



Nutritional Concerns for Strength Training

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1) Nutritional Needs for Strength Training

The goal for most people incorporating strength training into their exercise program is to enhance their lean muscle mass and develop muscular endurance and strength. Nutrition plays a major role in the development of lean muscle mass and therefore is an important consideration for people using strength training in their exercise regime.

* **Energy Intake.** The most important nutritional factor involved in the building of lean muscle mass is the total energy intake (calories). It takes a significant amount of energy to fuel a strength training program. There are three nutrients that supply the body with fuel and as a result build muscle mass: carbohydrate, protein and fat.

* **Carbohydrates.** When building muscle through a strength training program carbohydrate is the most important nutrient to increase in the diet in order to increase the total energy intake. A diet higher in carbohydrate (approximately 60%) supplies the muscles with the best source of energy to sustain the training program over time. Carbohydrate replenishes the fuel that was used in the activity and as a result, the muscle has the energy to work equally hard on successive days. If a low carbohydrate diet is consumed the body will rely on protein as a source of energy. Not only is protein a less efficient source of energy for the body, but protein has other functions it must fulfill in the body and therefore should not be relied on as an energy source.

* **Protein.** The most important role of protein is to build, maintain and repair tissue, and to produce hormones and enzymes. Therefore, it is obvious that protein plays an essential role in the strength training program. Evidence suggests that individuals engaged in strength training may need more protein than sedentary individuals. The recommendation for the average Canadian is to consume 0.8 grams of protein per kilogram of body weight each day. The current protein recommendation for athletes is 1.4 - 1.8 gm/kg/day. For those athletes who have a higher protein needs, such as growing adolescents and pregnant women, or for those athletes whose diet may be inadequate, such as those who frequently diet to lose weight or the elderly population, protein needs may be as high as 2.0 - 2.5 gm/kg/day.

The additional protein needs of athletes does not mean that the athlete should eat high protein diets or take protein supplements. Intakes of protein above the requirement can not be stored for future use. Excess protein is broken down by the liver and is either burned for energy or stored as body fat, not muscle. High protein intakes are usually high in fat and, thus, often deprive the athlete of the most efficient fuel, carbohydrate.

The increased protein requirement for the athlete can easily be met through sound nutritional eating habits by following Canada's Food Guide. For example, consider a 170 pound (77 kg) person engaged in a strength training program. The amount of protein the person needs to consume is $1.4 \text{ grams} \times 77 \text{ kg} = 108 \text{ grams}$ of protein per day. This can easily be met by consuming 3 servings of meat and alternatives per day (3 ounces per serving), 3 servings of milk products per day, 9 grain products and 8 vegetables and fruit per day. This type of diet provides the athlete with a high intake of carbohydrate as well as adequate protein for muscle development.

* **Fat.** Fat is the body's most concentrated source of energy. However, while some fat is essential, there is no rationale for a high-fat diet for the athlete. Fat is a less efficient source of energy for the athlete, particularly for the casual athlete. Endurance training increases the muscle's ability to use fat as a fuel. When the goal of the strength training program is to increase lean muscle and decrease body fat, it is important to keep the fat intake in the diet at about 20 to 25 percent of the total intake which allows for adequate intakes of carbohydrate and protein.

* **Water.** During exercise heat is generated within the body by the working muscles. If this heat builds up, the body temperature rises which negatively influences athletic performance. The body's response to this heat is through evaporation of perspiration from the skin. Heavy sweating results in large losses of body water. Unless this water is replaced the body becomes dehydrated and its cooling mechanism cannot function properly. Therefore, water consumed during the workout helps to cool the body. Water also helps the circulation of blood, and therefore nutrients and oxygen, to the working muscles. As a general guideline, 125 ml of water should be consumed every 10 - 15 minutes throughout the workout. Sport drinks are not warranted for strength training programs. Sport drinks were developed for endurance athletes who lose significant amounts of sodium and potassium as a result of high sweat losses.

2) Dietary Supplements and Ergogenic Aids

There have been many claims for the performance-enhancing properties of dietary supplements. Because of their supposed ability to enhance exercise performance, these substances are collectively referred to as ergogenic aids. Although there is ongoing research into some of the supplements available, to date there are no "magic nutrients" that can enhance muscle and strength gains. Most experts agree that by following a diet as recommended above, one can achieve substantial gains in strength and muscle mass. However, there are products available to the public which must be addressed:

* Vitamin and Mineral Supplements: Research has not found that athletic performance is improved by mega-doses of vitamin or mineral supplements. Improvement in performance may be noticed if a person deficient in a vitamin or mineral improves the level of that nutrient. However, this can easily be done through dietary changes which is preferred by the body over supplements.

* Protein or Carbohydrate Supplements: With the increased energy demands of strength training, athletes must be sure to increase their energy intake. Energy demands can be accomplished through an increased intake of food and drink. However, in some instances the needs are so high that it becomes difficult to consume the necessary amounts of food. In these situations carbohydrate drinks and protein powders can increase the total energy intake if needed.

* Creatine/Creatine Monohydrate: Of the supplements available, this substance has shown promise in high intensity exercise, especially where repeated sprints (running, swimming) are performed with short recovery periods. The greatest increases have been found in people who have low dietary creatine intake. However, studies to date are conflicting regarding the effect creatine has on performance and more controlled studies are needed in this area. Researchers have not found creatine to show any harmful side effects at the recommended dosages, but studies have not examined the long term effects of supplementation. There is also conflicting recommendations regarding the amount of supplementation required to see any benefit.

* Carnitine: Claims to increase power and energy and lower body fat. Humans synthesize adequate carnitine and deficiency is not likely. Carnitine is found in a variety of food sources such as red meats and dairy products. Although there are some theoretical points favoring potential ergogenic effects of carnitine supplements, there is currently no scientific basis for healthy individuals or athletes to use carnitine supplementation to improve exercise performance.

* Chromium Picolinate: Product claims to improve performance by an increase in strength and or muscle mass and a reduction in body fat. Majority of research studies have not found chromium to have a significant effect on exercise performance or body fat levels. Chromium (Cr) is an essential nutrient found in the diet. Diets high in refined foods and simple sugars may be deficient in (Cr) and urinary losses of (Cr) may be increased in response to strenuous exercise. Therefore, the risk of deficiency may be higher in the athlete. Chromium supplements may have a positive effect if a person is deficient in this nutrient, however, adding good sources of (Cr) to the diet (i.e. mushrooms, oysters, apples) will return levels to normal.

There are many other products available on the market that claim to improve athletic performance. It is important to critically evaluate the products by examining the physiological sense of the claims, the supportive evidence provided, the research articles quoted, and the legal and health implications of use.