Hughston Health Alert

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Osteoporosis

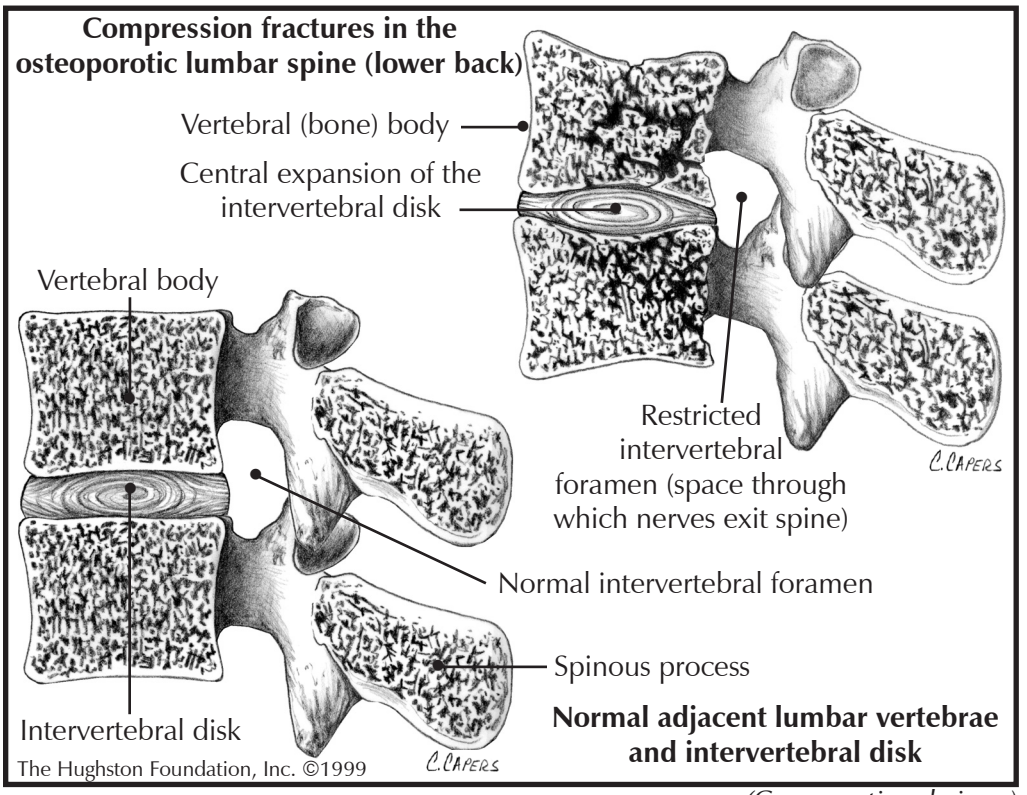
Am I at Risk?

What is osteoporosis?

Osteoporosis, or "thin" bones, is a disease that gradually weakens bones, making them more fragile and likely to break. It is ***not*** a form of arthritis. Osteoporosis leads to an increase in certain types of fractures (broken bones), such as hip fractures, wrist fractures, and compression fractures of the spinal vertebrae (back bones) (Figure). Although it can occur in men or women at any age, this condition most commonly affects women after menopause.

Our bones are dynamic tissues; new bone is constantly growing to replace old bone. The rate of new bone growth changes as we age. Bones grow quickly during childhood and adolescence and thicken during early adulthood. Between ages 25 and 35, our bones reach their maximum thickness, which is considered "peak bone mass." After early adulthood, bones begin to lose mass faster than they can replace it. In women, the rate of bone loss increases as estrogen levels decrease after menopause. Left unchecked, this bone loss can lead to osteoporosis.

Age-related bone loss in men occurs almost as rapidly as in women. However, men develop a greater bone mass while they are growing and do not experience the accelerated phase of bone loss that women have in their early menopausal years. Therefore, osteoporosis generally occurs less frequently in men.



