

Calcium - A Vital Foundation Mineral for a Healthy Body

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Abstract: *The average adult's weight is made up of about two per cent calcium. Most of this is found in the skeleton and teeth – The rest is stored in the tissues or blood. Calcium is vital for healthy teeth and bones. It also plays a crucial role in other systems of the body, such as the health and functioning of nerves and muscle tissue. Calcium is a key nutrient for your body to stay strong and healthy. It is an essential building block for lifelong bone health in both men and women, among many other important functions. While the amount you need depends on various factors, everyone can benefit from eating calcium-rich foods, limiting foods that deplete calcium, and getting enough magnesium and vitamins D and K-nutrients that help calcium do its job. Good sources of calcium include dairy foods and calcium-fortified products, such as soymilk and breakfast cereals. People at different life stages need different amounts of calcium – young children, teenagers and older women all have greater than average requirements.*

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1. Introduction

The foundation of all life is minerals. Minerals provide a rich substance for the life of plants, which then give humans, as well as animals and most life forms, life. All minerals have intrinsic value in the health of our bodies and our minds [13]. Minerals help initiate many actions in the body, from nerve propagation to heart rhythm to tissue fluid balance. We need minerals, such as calcium for healthy connective tissue, skin and joints, as well as bones and teeth. That means if you are deficient, those tissues could be predisposed to untimely breakdown, slow healing, or inflammation.[12] Many forms of calcium, either in the diet or in supplement form, are very difficult for the body to break down. If it is an unusable form, you may be subject to calcium excess challenges, such as bone spurs, arthritis, kidney or gall stones and other problems. Quality calcium (and other minerals) is critical in order for the body to utilize it properly [2]. Potassium and calcium are critical for healthy heart function. Minerals are also critical to the functioning of every organ that secretes a hormone - all members of the endocrine system.

2. Role of Calcium in Body Functioning

Calcium is the most abundant mineral in the body, one that plays many vital roles. Your body uses it to build healthy bones and teeth, keep them strong as you age, send messages through the nervous system, help your blood clot, and regulate the heart's rhythm, among other things [1]. If the body notices that not enough calcium is circulating in the blood, it will use hormones to reduce the amount put out by the kidneys in the urine. If not enough calcium is absorbed through the gastrointestinal tract, calcium will be taken from the bones [6].

If the dietary intake of calcium is constantly low, your body will eventually remove so much calcium from the

skeleton that your bones will become weak and brittle. Australians receive most of their calcium from dairy foods [4]. If milk is removed from the diet, it can lead to an inadequate intake of calcium. This is of particular concern for children and adolescents, who have high calcium needs [5]. Calcium deficiency may lead to disorders like osteoporosis (a disease of both men and women in which bones become fragile and brittle later in life). Vitamin D is another critical nutrient that helps the body absorb calcium and regulates calcium in the blood.

Our body gets the calcium it needs in one of two ways. The first and best way is through the foods you eat or the supplements you take. However, if you're not consuming enough calcium, your body will get it in a different way, pulling it from your bones where it's stored. That's why diet is key [10]. Getting enough calcium in your diet is particularly important when you're under the age of 30 and still building bone mass. Making smart choices now will help you avoid serious bone loss later in life. But no matter your age, you can take steps to protect your bones and put the brakes on osteoporosis.

Calcium helps you lose weight, studies show. "Really exciting research shows that if you get three servings of dairy daily, you're not only preventing osteoporosis, but you're enhancing weight loss," says WebMD Weight Loss Clinic dietician Kathleen Zelman, MPH, RD, LD.

There is more calcium in the body than any other mineral and it has several important functions.

These include:

- Helping build strong bones and teeth
- Regulating muscle contractions, including heartbeat
- Ensuring blood clots normally

Calcium plays a role in:

- Strengthening bones and teeth
- Regulating muscle functioning, such as contraction and relaxation
- Regulating heart functioning
- Blood clotting
- Transmission of nervous system messages
- Enzyme function.

3. Good Sources of Calcium

Milk and Milk Products – Dairy products are rich in calcium in a form that is easily digested and absorbed by the body. Sources include milk, yogurt cheese and buttermilk. One cup of milk, a 200g tub of yoghurt or 200ml of calcium fortified soymilk provides around 300mg calcium. Calcium fortified milks can provide larger amounts of calcium in a smaller volume of milk – ranging from 280mg to 400mg per 200ml milk.

Leafy Green Vegetables – broccoli, collards (cabbage family), Chinese cabbage and spinach. One cup of cooked spinach contains 100mg, although only five per cent of this may be absorbed. This is due to the high concentration of oxalate, a compound in spinach that reduces calcium absorption. By contrast, one cup of cooked broccoli contains about 45mg of calcium, but the absorption from broccoli is much higher at around 50–60 per cent [7].

