolyte for an athlete is sodium and that is commonly found in the table salt as sodium chloride. Sodium and chloride are electrolytes found outside the cell in a human body and potassium inside the cell. Other than the maintenance of water electrolyte balance sodium has a very important function in the contraction of muscles. It has a direct impact on the blood pressure and nerve impulses can be very important for an athlete to stay sharp. 1 teaspoon of common salt contains about 2300 mg of sodium that is about 100 millimoles.

I do notice several athletes using oral rehydration solution during training. What is different about ORS and sports drink? ORS is typically used in individuals with gastrointestinal problems and ORS is administered to replace very heavy losses of sodium those who have vomiting and diarrhea. So ORS contains lower amount of carbohydrates and three times more sodium of a sports drink. Whereas sports drink is ideally planned for an athlete which is isotonic of a similar sugar of 6 to 8 percent and contains about 25 millimoles of sodium. Do remember sports drink also contain phosphoric acid and that can corrode the enamel and you have to practice water chasing or after you consume sports drink remember to drink plain water so that you don't have dental caries.

On the flip side sports drink are also very costly though convenient for competition days. Do you always have to rely on sports drink? Not necessarily. You can make your own isotonic drink by adding about half teaspoon of salt in a litre of water. By ensuring sodium in your water you can make sure that your body holds more water. Sweat loss can vary among different athletes and various sports.

So the range can be from anywhere 20 all the way to 80 millimoles per litre. Another similarity oral rehydration solution not only contains three times more the amount of sodium. Similarly it also has three times more of potassium too. Then the coconut water is consumed by several

athletes. But did you know that is very low in sodium? Interestingly it is also very high in potassium.

So excessive consumption of tender coconut water for an athlete who loses a lot of sodium and sweats in training can be counterproductive. So what can you do about it? You can simply add about quarter teaspoon to half teaspoon of salt which can bring back the missing sodium into the tender coconut water. That way you can ensure the body is not missing out on sodium. As you see in the comparison the potassium content of tender coconut water is on par to the oral rehydration solution. Even the average amount of sodium present in a sports drink is missing in tender coconut water.

So is there any restriction to sodium consumption in athletes? Rather based on your training intensity, duration and the weather condition an athlete sometimes may need copious amounts of sodium. So what happens to those athletes who over drink water without paying attention to sodium? Very high sweat loss of sodium that can lead to hyponatremia or lowered sodium. Drinking excessive amounts of tender coconut water without realizing its lack of sodium can lead to hyperkalemia or increased potassium leading to irregular heartbeats. Dilation of plain water during training or immediately after an intense or a prolonged training session can further lead to dilution of these body fluids and induce exercise induced hyponatremia. This can be seen in smaller athletes who are ectomorphs or in endurance athletes.

For those athletes who are at the risk of exercise induced hyponatremia ensuring adequate amount of salt intake prior to the training can help avoid this condition. Low-lired sodium in the body coupled with extra intake of plain fluids can make the muscle cramps worse. As I touched upon high altitude training even in the basics of hydration, a reminder for those athletes who are training at higher altitude the similar guidelines of hydration apply. I am also going to be sharing a video of how you can prepare your own isotonic drink. You can either use chilled fluids or diluted fruit juice to the ratio of 2 is to 3.

Simple sugars such as glucose to polysaccharides as maltodextrin that can be made to 6 to 8 percent of an isotonic drink. Adding about half to one teaspoon of salt can ensure the addition of sodium and that way you can make your own isotonic drink and don't have to rely on a store bought or a commercial product. To summarize sports drinks can be useful for athletes in a competition setting where you are very sure about the constituents and don't have to mix and match and worry about calculations to make your own isotonic drink. Athletes who are looking at regular training days and especially if the weather condition is hot and humid cooling your fluids can help you lower your body temperature. Keeping a cooler body can lower rate of perceived exertion and prolong your exercise time.

