



CALCIUM AND VITAMIN D

The Role of Calcium

Calcium is needed for muscle contraction, blood vessel contraction and expansion, the secretion of hormones and enzymes, and sending messages through the nervous system. A constant level of calcium is maintained in body fluid and tissues so that these vital body processes function efficiently

Bone undergoes continuous remodeling, with constant resorption (breakdown of bone) and deposition of calcium into newly deposited bone (bone formation). The balance between bone resorption and deposition 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 (a disorder characterized by porous, weak bones).

Recommended Intake

Age	Daily Dose
4-8 yrs	800 mg
9-18 yrs	1300 mg
19-50 yrs	1000 mg
51 + yrs	1200 mg

The Role of Vitamin D

Vitamin D enhances calcium absorption from the intestinal tract. In the absence of vitamin D, less than 10% of dietary calcium will be absorbed.

Vitamin D can be found in fortified foods such as milk. The US milk supply is fortified with 10 micrograms (ig) (equal to 400 International Units or IU) of vitamin D per quart. One cup of vitamin D fortified milk supplies one-half of the recommended daily intake for adults between the ages of 19 and 50, one-fourth of the recommended daily intake for adults between the ages of 51 and 70, and approximately 15% of the recommended daily intake for adults age 71 and over. Vitamin D can also be synthesized by the skin when it is exposed to sunlight. Season, geographic latitude, time of day, cloud cover, smog, and sunscreen affect UV ray exposure and vitamin D synthesis. Ten to fifteen minutes of sun exposure at least two times per week to the face, arms, hands, or back without sunscreen is usually sufficient to provide adequate vitamin D. It is very important for individuals with limited sun exposure to include good sources of vitamin D in their diet.

Recommended Vit. D Intake:

400-800 IUs

Selected Food Sources of Calcium

Food	Calcium (mg)	% DV*
Yogurt, plain, low fat, 8 oz.	415	42%
Yogurt, fruit, low fat, 8 oz.	245-384	25%-38%
Sardines, canned in oil, with bones, 3 oz.	324	32%
Cheddar cheese, 1 ½ oz shredded	306	31%
Milk, non-fat, 8 fl oz.	302	30%
Milk, reduced fat (2% milk fat), no solids, 8 fl oz.	297	30%
Milk, whole (3.25% milk fat), 8 fl oz	291	29%
Milk, buttermilk, 8 fl oz.	285	29%
Milk, lactose reduced, 8 fl oz.**	285-302	29-30%
Mozzarella, part skim 1 ½ oz.	275	28%
Tofu, firm, made w/calcium sulfate, ½ cup***	204	20%
Orange juice, calcium fortified, 6 fl oz.	200-260	20-26%
Salmon, pink, canned, solids with bone, 3 oz.	181	18%
Pudding, chocolate, instant, made w/ 2% milk, ½ cup	153	15%
Cottage cheese, 1% milk fat, 1 cup unpacked	138	14%
Tofu, soft, made w/calcium sulfate, ½ cup***	138	14%

Selected food sources of vitamin D

Food	International Units(IU) per serving	Percent DV*
Cod liver oil, 1 Tablespoon	1,360	340
Salmon, cooked, 3½ ounces	360	90
Mackerel, cooked, 3½ ounces	345	90
Tuna fish, canned in oil, 3 ounces	200	50
Sardines, canned in oil, drained, 1¾ ounces	250	70
Milk, nonfat, reduced fat, and whole, vitamin D fortified, 1 cup	98	25
Margarine, fortified, 1 Tablespoon	60	15

Calcium Supplements

There are two main types of calcium supplements available; calcium carbonate and calcium citrate. Calcium carbonate is less expensive but needs an acidic stomach environment to be absorbed. It should be taken with food and it can cause gas or constipation.

Calcium Citrate is more expensive but does not require an acidic environment to be absorbed. People who take medicines to lower stomach acidity

(Zantac, Prilosec, Protonix, Nexium, Aciphex, Tagamet, Pepcid or Axid) should use calcium citrate. It is less likely to cause gas or constipation, however, you need to take more of them to get the same amount of calcium you get from calcium carbonate.

Calcium is best absorbed if taken with meals. Our bodies can only absorb about 500 mg of calcium at a time, so it is wise to spread your intake out over the day instead of all at one time. Because calcium can interfere with iron absorption it is best not to take the two supplements at the same time. Calcium can also interfere with the absorption of other medications including:

- digoxin
- fluoroquinolones
- levothyroxine
- antibiotics in tetracycline family
- anticonvulsants such as phenytoin
- thiazide, type of diuretic
- glucocorticoids

Ask your provider or pharmacist if any medication you are taking could have an interaction with a calcium supplement.

The Role of exercise

Calcium and bone health

Your bones are living tissues and continue to change throughout life. During childhood and adolescence, bones increase in size and mass. Bones continue to add more mass until around age 30, when peak bone mass is reached. Peak bone mass is the point when the maximum amount of bone is achieved. Because bone loss, like bone growth, is a gradual process, the stronger your bones are at age 30, the more your bone loss will be delayed as you age. Therefore, it

is particularly important to consume adequate calcium and vitamin D throughout infancy, childhood, and adolescence. It is also important to engage in *weight-bearing exercise* to maximize bone strength and bone density (amount of bone tissue in a certain volume of bone) to help prevent osteoporosis later in life. Weight bearing exercise is the type of exercise that causes 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

- walking
- running
- dancing
- aerobics
- skating

Examples of NON-weight bearing exercise

- swimming
- bicycling
- water aerobics

RECOMMENDATION
