

NUTRITION

Nutrition For Fitness

Starting an exercise program does not mean having to eat any special foods or follow any special diet. Generally, eating a well balanced diet that includes plenty of variety provides all the nutrients needed when increasing physical activity. However, depending on the intensity or length of endurance required by the sport or activity, calorie or fluid needs, may be increased.

The American Dietetic Association, Dietitians of Canada and the American College of Sports Medicine published a position paper concerning "Nutrition and athletic performance". It was their opinion that six major points should be considered when designing an adequate intake for athletic performance:

1. Low energy diets will not sustain athletic training.
2. Fat intake should not be decreased below 15% of total energy intake, because some fat is essential for good health.
3. Emphasize increased intake of whole grains and cereals, beans, and legumes.
4. Five or more daily servings of fruits and vegetables provide nutrients and fiber.
5. Dieting athletes should not skimp on protein and need to maintain adequate calcium intakes.
6. A variety of fluids-especially water-should be consumed throughout the day, including before, during and after exercise workouts.

Taken as a whole, these recommendations

indicate that a healthy daily intake can easily be accomplished. A balanced intake as recommended by the Dietary Guidelines for Americans should include 55%-58%of calories from carbohydrate sources including fruits, vegetables, whole grains, cereals, beans and legumes. Carbohydrates supply quick energy for short bouts of intense exercise. In addition, carbohydrates protect protein from being broken down and used as an energy source, instead of its more important role of building and repairing muscle tissue.

Protein needs can be met by an intake of 12%-15% of calories from protein. Protein is needed for the building of body tissue to support increased activity as well as production of hormones and immunity factors, and repair of muscle tissue. The Journal of The American Dietetic Association reports that for the male endurance athlete, a protein intake of 1.2g/kg per day of protein is recommended. For the male resistance athlete, such as body builders, protein needs are increased and are advised to consume 1.6 to 1.7 g/kg per day of protein. No recommendations for females athletes is offered. Most importantly, energy intake must be adequate to insure that tissue protein will not be used as an energy source due to lack of other primary energy sources.

Fats' major role in the body is temperature insulation, organ protection and energy. During exercise over a wide range of intensities, fat is a dominate source of energy. Once the stored energy from the muscles and liver, in the form of glycogen, is used up, fat becomes the favored energy source. The Dietary Guidelines for Americans recommends 25-30% of the total daily caloric intake come from fats. The advisable proportion of energy from fatty acids is 10% saturated, 10% monounsaturated and 10% polyunsaturated. Negative effects have been noted on blood lipid profiles in some people when total dietary fat intake is less than 15% of energy.

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QUESTIONS FROM

t h e c l i n i c

Q • How much exercise is enough to make me fit?

a • For overall fitness, the American College of Sports Medicine recommends:

1. Aerobic or cardiovascular conditioning: 3 to 5 workouts a week. Fewer than three won't be enough, more than five will add little value.
2. Intensity: The goal is to work fairly hard, at 55 to 90 percent of your maximum heart rate. To find your maximum heart rate subtract your age from 220. Then, multiply by the percentage you wish to work at. For example: If your age is 49 and you wish to work at 75% of your maximum heart rate you would subtract 49 from 220=171 then multiple by .75=128. Your goal intensity would then be to work out while your heart beats 128 times a minute. You can measure your heart rate by lightly pressing on either large artery on the side of your neck for 10 seconds immediately after stopping an activity. Multiply this number by six to estimate your heart rate per minute.
3. Duration: Workouts should last 20 to 60 minutes. If you must cut down on exercise, begin by cutting down on duration, making workouts last less time. If necessary, cutting back on the frequency of workouts say, 4 rather than 5 days a week is better than lessening intensity.
4. Strength training: use machines or weights to build muscle mass two or three days a week. In each session, work each muscle group 8-10 times.
5. Flexibility training: stretching the major muscle groups: at least four repetitions, two or three days a week. This can be part of the warm up or cool down routine that helps muscles to adjust to the new stress of exercise and prevents injury.

