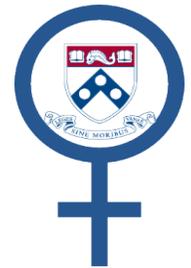




University of Pennsylvania
 Student Health Service
 Women's Health



Calcium for Bone Health

Building strong bones, especially before the age of 30, can be the best defense against developing osteoporosis, a disease in which bones become fragile and are more likely to break. Although there is no cure for osteoporosis, there are steps you can take to prevent it or to slow or stop its progress. Optimize your bone health by choosing the following:

- A balanced diet rich in calcium and vitamin D;
- Weight-bearing exercise;
- A healthy lifestyle with no smoking or excessive alcohol intake;
- Talking to your healthcare professional about bone health.

Calcium (Ca⁺⁺) is the most abundant mineral in the human body; about 99% is in the bones and teeth where it plays a structural role. The remaining 1% is present in body tissues and fluids where it is essential for cell metabolism, muscle contraction, nerve impulse transmission, and blood clotting. Despite the critical importance of calcium to our bodies, national surveys show that American women consume *less than half* of the daily recommended amount of calcium!

Dietary Reference Intakes (DRI's) of Ca⁺⁺ for Women

11-24 years old	25-50 years old	Pregnancy	Breast-feeding
1200-1500 mg/day	1000 mg/day	1200 mg/day	1200 mg/day
Get enough calcium during these years while the bones are growing	Even after you have reached your adult height, you still need calcium each day to keep bones strong and healthy	You must supply your body and your unborn baby with calcium	You may need up to 1500 mg/day of calcium if you are a breast-feeding teenager or young adult. Talk to your health care provider.

Bones suffer the consequences of a low-calcium diet. When your calcium intake is low, the calcium stored in your bones is "stolen" to supply the rest of your body. Use the following food suggestions to add more calcium into your daily meals and snacks. **Vitamin D** is necessary for the body to absorb the calcium you consume. Vitamin D may be made by your body through direct exposure of your skin to sunlight (15 minutes a day without sunscreen) and/or consumed by eating fortified dairy products, egg yolks, and oily saltwater fish.

A **Calcium Supplement** may help you meet your daily intake needs and should preferably be taken with meals. Calcium carbonate, calcium citrate and calcium gluconate are chewable and marketed by a number of companies. Take no more than 500 mg of calcium (supplement and/or food sources) at one time to maximize absorption. To avoid calcium toxicity, do not exceed 1500 mg of calcium per day.

Selection of Dietary Sources of Calcium – Single Serving Size (ARS, 2002)

Source	Ca ⁺⁺ mg	Calories	Source	Ca ⁺⁺ (mg)	Calories
Yogurt, plain, non-fat, 8oz	452	127	Sardines, in oil, drained, 3 oz	325	177
Romano cheese, 1.5 oz	452	165	Tofu, firm, 4 oz (1/2 cup)	253	88
Ricotta cheese, part skim, 4 oz	335	170	Spinach, cooked from frozen	146	30
Pasteurized process cheese food, 2oz	323	188	Broccoli (frozen/raw), 1 cup	100-136	40
Provolone cheese, 1.5 oz	321	150	Oatmeal, instant, fortified, 1 packet	99-110	97-157
Mozzarella, part-skim, 1.5 oz	311	129	Edamame (cooked green soybeans)	130	127
Cheddar cheese, 1.5 oz	307	171	White beans, canned	96	153
Fat-free (skim) milk, 1 cup	306	83	Kale, cooked from frozen	90	20
Feta cheese, 1.5 oz	210	113	Unsalted Dry roasted almonds, 1 oz	75	169
Fortified ready-to-eat cereals, 1oz	236-1043	88-106	Rainbow trout, 3 oz	73	144
Soy beverage, Ca ⁺⁺ fortified, 1 cup	368	98			

Women's Health Calcium Handout

Factors that influence the absorption of calcium include Vitamin D, small amounts of fat, exercise, magnesium and estrogen.

Factors that inhibit the absorption of calcium include soft drinks and caffeine. Legumes and cereal grains such as whole wheat, oats, rye, and barley contain phytates, which may also interfere, to a lesser extent, with calcium absorption.

Exercise is a critical part of maintaining healthy bones. Two types of exercises are important for building and maintaining bone mass and density: weight-bearing and resistance exercises. Weight-bearing exercises are those in which your bones and muscles work against gravity; your feet and legs are bearing your weight. Jogging, walking, stair climbing, dancing and soccer are examples of weight-bearing exercise with different degrees of impact. Swimming and bicycling are not weight-bearing. Resistance exercises are activities that use muscular strength to improve muscle mass and strengthen bone. These activities include weight lifting, such as using free weights and weight machines found at gyms and health clubs. An active lifestyle (i.e. 30 minutes of moderate intensity exercise most days) filled with varied physical activities strengthens muscles and improves bone strength.

Alcohol and Smoking

Expert opinions are mixed on the role of alcohol in both calcium absorption and osteoporosis. While high alcohol consumption (greater than 2-3 oz per day) is associated with the development of osteoporosis, a number of studies have linked moderate alcohol consumption to higher bone density compared to no alcohol consumption. This increase in bone density for those who consume 3-4 drinks per week may be because alcohol increases estrogen levels, and estrogen increases the body's ability to utilize calcium and other minerals. Smoking has anti-estrogen properties and promotes bone loss, which is another reason that it should be avoided.

In premenopausal women, prolonged **amenorrhea** (absence of menstrual periods) is also associated with an increased risk for osteoporosis. Amenorrhea may occur for a variety of reasons including inadequate body fat, medications (Depo-Provera), intense exercise, and/or illness. Women with amenorrhea should consult their health care provider for evaluation.

References/Recommended Websites:

Centers for Disease Control and Prevention (2006). Bone Health, retrieved from <http://www.cdc.gov/nccdphp/dnpa/bonehealth/>.

Centers for Disease Control and Prevention (2005). Falls and Hip Fractures Among Older Adults, retrieved from <http://www.cdc.gov/ncipc/factsheets/falls.htm>.

The Institute of Medicine of the National Academy of Sciences (1997) Washington, DC: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418.

National Institutes of Health (2005). Osteoporosis and Related Bone Diseases- National Resource Center retrieved from <http://www.osteoporosis.org>.

National Osteoporosis Foundation (2005), retrieved from: <http://www.nof.org/>.

North American Menopause Society (2005), retrieved from <http://www.menopause.org>.

Nutrient values from Agricultural Research Service (ARS) Nutrient Database for Standard Reference (2002), Release 17. retrieved from: <http://www.health.gov/dietaryguidelines/dga2005/document/html/appendixB.htm>.