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THEME: HEALTHY AGING

Keeping Active Amid Life Changes

by Cherilyn Hultquist, Ph.D.



Throughout life, change of any magnitude can be equally stressful and exciting. Whether it's a new career or a retirement, more or less leisure time becoming available, moving to a new location or any one of life's big or small challenges, physical activity can be an anchor to help a person cope with change. Maintaining a regular exercise regimen has many known health benefits and can help one establish a new daily routine, manage stressors, create a social network and explore new surroundings.

Whether we like to admit it or not, most of us are creatures of habit, and any type of life change can disrupt our comfortable routines. Finding time to exercise on a regular basis will be one of the quickest and most beneficial ways to settle into a new routine. For some, exercise may be the only familiar part of their

day. The key is to find activities that are easy to commit to on a daily basis. This can be achieved a number of ways, including finding a convenient location for exercise like a local gym, community center, walking trail or even your home. By identifying specific places to exercise, people can plan the rest of their day around physical activity instead of hoping they can fit it in before the day is over. Also, it is important to try to keep the same block of time set aside to exercise most days. Having a set routine doesn't mean exercise will be boring; rather, designating certain days for cardiovascular exercise, strength training and/or mind-body exercise (e.g., yoga or Tai Chi) will offer not only variety but also a well-rounded program.

Recommending exercise as a mechanism to manage stress has been popular among health-and-fitness professionals for many years. While the specifics are not fully understood, exercise can have both an immediate and a long-term effect on one's mood, perception of stress and feelings of anxiety. Not only is exercise a way to do something positive on a physical level, it can serve as a temporary distraction to stressors that are present or provide time to think about and navigate any change at hand. When using exercise as a mechanism to manage stress, it is important to find a mode that will not compound the stress. For example, identifying ahead of time if a group or solo environment is better, if the location is easy or difficult to get to or if the exercise requires coordination or specific equipment can all help when the goal is to keep stress levels low. In addition to aiding in reducing stress and anxiety, exercise can also boost self-confidence through a sense of accomplishment and improving one's physique. The good news is that any type of exercise can produce these results.

Another benefit that regular physical activity can provide during a time of change is an opportunity to expand a social support network. This can include meeting new people with similar interests or connecting with family and friends for accountability during times of transition. Social support is often associated with better adherence to exercise ➤

ACSM FIT SOCIETY



AMERICAN COLLEGE
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LEADING THE WAY

Letter from the Editor

by Dixie L. Thompson, Ph.D., FACSM

Welcome to the Fall 2010 edition of ACSM *Fit Society*® Page! Physical activity and fitness have a number of benefits for all people, but they can work wonders among aging populations. This issue highlights the many benefits older adults can experience by living a physically active life, including preserving mental capacity, reversing physiological effects of aging and serving as a way to adapt to change. The articles in this issue, we hope, will reinforce that physical activity and fitness are achievable at any age, as long as you know how to get started.

Please look over this information that ACSM experts have prepared for you, share it with friends and family and enjoy the fitness opportunities that this season presents. It's never too late to get out there and get moving!

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Keeping Active (continued from page 1)

recommendations, particularly among women. Some ways to expand a social network include joining community groups that offer exercise programs such as walking, running and hiking clubs or consistently attending group exercise classes the same days and times each week. Most people are habitual with exercise, so it is likely that faces will start to become familiar. Many community groups or churches offer leagues for older, active adults including swimming, tennis, racquetball and volleyball. Not only will leagues provide social interaction, participation can also drive other aspects of health and fitness as regular practice sessions and outside training will likely be involved as well.

Whether someone is in a new environment or simply has time to explore a location where he or she already resides, many communities have designated areas for physical activity.

Typically, city or county government offices have information about these locations and upcoming events. Discovering bike paths, hiking, and walking trails, historic neighborhoods/locations and parks will help an individual connect with and take pride in the community. Another benefit of exploring outdoor activities is that people can move in ways that are impossible in other environments. For example, practicing yoga or Qigong at a park, navigating the uneven terrain of an unpaved trail, jogging into the wind or kayaking on a lake will all provide additional physical challenges for the body that enhance results and cannot be replicated indoors.