Q • Do athletes need extra supplements or aids to enhance performance?

a • According to Gary Green, MD, chair of the National Collegiate Athletic Association Drug Testing and Education Committee, "most supplements are simply a waste of money. He estimates that some athletes spend upward of \$90 per week on supplements-money that would be much better spent on nutritious foods. A balanced diet that contains high-energy foods, extra fluids and electrolytes, and perhaps a little extra protein is all that the vast majority of athletes need." In addition, there is little regulation of dietary supplements which could mean that ineffective or potentially dangerous ingredients accompany the ingredient that is intended. It is also important to be aware that supplements do not have a standard serving size or dosage so, athletes are warned not to take supplements that exceed 100% of the Daily Value. It is wise to check the label for the letters USP (United States Pharmacopeia) on the label. This provides some assurance that the manufacturer follows USP guidelines for the dissolution, potency and purity of its products.

Q • How much exercise do I need to lose a few extra pounds?

a • Body weight is a balance between the energy supplied in the form of food and the energy used to maintain body functions. If you add to the energy use side by increasing your physical activity, without also adding energy intake, weight loss will result. Certain factors must be considered however. At times, shifts in fluid balance may prevent a weight loss from being apparent. After an adjustment period in which exercise is continued, weight loss will follow. How much exercise you do and at what intensity will determine just how much weight will be lost. Don't restrict energy intake too severely. If your energy intake is inadequate, your ability to continue exercise at sufficient intensity to derive maximal benefit will be compromised. Also, new muscle tissue that is built as a result of exercise, adds to the lean body tissue that weighs more than the fat tissue it replaced. If your scale does not show a consistent weight loss, you should measure your success by the way that you feel and the new strength that you have acquired.

Nutrition Realities welcomes your Questions from the Clinic. If you have questions or comments, please send them by mail, FAX, or e-mail to:

Questions from the Clinic

Nutrition Realities • Egg Nutrition Center
1050 17th St., NW • Suite 560 • Washington, DC 20036
FAX: (202) 463-0102 • e-mail: enc@enc-online.org

Realities

Getting *Started*



Whether your excuse is too little time, afraid of hurting an old injury, unsafe surroundings, lack of equipment or money, it is time to get into action, physically. When everyday seems like the last and stress is beginning to wear you down, and your doctor is not thrilled with your weight or blood lipid levels, it is time to consider a change in your lifestyle.

A report of the US Surgeon General on Physical Activity and Health recommends:

1. People who are usually inactive can **improve their health** and well being by becoming even **moderately active** on a regular basis.
2. Physical activity need **not be strenuous** to achieve health benefits.
3. **Greater health benefits** can be achieved by increasing the amount (duration, frequency or intensity) of physical activity.

Although there seems to be considerable consensus about the value of exercise and physical activity, data collected by the Center for Disease Control and Prevention shows that more than 60% of adults do not achieve the recommended thirty minutes a day of regular physical activity. In fact, 25% of all adults are not physically active at all.

Many researchers have linked the increase in chronic disease and its resultant increased healthcare costs to the US public's lack of physical activity. The Surgeon General reports that regular physical activity can reduce the risk of: dying from heart disease; developing diabetes, high blood pressure and obesity as well as diminished bone density. Of great concern are the data that show that nearly half of young people aged 12-21 years are not vigorously active on a regular basis.

Given the growing interest in health foods and dietary supplements, Americans appear to be interested in improving their health. Lack of knowledge about how to incorporate exercise into their day's activities as well as a mistaken impression that exercise requires extensive preparation including special foods or equipment contributes to the public's inactivity.

