Introduction

Research over the past 20 years has clearly documented that the type, amount, composition, and timing of food intake can dramatically affect exercise performance, recovery from exercise, body weight and composition, and health. As individuals increase their physical activity (PA) or work activity to 1 hour per day or more, the importance of adequate energy and nutrient intakes become more critical. With our growing obesity epidemic and the call for the American public to eat better and exercise more, the interest in nutrition, PA, and weight loss has increased. Thus, providing active individuals with accurate and precise nutritional recommendations will reduce the use of unhealthy dietary practices or sport and weight loss supplements not grounded in science.

Energy Needs

Determining the energy needs of an active individual requires that a number of factors be considered, including age, sex, body size, sport, level and intensity of PA, and activities of daily living. The IOM report [5•] provided some general energy recommendations for active and very active individuals based on age and body size. They categorized an active individual as walking between 6 and 10 miles per day, although a very active individual walks more than 10 miles per day at 2 to 4 mph. For example, an active or very active 30-year-old man weighing 72.2 kg (160 lbs) and having a body mass index (BMI) of 24.99 (kg/m²) would have estimated energy needs of 2959 and 3434 kcal/d, respectively. An active or very active 30-year-old woman weighing 68 kg (150 lbs) and having a BMI of...
24.99 (kg/m²), would have estimated energy needs of 2477 and 2807 kcal/d, respectively. For the active individual with a healthy body weight, the goal is to maintain adequate energy intake to assure that weight is maintained. The dietary plan needs to focus on timing of meals and snacks throughout the day and insure that these individuals are well fueled before training or practice sessions. For most individuals, energy needs decrease with age, even if activity levels remain constant; thus, the amount of energy required to maintain body weight will decrease. For this reason, body weight typically increases with age even in active individuals.

Maintaining Body Weight and Body Composition

Weight loss and dieting are popular topics, even among active individuals who typically have body weights within normal ranges for their height (BMI 19–25 kg/m²). Many active individuals want to change their body composition (eg, get leaner) or lose weight to improve their sport performance or appearance. If weight loss is the goal, it should be accomplished slowly during a period when the individual is not participating in competitive events [20]. Conversely, if weight gain is the goal, this can be accomplished by adding about 500 to 1000 kcal/d into the diet per day, while the athlete participates in appropriate strength training exercises [9,21]. It is important that these steps be done simultaneously to assure that the extra energy consumed is contributing to increased muscle mass and not fat mass. The athlete needs to understand that increases in muscle mass usually occur slowly and will depend on one’s genetic make-up, degree of positive energy balance achieved, and the type of strength training program being used [22].

Because the goal of weight loss is to maximize fat loss while minimizing lean tissues losses, weight should be lost gradually (~1–2 lbs/wk or 0.5–1.0 kg/wk) [9,20] with an energy deficit from both diet and exercise of approximately 500 to 1000 kcal/d [20]. A number of problems arise that defeat the goals of a weight-loss program if an active individual restricts energy too severely. Severe energy restriction typically means the nutritional quality of the diet is compromised, lean tissue is lost, and the ability to exercise decreases. Severe energy restriction can be extremely stressful and lead to a preoccupation with food, loss of motivation, and the inability to stay on the diet [21,23–25]. For these reasons, it is not recommended that energy be restricted to less than 1800 kcal/d for active women and less than 2000 kcal/d for active men. In order to remain physically active while dieting, the active individual needs a diet that provides adequate carbohydrate for glycogen replacement, adequate protein for the maintenance and repair of lean tissue, and enough fat to meet essential fatty acid needs and to make the diet palatable. Depending on the food preferences of the individual, a multivitamin and mineral supplement may also be necessary while dieting for weight loss.

Determining a weight loss goal for an active individual can be difficult. First, a realistic healthy body weight for his or her level of PA must be established. This decision should be made jointly with the active individual and based on past dieting and weight loss experiences, type of PA currently engaged in, the eating environment in which they work and live, genetics (family size and shape), health risk factors, and psychologic issues. If an unrealistic weight goal is set, there is a high probability of failure, which has a number of emotional and psychologic outcomes. A healthy weight is one that can be realistically maintained, allows for positive advances in exercise performance, minimizes the risk of injury or illness, is consistent with long-term good health, and reduces the risk factors for chronic disease [5,9]. Unfortunately, failure to meet weight loss goals in some sports can result in severe consequences, such as being cut from the team, restriction from participation, or elimination from competition. These situations can result in active individuals chronically dieting to maintain a lower than healthy body weight, causing loss of lean mass, decreased ability to perform at high intensities, loss of muscle strength and endurance, and poor nutritional status. Some of these individuals may develop disordered eating, which in severe cases lead to a clinical eating disorder [26]. Nutritional strategies for identification, intervention, and treatment of eating disorders in active individuals and athletes have been presented elsewhere [27,28].

Chronic dieting in the active woman with normal body weight can have devastating consequences. Energy restriction can result in poor intakes of bone-building nutrients, weight loss, increases in catabolic hormones, and menstrual dysfunction [14,29–31]. The decrease in reproductive hormones can lead to loss of (or failure to gain) bone mass in young female athletes and active adult women [32,33]. Finally, a pattern of low energy intake, while exercise energy expenditure is high, can put active women at risk for one or more of the disorders in the female athlete triad (amenorrhea, disordered eating, and osteoporosis) [33].

Macronutrient Requirements for Exercise

Not only do active individuals need adequate energy to maintain weight and repair damaged tissues, they also need the right proportion of carbohydrate, protein, and fat in their diets. The exact proportions of these nutrients will depend on an individual’s total energy needs, the intensity, duration and frequency in which they participate in PA, the type of exercise they engage in, and their health, body size, age, and sex. The recommendations for macronutrients for those engaged in daily PA are given below and in Table 1.