

Live Well to

Learn Well

Web:

[health.cornell.edu](http://health.cornell.edu)

Phone (24/7):

607-255-5155

Fax:

607-255-0269

Appointments:

Monday–Saturday

*Check web for hours, services, providers, and appointment information*

110 Ho Plaza,

Ithaca, NY

14853-3101

# Calcium, Vitamin D, and Bone Health

## Why we need calcium

Calcium is the mineral that builds bones and keeps them strong. Ninety-nine percent of the calcium in the body is stored in bones and teeth. The remaining one percent, found in blood and soft tissues, is essential for life and health—without this, your muscles wouldn't contract properly, your blood wouldn't clot and your nerves wouldn't carry messages.

Sufficient calcium is needed for bones to grow to a maximum density by age 20–30 and maintain their density as you get older. A serious bone disease, osteoporosis, can result from insufficient calcium intake throughout the lifetime.

## How much calcium is needed

The recommended daily intake for adults is 1000 mg. (Teens and older adults need more.) Recommendations for pregnant and breastfeeding women correspond to the age of the mother. If you have osteoporosis or an eating disorder, or are a non-menstruating woman, your calcium intake may need to be higher.

## Good sources of calcium

Most of the calcium naturally found in foods comes from milk (dairy) products. However, some plant foods (e.g., orange juice, broccoli, spinach), fish (e.g., salmon, canned sardines), and fortified foods (e.g., cereal, soy milk) are good sources of calcium too. Note: calcium is not absorbed as well from these sources as it is from dairy products, but it is still beneficial.

- Get into a routine of including 2–3 servings of high calcium foods every day. Milk in your coffee adds up, too! If you maintain a good overall food pattern, you can get enough calcium from foods.
- Calcium content is listed on food labels. The percent Daily Value (DV) corresponds to 1000 mg. Thus, a cup of cereal that contains 10% DV provides 100 mg of calcium.

## If you don't eat dairy products

If you are lactose intolerant, dairy products such as Lactaid milk and yogurt have low lactose levels but excellent calcium levels. If you are allergic to milk protein or you are vegan (eating no animal products), try calcium-fortified soymilk, orange juice and cereals. Fortified rice milk and almond milk are good choices for calcium, but they are lower in protein than soymilk.

Read more about calcium sources at the NIH Office of Dietary Supplements: [ods.od.nih.gov](http://ods.od.nih.gov)



*Even if you don't consume dairy products, you can still get calcium from many other foods.*

## Calcium supplements

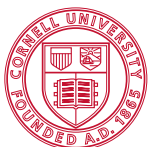
If you are not able to get adequate calcium from foods, you should take a supplement. Usually, about 500 mg calcium from supplements per day is enough. Calcium is better absorbed when taken in small doses (500 mg or less). Don't exceed the upper limits of calcium from dietary and supplemental sources, because an overload may cause medical problems.

## What kind should I take?

A wide range of supplements is available. It's helpful to find one that's inexpensive, easy to swallow, and well tolerated. Calcium supplements vary in the following ways:

- **chewable vs. non-chewable**—large supplements may be difficult to swallow.
- **type of calcium**—usually calcium carbonate or calcium citrate. Carbonate is inexpensive, tolerated by most people, and available in many chewable flavors, but some individuals experience constipation with carbonate. Citrate is less likely to cause constipation, but harder to find in chewable form.
- **Vitamin D**—some calcium supplements also include this important vitamin.
- **other mineral content**—not usually needed.
- **brand-name or generic**—generic equivalents are usually less expensive.
- **“natural” products**—may include bone meal, unrefined oyster shell, or dolomite. They should be avoided due to potential lead or mercury contaminants.

Examples: TUMS (calcium carbonate) are chewable and inexpensive. If you also need



vitamin D, you can take a calcium carbonate and vitamin D combination, such as Viactiv or Caltrate Plus. If you have constipation or gas, you may want to try calcium citrate (e.g., Citracal, Citracal petite) or calcium phosphate (e.g., Posture-D). Many other supplement brands are available in supermarkets and pharmacies. Read the label to determine the calcium and vitamin D content per serving.

## How do I know if I'm low in calcium?

Calcium levels in the blood are normally maintained within a close range, independent of dietary intake or amount of calcium stored in the bones. Thus, calcium levels in the bones can't be determined by a blood test. DEXA (Dual Energy X-ray Absorptiometry) scan is the most commonly used test to evaluate bone density.

