The Most Essential Foods For Bone Strength

14 MIN READ

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Your evidence-backed guide to preserving bone density and joint strength through smart nutrition and lifestyle choices.

All the talk about protecting bone in our 50s and 60s can feel alarming, like a race against time stacked in the clock's favor.

It turns out, there's good reason for concern: **Low bone mass**, a precursor to **osteoporosis**, impacts up to 43% of adults over 50.

But is it inevitable to experience bone loss as we age?

The answer is both real and motivating. First, the real part: Yes, we lose bone as we get older, says Donald Miller, Pharm.D., a professor emeritus at North Dakota State University and a former member of the FDA Arthritis Advisory Committee.

Age-related changes in hormone levels and muscle mass affect the biological processes that create bone and keep it resilient. The result? We become less efficient at building bone and replenishing it over time.

But here's the motivating part: Bone strength *can* be maintained over age 50, and, in some cases, modestly increased.

Weight-bearing exercise is essential to keep bones and joints strong. (Think: weight training, racket sports, walking, running, dancing.) Bones weaken when they aren't exposed to muscle-contraction forces that **stimulate** bone formation.

The other best tool we have for osteo-defense? What we eat.

What Happens to Bone as We Age

Our bones are **metabolically active** throughout life, constantly adapting to meet changing physical demands. From youth up through our late twenties, they're in building-mode. During these years, everything, from our diet to how we move to our hormones, contributes to building strong bones.

Somewhere between age 25 and 30, we reach "peak bone mass" — the greatest bone density we'll ever have.

Over the next decades, bones maintain strength and density through *remodeling*: microdamage is repaired; old brittle bone is resorbed, or broken down and absorbed by the body; and new bone is deposited. According to the American Academy of Orthopedic Surgeons, our skeleton is completely remodeled about every **10 years**.

Around age 50, however, bone resorption begins to outpace new bone formation, decreasing bone mineral density (BMD) and weakening **microarchitecture**, the structure and organization of bone tissue. In women, this shift accelerates during menopause, when declining estrogen **disrupts** remodeling.

Additionally, as we age we are **less efficient** at absorbing dietary calcium, which can cause the body to pull from calcium stores in bone for functions like muscle contraction and blood clotting.

Men, who typically have more bone to begin with and experience gradual hormonal changes, tend to lose bone more **slowly**. (Osteoporosis rates among men over 50 are **4.4%** compared to 19.6% among women.) Still, lower testosterone, reduced muscle mass, and conditions like diabetes and rheumatoid arthritis all affect bone health. Research also suggests that many men are **less aware** of these risks. "By age 80

many men have osteoporosis, too," Miller says.

"The goal is to keep bones from getting weaker, and to slow that natural process," he adds.

How to Make Bones and Joints Strong

First, **exercising regularly** will help keep your bones strong. Bones require key dietary nutrients to support both building and remodeling. These include vitamins C, D, K; minerals like calcium, magnesium, potassium, and phosphorus; and protein.

While these nutrients play different roles when it comes to bone health, they often work synergistically. For example, calcium is the **building block of bone**, but the body can't absorb and use it effectively without Vitamin D. And magnesium is essential for D to be activated, absorbed, and effectively used by the body.

Also, systemic **inflammation** can increase bone resorption and suppress bone formation. Antioxidants and anti-inflammatory nutrients, like Vitamin C, polyphenols, and omega-3 fatty acids, help counteract this effect.

In other words, the best way to ensure you're getting enough of the nutrients your bones need, as well as your muscles, and the rest of your body, is to eat a balanced, whole-foods diet, says **Angel Planells, MS, RDN**, a Seattle-based expert in men's nutrition and healthy aging and a spokesperson for the Academy of Nutrition and Dietetics.

"So even if you're not 'building' new bone in the way children, teenagers and younger adults do, you are still protecting and preserving what you do have in terms of muscle mass and bone health," he says.

7 Surprising Bone-Boosting Foods

While dairy products reign supreme when it comes to getting the amount of calcium, Vitamin D, and protein our bones need, these **foods** are also heavy-hitters when it comes to bone health. They each pack a surprising amount of nutrients per serving, and in some cases, hit multiple nutrient categories at once.

