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Calcium

Michigan State University Extension Service

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# CALCIUM

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## Why do you need calcium?

Calcium performs several essential functions in our bodies. It is one of the minerals which makes up our body structure. Ninety-nine percent of the calcium in our bodies is found in bones and teeth. The other one percent is involved in helping body processes function normally. It helps nerves, aids in normal blood clotting and aids muscles during contraction and relaxation.

## Bones and Teeth.

The development and maintenance of our bones and teeth is an ongoing process through all ages and stages of our lives. Therefore, everyone needs calcium throughout life. Infants and children are adding inches to their bones every year. The process of increasing the mineral content of our bones, or adding to our bone mass continues through our late 30's. During pregnancy, women need extra calcium to support bone and tooth growth in the fetus.

Many adults think that their need for calcium decreases, but this is not true. The calcium in bones is constantly being renewed as old cells are replaced by new cells. Therefore, both men and women

need to eat foods which are good sources of calcium throughout their lives. This will help prevent problems with bones in later years.

## Body Processes.

One percent of the calcium in our body circulates in our blood to aid various body processes. When people stop eating calcium-rich foods, the body may obtain calcium from our bones to maintain a constant level of calcium in the blood. Very low calcium intake over many years may result in weakened bones.

Recent research has been focusing on the role calcium has in controlling high blood pressure and in helping prevent cancer. Both of these issues require more research before definite recommendations can be made about calcium requirements for these diseases. But indications are that adequate calcium intake from food sources is beneficial.

## How much calcium do you need?

The Recommended Dietary Allowance Chart indicates the amount of calcium recommended for people of various ages and life stages. Calcium needs vary

according to age. Current research suggests that women need more calcium than formerly thought to prevent osteoporosis. Osteoporosis is a condition in which our bones have lost considerable bone mass, which weakens the bones and leads to problems such as back pain, loss of height, Dowager's hump, and increased susceptibility of bones to fracture.

While the Recommended Dietary Allowances are set to provide adequate nutrients for the majority of healthy people, researchers concerned about osteoporosis are recommending higher intakes of calcium for adult women. Their recommendations suggest 1000 mg. calcium for adult women ages 19 to 50; 1500 mg. calcium for postmenopausal women who are not receiving estrogen; 1500 mg. calcium for pregnant and lactating women over 19; and 1700 mg. calcium for pregnant and lactating women under age 19.

For people who can eat dairy products, it is recommended that calcium be obtained from low-fat dairy products and other calcium-rich foods. Calcium from food sources is more readily absorbed by the body than that obtained from calcium supplements. While some grains and vegetables are high in calcium, they may also contain phytate and oxalates, which are chemical compounds that bind to the calcium, preventing it from being absorbed by the body.

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Vegetables containing oxalate include spinach, swiss chard and beet greens. Phytates are found in whole grain cereals and legumes. In general, when the diet contains sufficient calcium, the oxalate and phytate content of foods should not be a concern.

The Food Sources of Calcium chart which begins on this page lists food sources of calcium. The serving sizes are for adults. If a person only drinks milk to obtain calcium, the recommended dietary allowances listed in the chart at right are equivalent to the following servings in terms of lowfat milk (1 cup of ½%, 1%, or 2% milk contains about 300 mg. calcium): 800 mg. equals 2-2/3 cups milk, 1000 mg. equals 3-1/3 cups milk, 1200 mg. equals 4 cups milk, 1500 mg. equals 5 cups milk. As can be seen from the chart, there are many foods other than milk which can be eaten to obtain calcium. Most people choose breads, cereals and vegetables in addition to dairy products to obtain sufficient calcium.

## How does calcium intake affect bone health?

The amount of calcium-rich foods eaten throughout life, and especially during the years up to our 30's, may affect bone mass. Research shows that the mass of our bones achieved by our early 30's, and our daily intake of calcium throughout life affects the likelihood of having healthy bones during our later years.

Physical activity also affects our bone mass. Research suggests that it is necessary to engage in moderate weight-bearing exercise such as walking, jogging and jumping rope to help bones retain calcium.

When lifestyles and eating styles are inappropriate, we risk developing osteoporosis in later life.

## Recommended Dietary Allowance<sup>1</sup> of Calcium Daily

Age	Recommended Allowance (mg)
Infant, 0-6 mos.	360
Infant, 6-12 mos.	540
Children 1-10 years	800
Males, 11-18 years	1200
Females, 11-18 years	1200
Adult Males, 19-50+	800
Adult Females, 19-50+	800
Pregnant and Lactating Women	1200
Pregnant and Lactating Females, under 19	1600

<sup>1</sup>Based on the 1980 Recommended Dietary Allowances established by the National Academy of Science. These allowances are considered adequate to maintain good nutrition for healthy persons in the U.S. population.

