

UNIVERSITY STUDENT HEALTH SERVICES • Fact Sheet

CALCIUM & BONE HEALTH**WHAT IS CALCIUM?**

Calcium is a mineral that is essential to maintaining strong bones. Calcium is also needed by the body's muscles and nerves to function properly.

Adequate calcium intake during childhood and adolescence is critical for bone health. These are the years when bone is forming rapidly. 85-90% of adult bone mass is acquired by the late teens. After bone mass peaks around age 30, it will start to decrease gradually.

Most of your body's calcium is stored in the bones. If you are not getting enough calcium in your diet, your body will start taking calcium from your bones, which can weaken the bones and lead to osteoporosis.

A calcium-rich diet, along with vitamin D and weight-bearing exercise, are the keys to building and maintaining strong bones throughout life.

WHAT IS OSTEOPOROSIS?

Osteoporosis is a bone disease that results from a mixture of genetics and too little calcium in the diet. It leads to weak, brittle bones that are more likely to break, even from minor trauma. Fractures can result in loss of function, pain, deformity, and life-threatening blood clots. Hip fractures in older adults can cause permanent disability and even death. Fractures in the spine can lead to a hunched-back appearance.

WHO IS AT RISK FOR OSTEOPOROSIS?

80% of adults with osteoporosis are women. While osteoporosis is most commonly seen in older women, it can affect young women with eating disorders and those who menstruate infrequently.

Other risk factors include:

- Caucasian or Asian race.
- Low body weight or small frame (BMI<19).
- Family history of osteoporosis.
- Lack of regular weight-bearing exercise.
- Smoking.
- High alcohol intake (>2 drinks daily).
- Low testosterone levels in men.
- Hyperthyroidism.
- Long-term use of oral steroid medications, some anticonvulsants, proton pump inhibitors, and some cancer therapies.

To prevent osteoporosis, it is important to manage controllable risk factors (eg. nutrition, exercise, smoking, alcohol use, etc.) and ensure adequate calcium and vitamin D intake.

HOW MUCH CALCIUM DO I NEED?

The recommended calcium intake for adults is 1000 mg a day. Older adults (women over age 50 and men over age 70) require a higher intake of 1200 mg a day. Calcium intake over 2000 mg a day should be avoided due to the risk of side effects.

The total daily calcium goal can be achieved with a combination of diet plus supplements. However, at least half of your calcium intake should come from dietary sources.

DIETARY SOURCES OF CALCIUM

Calcium is best absorbed through a calcium-rich diet. However, the average American consumes only 500mg of calcium in their daily diet.

- 3-4 servings of high-calcium foods are required to meet daily calcium needs. Dairy products are great sources of calcium. One serving is equal to 8 oz of milk or yogurt or 1 oz of hard cheese. A rough way to estimate calcium intake is to multiply the number of dairy servings per day by 300 mg.
- If you cannot eat dairy products, collard greens/kale/broccoli, tofu, beans, almonds, and fortified cereals and soy products are good alternative sources of calcium. If you are lactose intolerant, try Fairlife Milk, Lactaid Milk, or lactase enzyme tablets.
- Use the Nutrition Facts label to figure out how many milligrams of calcium a particular serving of food contains. Locate the %DV (percent daily value) for calcium on the food label, drop the % sign, and add a zero.

CALCIUM SUPPLEMENTS

If you are not able to get enough calcium from your diet, talk to your healthcare provider about adding a calcium supplement. Do not rely on a multivitamin for your calcium needs. Most multivitamins contain minimal amounts of calcium.

❖ WHICH CALCIUM SUPPLEMENTS ARE PREFERRED?

When choosing a calcium supplement, look for the amount of elemental calcium listed on the bottle. Elemental calcium is the actual amount of calcium in the supplement and is the number used to calculate your intake.

Common calcium supplements include the following:

- Calcium carbonate (Tums, Os-Cal, Caltrate, Viactiv) contains the most elemental calcium per tablet and is the least expensive. Calcium carbonate should be taken with food since it requires stomach acid for absorption. It is not well-absorbed in people taking an acid blocker (eg. Pepcid, Prilosec, Nexium, etc.).
- Calcium citrate (Citracal) and calcium gluconate are more easily absorbed and can be taken with or without food. They are preferred in people taking acid-blocking medications (eg. Pepcid, Prilosec, Nexium, etc.) or in those with malabsorption disorders (eg. inflammatory bowel disease, etc.).
- Avoid “natural source” calcium supplements, such as oyster shells or bone meal, since they may be contaminated with low levels of lead.
- If you do not like to take pills, consider supplements that come in chewable or gummy forms.

❖ HOW DO I TAKE MY CALCIUM SUPPLEMENT?

In addition to knowing whether you can take your calcium supplement with food (as noted above), it is important to remember the following:

- Calcium is best absorbed by the body when no more than 500 mg of elemental calcium is taken at one time. Therefore, if large doses of supplements are needed, they should be taken in divided doses (eg. morning and evening).
- Calcium interferes with the absorption of iron, thyroid hormones, and the fluoroquinolone or tetracycline classes of antibiotics (eg. ciprofloxacin, levofloxacin, doxycycline, minocycline). Therefore, these medications should be taken at different times of the day.

❖ IS IT POSSIBLE TO TAKE TOO MUCH CALCIUM?

Do not exceed a total calcium intake of 2000 mg a day (diet plus supplements). Getting too much calcium from food is rare. Excess intake is usually due to overuse of calcium supplements.