1. **Dried plums (prunes):** People may think of these dried fruits for digestive regularity, but daily consumption of prunes appears to support bone density. In a yearlong **study**, postmenopausal women who ate 5-6 prunes a day retained greater BMD in their hips, compared to women in a control group. Prunes are good sources of Vitamin K, calcium and potassium, and also polyphenols, which can reduce inflammation.
2. **Canned fatty fish (with bones), like salmon, mackerel, and sardines.** Canned fish is a rich source of calcium and Vitamin D, which work together to support bone, as well as magnesium and phosphorus. It also provides ample protein and omega-3 fatty acids, anti-inflammatory agents that help **reduce risk** of bone loss. Just be mindful of the sodium content.
3. **Dark leafy greens (most)**. Greens are rich in antioxidants, which help **protect bone** from oxidative stress, and are also excellent sources of calcium, magnesium, potassium, and Vitamin K. **Spinach** is the one exception, because it contains oxalate, a compound that prevents calcium absorption.
4. **Canned beans.** Beans offer a double-punch of protein and bone-building minerals. Always rinse canned beans before eating, to help remove phytate, another compound that interferes with mineral absorption. You can also pair them with foods that enhance absorption, like bell peppers, garlic, and onion.
5. **Pumpkin and Hemp Seeds:** Don’t let their size fool you: These seeds are bone-nutrient powerhouses. Just one ounce of pumpkin seeds contain more than 8.5 g protein, 168 mg

magnesium, 229 mg of potassium, 349 mg phosphorus, and 13 mg of calcium. And about the same amount of hemp seeds contains 9 g protein, more than 200 mg magnesium, 20 mg calcium, and almost 490 mg phosphorus.

6. **Soy (tofu, edamame, soymilk, natto).** Soy is a great source of plant-based protein as well as magnesium, potassium, and phosphate. Some **research** found soy isoflavones to benefit BMD among post-menopausal women, and natto, a fermented soy product, is **associated** with reduced risk of fracture among the same group.
7. **Fermented foods.** Foods like kimchi and sauerkraut are rich in both Vitamin K and gut-friendly probiotics, which can **influence** bone health. **Fermented dairy** — particularly low-fat varieties of kefir, yogurt, and some cheese — also provide ample calcium, Vitamin D, phosphorus, and protein. There is also increasing interest in Vitamin K2, found in animal products and fermented foods, for **facilitating** calcium utilization by the body. A **2022 meta-analysis** concluded that K2 may support and even improve BMD among postmenopausal women, although more research is needed.

These Are The Most Essential Nutrients for Bone Health

Here's closer look at the nutrients we need for strong bones and joints and foods that contain them:

1) Calcium

This essential mineral is the building block of bone tissue. Women over age 50 need **1,200mg** daily to counteract dwindling estrogen levels that impact bone remodeling. Men over age 50 need **1,000mg**. Spreading your calcium intake **throughout** the day helps the body absorb it. Calcium is added to many fortified products, and naturally abundant in dairy, soy, and dark leafy greens, among other foods. Here are

some good **sources**:

How to Get Your Calcium:

- Low-fat yogurt, 8 oz – 333 mg
- Mozzarella cheese 1.5 oz – 333 mg
- Nonfat dairy milk 1 C – 299 mg
- Plant-based milk (almond, soy), 8 oz – 299 mg
- Cottage cheese, 1 C – 138 mg
- Tofu, firm, 4 oz – 253 mg
- Soybeans, ½ C – 131 mg
- White beans, ½ C – 80 mg
- Spinach, cooked 1 C – 246 mg
- Kale, cooked 1 C – 94 mg
- Canned salmon (with bones), 3 oz, 181 mg
- Fresh figs (5), 110 mg

2) Potassium

This mineral can **help** neutralize acid in the body that contributes to bone loss, and may **increase** BMD and bone **microarchitecture**. Men **need** 3,400 mg per day, women 2,600 mg. Great food **sources** of potassium include:

- Beet greens, cooked, 1 C – 1,309 mg
- Swiss chard, cooked, 1 C – 961 mg

- Potato, baked with skin – 926 mg
- Yam, cooked 1 C – 911 mg
- Acorn squash, cooked, 1 C – 896 mg
- Spinach, cooked, 1 C – 839 mg
- Broccoli rabe, cooked, 1 C – 550 mg
- Mushrooms, cooked, ½ C – 264 mg
- Shell beans (white, Great Northern, pinto, kidney, black), cooked ½ C – 306-502 mg
- Soybeans, ½ C – 443 mg
- Lentils, cooked, ½ C – 366 mg
- Avocado, ½ C – 364 mg
- **Kiwi,** 1 medium, 312 mg
- Orange juice, ½ C – 248 mg
- Coconut water, 1 C – 396 mg
- Banana, 1 medium – 450 mg
- Yogurt, plain nonfat, 4 oz – 313 mg
- Greek yogurt, low fat, 4 oz – 160 mg
- Milk, 1% fat, ½ C – 183 mg
- Soy milk, ½ C – 146 mg
- Clams, 3 oz – 534 mg
- Trout, 3 oz – 383 mg
- Tofu, ½ C – 299 mg