(Cross-sectional views)

Risk factors

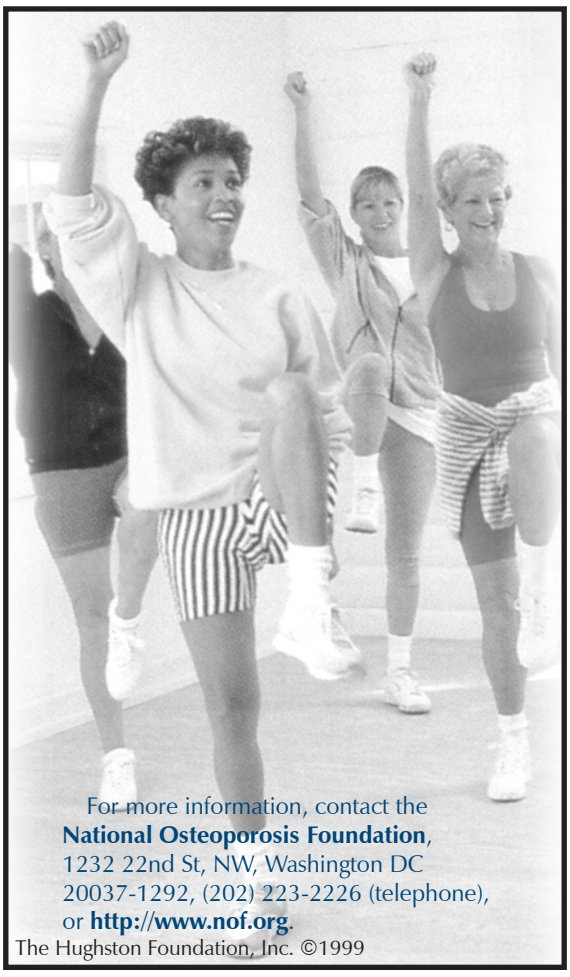
Several factors increase the risk of developing osteoporosis. They include hormonal status, heredity, lifestyle choices, use of certain medications, physical activity level, and associated disease states.

Inside This Issue:

In women, menopause, which can occur naturally or as a result of surgery (removal of ovaries), is the most common risk factor. The chance of developing osteoporosis can be more problematic for women who have an early menopause because they prematurely lose estrogen. Men with a low testosterone level are also at risk for osteoporosis.

You are at increased risk if you have older relatives who have sustained certain fractures (e.g., hip, wrist, and spine), are hunched over, or have lost height because of osteoporosis. Women of all ethnic backgrounds are at risk for developing osteoporosis; however, white and Asian women are at a higher risk than other women are. Thin, petite, small-muscled women are at higher risk than other women are.

Beginning in your late teenage years, lifestyle choices affect the strength of bone and rate of bone loss. For example, alcohol is toxic to bones. Heavy drinking (i.e., more than two alcoholic drinks each day) can cause osteoporosis even if you do not have other risk factors. Smoking reduces bone mass and can interfere with estrogen function. You are at increased risk of developing osteoporosis if your diet has always been low in vitamin D and calcium, which are the substances that help the body build bone. When eaten in large amounts, protein-rich or salty foods may cause your body to lose calcium. Caffeine and certain medications, such as cortisone or excess thyroid hormone, increase calcium loss. (However, do not stop taking any prescribed medication without your doctor's approval.) Inactivity weakens bones. Over time, these weakened bones can become thinner and can break.



For more information, contact the **National Osteoporosis Foundation**, 1232 22nd St, NW, Washington DC 20037-1292, (202) 223-2226 (telephone), or **http://www.nof.org**.

Bone loss is associated with a variety of diseases and conditions, such as Paget disease, multiple myeloma, anorexia nervosa, diseases treated with steroids, and malabsorption of calcium or vitamin D. Advanced kidney and liver disease can contribute to an acceleration in osteoporosis. Osteoporosis is a characteristic of several endocrine (glandular) diseases, such as overactivity of the thyroid or parathyroid glands, excess production of growth hormone, Cushing syndrome, and hyperprolactinemia.

