



OSTEOPOROSIS—WHAT YOU NEED TO KNOW TO KEEP YOUR BONES HEALTHY

by Teena Buchalter, MS, RD

You've heard the commercials on television touting medicine to prevent osteoporosis, but did you know there are things you can do right now to keep your bones healthy? The maximum amount of bone mass (peak bone mass) is laid down by the time you turn age 30. Peak bone mass is largely determined by genetic factors, nutrition, physical activity and health during your childhood and young adult growth periods. People with higher bone mass when they reach maturity have a better chance of reducing their risk of developing osteoporosis. It's thought that an adequate intake of calcium and vitamin D can reduce the rate of bone loss after skeletal maturity, particularly in the elderly and during the first decade following menopause. But no matter how old you are, you can make small changes in your daily life to keep your bones healthy and strong, such as eating calcium-rich foods, exercising daily and limiting your consumption of alcohol.

What is Osteoporosis?

Osteoporosis literally means, "porous bone." Over time, as calcium is drained from the bones, they become thin, brittle and break easily. By age 65, some women have lost half their skeletal mass. It is a silent disease often discovered only after a bone is broken. People with osteoporosis often break bones in the hip, spine and wrist. According to the National Institutes of Health, 1 out of every 2 women and 1 in 4 men over 50 will have an osteoporosis-related fracture in their lifetime. In the U.S. today, 10 million

individuals already have osteoporosis and 34 million more have low bone mass, placing them at increased risk for the disease. Research has also shown there is a genetic component to the disease. If someone in your family has osteoporosis, you have a 60-80 percent chance of getting the condition too. If your mother broke her hip, your chances double for having a hip fracture – a strong indicator of bone weakness. The good news is that osteoporosis can be prevented, diagnosed and treated before any fracture occurs. Even after a fracture occurs, there are effective treatments to decrease the risk of further fractures.

Who is at risk for Osteoporosis?

Anyone can develop osteoporosis, including men, but it is more prevalent in women over age 50.

Other risk factors include:

Body Size – small, thin women are at greater risk.

Ethnicity – White and Asian women are at the highest risk. Black and Hispanic women have a lower risk.

Family History – It's in the genes - Osteoporosis tends to run in families.

Hormones – Low estrogen levels seen in menopausal women and low testosterone levels in men tend to favor the development of osteoporosis.

Anorexia Nervosa – this eating disorder can lead to osteoporosis.

Diet – a diet low in calcium and Vitamin D make you more prone to bone loss.

Medications – medications used to treat hypothyroidism and Rheumatoid Arthritis increase the risk of osteoporosis.

Activity and Exercise – lack of exercise or long-term bed rest can weaken bones.

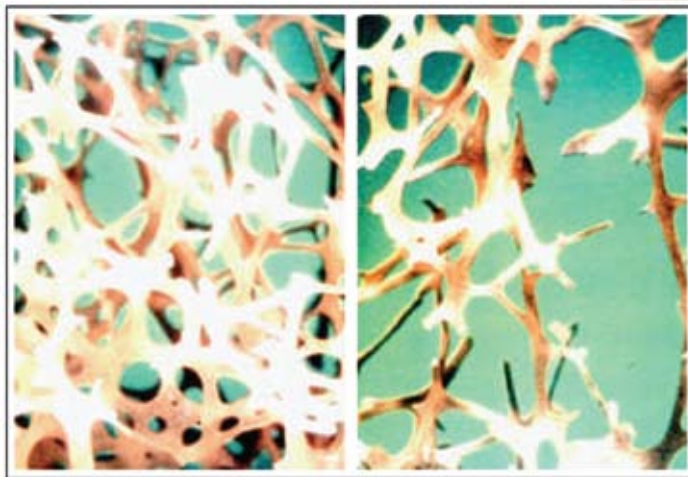
Smoking – Cigarettes are bad for bones, as well as the heart and lungs.

Drinking Alcohol – Too much alcohol can cause bone loss and broken bones.

