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Principles Of Race Management

Race Management Strategy and Power Output

The primary limiting factors to race performance will be directly related to factors that affect the overall decrease in power output over time. In one sentence, during the race,

Eat, drink, and be merry!

This means – eating (for fueling), drinking (for hydration and cooling) and attentional focus (cognitive factors).

Nutritional factors associated with fatigue or a decline in performance (Burke and Deakin):

- Depletion of glycogen stores in the active muscles
- Hypoglycaemia
- Other mechanisms of “central fatigue” involving neurotransmitters
- Dehydration
- Hyponatremia
- Gastrointestinal discomfort and upset

Pre-Race Nutrition and Hydration

Pre-race carbohydrate intake:

- 3 hours before – 1.0 g per kg body weight
- 1 hour before – 0.25g per kg body weight

Pre-race hydration:

- 16oz up to 2 hours before event
- 4-8oz 5 to 10 minutes before event
- * kidneys take 60 – 90 minutes to process excess liquid
- ** intake 5 to 10 minutes before race replaces initial sweat loss

During The Event

The key to race management with respect to nutrition is gastric emptying. The stomach can tolerate fluid volumes > 1L per hour, but gastric emptying will be limited primarily by the carbohydrate concentration (should be less than 8%, or 80g/L). For most people this is about 1.0 g carbohydrate (per kg body weight) per hour, which is also the maximal rate of glucose oxidation in the body.

Hydration

1% loss of body weight lost by dehydration (1.5 lb per 150 lb person) – can occur before the brain signals thirst – this will slow pace by 2%. Since you will *voluntarily* replace only 2/3 of sweat losses via the thirst mechanism, it is a task that must be pursued! *The goal is to match sweat rate (fluid intake with fluid loss)*

Sweat loss = change in body mass (kg x 1000) + fluid intake (ml) – urine loss (kg x 1000)

Sweat rate (ml/hr) = Sweat loss (ml) ÷ exercise duration (hr)

% dehydration = change in body mass (kg) ÷ pre-exercise body mass (kg) x 1000

** note – 1 kg = 1000g = 1000 ml of water

Note: increasing temperature and humidity increases sweat rate and glycogen utilization (in order to regulate temperature) – therefore may have to increase fluid and/or carbohydrate intake

More fluid absorbed from carbo/electrolyte drinks (90-95%) than plain water (50-60%).

Therefore - 240 ml (8 oz) per 15 - 20 minutes (with a pinch of salt) – to match sweat rate – will work for most people (typically 16 – 24oz per hour depending on conditions).

Carbohydrate

If event is greater than 60 to 90 minutes in duration: need steady flow of carbohydrate for ease of utilization (especially to maintain blood glucose for central nervous system usage!)

Maximum glycogen utilization = 1.0 – 1.2g per minute (60 – 70g per hour) so this must be maintained during the event.

Therefore - 0.5g carbohydrate per pound of body weight per hour (or 1.0 g per kg body weight) – **goal of 40 to 60 g per hour will work for most people!** Can be partially accomplished by sport drinks with 4 to 8% solution (10 – 20g per 8oz fluid) (i.e. Gatorade = 14g per 8oz and 110mg sodium) – if greater than this, solution will slow gastric emptying rate. Some people may have GI distress when using drinks or products containing fructose as it is a very common GI irritant.

Protein

Protein has some importance nutritionally in a race that is *longer than 4 – 6 hours in duration*. The goal is to take in 1g of protein for every 7 – 10g of carbohydrate per hour. This will prevent the body from using it's protein (i.e muscles) for energy.

Sodium and Potassium

If the event is > 3 - 4 hours – need sodium at a rate of 500 to 700mg per hour though may require up to 1000 mg per hour depending on the individual's sweat rate.

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