

Osteoporosis

What is osteoporosis?

Osteoporosis is a condition that results from thinning and weakening of normal bone. It results in a decrease in the density of bone mass. This puts a patient at a much higher risk of bone fracture, because the bone loses its ability to support the weight of your body. There are two categories of osteoporosis, Type I and Type II. Type I osteoporosis occurs in post-menopausal women, due to estrogen deficiency. Type II occurs in both men and women (about two to three time more frequently in women), and is due to aging and calcium deficiency over many years.

What causes osteoporosis?

As we age, the amount of bone in our bodies gradually declines. Women are especially prone to developing thin bones because they don't develop as much bone as men when they are younger. Also, their rate of bone loss is greater than that of men. Post menopausal women will lose 2-3% of their bone mass per year. Because of this, age and gender are the most important factors for developing osteoporosis.

Other risk factors include Northern European ancestry, hypothyroidism, anticonvulsant medication, eating disorders (anorexia and bulimia) and a sedentary lifestyle. Thin women are more prone than overweight women to develop osteoporosis. Caucasians are more prone than African Americans. Americans are especially prone to developing osteoporosis, the exact cause is not known. We do know that it is not entirely related to ancestry, as many immigrants from other countries develop an American's higher risk of osteoporosis.

Of note is that osteoporosis does not "kick in" at menopause. Some experts feel that, for example, an athlete who has two or more stress fractures has osteoporosis until proven otherwise. Sodas contain phosphoric acid which competes with calcium uptake in the gut and has been implicated as a contributing factor for osteoporosis in teenagers. Pregnancy and breast feeding further leach calcium from the skeleton, placing women at risk for slowly developing bone loss even before menopause. Abnormal menstrual cycles (primary or secondary oligomenorrhea) place a woman at risk as well. In female long distance runners who run more than 40 miles weekly there is a high likelihood of not having periods (oligomenorrhea), which can result in secondary bone loss due to abnormal estrogen levels. Another risk factor is a total hysterectomy (uterus and ovaries); the loss of the ovaries essentially creates a premature menopause condition and places a woman at even greater risk of developing osteoporosis. Finally, patient who are on long term corticosteroids (e.g prednisone) for medical conditions (cancer, asthma, rheumatologic conditions) are at risk for developing osteoporosis.

How is osteoporosis diagnosed?

Osteoporosis is most commonly found either on routine examination, or following a fracture due to weakened bone. X-rays usually show a generalized loss of bone density (osteopenia), but are not diagnostic. Before osteopenia can be appreciated by xrays, one must lose about 25% of their bone density. The most useful test is called “bone densitometry”, or DEXA scan. While this test requires special equipment, it is safe, exposes the patient to small amounts of radiation, and is useful in detecting the early stages of osteoporosis. Some DEXA scans assess bone density about the hip and spine while others assess bone density about the wrist region. These areas are selected because they are at most risk for fracture (e.g. compression spine fractures, hip fractures, distal radius fractures) when one develops osteoporosis.

What is the treatment for osteoporosis?

The primary goal of treatment for osteoporosis is to minimize the incidence of pathological fractures. The three components of treatment are exercise, nutritional supplementation and medications.

Exercise is important to maintain healthy bones. Activities that stress bones have been shown to maintain and increase bone mass, thus reducing the chance of developing osteoporosis. Individuals who live a sedentary lifestyle have weaker bones and are subject to a higher risk of pathological fractures. Resistance forms of exercise, such as weight training, are effective for stimulating bone production, but even aerobic activities such as jogging or walking can help strengthen bones and prevent osteoporosis.

Calcium supplementation is important to ensure oral intake is 1,200-1,500 mg. per day. Consuming this amount of calcium can be difficult for most people as it would require you to eat and/or drink the equivalent of 5-6 glasses of milk per day. Because of this, many patients at risk for osteoporosis should take a calcium supplement every day. This can be taken with Vitamin D, which helps with absorption of calcium into the body. Also, caffeinated substances such as coffee and sodas should be avoided, as they decrease calcium absorption.

There are several prescription medications available for the treatment of osteoporosis. Biphosphonates, such as Fosamax and Actonel, are a type of medication that helps regulate calcium and prevent bone loss. Bone turnover, or replacement of bone by our bodies, is a normal process. In patients with osteoporosis, the replacement of old bone with new, does not maintain pace with the breakdown of old bone. Biphosphonates slow the rate of bone breakdown by inhibiting the cell responsible for bone breakdown.

Raloxifene is a newer medication that has been developed to provide some of the same advantages of estrogen, which helps maintain bone mass, without the potential side effects. Raloxifene is a type of medication called a Selective Estrogen Receptor Modulator, or SERM. The effects of SERM's are similar to that of estrogen, without the side effect of irritating the uterine lining. Furthermore, there is evidence that Raloxifene may decrease the risk of breast cancer.

A new class of osteoporosis drugs to reverse bone loss has been approved. Teriparatide (brand name Forteo) stimulates the formation of new bone by increasing the number and the action of bone-forming cells, called osteoblasts.

Summary

Stay fit, keep active, take your vitamins, and assess your risk factors. If you are a perimenopausal woman you should have a DEXA scan to determine your baseline bone density as the rate of bone loss varies from person to person. A physician can help develop an individualized osteoporosis prevention and treatment plan.