

## OPTIMIZING PERFORMANCE DURING THE 'EVENT': NUTRITION, HYDRATION AND RACING TIPS

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Hopefully you were able to pick up some valuable pre-event pointers in the last article. This is the second in a series of three articles that is going to examine some of the basic human physiology behind many of the well-established recommendations in terms of nutrition, hydration and training “*during*” an event. Contrary to the last article, the definition of event here is any run, workout or race you do that takes longer than 60 min to complete. In terms of taking in water, carbohydrates and electrolytes during a training run, “practice makes perfect” *before* the goal race. Implementing the recommendations below in your training will prepare your body for race day. There are two major areas that need to be considered on race day: even and consistent pacing and the taking in of carbohydrates.

### RACING PHYSIOLOGICALLY EFFICIENTLY: EVEN PACING DOESN'T MEAN EVEN EFFORT

Before jumping into pacing tips for workouts and racing, I will touch briefly on the need for a good warm-up. Physiologically the body needs a good warm-up before starting anything tough (like a hard workout or race), and generally the slower you can bring your body to a good warm-up the better. In a run or race over 5km in distance you are mainly depending on your aerobic energy system, which primarily uses fat as a fuel source. All of us, even really lean people, have tons of stored fat to draw upon for energy. The only draw back is that fat and aerobic metabolism takes awhile to ‘warm-up’ and activate and you can only draw upon it at lower running intensities. In comparison, we have very limited supplies of stored carbohydrate (muscle and liver glycogen), which can run out as we ‘hit the wall’, in some cases in only 75 min of running. But, it can provide energy and fuel at high intensities or fast pace running. Therefore, a good warm-up increases blood flow to working muscles, increasing aerobic metabolism, which increases fat metabolism, which then leads to less lactate build-up and less use of stored glycogen (carbohydrate) when the workout or race starts. This usually takes 15 to 20 minutes of easy running. For beginners, if you feel really sluggish every time you jump into your runs or warm-ups, you’re probably running too fast too early. If this happens to you, try easy walking for 5 minutes, then into brisk walking for another 5 minutes, and finally into an easy jog before attempting any faster running.

Learning and teaching your body to run at an even pace *within* your current abilities is one of the keys to distance running success. The great Paavo Nurmi, a Finn who won nine Olympic Gold Medals, already realized this concept before most of his competitors in the 1920’s. Before the time of big sideline clocks, he was known to run his Olympic races with a watch in his hand, checking his times per lap, regardless of how fast or slow the other athletes were running. The idea is to be able to run the same pace throughout the entire race as hard as you can and hold it right to the finish line. Of course this simple concept is, at most times, hard to implement because you often don’t know how fast you’ll run overall, until the race is finished. This makes it difficult to decide on an acceptable pace. But, given the strong probability that an early fast pace is more debilitating than an early slow pace, the odds of finishing faster are improved by beginning more slowly. I once heard John Stanton summarize this very well while giving last-minute advice before a major marathon. He said, break the race distance up into thirds in terms of effort, while maintaining even pace. The first-third of the race should feel very easy and you should enjoy the sites and the energy of the race. During the middle-third, you’ll have to start focusing a little more on keeping your even pace while still enjoying some of the sites. And finally, during the last-third you really have to focus to maintain the pace and rhythm that your running.

So how do you come up with a goal time for a race, and therefore a goal race-pace? There are a couple of good factors one can multiply by to get a good idea of what one is capable of possibly running at another race distance<sup>1</sup>. If you’ve recently completed a 5km, multiplying your time by 2.1 will give you an idea of what you can currently run over 10km. Alternatively, multiplying your 10km time by

4.76 or 0.48 will give you a rough estimate of a marathon time or 5km time, respectively. For example, if you just recently finished a 10km race in 60 minutes, you can multiply that time by 4.76 to get 285.6 minutes for the marathon. This equals 4.76 hours or 4 hours and 45 minutes, which equates to a goal race pace of 6:45 per kilometre or 10:54 per mile. Of course, these are just estimates and overall prior running experience, fitness, health and injury status and race day weather, just to name a few, will also all come into play. In addition, as stated above, being more conservative early on in the race will lead to the best race experience.

