Improve Your Performance: Sports Nutrition for Youth and Adults

Guidelines for healthy nutritional and exercise or physical activity practices are well established for optimal health and disease prevention. The term “sports nutrition” is often used when describing how nutrition can improve athletic and/or exercise performance. This paper will discuss how nutrition can improve overall exercise performance, as well as how nutrition and exercise can lead to weight loss. Dietary supplements will also be addressed, due to their wide use by athletes.

Exercise and Nutrition

Pre-Exercise Nutrition for Adults and Youth/Adolescents

Pre-exercise nutrition is important for all levels of exercise; however, the amount of foods and beverages a person consumes will differ depending on the energy demands of the activity in which he/she is engaged. Units used to measure energy are “kiloCalories” (abbreviated “kcals” or “kcal”) or “Calories.” For adults and youth, the timing and types of food and beverages they consume are critical to optimal exercise performance.

First, what is the best time to consume meals prior to activity? If a person exercises in the morning, consuming a small snack (e.g., 1 tablespoon of peanut butter on a medium bagel, and half a banana) at least one hour prior to exercising is ideal.

Physical activity—refers to any activity resulting in bodily movement. Examples include gardening, housework, and light walking.

Exercise—is a form of physical activity, but refers to planned, structured activity for the benefit of improving one’s fitness. Examples include running, swimming, weight lifting, and fast-paced walking.
Often times, however, people have a difficult time consuming food if they exercise early in the morning. In that case, having a light snack the night before can help provide some energy in the morning; however, even with a light snack the night before, a person will need to consume something in the morning. If a person cannot consume “real food” prior to exercising early in the morning, consuming something like a sports gel or sports chew with water, or a sports drink, can provide the extra energy a person needs for an early morning exercise session.  

If a person exercises after lunch, waiting at least an hour after eating is important to help with digestion. An example of a lunch to consume one to two hours prior to exercising would be a turkey sandwich with mustard on whole grain bread with a medium banana and a glass of low-fat milk or soy beverage. For youth/adolescents, lunch time meals are very important if participating on a sports team. Typically, they are not able to consume food during class time, so consumption of about 200 more Calories at lunch is important.  

Hydration is also important; therefore, sipping water throughout the day may be helpful to prevent dehydration, especially in athletes. A crude way to know if a person is well hydrated is to look at urine color. Pale yellow is ideal, and is an indicator that a person is well hydrated. Dark yellow urine indicates dehydration, whereas a clear urine color indicates over-hydration. Another measure of hydration status is body weight. A person needs to measure his/her body weight for at least three mornings in a row (without clothing and after voiding, first thing in the morning). This will establish a baseline body weight. Women may need to measure body weight for more than three days, due to variations in body weight as a result of their menstrual cycle. Once a baseline body weight is established, measuring body weight after exercise can help a person to evaluate if he/she has consumed enough, or too much, fluid during exercise. Weight loss will mean not enough fluid was consumed, while weight gain will indicate that too much fluid was consumed.

If weight loss is not a goal for an adult or youth athlete, then consuming a small snack one hour prior to a later workout is a great idea. About six small whole grain crackers, a sports bar that is not too high in Calories (e.g., 200 Calories or less), or half a peanut butter and jelly sandwich on whole grain bread, with water, are some options prior to exercising. In fact, research has shown that the pre-exercise meal can improve performance. Lee et al. found that consumption of a high carbohydrate beverage (containing 22% carbohydrate) 30 minutes prior to exercise helped adolescent boys perform better on a cycling (sprint) exercise compared to a volume-matched placebo beverage. It has also been reported that consumption of a carbohydrate gel (with water) about five minutes prior to exercise significantly improved intermittent endurance ability of adolescents who were on team sports. 

### During-Exercise Nutrition for Adults and Youth/Adolescents

Nutrition also plays a role during exercise. The type of food and beverages consumed during exercise depends on the type and duration of the sport. For example, during long distance cycling, consuming snacks is easier to do because a cyclist can put snacks into his/her cycling jersey and there is no stomach jostling, as there is in running. In running, it is more difficult to carry water bottles and snacks.

If the exercise duration is greater than one hour, some type of carbohydrate beverage (e.g., sports drink) should be consumed, which will help with both hydration and performance. That is because the sugar from the sports drink will help delay the use of muscle stores of carbohydrates (called “glycogen”), and allow a person to use them later during exercise. 

