TeamJet Hawaii Marathon Clinic 2009 Newsletter

"Running is a big question mark that's there each and every day. It asks you, 'Are you going to be a wimp or are you going to be strong today?'"

Peter Maher, Irish-Canadian Olympian

This Weeks Goals:

Introduction to Hills and Speed workouts. Make sure to say Hi to a new person every run and get their story. This way we become a big Ohana!!

This Weeks Workouts:

Tuesday: Hill repeats

Thursday: Speed intervals

Sunday: First Race, 6am at Kapiolani Park, or alternate run at Kapiolani Park at 7am with coaches not running the race.

On My Mind: Hydration

One question that I get a lot is, "what should I drink?" Those of you who know my nationality know the answer I would like to say, but I must stay true to the context of the situation.

Sports drinks

Provide extra energy. During exercise the body draws on stores of carbohydrates for energy so it is important to make sure that stores are brimful before, during and after exercise. To provide the extra energy needed for top performance and repeated training, a high carbohydrate diet is essential. Sports drinks contain quickly absorbed carbohydrates, which can help to give the blood glucose level a boost during strenuous exercise.

Drinks offering to increase your energy and 'pep' you up, such as Red Bull, Purdeys, Lipovitan B3 or Power Horse, tend to be very high in sugar. A drink with more than 10g of carbohydrate per 100 mls slows down fluid absorption. So, the best drinks to choose are water, isotonic sports drinks or one of the homemade recipes above. Whichever you choose, remember to use the same one through training and competition. You will soon get to know how much carbohydrate your body needs for a particular activity to maintain blood glucose levels.

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Help rehydrate. The body sweats to maintain a normal body temperature when exercising. If the lost fluid isn't replaced you can't exercise for as long and performance suffers. Water is best for replacing lost fluids for most exercise but in longer bouts of exercise some sports drinks can help to speed up rehydration. To rehydrate, choose a sports drink, which is isotonic since this can help speed up rehydration. An isotonic drink has the perfect combination of carbohydrates and electrolytes (potassium and sodium).

Convenience. Sports drinks come in a wide range of packaging - bottles, cans, and foil packs - giving a quick and easy way to take fluid and extra carbohydrate.

Isotonic drinks. The consumption of isotonic sports drinks during exercise has been shown to delay the onset of tiredness and thus improve performance. It has been suggested that this may be due to a reduction in the amount of muscle glycogen that is used. A study was designed to examine the effect of the consumption of an isotonic sports drink by recreational runners on muscle glycogen utilization during a treadmill run. The results of the study clearly show that consumption of an isotonic sports drink during treadmill running produced a 28% reduction in whole glycogen utilization and a 42% sparing of glycogen in the type 1 (slow twitch) fibers.

Ultimately you need to find what works for you, but this should send you down the right path. Marathoners in the mid 70's used decarbonated coke as their race drink, even during the Olympics in Montreal!! Some people can actually stomach beer, but I think we are going for maximum benefit here!!

Here is some more info from an article I liked about the topic:

Depletion of the body's carbohydrate stores and dehydration are two factors that will limit prolonged exercise.

Dehydration

Sweating is the way in which the body maintains its core temperature at 37 degrees centigrade. This results in the loss of body fluid and electrolytes (minerals such as chloride, calcium, phosphate, magnesium, sodium and potassium) and if unchecked will lead to dehydration and eventually circulatory collapse and heat stroke. The effect of fluid loss on the body is as follows:

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% Body weight lost as sweat	Physiological Effect
2%	Impaired performance
4%	Capacity for muscular work declines
5%	Heat exhaustion
7%	Hallucinations
10%	Circulatory collapse and heat stroke

Electrolytes

Electrolytes serve three general functions in the body:

- many are essential minerals
- they control osmosis of water between body compartments
- they help maintain the acid-base balance required for normal cellular activities

The sweat that evaporates from the skin contains a variety of electrolytes. The electrolyte composition of sweat is variable but comprises of the following components:

- Sodium
- Potassium
- Calcium
- Magnesium
- Chloride
- Bicarbonate
- Phosphate
- Sulphate

Carbohydrate

Carbohydrate is stored as glucose in the liver and muscles and is the most efficient source of energy, as it requires less oxygen to be burnt than either protein or fat. The normal body stores of carbohydrate in a typical athlete are:

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- 70kg male athlete - Liver glycogen 90g and muscle glycogen 400g
- 60kg female athlete - Liver glycogen 70g and muscle glycogen 300g.

