There are so many reasons to start exercising! First, you will feel great. Just give it a try! Also, exercise has been shown to improve heart and lung function, decrease the risk of heart disease, decrease the chance of illness or death from all causes, decrease anxiety and depression, and even slow the process of aging. For example, researchers found that many bodily functions start to decline at a rate of two percent per year after the age of 30. But, with exercise, this aging process is slowed to a rate of one-half percent per year! This means that a person who does not exercise will have lost 70 percent of their functional ability by the age of 90. In contrast, a 90 year-old exerciser will have only lost 30 percent of their functional ability and still be 70 percent strong!

Although you may want to begin your exercise program right now, you might also be concerned about some of the risks of exercise. By far, pulled muscles and sprained ankles account for the majority of injuries which occur while exercising. Also, there is a small risk of serious injury such as a heart attack or collapse during exercise. Certain medical conditions may put you at higher risk for serious injury during exercise, such as congestive heart failure, diabetes, or heart attack. And worrisome symptoms include chest pain, irregular heartbeat, shortness of breath, joint swelling, or trouble walking. However, most chronic medical problems are significantly improved with exercise. With proper exercise choices, equipment, and warm-up, the rate of injury is markedly decreased. To be on the safe side, a mixed weight bearing (walking) and non-weight bearing (swimming) exercise regimen will reduce the risk of joint injury.

Stretching and warming up is recommended prior to and after exercise to help prevent muscle injury. It is best to check in with your doctor if you have any of the above medical concerns, a family history of heart disease, or if you are a man over 40 or a woman over 50. With these precautions, the vast majority of older folks can safely start an exercise program and live longer, healthier lives.

Now that we have reviewed the reasons why to exercise, and the precautions to take, let’s talk about the different types of exercise.

(Continued on page 4, see Exercise)
Q: What is the ideal surface for walking?

A: As far as walking surfaces are concerned, a cushioned surface is more forgiving than a hard surface in terms of the mechanical stress exerted on the bones and supporting structures. Ideally, a rubberized track or a grass surface permits some impact loading but less than an asphalt or concrete surface. These cushioned surfaces lower the potential for an overuse injury such as a stress fracture. This is particularly important for folks who walk on the tile-covered concrete floor at the local mall for exercise.

If one’s exercise routine utilizes a hard surface for impact activities such as walking or jogging, it’s very important to pay close attention to your shoes. Proper fitting running shoes with good shock-absorbing qualities are essential. It’s equally as important to know when to get new shoes. The shock-absorption characteristic of a good quality running shoe lasts for 200-400 miles of use. It’s not unusual for the shock absorption properties of the shoe to wear out before the shoe shows signs of significant wear.

There are other factors to consider when determining the ideal surface for walking. Is the surface free of holes, roots, and/or loose impediments? Is the surface well lit? Is the surface hilly or flat? If the surface is a road, what’s the traffic like? Is the surface indoors or outside to account for inclement weather? Are others walking nearby so you are not out alone?

Based on reviewing all the factors involved, a hard surface may be preferable. If so, pay special attention to exercise intensity and duration, as well as your shoes, to avoid overuse injury.

Q: What’s the best exercise to stay healthy?

A: There is no magic exercise. The best exercise is the one (or better yet, more than one exercise) you enjoy and find the time to do. Getting 30 to 60 minutes of daily physical activity is far better than getting no exercise at all, or being sedentary. Consult with your healthcare provider if you have special needs or concerns.
While some older adults thrive in structured exercise programs, others see it as a major inconvenience or impossibility, and subsequently avoid joining exercise groups. You understand the benefits of exercise, but dread getting into the car and driving to the gym or senior center to participate with others, or you simply feel as though you do not have time in the day to schedule an exercise class. You are retired but find yourself busier now than when you were working! You may even feel as though you are not physically able to participate in an exercise program.

The good news is that you can still reap most of the benefits of physical activity and exercise just by being active during the day. ACSM recommends a minimum of 30 minutes of physical activity most days of the week to improve your health. How can we improve our cardiorespiratory endurance, muscular strength and endurance, flexibility, balance, and health in just 30 minutes a day without performing planned exercise? The answer is to make small changes that challenge your body throughout the day.

Cardiorespiratory endurance or aerobic fitness will help to reduce your risk of cardiovascular disease, some forms of cancer, and diabetes. Try to increase the number of steps you take in the day by parking a few spaces further from the store entrance, walking a hole or two while golfing, or playing with your grandchildren. These suggestions are small changes to help develop your aerobic fitness. Take a walk with someone to catch up on events instead of calling or e-mailing. Go dancing! If you would like a real challenge, take the stairs instead of the elevator or escalator.