## **NUTRITION AND HYDRATION DURING EVENTS OVER 1-HOUR**

During exercise over one hour, muscle glycogen (stored carbohydrate) depletion and/or hypoglycaemia (low blood sugar) are associated with fatigue. Therefore, there is no question, as many previous well-controlled studies have shown, that ingestion of carbohydrate during prolonged, strenuous exercise increases performance<sup>2</sup>. There is also no question that staying hydrated with water and electrolytes (sodium and potassium) can also increase performance, as only a 3% loss in body water weight can already lead to decreased functioning. In regards to hydration, most experts suggest at least 100-150 ml of water with electrolytes every 15 minutes of exercise, or around 400-600 ml per hour. Of course this is dependant upon individual sweat rates and the outside temperature while exercising.

### ***Why Does Carbohydrate Ingestion Increase Performance?***

How ingestion of carbohydrate during exercise increases performance is highlighted in Figure 1 and commented on by expert Edward Coyle,

The primary purpose of carbohydrate ingestion during strenuous exercise lasting longer than 1-hour is to maintain a sufficient concentration of blood glucose and to sustain a high rate of energy production from blood glucose (carbohydrate taken in) and glycogen stored in the muscles, which can allow competitors to both exercise longer and sprint faster at the end of their exercises or races<sup>3</sup>

### ***Type and Amount of Carbohydrate:***

A common question I've heard is what 'type' of carbohydrate is best? When looking at the collection of studies (each dot represents a study) in Figure 2, there appears to be very few differences between glucose, sucrose (glucose + fructose) and maltodextrins (glucoses linked together) in their effect on how much the body can absorb and then burn (oxidize) for energy. On the other hand, fructose *alone* results in lower oxidation rates and is not as effective in improving performance. In fact, it may even cause gastrointestinal (stomach) problems leading to impaired performance. This graph also shows, up the left hand axis, that regardless of the amount of carbohydrate an athlete takes in, your body can only burn 1 gram/min or 60 grams/hour<sup>4</sup>. When you take in more than 1 gram/min, your body can't burn that extra carbohydrate and it just sits in your stomach or small intestine; which increases the chance of stomach upset. So, a practical approach is to aim for 60 grams of carbohydrate per hour in a properly formulated sports drink during runs or races over 1 hour. Most 8 oz cups on races courses contain ~15 grams per drink cup, and most 500ml sports drinks contain ~30 grams.

Much evidence also exists showing that sports drinks with a solution of 6-8% carbohydrates are also optimal<sup>4</sup>. If you take in a more concentrated solution, the stomach-emptying rate vastly decreases and your drink just sits in your stomach causing upset.

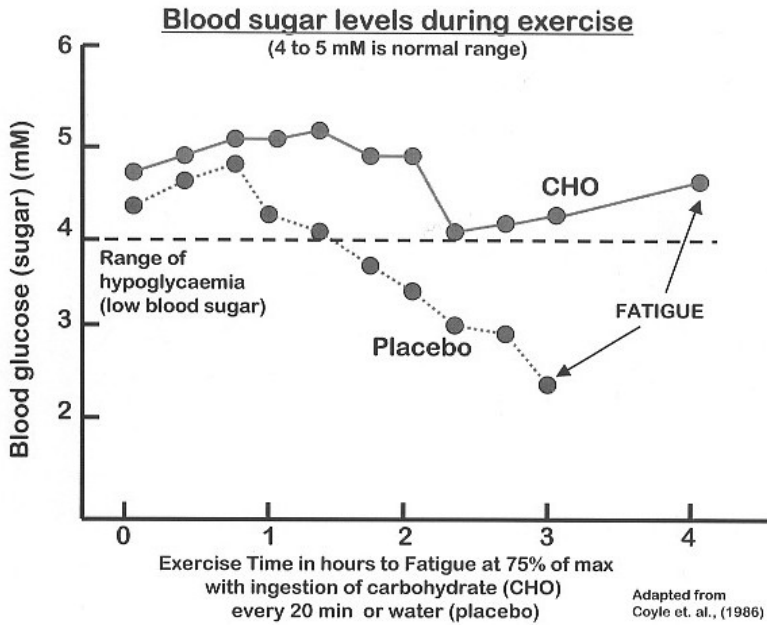
So in a nutshell: practice, practice, practice before race day and shoot for ~800 ml of water with electrolytes per hour and 60 grams of carbohydrate per hour in an ~6-8 % solution (most sports drinks). Many sports gels are much more concentrated (~15% carbs) and therefore should be taken with lots of water. Watch the next issue for the last instalment of nutrition '*after*' the event.

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**References**

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**Figure 1:**



**Figure 2:**