- Excessive use of calcium supplements may increase the risk of kidney stones and cardiovascular disease.
- Consult your medical provider prior to adding a calcium supplement if your family has a history of calcium-containing kidney stones.

VITAMIN D

- ❖ Your body needs vitamin D to absorb calcium. In addition to improving bone health, Vitamin D also helps your immune system function effectively and reduces inflammation.
- ❖ Vitamin D is made naturally by the skin after exposure to sunlight.
 - You can get enough Vitamin D just by being out in the sun for 10-15 minutes a day without sunscreen (except during winter months in northern parts of the US).
 - People with darker skin need more sun to make adequate amounts of vitamin D.
 - Vitamin D production by the skin also decreases with age.
- ❖ The best dietary source of vitamin D is fortified cow's milk, which contains approximately 100 IU (international units) per 8 oz cup. Vitamin D is also found in egg yolks, salmon, tuna, and fortified cereals/juices/dairy products.
- ❖ The recommended daily intake of vitamin D is 600 IU for people ages 1-70 and 800 IU for people over age 70.
 - The most commonly used supplements are vitamin D3 (cholecalciferol) and vitamin D2 (ergocalciferol). Vitamin D3 is preferred because it is more effective in raising levels. However, vitamin D2 is preferred by vegetarians because it is derived from plant sources.
 - Vitamin D can be taken in one dose with or without food.
 - Most multivitamins contain 400 IU of vitamin D per dose.

- ❖ Do not take vitamin D doses higher than recommended by your medical provider.
 - Based on current data, the safe upper limit for vitamin D dosing is 4000 IU per day. However, higher doses are sometimes required for the initial treatment of vitamin D deficiency.
 - Excessive use of Vitamin D supplements can lead to symptoms of acute intoxication, such as confusion, increased urination/thirst, loss of appetite, vomiting, and muscle weakness. Chronically high vitamin D levels can cause bone demineralization and pain.

HEALTHY HABITS FOR STRONG BONES

In addition to getting enough calcium and vitamin D, the following lifestyle habits are important for building and maintaining strong bones throughout life:

- ❖ Engage in regular weight-bearing exercises. This means exercises that involve gravity and muscle tension on the bone. Examples include running, walking, stair climbing, jump roping, and other impact-producing activities. Resistance training (eg. weight lifting) is also great for bone health. Swimming, biking, and exercising on machines (eg. elliptical trainers) are great cardiovascular workouts but have less impact on bone health.
- ❖ Avoid smoking. Research shows that smoking is associated with decreased bone density and an increased risk of fractures. Smoking may also decrease estrogen levels needed to maintain healthy bones.
- ❖ Limit alcohol consumption to 2 drinks or less per day. One drink is equivalent to 12 oz of beer, 5 oz of wine, or 1.5 oz of liquor. Excess alcohol intake can interfere with the absorption of calcium and other nutrients needed for strong bones. Alcohol can also adversely affect the hormones that regulate calcium levels and reduce the formation of new bone.
- ❖ Avoid consuming large amounts of sodium. High levels of salt intake can lead to a greater loss of calcium through the urine. Therefore, limit your sodium intake to no more than 2300 mg per day.
- ❖ See your medical provider if you are premenopausal and having infrequent menstrual periods. Your estrogen levels may be low, which can increase your risk of developing osteoporosis.

CALCIUM CONTENT OF FOODS						
400 MG CALCIUM	300 MG CALCIUM	200 MG CALCIUM	150 MG CALCIUM	100 MG CALCIUM	50 MG CALCIUM	25 MG CALCIUM
Yogurt (plain, nonfat, low-fat), 1 cup	Milk (nonfat, low-fat, lactose-reduced, whole, goat's milk), 1 cup	Cheddar, gruyere, mozzarella (part skim), muenster, swiss cheeses, 1 oz	Oatmeal (instant), 1 packet	Ice cream, ice milk, frozen yogurt, ½ cup	Cottage cheese, ½ cup	Whole wheat or white bread, 1 slice
Evaporated skim milk, ½ cup	Fortified soy and rice milks, 1 cup	Burrito (chicken/beef with cheese & beans), 1	Cheese pizza, 1 slice	Almonds, 1.5 oz (36 nuts)	Hummus, ½ cup	Tortilla (flour), 6"
Nonfat dry milk powder, ¼ cup	Fortified orange juice, 1 cup	Enchilada with cheese & beans, 1	Nachos with cheese and beans, 4	Spinach, ½ cup	Baked beans, ½ cup	Tortilla chips, 10
Mackerel (canned), 5 oz	Macaroni and Cheese, ¾ cup	Lasagna, 2.5" x 4" piece	Bok choy, 1 cup	Turnip greens (frozen, cooked), ½ cup	Kale, mustard greens (frozen, cooked), ½ cup	Egg (hard boiled), 1
Sardines in oil, 4 oz	Grated parmesan cheese, 1 oz	Tofu, 1 cup	Rhubarb (frozen, cooked), ½ cup	Crab, 3 oz	Orange, 1 medium	Refried beans, ½ cup
	Ricotta cheese (part-skim, nonfat), ½ cup	Soybeans (cooked), 1 cup		Clams, 3 oz	Tortilla (corn), 6"	Broccoli, ½ cup
	Collard greens (frozen, cooked), 1 cup	Figs (dried), 10			English muffin, 1	Raisins, ½ cup
	Salmon (baked, broiled), 6 oz				Oatmeal muffin, 1 medium	