During hard exercise, carbohydrate can be depleted at a rate of 3-4 grams per minute. If this is sustained for 2 hours or more, a very large fraction of the total body carbohydrate stores will be exhausted and if not checked will result in reduced performance. Recovery of the muscle and liver glycogen stores after exercise will normally require 24-48 hours for complete recovery.

During exercise there is in an increased uptake of blood glucose by the muscles and to prevent blood glucose levels falling the liver produces glucose from the liver stores and lactate.

Consuming carbohydrate before, during and after exercise will help prevent blood glucose levels falling too low and also help maintain the body's glycogen stores. Many athletes cannot consume food before or during exercise and therefore a formulated drink that will provide carbohydrate is required.

Fluid absorption

There are two main factors that affect the speed at which fluid from a drink gets into the body:

- the speed at which it is emptied from the stomach
- the rate at which it is absorbed through the walls of the small intestine

The higher the carbohydrate levels in a drink the slower the rate of stomach emptying. Isotonic drinks with a carbohydrate level of between 6 and 8% are emptied from the stomach at a rate similar to water. Electrolytes, especially sodium and potassium, in a drink will reduce urine output, enable the fluid to empty quickly from the stomach, promote absorption from the intestine and encourage fluid retention.

What's wrong with water?

Drinking plain water causes bloating, suppresses thirst and thus further drinking. It stimulates urine output and therefore is inefficiently retained. A poor choice where high fluid intake is required. Water contains no carbohydrates or electrolytes.

Sports Drinks

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There are three types of Sports drink all of which contain various levels of fluid, electrolytes and carbohydrate.

Type	Content
Isotonic	Fluid, electrolytes and 6-8% carbohydrate
Hypotonic	Fluids, electrolytes and a low level of carbohydrate
Hypertonic	High level of carbohydrate

The osmolality of a fluid is a measure of the number of particles in a solution. In a drink these particles will comprise of carbohydrate, electrolytes, sweeteners and preservatives. In blood plasma the particles will comprise of sodium, proteins and glucose. Blood has an osmolality of 280-330mOsm/kg. Drinks with an osmolality of 270-330mOsm/kg are said to be in balance with the body's fluid and are called Isotonic. Hypotonic fluids have fewer particles than blood and Hypertonic have more particles than blood.

Consuming fluids with a low osmolality, e.g. water, results in a fall in the blood plasma osmolality and reduces the drive to drink well before sufficient fluid has been consumed to replace losses.

Which is most suitable?

Isotonic - quickly replaces fluids lost by sweating and supplies a boost of carbohydrate. This drink is the choice for most athletes - middle and long distance running or team sports. Glucose is the body's preferred source of energy therefore it may be appropriate to consume Isotonic drinks where the carbohydrate source is glucose in a concentration of 6% to 8% .

Hypotonic - quickly replaces fluids lost by sweating . Suitable for athletes who need fluid without the boost of carbohydrate - jockeys and gymnasts.

Hypertonic - used to supplement daily carbohydrate intake normally after exercise to top up muscle glycogen stores. In ultra distance events high levels of energy are required and Hypertonic drinks can be taken during exercise to meet the energy requirements. If used during exercise Hypertonic drinks need to be used in conjunction with Isotonic drinks to replace fluids.