Life will rarely stay the same, making change inevitable, but using physical activity to help cope with change clearly has many benefits. As with any successful exercise program,

activities need to be enjoyable, accessible and occur regularly, all of which will help to establish a new daily routine amid change.

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Q&A

by Anthony Luke, M.D., FACSM

Q: Can "brain exercises" help decrease the risk of Alzheimer's disease?

A: Memory loss is a common problem that accompanies aging. Many people think that doing mental exercises can help reduce memory loss. As I was looking into your query, I found interesting research that was conducted at my own institution, the University of California, San Francisco. The study looked at two groups of 15 subjects (average age 72). One group performed a 40-minute training program of pattern recognition drills on a computer, three to five times a week, for three to five weeks. The other group did not engage in a training program. When a memory test of recognition was administered to both groups, the group that completed the training program scored better than the other group. Plus, the group that completed the training program showed less brain activity during the memory test, which suggests that their brains were more efficient during the testing.

Researchers suggest that regular perceptual training—in this case it was vision—can lead to improvements in memory. For more information on this training, visit <http://www.positscience.com/>.

Another interesting study published in 2009 by a group at the Mayo Clinic found that computer-based hearing training (conducted for one hour per day, five days per week, for eight weeks) for a total of 40 hours improved individuals' memory and attention abilities. Therefore, there does seem to be some evidence that regular brain-challenging tasks can help improve brain function such as memory. It seems my mother-in-law who does Sudoku every day to stay sharp is really on to something.

Q: I'm over 70 now and work out regularly. I've heard about muscle loss, and I am wondering how can this be reduced?

A: An article published in the *The New York Times* in August described "sarcopenia," which is the age-related loss of muscle mass, strength and function. It's estimated that 10 percent of adults over age 60 suffer from sarcopenia, and the article describes it as being to muscle what osteoporosis (loss of bone mineral density) is to bone. The loss of muscle often involves the fast twitch (FT) fibers which act more during high-intensity, anaerobic movements. Muscle loss results from the loss of nerve innervation and protein synthesis which affects muscle function and regeneration.

Sarcopenia has been linked with the age-related decrease in hormones, in particular the concentrations of growth hormone (GH), testosterone (T) and insulin-like growth factor (IGF-1). There is a lot of interest in supplements and drugs that act similarly to these hormones, though there

Fitness for Anti-Aging

by Tiffany Esmat, Ph.D.



Do you know what centenarians and long-lived individuals tend to have in common? Would you guess that their longevity has often been attributed to a healthy lifestyle that includes regular exercise, a social network and positive mental outlook?

As we age, both structural and functional declines occur in most physiological systems, even in individuals without chronic diseases. This decline presents itself through decreased maximal aerobic capacity and muscle performance. In addition, body composition (the percentage of muscle mass to fat mass) also starts to change. Aging is often associated with decreased muscle mass and increased fat mass, placing older adults at a greater risk for both metabolic and cardiovascular disease. These changes often contribute to reduced functional capacity and further affect activities of daily living and overall quality of life.

However, while exercise may not completely stop the biological aging process, it can provide many positive benefits. Benefits include increasing life expectancy and decreasing the progression and development of some chronic diseases while decreasing the risk of disability. Living an inactive or sedentary lifestyle can have many negative side effects including increased fatigue, sleep

disturbances, difficulty with everyday tasks and decreased self-esteem. Often the negative effects associated with living a sedentary lifestyle are confused with getting older. Remember that lifestyle factors or things we have control over can make a difference in how we age. If we choose to participate in physical activity and regular exercise, we can choose to positively impact how we age. By leading an active lifestyle, we are working to preserve our independence by increasing our functional ability.

It is never too late to become physically active. Participating in a regular exercise program brings benefits that can affect our everyday activities. These include improved cardiovascular endurance, muscular endurance, flexibility and balance. These are important factors in functional ability. In addition, participation in regular exercise can also positively affect pain control, self-confidence and sleep patterns. These multiple benefits can make the difference between living at home independently or not.

