

Running and Diet

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Training to run safely and well requires attention to diet to ensure that you have the macronutrients (protein, carbohydrates and fat) and micronutrients (vitamins and minerals) and the water that your body requires to function efficiently. A healthy diet for an active person may consist of approximately 50% carbohydrates (CHO), 30% fat and 20% protein, although these proportions may vary with individual needs.

During low intensity prolonged exercise (eg, a one hour or more run at around 50-60% maximum effort), fats and carbohydrates are used more or less equally to provide energy. For strenuous exercise of the type involved in training for middle and long distance running, carbohydrates provide the primary muscle fuel and hence a diet that meets a runner's needs may need to have a higher carbohydrate level to replace the energy lost in training. Studies cited in the running research newsletter *Peak Performance* (Issue 176, January 2003) suggest that for a moderately intensive training program (around 60 minutes/day), an adequate intake is 5-7gm of carbohydrate per kilogram of body mass per day. For an average 70kg male that means 350-490gm of CHO/day and for a 60kg female, 300-420gm/day. These are guideline quantities only and would need to be adjusted according to individual needs and the nature of the training that is undertaken.

Fats are still needed in a healthy diet, as is protein. Although a high % body fat is excess baggage for runners it is important to maintain adequate body fat levels. Fat in the diet is essential for a healthy life. For example, lipids (fat) are required to transport oestrogen, other steroid hormones and the fat-soluble vitamins (A, D, E & K) around the body. Fat also provides cushioning in the plantar footpad. If % body fat falls below healthy levels, the probability increases that some or all of the following may occur:

- a) Reduced vitamin D inhibits calcium uptake and this can lead to osteoporosis.
- b) Reduced foot cushioning increases transmission of foot impact forces.
- c) The effect of a) and b) can lead to stress fractures.
- d) Lowered steroid hormone transport can result in menstrual cycle cessation.
- e) Psychological pressures associated with an overemphasis on fat loss may promote eating disorders which exacerbate a) -> d).

Training and racing impose demands on muscles that result in a need for protein to repair damage and to strengthen muscles to make them better able to respond to those demands.

Carbohydrate is stored in the muscles and liver as glycogen, which consists of glucose units. Muscle glycogen is the primary source of CHO for the energy used in running. The liver releases glucose into the blood and hence has a vital role in supplying energy to the brain. Increasing the amount of stored muscle glycogen improves endurance exercise outcomes. An effective way to improve muscle glycogen stores is to ingest CHO rich foods immediately after strenuous exercise (either high intensity or endurance) when muscle glycogen resynthesis rates are highest. Eating moderate to high glycaemic index foods (eg, sultanas, bananas, sweets, sports drink) at this time increases the rate at which CHO is absorbed by the digestive system and the rate at which it is available to be stored in the muscles. This practice also aids recovery from demanding exercise. If you engage in long distance or other endurance events, CHO intake during the event will be required and that must also become part of your training. Depending on the length and nature of the event, a 70 kg athlete should aim for around 30-60gm of CHO/hour, remembering that there is a time lag between eating and the glucose from that food being available for use.

It is important for the body to be well hydrated before commencing strenuous exercise and to maintain fluid levels during that exercise. The body regulates temperature by sweating and the consequent evaporation of sweat from the skin. Water loss rates may be around 1 litre per hour with moderate levels of exercise on a warm day. You can check your water loss rate by weighing

yourself on a set of accurate scales (preferably naked) prior to a training run and then re-weighing immediately after the run. The reason for being naked is that your clothes will probably be soaked with perspiration after the run and you need to know how much water has been lost from your body. The difference in the two weights divided by the time you were running gives the water loss rate. Environmental conditions will cause this rate to vary, but the exercise will give you a good idea of your water loss rates if you repeat it under different conditions.

It can be useful to start exercise with around 500ml of fluid in the stomach and to top it up at regular intervals minutes depending on conditions and the nature of the exercise undertaken. The *Peak Performance* article indicates typical stomach emptying rates of around 600ml/hour into the intestines where water can be extracted. The volume of fluid in the stomach affects the rate of emptying and hence the delivery of fluid to where it is needed in the body. Studies indicate that the rate of emptying of the stomach is also influenced by the CHO content of the fluid that is ingested, decreasing with increased CHO content. The optimal level for replacing fluid losses and CHO for energy for prolonged moderate intensity exercise appears to be around 6% CHO. Experiment to find a drink that suits you.

As with all things associated with running, individual needs vary widely and hence the above should be taken as a guide to be adapted to meet those needs. Incorporating nutrition and hydration into your training and monitoring the outcomes allows you to determine what works best for you.