- Salmon, 3 oz – 280-535 mg
- Beef, 3 oz – 288 mg

3) Magnesium

Magnesium **supports** numerous physiological functions, including protein synthesis, energy production, muscle and nerve function, and blood pressure regulation. It's also important for bone development. Lower levels of magnesium are **linked** to lower BMD, osteoporosis, and higher risk of fracture. Men over age 51 **need** 420 mg of magnesium per day, and women need 320 mg.

Most foods that provide dietary fiber — including green leafy vegetables, legumes, nuts, seeds, and whole grains —and lean meats, are good **sources** of magnesium.

- Pumpkin seeds, roasted, 1 oz – 156 mg
- Chia seeds, 1 oz – 111 mg
- Almonds, dry roasted, 1 oz – 80 mg
- Cashews, 1 oz – 74 mg
- Peanut butter, 2T – 53 mg
- Dark chocolate (70%+), 1 oz – 64 mg
- Soymilk, 8 oz – 61 mg
- Edamame, ½ C – 50 mg
- Oatmeal, cooked, ¾ C – 47 mg
- Potato baked with skin, medium – 43 mg
- Brown rice, cooked, ½ C – 42 mg

- Whole-wheat bread, 1 slice – 23 mg
- Yogurt low-fat, 8 oz – 42 mg
- Banana, 1 medium – 32 mg
- Avocado, ½ C – 22 mg
- Broccoli, cooked ½ C – 12 mg
- Mackerel, 3 oz – 82 mg
- Salmon, Atlantic 3 oz – 31 mg
- Chicken, 3 oz – 22 mg
- Beef, lean, 3 oz – 20 mg

4) Vitamin K

This vitamin is important for blood clotting and bone metabolism, among other functions. Some **research** has linked higher blood levels of Vitamin K with greater BMD. Men need **120 mcg, women 90 mcg**. It's easy to get enough K from your diet. For example, one cup of raw spinach has 145 mcg, or 121 % of the daily recommended value (**DV**), and a half cup of cooked broccoli contains 110 mcg, or 92 % DV. Other good **sources** of Vitamin K include:

- Collard greens, cooked, 1/2C – 386 mcg
- Swiss chard, ½ C – 286 mcg
- Kale, cooked, ½ C – 247 mcg
- Mustard greens, ½ C – 215 mcg
- Brussels sprouts, ½ C – 109 mcg
- Soybeans/edamame, 1 C – 31 mcg

- Soybean oil, 1 T – 25 mcg
- Canola oil, 1 T – 10 mcg
- Kiwi, 1 fruit – 30 mcg
- Prunes, 5 – 28 mcg
- Avocado, ½ fruit – 21 mcg
- Pomegranate juice, ¾ C – 19 mcg
- Blueberries, ½ C – 14 mcg

There is also increasing interest in Vitamin K2, which is mostly found in animal products and fermented foods, for **supporting** calcium utilization by the body.

5) Vitamin C

This antioxidant is **important** for immunity, wound healing, and protection against free-radical damage. It's also essential for collagen synthesis, supporting the structural integrity of bone, and also helps protect bone against oxidative stress. **Observational studies** found greater vitamin C intake associated with higher BMD, lower rates of bone fracture, and reduced risk of osteoporosis. But a **review** only found these benefits from dietary sources of Vitamin C, not supplements. Men **need** 90 mg, women 75 mg daily. The best food **sources** of C are fruits and vegetables, including:

- Guava, 1 medium – 125 mg
- Orange, 1 medium – 68 mg
- Pink grapefruit, ½ fruit – 45.5 mg
- Kiwi, 1 fruit – 26.2 mg

- Cantaloupe, 1 C cubed – 14.4 mg
- Strawberries, ½ C sliced – 13 mg
- Tomatoes, 1 medium – 12.3 mg
- Yellow pepper, ½ pepper – 171 mg
- Red bell pepper, ½ pepper – 71 mg
- Green chili pepper, ½ pepper – 54 mg
- Cauliflower, cooked, ½ C – 27 mg
- Broccoli, cooked, ½ C – 50 mg
- Red cabbage, raw, chopped, 1C – 50 mg
- Brussels sprouts, cooked ½ C – 48 mg
- Kale, raw, chopped, 2 C – 39 mg
- Potato, baked, 1 medium – 20 mg

