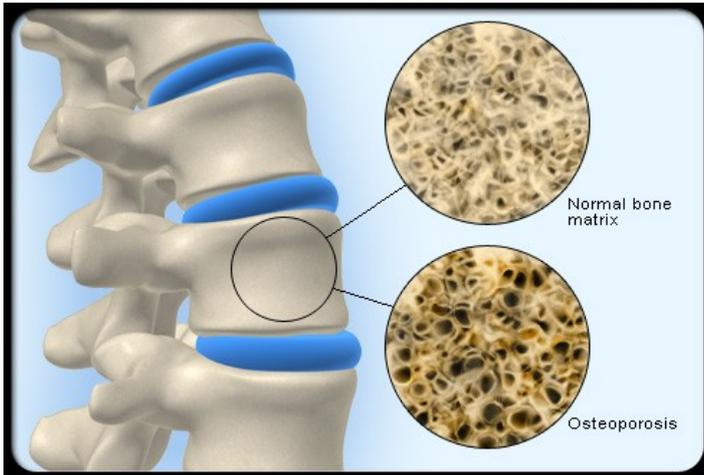
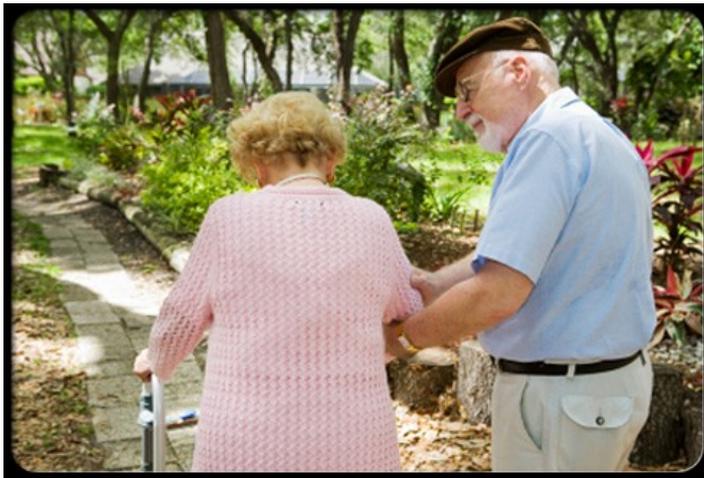


Osteoporosis - Are Your Bones at Risk ?



What Is Osteoporosis?

Osteoporosis is a disease characterized by low bone mass and loss of bone tissue that may lead to weak and fragile bones. If you have osteoporosis, you have an increased risk for fractured bones (broken bones).



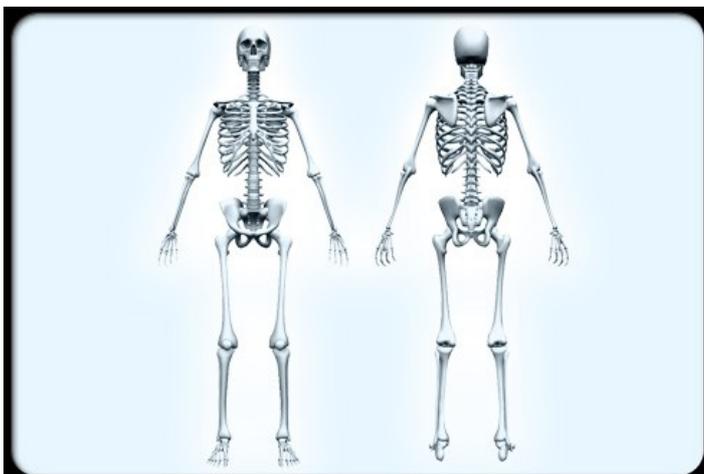
Does Osteoporosis Only Affect the Elderly?

Osteoporosis has often been thought to be a condition that frail elderly women develop. However, the damage from osteoporosis begins much earlier in life. Because peak bone density is reached at approximately 25 years of age, it is important to build strong bones by that age, so that the bones will remain strong later in life. Adequate calcium intake and exercise are essential for building strong bones.



Why Is Osteoporosis an Important Public Health Issue?

In the United States, more than 10 million people have osteoporosis and almost 34 million more have low bone density. Approximately 80% of those with osteoporosis are women. Of people older than 50 years of age, one in two women and one in eight men are predicted to have an osteoporosis-related fracture in their lifetime. White and Asian racial groups are at a greater risk. With the aging of America, the number of people with osteoporosis-related fractures will increase substantially. The pain, suffering, and economic costs will be enormous.