Improvements in your muscular strength and endurance may help to reduce your risk of osteoporosis, as well as reduce your risk of falling. Try gardening; all that weed pulling and digging is great for the back muscles, while getting up and down is excellent for developing lower body muscles. Carry your groceries out to the car instead of using a cart for upper body strength. Clean out the garage, attic, or a closet; sorting all those bits and pieces will definitely put your muscles into motion. Or while you are watching TV, perform resistance-training exercises, such as chair stands or biceps curls during the commercials.

Flexibility or the ability of the joints to move through a range of motion is important to maintain because of its relationship towards activities of daily living. Holding a position for 10-30 seconds can enhance your flexibility. Make modest changes, like when turning off the alarm, reach across the body and hold that position, and sit up in bed and open your arms wide to greet the morning and stretch the chest. While you are brushing your hair, drop your arm behind the head for a triceps stretch, and then as you are brushing your teeth, put one foot behind you and stretch out the calf muscles. As you sit down to the breakfast table, perform a spinal rotation to each side. As you sit down to put on your shoes, lengthen the leg and reach for your toes for a hamstring stretch. And finally, before you put your car into gear, turn to look over one shoulder and then the other, holding each position. You will have completed almost a full body flexibility program before lunchtime!

Maintaining your balance is critical to help reduce the incidence of falls. Provide yourself with balance challenges throughout the day. When you are standing in line at the grocery store, you can work on balance by holding onto your shopping cart and standing on one leg. You can rise up on your toes while you are washing dishes, or as you are walking from one room to the next, practice tandem walking by placing one foot directly in front of the other, using the wall for stability.

Simple, short activities done throughout the day can improve your health and fitness. Take the time to think of ways to increase or enrich the quality of your activity level. Remember, every movement that you make during your day is an opportunity to move your body toward better health and fitness.
Exercise

(Continued from page 1)

Flexibility

Stretch your muscles and tissues to help prevent injuries and falls. Especially important areas to stretch include the legs, back, neck, shoulders, and ankles. Examples of stretching exercises can be demonstrated by an exercise specialist, or can be reviewed at the Web Site: http://www.nia.nih.gov/exercisebook/chapter4.htm, which was developed by the National Institute of Aging. Flexibility training can be done every day and should be a part of your warm-up program.

Endurance exercise

This type of exercise increases your breathing and heart rate by repetitive body motion, improving the health of your heart, lungs, and circulatory system, as well as your stamina. It can also delay or prevent many diseases associated with aging such as diabetes, colon cancer, heart disease, and stroke.

Examples of endurance exercises include walking, swimming, jogging, biking, and rowing. Endurance exercise should be started and progressed slowly, as this will help avoid injury. The goal is to exercise for 30 minutes a day at a level that increases your heart rate and breathing but still allows you to talk while exercising. You may need to start at a slower rate and shorter time to avoid injury.

Strength Training

Building muscles increases your metabolism and helps prevent osteoporosis. Examples include weight lifting, going from sitting to standing, or lifting a soup can or bag of rice. Strength exercises should be done every other day with three sets of eight to 12 repetitions for each exercise.

Balance Exercise

Enhancing your balance helps prevent falls and injury. Exercises include strengthening leg muscles and practicing standing on one leg. For a more difficult exercise, try balancing while standing on a pillow; then try standing on a pillow with only one leg.

One good strategy is to start exercising 30 minutes a day, with flexibility and endurance training on some days and strength and balance training on other days. Vary the types of exercises to keep things interesting, and pick exercises that are fun and interesting to you. For example, stretching with your neighbor or family member may be more fun, or you may desire a walk alone in the morning to begin your day. Keep track of your progress for motivation.

If you are not sure where to begin with an exercise program, your doctor or other healthcare professional can help you. There are exercises to suit everyone's desires and needs. By exercising, you will see improvements in your daily activities, notice enhanced feelings of wellness, as well as help prevent many medical problems. So get started and have fun!

ACSM and the Breakfast of Champions

Browse the cereal aisle at any grocery store right now and check out boxes of the Breakfast of Champions. ACSM and Wheaties® have embarked on an educational partnership this year to provide health and fitness information on Wheaties® boxes. Wheaties® is committed to taking their customers on a “personal fitness journey,” and have partnered with ACSM to create reliable fitness tips.

From Championship boxes with sport-specific fitness themes, to regular boxes with general health and fitness information, Wheaties and ACSM will reach millions of Americans with the latest fitness information, practical health and fitness tips and cutting-edge science to motivate people to be physically active. ACSM will share fitness insights and knowledge through content printed on millions of Wheaties boxes and featured on the Wheaties Web site, Wheaties.com.

