



Exercise Information Packet

National Institutes of Health
Osteoporosis and Related Bone Diseases
National Resource Center



**National Institutes of Health
Osteoporosis and Related
Bone Diseases ~
National Resource Center**

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Exercise for Your Bone Health

Vital at every age for healthy bones, exercise is important for treating and preventing osteoporosis. Not only does exercise improve your bone health, it also increases muscle strength, coordination, and balance, and leads to better overall health.

Why Exercise?

Like muscle, bone is living tissue that responds to exercise by becoming stronger. Young women and men who exercise regularly generally achieve greater peak bone mass (maximum bone density and strength) than those who do not. For most people, bone mass peaks during the third decade of life. After that time, you can begin to lose bone. Women and men older than age 20 can help prevent bone loss with regular exercise. Exercising allows you to maintain muscle strength, coordination, and balance, which in turn help to prevent falls and related fractures. This is especially important for older adults and people who have been diagnosed with osteoporosis.

The Best-Bone Building Exercise

The best exercise for your bones is the weight-bearing kind, which forces you to work against gravity. Some examples of weight-bearing exercises include lifting weights, walking, hiking, jogging, climbing stairs, tennis, and dancing. Examples of exercises that are not weight-bearing include swimming and bicycling. While these activities help build and maintain strong muscles and have excellent cardiovascular benefits, they are not the best way to exercise your bones.

Exercise Tips

If you have health problems – such as heart trouble, high blood pressure, diabetes, or obesity – or if you are over age 40, check with your doctor before you begin a regular exercise program.

According to the Surgeon General, the optimal goal is at least 30 minutes of physical activity on most days, preferably daily.

Listen to your body. When starting an exercise routine, you may have some muscle soreness and discomfort at the beginning, but this should not be painful or last more than 48 hours. If it does, you may be working too hard and need to ease up. STOP exercising if you have any chest pain or discomfort, and see your doctor before your next exercise session.

If you have osteoporosis, ask your doctor which activities are safe for you. If you have low bone mass, experts recommend that you protect your spine by avoiding exercises or activities that flex, bend, or twist it. Furthermore, you should avoid high-impact exercise in order to lower the risk of breaking a bone. You also might want to consult with an exercise specialist to learn the proper progression of activity, how to stretch and strengthen muscles safely, and how to correct poor posture habits. An exercise specialist should have a degree in exercise physiology, physical education, physical therapy, or a similar specialty. Be sure to ask if he or she is familiar with the special needs of people with osteoporosis.

A Complete Osteoporosis Program

Remember, exercise is only one part of an osteoporosis prevention or treatment program. Like a diet rich in calcium and vitamin D, exercise helps strengthen bones at any age. But proper exercise and diet may not be enough to stop bone loss caused by medical conditions, menopause, or lifestyle choices such as tobacco use and excessive alcohol consumption. It is important to speak with your doctor about your bone health. Discuss when you might be a candidate for a bone mineral density test. If you are diagnosed with low bone mass, ask what medications might help keep your bones strong.

The National Resource Center acknowledges the assistance of the National Osteoporosis Foundation in the preparation of this publication.

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For Your Information

For updates and for any questions about any medications you are taking, please contact the U.S. Food and Drug Administration at 1-888-INFO-FDA (1-888-463-6332, a toll-free call) or visit their Web site at www.fda.gov.

Recognizing the National Bone And Joint Decade 2002-2011

Excerpt from:

Bone Health and Osteoporosis: A Report of the Surgeon General Chapter 6: Determinants of Bone Health

Physical Activity, Body Weight, and Bone Health: What the Evidence Tells Us

- Physical activity is important for bone health throughout life.
 - Depending on age, it may help increase or preserve bone mass.
 - It may also help reduce the risk of falling.

- All types of physical activity can contribute to bone health.
 - Activities that are weight bearing or involve impact are most useful for increasing or maintaining bone mass.
 - Some activities that are not weight bearing or are low impact may help improve balance and coordination and maintain muscle mass, which can help prevent falls.

Physical activity of all kinds has overall benefits to health and weight maintenance. Regular physical activity lowers risk factors for cardiovascular disease, colon cancer, and type 2 diabetes, and helps to control blood pressure (USDA 2000). Physical activity plays an important role in skeletal health because bone mass is responsive to the mechanical loads placed on the skeleton.

Background: Why Focus on Physical Activity?