What Are the Symptoms of Osteoporosis?

Normal bone is composed of protein, collagen, and calcium, all of which give bone its strength. Bones that are affected by osteoporosis can break (fracture) with relatively minor injury that normally would not cause a bone to fracture.

The osteoporosis condition can be present without any symptoms for decades. Therefore, patients may not be aware of their osteoporosis until they suffer a painful fracture. Symptoms depend on the location of the fracture. We'll take a look at the most common locations for osteoporotic fractures on the next few slides.

Osteoporosis Symptoms: Fractures of the Spine

Fractures of the spine (vertebra) can cause severe "band-like" pain that radiates around from the back to the side of the body. Over the years, repeated spine fractures can cause chronic lower back pain as well as loss of height or curving of the spine, which gives the individual a hunched-back appearance of the upper back, referred to as a "dowager hump."



Osteoporosis Symptoms: Stress Fracture

A fracture that occurs during the course of normal activity is called a minimal trauma fracture or stress fracture. For example, some patients with osteoporosis develop stress fractures of the feet while walking or stepping off a curb.



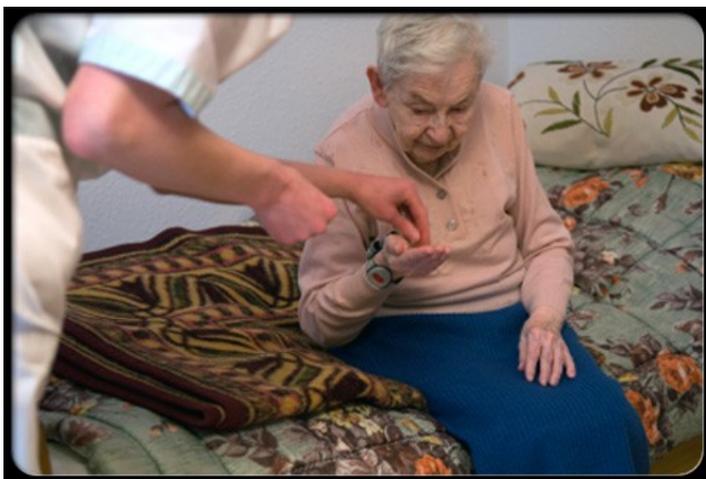
Osteoporosis Symptoms: Hip Fracture

Hip fractures typically occur as a result of a fall. With osteoporosis, hip fractures can occur as a result of trivial accidents. Hip fractures may also be difficult to heal after surgical repair because of poor bone quality.



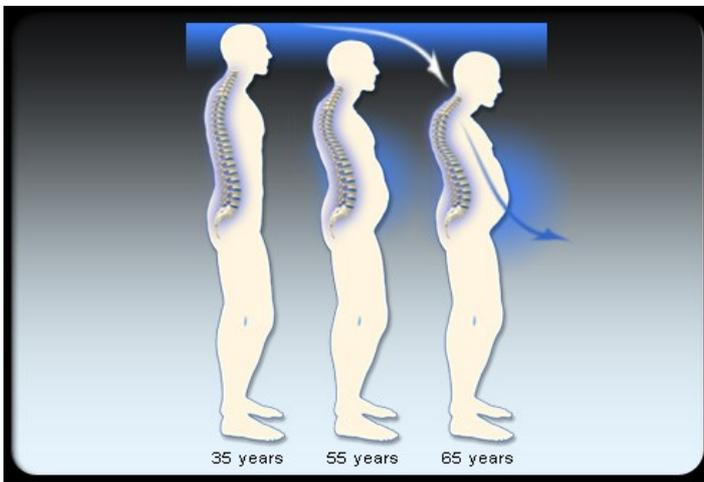
What Are the Consequences of Osteoporosis?

Osteoporosis bone fractures are responsible for considerable pain, decreased quality of life, lost workdays, and disability. Up to 30% of patients suffering a hip fracture will require long-term nursing-home care. Some 20% of women with a hip fracture will die in the subsequent year as an indirect result of the fracture. In addition, once a person has experienced a spine fracture due to osteoporosis, he or she is at very high risk of suffering another such fracture in the near future (next few years).