## Food Sources of Calcium

Food	Serving Size	Mg.
Almonds	¼ cup	76
Beans, common, white, cooked	½ cup	45
*Beet greens, fresh, cooked, drained	½ cup	72
Black bean soup, prepared with water	1 cup	44
Bok choy, cooked	½ cup	125
Brazil nuts	¼ cup	65
Bread products made with milk	1 slice	21
Broccoli, fresh, cooked	½ cup	68
Broccoli, frozen, cooked	½ cup	38
Cheese, blue, natural	1 oz. (1¼ x 1 x 1")	150
Cheese, cheddar, natural	1 oz. (1-2/3 x 1 x 1")	205
Cheese, colby, natural	1 oz. (1-2/3 x 1 x 1")	195
Cheese, cottage, lowfat	½ cup	69
Cheese, gouda, natural	1 oz. (1-2/3 x 1 x 1")	199
Cheese, gruyere, natural	1 oz.	287
Cheese, mozzarella, natural, part-skim	1 oz. (3½ x 3½ x ½")	183
Cheese, muenster, natural	1 oz. (1-2/3 x 1 x 1")	204
Cheese, parmesan, natural, grated	1 Tbsp.	69
Cheese, pasteurized, process American	1 oz.	175
Cheese, ricotta, natural, w/skim milk	½ cup	335
Cheese, swiss, natural	1 oz.	273
Collard greens, frozen, chopped, cooked	½ cup	150
Cream of Wheat, enriched, cooked, instant or quick	¾ cup	150
Dates	10 average (3.4 oz.)	60
Egg	1 large	29
Farina, enriched, instant, cooked	½ cup	94
Filberts	¼ cup	71
Ice cream, vanilla	2/3 cup	117
Ice milk, vanilla	2/3 cup	117
Ice milk, vanilla, soft-serve	2/3 cup	184

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Osteoporosis affects both men and women. Women are more likely to develop osteoporosis during the 10 to 15 years after they have been through menopause. By the time they are 65, about 25% of women have had fractures related to osteoporosis. Men do not usually become susceptible to osteoporosis until they are in their 70's. Two factors affecting our likelihood of developing osteoporosis over which we have control are calcium intake and physical activity.

## How to increase your consumption of calcium-rich foods.

Calcium ingested through food is more readily absorbed by our bodies than calcium obtained through supplements. The best food source of calcium is dairy products, but many people do not use dairy products because they do not like them or do not tolerate them well.

Some individuals have a condition called lactose intolerance. They lack an enzyme necessary for digesting milk and some other dairy products. When a person with lactose intolerance ingests too much lactose-containing food, they may experience intestinal cramps, gas and diarrhea. Frequently, symptoms can be avoided by eating smaller servings of dairy products. The amount of lactose tolerated is individual, and each person must determine how much they can eat without having symptoms.

Even lactose intolerant people can usually eat yogurt, because the lactose has been broken down during processing. Many hard cheeses can also be tolerated.

The lactose in fluid milk can be reduced by using a product available from the pharmacy called Lactaid®. Drops of this product added to milk will change up to 97% of the lactose to simple sugar.

## Food Sources of Calcium

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Kale, fresh, cooked	½ cup	74
Kidney beans, canned, solids and liquid	½ cup	37
Milk, whole	1 cup	290
Milk, lowfat, 2%	1 cup	298
Milk, nonfat skim, ½% or 1%	1 cup	300
Milk, skim or lowfat, protein fortified	1 cup	352
Milk, nonfat dry milk powder	1/3 cup	279
Milk, evaporated, undiluted	1 cup	637
Milkshake, vanilla (fast food)	10 oz. serving	328
Molasses, cane, blackstrap	1 Tbsp.	137
Navy beans, cooked	½ cup	47
Orange, fresh, edible portion	1 average	54
Oyster meat, eastern, raw	1/3 cup	75
Pancake, original, baked (Aunt Jemima)	4" diam. x ½"	23
Pinto beans, cooked	½ cup	79
Pudding, chocolate w/skim milk (Jello)	½ cup	172
Pudding, vanilla w/skim milk (Jello)	½ cup	154
Salmon, canned, pink, w/bones	½ cup	216
Sardines, canned, with bones	1 medium	52
Sesame seeds	1 Tbsp.	12
Shrimp, canned, drained solids	½ cup	63
**Soup, creamed, prepared w/milk	1 cup	175
Soybeans, cooked	½ cup	66
*Spinach, canned, drained solids	½ cup	121
*Spinach, fresh, cooked, drained	½ cup	84
Sunflower seeds, dry, hulled	¼ cup	43
Sweet potato, baked, peeled	1 medium	46
*Swiss chard, fresh, cooked, drained	½ cup	64
Tofu, made with calcium sulfate	½ cup	154
Turnip greens, frozen, cooked, drained	½ cup	97
Turnip greens, fresh, cooked, drained	½ cup	133
Yogurt, lowfat, plain	1 cup	415
Yogurt, lowfat, fruit-flavored	1 cup	345
Yogurt, whole milk, plain	1 cup	274

\*Contains oxalic acid, which may reduce absorption of calcium.