Chronic Medical Problems – such as rheumatoid arthritis, hyperthyroidism, (excessive production of thyroid hormones) hyperparathyroidism, (production of excessive amounts of parathyroid hormone), diabetes, or liver disease.

How is Osteoporosis Diagnosed?

A test called a bone mineral density test (called a DXA) is the best way to check your bone health. This test can diagnose osteoporosis, check bone strength, and if you are being treated for osteoporosis, see if the treatments are making the bones stronger. (see figure 1) All women over the age of 65 should get the test. Postmenopausal women with medical conditions that cause bone loss (thyroid disease, parathyroid disease), steroids, anticonvulsants (dilatant) as well as menopausal women with any of the following risk factors should also get the test. The test should be repeated every 2 years.



Normal

Osteoporotic

- 1 previous fracture
- 2 thin
- 3 history of hip fracture in a parent
- 4 smoker
- 5 family history of osteoporosis

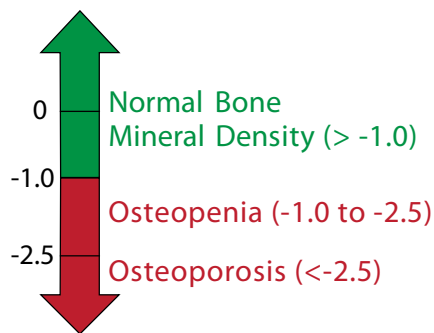


Figure 1

What role does calcium play in Osteoporosis?

Calcium is the most abundant mineral in the human body and has several important functions. More than 99% of the total body calcium is stored in the bones and teeth where it functions to support the structure. The remaining 1% is found throughout the body in blood, muscles and fluid between cells. A constant level of calcium is maintained in body fluid and tissues so that vital body processes function efficiently. The skeleton is the body's calcium reserve. Bone is a living tissue and is continuously remodeling, breaking down and re-depositing calcium into new bone formation everyday. The balance between the breaking down of bone and the re-depositing changes as people age. During childhood there is a higher amount of bone formation and less breakdown. In early and middle adulthood, these processes are relatively equal. In aging adults, particularly among postmenopausal women, bone breakdown exceeds its formation, resulting in bone loss, which increases the risk for osteoporosis.

How can you prevent bone loss which leads to Osteoporosis?

Diet

Calcium is lost everyday through normal bodily processes and must be replaced through the diet. If the calcium lost is not replaced through diet, the body will draw on the skeletal reserves of calcium to meet the need. Dairy products such as low fat milk, cheese, and yogurt are excellent sources and are the major contributors of calcium in the diet. The calcium in milk also helps make teeth, gums and

Right: Figure 2

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SELECTED CALCIUM-RICH FOODS

Food Item	Serving Size	Calcium (mg)	Fat (g)	Calories
Milk				
Whole	8 oz	290	8.9	156
1% milk	8 oz	300	2.6	102
2% milk	8 oz	297	4.7	121
Skim milk	8 oz	302	0.4	86
Yogurt				
Plain fat-free (with added milk solids)	8 oz	487	0.4	136
Plain low-fat (with added milk solids)	8 oz	447	3.7	155
Fruit low-fat	8 oz	338	2.8	243
Frozen, vanilla, soft serve	1/2 cup	103	4.0	114
Cheese				
American cheese	1 oz	174	8.9	106
Cheddar cheese	1 oz	204	9.4	114
Cottage cheese, 1% low-fat	1 cup	138	2.3	164
Mozzarella cheese, part skim	1 oz	183	4.5	72
Muenster cheese	1 oz	203	8.5	104
Parmesan cheese, grated	1 tbsp	69	1.5	23
Ricotta cheese, part skim	1/2 cup	337	9.8	171
Ricotta cheese, whole milk	1/2 cup	257	16.1	216
Ice Cream, Vanilla				
Low-fat	1/2 cup	91.7	2.8	91.7
High-fat	1/2 cup	86.6	12	178
Fish and Shellfish				
Sardines, canned in oil, drained, including bones	3.75 oz	351	10.5	191
Salmon, pink, canned, including bones	3 oz	181	5.1	118
Shrimp, canned, drained	3 oz	50	1.7	102
Vegetable				
Bok Choy, raw (Chinese cabbage)	1 cup	74	0	9
Broccoli, cooked, drained from raw	1 cup	71.6	0.6	23.6
Broccoli, cooked, drained, from frozen	1 cup	94	0.2	50
Soybeans, mature, boiled	1 cup	261	12	254
Collards, cooked, drained, from raw	1 cup	226	0.6	49
Turnip greens, cooked, drained, from raw (leaves and steams)	1 cup	197	0.3	29
Tofu	1/2 cup	204*	5.6	97
Orange (navel)	1 whole	56	0.1	65
Orange Juice, fortified with calcium	8 oz	300	0.1	100
Dried figs	10	270	2.2	477
Almonds (dry roasted)	1 oz	75	15	169
Sesame seeds, kernels, toasted	1 oz	37	13.6	161
Sunflower seeds, dried	1 oz	33	14.1	162