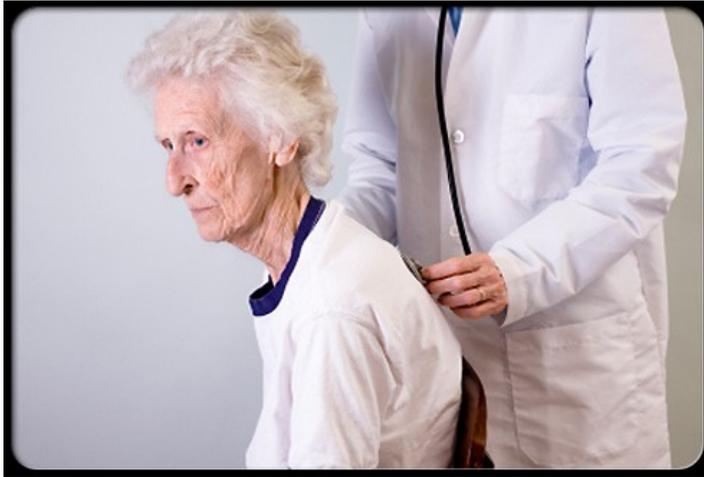
What Factors Determine Bone Strength?

Bone mass (bone density) is the amount of bone present in the skeletal structure. Generally, the higher the bone density, the stronger the bones. Bone density is greatly influenced by genetic factors and can be affected by environmental factors and medications. For example, men have a higher bone density than women. African Americans have a higher bone density than Caucasian or Asian Americans. Normally, bone density accumulates during childhood and reaches a peak by around 25 years of age. Bone density is then maintained for about 10 years. After age 35, both men and women will normally lose 0.3%-0.5% of their bone density per year as part of the aging process.



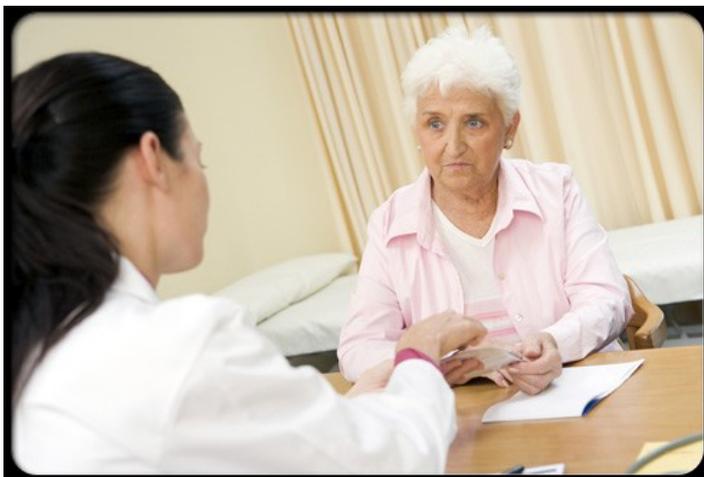
Menopause, Estrogen, and Osteoporosis

Estrogen is important in maintaining bone density in women. When estrogen levels drop after menopause, bone loss accelerates. During the first five to 10 years after menopause, women can suffer up to 2%-4% loss of bone density per year! This can result in the loss of up to 25%-30% of their bone density during that time period. Accelerated bone loss after menopause is a major cause of osteoporosis in women.



What Are the Risk Factors for Developing Osteoporosis?

- female gender
- Caucasian or Asian race
- thin and small body frames
- family history of osteoporosis (for example, having a mother with an osteoporotic hip fracture doubles your risk of hip fracture)
- personal history of fracture as an adult
- cigarette smoking
- excessive alcohol consumption
- lack of exercise
- diet low in calcium
- poor nutrition and poor general health
- malabsorption (nutrients in the bowels are not properly absorbed)
- low estrogen levels
- chemotherapy
- loss of the menstrual period (amenorrhea)
- chronic inflammation
- immobility, such as after a stroke or any condition that interferes with walking
- hyperthyroidism (excessive thyroid hormone)
- hyperparathyroidism (excessive parathyroid hormone production causes too much calcium to be removed from the bone)
- vitamin D deficiency (vitamin D helps the body absorb calcium)
- certain medications can cause osteoporosis such as long-term use of heparin (a blood thinner), antiseizure medications phenytoin (Dilantin) and phenobarbital, and long-term use of oral corticosteroids (such as prednisone)





How Is Osteoporosis Diagnosed?

A routine X-ray can suggest osteoporosis of the bone, which appears much thinner and lighter than normal bones. Unfortunately, by the time X-rays can detect osteoporosis, at least 30% of the bone has already been lost. In addition, X-rays are not accurate indicators of bone density. The appearance of the bone on the X-ray is often affected by variations in the degree of exposure of the X-ray film.