6) Vitamin D

This nutrient is **essential** for allowing the body to absorb and use calcium. It's also important for **muscle function**, providing protection against falls, and for modulating inflammation in the body, which can **interrupt** bone remodeling. Adults up to age 70 **need** 15 mcg per day, and over age 70, that recommendation increases to 20 mcg. Many older adults are deficient in Vitamin D. The best source of D is sunlight, followed by fortified foods. Few **foods naturally contain** it, but here are some **options**:

- Salmon (sockeye), 3 oz – 14 mcg

- Dairy milk, 1 C – 3 mcg
- Plant-based milk (soy), 1C – 2.9 mcg
- Beef liver, 3 oz – 1.02 mcg
- Egg yolk, 1 egg – .9 mcg

7) Phosphorous

This mineral works with calcium to support bone structure. Most adults get more than the **recommended 700 mg** from protein-rich sources including meat, eggs, and dairy, and through seeds, nuts, grains and some vegetables. But phosphorus is also added to processed foods, which can cause dangerously high levels that have **detrimental effects** on bone and mineral metabolism, especially for people with kidney conditions. The best option? Eat whole foods, avoid processed foods, and don't worry *too* much about phosphorus.

- Greek yogurt, 7 oz – 274 mg
- Chicken meat, 100 g (a bit less than a cup) – 192 mg
- Soybeans, cooked, ½ C – 210 mg
- Lentils, cooked ½ C – 178 mg
- Almonds, 1 oz – 136 mg
- Egg, 1 cooked – 99 mg
- Whole-wheat bread, 1 slice – 76 mg
- Brown rice, cooked, ½ C – 75 mg
- White rice, cooked, ½ C – 31 mg
- Asparagus, cooked, 4 spears – 32 mg

8) Protein

Our bones need protein to build, and for remodeling throughout life. But how much protein we need for bone health has been debated. There was concern that too much protein in the diet could cause calcium to leech from bone. But current research finds those concerns to be more nuanced, says Planells. For example, collagen, the structural protein in bone, “needs sufficient dietary protein to maintain bone integrity,” he says. Protein also supports calcium absorption. Meanwhile, getting enough protein is necessary to **maintain muscle**, providing protection from falls and subsequent bone fracture. “Higher protein intakes are likely to be protective unless calcium intakes are inadequate, in which case higher protein intakes may be harmful,” he explains.

Adults should aim for **.8 -1.2 grams** of protein per kilogram of body weight per day, from sources including lean meat, poultry, seafood, eggs, dairy, beans, lentils, nuts and seeds.

- Lentils, cooked ½ C – 9g
- Soybeans, cooked ½ C – 15g
- Pumpkin seeds, 1 oz – 8.5g
- Almonds, 1 oz – 6g
- Cashews, 1 oz – 5g
- Tofu, firm, ½ block – 7g
- Greek yogurt, low fat, 7 oz – 19g
- Cottage cheese, 4 oz – 14g
- Milk, 2%, 1 C – 8.5g
- Mozzarella cheese, 1 oz – 7g

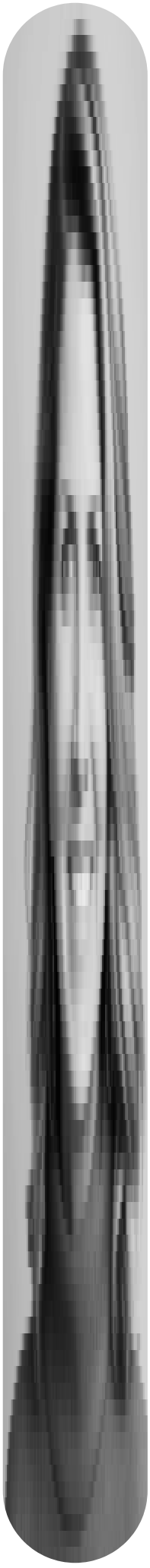
- Egg, 1 large – 6g
- Chicken, 3 oz – 27g
- Beef, lean, ground, 4 oz – 24g
- Salmon, Chinook, 3 oz – 21g

Angel Planells' 5 Tips for Bone Health

- Eat a whole-food diet rich in calcium, vitamin D, protein and other bone-health nutrients
- Stay active and particularly focus on strength and balance exercises
- Limit alcohol, sodium, and caffeine intake
- If your diet doesn't meet the recommended requirements for key vitamins, like D, take a supplement
- Talk with your medical provider about a DEXA scan, to help build a smart-bone plan from where you are now

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