Adding recommended amount of carbohydrates 6 to 8 percent and roughly about half teaspoon of salt in a litre of water can improve the taste of your hydration drink thereby encouraging you to drink more. You can also add pieces of fruit or some herbs like pudina or anything that you like even cinnamon stick that can be infused water if that can encourage you to consume more fluids. Just paying a little attention to the color of your urine can be the simplest way to track hydration status. I hope you enjoyed listening to this lecture and will engage with you in the forum. I hope the detailed lecture on hydration and the practical implications has helped you.

As a reflection of that I would like to discuss a case study of what actually happens on court. This case study discussion hopefully will give you an insight of what can be the challenges of an athlete in a real life scenario. Here is an adolescent badminton player. Here is an history of hyperhidrosis which means excessive sweating. So as you can see in this photo he is dripping of sweat.

There is not only the challenge of excessive sweating in training but also severe loss of body fluids in competition. Goes without saying his training days itself he needs to carry a change of clothes. Even on competition days he needs to have adequate change of t-shirts. On one occasion in his tournament his shoes were so soaking wet he had to in fact request for a change of shoes. The loss of body fluids can leave this young badminton player exhausted and fatigued.

He barely finishes the first few rounds of matches. You can imagine just by viewing this photo of this young lad how soaking wet he is in his own sweat. His average change of body weight is about 1kg after training. Now let us revisit what we learnt in the hydration and the continued practical implications of hydration. So what can work for this badminton player? I suggest it as I taught all of you folks to genuinely plan his hydration not only during training which is often the biggest mistake in young children.

So to calculate the amount of sodium he is taking perhaps even a salty lemonade or a jal jirapani or even extra salt sprinkled on his food can help him retain body water before training. And on occasions of his tournament days he can also make an effort to take extra salt by salt loading where he will consume calculated amounts of table salt in water over 1 to 2 hours before his tournament. Similarly even glycerol can be used which is typically suggested for endurance athletes. Unlike an outdoor sport I don't know how many of you have had the opportunity to spend some time in a badminton court.

It can be worse. It can get very hot inside and obviously that can be very uncomfortable for a child with a history of hyperhidrosis or excessive sweating. So during his training he can opt for ice slushes that can help lower his body temperature and can improve his body cooling. That can be useful to retain body water and post his training or tournament the badminton player can continue sipping isotonic solutions to ensure there is no exercise induced hyponatremia meaning consuming plain water which further leads to dilution of body fluids thereby further causing excessive urination and loss of body water. Even diluted fruit juice or cordial can be a good option for rehydration. So this way working with this badminton player and educating him and documenting the outcomes can help us track progress of how in the coming weeks his body mass changes before training and after training can improve.

Also for every kg of sweat loss we are able to in some way work around adjusting the sodium to half to one teaspoon of salt starting from before training and during training and if need be even after his workout to ensure he remains hydrated. Also as the badminton player trains on an average of 2 to 3 hours at a stretch it is also equally important to plan his isotonic carbohydrate solutions paid by the use of diluted fruit juice which offers fructose or simple sugars such as glucose or even a polysaccharide as a maltodextrin to ensure that the carbohydrates can retain the body water. Since the young lad typically has challenges in tournament in some way to practice this hydration protocol in a very hot humid environment which is where he faces the most challenge in some way can help him acclimate and improve his hydration. So to summarize consuming fluids with salt or even food with extra salt before

the training set a stage for better hydration during the workout. Chilled fluids to ice slush during the workout along with carbohydrates which I already explained it could be from glucose to diluted fruit juice to maltodextrin to give you 6 to 8% of carbohydrates can retain body water.

If you are a salty sweater or in this case of the badminton player having excessive sweat loss you can opt for commercial products with double the sodium content. Instead of simply consuming plain water post training ensure that you do continue to consume fluids with electrolytes that can make up for the sweat loss. I hope this case study was insightful for you. Hi I am Luft Chilani and I recently competed in junior nationals and I got 5 gold medals and best swimmer award in group 1. I focus on my hydration and eating light so I could feel energetic in my events and I focus on my electrolytes and you can take other sports supplements in right amount right timing and right dosage by a quality which is given by a qualified dietitian to give an extra push to your performance.