The National Osteoporosis Foundation, the American Medical Association, and other major medical organizations are recommending a dual energy X-ray absorptiometry scan (DEXA or DXA) for diagnosing osteoporosis. The test measures bone density in the hip and the spine, takes only five to 15 minutes to perform, uses very little radiation (less than one-tenth to one-hundredth the amount used on a standard chest X-ray), and is quite precise.

Who should have bone density testing?

The National Osteoporosis Foundation guidelines state that there are several groups of people who should consider DXA testing:

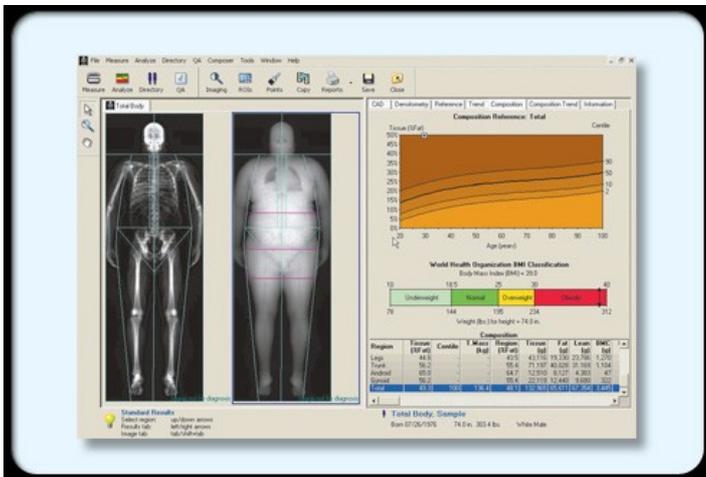
- all postmenopausal women below age 65 who have risk factors for osteoporosis;
- all women aged 65 and older;
- postmenopausal women with fractures, although this is not mandatory because treatment may well be started regardless of bone density;
- women with one of the many medical conditions associated with osteoporosis; and
- women whose decision to use medication might be aided by bone density testing



How Are Bone Density Results Measured?

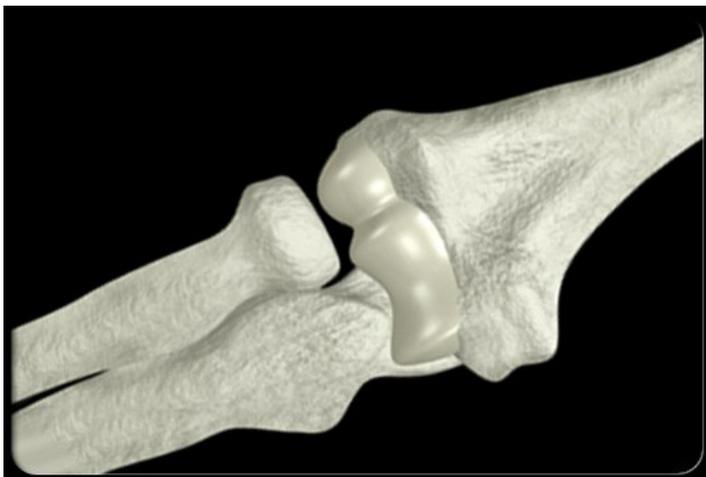
Upon completion of a DXA scan, the bone density of the patient is then compared to the average peak bone density of young adults of same sex and race. This score is called the "T score," and it expresses the bone density in terms of the number of standard deviations (SD) below peak young adult bone mass.

- Osteoporosis is defined as a bone density T score of -2.5 SD or below.
- Osteopenia (between normal and osteoporosis) is defined as a bone density T score between -1 and -2.5 SD. all women aged 65 and older;



How Is Osteoporosis Treated and Prevented?

The goal of osteoporosis treatment is the prevention of bone fractures by stopping bone loss and by increasing bone density and strength. Although early detection and timely treatment of osteoporosis can substantially decrease the risk of future fracture, none of the available treatments for osteoporosis are complete cures. In other words, it is difficult to completely rebuild bone that has been weakened by osteoporosis. Therefore, prevention of osteoporosis is as important as treatment. We'll take a look at some of the prevention and treatment options on the following slides.





Prevention and Treatment: Exercise

Exercise has a wide variety of beneficial health effects. However, exercise does not bring about substantial increases in bone density. The benefit of exercise for osteoporosis has mostly to do with decreasing the risk of falls, probably because balance is improved and/or muscle strength is increased. Research has not yet precisely determined what type or duration of exercise is best for osteoporosis. Nevertheless, most doctors recommend weight-bearing exercise, such as walking, preferably daily.