If a person is exercising less than an hour, water as the source of hydration is fine. Generally, if exercise is less than one hour, other foods or caloric beverages are not needed. If, however, an athlete is working out several times a day, with shorter, more intense bouts, some type of gel or sports chews with water and/or sports drink may be recommended.  

In a recent critical review of the research literature, Colombani and colleagues evaluated 17 studies where the researchers tested the effect of various carbohydrate beverages or foods used in endurance events (mostly cycling) that lasted from 26 to 241 minutes. The studies were conducted in adults. The carbohydrate intake differed among these studies; however, Colombani et al. reported mixed results. About half of the studies reviewed showed a benefit of carbohydrate consumption during exercise, while the
other half did not. Some things to consider are the following:
1. the athletes were mostly cyclists; 2. different types and amounts of carbohydrates were used; 3. different exercise durations were examined; 4. different fitness levels of athletes were studied.

With this in mind, it is important to remember that good nutrition positively influences performance; however, the duration, intensity, type, and frequency of exercise will dictate the need, amount, and type of carbohydrate needed. The bottom line is this: if you are exercising less than an hour, generally water is fine, but greater than one hour, a sports drink or water with a sports gel or sports chews are recommended. However, there are many things that impact a person’s need for fluids aside from duration, intensity, type, and frequency of exercise. These include, but are not limited to: heat, humidity, and gender.4

Post-Exercise Recovery Nutrition for Adults and Youth/Adolescents

Recovery nutrition is equally important to optimal exercise performance as pre- and during-exercise nutrition. The most important time to consume foods containing carbohydrate and protein after exercising is within the first two hours post-exercise, especially if the exercise was of long duration (e.g., > 60 minutes) and/or high intensity. Note that high intensity exercise is usually defined as achieving around 80% or greater of your predicted heart rate maximum. A quick way to calculate predicted maximal heart rate is by using the Karvonen equation, which is 220 – age in years = maximal heart rate. That heart rate is considered a person’s predicted maximal heart rate. Thus, if a person exercised at 80% or higher of his/her predicted maximal heart rate, that would be considered high intensity exercise. The first two hours post-exercise allows for optimum speed of glycogen replenishment in the muscles and liver, while the protein assists with muscle building and repair.3,11

Foods higher in complex carbohydrates, like whole grain bread, pasta, or brown rice, along with some protein source, like chicken, hummus, or fish, are important to consume post-exercise. Because many people who exercise do not always feel hungry for solid food post-exercise, consuming a sports drink, milk, or juice is also recommended for both hydration and glycogen replenishing purposes. In the last few years, chocolate milk has become a popular post-exercise drink. Chocolate milk is affordable and provides hydration along with carbohydrates, protein, calcium, vitamin D, sodium, and potassium (electrolytes lost with exercise). Low-fat chocolate milk contains a 4:1 ratio of carbohydrate to protein, which is similar to many more expensive recovery drinks.12 Drinking low-fat chocolate milk that provides 1 to 1.5 grams of protein per kilogram (kg) of body weight (0.03 to 0.05 ounces per pound) immediately after exercise, and again two hours post-exercise, can help with recovery and prevent muscle damage.12 This would be equal to about 8 ounces of low-fat chocolate milk.

Summary: Pre-, During-, and Post-Exercise Nutrition

Pre-, during-, and post-exercise nutrition are all important for performance and optimal health. Managing a balanced intake of foods and fluids is the key to optimal exercise performance for all ages. Understanding what foods and beverages are best for certain activities will lead to better workouts and competitions. For examples of optimal nutrition for health, fitness, and performance, see Figures 1, 2, and 3.

Figure 1. Optimal Nutrition for Health
Weight Management for the Active Person

Achieving energy balance and maintaining body weight should be easy if the energy (e.g., Calorie) intake equals the energy or Calories expended. Thus, weight loss should also be simple: just increase energy expenditure (e.g., exercise more) and/or reduce energy intake (e.g., eat less). The reverse should also be true if a person wants to gain weight. So why isn’t it simple? Why do people struggle to lose weight?

Achieving a Healthy Body Weight

The need or desire to lose weight and/or change body composition is common for people of all ages, even those who are fit and active. Children and young adults who are overweight or obese may experience increased pressure to lose weight to be competitive and participate in their selected sport.