“ACSM is the most trusted source of fitness information in the country, but as a non-profit organization, reaching a wide public audience with critical information is a challenge,” said ACSM President W. Larry Kenney, Ph.D. “By entering this first-of-its-kind partnership with Wheaties, ACSM can funnel fitness information directly to the breakfast tables of millions of Americans whom the organization typically would not be able to reach.”

The Wheaties® tradition of promoting fitness goes back more than 70 years. In the 1930s, Babe Ruth and coach Howard Jones advised “to exercise and practice regularly” to get “a champion's energy, pep and speed.” In the 1950s, Bob Richards presided over the Wheaties Sports Federation, which encouraged physical fitness for all Americans.

“Helping Americans meet their fitness goals has been a Wheaties® mission for a long, long time, and this partnership with ACSM will deliver important information in a motivating style that is designed to lead people to real results,” said Brian Kittelson, Wheaties marketing manager. “We are thrilled that The Breakfast of Champions and the ACSM together will help fuel many more personal championships in the years to come.”

Wheaties and ACSM will also be offering a free e-mail bulletin for subscribers that will provide additional fitness information supplementing the content on the cereal box.
Flexibility in Aging: Stretching to Mend the Bend

by Diane Austrin Klein, Ph.D.

We all age a little each day, and with aging come some physiological changes to our musculoskeletal system and our flexibility. Losses in flexibility are as much the result of disuse as they are to aging. Reductions in joint range-of-motion affect mobility and balance, impacting routine physical functional status and the ability to perform basic and instrumental activities of daily living (ADLs/IADLs). Routinely performing flexibility and stretching exercises can limit the losses of flexibility over time. Although many of us exercise regularly, stretching before and after our exercise routines, we may not be doing enough to maintain flexibility and physical function.

Defining Flexibility

To appreciate the impact of aging, we must establish a common definition of flexibility and understand the physiological changes affecting flexibility during aging. Flexibility enables muscles and joints to move through their full range of motion. It has been defined as the absolute range of movement in a joint or series of joints that is attainable in a momentary effort with the help of a partner or a piece of equipment. Flexibility varies for each muscle and joint group. The condition of the muscles, joints, and connective tissues— including muscle fascia, ligaments, tendons, collagen, and elastin — affects flexibility.

Aging and physical inactivity contribute to the loss of flexibility over time. The notion of “use it or lose it” is highly applicable to flexibility and later affects ability to function in our daily routines. Several physiological changes affecting flexibility occur with aging:

- Increased calcification, fraying, or cracking in cartilage and ligaments
- Erosion of cartilage in heavily used joints — particularly of the knees and hands
- Decreased elasticity in joint capsules, tendons, and ligaments with the development of cross-linkages between adjacent fibrils of collagen
- Increased dehydration and loss of joint lubricants in connective tissue
- Changes in the chemical structure of the tissues

Older adults experience greater flexibility losses than younger adults, but activity can minimize losses. It has been suggested that performing flexibility and stretching exercises stimulate production and retention of connective tissue lubricants and can reduce flexibility losses.

Toward Healthier, Successful Aging

Experts say three components for “successful aging” include (1) avoiding disease and disability; (2) maintaining high cognitive and physical function; and (3) continuing to engage in life (and with others). These components focus on overall lifestyle behaviors — good dietary management, continuing education, socialization, and exercise. The exercise component, particularly for strength and flexibility, enables high physical function and avoidance of disability.

Physiological changes in aging muscles and joints affect mobility and limit locomotion, including reduced muscular work capacity and loss of muscle mass. Increases in connective tissues and cross-linkages add to muscle stiffness, soreness, and tension. For older adults, flexibility exercise is essential for aging muscles to retain their flexibility and protect them from injury. Older adults are more susceptible to muscle injury and it takes longer for their injuries to heal properly. In many cases, healed muscles may not perform as well as prior to the injury.

Recommendations from the Centers for Disease Control and Prevention and the American College of Sports Medicine have identified a need for older adults to perform flexibility exercises, preferably daily. Flexibility and stretching exercises should be performed in a slow, sustained manner, holding stretches for 30 seconds. The stretch should be felt in the muscle, not the joint. If arthritis or muscle weakness is an issue, stretching and flexibility exercise can be performed in a warm pool to provide muscle warming and buoyancy.

Stretching and Flexibility Exercises

Flexibility training should be balanced with strength training to prevent connective tissues from becoming too loose and weak and being subject to damage through overstretching or sudden, powerful muscular contractions. The key is to strengthen what we stretch and stretch what we strengthen. When performing both a stretching program and a regular weight-lifting strength-training program, stretching should occur after the weight-training program so that muscles are warmed before the stretching activity.