The general recommendation for all adults is to accumulate 150 minutes of moderate aerobic activity per week. Additional benefits can be achieved through more activity. Adults that cannot participate in the minimum recommendation of 150 minutes per week should be as physically active as possible. The aerobic activity should be a rhythmic activity that uses large muscle groups such as walking, cycling, swimming or low-impact aerobics. What is the best type of activity? It depends on the individual. The ideal activity is one that is accessible, does not impose orthopedic stress and, most important, is one that is enjoyable to enhance overall compliance with the exercise program.

Muscular strength and endurance is often considered the most important component of health-related fitness for older adults as it counters the loss of muscle mass and the corresponding physical weakness that occurs with aging. In addition, it can help with balance issues, thereby reducing the risk of falls and fractures. Muscular strength and endurance also plays a great role in completing everyday tasks such as climbing stairs, unloading groceries and getting up from a seated or reclined position. The general recommendation for muscular strength and endurance includes training each of the six major muscle groups (legs, abdominals, back, chest, shoulders and arms) twice a week at a moderate intensity. A combination of eight to ten exercises should be performed with one to three sets of 10 to 15 repetitions.

Flexibility training (stretching) can help increase range of motion needed for everyday activities. Flexibility exercises should be performed at least two times per week with each stretch held for 10 to 30 seconds to the point of tension but not pain. Each stretch should be completed two to four times. Balance training refers to a combination of activities created to increase lower body strength and while decreasing the risk of falling. Balance training is recommended for any adult at risk of falling.

For those who are not currently active, a great place to start is by limiting your sedentary leisure time. Try to incorporate ways to be more physically active in your everyday life such as taking the stairs or parking the car farther away from your destination. Find ways to socialize while participating in physical activity. Remember that some activity is better than none, and even small amounts bring health benefits. Whether you are currently physical active or have not been active in many years, the importance of a well-rounded exercise program cannot be stressed enough. The benefits are for everyone, regardless of age. Remember: it is never too late to start an exercise program to experience the many wonderful anti-aging benefits.

Editor's note: See the Federal Physical Activity Guidelines for Older Adults for more information.

ACSM AT YOUR FINGERTIPS

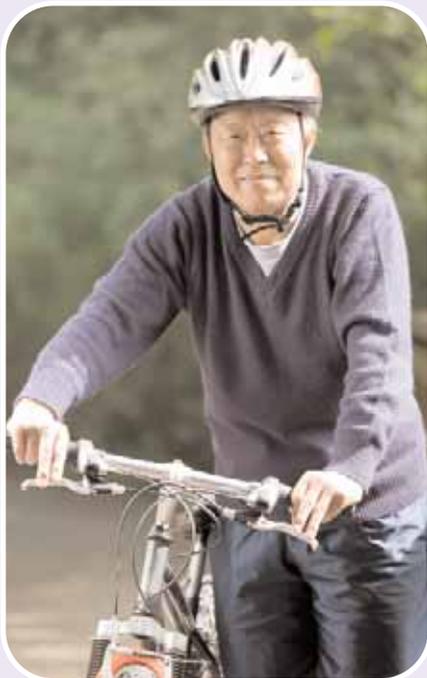


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Staying Mentally Sharp Through Physical Activity

by Siobhan M. White & Thomas R. Wójcicki, University of Illinois



Aging is associated with declines in cognitive function and structural changes in the brain which result in:

- Reduced efficiency of mental processes such as learning, planning, making decisions and paying attention;
- Decreased reaction time and memory impairment; and
- Decreased number of brain cells and volume.

In general, there is a commonly held belief that the aging process is inherently associated with a natural, seemingly unavoidable, deterioration of brain function.

However, emerging research in the fields of neuroscience and kinesiology suggest that many of these age-related declines in cognitive functioning are not inevitable and that help may literally be just a few steps away. Most people recognize that physical activity is

essential for improving and maintaining physical health and condition. What may be less widely understood, however, is the fact that regular physical activity also positively influences cognitive health. Over the past decade, a growing body of research suggests that physical activity participation is beneficial for preserving—even enhancing—cognitive function, especially in the aging population.