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Seven Rules of Hydration

1. The rate of passage of water from your stomach into your small intestine depends on how much fluid is actually in your stomach. If there is lots of water there, fluid flow from stomach to intestine is like a springtime flood; if there is little water, the movement resembles a lightly dripping tap. Therefore, to increase stomach-intestinal flow (and overall absorption of water) you need to deposit a fair amount of liquid in your stomach just before you begin your exercise. In fact, 10-12 ounces of fluid is a good start. This will feel uncomfortable at first, so practice funneling this amount of beverage into your "tank" several times before an actual competition.
2. To sustain a rapid movement of fluid into your small intestine during your exertions, take three to four sips of beverage every 10 minutes if possible, or five to six swallows every 15 minutes.
3. If you are going to be exercising for less than 60 minutes, do not worry about including carbohydrate in your drink; plain water is fine. For more prolonged efforts, however, you will want the carbohydrate.
4. Years of research have suggested that the correct concentration of carbohydrate in your drink is about 5-7%. Most commercial sports drinks fall within this range, and you can make your own 6% drink by mixing five tablespoons of table sugar with each litre of water that you use. A bit of sodium boosts absorption; one-third teaspoon of salt per litre of water is about right. Although 5-7% carbohydrate solutions seem to work best for most individuals, there is evidence that some endurance athletes can fare better with higher concentrations. In research carried out at Liverpool John Moores University, for example, cyclists who ingested a 15% maltodextrin solution improved their endurance by 30 per cent compared to individuals who used a 5% glucose drink. The 15% drink also drained from the stomach as quickly as the 5% one, though many other studies have linked such concentrated drinks with a slowdown in water movement.
5. A 6% "simple sugar" drink will empty from your stomach at about the same rate as a fancy 6% "glucose polymer" beverage, so don't fall for the idea that the latter can boost water absorption or enhance your performance more than the former, and don't pay more for the glucose-polymer concoction.
6. Contrary to what you've heard, cold drinks aren't absorbed into your body more quickly than warm ones. However, cold drinks are often more palatable than warm ones during exercise, so if coldness helps you to drink large quantities of fluid while you exert yourself, then keep your drinks cool.
7. Swilling drinks during exercise does NOT increase your risk of digestive-system problems. In actuality, most gut disorders that arise during exercise are caused by dehydration, not from taking in fluid. Dehydration induces

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nausea and discomfort by reducing blood flow to the digestive system, so by all means keep drinking!

Water Intoxication

Intracellular fluid and interstitial fluid have the same osmotic pressures under normal circumstances. The principal cation inside the cell is K+ (Potassium), whereas the principal cation outside is Na+ (Sodium). When a fluid imbalance between these two compartments occurs, it is usually caused by a change in the Na+ or K+ concentration. Sodium balance in the body normally is controlled by aldosterone and ADH (antidiuretic hormone) . ADH regulates extra cellular fluid electrolyte concentration by adjusting the amount of water reabsorbed into the blood by the distal convoluted tubules and collecting tubules of the kidneys. Aldosterone regulates extra cellular fluid volume by adjusting the amount of sodium reabsorbed by the blood from the kidneys, which, in turn, directly affects the amount of water reabsorbed from the filtrate.

Certain conditions, however, may result in an eventual decrease in the sodium concentration in interstitial fluid. For instance, during sweating the skin excretes sodium as well as water. Coupled with replacement of fluid volume with plain water, these conditions can quickly produce a sodium deficit. The decrease in sodium concentration in the interstitial fluid lowers the interstitial fluid osmotic pressure and establishes an effective water concentration gradient between the interstitial fluid and the intracellular fluid. Water moves from the interstitial fluid into the cells, producing two results that can be quite serious:

- The first result, an increase in intracellular water concentration, called over hydration, is particularly disruptive to nerve cell function. In fact, severe over hydration, or water intoxication, produces neurological symptoms ranging from disoriented behavior to convulsions, coma, and even death.
- The second result of the fluid shift is a loss of interstitial fluid volume that leads to a decrease in the interstitial fluid hydrostatic pressure. As the interstitial hydrostatic pressure drops, water moves out of the plasma, resulting in a loss of blood volume that may lead to circulatory shock.

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