HIGH-CARBONHYDRATE DIETS BEFORE COMPETITION

In most athletic events, muscle glycogen (the storage form of carbohydrate in the muscles) is the most critical fuel used to produce the energy for movement. As the duration of the exercise increases, it is progressively more likely that muscle glycogen stores will be reduced to the point that the muscles can no longer keep up with the demand for energy. This occurs during prolonged continuous exercise like distance running or road cycling as well as during prolonged periods of intermittent, brief, high-intensity exercise that is common in sports such as football, basketball, soccer, and tennis. If the glycogen used in a training session or a competition is not fully restored before the next day of training or the next competition, exercise performance will probably be impaired. Nearly 70 years ago, Swedish scientists showed that eating a high-carbohydrate diet for several days before exercise improved endurance capacity compared with that achieved following the consumption of a normal mixed diet. The practical implications of those findings are still relevant today.

Carbohydrate Loading

A suitable method for increasing muscle glycogen stores before a competition was demonstrated in 1981. This procedure is illustrated in Figure S1 and requires that athletes gradually reduce (i.e., taper) their training during the week before competition. During the last 3 d before competition, athletes should increase the carbohydrate content of their diets to the equivalent of 8-10 g of carbohydrate/kg body weight.

FIGURE S1. Modified carbohydrate loading protocol that involved reducing training duration and intensity and increasing the daily carbohydrate content of the diet during the 3 d before competition. (Sherman et al., 1981).

This procedure may be too long for athletes who need to recover their glycogen stores within a few days of a heavy training session or competition. Modifications of the taper method include simply finishing training 3 d before competition and increasing the amount of carbohydrate consumed each day to 8-10 g/kg body weight. Undertaking this abbreviated approach will restore muscle glycogen concentrations to pre-exercise values even after just one day of rest and increased carbohydrate intake.
Performance Benefits of High-Carbohydrate Diets

Over the last 40 years, many research studies and testimony from many champion athletes have shown that high-carbohydrate diets can improve performance in events that last about 90 min or longer, including sports like soccer that involve multiple intermittent sprints. Unfortunately, it appears on the basis of limited research that female athletes may not benefit from high-carbohydrate diets; the reason for this difference between sexes is not clear.

Once resting muscle glycogen concentrations are raised to high values by carbohydrate loading, it appears that athletes may continue to train at low intensities for 20 min or so each day without causing a significant reduction in the high glycogen stores.

Must I Eat a High-Carb Diet Every Day?

Eating a high-carbohydrate diet can be boring and can sometimes cause bloating and other gastrointestinal disturbances. As long as you consume at least 5-6 g of carbohydrate/kg body weight, you do not need to eat a high-carbohydrate diet (8-10 g/kg) every single day during training. Rather, you should emphasize carbohydrates in the days following particularly hard training sessions and the days before particularly important competitions.

SUMMARY

The more demanding the training program or competition, the greater is the amount of dietary carbohydrate needed to replace glycogen stores. Failure to replace muscle glycogen stores will result in the inability to complete exhausting training sessions or an inability to maintain an optimum race pace during endurance competitions.

RECOMMENDATIONS

- The optimum preparation for a period of prolonged heavy exercise is as follows:

  - You should adopt a carbohydrate diet that fits your schedule, but ensure that your daily carbohydrate intake is not lower than 5-6 g/kg body weight and is ~8-10 g/kg on days following especially hard training sessions and days before important competitions. For a 70-kg (154-lb) athlete, 5-6 g/kg body weight is 350 – 420 grams of carbohydrate (1400 – 1680 kcal) and 8-10 g/kg body weight is 560 – 700 grams of carbohydrate (2240 – 2800 kcal).
  - You can increase your carbohydrate intake by not only choosing to eat more bread, potatoes, rice, or pasta but also by including a concentrated carbohydrate beverage such as Gatorade Carbohydrate Energy Formula. Drinks such as this will minimize problems of bloating and gastrointestinal discomfort.
  - About 3 hours before prolonged exercise you should eat an easy to digest high-carbohydrate meal that provides about 2.0-2.5 g of carbohydrate/kg body weight.
  - About 1 or 2 hours before exercise you should ingest about 600 ml of water, or better still, a sports drink, to ensure that you are well hydrated before exercise.
  - You should drink about 200 ml of a sports beverage frequently throughout prolonged exercise following the simple rule that if you are sweating a lot, then make sure that you drink a lot so that you avoid severe dehydration and you maximize the benefits of carbohydrate intake. You should drink enough during exercise to minimize weight loss, but avoid weight gain.

SUGGESTED ADDITIONAL RESOURCES