Osteoporosis can affect the quality of your life. Talk with your doctor about the factors that may put you at risk for this condition and about what you can do to prevent or treat it.

Clark H. Cobb, M.D.
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Screening Tests for Osteoporosis

Osteoporosis describes a decrease in bone mass. It causes dense bones to become thin and porous. Having thin bones increases your risk for developing a fracture (broken bone). Approximately 10 million people in the United States have osteoporosis, and 18 million more have early thinning of bones that puts them at increased risk of developing osteoporosis. However, only 23% of people who have osteoporosis know that they have it or have talked with their doctor about their condition. Special bone density tests are available to help your doctor find out if you have osteoporosis and to what degree osteoporosis has affected your bones. Using the information from the test, your doctor can prescribe a treatment plan to help strengthen your bones.

Who needs a bone density test?

All women who are 65 years of age or older should have a bone density screening test. Women should have a screening test at an earlier age if they have a family history of osteoporosis, have an increased incidence of fracture after the age of 45, currently are smoking, are underweight, or have other risk factors discussed in "Osteoporosis: Am I at Risk?" (p. 1). In addition, women or men who are considering therapy for osteoporosis should be screened. If a person has a disease or is taking any medication that can cause bone loss, he or she should have a screening test. Women who have been on hormone replacement therapy for a prolonged time also need to be screened.

Types of screening tests

Several tests are available to screen bones for osteoporosis. The most widely used and most accurate test is called a DEXA (dual-energy x-ray absorptiometry) scan. The DEXA

scan can measure the bone density in your spine (back bone), hip, or whole body. It is painless and takes about 15 minutes to complete. Some blood tests also are available, but they mainly are used to determine how effective treatment is.

What do the results mean?

The DEXA scan can give three basic results: 1) a normal scan, 2) osteopenia (early thinning of bones), or 3) osteoporosis. Your need for further evaluation and treatment is based on the amount of bone loss that this scan shows.

Will Medicare cover the cost?

Currently, Medicare covers the cost of one DEXA scan every two years for specific diagnoses, which include the following:

1. Your doctor or other qualified medical professional determines that you are estrogen deficient (i.e., postmenopausal) and at risk for developing osteoporosis based on your medical history and other findings.

2. X-rays show abnormalities of your vertebrae (spine bones) that indicate osteoporosis, osteopenia, or fracture.

3. You are receiving or expecting to receive steroid therapy consisting of 7.5 mg or more of prednisone each day for more than three months. (Steroids are medications given to treat various diseases, such as arthritis, asthma, Crohn disease, and lupus.)

4. You have primary hyperparathyroidism (overactive parathyroid).

5. You are being monitored to assess how well your bones are responding to a United States Food and Drug Administration-approved osteoporosis drug therapy, such as estrogen, alendronate (Fosamax), or calcitonin.

In certain cases, Medicare will cover the cost of having a DEXA scan more often than every two years. Your doctor can tell you if Medicare considers you eligible for more frequent testing.

Osteoporosis can be a debilitating problem for women and men. By using special tests, such as the DEXA scan, your doctor can diagnose the degree of bone loss and can formulate a treatment program to strengthen your bones and help you remain active.

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Prevention and Treatment of Osteoporosis

Osteoporosis is a common cause of fractures (broken bones), especially in women who are beyond menopause. However, by strengthening your bones, slowing bone loss, and avoiding falls, you can help prevent or treat the condition and avoid fractures.

Diet

Prevention and treatment of osteoporosis begin with proper diet. Ensuring that you get enough calcium and vitamin D each day is a great start (Table). Calcium helps your body build bone, and vitamin D helps your body absorb calcium. Calcium can be found in dairy products (e.g., milk, cheese, yogurt, and ice cream); in salmon and sardines with bones; in dark green, leafy vegetables (e.g., kale and broccoli); and in foods with added calcium (e.g., orange juice). For example, a one-cup serving of milk contains about 300 mg of calcium, and a one-cup serving of broccoli contains about 135 mg.

