

# Marie Murphy Health & Fitness

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## Optimize Your Performance

Over the past 20 years, research has clearly documented the beneficial effect of nutrition on athletic performance. Proper nutrition is critical not only to your athletic success, but also and more importantly to your growth, development and overall health. Inadequate nutrient intake deprives your body of the energy needed to perform an event, the carbohydrates necessary for glycogen replacement, the protein needed for tissue building and repair, and the micronutrients necessary for normal metabolism and maintenance of body homeostasis.

Energy balance for the athlete is the amount of energy the athlete consumes (food calories) necessary to balance the amount of energy the athlete expends (activity). Physical activity does influence the amount of specific nutrients required and the optimal timing of their intake. The athlete, who is engaged in heavy training, will have higher energy and nutritional requirements. Total energy intake must be sufficient to offset the energy expended during athletic training and performance.

### Energy Availability

Many athletes spend a great deal of their time and effort maintaining and manipulating energy balance. Manipulating energy balance has extremely important implications that affect not only your body weight, but also your proportion of fat mass and fat-free mass, carbohydrate stores, bone health, vitamin and minerals status, and menstrual status in women. Energy availability = total energy – energy cost of training/competition (ideally this should be  $>30$  kcal/kg FFM/day).

Your energy requirements are influenced by the energy expenditure of your training load (intensity, frequency and duration) along with your body size, growth and pursuit of weight loss or gain. The role of your nutritional regimen is to supply you with the fuel and nutrients needed to optimize the adaptations achieved during your training and to ensure recovery between your workouts. Low carbohydrate intake can result in inadequate glycogen stores, premature fatigue and possible utilization of the body's protein stores for energy. It is important that you have adequate fuel stored in your muscles (muscle glycogen) and adequate hydration to optimize your performance. Arguably, carbohydrates are the recommended source of energy needs from intense training.

### Specific Nutritional Strategies

Specific nutritional strategies for athletes are: carbohydrates  $>5$ g/kg/body weight/day to fuel their training and racing; CHO intake ranges of  $5\text{-}7$ g/kg/day for general training needs and  $7\text{-}10$ g/kg/day for the increased needs of endurance athletes. Protein intakes of  $1.2\text{-}1.6$  g/kg/body weight/day are needed for repair and adaptation. Fluid and electrolyte consumption of  $1.2\text{-}1.5$  liters for each kg of weight lost for adequate hydration and sodium balance. Spacing fluid intake over several hours after exercise has been shown to be more effective in restoring fluid balance (because of lower urine losses) than consuming fluid as a large bolus immediately after exercise. The optimal level in a sodium re-hydration drink has been measured at  $50\text{-}80$ mmol/L.

There are a number of techniques used to estimate the energy balance of athletes. The most accurate methods are nitrogen balance and doubly labeled water. However, we can also use dietary recalls/records and compare these to the energy expenditure of the athlete through their activity diaries or questionnaires. Energy balance for an athlete can also be best assured by measuring their body weight. A stable body weight over time indicates that you are in a state of energy balance. To enhance your growth and development, a neutral or positive energy balance is the desirable state.