Team CdLS Saratoga Palio ½ Marathon & 5K Training

Tips for the Week of 8-29-2011

There are **3** weeks to go before the Saratoga Palio Half Marathon & 5K.

Ok sports fans……we're getting close now. Next week is your last long run and then we start the week long **taper phase**.

Labor Day Week-End

Labor Day weekend is coming up and many of you may be heading out of town. It's one of those weeks when you have to be flexible with your training schedule. As mentioned in earlier tips, the long run and mid-week pace runs are the most important workouts. You need to fit them in with the rest of your activities.

This quote from Bob Glover, author of The *Runner's Handbook* and *The Competitive Runner's Handbook*, sums it up perfectly:

"The single most important ingredient to marathon success is the long run. "Going long" is a hallowed weekend tradition that is despised and loved, feared and revered, bragged about and complained about. Whether you like long runs or not, one thing remains clear: You have to run them if you want to maximize your potential on marathon day. The long run can make you physically and psychologically stronger or it can destroy you, turning running into a painful task. The long run mirrors the marathon itself: it demands attention and respect."

If you can't do your regular long run routine over the Labor Day weekend then you have a number of options. You can run on your own when you're out of town. It's a great way to explore a new area. However, measuring a course, getting water and Gatorade during the run, and just finding a few hours for the run can all be challenging.

Another option is to move your long run to Thursday or Friday. You can then move the pace run to the week-end. It should be a lot easier to fit in the shorter pace run while you're out of town.

If you end up running by yourself while out of town, you'll need to make plans for fluid replacement. Choose a course that may have water fountains. That way, you only need to worry about Gatorade. You can set up your own aid station by dropping off Gatorade ahead of time and then run a loop that allows you to pass the station several times. A better option is to carry Gatorade with you on the run. A hydration belt, such as those manufactured by Ultimate Direction or Nathan Sports, allow you to carry water, Gatorade, gels and keys. The extra weight is evenly distributed around your waist. Check out their web-sites for some examples.

http://www.ultimatedirection.com/product.php?page=waistpacks

http://www.nathansports.com/our-products/hydrationnutrition

Sports Nutrition: Fluid, Electrolytes, and Minerals

by Timothy D Noakes
(Report from the World Forum on Physical Activity and Sport, Quebec City, Canada)

Introduction

It has been popularly believed that neither fluid nor food should be ingested during exercise, regardless of its duration or intensity. Indeed some even advocated that athletes should restrict the amount of fluid they ingested daily whilst training. These practices ignored an established body of scientific evidence showing that both fluid and carbohydrate (CHO) ingestion during exercise lasting more than 90 min. enhanced performance, the latter by preventing a fall in the blood glucose concentration (hypoglycaemia).

Water rather than CHO ingestion has always been promoted during exercise, in part because of studies showing that runners who are the most dehydrated after distance races had the highest post-race rectal temperatures. This observation led to the belief that rises in rectal temperature and dehydration were causally related, so that water, in large volumes, should be ingested to prevent "heat exhaustion". However, this hypothesis was only partially correct as the major determinant of the rise in rectal temperature during exercise is the metabolic rate which determines sweat rate and hence the level of dehydration. Levels of dehydration have rather smaller, independent effects on rises in core temperature during exercise.

Nevertheless the notion that fluid replacement alone was of primary importance for optimizing performance during prolonged exercise was promoted to such an extent that CHO ingestion was discouraged because it was believed to slow the rate of gastric emptying and hence the rate at which fluid could be replaced during exercise. Only recently have modern studies confirmed the 50 year old findings by showing that the ingestion of CHO solutions also enhanced exercise endurance in the laboratory.

Fluid requirements of athletes

The exact amount of fluid, electrolytes and CHO that should be consumed to losses of Na^+ and Cl^- ions in sweat depend on an individual's level of fitness and heat acclimation: despite a 12% increase in overall sweat-rate after heat acclimation, Na^+ losses in sweat decrease by almost 60%.

The amount or sweat lost during exercise is dependent on the metabolic rate which is proportional to the body mass and the speed of movement. Sweat rates have been studied mostly in runners. Although estimated sweat rates in runners racing over varying distances lasting > 2 hr. are ~ 1 l/hr., their rates of fluid intake are usually < 0.6 l/hr. Such discrepancies result in body mass losses of 2-3 kg and this loss of weight appears to be independent of race duration.

One explanation for the failure of most athletes to meet their fluid requirement during exercise is that they develop symptoms of abdominal 'fullness' when they attempt to drink fluid at the same high rates at which they sweat. Distension of the bowel reduces the desire to drink until the ingested fluid has been absorbed. Feelings of abdominal 'fullness' may be due to limited rates of ingested fluid absorption.