Supplements also provide needed calcium. If you need to take a supplement, choose it carefully. Avoid bone meal and dolomite supplements because they may contain lead.

You need at least 400 IU of vitamin D each day. You can get your daily requirement by taking a multivitamin; getting 30 to 60 minutes of sun exposure (wear sunscreen and protective clothing); or consuming foods, such as fortified milk (a one-cup serving contains 100 IU) or salmon (a three-ounce serving contains 425 IU). Although vitamin D in adequate amounts helps your body absorb calcium, it is harmful if taken in excessive amounts. Most people should avoid taking more than 800 IU each day.

Table.

Daily Calcium Needs for Women Throughout Life

Age	Calcium needs
11 to 24 years	1200 to 1500 mg
25 to 50 years	1000 mg
51+ years	1500 mg
Pregnant or nursing	1200 to 1500 mg

*Source: National Institutes of Health Osteoporosis and Related Bone Diseases~National Resource Center (**http://www.osteo.org/osteo.html**).*

Exercise

You can help reduce the risk of developing osteoporosis by exercising regularly. Your regular exercise program should include weightbearing and resistance exercises that strengthen bones and muscles. Participate in this program three to five times each week. Weightbearing exercises include activities such as walking, dancing, hiking, and housework. Resistance exercises include weight training and pushups. Remember to talk with your doctor before starting any exercise program. He or she can help you create a program that fits your needs and abilities.

Medication

Your doctor may prescribe various medications that help slow the loss of bone mass so your body can build new bone as fast as old bone is lost. Hormone replacement therapy (i.e., replacement of estrogen) is one of the most valuable options for women who are candidates for such medication. In addition to the treatment of bone loss, the benefits of this therapy include a reduction in the risk of heart disease and in the symptoms of menopause. Unfortunately, some women cannot or will not take hormone replacement therapy because of side effects (e.g., breast tenderness, slight bloating, and vaginal bleeding), certain risk factors (e.g., endometrial, breast, or uterine cancer), or other associated problems (e.g., uncontrolled hypertension, impaired liver function, or porphyria). Some women may not be able to take estrogen therapy if they have problematic diabetes, gallbladder disease, migraines, pancreatitis, high triglyceride levels, or endometriosis. However, these women may be able to take other medications, such as alendronate (Fosamax), calcitonin, or calcium plus vitamin D. Talk with your doctor to find out about the best choice for you.

Home safety

Falls often lead to fractures in people with osteoporosis. To prevent falls, create a safe home. Remove or anchor rugs and furniture that may cause you to trip. Install nightlights and grip bars in your bathroom and use a rubber mat in the floor of your tub. Keep regularly used items at a height you can reach easily without a stool. Make sure that the rooms in your home are well lit.

Screenings and lifestyle changes

By age 30, you and your doctor should discuss your risk of developing osteoporosis. Regular osteoporosis screenings that may include bone density tests should begin for women by age 65 and for men by age 75. Younger men and women should have these regular screenings if they have alcoholism, use tobacco heavily, or have an associated disease (e.g., hyperparathyroidism, disease treated with steroids, glandular disease, or advanced kidney or liver disease). The use of DEXA (dual-energy x-ray absorptiometry) scan bone density tests has greatly increased the accuracy of diagnosis and has allowed better monitoring of the disease and its treatment (see "Screening Tests for Osteoporosis," p. 2).

In addition to checkups, you can help prevent osteoporosis by making some lifestyle changes. Stop smoking and decrease your alcohol intake. Increase your physical activity level and improve your diet.

All women, and even some men, should be concerned about osteoporosis. For women, waiting until your postmenopausal years to consider the risks and to make lifestyle changes may not be prudent. Education, wise lifestyle choices, and regular screenings can reduce the likelihood that this disease will affect your quality of life.