* The calcium content of tofu may vary depending on processing methods. Tofu processed with calcium salts can have as much as 300 mg (milligrams) for every 4 oz. Often, the label or the manufacturer can provide more specific information.

Note: You may also increase the calcium in foods by following these suggestions:

1. Add nonfat powdered milk to all soups, casseroles, and drinks.
2. Buy juices, cereals, and breads that are fortified with calcium.
3. Replace whole milk and cream with skim and low-fat milk in recipes.
4. Replace sour cream with yogurt in recipes.
5. Some bottled waters contain calcium, so check the labels for more information.

Source: USDA Nutrient Data Laboratory, 2000.

jawbones healthy and strong. Most milk is fortified with vitamin D, which helps the body absorb calcium. Not only does milk provide 300 mg of calcium in 8 fluid ounces (1 cup), it's low in fat (choose 1% or skim) and contains other valuable nutrients such as magnesium and phosphorus, also necessary to maintain bone health. What if you have lactose intolerance or have trouble digesting lactose, the natural sugar found in milk? Choose "lactose-free" milk and milk products. Other good sources of calcium include spinach, broccoli and collards. These are good alternatives for people who can't digest milk or milk products, but they contain far less calcium than dairy products. Recognizing that Americans are not meeting their recommended intake for calcium, food companies have added calcium to several products such as orange juice with added calcium and vitamin D, soy beverages, breakfast cereals and breads.

How to formulate a diet rich in calcium. It's easy to get your full day's requirement of calcium in the foods you eat. (2) 8 oz. cups of low fat yogurt and (1) 8 oz. glass of milk will provide 1274 mg of calcium. An 8 oz. glass of orange juice fortified with calcium provides 300 mg or as much as a glass of milk. If you start your day with a bowl of breakfast cereal, 4 oz. of milk and 8 oz. of orange juice fortified with calcium, you've tallied up 450 mg of calcium. Try adding 8 oz. of yogurt at lunch, and you've increased your consumption by 300 mg for a total of 750 mg. At dinner time, 2 slices of cheese and a ½ c. of low fat ice cream adds 440 mg making the day's total of calcium 1190 mg. Use the chart (figure 3) to determine how much calcium you need and then find foods rich in calcium. (figure 2 p. 19) Look at the %Daily Value for calcium on food labels (figure 4) so you know how much one serving contributes to the total amount you need per day. A food with **20% DV** or more contributes a lot of calcium to

your daily total, while one with **5% DV** or less contributes a little.

