

Bone Health

Fact Sheet



While genetic factors play an important role in determining bone mass, it is critical not to underestimate the vital role that lifestyle factors can play in promoting bone health status. Here are some ways to support good bone health:

- Engage in regular weight-bearing exercise
- Aim to spend at least 20 minutes outside in the sun each day. If you have difficulty getting sun exposure, you can get vitamin D from fortified non-dairy milks or a vitamin D3 supplement
- Manage sodium intake by cooking most of your meals at home — packaged foods and restaurant foods often contain high amounts of sodium
- Avoiding excess dietary protein (especially animal protein)
- Eat calcium-rich plant foods
- Avoid tobacco
- Limit or avoid alcohol consumption

Calcium

Plant-based foods are excellent vehicles for delivering calcium to our bodies. Beans and greens are rich in calcium and, unlike dairy, come packaged with countless other vitamins, minerals and phytonutrients that benefit health and improve calcium absorption and utilization.

Calcium is a mineral found in the ground, which is why plants grown in the ground are excellent sources of calcium. Cows eat calcium-containing plants, which is why their milk contains calcium! Marketing and government recommendations have influenced people to believe that consuming dairy is the only way to get enough calcium. Despite this common belief that dairy products build strong bones, no protective benefit between milk consumption and hip fracture risk has been demonstrated. This may partially explain why cultures with the highest average intakes of dairy products also have the highest fracture risk! Milk consumption in teenage years is also not associated with better bone health in adulthood. Milk — and too much animal protein consumption — does not do a body good! Osteoporosis is NOT a calcium deficiency disease. It is better described as bone atrophy.

A strong skeleton depends more on preventing the loss of calcium from your body than on eating or drinking greater amounts of calcium. Calcium losing habits include tobacco use, alcohol and soda consumption, stress, high intakes of animal protein and sodium, and a lack of both weight bearing exercise and sun exposure (or vitamin D deficiency). While calcium is certainly an important nutrient, adequate intake from calcium-rich plant foods should be consumed in conjunction with a calcium-preserving lifestyle.

Plant-Based Calcium Sources

Food	Amount	Calcium (mg)
Collard greens, cooked	1 cup	357
Plant-based milks, calcium fortified	1 cup	300-500
Soy yogurt, plain	6 ounces	300
Turnip greens, cooked	1 cup	249
Tofu, processed with calcium sulfate	4 ounces	200-240
Tofu, processed with nigari	4 ounces	130-400
Tempeh	1 cup	184
Kale, cooked	1 cup	179
Soybeans, cooked	1 cup	175
Bok choy, cooked	1 cup	158
Mustard greens, cooked	1 cup	152
Okra, cooked	1 cup	135
Tahini	2 Tbsp	128
Navy beans, cooked	1 cup	126
Almond butter	2 Tsp	111
Almonds, whole	¼ cup	94
Broccoli, cooked	1 cup	62

Source: The Vegetarian Resource Group, <http://www.vrg.org/nutrition/calcium.php>

While calcium is crucial for maintaining strong bones, there are several other nutrients that play a significant role in bone health within a plant-based diet. These nutrients work together in complex ways to support bone structure and function.

Magnesium

Magnesium is a mineral that contributes to increased bone density and plays an important role in maintaining healthy bones. It aids in the absorption and metabolism of calcium and is involved in the regulation of bone mineralization. Plant-based sources rich in magnesium include brown rice, dark green vegetables (such as spinach and kale), legumes (like lentils and chickpeas), nuts (such as almonds and cashews), seeds (like pumpkin and sunflower seeds), and whole grain cereals.

Vitamin C

Vitamin C is essential for the production of collagen, a protein that forms the connective tissue in bones. Collagen provides the framework for bone mineralization and strength. Plant-based sources high in vitamin C include citrus fruits (such as oranges and grapefruits), peppers, tomatoes, strawberries, kiwi, and other fruits and vegetables. Including these foods in a plant-based diet ensures an adequate intake of vitamin C for collagen synthesis and bone health.

Vitamin K

Vitamin K is known to stimulate bone formation and plays a vital role in regulating calcium within bones. It helps activate proteins that are involved in the mineralization of bones and reduces the risk of fractures. Dark leafy greens (such as kale, spinach, and Swiss chard), beans (like black beans and kidney beans), and whole soy products (such as edamame and tofu) are excellent plant-based sources of vitamin K. Including these foods in the diet can help support bone health and mineralization.

Potassium

Potassium is a mineral that plays a role in maintaining bone health by decreasing the loss of calcium and promoting bone-building processes. It helps counteract the negative effects of a high-sodium diet, which can lead to increased calcium excretion. Plant-based sources rich in potassium include oranges, bananas, potatoes, sweet potatoes, tomatoes, leafy greens, beans (such as white beans and lima beans), and other fruits and vegetables. Including these potassium-rich foods in a plant-based diet can help support bone health and prevent excessive calcium loss.

By incorporating a variety of plant-based foods rich in these nutrients, individuals following a plant-based diet can ensure they are providing their bodies with the necessary components for optimal bone health. It is important to maintain a balanced and diverse diet that includes a wide range of fruits, vegetables, whole grains, legumes, nuts, and seeds to obtain these nutrients and support overall bone health.

References

Platrician Project. (2023). Plant-Based Nutrition Quick Start Guide. Retrieved from <https://www.platricianproject.org/resources/quick-start-guide>

Feskanich D, Willett WC, Colditz GA. Calcium, vitamin D, milk consumption, and hip fractures: a prospective study among postmenopausal women. *Am J Clin Nutr.* 2003;77:504–511.

D Feskanich, H A Bischoff-Ferrari, A L Frazier, W C Willet. Milk consumption during teenage years and risk of hip fractures in older adults. *JAMA Pediatr.* 2014 Jan;168(1):54-60.

Hsu E. Plant-based diets and bone health: sorting through the evidence. *Curr Opin Endocrinol Diabetes Obes.* 2020 Aug;27(4):248-252.

Nordin BEC, Need AG, Morris HA, Horowitz M. The nature and significance of the relationship between urinary sodium and urinary calcium in women. *J Nutr.* 1993;123:1615-1622.

Tucker KL, Hannan MT, Chen H, Cupples LA, Wilson PW, Kiel DP. Potassium, magnesium, and fruit and vegetable intakes are associated with greater bone mineral density in elderly men and women. *Am J Clin Nutr.* 1999;69:727-736.