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Cardio Kickboxing

Cardio kickboxing -- a combination of aerobics, boxing, and martial arts -- is one of the most popular fitness trends to hit gymnasiums in recent years. These workouts, which are inspired by martial arts, have motivated many people to start a fitness program.

This intense, total-body workout can improve strength, aerobic fitness, flexibility, coordination, and balance.[1] The American Council on Exercise (ACE), which evaluates exercise products and programs, notes that, during a one-hour kickboxing workout, you can burn from 500 to 800 calories, which is up to twice the calories you burn during a one-hour step-aerobics class.

Kickboxing classes can be a great

alternative for people who have become bored with weight-room cardiovascular activities, such as brisk walking or jogging on a treadmill. They also provide an option for people who enjoy the "semi-dance" movements found in aerobics or step classes.

However, kickboxing-style fitness programs are not necessarily geared toward the beginner. The beginning cardio kickboxer must have above-average endurance, strength, and flexibility. ACE advises exercisers to keep the following things in mind when participating in this aerobic activity[1]:

1. Before beginning a class, ensure that the instructor is properly certified to lead a safe and effective class. This certification should come from an accredited fitness organization, such as ACE, American College of Sports Medicine, or Aerobic Fitness Association of America.

2. Talk with a qualified fitness professional to find out whether cardio kickboxing is an appropriate activity for you. You should already be exercising aerobically at least three times each week for 20 to 30 minutes and maintaining your target heart rate (see "General Exercise Guidelines from the ACSM," p. 7). In addition, you should have good flexibility and coordination. If you have had orthopaedic surgery or other health problems, get permission from your doctor before beginning the class.

3. Work with a qualified instructor to learn and master proper technique. At the beginning of the class, the instructor should teach various techniques and should allow you to practice them. He or she can demonstrate how to kick and punch without overextending or locking your joints. The instructor can show you how to modify different moves so that they are comfortable for you and are executed safely and correctly.

4. Pay attention to what feels right to your body. Kick at a level that is comfortable to you. Don't do a move that hurts, even if you are doing it correctly. Take breaks or stop if you feel tired. Drink plenty of water throughout the class.

5. Do not wear or hold weights when punching or kicking. Although using weights can help develop your aerobic fitness in certain programs, the risk of joint injury outweighs the benefits for the beginning kickboxer.

6. Remember that this activity is not a self-defense course.

Class format

At the beginning of each class, the instructor teaches various moves and their names and initiates a slow practice so you become familiar with the format. Next, you warm up for five minutes with some of the moves you just learned. Once your muscles are warm, you stretch them. Stretching focuses on the major muscle groups, including the hamstrings, adductors, heel cords, back flexors and extensors, and the muscles of the shoulder and neck.

After warming up and stretching, you begin the 40- to 45-minute aerobic section, which includes kicks, punches, speed bag, shadow boxing, jump rope drills, and footwork. These moves usually are done in combination formats (e.g., kick, knee, jab, and jab). You do many repetitions so that you can focus on proper body mechanics rather than on what move or combination is coming up next.

A cool-down period follows the aerobic workout. This period can include strengthening and abdominal exercises. When your heart rate decreases, you stretch for five to 10 minutes. Most classes are between 60 and 90 minutes long.

Cardio kickboxing is meant to be a fun and effective program for achieving your fitness goals. If you follow these guidelines, it can be just that!

Helen Reinking, P.T.A.
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1. Beginners should use care with Tae Bo and other kickboxing workouts. Phys Sportsmed 1999;27(6):28.

Spinal Injuries in Adolescent Athletes

Because of their age and involvement in vigorous activities and sports, adolescents risk injury to the spine (back bone). Certain types of sport activities increase the risk of injury, especially to the lower back. However, these athletes can take steps to prevent many types of spinal injuries.

Anatomy and skeletal development

The spine is made up of vertebrae (bones), intervertebral disks (shock absorbers between vertebrae), and the spinal cord and other nerves (Figs. 1A and 1B). The vertebrae and intervertebral disks protect the spinal cord, and they enable the torso to move in many directions.