For most overweight or obese people, weight loss improves overall health and the ability to be physically active. However, the amount of weight loss needed to reach a healthy body weight or normal body mass index (BMI, kg/m2) may be much more than ever seen in previous generations. Currently, about 66% of the adult population in the United States is either overweight and/or obese, with about 34% being obese. The overweight and obesity rates in children and youth are also high, which means more children and young adults participating in sports or trying to be active will be at an unhealthy weight. For adults, overweight is defined as a BMI of 25 to 29.9 kg/m2, while obese is defined as a BMI of ≥ 30 kg/m2. The National Institutes of Health (NIH) has a BMI calculator on their website to easily determine BMI (www.nhlbi.nih.gov/guidelines/obesity/BMI/bmicalc.htm).

A better indication of weight status in athletes is percent body fat. There are many athletes who, based on BMI, may be considered overweight or even obese. However, measurement of their percent body fat indicates that they may be overweight, but are not over-fat. Techniques to measure percent body fat include: dual-energy X-ray absorptiometry (DXA), underwater or hydrostatic weighing, air displacement plethysmography, bioelectrical impedance analysis, and skinfold measures.

DXA, underwater weighing, and air displacement plethysmography are the most accurate measures, but are usually expensive. Though bioelectrical impedance analysis and skinfold measures are not as accurate, they can give an estimation of a person's percent body fat.

Briefly, DXA is one of the most accurate ways to assess body composition. It uses low volume X-rays (less than the exposure obtained in a cross-country plane flight) to evaluate bone mineral density, lean body mass, and fat mass. Underwater or hydrostatic weighing is also an accurate method to determine body composition. A person sits on a chair with a scale attached to it and is asked to breathe out air as he/she goes under water.
Factors Regulating and Influencing Energy Balance

Environment and Lifestyle
- Cognition, Reward, Choice, Mood, Stress

Nutrient Sensing
- Muscle, Liver, Fat, Gut

Energy Intake
- Total intake
- Composition of diet
- Amount & type of fiber
- Type of foods (energy density)
- Timing of intake around physical activity (PA)
- Body weight & body composition
- Hormonal control of appetite

Energy Expenditure
- Resting Metabolic Rate
- Activities of Daily Living
- Type & intensity of PA
- Body weight & composition
- Total energy intake & composition of food
- Genetics

BRAIN

Lean body mass and fat mass are estimated using a specific equation, based on the underwater weight and the amount of oxygen left in the lungs. Air displacement plethysmography uses a premise similar to underwater weighing; however, instead of water displacement, air displacement is used to determine body composition. The person sits inside a large cylindrical instrument as the readings are made. Bioelectrical impedance analysis uses electrodes to evaluate electrical conductivity throughout the body. Muscles carry more electrical charges than fat. After readings are made, the numbers are placed into prediction equations to estimate lean body mass and fat mass. Finally, skinfold measures use skinfold calipers to evaluate subcutaneous fat in specific areas of the body (e.g., triceps, biceps, subscapular, mid-thigh, mid-calf), and these numbers (in millimeters) are placed into prediction equations to estimate percent body fat.

Conversely, there are those who participate in sport who, based on either BMI or body composition data, are at healthy weights. Yet these people also want to lose weight for their sport or to achieve an aesthetically pleasing body shape. Some of these people are young and still growing while participating in high levels of exercise, which is the least desirable time to severely restrict energy intake.

Energy Balance—Understanding the Factors

The classic energy balance equation states that if energy intake (total Calories or kcals consumed) equals energy expenditure (total Calories or kcals expended), then weight is maintained. Although the concept of energy balance appears simple, it is a dynamic process. This means that when one factor on the energy intake side is changed, it can impact energy expenditure. Thus, numerous factors are working together to influence each side of the energy balance equation, which ultimately results in either maintenance or change in body weight. For example, total energy expenditure is influenced by total energy intake; composition of the energy intake, which changes how food is digested and absorbed (see Figure 4); and the timing of food intake. Conversely, activities of daily living will change depending on the level of sitting, standing, and fidgeting a person does. In addition, the type, intensity, and duration of planned exercise may change the utilization and need for carbohydrates, protein, and fat, which could alter body composition.