Soy and Tofu – tofu (depending on type) or tempeh and calcium fortified soy drinks.

Fish – sardines and salmon (with bones). Half a cup of canned salmon contains 402mg of calcium.

Nuts and seeds – brazil nuts, almonds and sesame seed paste (tahini). Fifteen almonds contain about 40mg of calcium.

Vegetables and greens: Many vegetables, especially leafy green ones, are rich sources of calcium. Try turnip greens, mustard greens, collard greens, kale, romaine lettuce, celery, broccoli, fennel, cabbage, summer squash, green beans, Brussels sprouts, asparagus, and crimini mushrooms.

Beans: For another rich source of calcium, try black beans, pinto beans, kidney beans, white beans, black-eyed peas, or baked beans.

Herbs and spices: For a small but tasty calcium boost, flavour your food with basil, thyme, dill weed, cinnamon, peppermint leaves, garlic, oregano, rosemary, and parsley.

Other foods: More good sources of calcium include salmon, tofu, oranges, almonds, sesame seeds, blackstrap

molasses, and sea vegetables. And don't forget about calcium-fortified foods such as cereals and orange juice.

Calcium fortified foods -including breakfast cereals, fruit juices and bread: 1 cup of calcium-fortified breakfast cereal (40 g) contains up to 200 mg of calcium - ½ cup of calcium-fortified orange juice (100 ml) contains up to 80 mg of calcium - 2 slices of bread (30 g) provides 200 mg of calcium.

3.1 Factors That Affect Calcium Absorption

There are a number of foods and substances that, when consumed in excess, drain calcium from your bones and deplete your body's calcium stores.

- **Caffeine** – Drinking more than 2 cups of coffee a day can lead to calcium loss. The amount lost can have a significant impact on older people with already low calcium levels. You can buffer the effects to an extent by drinking coffee with milk. more than six drinks per day of caffeine-containing drinks – for example, coffee, cola and tea (although tea has less caffeine)
- **Animal protein** – Protein is a vital part of your diet, but getting too much protein from animal sources can lead to calcium loss. To avoid weakening your bone's calcium stores, limit yourself to 4 ounces of meat per day.
- **Excessive alcohol intake**-Alcohol inhibits calcium absorption and disrupts your body's calcium balance in a number of ways. Try to keep your alcohol consumption to no more than 7 drinks per week.
- **High-Salt diet:** Eating too much salt can contribute to calcium loss and bone breakdown. What you can do: taste your food before adding more salt and reduce processed foods, which are often high in sodium.
- **Soft drinks** – It's best to avoid drinking soft drinks regularly. In order to balance the phosphates in soft drinks, your body draws calcium from your bones, which is then excreted.
- Very low body weight
- Very high intakes of fibre (more than 50 g per day, from wheat bran)
- Low levels of physical activity
- Low levels of vitamin D – people who are housebound or cover their bodies completely when they are outside are at increased risk
- Smoking.

3.2 Too much or too little of Calcium can harm

Osteoporosis is a "silent" disease characterized by loss of bone mass. Due to weakened bones, fractures become commonplace, which leads to serious health risks such as the inability to walk. People with osteoporosis often don't recover after a fall and it is the second most common cause of death in women, mostly those aged 60 and older

[8]. Men are also at risk of developing osteoporosis, but typically 5 to 10 years later than women. Fortunately, osteoporosis is preventable for most people, and getting enough calcium in your diet is the first place to start.

Calcium overload can happen very easily when people take supplements on top of eating calcium-fortified foods. Today there are lots of calcium-fortified foods, including orange juice and nutrition bars. Taking high doses of calcium (over 1500mg a day) could lead to stomach pain and diarrhoea. Excess calcium gets deposited in the lining of blood vessels and makes arteries stiffen [11]. This forces your heart to work harder to pump blood throughout your body. Excess calcium can also cause other health problems, such as kidney stones.

According to the most recent Australian Nutrition Survey data published in 1995, about 90 per cent of women and 70 per cent of children do not achieve the recommended dietary intake (RDI) for calcium. It is much better to get calcium from foods than from calcium supplements. Be guided by your doctor about whether you need additional supplements [7]. Too much calcium (2,000 mg or more) from supplements may cause other health problems. It is thought that calcium may help lower high blood pressure and protect against colon and breast cancer, although more evidence is needed to confirm this. A lack of calcium could lead to a condition called rickets in children or osteoporosis.

4. Conclusion

Calcium is a key nutrient for your body to stay strong and healthy. It is an essential building block for lifelong bone health in both men and women, among many other important functions. While the amount you need depends on various factors, everyone can benefit from eating calcium-rich foods, limiting foods that deplete calcium, and getting enough magnesium and vitamins D and K-nutrients that help calcium do its job.

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