Moderate physical activity can be achieved in a number of ways. It is roughly equivalent to any physical activity that uses approximately 150 calories of energy per day or 1,000 calories a week.¹ For those who are time restricted, increased intensity of activity can mean less time is required to receive the same result. For those who are older or physically challenged, a slower pace for a longer duration can achieve similar health benefits. In this way, an exercise program can be readily tailored to your own lifestyle.

Considering equipment needs depends on the type of activity one chooses. Many daily activities such as walking, stair climbing, dancing or gardening require little investment. Incorporating exercise into activities that you already perform will help insure continued participation. It can be as simple as filling two coffee cans with sand then lifting them over your head several times a day. Alternatively, choosing to walk stairs rather than take an elevator, or walking to the post office, bank or supermarket rather than driving your car provides opportunities to achieve your exercise goals.

Each time you manage to achieve a desirable level of activity, you will feel better and be further along the road to a healthy life. Adding a well planned, balanced diet that includes variety and adequate hydration is all that is necessary to support any level of physical activity from jumping rope to marathon running.



Designing A Fitness Program

Once you have decided to get started on the road to fitness, it is wise to start slowly. Finding different types of physical activity that are enjoyable to you will help you keep your commitment. Finding a partner who can encourage your efforts often helps to insure that you get the most from your fitness program.

The old adage, “no pain, no gain”, no longer applies to a good fitness program. Setting a goal of 30 minutes of moderate physical activity is all you need to begin to reap health benefits. Periods of activity can be as brief as 10 minutes each, leading to a total of 30 minutes daily. Including physical activity in a routine that you currently perform such as walking stairs to and from your office and apartment or parking your car far from the store and carrying your packages adds to your daily physical activity.

After you become comfortable with your moderate intensity exercise program, you may wish to increase either the duration or the intensity of your activity. The goal is now 30 minutes of vigorous activity at least 5 times a week. Pushing slightly past fatigue is okay, however, a good pace should allow you to talk comfortably without becoming short of breath. Including some resistance exercise such as weight training, sit-ups, or push-ups 2-3 days a week, can add even greater health benefits. Just remember once arms or legs start shaking uncontrollably, it is time to decrease intensity.

Although you may not see an immediate change in your body, changes are occurring. Repeated aerobic exercise produces beneficial changes in the heart and blood vessels that are responsible for delivering oxygen to the muscles. Because the body needs more oxygen during exercise, it responds to training by producing more red blood cells and increasing blood volume. Exercise training also leads to an increase in the number of very small blood vessels in muscle tissue allowing oxygen to be delivered more easily to the muscles. Additionally, training

causes the heart muscle to enlarge and strengthen. In this way, each time the heart contracts more efficiently, more blood is pumped with each beat. As exercise increases, the heart becomes more efficient which allows the heart to beat at a slower less pressured pace.

Determining your goal is the first step in designing an appropriate exercise program. If general fitness is your goal then you seek to be able to do your daily activities with reserve energy to meet a physical challenge or endure stress. You want to be able to comfortably play with a child or grandchild without getting winded, climb the stairs to



the office without exhaustion or keep mother nature from adding extra pounds as you age. For you, physical exercise can provide such benefits as: prevention of chronic disease, maintenance of ideal weight, restful sleep, stronger self image, increased flexibility, strengthened lung and circulatory capacity as well as optimal bone density. Your goals can be reached by cardiorespiratory endurance exercise. This type of exercise involves slow and steady use of energy to build stronger body muscle tissue.

If however your goal is body conditioning, you seek to increase the size and the amount of muscle mass relative to

body fat tissue. Weight training or resistance training involves the use of weights to provide resistance for muscle strength and endurance. As one grows older, weight training increases muscle endurance that allows one to walk longer before exhaustion and provides strong back and abdominal muscles to reduce the risk of back injury. Weight training is often used to enhance performance in sports or cardiorespiratory endurance exercise.

