Sports Drinks

Water or Sports Drinks?

This is an educational aide memoir and does not represent any medical advice. For that you need to see a qualified medical practitioner, ideally familiar with extreme trekking and climbing.

Version 1.0

Document Control

Version	Text	Date	Author/Reviewer
1.0	Draft	29 April 2017	Lyman
1.1			
1.2			

When a group of us walked the Kokoda Track in Papua New Guinea we were introduced to the idea that too much water can kill you. Overhydration can lead to the salts and electrolytes in your body becoming too diluted. Hyponatremia is the situation in which sodium (Salt) becomes very low. Too little sodium results in degraded muscle and nerve function, cell damage, and eventually, if unchecked, seizures, coma and death. Some of the deaths on the Kokoda Track, we were told, which mystified the trek leaders and authorities at the time, were those which occurred when a trekker was well hydrated, often carrying water, or which happened near streams. Some have been confirmed as overhydration deaths, while others are suspected of being so. Too little water is not good either, something with which we are generally all familiar.

If overhydration is suspected (a difficult thing to discern we would suggest, but should be considered if walking in any warm environment) an immediate antidote is a sports drink since these drinks contain sodium. Which begs the question, how much water and how much sports drinks? And of course the popular perception is that water is better for you than a drink which contains high levels of sugars and other things not good for our health. As with anything it's all about striking the right balance, something our Kokoda trekkers understood. Each trekker balanced fresh water intake each day with 100grams of sports drink powder which was made up into one litre of drink. Along with salt tablets it was a good way to keep up the electrolyte balance on a hard working day.

Merits of Sports Drinks

There are any number of technical studies out there which demonstrate the merits of sports drinks, though often these studies are funded by sports drinks companies. So you may reasonably be a little cynical about them. This short paper attempts to summarise the benefits but does so by drawing on independent scientific publications which are footnoted where appropriate. Use those footnotes to dig around in the more scientific data if you are so inclined.

Sports drinks are a combination of water, carbohydrates, and electrolytes such as sodium and potassium. (Electrolytes are minerals that help your muscles function and your body maintain a water balance.) Ideally your sports drink will contain sodium and potassium and 6-8% of carbohydrates. When mixing up your own drinks it may be tempting to increase the amount of powder to water but as a general rule the manufacturers have the balance correct and there is

no additional merit in increasing the percentages of electrolytes and carbohydrates.

"The type of carbohydrates used in sports drinks also matters. Some have a combination of sucrose, glucose, and fructose, which makes them sweet. These sugars are absorbed into your small intestine as quickly as plain water. Drinks made with fructose as the only carbohydrate source can slow absorption and give you an upset stomach, bloating, or diarrhoea."[1]

Design

Sports drinks are designed to promote rapid fluid replacement by using:

- electrolytes (mainly sodium (salt)) to help keep water in the body,
- flavours to promote voluntary intake (you can be more inclined to drink a sports drink than water), and
- Sodium to promote voluntary fluid intake.[2]

An additional benefit of sports drinks is managing the recovery of water to the body is the addition of glucose to the blood.[3]

"One of the rationales for the inclusion of sodium in sports drinks is to increase intestinal glucose transport and ultimately promote net water absorption. However, the ingestion of carbohydrate drinks with increased sodium concentration (0–50 mEqL−1) does not enhance intestinal water absorption (Gisolfi et al. 2001) or the incorporation of water (Koulmann et al. 1997) or glucose (Hargreaves et al. 1994) into plasma. There are, however, other reasons for the addition of sodium to drinks intended for consumption during prolonged exercise in the heat. Sodium in a sports drink could replace sodium losses through sweating. It is unclear if the losses of electrolytes through sweating affect exercise performance. Electrolytes are rapidly redistributed

[1] Murphy, Dee. "Water vs. sports drinks: can sports drinks beat plain old water?" Current Health 2, a Weekly Reader publication, Apr.-May 2004, p. 18+. Expanded Academic ASAP, go.galegroup.com/ps/i.do?p=EAIM&sw=w&u=uts&v=2.1&id=GALE%7CA115346649&it=r&asid=f658722f6508a70226cccd050be29653.

[2] Post exercise rehydration: potassium-rich drinks versus water and a sports drink Alexandra Pérez-Idárraga and Luis Fernando Aragón-Vargas Appl. Physiol. Nutr. Metab. 39: 1167–1174 (2014)

[3] R. Guijarro Huerta, M. Hernández Fernández, N. Bellido Blanco, MC. Blanco Díaz. Isotonic sports drinks vs water in the hydration recovery after an immediate postpartum period General Hospital Nuestra Señora Del Prado. Talavera de la Reina. Toledo. Spain.

among fluid spaces and apparently their concentration does not vary in active muscle tissue after prolonged exercise. (Costill et al. 1981)."[4]

A useful, independent study by the Australian Institute of Sport suggests a benefit of sports drinks which is often overlooked. The act of drinking activates receptors in the back of the mouth, the soft palate and the side and back of the throat, which then tell the body it is less thirsty, or no longer thirsty. When water is taken the receptors trigger immediately and the sensation of not being thirsty occurs, even if the body does need more hydration. There is some thinking that sports drinks are less prone to trigger the receptors and so the sensation of thirst being slaked is less immediate. The body is then hydrated more completely than if water alone is ingested.[5]

"It is well established that the act of drinking activates oropharyngeal receptors and decreases thirst independently of plasma dilution (Figaro and Mack 1997), which may explain our findings. Furthermore, thirst remained low at the end of the session, a point when participants were again dehydrated. If rapid rehydration is to be achieved after exercise, thirst alone is likely not enough of a stimulus; how humans perceive the need to correct intra- or extracellular water and salt deficits is not fully understood (Obika et al. 2009), particularly after dehydration from exercising in the heat.

It is possible that the thirst mechanism is intended to facilitate slow rehydration with a minimum waste of fluid in the form of additional urine production."[6]

Sports drinks can include citric acid. If they do that acid can etch your teeth and contribute to decay. So drinking through a straw, pouring straight down and otherwise not using the drink as some sort of mouthwash is probably of benefit. Some recommend a quick drink of water after taking a sports drink to help mitigate the effects of the citric acid.

---

[4] Juan Del Coso, Emma Estevez, Rau´l Antonio Baquero, and Ricardo Mora-Rodriguez "Anaerobic performance when rehydrating with water or commercially available sports drinks during prolonged exercise in the heat" Appl. Physiol. Nutr. Metab. 33: 290–298 (2008)

[5] http://www.ausport.gov.au/__data/assets/pdf_file/0008/594170/Sports_drinks_carbohydrate-electrolyte_drinks_-_June_2017.pdf

[6] Juan Del Coso, Emma Estevez, Rau´l Antonio Baquero, and Ricardo Mora-Rodriguez "Anaerobic performance when rehydrating with water or commercially available sports drinks during prolonged exercise in the heat" Appl. Physiol. Nutr. Metab. 33: 290–298 (2008)

A helpful two page summary about sports drinks summary has recently been put together by the Australian Institute of Sport.[7]

Conclusions

There are clear benefits to drinking sports drinks if you are working out heavily or are on a long, hot trek. The consensus seems to be that if you have a balanced diet and are working for up to an hour then a combination of water and diet will provide the hydration and electrolytes which you need. Where the body is working for longer periods, and in environments such as the humidity of the Kokoda Track, there is clear benefit in supplementing your diet with sports drinks.

[7] https://www.ais.gov.au/__data/assets/pdf_file/0009/998802/36194_Sport-supplement-fact-sheets-Sports-drinks-v4.pdf