A Word of Caution About Exercise

It is important to avoid exercises that can injure already weakened bones. In patients over 40 and those with heart disease, obesity, diabetes mellitus, and high blood pressure, exercise should be prescribed and monitored by their doctors. Finally, extreme levels of exercise (such as marathon running) may not be healthy for the bones. Marathon running in young women that leads to weight loss and loss of menstrual periods can actually cause osteoporosis.



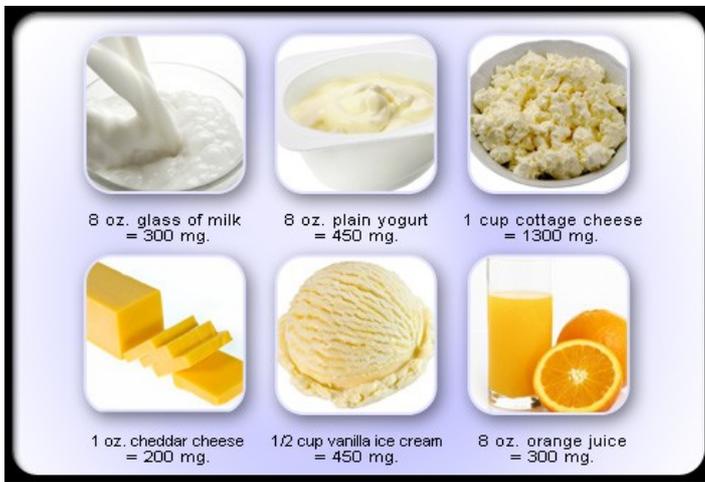
Prevention and Treatment: Quit Smoking and Curtail Alcohol

Smoking one pack of cigarettes per day throughout adult life can itself lead to loss of 5%-10% of bone mass. Smoking cigarettes decreases estrogen levels and can lead to bone loss in women before menopause. Smoking cigarettes can also lead to earlier menopause. Data on the effect of regular consumption of alcohol and caffeine on osteoporosis is not as clear as with exercise and cigarettes. In fact, research regarding alcohol and caffeine as risk factors for osteoporosis shows widely varying results and is controversial. Certainly, these effects are not as powerful as other factors. Nonetheless, moderation of both alcohol and caffeine is prudent.

For all people, with or without osteoporosis:	Dosage
Children ages 1 to 10	800 mg/day
Men, premenopausal women, and postmenopausal women also taking estrogen	1000 mg/day
Teenagers and young adults ages 11 to 24	1200 mg/day
Post menopausal women not taking estrogen	1500 mg/day
Pregnant and nursing mothers	1200 mg/day to 1500mg/day

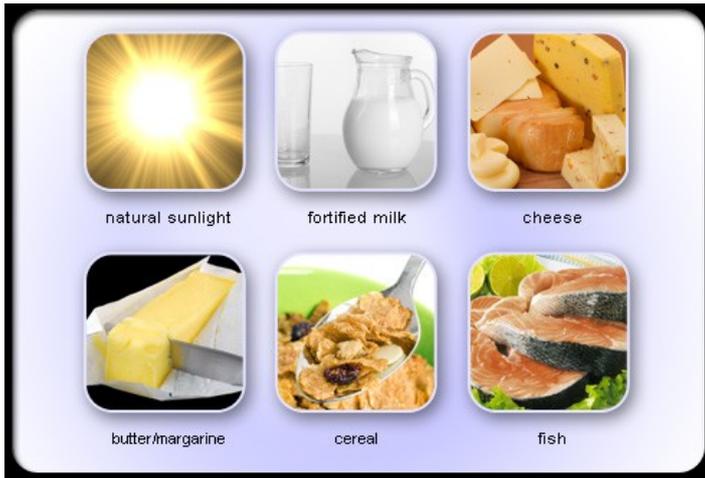
Prevention and Treatment: Calcium Supplements

Building strong and healthy bones requires an adequate dietary intake of calcium and exercise beginning in childhood and adolescence for both sexes. Importantly, once osteoporosis is present, a high dietary calcium intake or taking calcium supplements alone is not sufficient in treating osteoporosis and should not be viewed as an alternative to or substituted for more potent prescription osteoporosis medications. In the first several years after menopause, rapid bone loss can occur even if calcium supplements are taken. Unfortunately, surveys have shown that the average woman in the United States consumes less than 500 milligrams of calcium per day in her diet, less than the recommended amounts. Additional calcium can be obtained by drinking more milk and eating more yogurt or cottage cheese or by taking calcium supplement tablets as well from calcium-fortified foods, such as orange juice.