Whether you're a weekend warrior or committed to a daily exercise program, a well-planned nutritious intake helps you achieve the greatest amount of health and fitness benefits. Each type of exercise requires energy from the nutrients that you eat, differing in the proportion of nutrients that are used.²

Physical activity that calls upon your body for immediate, short term energy uses mostly carbohydrates and smaller amounts of fats and protein to power your activity. In contrast, physical activity that requires longer more sustained exertion such as running or swimming, uses a greater mix of nutrients such as carbohydrates with fats and some protein. As many professional athletes have learned, a poorly balanced diet can lead to early fatigue and less muscle development. Even if your exercise goals are just being able to carry your own groceries or walk with friends without feeling winded, proper nutrition will support your effort.

However, if becoming an athlete is your goal, genetics, exercise training and diet are the major factors determining your performance potential. Eating a well planned diet can maximize your energy stores allowing you to extend your endurance beyond when fatigue would normally set in. Replenishing energy used during an athletic event with adequate nutrients insures that your body will be ready for future challenges.

² *Chart: Rough estimates of fuel use during various forms of physical activity*

For Everything *There is a Time*

Timing of nutrient intake plays a greater role in athletic performance the longer the duration of participation. The nutrient needs and the timing of intake become much more important for someone preparing for an all day triathlon event compared to someone participating in a short weight lifting competition.

The Training Diet

The basic components of a training diet are the same as those for the general public outlined by the Dietary Guidelines for Americans. Using the US Food Guide Pyramid, an athlete in training should be able to meet their nutrient requirements for everything with the possible exception of energy and fluid needs. For many athletes, energy needs may exceed the number of servings suggested by the US Food Guide Pyramid. It is suggested that the athlete first attempt to meet their energy (calorie) needs by increasing their intake of carbohydrate sources, such as breads, cereals and grains, vegetables and fruits. For variety and dietary balance, if energy needs continue to exceed intake, increased servings from the dairy and protein groups are recommended.

Pre-exercise Meal

Depending on the individual athlete's gastrointestinal processing time, pre-game meals and snacks may be advisable. Determining the best timing of intake at practices is the best way to judge if eating just before exercise extends or interferes with performance. The pre-game meal should supply sufficient fluid to maintain hydration while remaining low in fat and fiber to prevent stomach cramping, high in carbohydrate to main blood sugar levels and moderate in protein. Whether the athlete prefers to consume a large meal just before exercise or a liquid beverage with the same nutrient content is largely a personal choice.

During Exercise Intake

During exercise, carbohydrate intake should begin in 15-20 minute intervals.

The carbohydrate should be mostly glucose, although mixtures of glucose and fructose seem to be effective. If the same amount of carbohydrate and fluid is ingested, the form of carbohydrate does not seem to matter. Sports drinks, solid or gel forms are equally as good when consumed with water. Exercise of short duration can have less benefit from carbohydrate intake than those lasting longer periods. For longer events, consumption of 0.7g of carbohydrate/kg body weight per hour is recommended by the American Dietetic Association and the American College of Sports Medicine.

Post-Exercise Meal

Consideration of both timing and nutrient composition of the post-exercise meal or snack should include such factors as: the length and intensity of the exercise session, when the next workout will occur, and caloric needs of the athlete. If one exercise event will shortly be followed by another, replenishing stored energy by consuming a post-exercise meal is of greater importance. Consumption of 1.5 grams of carbohydrates/kg at 2 hr. intervals beginning immediately after exercise is generally recommended. When the athlete is able to rest for a day between workouts, the timing of post-exercise intake does not appear to be as critical.

Intakes of carbohydrate alone or carbohydrate with protein and fat following endurance and resistance exercise appears to work equally as well in restoring the body's energy supply. According to the American Dietetic Association and the American College of Sports Medicine, "including protein in a post-exercise meal may provide needed amino acids for muscle protein repair and promote a more anabolic hormonal profile".

The following is a sample menu for a training meal, a pre-game meal, during event snack and a post-game meal.