A variety of stretching and flexibility exercise techniques attract older adults because they are fun, easy to do, and highly effective. These include Tai Chi, Yoga, Pilates, and water exercises, because of their ability to safely develop both strength and flexibility. This results

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Stay Active After Joint Replacement
by Paul S. Sherbondy, M.D.

Total joint replacement is one of the most effective surgical procedures developed in the 20th century. Each year, more than 500,000 joint replacements of the hip and knee are performed in the United States. Joint replacement is most often performed on persons of retirement age for unremitting joint pain caused by osteoarthritis. There are numerous other indications for joint replacement, including arthritis from previous injuries and rheumatoid arthritis. Once considered a surgical procedure for the aged, joint replacements are now being performed on patients 40 to 60 years of age. While most common in the hip and knee, surgical replacement of other joints including the ankle, shoulder, elbow, wrist, and fingers have been developed.

Due in part to technological advances of modern medicine, Americans enjoy an ever-increasing life expectancy. We are an “on-the-go” society, with commitments to work and family and the pursuit of leisure-time activities. It is increasingly unacceptable for us to have our lifestyle limited by a painful joint. We have also become a much more athletic and health-conscious society. Sports participation has increased dramatically in the past half century, and larger numbers of women enjoy sporting activities. Athletics are not just for kids anymore either. We chose to pursue an expanding array of sporting activities into adulthood. Unfortunately, athletic participation also increases the risk of serious joint injury that may lead to the development of arthritis. Exercise is also an important component of a healthy lifestyle. Physicians often recommend exercise programs to help lose weight and control diabetes or high blood pressure. We also exercise to feel good and improve our self-image and vitality. As we age, a painful knee or hip can significantly affect our ability to pursue recreational sports or exercise. Joint replacement is a surgical procedure that can help us continue an active lifestyle.

Normal joints are composed of cartilage supported by underlying bone and lubricated by joint fluid. They are dynamic structures able to adapt to changes in stress and activity. Arthritis is an irreversible process that causes wearing away of the cartilage. This results in roughness of the joint surfaces that can then lead to bone spurs, crookedness, swelling and pain. Joint replacement involves removal of the diseased joint cartilage and a small amount of the underlying bone. The resected bone and cartilage is then replaced with metal and plastic. The metal portion is affixed to the bone and the plastic is placed in between and serves as the joint-bearing surface. The metal implants are affixed to the bone with special cement or the bone is allowed to grow onto the implant surface to provide stability.

An artificial joint does not have the same dynamic ability to adapt to changes as a normal joint. Therefore, joint replacements unfortunately have a finite lifespan. Normal stresses from walking and movement cause microscopic wearing of the plastic spacer. The interface between the bone and implant also represents a potential weak area. Breakdown of this interface can lead to implant loosening. Joint replacements are also at risk for other complications including implant breakage, dislocation and bone fracture above or below the implant. Under normal circumstances, the risk of these adverse events occurring is minimal. Increased activity and loading of the joint can accelerate these processes. Exercise and sports increase the risk of these adverse events. Factors that can affect these problems include the length of time the implant is required to be in place and the type and intensity of activity performed. Activity levels generally correlate to age, so the younger a person is at the time of joint replacement, the greater the likelihood of developing problems.

There are several issues to consider for those who wish to continue an active lifestyle beyond that required for activities of normal daily living. The first is to discuss the desired activity with your surgeon and determine what activity is permitted. Having this discussion before surgery can help form realistic expectations after surgery. Another important issue is your prior experience with the desired activity. It is more realistic to continue to pursue a permissible exercise or sporting activity that you are experienced with rather than beginning one anew.

In general, after hip or knee replacement, most surgeons permit patients to engage in stationary biking, dancing, golf, swimming, walking, and doubles tennis. With prior experience, low-impact aerobics, road bicycling, bowling, hiking, horseback riding, and cross country skiing are usually permitted. High impact activities such as racquetball, soccer, singles tennis, football, basketball, softball, and jogging are not permitted. Opinions vary on other activities including weightlifting and downhill skiing. There may also be permanent restriction from kneeling with total knee replacement and squatting with total hip replacement. Heavy lifting, carrying, and intensive manual labor are also usually not permitted.

(Continued on page 11, see Active)
Exercise after Menopause

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

There are many well-recognized reasons for exercise: better heart health, lower risk of type 2 diabetes, and weight management are just a few. Unfortunately, many women fail to make the time to exercise regularly, and subsequently miss the benefits that come from an active lifestyle. Some women believe that exercise is more important for men, while others confuse being busy with getting adequate exercise. Some older women also mistakenly believe that it is too late to begin an exercise program after menopause. However, a recent study showed that women 65 or older who increased their physical activity lowered their risk of death during the follow-up period by almost 50 percent! In fact, there are many well-documented benefits that can be gained by postmenopausal women when they exercise regularly.