The body constantly monitors the strain on bones caused by muscle action, and any substantial increase in these forces signals the need to build more bone. Conversely, reductions in biomechanical forces from lower activity levels or loss of muscle mass (sarcopenia) signals less need for bone, which leads to the elimination of bone. The latter process may be worsened by estrogen deficiency, which appears to reduce the sensing of biomechanical strains by bone cells (Riggs et al. 2002).

Physical activity has been identified as one of the Leading Health Indicators in the *Healthy People 2010* health objectives for the Nation during the next decade. It is one of the most important controllable lifestyle changes to help prevent (or reduce the risk of) a number of chronic conditions, including heart disease, diabetes, and some cancers. It also helps with weight control and the lessening of symptoms related to arthritis (USDHHS 1996).

Many adult Americans do not engage regularly in leisure-time physical activity. The participation by both men and women declines with age, with women being consistently less active than men (Schiller et al. 2004). The same problem exists for children. Many children become far less active as they pass through adolescence. Only half of those age 12 to 21 exercise vigorously on a regular basis and 25 percent report no exercise at all (Gordon-Larsen et al. 1999). Children may find it difficult to get daily physical activity in schools. While most schools have requirements for physical activity of some kind, only 8 percent of elementary schools, 6.4 percent of middle/junior high school, and 5.8 percent of senior high schools provide physical education on a daily basis (SHPPS 2001). At the other extreme, some girls and young women, especially those training for elite athletic competition, exercise too much, eat too little, and as a result develop delayed puberty or amenorrhea (cessation of menstrual periods). These girls are at risk for low bone mass and fractures (Warren 1999). One of the national health objectives for 2010 is to increase to 30 percent the proportion of adults who perform, more than 2 days per week, physical activities that enhance and maintain muscular strength and endurance (USDHHS 2000). Only 12 percent of people age 65 to 74 and 10 percent of those over age 75 meet that objective, underscoring the need for programs that encourage older adults to incorporate strength training and regular physical activity into their lives (Kruger et al. 2004).

To encourage increased levels of physical activity among all age groups, “Physical Activity and Health: A Report of the Surgeon General” recommends a “minimum of 30 minutes of physical activity of moderate intensity (such as brisk walking) on most, if not all, days of the week” (USDHHS 1996). Children and adolescents should aim for at least 60 minutes of physical activity per day (USDA 2000). In addition to helping achieve healthy weight and avoid chronic diseases like heart disease and diabetes, this type of physical activity can benefit skeletal health by building muscle mass and promoting balance and coordination, which may help individuals avoid falls and/or minimize the impact if a fall does occur. But the skeleton responds preferentially to strength training and short bouts of high-load impact activity (such as skipping or jumping), both of which improve bone mass and strength. In light of this, “Physical Activity and Health: A Report of the Surgeon General” also recommended that adults supplement their cardiorespiratory endurance activity with strength-developing exercise at least two times per week (USDHHS 1996).

Excerpted from: U.S. Department of Health and Human Services. Bone Health and Osteoporosis: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Office of the Surgeon General, 2004, pages 122-124.

Excerpt from:

Bone Health and Osteoporosis: A Report of the Surgeon General Chapter 7: Lifestyle Determinants to Promote Bone Health

The foundation of a good physical activity regimen involves at least 30 minutes (adults) or 60 minutes (children) of moderate physical activity every day. This regimen can and should involve a variety of activities. Some can be routine activities like walking or gardening. Others may occur more infrequently and differ from day to day and week to week, such as dancing, aerobic classes, biking, swimming, tennis, golf, or hiking. However, it is clear that physical activity to specifically benefit bone health should involve loading (stressing) the skeleton. As a result, weight-bearing activities such as walking should be included in an optimal physical activity regimen to benefit the musculoskeletal system. Moreover, the evidence suggests that the most beneficial physical activity regimens for bone health include strength-training or resistance-training activities. These activities place levels of loading on bone that are beyond those seen in everyday activities; examples include jumping for the lower limbs and weight lifting or resistance training for the lower and upper skeleton. Finally, while a focus on activities that build or maintain bone strength is appropriate and necessary, many older individuals will remain at high risk of fracture. For these individuals, balance training can provide the added benefit of helping to prevent potentially injurious falls.