Influences of physical activity on cognitive health

Engagement in regular, systematic physical activity has been shown to offer numerous benefits for certain aspects of cognitive health. For instance, older adults who are more physically active have higher mental processing speed and are better at planning, scheduling and multi-tasking. Additionally, physically active individuals are better able to focus their attention on relevant environmental cues, which may be particularly important when performing everyday tasks such as driving. Older adults who regularly exercise have also been shown to exhibit improvements in memory. Furthermore, older adults who are active are less likely to experience dementia and Alzheimer's disease even if they carry the genes that predispose them to such conditions.

In addition to the benefits of mental processes, physical activity has also been shown to positively influence brain structure. Recent evidence suggests that participation in regular physical activity by older adults can actually result in the generation of new brain cells. Moreover, increased physical activity levels can result in the formation of new connections between brain cells, allowing the brain to work more efficiently.

How does physical activity influence cognitive functioning?

Increases in physical activity may result in an increased ability for the body to supply blood to the brain. Additionally, it may increase the levels or binding of chemicals in the brain that are necessary to perform many of the mental processes described above. The old adage “use it or lose it” may be in full effect when it comes to the relationship between physical activity and cognitive functioning. Simply learning new tasks such as dance steps or resistance exercises, for instance, may translate to improvements in mental processes that are used in everyday life.

How much physical activity is needed to reap these benefits?

Most studies done to date have shown that 45 minutes of brisk walking three times a week can be enough physical activity to result in positive improvements in brain structure and function. Combining brisk walking with strength training activities, such as weight lifting, two to three times a week may result in further improvements to cognitive health.

How do I become physically active?

It is never too late to begin a physical activity routine, as older adults who were relatively inactive have been shown to experience cognitive benefits after just 6 to 12 months of regular activity. If you are just starting out, however, it is important to start slowly. It is important that you listen to your body, use proper form and progress at a level that is somewhat challenging, yet attainable. For example, you might want to begin with a ten-minute walk, three times a week. Then you can add an additional five minutes each week until you are walking the full 45 minutes. If the weather is an issue, you may want to consider using a treadmill, an indoor track or even a local shopping mall. Explore your options. For instance, many park districts and gyms offer classes specifically designed for older adults. If you want to workout at home, perhaps purchasing an exercise video may be the answer for you.

Regardless of the option you chose, it is important to stay committed by scheduling time in your day to make physical activity a priority. Set exercise-related goals and regularly assess your progress to keep you motivated and focused. Additionally, finding a friend or significant other to exercise with may be helpful, as you can share your experiences and hold each other accountable. Every little bit of physical activity is beneficial, so even if you don't have 45 minutes, simply dedicating whatever time you have available to physical activity can help preserve, even improve, your cognitive health.

Editor's note: ACSM's Position Stand on Exercise and Physical Activity for Older Adults cites extensive evidence for claims of the health benefits of exercise in this population.

Balance and Fall Prevention

by Michael E. Rogers, Ph.D., FACSM

Falls are one of the most serious health risks for older adults. They are not only the leading cause of injury-related deaths in this population, but they are also a significant cause of disability. In fact, falls cause ten percent of all emergency department visits and more than half of injury-related hospitalizations.

Balance 1



Approximately one in three older adults falls each year. As the number of older adults increases rapidly over the next decade, the annual cost for fall-related injuries is expected to skyrocket, reaching \$44 billion by 2020. Although most falls don't result in severe physical injuries, a fall or near-fall often produces a psychological fear of falling. This contributes to a self-imposed decrease in activity, followed by functional declines and a greater risk for falls.

Balance 2



Falls in older adults are often viewed as unpredictable and unavoidable accidents. However, identification of the factors linked to falls combined with appropriate interventions to correct these conditions can dramatically lessen the risk of a fall. In many cases, falls are caused by a loss of balance or the inability to maintain the body's center of gravity (COG) over its base of support (BOS). There are two types of balance:

- Static balance, which is the ability to control postural sway during quiet standing; and
- Dynamic balance, which is the ability to react to changes in balance and to anticipate changes as the body moves. Dynamic balance includes maintaining balance while walking and stepping over or around objects.

