

## UNIVERSITY STUDENT HEALTH SERVICES • Fact Sheet

**CALCIUM, VITAMIN D, & 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 caused by too little calcium in the diet and a person's genetic predisposition. It leads to weak, brittle bones that can break even with 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 female. While osteoporosis is most commonly seen in older adults, it can affect young adults 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 males.
- 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 1000mg a day. Older adults (females over age 50 and males over age 70) require a higher intake of 1200mg a day.
- ❖ Calcium intake over 2000mg 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 8oz of milk or yogurt or 1oz of hard cheese. For a rough estimate of your daily calcium intake, multiply the number of dairy servings per day by 300mg.
- ❖ 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 much calcium is in a particular serving of food. To determine milligrams of calcium, 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 low 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 best absorbed in a meal that is low in iron content. 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. ulcerative colitis, Crohn's 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 500mg 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 2000mg 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 certain types 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 8oz cup. Vitamin D is also found in egg yolks, salmon, tuna, and fortified cereals/juices/dairy products.
- ❖ Many sources recommend a daily Vitamin D intake of 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. Vitamin D2 is derived from plant sources and is preferred by vegetarians.
  - Vitamin D can be taken in one dose with or without food.

- ❖ Do not take vitamin D doses higher than that 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:

- ❖ 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 12oz of beer, 5oz of wine, or 1.5oz 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 2300mg 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.

<b>CALCIUM CONTENT OF FOODS</b>						
<b>400 MG CALCIUM</b>	<b>300 MG CALCIUM</b>	<b>200 MG CALCIUM</b>	<b>150 MG CALCIUM</b>	<b>100 MG CALCIUM</b>	<b>50 MG CALCIUM</b>	<b>25 MG CALCIUM</b>
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	Rhubarb (frozen, cooked), ½ cup	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	Lasagna, 2.5" x 4" piece		Crab, 3 oz	Orange, 1 medium	Refried beans, ½ cup
	Ricotta cheese (part-skim, nonfat), ½ cup	Tofu, 1 cup		Clams, 3 oz	Tortilla (corn), 6"	Broccoli, ½ cup
	Collard greens (frozen, cooked), 1 cup	Soybeans (cooked), 1 cup			English muffin, 1	Raisins, ½ cup
	Salmon (baked, broiled), 6 oz	Figs (dried), 10			Oatmeal muffin, 1 medium	