Osteoporosis

What is Osteoporosis? Osteoporosis is a widespread disease characterized by decreased bone mass and poor bone quality, which leads to increased numbers of fractures typically of the hip, spine and wrist. Osteoporosis reflects the inadequate accumulation of bone during growth and maturation, excessive losses thereafter, or both. The term osteoporosis literally means porous bone. The disease often develops unnoticed over many years, with no symptoms or discomfort until a bone fracture occurs.

Facts: Osteoporosis is a global public health problem currently affecting more than 200 million people worldwide. The United States alone, 10 million already have the disease and 18 million are at risk, 80 percent of whom are women. One in two women and one in five men older than 65 years will sustain bone fractures caused by osteoporosis. Each year, 1.5 million fractures are attributed to osteoporosis, including 350,000 hip fractures. Seventy percent of those suffering from osteoporosis do not return to previous pre-injury status. The acute and long-term medical care expenses associated with these fractures costs the nation an estimated $10 billion - $18 billion.

What are the Risk Factors? Although knowledge of the causes of osteoporosis is incomplete, genetic, endocrine and life style factors are contributory. Risk factors associated with osteoporosis include insufficient calcium intake, sedentary lifestyle, smoking, and excessive alcohol consumption. A family history of fractures, a small, slender body, fair skin and a Caucasian or Asian background can increase the risk of osteoporosis. Everyone loses bone with age. After 35 years of age, the body builds less new bone to replace the loss of old bone. In general, the older you are, the lower your total bone mass and the greater your risk for osteoporosis. Osteoporosis has also been linked to the use of some medications, including steroids, and to other illnesses, including some thyroid problems.

What are the Consequences? Loss of height and a stooped appearance of a person with osteoporosis results from partial collapse of weakened vertebrae.

Diagnosis: It is important to get an early diagnosis of osteoporosis, usually made by your doctor using a combination of a complete medical history and physical examination, skeletal X-rays, bone densitometry and specialized laboratory tests. If your doctor diagnoses low bone mass, he or she may want to perform additional tests to rule out the possibility of other diseases that can cause bone loss, including osteomalacia (a metabolic bone disease characterized by abnormal mineralization of bone) or hyperparathyroidism (overactivity of the parathyroid glands).

Treatment: Since today's effective and safe treatments primarily preserve existing bone tissue, prevention, which involves maximizing maturational gains in bone density and minimizing post-maturity losses, emerges as the crucial current disease prevention strategy. Treatment is often a team effort involving a physician or internist, an orthopaedist, a gynecologist, and an endocrinologist. Although exercise and nutrition therapy are often key components of a treatment plan for osteoporosis, there are other treatments as well.

Estrogen replacement therapy (ERT) is often recommended for women at high risk for osteoporosis to prevent bone loss and reduce fracture risk. A measurement of bone density when menopause begins may help you decide whether ERT is right for you. Hormones also prevent heart disease, improve cognitive functioning, and improve urinary function. ERT is not without some risk, including enhanced risk of breast cancer; the risks and benefits of ERT should be discussed with your doctor.

New anti-estrogens known as SERMs (selective estrogen receptor modulators) can increase bone mass, decrease the risk of spine fractures, and lower the risk of breast cancer.

Calcitonin is another medication used to decrease bone loss. A nasal spray form of this medication increases bone mass, limits spine fractures, and may offer some pain relief.

Bisphosphonates, including alendronate, markedly increase bone mass and prevent both spine and hip fractures.

Prevention:

Whatever your age or health status, you need calcium to keep your bones healthy. Calcium continues to be an essential nutrient after growth because the body loses calcium every day. Inadequate calcium during growth can contribute to the development of osteoporosis later in life. Although calcium cannot prevent gradual bone loss after menopause, it continues to play an essential role in maintaining bone quality. Even if women have gone through menopause or already have osteoporosis, increasing intake of calcium and vitamin D can decrease the risk of fracture.

How much calcium you need will vary depending on your age and other factors. The National Academy of Sciences makes the following recommendations regarding daily intake of calcium:

- Males and females 9 to 18 years: 1,300 mg per day
- Women and men 19 to 50 years: 1,000 mg per day
- Pregnant or nursing women up to age 18: 1,300 mg per day
- Pregnant or nursing women 19 to 50 years: 1,000 mg per day
- Women and men over 50: 1,200 mg per day

Dairy products, including yogurt and cheese, are excellent sources of calcium. An eight-ounce glass of milk contains about 300 mg of calcium. Other calcium-rich foods include sardines with bones and green leafy vegetables, including broccoli and collard greens.

If your diet does not contain enough calcium, dietary supplements can help. Talk to your doctor before taking a calcium supplement.

Vitamin D helps your body absorb calcium. The recommendation for vitamin D is 200-600 IU (international units) daily. Supplemented dairy products are an excellent source of vitamin D. (A cup of milk contains 100 IU of vitamin D. A multivitamin contains 400 IU of vitamin D.) Very few foods in nature contain vitamin D. The flesh of fish (such as salmon, tuna, and mackerel) and fish liver oils are among the best sources, and vitamin supplements can be taken if your diet does not contain enough of this nutrient. However, the body can make its own vitamin D through exposure to sunlight. It has been suggested that approximately 5-30 minutes of sun exposure between 10 AM and 3 PM at least twice a week to the face, arms, legs, or back without sunscreen usually lead to sufficient vitamin D synthesis. Despite the importance of the sun to vitamin D synthesis, it is prudent to limit exposure of skin to sunlight to within your own personal tolerance levels. Since too much vitamin D can be toxic, consult with your doctor before taking any vitamin supplement.