The ability to balance depends in large part on sensory, muscular and motor systems. The three most influential sensory systems are the visual, vestibular and somatosensory systems. However, with advancing age, sensory function decreases, which negatively affects balance. Understanding these systems is essential to providing exercise programs that target balance for older adults.

The visual system is a major contributor to balance, providing information about the environment, the location of the person and the direction and speed of the person's movement in the environment. Visual acuity, depth perception, peripheral field and sensitivity to low spatial frequencies (requiring more contrast to detect spatial differences) decrease with age. As a result, older adults

tend to have a reduced ability to use visual cues to control balance.

The vestibular system, located in the ears, provides information about movement of the head, independent of visual cues. One component, the otoliths, detects head movement in relation to gravity, such as degree and direction of head tilt. The other component, the semicircular canals, are fluid-filled canals composed of three half circles positioned in three different planes. As the head moves, fluid in the canals triggers receptors and information is sent to the brain where it provides input about head orientation. At approximately age 40, vestibular neurons start to decrease in number and size, resulting in various impairments including dizziness.

Balance 3



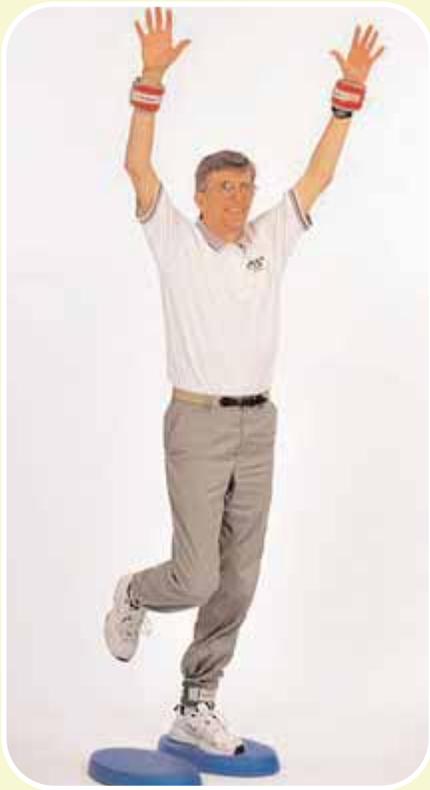
The somatosensory system provides information about the body's position and contact from the skin through pressure, vibration and tactile sensors, as well as joint and muscle proprioceptors. Skin sensation via tactile, vibration and pressure sensors is important in all activities of daily living, especially those involving movement. Skin sensitivity is reduced with increasing age. Lack of input from tactile, pressure and vibration receptors makes it difficult to stand or walk and detect changes in heel-to-toe body weight shifts, which are important in maintaining balance.

In addition to the three sensory systems, muscle strength plays a role in balance and mobility. Muscles are particularly important in

Balance (continued from page 5)

allowing the body to maintain postural stability, since they work to keep the COG within the BOS.

Balance 4



A basic premise of exercise science is that in order to improve the function of a system through exercise, the exercise must stimulate that system (i.e., the principle of specificity). Many studies have shown that strength can be improved in older adults using different types of resistance training. However, resistance training alone has only a modest effect on improving balance, even though strength and balance are related. This is likely because the ability to maintain balance involves a several processes that require the successful integration of multiple components, including several sensory systems not typically affected by resistance training. Exercise programs that target the physiological systems in balance control, specifically the visual, vestibular, somatosensory and muscular systems, can improve balance and reduce the risk for falls.

Balance exercises involve maintaining standing and postural stability under a variety of static and dynamic conditions. Activities in a balance-training program can include standing with one foot in front of the other to alter the base of support (see *Balance 1*), shifting the body weight in different directions (see *Balance 2*) and lifting the feet from the floor (see *Balance 3*). Exercises can also be performed with the eyes closed, while moving the head and/or while standing on foam (see *Balance 4*) to target the visual, vestibular and somatosensory systems respectively. A variety of activities are used to increase strength using body weight (see *Balance 5*) or equipment such as cuff weights or elastic resistance bands. Exercises which simulate activities of daily living, such as reaching forward to put something on a shelf (see *Balance 6*), can then incorporate resistance and dynamic balance to challenge balance further. However, when performing these exercises it is important to have a chair or other sturdy surface within reach in case it becomes necessary to steady one's self.