One of the benefits to regular exercise is cardiovascular health. Regular aerobic exercise reduces the risk of dying from heart disease, lowers blood pressure, and helps control cholesterol levels. According to data from the Women’s Health Study, women who walk two or more hours per week reduce their risk of coronary heart disease by two-thirds. One of the reasons that heart disease risk climbs in women after menopause is the tendency for blood pressure to increase with age. Researchers at the University of Tennessee at Knoxville studied previously sedentary, postmenopausal women with elevated blood pressure and found they were able to lower their systolic blood pressure by walking approximately two miles per day. This reduction in blood pressure translates into an approximate 20 percent lower risk of coronary heart disease.

Bone health is a particular concern for many postmenopausal women because of the decline in bone density after menopause. Approximately eight million American women have osteoporosis, and more than 30 million more have low bone density, although not clinically low enough to be diagnosed as osteoporosis. It is estimated that one-half of all women over the age of 50 will have an osteoporosis-related fracture. Exercise and a healthy diet across the lifespan are two ways to maximize bone health. Once menopause is reached, it appears that regular weight-bearing exercise can help minimize bone loss. According to data from the Nurses Health Study, the risk of hip fracture in postmenopausal women declines by six percent for every hour per week spent walking. Strength training, as a supplement to aerobic exercise, can also be useful in maintaining bone.

A common complaint among postmenopausal women is weight gain. In addition to weight gain, there are other unhealthy menopause-related body composition changes, such as a decrease in muscle mass and an increase in abdominal fat. Although some of these changes may be inevitable, the magnitude of these changes can be controlled. A large number of studies have found that exercise during the time around menopause is critical in minimizing fat accumulation. Postmenopausal women who exercise regularly are much less likely to be obese than their sedentary counterparts. In addition to maintaining regular exercise, it is important that women recognize that a decrease in resting metabolism occurs with age. In order to prevent body fat gain, this decrease in metabolic rate must be matched by a decrease in caloric intake.

So, how much exercise is enough to experience the benefits that have been described? From a public health standpoint, the Centers for Disease Control and Prevention, the American College of Sports Medicine and the Surgeon General agree that 30 minutes of moderate aerobic exercise on most, if not all, days of the week will provide health benefits. It is important to note, however, that this is a minimal recommendation and greater benefits, particularly in controlling weight, can be achieved with additional exercise. The specific type of exercise (walking, swimming, cycling, etc.) seems less important than the fact that the exercise is performed regularly. Find a type of exercise that you enjoy and that best suits your individual needs.

Here are a few tips if you are a postmenopausal woman and just beginning an exercise program.

• Make a commitment to exercise regularly. Have contingency plans when time conflicts, travel, weather issues, or other unexpected issues arise. Even if illness or emergencies force you out of your routine, return to your plan as quickly as possible. Keeping a daily journal of your exercise can be useful in helping you monitor your commitment to exercise.

• Find an exercise support system. For some women this will mean enlisting an exercise buddy to work out with you. For others it may mean finding someone to talk with about the struggles and successes that are encountered with leading an active lifestyle. People are much more likely to continue exercising regularly when they have supportive people around them.

• Start out slowly and progress naturally. Too many people begin exercise programs that are either too intense or too long in duration. This often leads to frustration and/or injury. Listen to your body – it will tell you if

(Continued on page 11, see Menopause...
The health benefits of appropriately prescribed long-term (more than 12 weeks) resistance training in older adults — ages 65 and older — are well known. They include improvements in muscle strength and endurance; other possible health benefits include increase in muscle mass, which translates into improvements in functional capacity. In addition, increased weight bearing with resistance training is considered beneficial in improving bone density and combating the effects of osteoporosis. Achieving appropriate levels of function is very important for older adults so they are able to carry out most of the daily living skills necessary to lead independent lives. Due to the fact that muscle wasting (sarcopenia) and weakness, exacerbated by physical inactivity, is prevalent in the aging population, more emphasis has been placed on developing resistance-training programs for older adults. When developing resistance-training programs for this group, important components to consider are the various training-related variables: frequency, duration, exercises, sets, intensity, repetitions, and progression. Older adults often have orthopedic issues that contraindicate resistance training of the affected joint(s). Older adults are also at a higher risk of cardiovascular disease, and in many cases have even been diagnosed with it. Therefore, it is critical that the older adult receive prior approval from their physician before participating in resistance training. It should be noted that proper supervision of the individual’s resistance-training program, including any testing procedures, by an appropriately trained exercise professional, is highly recommended. It should also be noted that performing maximum strength testing in many older adults is not recommended. Therefore, when strength testing is appropriate, sub-maximum testing protocols for estimating maximum strength are recommended.