The evidence does not lead to a specific set of exercises or practices but rather a set of principles that can be applied and varied according to the age and current physical condition of an individual. Many of these principles have been reviewed by expert panels of the American College of Sports Medicine (ACSM) (Kraemer et al. 2002, ACSM 1998a, ACSM 1998b) and they lead to the following suggestions for the frequency, intensity, length, and type of physical activity regimens to benefit bone health for individuals of all ages:

- Since continued physical activity provides a positive stimulus for bone, muscle, and other aspects of health, a lifelong commitment to physical activity and exercise is critical.
- Ending a physical activity regimen will result in bone mass returning to the level that existed before the activity began. Since repetitive programs of physical activity may be discontinued due to lack of motivation or interest, variety and creativity are important if physical activity is to be continued over the long term.
- Physical activity will only affect bone at the skeletal sites that are stressed (or loaded) by the activity. In other words, physical activity programs do not necessarily benefit the whole skeleton, although any type of activity provides more benefit to bone than does no activity at all.

- For bone gain to occur, the stimulus must be greater than that which the bone usually experiences. Static loads applied continuously (such as standing) do not promote increased bone mass.
- Complete lack of activity, such as periods of immobility, causes bone loss. When it is not possible to avoid immobility (e.g., bed rest during sickness), even brief daily weight-bearing movements can help to reduce bone loss.
- General physical activity every day and some weight-bearing, strength-building, and balance-enhancing activities 2 or more times a week are generally effective for promoting bone health for most persons.
- Any activity that imparts impact (such as jumping or skipping) may increase bone mass more than will low- and moderate-intensity, endurance-type activities, such as brisk walking. However, endurance activities may still play an important role in skeletal health by increasing muscle mass and strength, balance, and coordination, and they may also help prevent falls in the elderly. Endurance activity is also very important for other aspects of health, such as helping to prevent obesity, diabetes, or cardiovascular disease.
- Load-bearing physical activities such as jumping need not be engaged in for long periods of time to provide benefits to skeletal health. In fact, 5 to 10 minutes daily may suffice. Most adults should begin with weight-bearing exercise and gradually add some skipping and jumping activity. Longer periods (30 to 45 minutes) may be needed for weight training or walking/jogging. Those who have been inactive should work up to this amount of time, gradually using a progressive program, e.g., start with shorter times and easier activities (light weights or walking) and then increase time or intensity slowly (by no more than 10 percent each week) in order to avoid injury.
- Physical activities that include a variety of loading patterns (such as strength training or aerobic classes) may promote increased bone mass more than do activities that involve normal or regular loading patterns (such as running).

These fundamental principles can be used to develop age-specific regimens, as outlined in the sections that follow.

Physical Activity for Children and Adolescents

For children over age 8 and adolescents, a bone-healthy program of physical activity could include the following:

- At least 60 minutes of moderate intensity, continuous activity on most days, preferably daily. This level of activity can help achieve a healthy body weight and lower the risk of other diseases such as cardiovascular disease and diabetes (USDHHS 1996, USDA 2000, USDHHS 2000, IOM 2002).
- Inclusion of weight-bearing and short, intense impact activities such as basketball, gymnastics, and jumping as part of this regular activity program.
- Performance of weight-bearing activities that increase muscle strength, such as running, hopping, or skipping. The best activities work all muscle groups. Examples include gymnastics, basketball, volleyball, bicycling, and soccer. Swimming, while highly

Table 7–6. Weight-Bearing Exercise for Kids and Teens

Exercise helps build bone and weight-bearing exercise is particularly helpful in this task. Weight-bearing exercise includes any activity in which your feet and legs carry your own weight. Here are some examples of weight-bearing exercise that can help you build strong bones:

- **Walking**
- **Running**
- **Jumping**
- **Jumping rope**
- **Dancing**
- **Climbing stairs**
- **Jogging**
- **Aerobic dancing**
- **Hiking**
- **Inline skating/ice skating**
- **Racquet sports, such as tennis or racquetball**
- **Team sports such as soccer, basketball, field hockey, volleyball, and softball or baseball**

Source: NICHD 2004.

beneficial to many aspects of health, is not a weight-bearing activity and thus does not contribute to increased bone mass.