Balance 5



The potential applications of balance training are tremendous. Training can be performed to reduce the risk of additional falls in chronic fallers or improve balance in aging adults who want to reduce the risk of their first fall.

Furthermore, balance exercises can be incorporated into rehabilitation programs for people with hip fracture, stroke and arthritis.

Reducing fall risk by improving balance in older adults will not only avoid increasing health care costs, but it also will give older adults a more active life. Further, providing effective interventions to target fall risk can make a major difference in quality of life for these individuals.

Balance 6



Photos used with permission from Hygenic Corporation.

Fueling for Training—What to Eat Before, During and After You Exercise

by Nancy Clark, M.S., R.D., C.S.S.D., FACSM



Athletes of all sports and abilities commonly ask me what they should eat before, during and after a competitive event:

When should I eat the pregame meal: 2, 3 or 4 hours beforehand?

How many gels should I take during a marathon?

What's best to eat for recovery after a soccer game?

The same athletes who worry about event fueling often neglect their day-to-day training diet. Hence, the real question should be: "What should I eat before, during and after I train?" After all, you can compete at your best only if you train at your best.

The goal of this article is to remind you to train your intestinal tract as well as your heart, lungs and muscles. To get the most out of each workout, you need to practice your fueling as well as your sports skills. Then, come the day of the competition, you know exactly what, when and how much to eat so you can compete with optimal energy and without fear of bonking (passing out from low blood sugar) or intestinal distress. Here are some sports nutrition tips to help you perform faster, stronger and longer.

When and what should I eat before I exercise?

Each person has a different tolerance for pre-exercise food. I often talk with athletes who report they don't eat before they exercise because they're afraid the food might cause intestinal problems. Then they needlessly suffer through major energy problems during their workouts. That's why they need to practice not only what they eat but also when and how much to eat before they exercise. From day one, I recommend you start training your intestinal tract by nibbling on a pretzel, cracker or other fuel that will enhance stamina, endurance and enjoyment of exercise.

You don't need to wait around for your pre-exercise snack to digest. You can grab a small snack just five minutes before exercise, and the food will get put to good use (as long as you are exercising at a pace that you can maintain for more than half an hour). That is, you might not want to eat much five minutes before a hard track workout, but you could enjoy a banana before you put on your jogging shoes. Research suggests you can eat an energy bar either 15 or 60 minutes before moderate exercise and gain a similar energy boost.

In general, most active people prefer to wait two to four hours after eating a full meal before they head to the gym or prepare for a team practice. The meal will have plenty of time to digest and empty from the stomach, particularly if they don't stuff themselves with high-fat foods (cheeseburgers and fries) that take longer to digest than a carb-based (pasta) meal. The rule of thumb is to consume:

Pre-exercise	Grams carb/lb	Calories/Time 150-lb athlete
5-60 minutes	0.5 g/lb	300 calories
2 hours	1.0 g/lb	600 calories
4 hours	2.0 g/lb	1,200 calories

For a 150-lb person, 300 pre-exercise calories translates to:

- Two packets of oatmeal or a Dunkin Donuts-size (4 oz.) bagel within the hour before your morning run.
- Four Fig Newtons and a banana at 4:30 in the afternoon when you plan to go to the gym after work at 5:30.

If you will be meeting your triathlon buddies for a 50-mile bike ride at 10:00 a.m., you'll want 600 calories by 8:00 a.m. That's a bowl of granola with a banana and milk or several pancakes. It's more than many cyclists tend to eat.

When and what should I eat during a long workout?

If you plan to exercise for longer than 90 minutes (be it a long run, row, bike ride or team practice), you should plan to consume

not only a pre-exercise snack (to fuel the first 60 to 90 minutes of your workout) but also additional carbs during exercise to maintain a normal blood sugar level. Your brain relies on the sugar (glucose) in your blood for fuel. If your blood sugar drops, you'll bonk—lose focus, lag on energy, yearn for the workout to end—and fail to get the most from your effort. Many coaches have learned that planning a mid-workout fueling session pays off in terms of happier athletes and enhanced ability to train harder at the end of a two-hour-plus team practice.