Prevention and Treatment: Calcium-Fortified Foods

Excluding dairy products, the average American diet contains approximately 250 mg of calcium. As mentioned on the previous slide, here are some examples of calcium-fortified foods and their respective calcium intake.



Prevention and Treatment: Vitamin D

An adequate calcium intake and adequate body stores of vitamin D are important foundations for maintaining bone density and strength. Unfortunately, vitamin D deficiency is quite common in the United States. Vitamin D is important in several respects:

- vitamin D helps the absorption of calcium from the intestines;
- a lack of vitamin D causes calcium-depleted bone (osteomalacia), which further weakens the bones and increases the risk of fractures; and
- vitamin D, along with adequate calcium (1,200 mg of elemental calcium), has been shown in some studies to increase bone density and decrease fractures in older postmenopausal but not in premenopausal or perimenopausal women.

The Food and Nutrition Board of the Institute of Medicine has recommended the following as an adequate vitamin D intake:

- 200 IU daily for men and women 19 to 50 years old;
- 400 IU daily for men and women 51 to 70 years old; and
- 800 IU daily for men and women 71 years and older.

Good sources of vitamin D include natural sunlight, fortified milk, cheese, butter/margarine, cereal, and fish.



Prevention and Treatment: Menopausal Hormone Therapy

Menopausal hormone therapy (previously referred to as hormone replacement therapy or HRT) has been shown to prevent bone loss, increase bone density, and prevent bone fractures. Estrogen is available orally (Premarin, Estrace, Estratest, and others) or as a skin patch (Estraderm, Vivelle, and others). Estrogen is also available in combination with progesterone as pills and patches. Progesterone is routinely given along with estrogen to prevent uterine cancer that might result from estrogen use alone. Women who have had a hysterectomy (surgical removal of the uterus) may take estrogen alone. Due to adverse effects of menopausal hormone therapy, such as increased risks of heart attack, stroke, blood clots in the veins, and breast cancer; menopausal hormone therapy is no longer recommended for long-term use but rather short-term use to relieve menopausal hot flashes. Every woman should have an individualized discussion regarding estrogen replacement with her doctor.



Prevention and Treatment: Medications

Currently, the most effective medications for osteoporosis that are approved by the FDA are anti-resorptive agents, which prevent bone breakdown. Antiresorptive medications inhibit bone removal (resorption), thus tipping the balance in favor of bone rebuilding and increasing bone density. Menopausal estrogen hormone therapy is one example of an antiresorptive agent. Others include alendronate (Fosamax), risedronate (Actonel), raloxifene (Evista), ibandronate (Boniva), calcitonin (Calcimar), and zoledronate (Reclast).

Selective estrogen receptor modulators (SERMs) are a class of drugs that work like estrogen in some tissues. The SERMs are developed to reap the benefits of estrogen while avoiding the potential side effects of estrogen. Examples include tamoxifen and Raloxifene (Evista).

For more information on these and other hormone medications, please read the Osteoporosis feature article on MedicineNet.com.

Prevention of Hip Fractures

The FDA has approved hip-protector garments for the prevention of hip fractures in unstable elderly people with known osteoporosis. Brand names available include Hipsaver and Safehip. These can be helpful for selected patients who are in the nursing-home environment, although the real extent of protection against hip fractures that is gained with use of hip protectors is a matter of current controversy.



Osteoporosis At A Glance



- Osteoporosis is a condition of increased susceptibility to fracture due to fragile bone.
- Osteoporosis weakens bone and increases risk of bone fracture.
- Bone mass (bone density) decreases after age 35 years and decreases more rapidly in women after menopause.
- Key risk factors for osteoporosis include genetic factors, lack of exercise, lack of calcium and vitamin D, personal history of fracture as an adult, rheumatoid arthritis, cigarette smoking, excessive alcohol consumption, low body weight, and family history of osteoporosis.
- Patients with osteoporosis have no symptoms until bone fractures occur.
- Diagnosis can be suggested by X-rays and confirmed by using tests to measure bone density.
- Treatments for osteoporosis, in addition to prescription osteoporosis medications, include stopping use of alcohol and cigarettes, and assuring adequate exercise, calcium, and vitamin D.

Source: http://www.medicinenet.com/osteoporosis_pictures_slideshow/article.htm