Alternatively, humans may dehydrate during exercise because they lose up to 60 mEq of Na+ for each liter of sweat. As a result, the equivalent of ~ 10 g of replace sweat and energy losses during exercise remain to be established. The NaCl is lost over three hours of exercise and the complete restoration of the fluid and electrolyte losses in three hours of exercise can only be achieved by the consumption of ~10 g of NaCl in food over a 24 hr. period.

Drinking isotonic (280 mOsm) CHO + NaCl solutions will not adequately replace sweat Na+ losses. For the maintenance of plasma and interstitial Na+ ion concentrations and hence volumes, an athlete would have to ingest one litre of a CHO solution containing 60 mmol/l of NaCl every hour. But such a solution is unpalatable. NaCl is only palatable up to concentrations of 20 mmol/l and most athletes can only drink ~ 0.5 l/hr. Hence, whether the replacement of 10 of the ~ 60 mEq of Na+ lost in sweat per hr. significantly helps to maintain plasma volume during prolonged exercise is open to debate.

Detrimental effects of 'voluntary' dehydration during exercise

If no fluid is ingested during prolonged exercise, serum Na+ concentration, osmolality and anti-diuretic hormone activity all increase. The rise in serum Na+ concentration and osmolality correlate with the increase in (body) oesophageal temperature and may be a stimulus for the reduction in skin blood flow and sweating that develops at advanced levels of dehydration. An important goal of fluid ingestion during exercise may therefore be to prevent rises in serum osmolality and thereby maintain sufficient skin blood flow for maximum evaporative and convective heat losses.

With sufficient fluid ingestion, rises in body temperature are attenuated.

However, the magnitude of this effect is not great. Most studies indicate that a 2-4 l fluid loss increases rectal temperature by <1degree C, whereas the rise in metabolic rate associated with high-intensity exercise can increase the rectal temperature by 3-4 degrees C.

Fluid deficits that develop during exercise also proportionately reduce stroke volume and increase heart rate. Falls in stroke volumes are prevented when the rates of fluid ingestion are sufficient to maintain enhydration, but heart rates continue to rise as catecholamine concentrations increase during exercise, even when dehydration is prevented.

Perhaps the greatest effect of fluid ingestion is to improve performance and reduce the perception of effort during prolonged exercise, especially in the heat. In contrast, there is probably less advantage in trying to replace all fluid losses during intense exercise in a thermoneutral environment.

Other electrolytes and minerals

Potassium is the major intracellular ion and is lost from the body in sweat and urine during exercise. However these losses are small (<1 gm even during very prolonged exercise) and are replaced by the normal daily dietary intake of 2-4 g. There is no evidence that potassium supplementation is required by the physically active.

Magnesium is another intracellular ion that, like potassium, is lost in sweat and urine during exercise. But the losses are trivial. There is no published evidence showing that magnesium deficiency is either common amongst the physically active, or that magnesium supplementation can either increase the intracellular magnesium stores, or enhance performance. The balance of evidence indicates that although body iron stores may be marginally reduced in some athletes, especially long distance runners, the incidence of true iron deficiency requiring treatment is no higher in the physically-active than in the sedentary population. Furthermore, the causes of iron deficiency anaemia in the physically active are not different from the causes of the condition present in sedentary persons. There is no indication for the indiscriminate use of iron supplementation by the physically active.

The intake of **calcium** especially by adolescent females, whether or not they are physically active, is usually less than the Recommended Daily Allowance (RDA). Hence adolescent female athletes come from a population that is already predisposed to an inadequate calcium intake. Female athletes in activities that favor thinness such as gymnastics, ballet dancing and running, are especially likely to eat kilojoule-restricted and therefore calcium-deficient diets. The chronic ingestion of a low calcium diet is associated with a reduced adult bone mass and greater risk for the development of osteoporosis including the complications of fractures of the hip or, in athletes, stress fractures. Hence there is a need to insure that females especially, ingest sufficient calcium throughout life.

There is no published evidence that the dietary requirements for **chromium**, **copper**, **zinc** or **phosphate** are increased in the physically active or that supplementation with any of these nutrients will improve athletic performance.

Carbohydrate requirements during exercise

Water absorption into the body largely results from the intestinal re-absorption of NaCl and the co-transport of glucose, galactose or amino acids with Na+ ions. As these solutes are actively absorbed, an iso-osmotic equivalent of water simply follows to keep the osmotic pressure of the small intestine the same as that of the plasma. With the exception of fructose which is only slowly absorbed in humans, the ingestion of any non-hypertonic CHO solution should increase rates of intestinal Na+ re-absorption and fluid uptake.