The Role of Vitamin D

Vitamin D - functions to promote calcium and phosphorus absorption which are necessary in healthy bones. Without vitamin D bones can

become thin and brittle resulting in a condition in adults called osteomalacia. About 99% of the milk supply in the U.S. is fortified with vitamin D. One cup of vitamin D fortified milk supplies 100 IU of vitamin D. Fortified breakfast cereals contain 40-50 IU per serving. Although milk is fortified with vitamin D, dairy products made from milk, such as cheese and ice cream, are generally not fortified with vitamin D. There are only a few commonly consumed foods that are good sources of vitamin D. Egg yolk, beef liver, salmon, mackerel, tuna fish canned in oil, sardines, and cod liver oil are significant dietary sources in addition to fortified milk. Most multivitamin tablets also contain vitamin D. Sun exposure is perhaps the most important source of vitamin D as the body is able to make its own vitamin D when the skin is exposed to sunlight - most vitamin D is manufactured in the scalp. The National Osteoporosis Foundation's 2007 recommendations for vitamin D are 800-1000 IU per day of vitamin D for people over age 50. Older people with poor appetites, malabsorption problems and limited exposure to sunlight need more. The vitamin D content of a food is found on the Nutrition Facts Panel on the food label and expressed as the % Daily Value. Remember, more than 20% Daily Value denotes a good source.

The role of Exercise

Engaging in weight-bearing exercise to maximize bone strength and bone density can help prevent osteoporosis later in life. These types of exercises cause your bones and muscles to work against gravity while they bear your weight. Resistance exercises such as weight training are also important because they help to improve muscle mass and bone strength. Examples of weight bearing exercise are walking, running and dancing. Examples of non-weight bearing exercise are swimming, bicycling and water aerobics.

RECOMMENDED CALCIUM INTAKES	
Age	Amount of Calcium
Infants	
Birth – 6 months	210 mg
6 months – 1 year	270 mg
Children/Young Adults	
1 – 3 years	500 mg
4 – 8 years	800 mg
9 – 18 years	1,300 mg
Adult Women & Men	
19 – 50 years	1,000 mg
50 +	1,200 mg
Pregnant or Lactating	
18 years or younger	1,300 mg
19 – 50 years	1,000 mg

Figure 3

Nutrition Facts			
100% JUICE Fortified with Calcium & Vitamin D			
Serving Size 8 fl oz (240mL)			
Servings per Container 12			
Amount Per Serving		Calories from Fat 0	
Calories 110			
		% Daily Value*	
Total Fat	0g		0%
Sodium	0mg		0%
Potassium	450mg		13%
Total Carbohydrates	26g		9%
		Sugars 22g	
Protein 2g			
Vitamin C	130%	Calcium	35%
Thiamin	10%	Riboflavin	4%
Niacin	4%	Vitamin B6	6%
Folate	15%	Magnesium	6%
Vitamin D	25%		
Good Source of both Vitamin D and Calcium			

Figure 4

What about Calcium Supplements?

Although food is the best source of calcium, most Americans do not get enough of it from their daily diet, and calcium supplements can be beneficial for some people. The two main forms of calcium found in supplements are carbonate and citrate. Calcium carbonate is the most common because it is inexpensive and convenient. Many people know calcium carbonate as the antacid "Tums." Calcium carbonate contains 40% calcium while calcium citrate (the calcium supplement found in orange juice) contains 21% calcium. Carefully read the label to determine how much elemental calcium (the amount that the body will absorb) the supplement contains. Calcium supplements have the potential to

interact with several prescription and over the counter medications and supplements. For example, calcium supplements may interfere with iron absorption and reduce the absorption of the antibiotic tetracycline, as well as interact with levothyroxine (thyroid hormone). It is important to discuss any medications and supplements you are currently taking or planning to take, with your doctor. Calcium supplements are absorbed best by the body when taken several times a day in amounts of 500 mg or less.

The bottom line...Consuming foods high in calcium, with adequate amounts of vitamin D, coupled with weight bearing exercises, can help promote strong, healthy bones in later life. The following websites were referenced

in this article and are available to anyone seeking more information on osteoporosis:

<http://ods.od.nih.gov/factsheets/Calcium.asp>

<http://orthoinfo.aaos.org>

www.niams.nih.gov/bone

<http://www.nof.org>

www.fda.gov/fdac/features/796_bone.html

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