

You have many ways to support strong bones with exercise, variety of food

By Nancy Ludwig, MS, RD, LD, Siletz Tribal Head Start Nutritionist

This segment focuses on some of the many ways we can support strong bones. It isn't as simple as calcium intake.

Physical activity and body weight: Physical activity may be the single-most important factor supporting bone growth. Muscle strength and bone strength go together.

Weight-bearing exercise is critical to supporting bone density. Heavier body weights also support bone density. This is one place where being small is a risk. Sedentary lifestyle and low body mass index (BMI) are risk factors.

Adequate **calcium** during the growing years is essential to achieving strong bones. The Dietary Reference Intake (DRI) Committee recommends 700 mg of calcium/day for children age 1-3, 1,000 mg of calcium/day for children age 4-8, 1,300 mg of calcium/day for everyone age 9-18, 1,000 mg up to age 50 and 1,200 mg for age 50 and older.

Needs are set at 1,300 mg for pregnancy and lactation. Some authorities suggest 1,500 mg for postmenopausal women who are not receiving estrogen. They also warn that intakes exceeding 2,500 mg/day could cause health problems.

Unfortunately, few girls and few adult women meet the recommended intakes from food.

Vitamin D is needed to maintain calcium metabolism and optimal bone health. In the Pacific Northwest, most people are low in Vitamin D. Experts are rethinking the recommendations.

It is also called the sunshine vitamin because it is synthesized on exposed skin. Sunscreen interferes with this conversion.

Vitamin D essentially does not occur in many natural foodstuffs. It is found in "fortified" foods.

Vitamin K does more than blood clotting. It appears to decrease bone turnover and protects against hip fractures. It is thought to stimulate bone formation. A diverse group of vitamin K-dependent proteins are essential in calcium metabolism, tissue mineralization and bone maintenance.

Bacteria in the digestive tract also manufacture vitamin K. Therefore, it is also important to have a healthy gut flora.

Dark leafy greens like kale and spinach are abundant sources of Vitamin K, which is thought to stimulate bone formation. Beans, soy products and some other fruits and vegetables also contain readily available vitamin K.

Magnesium, like calcium, is an important bone mineral. Approximately 60 percent of the body's magnesium is in the bones. People who eat magnesium-rich foods and supplements show less bone loss and greater bone density.

In addition, magnesium and calcium are interrelated. Increasing calcium without also increasing magnesium can decrease magnesium levels in bone and other tissues.

Beans and greens – legumes and green leafy vegetables also are excellent sources of magnesium.

Magnesium is an important bone mineral. Studies have shown higher magnesium intake to be associated with stronger bones.

Phosphorous is important for optimal bone health. Usually, a one-to-one ratio with calcium is recommended. High levels, more than twice that of calcium, should be avoided and can cause secondary hyperparathyroidism, which can increase bone loss.

Trace minerals: Fluoride is a mineral surrounded with controversy about whether it should be added to the water supply. Fluoride does, however, play a role in strengthening bones and teeth. Women who live in areas where water is fluoridated tend to have lower incidence of osteoporosis.

Zinc intake is directly related to bone density. As zinc intake increases (up to recommended levels) bone losses decrease in women of all ages.

Manganese deficiency increases calcium loss from bone, increasing risk for fractures. **Silicon** is involved in the formation of bones and collagen.

Vanadium is necessary for growth and bone development. **Boron** strengthens bones (in animals).

Dairy foods are rich in calcium. There is a debate, however, about whether long-term consumption of dairy products helps bones. In North America, dairy products are often consumed with high-salt, meat-based diets. Excess salt and excess animal protein are associated with increased urinary loss of calcium.

Beans and greens are important plant sources of calcium. Broccoli, Brussels sprouts, collards, kale, mustard greens, turnip greens and others are loaded with highly absorbable calcium and a host of other important nutrients.

While these foods have a smaller amount of calcium per serving compared to dairy products, they have more calcium per calorie and the calcium they contain is well-absorbed. According to PCRM (Physician's Committee for Responsible Medicine), one cup of cooked kale has the same amount of absorbable calcium (100 mg) as one cup of cow's milk with less than half of the calories.

Beans are a good source of calcium too. Choose from baked beans, chickpeas, tofu (calcium set) or other bean products.

Calcium-fortified foods include calcium-fortified orange and apple juices as well as soy and rice milks. The dairy replacements should be shaken to assure that the calcium isn't left behind at the bottom of the carton.

Vitamin D-fortified foods are important because vitamin D is not found in most foods unless they are fortified. Dairy milk is fortified, as are some of the other calcium-fortified beverages listed above.

Remember, vitamin D is actually a hormone produced by sunlight on the skin. It is difficult to get adequate sun exposure near the 45th parallel and supplementation may be advised.

Unfortified food sources of vitamin D vary in the amount provided. Naturally occurring sources include veal, beef, egg yolks, liver, fatty fish (herring, salmon, sardines) and their oils.