## Vitamin D supplements

Vitamin D contributes to bone health by regulating calcium absorption. The human body can synthesize vitamin D when exposed to brief periods of sunlight (fifteen minutes a few times a week without sunscreen). Vitamin D is also found in a limited number of foods (see table). The Daily Value (DV) for vitamin D is 600 International Units (IU).

It is difficult to get enough Vitamin D from foods, so you will need sufficient sunshine or a supplement. A multivitamin that provides the DV is usually enough. Supplements providing more are recommended for people with vitamin D deficiency, as determined by blood testing.

## A young person can have "old bones"

Typically, bones increase in density until approximately age 30. After that, density plateaus and gradually decreases. Osteoporosis is a serious disease of low bone density, with bone structure weakened to the point where fractures easily occur. Osteoporosis or osteopenia (slightly low bone density) can result from insufficient levels of any of the following: calcium, vitamin D, estrogen/testosterone, weight-bearing activity, or body weight.

In young people, stress fractures can occur as a result of repetitive impact on weakened bones over time, including stress from normal activities such as jogging. However, osteoporosis is often silent and may not become apparent until a later age, usually around age 40-50 in women and a few decades older in men. Severe bone problems include rounded backs, lost inches in height from collapsed vertebrae, and serious fractures of the back, hip and other bones.

## Do I have low bone density?

*You are at risk if you—*

- do not get enough calcium daily
- have low blood levels of vitamin D
- have a family history of osteoporosis
- use excessive alcohol or smoke cigarettes
- are Caucasian or Asian (though, all ethnicities can develop osteoporosis)
- are low weight or have a history of an eating disorder
- are a woman with irregular menstruation or no menstruation for six months
- are using Depo Provera contraceptive injection and have other risk factors
- are currently or have been on long-term glucocorticoid (steroid) medications
- have certain endocrine problems such as thyroid or parathyroid disorder
- have the appearance of low bone density on a standard X-ray or have had fractures characteristic of low bone density

## Treatment for low bone density

Low bone density is not totally reversible, so prevention and early detection are extremely important. The only effective treatment for osteoporosis associated with low weight is to restore and maintain normal body weight and menstrual periods (in women). Without normal hormone levels, calcium, vitamin D and exercise won't be enough to help.

Estrogen medications (usually given as oral contraceptive pills) are often prescribed for women who are not menstruating. Although estrogen treatment benefits older women with osteoporosis, estrogen medication in younger underweight women does

not improve bone density. A normal menstrual cycle is the best predictor for improvement in osteoporosis, because it signals the presence of a normal hormonal balance.

Other medications, such as Fosamax, are used to treat osteoporosis in postmenopausal women, but have not been approved for use in adolescents and young adults.

## What can I do if I'm at risk?

- **Get the facts**—depending on your risk factors, your health care provider may recommend a nutrition evaluation, DEXA scan or other lab tests.
- **Get help**—medical, nutrition or counseling professionals can help you improve your weight, exercise, and nutrition.
- **Develop a plan**—include regular health care visits and adequate intake of nutrients calcium, vitamin D, and protein.
- **Stick with it**—bone health is life-long.

## Build stronger bones & preventing osteoporosis

- Maintain an adequate body weight and maximize your nutrition.
- Exercise moderately on a regular basis. Weight-bearing exercise such as walking, jogging, dancing, weight-lifting, skiing, skating or racquet sports are best, for a minimum of 30 minutes, three to six times a week. Caution: when body weight is too low, exercise can have a negative effect on bone density.

## Boost your calcium & vitamin D intake

Avoid high caffeine and salt intake, high alcohol use, and tobacco. All of these either reduce absorption of calcium from the intestines or increase calcium loss through the kidneys.

## More information

- **NIH Office of Dietary Supplements:** [ods.od.nih.gov](https://ods.od.nih.gov)
- **National Institutes of Health:** [osteoo.org](https://osteoo.org)
- **National Osteoporosis Foundation:** [nof.org](https://nof.org)
- **Osteoporosis Education:** [osteooed.org](https://osteooed.org)
- **USDA National Nutrient Database:** [ars.usda.gov](https://ars.usda.gov)