A common mistake made regarding energy balance is to assume that changing either side of the equation by 3,500 Calories will always result in one pound (about 0.5 kg) of body weight gained or lost, without considering all other factors that might adapt as energy intake is changed. A classic example of this concept was illustrated by Swinburn and Ravussin. These researchers asked: What would happen if a person consumed an extra chocolate chip cookie (about 100 Calories each) every day for 40 years? The theoretical calculation dictates that the amount of extra energy consumed would equal 1.5 million Calories. If we assume that there are about 3,500 Calories/pound (7,700 Calories/kg of fat tissue, the estimated weight gain would be about 417 pounds (190 kg) over this 40-year period. Yet, this does not happen. In reality, if someone consumed these extra Calories every day for 40 years,
the weight gain might only be about 6 pounds (2.7 kg), depending on a person’s initial body size. After a short period of positive energy balance, the extra energy consumed each day would cause weight gain (both fat and muscle). Eventually, as the body gets bigger, energy expenditure would increase to the point where the person would be in energy balance again, only at a larger body size. Now, to maintain this larger body size the person would need to continue to eat these additional Calories. Of course, the amount of weight gained will depend on the number of extra Calories consumed, the composition of these Calories (e.g., the amount of fat, carbohydrate, protein, or alcohol), and overall energy expenditure.

Thus, a number of factors ultimately determine a person’s body weight (Figure 4). Some of these factors include genetics, changes in the body’s hormones that control energy balance and appetite, the health of a person’s intestines (e.g., gut microflora), and the food and exercise environment that can drive eating, exercise, and body composition.15

Role of Diet and Exercise in Achieving a Healthy Body Weight

What is a healthy or optimal body weight? How does someone determine a healthy body weight? Although there are tables and charts that can guide people to what is a healthy body weight, other criteria are frequently used to help determine a person’s healthy body weight, regardless of a person’s activity level.16 These are:

- Weight that can be maintained without constant dieting or restraining food intake.
- Weight that minimizes health risks and promotes good health.
- Weight that promotes good eating habits and allows participation in some type of physical activity.
- Weight that allows optimal performance in the sport(s) of one’s choosing.
- Weight that takes into consideration genetic makeup and family history of body weight and shape.
- Weight that is appropriate for age and level of physical development.
- Weight that can be accepted by the individual.

Thus, body weight should promote good health and be “reasonable” in terms of whether or not it can be achieved and maintained. If a person is constantly dieting or repeatedly gaining and losing weight, they may be trying to achieve or maintain an unrealistic body weight. Conversely, some sports (e.g., gymnastics, wrestling, light weight rowing) may require a low body weight. When this is the case, an athlete may intentionally drop to a lighter weight during periods of high competition or choose to compete at a lower weight class. While it is important for athletes to achieve and maintain a healthy body weight throughout the year, some athletes may target body weights that are not healthy and/or are difficult to maintain during the off-season. Selecting a target weight that is unrealistic can be unhealthy for both young and older active people. For younger people, in particular, “making weight” for sport can stunt growth and result in a number of other health problems.

Where to Make Change: Diet and Physical Activity Factors

If a person is interested in weight loss, what dietary and physical activity behaviors need to change to achieve the greatest impact? What changes are sustainable and manageable, yet produce acceptable changes in body size and composition? What behavioral changes will the person actually make? These are difficult questions to answer and, of course, the answers will be different for different people at various stages in their life. The following diet and physical activity behaviors have significant research to support their recommendation to people who are interested in losing weight, increasing muscle mass, and/or maintaining weight loss.

- Eat breakfast, including high quality protein (e.g., an egg) in the meal.20
- Consume adequate high quality protein, especially after exercise, and spread protein throughout the day.21
- Select low Calorie-dense foods,22, 23 including whole grain foods, five or more servings of whole fruits and vegetables per day, and lean protein sources (e.g., chicken, tuna, lean beef, tofu, legumes).
- Eat foods high in fiber, with a goal of getting the recommended intakes for dietary fiber (14 grams/1,000 Calories)24, 25 from both soluble (e.g., oatmeal) and insoluble (e.g., whole wheat cereal) sources.24
- Limit intake of sugar-sweetened beverages (e.g., sodas, “fruit” drinks).26
- Spread Calorie intake throughout the day. Be sure to consume both carbohydrate and protein after exercise.3
- Manage portion size.22,27
- Increase high intensity exercise;18 maintain a strength-training program.
- Do not restrict caloric intake too severely, especially when combining Calorie restriction with a fitness/strength training program.28
Summary: Energy Balance

Management of weight is an ever-increasing challenge in societies where good tasting, high calorie food is convenient, inexpensive, abundant, and widely marketed. Developing a weight management plan is essential for everyone, including active adults and growing, active youth, who can expend high amounts of energy (Calories) in their exercise training and sport competitions. For active people who are overweight or obese, weight loss still can be difficult and can change body composition unfavorably if energy intake is restricted too much while maintaining a moderate to high level of exercise. Finally, having an understanding of the many factors influencing weight can lead to more effective weight management plans.