**Frequency**

Frequency refers to the number of exercise sessions per week. The traditional recommendation for frequency is to engage in three training sessions per week for individuals primarily seeking improvement in their overall health and fitness capacity. Even though some individuals may be motivated to train more frequently, resistance-training studies with the elderly have indicated a range of two to four days per week to be effective and adequate in improving strength. So the recommendation is that the older individual train at least two days per week but no more than four, suggesting an average training frequency of three days per week. Also, the frequency of exercise should be structured so that there is at least 48 hours between training sessions. An individual could satisfy this requirement with a “total body” routine, meaning that they would exercise all of the chosen muscle groups during each training session two or three days per week. Another approach could be a “split” routine where some of the chosen muscle groups are exercised on one or two days a week while the remaining are exercised on a separate one or two days. This “split” routine approach may not be appropriate for those older individuals who are just beginning their program.

**Duration**

Duration describes the length of each training session. In reference to training duration, longer training sessions are not necessarily more effective. If one has an appropriately designed program based on sound training variables, lengthy training sessions are not necessary. In fact, older adults should avoid lengthy training sessions, because they may increase the risk of injury, manifested by extreme fatigue. Present guidelines for resistance training in older adults recommend a range of approximately 20-45 minutes per session. In other words, one should attempt to train for at least 20 but no longer than 45 minutes. This range suggests an approximate average duration of 30 minutes per session.

**Exercises**

Exercise may be categorized as either multi-joint, meaning more than one joint is dynamically involved to perform the exercise (e.g., bench press, shoulder press, leg press), or uni-joint, meaning only one joint is dynamically involved (e.g., bicep curls, triceps extensions, leg extensions). In the older adult, the resistance-training program should focus primarily on multi-joint exercises. Uni-joint exercises are not discouraged entirely but should not make up the majority of exercises within the training program. Additionally, machines are recommended over free weights (i.e., barbells and dumbbells) due to skill-related and safety factors. As the individual progresses, they can use freeweight exercises appropriate for their level of skill, training status and functional capacity.

**Muscle Groups**

Traditionally, muscle groups are classified as the following: 1) chest, 2) shoulders, 3) arms, 4) back, 5) abdomen, and 6) legs. Specifically, the chest group contains the pectoral muscles, the shoulder group contains the deltoid, rotator cuff, scapular stabilizers and trapezius muscles, the arm group...
contains the biceps, triceps, and forearm muscles, the back group contains the latissimus dorsi of the upper back and the erector muscles of the lower back, the abdomen group contains the rectus abdominis, oblique, and intercostals muscles, and the leg group contains the hip (gluteals), thigh (quadriceps), and hamstring muscles. In the older adult, it is important to attempt to incorporate all six of these muscle groups into the comprehensive resistance-training program.

**Number of Exercises per Muscle Group**

It has been recommended that one to two exercises per muscle group is normally adequate. Noteworthy here is to understand that by employing primarily multi-joint exercises in the resistance training program one may actually exercise more than one muscle group or specific muscle per exercise. For example, in performing the leg press exercise the quadriceps, hamstrings, and gluteal muscles are all involved and, in many cases, this could eliminate the need to perform any uni-joint exercises for those particular muscles.

**Order of Exercises and Muscle Groups**

If a person is performing both multi-joint and uni-joint exercises for a particular muscle group, it is recommended that the multi-joint exercise(s) be performed before the uni-joint exercise. Additionally, within each resistance-training workout, larger muscle groups (i.e., legs, back, and chest) should be worked before smaller muscle groups (i.e., arms and shoulders).

**Sets**

Studies have shown improvements in muscle strength employing ranges of one to three sets of each exercise during the training program. Based on current guidelines, it would be recommended that the individual start with one set of each exercise and, depending on individual need, possibly progress up to no more than three sets when the fitness professional deems it appropriate. It should be noted, however, that an average of two sets of each exercise would be beneficial for most individuals. To avoid excess fatigue, a two-to-three minute rest period between sets and exercises is recommended.