Sample Training Meal Pattern:

- Breakfast-** 1cup orange juice, 2 scrambled eggs, 1 English muffin
Snack- 1cup low fat milk, 1bagel, 1tablespoon jelly
Lunch- sandwich: Kaiser roll with 3 ounces lean ham, 1 ounce cheese, 2 slices of tomato and 1 lettuce leaf. 1apple, 1 banana
Snack- 1cup low fat milk, 1cup rice pudding
Dinner- 3 ounces broiled salmon, 1cup noodles, 1cup peas, ?cup fruit salad
 1 cup low fat milk, 1dinner roll, 2teaspoons margarine
Snack- 1cup low fat milk, ? cup low fat frozen yogurt, 2plain cookies

Sample Pre-game Meal:

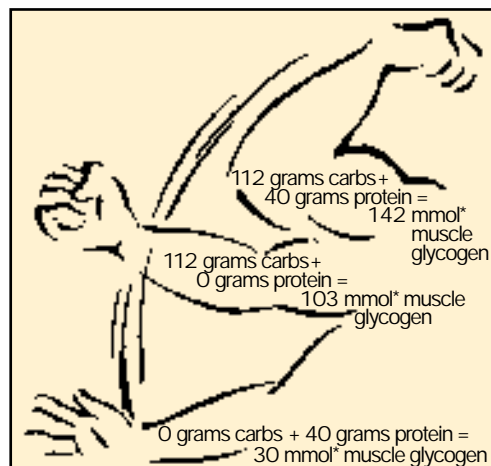
- 1cup fruit juice, 1 ? cup of dry cereal, 1cup lowfat milk, 1 hard cooked egg, 1 slice toast

Sample During Exercise Intake:

- 2cups diluted fruit juice, 1 large banana, 1 lowfat fruit yogurt

After Game Meal:

- 1? cups of rice, 3 ounces of sliced chicken breast, ? cup carrots, ? cup snow peas, 20 sliced almonds, 1 cup sliced pineapple, 1 cup custard, 1 cup fruit juice



*mmol = micromoles

Glycogen stores 4 hours after exercise (micromoles glycogen/g protein)

Feeding	Carbs(g)	Protein(g)	Glycogen (mmol)
1	0	40	+30
2	112	0	+103
3	112	40	+142

Note: 112g carb=448 calories; 40g protein=160 calories

What It Takes To Be An Active Senior

Throughout life we make many choices that effect the way we will live out the remaining days of our lives. The many excesses and inadequacies that our bodies were gracious enough to tolerate at a younger age, begin to show their affects after we achieve adulthood. We can all benefit from some self evaluation and some small lifestyle changes where necessary, because it is never too late to reap the benefits of a well balanced, nutritious diet combined with moderate exercise.

Although energy requirements decrease as we age due to the loss of lean body tissue, individual energy needs must be determined to maintain a healthy body weight. Protein needs do not seem to decline with age, in fact, there is some research to show that protein needs increase with age. The importance of adequate protein intake for seniors was reported by Castaneda et al.1 (1995), who found that elderly women who were fed low protein diets had compromised immune response, muscle function and significant loss of lean muscle tissue. Campbell et al.2 (2001) points out that the RDA of 0.8gram of protein per kilogram of body weight may not be adequate for older people. One to 1.25 grams of protein per kilogram body weight has been suggested to maintain muscle mass and promote protein synthesis.

Are all sources of protein the same? Researchers investigated whether subjects

fed animal versus vegetarian protein sources supported muscle function, protein turnover, and body composition equally. Pannemans et al.3 (1998) found in a study of 12 elderly women that whole-body protein breakdown was lower when subjects consumed a high animal protein diet. In fact, a significantly greater amount of whole-body protein was formed, while subjects consumed a high animal protein diet versus a vegetarian diet.