Dietary Supplements

In today’s society, there are many over-the-counter dietary supplement products that claim to increase muscle mass, reduce body fat, improve endurance, accelerate recovery, or enhance sport performance in other ways. About half of all U.S. adults use some type of dietary supplement, at a total annual cost of about 30 billion dollars.29 Youth and young adults involved in exercise and sports also use many dietary supplements.30 Dietary supplements are products that include vitamins, minerals, herbs or other botanicals, probiotics, amino acids, enzymes, and animal extracts, as well as other substances. These supplements are sold as tablets, capsules, softgels, gelcaps, and powders, and as drinks and energy bars.31 To make smart decisions about using dietary supplements, it is important to know if a product is effective, safe, and, in some sports, legal to use.

Dietary supplements were legally defined by the Dietary Supplement Health and Education Act (DSHEA) of 1994 as products, taken by mouth, that contain a “dietary ingredient” intended to supplement the diet. The DSHEA requires these supplement products to be labeled as dietary supplements.36

Effectiveness

Research shows that some dietary supplements are beneficial for overall health and sports performance. Examples include multivitamin/mineral products, calcium, iron, vitamin D, fish oil/omega 3 fatty acids, creatine, sodium bicarbonate, and protein.32,33 Many dietary supplements need more scientific research to determine their effectiveness and safety.15,16 Consuming excessive amounts of any dietary supplement has health and exercise performance risks.32–34 In addition, some dietary supplements that are beneficial to one person may not be beneficial to another person. Furthermore, individuals may experience differing responses to the same supplement.

Dietary supplements can help provide adequate intake of essential nutrients if people are not able to obtain the nutrients needed from what they eat and drink.31 For example, people who are on weight loss programs may severely decrease their food intake and eliminate vitamin and mineral rich foods from their diets; supplements can help them meet their nutrient needs. People who regularly make unhealthy food choices are also at risk for nutrient deficiencies and may benefit from the right kind and amounts of dietary supplements.

However, dietary supplements cannot take the place of eating the variety and amounts of foods that are important for a healthy diet. Credible guides for choosing a variety of healthy foods, which include the Dietary Guidelines for Americans and MyPlate, are listed in Table 1.

Safety

The U.S. Food and Drug Administration (FDA) is the federal government agency that oversees both dietary supplements and medicines.34 Dietary supplements are not approved by the FDA for effectiveness and safety before they are sold.31 However, prescription and nonprescription medications are required to be reviewed and approved by the FDA before they can be marketed. Companies that produce dietary supplements are responsible for having evidence that their products are safe, accurately labeled, and that claims made on the labels are truthful. However, these companies do not have to provide evidence to the FDA that they meet the requirements to market the products.34 The FDA may remove a supplement from the market or work with the manufacturer to voluntarily recall the product if the FDA determines that it is unsafe or unfit for human consumption.34 Certain types of “health-related” claims can be included on dietary supplement product labels. For example, companies are permitted to state that a dietary supplement addresses a nutrient deficiency, supports health, or is linked to a particular body function like immunity or bone or heart health. This type of claim must be
Table 1. Sources of Credible Science-Based Information on Dietary Supplements

**Academy of Nutrition and Dietetics**
- The Sports, Cardiovascular, and Wellness Nutrition (SCAN) dietetics practice group
  - [www.scandpg.org/](http://www.scandpg.org/)

**National Center for Drug-Free Sport**
- [www.drugfreesport.com](http://www.drugfreesport.com)

**United States Anti-Doping Agency**
- Provides credible dietary supplement information to athletes
  - [www.usada.org](http://www.usada.org)

**National Institutes of Health**
- **The Office of Dietary Supplements**
  - Provides accurate and up-to-date scientific information about dietary supplements
    - [ods.od.nih.gov/](http://ods.od.nih.gov/)
- **National Center for Complementary and Alternative Medicine Clearinghouse**
  - [nccam.nih.gov/](http://nccam.nih.gov/)