**Intensity**

Intensity refers to the amount of weight being lifted, and is a critical component of the resistance training program, considered by many fitness professionals to be the most important training-related variable for inducing improvements in muscle strength and function. In other words, the more weight lifted, the more strength gained. Even though this may not always be the case, the importance of intensity in facilitating strength improvements is well documented. Intensity is often expressed as a percentage of the maximum amount of weight that can be lifted for a given exercise (1RM). For example, if someone who has a maximum effort of 100 lbs. on the bench press exercise performs a set with 80 lbs., they would be training at 80 percent. Studies have suggested that older individuals are able to tolerate higher intensities of exercise, up to 85 percent. However, research has also shown intensities ranging from 65-75 percent of maximum to significantly increase muscle strength. Therefore, in order to increase strength while simultaneously decreasing the risk of musculoskeletal injury that often accompanies higher intensities of resistance training, a low-intensity to moderate-intensity range of 65-75 percent is recommended.

**Repetitions**

Repetitions (reps) refer to the number of times an individual performs a complete movement of a given exercise. There is an inverse relationship between intensity and repetitions, indicating that as the intensity increases the repetitions should decrease. Based on previous research, a rep continuum has been established that demonstrates the number of repetitions possible at a given relative intensity. For example, an intensity of 60 percent relates to 16-20 reps, 65 percent = 14-15 reps, 70 percent = 12-13 reps, 75 percent = 10-11 reps, 80 percent = 8-9 reps, 85 percent = 6-7 reps, 90 percent = 4-5 reps, 95 percent = 2-3 reps, and 100 percent = 1 rep. In view of the previously mentioned recommendations for an intensity of 65-75 percent of maximum, this would suggest that for each training exercise the individual perform an adequate amount of weight that would allow for 10-15 reps. In the event that no initial strength testing was performed, simply through trial-and-error an individual could determine appropriate training loads that would allow them to perform only 10-15 reps. They could then be sure of training at 65-75 percent of maximum effort.

**Progression and Variation**

In order to continually enjoy improvements in strength and functional capacity, it is important to consistently incorporate progression and variation into the resistance-training program. Progressing and varying one’s program commonly involves incorporating the overload principle. The overload principle involves making adjustments to the training variables of the resistance-training program such as frequency, duration, exercises for each muscle group, number of exercise for each muscle group, sets and repetitions. In terms of adjustment, normally the overload principle involves making increases to these variables. For example, making progressive increases in intensity has been shown to be important in increasing muscle strength. In terms of the rate of progression, one should consider attempting to progress their resistance-training program on a monthly basis. However, it should be noted that increasing the intensity in some older adults may be contraindicated due to orthopedic and/or other medical limitations. As a result, making adjustments in other training variables would be recommended.

To read more Current Comments, please visit the ACSM Web Site at www.acsm.org.
The American College of Sports Medicine (ACSM) is the nation's largest group of exercise scientists, sports medicine doctors and sports nutritionists. The members meet each year to present their research. Below are some tidbits of nutrition and exercise news that was presented at the May 2003 meeting in San Francisco.

Performance

- Intramuscular fat — that is, fat that is stored within muscles—can provide up to 25 percent of the energy used during endurance exercise. Athletes may need two days to replenish intramuscular fat if they eat a high fat (40 percent) diet and even longer with a lower fat diet (24 percent of calories; at least 60 to 80 grams of fat). Endurance athletes can and should appropriately include nuts, peanut butter, olive oil and other healthful fats into their daily meals. Fat-free diets are not conducive to optimal fueling.

- If you exercise twice a day, your morning coffee can still enhance your afternoon effort. Cyclists (who were accustomed to drinking coffee) consumed the equivalent of two mugs of coffee before a morning ride to exhaustion. When they took more caffeine before the afternoon exercise test, they performed similarly to when they only had the morning dose. Morning brew is enough!

- If you are tempted to buy oxygenated water, think again. It does not supersaturate the blood with oxygen (and thereby enhance performance). Yet, you do want to drink enough fluids on a daily basis—unlike a college hockey team of which 14 of the 16 players starting the practice dehydrated. During the 90 minute practice, not one player drank enough to match fluid losses. Be sure to know your sweat rates and replace fluid accordingly!

Hydration

For years, athletes have been told to drink as much water as they can tolerate. That’s no longer the case. Endurance athletes — those who exercise for more than four hours and overhydrate with fluids that contain little or no sodium — can experience hyponatremia (low blood sodium; associated with malaise and confusion at least, and death at worst). A survey of marathon runners who experienced hyponatremia indicates they: 1) drank more fluid during the marathon and 2) had saltier sweat compared to others who maintain normal sodium levels.

- Hyponatremia occurs more often in women than in men. This might be because women are more diligent than men about drinking water, or it might be related to menstrual cycle hormones.

- Football players with a history of cramp-free players. They also had higher sweat rates, experienced more muscle cramps. Cramp-free players drank less fluid than cramp-free players. They became more dehydrated and experienced more muscle cramps. They also had higher sweat rates, and simultaneously higher sodium losses. Consuming sports drinks is a convenient way to boost sodium intake. Pretzels and broth work too.