Physical Activity for Adults

Adults should strive to get at least 30 minutes of physical activity on most days, preferably daily (USDHHS 1996, USDA 2000, USDHHS 2000, IOM 2002). As part of that regular physical activity program, the following can help enhance bone health:

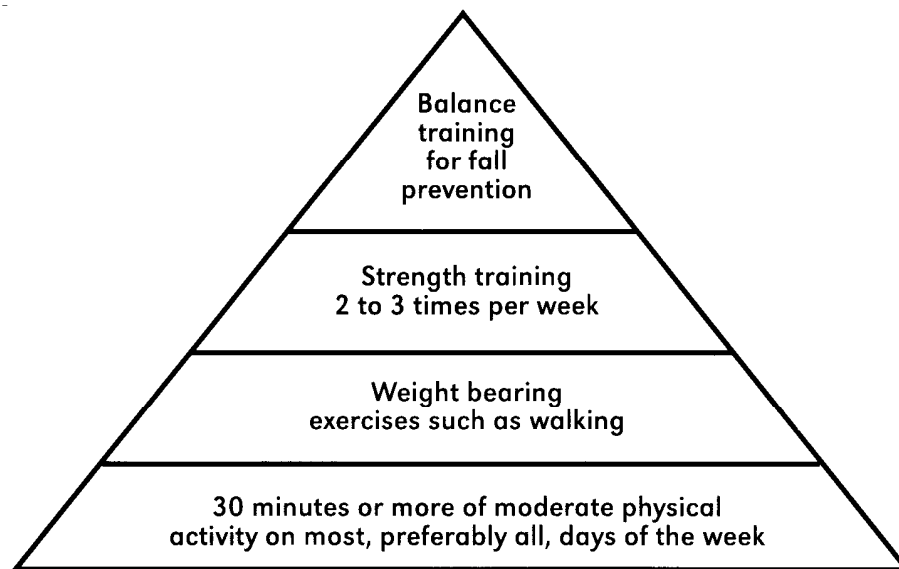
- For those individuals who can tolerate impact activities, a simple, 10-minute program of physical activity that incorporates 50 3-inch (8-centimeter) jumps per day.
- A progressive program of weight training that uses all muscle groups, with the amount of weight lifted increased gradually over time.
- A jogging or stair-climbing program for those who cannot tolerate higher impact physical activity.
- Active recreational activities such as tennis, hiking, or basketball.

In addition, it is advisable for adults to try to find ways to add extra weight-bearing exercise into everyday activities. For example, consider parking farther away in the parking lot or taking the stairs instead of the elevator.

General recommendations for physical activity in adults are shown in the pyramid in Figure 7-2, with the base of the pyramid being 30 minutes or more of moderate physical activity on most, preferably all, days of the week. It is also recommended that weight-bearing exercises and strength and balance training be added as a part of regular physical activity (Nelson 2002, Seguin and Nelson 2003). Lifestyle activities such as walking, gardening, and raking leaves can also be a valuable part of regular physical activity (USDHHS 1996).

It is important to begin any physical activity program slowly and to consider previous activity levels. Those who have been inactive should begin with 5 to 10 minutes of activity per day, and a pre-exercise evaluation by a physician may be advised. Those who are more fit can increase physical activity levels to 20 to 30 minutes of moderate activity at a higher heart rate (60–85 percent of maximum heart rate). Generally, it is advisable to increase activity levels by no more than 10 percent each week to avoid injury. For example, those who begin with 15 minutes per day can progress to 17 minutes the second week, and so on.

Figure 7–2. General Recommendations for Physical Activity in Adults



Source: Nelson 2002.

Finally, adults should consult a physician or physical therapist if orthopedic conditions like arthritis, functional limitations, or other medical conditions make these physical activity guidelines difficult or unsafe to follow.

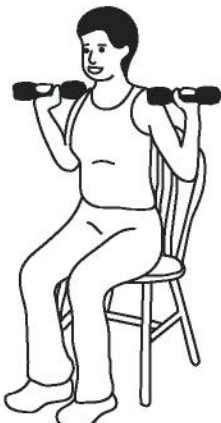
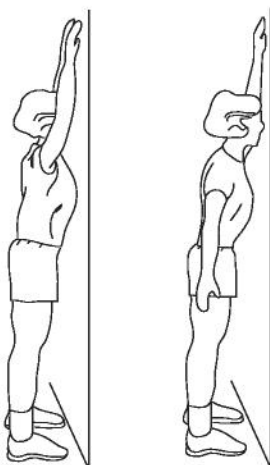
Physical Activity for Older Adults

Most elderly individuals should strongly consider engaging in regular physical activity. Physical activity is the only single therapy that can simultaneously improve muscle mass, muscle strength, balance, and bone strength. As a result, it may decrease the risk of fractures, in part by reducing the risk of falling. In fact, fall risk reduction may be the biggest benefit of physical activity for the elderly.