Originally, the rate of ingested CHO oxidation was assumed to be limited by gastric emptying and considerable emphasis was placed on factors that influence the rate of gastric emptying, such as the drink osmolality and caloric content. More recent studies, however, have shown that the volume of the drink is a more important determinant of its rate of gastric emptying than its osmolality or caloric content. When CHO solutions with vastly different osmolalities are repeatedly ingested in sufficient volumes during exercise, their rates of gastric emptying are quite similar. Furthermore when concentrated CHO solutions are ingested at high rates, the rates of CHO delivery to the intestine exceeds the peak rates of ingested glucose oxidation. Irrespective of the ingestion regimen, rates of ingested glucose oxidation only rise to ~ 1 g/min. after 60-90 min. of exercise at intensities of >50% Of V02 max. Hence, the rate of oxidation of glucose ingested repeatedly during exercise is not limited by gastric emptying, as originally proposed. _ Instead, these and other data suggest that the oxidation of ingested CHO after 60-90 min. of exercise is regulated by the rate at which physiological concentrations of glucose can be oxidised by the working muscles.

Optimal fluid replacement during exercise

Some form of CHO (other than fructose) should be ingested during prolonged (> 90 min.), moderate-intensity exercise. Under these circumstances, liver glycogen depletion and hypoglycaemia can limit endurance.

Whether an athlete should ingest a large amount of CHO at the onset of exercise, however, is open to question. As only 20 g of ingested CHO is utilized in the first hour of exercise, drinking more than that amount of CHO may attenuate the fall in insulin concentration and thereby delay fat mobilization. A resultant increased reliance on the limited working muscle glycogen stores early in exercise could lead to a more rapid onset of muscle fatigue.

High concentrations of CHO accumulating in the small intestine may also impair fluid absorption. While isotonic glucose polymer drinks enter the stomach with an osmotic pressure of 280 mOsm, the products of their digestion can become very hypertonic if they accumulate in the bowel. For instance, a 10 g/100 Ml concentration of unabsorbed glucose in the intestine would produce an osmotic pressure of 555 mOsm which would be expected to 'pull' water into the bowel.

In the first 60-75 min. of exercise, athletes should therefore probably consume 100ml every 10 min. of a dilute (3-5g/100ml) CHO solution. Only after 90 min. of exercise should the ingested CHO concentration perhaps be increased to ~10 g/l 00 ml to match the peak (~l g/min.) rates of blood glucose oxidation.

Interesting…..no? It's a lot more complicated behind the scenes than simply grabbing that cup of water and Gatorade at the aid stations. The physiology is really important.

Suggested Week 3 Training Schedule

Below are suggested workout schedules for the three types of ½ marathon runners for this week.

Week 3	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**	
Type of Runner	**8/29/11**	**8/30/11**	**8/31/11**	**9/1/11**	**9/2/11**	**9/3/11**	**9/4/11**	**Total Weekly Miles**
1st Timer, Novice Runner	3 Miles **Tempo**	**Rest**	3 Miles Easy	2 Miles Easy	**Rest**	10 Miles **Easy**	Rest or Cross Train	18
2nd Timer	Strength & 2 Miles Easy	3 Miles **Tempo**	**Rest**	4 Miles Easy	Strength & 2 Miles Easy	11 Miles **Easy**	Rest or Cross Train	22
Experienced ½ Marathoner	Strength & 2 Miles Easy	3 Miles **Tempo**	**Rest**	5 Miles Easy	Strength & 2 Miles Easy	12 Miles **Easy**	Rest or Cross Train	24

Below is my suggested workout schedule for the **5K** runners for this week.

Week 3	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
Type of Runner	**8/29/11**	**8/30/11**	**8/31/11**	**9/1/11**	**9/2/11**	**9/3/11**	**9/4/11**	**Total Weekly Miles**
5K Runners	**40** min. run at **Tempo**	Cross Train or 30 min. easy	**40** min. run at **Tempo** or Rest	Cross Train or 30 min. easy	**Rest**	**50** min. run easy	Cross Train	12-14

Experienced & Veteran ½ Marathoners

This week's workout will be a mix of long intervals. It will include a set of ½ mile repeats, a one-mile run, and a second set of ½ mile repeats.

Start with a 1/2-mile warm-up at an easy pace.

Follow this with a set of 2 half-miles at 10K pace. Take a 2:00 minute break between repeats. Take a 3-minute break after the second half-mile.

Next, run one mile at Lactate Threshold (LT) pace. For a quick estimation of your LT pace for one mile, double your earlier half-mile split and add 20 seconds. Follow the mile with another 3 minute break.

Next, run another set of 2 half-miles at 10K pace with a 2:00 minute rest between repeats.

Finish the workout with a 1/2-mile cool-down.

Enjoy!

Coach Marc