\*\*Average of calcium values for tomato, shrimp, potato, pea, oyster stew, mushroom, clam chowder, chicken, celery and asparagus cream soups.

Lactaid® brand fluid milk, which is somewhat reduced in lactose, is also available in the dairy section of grocery stores.

Some leafy green vegetables not containing oxalates, such as broccoli, turnip greens, collard leaves and kale will add calcium to the diet. Some fish, such as canned salmon and sardines, have soft bones which can be eaten and are a source of calcium. Additionally, dried beans and tofu, which is processed with calcium sulfate, are other food sources of calcium.

## Dietary factors which affect calcium obtained from foods.

The lactose and vitamin D in dairy products will help your body absorb calcium. On the other hand, caffeine in coffee, tea and pop can affect calcium use when individuals consume large amounts (6 or more cups a day). Moderation is especially important in post-menopausal women.

Drugs which can also have a negative effect on calcium absorption are aluminum-



containing antacids, corticosteroids, and tetracycline. Post-menopausal women using these drugs should ask their physician about the effect on calcium.

In addition to caffeine and drugs, several studies have raised the issue about whether fiber interferes with calcium absorption. This question is still unanswered in regard to the amount of fiber normally eaten by individuals. Current recommendations suggest that moderate fiber consumption will not significantly interfere with calcium absorption when the diet contains adequate calcium from a variety of foods.

## Can you consume too much calcium?

It is unlikely that you will consume too much calcium from food sources. Over consumption of calcium is usually only seen when an individual is taking supplements containing calcium. When physicians recommend that individuals use calcium supplements, it is important to let the physician know if dairy products are eaten so that calcium supplements can be prescribed accordingly. Usually it is safe for most individuals to consume up to 1500 mg. of calcium daily without side effects. When this amount is exceeded for some period of time, susceptible individuals may be at risk of developing calcium stones in the kidney and urinary tract. Individuals diagnosed as having calcium stones should not take calcium supplements. Consult your physician before using calcium supplements.

## Should you use calcium supplements?

Food is the best source of calcium, and the source which the body can most readily use. However, for

some individuals, calcium supplements may be the only reasonable source of sufficient calcium. Pregnant or lactating women and women (especially post-menopausal) who do not consume dairy products may need to use calcium supplements. It is important to note that good sources of calcium should be consumed throughout a person's life. Once a person has begun the bone demineralization which occurs in osteoporosis, it is not possible to totally reverse the damage. However, it is never too late to improve calcium consumption and physical activity to retard some of the damage caused by poor calcium intake.

When calcium supplements are used, it is important to read labels carefully. Some supplements contain more calcium than others and it is important to note how much elemental calcium is contained in the supplement. Plan how many of the supplements to consume accordingly. Your physician can help you in this process.

Many physicians recommend that their patients use antacid tablets as a source of calcium carbonate because they are inexpensive. The antacids containing calcium carbonate are the same composition as the supplements containing calcium carbonate.

Several cautions should be heeded when using calcium supplements. Those calcium-containing antacids which also contain aluminum should not be used as a calcium supplement because the aluminum will inhibit the absorption of calcium. People with abnormal kidney function should only use calcium supplements if their physician agrees.

Some calcium supplements contain vitamin D. Vitamin D and calcium supplementation do not need to be combined. Daily intake of vitamin D should not exceed 600 to 800 I.U. It is obtained from sunshine (10 minutes per day), vitamin D-fortified milk, eggs, mackerel, swordfish and liver. Most multi-

vitamins also contain 400 I.U. of vitamin D.

Several recommendations are made about when to take calcium supplements. Calcium seems to be absorbed better when spaced out during the day, and taken between meals. However, this practice may cause stomach upset for some people. If this occurs, take supplements with a meal. Taking calcium supplements in one dose at night has been reported by some to enhance calcium absorption, but research supports spacing out supplements.

Do not use dolomite and bonemeal as sources of calcium because they may be contaminated with toxic metals, such as arsenic, mercury, lead and cadmium.

## Conclusion

Foods containing calcium are the best way to obtain enough of this mineral. Some individuals may need to ingest part or all of their calcium requirement in the form of supplements. This should only be done with the advice of a physician. In order to prevent osteoporosis, which can be caused by insufficient calcium intake, it is important to use good sources of calcium throughout life and to include exercise in your daily routine. Finding ways to include calcium in the diet is far better than becoming painfully crippled with osteoporosis in later years.

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