Dark leafy greens, almonds, sesame seeds, dark molasses and canned fish (containing soft edible bones) are among the less commonly known foods that are rich in calcium.

All dark leafy greens contain calcium. Spinach and chard also contain oxalic

acid, which interfere with the calcium bioavailability.

Fruits and vegetables have been cited in the *American Journal of Clinical Nutrition* showing that higher intake throughout the teen years improves bone density in adulthood.

An array of nutrients found in fruits, vegetables and other plant foods have been shown to promote bone health.

Citrus fruits, tomatoes and peppers as well as other fruits and vegetables provide vitamin C, which is essential for making collagen, the connective tissue that minerals cling to when bone is formed. Oranges, bananas, potatoes and other fruits, vegetables and beans are rich sources of potassium.

Potassium decreases the loss of calcium from the body and increases the rate of bone building.

References

Understanding Nutrition, 11th Edition, Ellie Whitney and Sharon Rady Rolfes

Vitamin D the Sunshine Hormone, Sponsored by the Oregon Psychiatric Association, Oct. 27, 2007

Nutrition for Women, Elizabeth Somer, MA, RD

Nutrition Guide for Clinicians, First Edition, Physicians Committee for Responsible Medicine; pcrm.org/health/prevmed/building_bones.html

Calcium content of foods (mg per 100 grams/3.5 ounces)

Thomas M. Wnorowski, Ph.D., CNCC, Millville, N.J.

Dolmas/Green Wraps

- 1-2 bunches collard greens
- 1 cup brown rice, cooked
- 1 cup lentils, cooked
- ¼ cup feta cheese, crumbled (optional)
- ¼ cup sunflower seeds, roasted, salted
- ¼ cup red onion, diced
- ¼ cup yellow bell peppers, diced
- ¼ cup red bell peppers, diced
- 3 tablespoons raisins
- 2 tablespoons olive oil
- 2 tablespoons vinegar (balsamic, cider or combination)
- ¼ teaspoon salt
- ¼ teaspoon dill

Greens: Wash individual leaves. Place whole into 2-4 inches of water to steam collard greens until soft for rolling. Drain water (save for soup). Remove the firm part of the stalk for ease of rolling.

Filling: Combine ingredients, season to taste, use up to ¼ cup per roll for cold appetizers or ½ cup per roll for larger dinner portions

Wrap: Roll greens tightly (think of swaddling a baby). They can be eaten cold or warm, and freeze well for later.

Be creative; choose from the following groups – grains, proteins, and veggies (equal parts). Include herbs and seasonings. See ideas below:

Grains – brown rice (many types), barley, millet, quinoa, etc

Proteins – lentils (brown or French), ground beef/chicken/turkey/wild game, feta/cheddar/cottage cheese, pine nuts, sunflower seeds or other nuts

Veggies – bell peppers, onions, garlic, celery, fennel root, eggplant, squash, tomatoes, etc.

Herbs – fresh parsley (excellent in liberal amounts), cilantro, dill, basil, fennel leaves, oregano, thyme, sage, rosemary, etc.

Seasonings – balance savory with tart (and notice sweet). For savory or salty, consider soy sauce or salt. For tartness, try apple cider vinegar, balsamic vinegar or lemon. For contrasting sweetness, try raisins or sweetened cranberries. For richness, add equal parts of oil to vinegar. It is OK to use a prepared salad dressing to make it easier. Don't forget the hot pepper sauce if you like it!

Human breast milk	33
Almonds	234
Amaranth	267
Apricots, dried	67
Artichokes	51
Beans, pint, black	135
Beet greens, cooked	99
Black-eyed peas	55
Bran	70
Broccoli, raw	48
Brussels sprouts	36
Buckwheat	114
Cabbage, raw	49
Carrot, raw	37
Cashews	38
Cauliflower, ckd	42
Chard, swiss	88
Chickpeas	150
Collards, raw	250
Cress, raw	81
Dandelion greens	187
Endive	81
Escarole	81
Figs, dried	126
Filberts	209
Kale, raw leaves	249
Kale, cooked	187
Leeks	52
Lettuce, it. Grn	35
Lettuce, dark grn	68
Molasses, dark	684
Mustard greens, raw	183
Mustard greens, ckd	138
Okra	92
Olives	61
Orange, fla.	43
Parsley	203
Peanuts, roasted	74
Peas, boiled	56
Pistachios	131
Potato chips	40
Raisins	62
Rhubarb, ckd	78
Sauerkraut	36
Sesame seeds	1,160
Soybeans	60
Spinach, raw	93
Squash, butternut	40
Sugar, brown	85
Sunflower seeds	120
Sweet potatoes	40
Tofu	128
Turnips, ckd	35
Turnip greens, raw	246
Turnip greens, boiled	184
Water cress	151