The following guidelines should be used to maximize the potential fall-prevention benefits of physical activity in the elderly:

- Physical activity needs to be of sufficient intensity to improve muscle strength, since poor muscle strength is a known risk factor for falls. Strength or resistance training is best for building muscle, but even aerobic endurance activity can yield some improvements in muscle strength.
- Improving balance can be an important component of any physical activity program designed to decrease falls. This program may include balance training exercises or a movement activity such as Tai Chi. Any activity that requires weight bearing and challenges the postural system can improve balance and potentially help reduce falls.
- Physical activity must be performed on average 3 times per week for 30 to 45 minutes per session for at least three months for strength and balance benefits to be realized, and it must be continued if benefits are to be maintained.

Figure 7–3. Examples of Strength Training Exercises

Overhead Press	Wall Arch
 <ol style="list-style-type: none">1. Stand or sit in an armless chair with feet shoulder-width apart. With a dumbbell in each hand, raise your hands, palms facing forward, until the dumbbells are level with your shoulders and parallel to the floor.2. To a count of two, slowly push the dumbbells up over your head until your arms are fully extended—but don't lock your elbows.3. Pause. Then, to a count of four, slowly lower the dumbbells back to shoulder level, bringing your elbows down close to your sides.4. Repeat ten times for one set. Rest for one to two minutes. Then complete a second set of ten repetitions. <p>Benefit: Strengthens muscles in the arms, upper back, and shoulders.</p>	 <ol style="list-style-type: none">1. Face a wall with your feet 6 inches from the wall and 6 inches apart.2. Stretch your arms up to touch the wall while taking a deep breath in.3. Concentrate on flattening your stomach.4. Also, try reaching up with one arm while stretching down with the other. <p>Benefit: Strengthens stomach and back, stretches shoulders and calves.</p>

Source: CDC 2004, NOF 2003.

Those who suffer a fall that requires a visit to a health-care provider or an emergency room should ask for a fall risk assessment that includes a program of physical activity. Physical activity is most effective if delivered as a part of a comprehensive fall-prevention program.

Physical Activity for Those With Fragility Fractures

Individuals who have already experienced osteoporotic fractures should avoid certain types of physical activities and exercises. For example, those who have had vertebral fractures may need to avoid activities that flex the spine.

Table 7–7. Weight-Bearing Exercise for Adults

Weight-Bearing/High Impact/Resistance Activities:
<ul style="list-style-type: none"> • Stair-climbing • Hiking • Dancing • Jogging • Downhill and cross-country skiing • Aerobic dancing • Volleyball • Basketball • Gymnastics • Weight lifting or resistance training • Soccer • Jumping rope
Weight-Bearing/Low Impact Activities:
<ul style="list-style-type: none"> • Walking • Treadmill walking • Cross-country ski machines • Stair-step machines • Rowing machines • Water aerobics • Deep-water walking • Low impact aerobics
Non-Weight-Bearing/Non-Impact Activities:
<ul style="list-style-type: none"> • Lap swimming • Indoor cycling • Stretching or flexibility exercises (avoid forward-bending exercises) • Yoga • Pilates

Source: NOF 2003.

Figure 7–4. Resources for Strength Training for Older Adults

"You don't stop exercising because you grow old. You grow old because you stop exercising."
—Anonymous

Growing Stronger:

Strength Training for Older Adults

This strength-training program was developed by experts at Tufts University and the Centers for Disease Control and Prevention (CDC). It is based upon sound scientific research involving strengthening exercises—exercises that have been shown to increase the strength of your muscles, maintain the integrity of your bones, and improve your balance, coordination, and mobility. The CDC website features links to the book and animated illustrations of exercises.

Source: CDC 2004.

Exercise: A Guide From the National Institute on Aging

The 48-minute video and 80-page companion booklet were produced by the National Institute on Aging (NIA) to demonstrate how to start and stick with a safe, effective program of stretching, balance, and strength-training exercises. The video features Margaret Richard, star of *Body Electric*, PBS' popular exercise show.

Source: NIA 2004.

Boning Up on Osteoporosis: A Guide to Prevention and Treatment

This 70-page booklet provides information on the prevention, detection, and treatment of osteoporosis. The booklet includes tips on how to begin an exercise program and provides 17 pages of illustrations and instructions on moving safely.

Source: NOF 2003.