While athletes in running sports that jostle the stomach may prefer to drink primarily liquid carbs (i.e., sports drink), cyclists and skiers might prefer a granola bar, dried fruit or a chunk of bagel plus water. The goal is:

- 30-60 grams carb (120-240 calories)/hour exercise that lasts 2-3 hours. (The pre-exercise snack will fuel the first hour.)
- 60-90 grams carb (240-360 calories)/hour extended exercise. (Examples: all-day hike, Ironman triathlon or century bike ride.)

Some athletes choose the convenience of engineered sports foods (e.g., Sports Beans, Clif Chomps, PowerGels). Others save money by choosing "real" foods (raisins, gummy candy) that cost less and often taste better. Both are equally effective.

When and what should I eat after a long workout?

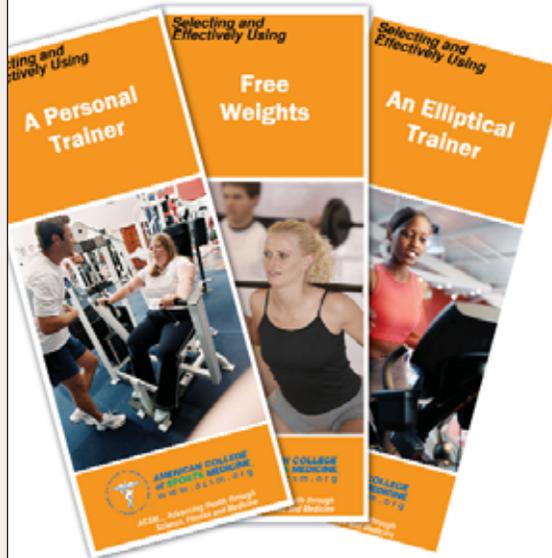
Rapid refueling is most important for people who do repeated bouts of intense, depleting exercise. You want to rapidly refuel if you are, let's say, a triathlete who does double workouts and will be exercising within the next six hours. Your muscles are most receptive to refueling within an hour after a hard workout, so the sooner you refuel, the sooner you'll be ready to roll again.

If you have a full day to recover before your next training session, or if you are a fitness exerciser who has done an easy workout and have lower recovery needs, you need not obsess over refueling immediately after your workout. Yet, I encourage all athletes to get into the habit of refueling soon after their workout. You will not only feel better and have more energy but also will curb your appetite. If you are trying to lose weight, a post-exercise snack can ward off the Cookie Monster.

To avoid over-indulging in recovery calories, plan to back your training into a meal. For example, enjoy breakfast after your morning workout instead of waiting to eat at the office. Plan to eat dinner right after your 5:00 p.m. workout. Remember—you haven't finished your training until you've refueled!

is little evidence that an effective substance has been found to be the elusive “fountain of youth.” Even human growth hormone, which often appears in the news, shows unclear results regarding its effectiveness for building muscle in older athletes. As is often the case, exercise is said to be successful in combating muscle degeneration from aging. A strength-training program is often beneficial with the recommendation that the individual train all the major muscles with a program of eight to ten exercises that train the major muscle groups (e.g., quadriceps, hamstrings, pectorals, abdominals) with three sets of 10-15 repetitions with good form. See ACSM’s Position Stand “Progression Models in Resistance Training for Healthy Adults.”

ACSM BROCHURES: Information On a Variety of Workout Equipment and Programs

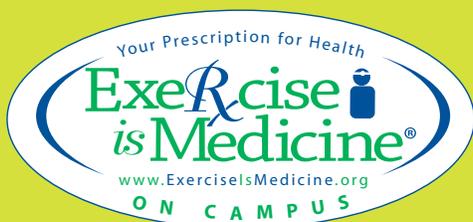


The American College of Sports Medicine touts the benefits of physical activity through offering comprehensive, up-to-date information on a variety of exercise-related topics. ACSM offers a variety of health and fitness brochures to anyone with an interest in sports medicine and exercise science.

ACSM brochures are linked below in PDF format, and are free to print, as many copies as you need.

For more information, visit www.acsm.org/brochures

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