Physes (growth plates) are areas on the ends of a child's bones where the bone grows. As the skeleton matures, the physes harden, and bones stop growing. Girls reach skeletal maturity at about 16½ years of age; boys, at about 17½ or 18.

Causes

Trauma and repetitive stress can cause back injury in adolescent athletes. Repetitive bending and twisting put athletes at risk for spinal injuries. During long training days, athletes are at increased risk of injury because their fatigued bodies cannot give full protection to the back. Using improper sport technique and having weak abdominal and tight leg muscles also can lead to injury.

The lumbar vertebrae (bones of the lower back) are more prone to injury in the growing adolescent, especially during sports participation. Ligaments and muscles that support the spine may not grow as fast as bone, and, therefore, they may become tight, putting increased stress on the spine.

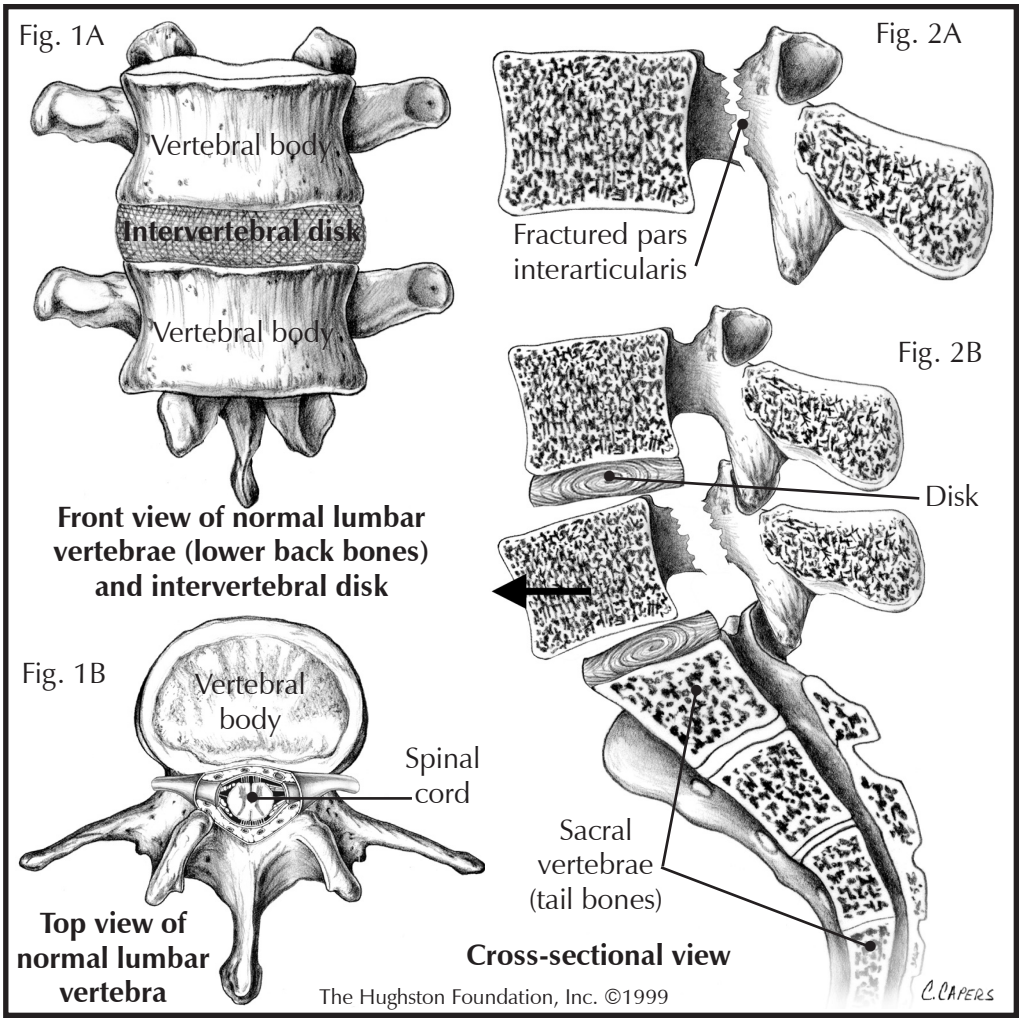
Difficult maneuvers involving "flight" account for most spinal injuries. During these activities, the athlete is airborne and lands on a hard surface, such as the floor in gymnastics, or the water, such as in diving maneuvers. Other activities associated with spinal injuries include blocking in football, takedowns in wrestling, and use of heavy weights and attempts at complex free-weight lifts in weight training.