Research has also shown that older adults require greater intakes of folic acid and vitamins B6 and B12 than those recommended in the 1989 RDAs to prevent a decline in cognitive function and prevention of coronary artery disease by keeping homocysteine levels within a normal range. Calcium and vitamin D are also important nutrients to consider as we get older, to minimize the risk of osteoporosis. It is clear, that an adequate intake of protein from animal sources such as lean meat, fish, eggs and poultry, which offer generous amounts of high quality protein together with vitamins and minerals, is essential to maintaining health as we enter the later stages of adulthood.

The second lifestyle factor to consider in planning for a dynamic life in the golden years is exercise. There are many impressive benefits associated with moderate physical activity for the adult. Older adults who are active weigh less, have greater flexibility,

more endurance, better balance and are less susceptible to chronic disease such as diabetes mellitus and coronary artery disease. Endurance activity improves mood, quality of sleep and blood flow to the brain, which is believed to improve mental ability. Strength training has been shown to improve mobility and resistance to injury, which often limits a senior's sense of independence.

The good news is that in most cases minor changes in eating and activity patterns can make major changes in your future. Including an adequate nutrient intake in your daily meal pattern and finding ways to incorporate 30 minutes of walking, jogging and occasional weight lifting or some other form of activity in your day can make you the type of senior that we all hope we will be fortunate enough to be.

1 Castaneda C, Charnley J, Evans W, Crim M: Elderly women accommodate to a low-protein diet with losses of body cell mass, muscle function, and immune response. *Am J Clin Nutr* 62:30-9,1995.

2 Campbell W, Trapp T, Wolfe R, Evans W: The Recommended Dietary Allowance for Protein May Not Be Adequate for Older People to Maintain Skeletal Muscle. *Gerontology* 56:M373-80, 2001.

3 Pannemans D, Wagenmakers A, Westerterp K, Schaafsma G, Halliday D: Effect of protein source and quantity on protein metabolism in elderly women. *Am J Clin Nutr* 68:1228-35,1998.

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Individual histories based on body size, weight and body composition, the sport being performed and the sex of the athlete allow the nutrition professional to tailor specific nutrient and energy recommendations to the needs of the athlete.

Concerning vitamin and mineral needs, it is assumed that the current Dietary Reference Intakes are also appropriate for athletes unless the athlete

is restricting energy intake in an effort to lose weight. In this case, taking a multivitamin supplement is advisable. Intense exercise stresses metabolic pathways, which may make a higher intake of some vitamins and minerals necessary. Calcium, iron and zinc are often low in the diets of athletes, especially females and may require periodic assessment of body status.

When considering hydration, The American College of Sports Medicine makes the following recommendations:

1. Before exercise- In addition to drinking generous amounts of fluid in the 24hours before an exercise session, about 2 cups of fluid 2-3 hours before exercise is advisable.

2. During exercise- Optimal hydration can be achieved by drinking 6-12oz of fluid at 15-20 minute intervals, beginning at the start of exercise. Beverages containing carbohydrate in concentrations of 4% to 8% are

recommended for intense exercise events lasting longer than 1 hour. Plain water is an appropriate source of hydration for exercise events lasting less than 1 hour. Including sodium in quantities of between 0.5-0.7g/liter of fluid, is recommended for exercise lasting longer than 1 hour.

3. After exercise- Consuming up to 150% of the weight lost during an exercise session may be necessary to cover losses in sweat and urine production. Including sodium either in or with fluids consumed post-exercise is also recommended.

A wise practice is to weigh yourself before and after an athletic event or workout. For each pound that is lost, it is recommended that 2 cups of fluid be consumed. Cool water is a superior choice for replenishing lost fluid, especially if the exercise lasted less than one hour and weight reduction is an additional goal.

NUTRITION realities

Executive Editor:
Donald J. McNamara, Ph.D.

Writers:
Marcia D. Greenblum, M.S., R.D.



1050 17th Street, NW Suite 560
Washington, DC 20036
(202) 833-8850 Fax: (202) 463-0102
e-mail: enc@enc-online.org