The bottom line: if you do extensive exercise in the heat, you should know your sweat rate as determined by weighing yourself naked before and after one hour of hard exercise with no fluid intake (1 lb. weight loss = 16 oz. sweat). You can then replace fluids appropriately, preferably with sodium-containing fluids and foods that replace sodium sweat losses. If your stomach is sloshing, stop drinking.

Body Image

- When 700 young adults (average age, 24 years) were asked how they perceived themselves on the spectrum from very underweight to very overweight, the women were more likely to see themselves as more overweight than their actual weight; the men saw themselves as being more underweight. High school and collegiate runners hold similar perceptions. When questioned, the women reported wanting to be lighter than their current weight. The male runners, in comparison, wanted to be a little larger.

- The male desire to be bigger is based on perception, not the actual preferences of women. A survey of about 200 collegiate men and women indicates 1) men believe the male figure most attractive to women is more muscular than the figure the women actually chose; 2) women prefer men with standard muscle, not hulks!

- Weight lifting is associated with not just improved strength but also improved perception of self-esteem, sports competence, coordination and health.

Women

Rat studies suggest the loss of regular menstrual periods that commonly occurs in active females may be related to inadequate calories, not excessive exercise. Rats that did lots of exercise but ate enough calories to support the exercise program maintained regular reproductive cycles. Rat studies also
Flexibility
(Continued from page 5)

in improved balance and mobility and
the ability to perform ADLs and IADLs,
maintaining functional independence.

Older adults beginning exercise pro-
grams should first obtain medical
clearance and then work with a certified
instructor. While exercise improves
overall “fitness,” their rate of adaptation
will be slower. Long-term goals are
achieved through slow progression, as
they adapt. Older adults should begin
at lower frequencies (two times/week),
start with shorter time periods (15-20
minutes) and at lower intensities. As
strength and endurance increase,
frequency, duration, and intensity may
be increased. Always begin the training
session with a warm-up and end with a
cool-down.

Active
(Continued from page 6)

Joint replacement of the hip or knee is
effective at relieving pain and improving
function. An active lifestyle including
some sports and exercise is usually
permitted afterwards. It is important to
have realistic expectations about future
activities after major joint replacement
and discuss desired activities with your
surgeon.

Kitchen
(Continued from page 10)

suggest the bone loss associated with
amenorrhea is likely related to reduced
muscle mass as opposed to hormone
imbbalances. Women need to eat
enough to support exercise, muscles
and menses.

• If you are a female athlete who has
stopped having menstrual periods, be
aware that many members of the
medical community lack knowledge
about the health problems associated
with amenorrhea. A survey suggests
only 53 percent of family doctors
recognized all three parts of the
female athlete triad (amenorrhea,
eating disorders, stress fractures) —
as did 36 percent of pediatricians and
17 percent of gynecologists. If you are
told it’s normal for athletic women to
stop menstruating, find another M.D.!

Muscle

Consuming inadequate calories and
protein reduces the body’s ability to
build muscles. Hence, dieting athletes
should be sure to have a strong protein
intake (at least 0.5 gm/pro/lb.). Yet, if
you are severely undereating (such as
an athlete “making weight”), choosing a
protein-rich diet will not protect your
muscles. Soldiers who did exhaustive
military operations while eating inad-
equate calories lost the same amount of
muscle regardless if they ate a high (0.5
gm/lb) protein or lower protein diet.

Supplements

Should you take vitamins C and E to
decrease the inflammatory response
associated with muscle damage caused
by exercise? No. A study with healthy
athletes who did muscle-damaging
exercise suggests 400 mg. C and 800
mg. E generated no protective benefits.
Ultramarathoners who took 1,000 mg. C
and 400 mg. E also experienced no
benefits in terms of severity of muscle
damage and recovery rates. Eating
wisely works.

Menopause
(Continued from page 7)

you are being too aggressive in your
approach. After a workout, you may
be slightly tired but should recover in
an hour.

• Get regular medical checkups. Most
doctors now encourage their patients
to exercise regularly. When you visit
your physician, be sure to inform him/
er about any changes in your
exercise routine and ask questions as
needed. Be sure to inform your
physician immediately if you experi-
ence chest pain, have severe diffi-
culty breathing, or injure a muscle or
joint.

There are a number of resources for
information about exercise for the
postmenopausal woman. An excellent
source of information is the Web Site for
the National Institute of Aging
(www.nia.nih.gov). Their booklet,
“Exercise: A Guide from the National
Institute of Aging” has specific informa-
tion about how to design your exercise
program and forms that can be helpful
in tracking your progress.