Specific injuries

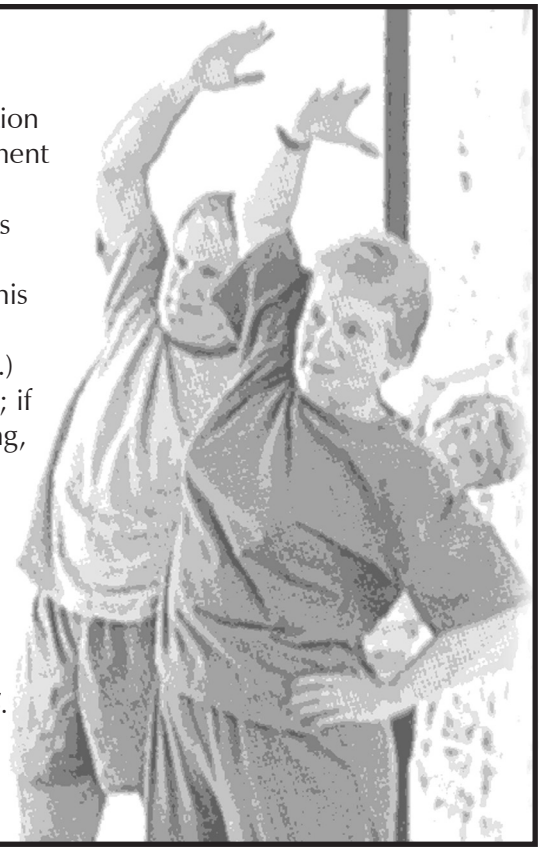
Spondylolysis and spondylolisthesis. Putting repetitive stress on the vertebrae can cause a thin area of bone, called the pars interarticularis, to fracture (break). Spondylolysis refers to a fracture on one side of the pars interarticularis (Fig. 2A). In spondylolisthesis, the fracture has occurred on both sides of this area and the fractured vertebra has slipped forward against its neighboring vertebra (Fig. 2B). Repetitive hyperextension of the lower back, such as excessive back bends by gymnasts or by football linebackers, can lead to these conditions.

Disk herniation. Intervertebral disks are made up of firm, gristle-like fibers that encompass a soft, fluid-like center. Disk material can bulge into the spinal canal and push on the spinal cord or another nerve. In adolescents, disk herniation most commonly results from repetitive trauma to the back.

In adolescents, a vertebral growth plate and its adjacent disk can become displaced into the spinal canal and push on the spinal cord. This condition is called slipped vertebral apophysis. It usually results from heavy lifting or from participation in sports that require



General Exercise Guidelines from the ACSM



The American College of Sports Medicine (ACSM) recently updated its position stand on the quantity and quality of exercise for healthy adults.[1] For improvement of cardiovascular fitness and body composition, the ACSM recommends performing physical activity three to five times each week for 20 to 60 minutes at a time. The activity should involve the large muscle groups (e.g., walking, running, cycling, and swimming). The level of intensity (target heart rate) for this physical activity should be at least 55% to 65% of your maximum heart rate. (You can estimate your maximum heart rate by subtracting your age from 220.) You can quickly determine if your intensity is too high by taking the "talk test"; if you cannot maintain a conversation with your exercise partner while exercising, then your intensity is too high. The ACSM also recommends that you include muscular strength and flexibility training in your exercise program. If you are not currently exercising, please consult your physician before beginning any exercise program. Consistency is the key to success in any exercise program; choose an activity that you enjoy and are likely to continue throughout your adult life. For more information contact the ACSM (**http://www.acsm.org**).