Like muscles, bones need exercise to stay strong. No matter what your age, exercise can help minimize bone loss while providing many additional health benefits. Doctors believe that a program of moderate, regular exercise (3 to 4 times a week) is effective for the prevention and management of osteoporosis. Weight-bearing exercises such as walking, jogging, hiking, climbing stairs, dancing, treadmill exercises, and weight lifting are probably best.

Falls account for 50% of fractures; therefore, even if you have low bone density, you can prevent fractures if you avoid falls. Exercise programs that emphasize balance training, especially tai chi, should be emphasized. Consult with your doctor before beginning any exercise program.

Non-Dairy Food Sources of Calcium

Food, Standard Amount	Calcium (mg)
Fortified ready-to-eat cereals (various), 1 oz	236-1043
Soy beverage, calcium fortified, 1 cup	368
Sardines, Atlantic, in oil, drained, 3 oz	325
Tofu, firm, prepared with nigari[b] , ½ cup	253
Pink salmon, canned, with bone, 3 oz	181
Collards, cooked from frozen, ½ cup	178
Molasses, blackstrap, 1 Tbsp	172
Spinach, cooked from frozen, ½ cup	146
Soybeans, green, cooked, ½ cup	130
Turnip greens, cooked from frozen, ½ cup	124
Ocean perch, Atlantic, cooked, 3 oz	116
Oatmeal, plain and flavored, instant, fortified, 1 packet prepared	99-110
Cowpeas, cooked, ½ cup	106
White beans, canned, ½ cup	96
Kale, cooked from frozen, ½ cup	90
Okra, cooked from frozen, ½ cup	88
Soybeans, mature, cooked, ½ cup	88
Blue crab, canned, 3 oz	86
Beet greens, cooked from fresh, ½ cup	82
Pak-choi, Chinese cabbage, cooked from fresh, ½ cup	79
Clams, canned, 3 oz	78
Dandelion greens, cooked from fresh, ½ cup	74
Rainbow trout, farmed, cooked, 3 oz	73

Dairy Sources of Calcium

Food, Standard Amount	Calcium (mg)
Plain yogurt, non-fat (13 g protein/8 oz), 8-oz container	452
Romano cheese, 1.5 oz	452
Pasteurized process Swiss cheese, 2 oz	438
Plain yogurt, low-fat (12 g protein/8 oz), 8-oz container	415
Fruit yogurt, low-fat (10 g protein/8 oz), 8-oz container	345
Swiss cheese, 1.5 oz	336
Ricotta cheese, part skim, ½ cup	335
Pasteurized process American cheese food, 2 oz	323
Provolone cheese, 1.5 oz	321
Mozzarella cheese, part-skim, 1.5 oz	311
Cheddar cheese, 1.5 oz	307
Fat-free (skim) milk, 1 cup	306
Muenster cheese, 1.5 oz	305
1% low-fat milk, 1 cup	290
Low-fat chocolate milk (1%), 1 cup	288
2% reduced fat milk, 1 cup	285
Reduced fat chocolate milk (2%), 1 cup	285
Buttermilk, low-fat, 1 cup	284
Chocolate milk, 1 cup	280
Whole milk, 1 cup	276
Yogurt, plain, whole milk (8 g protein/8 oz), 8-oz container	275
Ricotta cheese, whole milk, ½ cup	255
Blue cheese, 1.5 oz	225
Mozzarella cheese, whole milk, 1.5 oz	215
Feta cheese, 1.5 oz	210

Source: Nutrient values from Agricultural Research Service (ARS) Nutrient Database for Standard Reference, Release 17. Foods are from ARS single nutrient reports, sorted in descending order by nutrient content in terms of common household measures. Food items and weights in the single nutrient reports are adapted from those in 2002 revision of USDA Home and Garden Bulletin No. 72, Nutritive Value of Foods. Mixed dishes and multiple preparations of the same food item have been omitted from this table.

Food Sources of Vitamin D

Food, Standard Amount	International Units per serving
Cod liver oil, 1 tablespoon	1,360
Salmon, cooked, 3.5 ounces	360
Mackerel, cooked, 3.5 ounces	345
Tuna fish, canned in oil, 3 ounces	200
Sardines, canned in oil, drained, 1.75 ounces	250
Milk, nonfat, reduced fat, and whole, vitamin D-fortified, 1 cup	98
Margarine, fortified, 1 tablespoon	60
Ready-to-eat cereal, fortified with 10% of the DV for vitamin D, 0.75-1 cup (more heavily fortified cereals might provide more of the DV)	40
Egg, 1 whole (vitamin D is found in yolk)	20
Liver, beef, cooked, 3.5 ounces	15
Cheese, Swiss, 1 ounce	12