For more information on the resources listed in Figure 7–4 go to:

- *Growing Stronger: Strength Training for Older Adults* at www.cdc.gov/nccdphp/dnpa/physical/growing_stronger/
- *Exercise: A Guide From the National Institute on Aging* at www.niapublications.org/exercisebook/exercisebook.asp
- *Boning Up on Osteoporosis: A Guide to Prevention and Treatment* at <http://www.nof.org/prevention/exercise.htm>.

Excerpted from: U.S. Department of Health and Human Services. Bone Health and Osteoporosis: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Office of the Surgeon General, 2004, pages 171-177.



Fitness & Bone Health for Women: The Skeletal Risk of Overtraining

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Are you exercising too much? Eating too little? Have your periods become irregular or stopped? If so, you may be putting yourself at high risk for several serious problems that could affect your health, your ability to remain active, and your risk for injuries. You also may be putting yourself at risk for developing osteoporosis, a disease in which bone density is decreased, leaving your bones vulnerable to fracture (breaking).

Why Is Missing My Period Such a Big Deal?

Some athletes see amenorrhea (the absence of menstrual periods) as a sign of successful training. Others see it as a great answer to a monthly inconvenience. And some young women accept it blindly, not stopping to think of the consequences. But missing your menstrual periods is often a sign of decreased estrogen levels. And lower estrogen levels can lead to osteoporosis, a disease in which your bones become brittle and more likely to break.

Usually, bones become brittle and break when women are much older, but some young women, especially those who exercise so much that their periods stop, develop brittle bones, and may start to have fractures at a very early age. Some 20-year-old female athletes have been said to have the bones of an 80-year-old woman. Even if bones don't break when you're young, low estrogen levels during the peak years of bone-building, the preteen and teen years, can affect bone density for the rest of your life. And studies show that bone growth lost during these years may not ever be regained.

Broken bones don't just hurt – they can cause lasting malformations. Have you noticed that some older women and men have a stooped posture? This is not a normal sign of aging. Fractures from osteoporosis have left their spines permanently altered.

Overtraining can cause other problems besides missed periods. If you don't take in enough calcium and vitamin D (among other nutrients), bone loss may result. This may lead to decreased athletic performance, decreased ability to exercise or train at desired levels of intensity or duration, and increased risk of injury.

Who Is at Risk for These Problems?

Girls and women who may be trying to lose weight by restricting their eating and/or engaging in rigorous exercise regimes are at risk for these health problems. This may include serious athletes, “gym rats” (who spend considerable amounts of time and energy working out), and/or girls and women who believe “you can never be too thin.”

“I was training really hard – all the time. Finally, my parents made me quit the cross country team ... I was eating almost nothing, training with a stress fracture ... I trained even when my body ached. I thought the pain, the headaches, and the missed menstrual periods were normal. I thought that was how a ‘champion’ was supposed to feel and train. I was proud of myself for being so thin and disciplined and losing all the ‘baby fat’ I had carried throughout junior high school. My friends all said, “Gosh, you have lost so much weight!” But I wasn’t in control. After my parents made me quit the team and took me to get help, I realized that my training regime was not normal or healthy. I realized that I was hurting myself and that I did not have to be obsessive about my weight, eating habits, and exercise in order to be attractive. I still exercise now, and I watch what I eat, but I am much more relaxed, healthier (my doctor says!), and happier. I have more energy – and more fun. I don’t have to set any records anymore, and I am a champion anyway!”

– An athlete who recovered from problems associated with overtraining and missed periods.

How Can I Tell if Someone I Know, Train With, or Coach May Be at Risk for Bone Loss, Fracture, and Other Health Problems?

Here are some signs to look for:

- missed or irregular menstrual periods
- extreme and/or “unhealthy-looking” thinness
- extreme or rapid weight loss

- behaviors that reflect frequent dieting, such as: eating very little, not eating in front of others, trips to the bathroom following meals, preoccupation with thinness or weight, focus on low-calorie and diet foods, possible increase in the consumption of water and other no- and low-calorie foods and beverages, possible increase in gum chewing, limiting diet to one food group or eliminating a food group
- frequent intense bouts of exercise (e.g., taking an aerobics class, then running five miles, then swimming for an hour, followed by weight-lifting, etc.)
- an “I can’t miss a day of exercise/practice” attitude
- an overly anxious preoccupation with an injury
- exercising despite illness, inclement weather, injury, and other conditions that might lead someone else to take the day off
- an unusual amount of self-criticism and/or self-dissatisfaction
- indications of significant psychological or physical stress, including: depression, anxiety or nervousness, inability to concentrate, low levels of self-esteem, feeling cold all the time, problems sleeping, fatigue, injuries, talking about weight constantly.