**The President’s Council on Fitness, Sports & Nutrition**
- Provides credible and practical resources on nutrition and physical activity
  - [www.fitness.gov/](http://www.fitness.gov/)
- **10 Tips Fact Sheet: Eating Healthy for an Active Lifestyle**

**U.S. Department of Agriculture (USDA)**
- Provides information on a variety of food and nutrition topics including the *Dietary Guidelines for Americans* and the MyPlate food guide

**U.S. Department of Defense**
- The Human Performance Resource Center (HPRC) Operation Supplement Safety (OPSS) provides resources on the informed use of dietary supplements for military personnel
  - [hprc-online.org/blog/dietary-supplements/opss](http://hprc-online.org/blog/dietary-supplements/opss)

**U.S. Food and Drug Administration (FDA)**
- Issues rules and regulations and provides oversight of dietary supplement labeling, marketing, and safety
  - [www.fda.gov/Food/DietarySupplements/default.htm](http://www.fda.gov/Food/DietarySupplements/default.htm)

**U.S. Department of Health and Human Services (USDHHS)**
- Provides information and tools for nutrition and physical activity
  - [www.healthfinder.gov/](http://www.healthfinder.gov/)
followed by the words, “This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.”

Tests for quality of supplement products are conducted by some organizations. Supplement products that pass these quality tests are permitted to display the seal of approval from the organization. These seals of approval provide assurance that the supplement product was properly manufactured, contains the ingredients listed on the label, and does not contain harmful levels of contaminants. However, these seals of approval do not guarantee that a product is safe or effective. Organizations that offer testing for quality or the presence of substances banned in certain sports include the U.S. Pharmacopeia, ConsumerLab.com, NSF International, and Informed Choice.

**Risks**

Some dietary supplements contain active ingredients that have strong biological effects which can be unsafe and harmful to health. Even “natural” supplements can be risky for people taking certain medications or with certain medical conditions. The FDA has discovered hundreds of “dietary supplements” containing drugs or other chemicals, particularly in products for weight loss or body building. The “extra ingredients” typically are not listed on the label, but can cause serious side effects or interact in dangerous ways with some medications or other dietary supplements, potentially causing injuries, illness, and even death. Information on tainted products marketed as dietary supplements can be found on the FDA website (www.fda.gov/).

**Ethics**

Some sports organizations ban athletes from using certain dietary supplements. These organizations include Major League Baseball, the National Football League, the National Collegiate Athletic Association, and the International Olympic Committee. Each of these organizations and their player associations provide information about the dietary supplements they ban.

**Credible Sources of Information**

It is important to use credible sources of information to evaluate the claims that are made about dietary supplements. The most credible information on dietary supplements is based on rigorous scientific testing.

- Ask health care providers for information. Even if they do not know about a specific dietary supplement, they may be able to access the latest medical guidance about its uses and risks.
- Consult with a registered dietitian, preferably a Board Certified Specialist in Sports Dietetics (CSSD), for advice on choosing safe, effective supplements. CSSDs are listed at www.scandpg.org.
- Organizations that have credible free publications and information about dietary supplements on their websites are listed in Table 1.

**Summary: Dietary Supplements**

Nutritional supplements that are effective, safe, and approved by a sports organization only “supplement” nutritious, healthy food and exercise practices; they cannot substitute for them. Ultimately, any dietary supplement alone, even those with proven benefits and safety, are not going to effectively enhance health, exercise, or sports performance unless people are practicing good, sound nutritional strategies.

It is important that consumers obtain credible information about the effectiveness, safety, and ethical use of dietary supplements for specific sports. Consult a knowledgeable physician or registered dietitian for personalized advice on taking dietary supplements to help meet health, fitness, and/or sports performance goals.

**Summary**

Good nutrition for physical activity, sport, and exercise can result in optimal health and exercise performance, regardless of whether a person is recreationally active or a competitive athlete. Good nutrition is a major component of disease prevention and health promotion. Combining good nutrition and exercise leads to energy balance, and thus, weight management. Finally, dietary supplements are just that, supplements to foods. Nonetheless, not all dietary supplements are created equal, and not all dietary supplements in the United States are regulated by the FDA.