William C. Etchison, M.S., and David T. Curd, M.S.

1. American College of Sports Medicine Position Stand. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in healthy adults. Med Sci Sports Exerc 1998;30(6):975-991.

very strenuous training, such as gymnastics.

Fractures. Blows to the back can cause fractures to certain parts of the vertebrae. Likewise, the physes and sacrum (tail bone) also can be fractured. Activities in which the athlete can get hit in the back or can fall from a great height can lead to spinal fractures.

Scheuermann's disease. This condition results in an exaggerated curve (hump) of the upper back involving at least two abnormally wedge-shaped vertebrae. The cause is not known.

Symptoms

Pain often accompanies back injuries. In many cases, activity makes the pain worse. To determine the seriousness of your adolescent's back problem, pay attention to whether he or she has back pain at night, limited movement of the lower back, or pain that goes down the leg. If your adolescent has these symptoms, he or she needs to seek treatment from a doctor.

Treatment

To treat a back injury, the adolescent athlete must stop playing the sport and participating in weight training, and he or she must see a doctor. The primary care doctor examines the athlete's back and, if necessary, refers the adolescent to an orthopaedic doctor. The doctor may prescribe a pain medication. Some adolescents need to wear a back brace as part of the treatment. A physical therapist instructs the athlete in appropriate conditioning, stretching, and strengthening exercises to rehabilitate the back and to enable him or her to return to sports participation.

After treatment, the doctor decides when the adolescent athlete can return to sports participation. Sometimes, the athlete has to decrease the intensity of practice or change the way he or she performs a particular activity.

Parents should be aware that the problem can reoccur. If it does, the adolescent will have to receive treatment again.

Prevention

Adults can help adolescent athletes prevent spinal injury. For example, coaches can institute shorter practices. Properly trained coaches, athletic trainers, parents, or other adults can supervise training sessions. They also can teach proper technique for weight training and various exercises.

Low back injury in adolescents is a serious problem. However, if diagnosed and treated properly, the athlete usually can return to vigorous activities.

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Galasko CSB. Back pain in children. In: Jayson MIV (editor). The Lumbar Spine and Back Pain. 4th edition. Edinburgh: Churchill Livingstone, 1992; 603-617.

Raloxifene: A New Medication to Fight Osteoporosis

Women now have another medication to build bone and reduce the risk of fracture associated with osteoporosis. Raloxifene (ruh-LOCKS-uh-feen) hydrochloride, a medication used to prevent osteoporosis, now can be used to treat the condition.

During menopause, dense bones lose mass faster than they can replace it. As they become thin and porous, bones can fracture easily. To slow this process, doctors often prescribe medications, such as alendronate (Fosamax), estrogen, or calcitonin (Calcimar), that help slow the rate of bone loss and help rebuild bone.

Raloxifene joins this small group of bone-building medications. Recently, researchers showed that raloxifene helps build bone in the spine and hip and reduces the risk of vertebral (spine bones) fractures.[1] In addition, the medication is associated with a lower incidence of breast cancer and has been shown to lower "bad" cholesterol levels.[1,2] Although, the medication does not relieve menopausal symptoms, it provides an alternative for women who cannot or will not take estrogen, alendronate, or calcitonin due to certain side effects, risk factors, or other problems.

1. Ettinger B, Black DM, Mitlak BH, et al. Reduction of vertebral fracture risk in postmenopausal women with osteoporosis treated with raloxifene. JAMA 1999;282:637-645.

2. Khovidhunkit W, Shoback DM. Clinical effects of raloxifene hydrochloride in women. Ann Internal Med 1999;130:431-439.

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Suggested readings and classic references for articles contained in this issue can be found on www.hughston.com

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