How Can I Make Needed Changes to Improve My Bone Health?

If you recognize some of these signs in yourself, the best thing you can do is to make your diet more healthful, and that includes consuming enough calories to support your activity level. It’s best to check with a doctor to make sure your missed periods aren’t a sign of some other problem and to get his or her help as you work toward a more healthy balance of food and exercise. Also, a doctor can help you take steps to protect your bones from further damage.

What Can I Do if I Suspect a Friend May Have Some of These Signs?

First, be supportive. Approach your friend or teammate carefully and be sensitive. She probably won’t appreciate a lecture about how she should be taking better care of herself. But maybe you could share a copy of this publication with her or suggest that she talk to a trainer, coach, or doctor about the symptoms she’s experiencing.

My Friend Drinks a Lot of Diet Sodas. She Says This Helps Keep Her Trim.

Often, girls and women who may be dieting will drink diet sodas rather than milk. Yet, milk and other dairy products are a good source of calcium, an essential ingredient for healthy bones. Drinking sodas instead of milk can be a problem,

especially during the teen years when rapid bone growth occurs. If you (or your friend) find yourself addicted to sodas, try drinking half as many sodas each day, and gradually add more milk and dairy products to your diet. A frozen yogurt shake can be an occasional low-fat, tasty treat. Or try a fruit smoothie made with frozen yogurt, fruit, and/or calcium-enriched orange juice!

For Fitness Instructors and Trainers:

It's important for you to be aware of problems associated with bone loss in today's active young women. As an instructor or trainer, you are the one who sees, leads, and perhaps even evaluates the training sessions and performances of your clients. You may know best when something seems to be amiss. You also may be the best person to help a zealous female exerciser recognize that she is putting herself at risk for bone loss and other health problems, and that she should establish new goals.

Trainers and instructors should also be aware of the implicit or explicit messages they send. An emphasis on health, strength, and fitness should be stressed, rather than an emphasis on thinness. Use caution when advising female clients to lose weight. And, if such a recommendation is deemed necessary, education and assistance regarding proper and safe weight management should be offered by knowledgeable personnel. As an instructor or trainer, it's best to maintain a professional rapport with your clients, so they can feel comfortable approaching you with concerns about their exercise training programs, appropriate exercise goals and time lines, body image and nutrition issues, as well as more personal problems regarding eating practices and menstruation.

My Coach and I Think I Should Lose Just a Little More Weight. I Want to Be Able to Excel at My Sport!

Years ago, it was not unusual for coaches to encourage athletes to be as thin as possible for many sports (dancing, gymnastics, figure skating, swimming, diving, running, etc.). However, many coaches are realizing that being too thin is unhealthy and can negatively affect performance. It is important to exercise and watch what you eat. However, it's also important to develop and maintain healthy bones and bodies. Without these, it will not matter how fast you can run, how thin you are, or how long you exercise each day. Balance is the key!!!

I'm Still Not Convinced. If My Bones Become Brittle, So What? What's the Worst Thing That Could Happen to Me?

Brittle bones may not sound as scary as some other fatal or rare disease. The fact is that osteoporosis can lead to fractures. It can cause disability. Imagine having so many spine fractures that you've lost inches in height and walk bent over. Imagine looking down at the ground everywhere you go because you can't straighten your back. Imagine not being able to find clothes that fit you. Imagine having difficulty breathing and eating because your lungs and stomach are compressed into a smaller space. Imagine having difficulty walking, let alone exercising, because of pain and misshapen bones. Imagine constantly having to be aware of what you are doing and having to do things so slowly and carefully because of a very real fear and dread of a fracture – a fracture that could lead to a drastic change in your life, including pain, loss of independence, loss of mobility, loss of freedom, and more.

But osteoporosis isn't just an "older person's" disease. Young women also experience fractures. Imagine being sidelined because of a broken bone and not being able to get those good feelings you get from regular activity.

Eating for Healthy Bones

How much calcium do I need? It is very important to your bone health that you receive adequate daily amounts of calcium, vitamin D, phosphorus, and magnesium. These are the vitamins and minerals that are most influential in building bones and teeth. This chart will help you decide how much calcium you need.

Recommended Calcium Intakes (mg/day)	
Ages	Amount
9-13	1300
14-18	1300
19-30	1000

Source: *National Academy of Sciences, 1997.*

Where can I get calcium and vitamin D? Dairy products are the primary food sources of calcium. Choose low-fat milk, yogurt, cheeses, ice cream, or products made or served with these choices to fulfill your daily requirement. Three servings of dairy products per day should give you at least 900 mg (milligrams) of calcium.

Green vegetables are another source. A cup of broccoli, for example, has about 136 mg of calcium. Sunlight is an important source of vitamin D, but when the sun isn't shining, turn to dietary sources of vitamin D.

Milk and dairy products. There are many great snack and meal items that contain calcium. With a little planning and “know how,” you can make meals and snacks calcium-rich!

- **Milk:** Wouldn't a tall, cold glass of this refreshing thirst quencher be great right now? If you're concerned about fat and calories, choose 1% or skim milk. You can drink it plain or with a low/no-fat syrup or flavoring, such as chocolate syrup, vanilla extract, hazelnut flavoring, cinnamon, etc.
- **Cheese:** Again, you can choose the low/no-fat varieties. Use all different types of cheese for sandwiches, bagels, omelets, vegetable dishes, pasta creations, or as a snack by itself!
- **Puddings (prepared with milk):** You can now purchase (or make from a mix) a variety of flavors with little or no fat, such as chocolate fudge, lemon, butterscotch, vanilla, and pistachio. Try them all!
- **Yogurt:** Add fruit. Eat it plain. Add a low/no-fat sauce or syrup. No matter how you choose to eat this calcium-rich food, it remains a quick, easy, and convenient choice. It's also available in a variety of flavors. Try mocha-fudge-peppermint-swirl for the more adventurous at heart and vanilla for the more traditional yogurt snacker!
- **Frozen yogurt (or fat-free ice cream):** Everybody loves ice cream. And now, without the unnecessary fat grams, you can enjoy it more often! Mix yogurt, milk, and fruit to create a breakfast shake. Have a cone at lunchtime or as a snack. A scoop or two after dinner can be cool and refreshing.

What are other sources of calcium? Many foods you already buy and eat may be “calcium-fortified.” Try calcium-fortified orange juice or calcium-fortified cereal. Check food labels to see if some of your other favorite foods may be good sources of calcium. You can also take calcium supplements if you think you may not be getting enough from your diet.

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Recognizing the National Bone And Joint Decade 2002-2011

Additional Resources

National Institute of Arthritis and Musculoskeletal and Skin Diseases

1 AMS Circle, Bethesda, MD 20892-3675

Telephone: 1-877-22-NIAMS (a toll-free call) or 301-495-4484

TTY: 301-565-2966

Fax: 301-718-6366

E-mail: NIAMSinfo@mail.nih.gov

Web site: www.niams.nih.gov

NIH Osteoporosis and Related Bone Diseases ~ National Resource Center

2 AMS Circle, Bethesda, MD 20892-3676

Telephone: 1-800-624-BONE (a toll-free call) or 202-223-0344

Fax: 202-293-2356

TTY: 202-266-4315

E-mail: NIAMSBONEINFO@mail.nih.gov

Web site: www.niams.nih.gov/bone

National Institute on Aging

Web site: www.nia.nih.gov/

National Institute on Child Health & Human Development

Web site: www.nichd.nih.gov/

National Institute on Diabetes & Digestive Diseases & Kidney Disease

Web site: www.niddk.nih.gov/

President's Council on Physical Fitness

Department W, 200 Independence Avenue, SW, Room 738-H

Washington, DC 20201-0004

Telephone: 202-690-9000

Fax: 202-690-5211

Web site: www.fitness.gov

Powerful Bones. Powerful Girls. The National Bone Health Campaign.

Web site: www.cdc.gov/powerfulbones/

Steps to a HealthierUS Initiative

Web site: www.healthierus.gov/steps/index.html

VERB™ It's what you do.

Web site: www.cdc.gov/youthcampaign/index.htm

American Council on Exercise

4851 Paramount Drive, San Diego, CA 92123

Telephone: 1-800-825-3636 (a toll-free call) or 858-279-8227

Fax: 858-279-8064

Web site: www.acefitness.org

National Strength and Conditioning Association

1885 Bob Johnson Drive, Colorado Springs, CO 80906

Telephone: 1-800-815-6826 (a toll-free call) or 719-632-6722

Fax: 719-632-6367

Web site: www.nasca-lift.org

Shape Up America!

E-mail: info@shapeup.org

Web site: www.shapeup.org

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