

- Bones

How nutrition shapes the future of your skeleton

From calcium and vitamin D to gut-friendly probiotics, science shows that what you eat today determines your bone strength tomorrow. Discover the nutrients and diets that keep your skeleton strong and resilient

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Think of your bones as the ultimate style statement — they're your body's foundation, the silent stars behind every strut and sway. But, just like an expensive pair of heels needs care, your bones need the right nutrients to keep you standing tall. Forget the outdated notion that bones only matter to octogenarians; the truth is, whether you're 16 or 60, what you eat today dictates how well your skeleton will age. Want to slay now and later? It's time to get serious about your bone health.



Nutritional building blocks

Bones are living tissues, constantly breaking down and rebuilding. This dynamic process, known as bone remodelling, relies on a delicate balance of nutrients to ensure that new bone formation keeps pace with resorption. Calcium and vitamin D are the superstars of this process, but they're far from the only players. Magnesium, vitamin K, phosphorus, and protein all contribute to maintaining bone density and preventing fractures.

A landmark study published in *The Lancet Diabetes & Endocrinology* (2022) emphasised the role of a nutrient-dense diet in maintaining optimal bone health. The research revealed that adults who consistently consumed adequate levels of calcium and vitamin D had a significantly lower risk of developing osteoporosis and fractures later in life.

The star mineral

Calcium is the most abundant mineral in the body, and 99 per cent of it is stored in bones and teeth. According to a 2021 study in *Osteoporosis International*, adults need at least 1,000 to 1,200 milligrams of calcium daily to maintain bone density. However, the study found that many adults fall short of this target, particularly women and the elderly, who are most at risk for bone-related diseases.

Sunshine vitamin

Without sufficient vitamin D, calcium absorption in the intestines decreases, leading to weakened bones. A 2022 study in *The Journal of Clinical Endocrinology & Metabolism* found that vitamin D deficiency affects nearly 50 per cent of the global population, contributing to increased risks of osteoporosis and fractures.

“Sunlight is the best source of vitamin D, but dietary sources like fatty fish, egg yolks, and fortified foods are essential, especially for people living in regions with limited sun exposure,” said Dr. Priya Menon, a researcher specialising in bone metabolism.

The unsung hero

Often overshadowed by calcium and vitamin D, magnesium plays a critical role in bone health by regulating calcium levels and activating vitamin D. According to research published in *Bone Reports* (2021), magnesium deficiency is linked to reduced bone density and an increased risk of fractures.

“Magnesium-rich foods like nuts, seeds, whole grains, and dark chocolate are often overlooked, but they’re crucial for maintaining strong bones,” said Dr Michael Lang, a nutrition scientist at the University of Zurich.

Vitamin K

This fat-soluble vitamin helps activate osteocalcin, a protein that binds calcium to the bone matrix. A study in *Nutrients* (2022) showed that individuals with higher vitamin K intake had better bone density and reduced fracture risk.

“Leafy greens like kale, spinach, and broccoli are excellent sources of vitamin K. Pairing them with healthy fats improves absorption,” said Dr Fiona Carter, a bone health expert at the University of Sydney.

The structural backbone

Protein isn’t just for muscles; it’s essential for bone strength too. Collagen, a key protein in bone, provides a framework for mineralisation. Research in *The American Journal of Clinical Nutrition* (2021) found that higher protein intake, particularly from diverse sources, was associated with increased bone mineral density in both men and women.

“While excessive intake without calcium can be harmful, balanced consumption is essential for bone remodelling,” said Dr Yoko Tanaka, a nutritionist and researcher at Kyoto University.

The impact of malnutrition

Malnutrition isn’t just about undernutrition; it includes poor dietary quality. A lack of essential nutrients can lead to brittle bones, fractures, and chronic diseases. According to a 2023 report in *The Journal of Bone and Mineral Research*, malnutrition in older adults is a leading cause of osteoporosis.

Mediterranean diet

The Mediterranean diet, rich in fruits, vegetables, whole grains, nuts, and healthy fats, has emerged as a gold standard for bone health. A 2021 study in *Osteoporosis International* linked adherence to this diet with higher bone mineral density and reduced fracture risk in postmenopausal women.

Chronic diseases

Poor bone health doesn't just lead to fractures; it's closely tied to chronic diseases like cardiovascular disease and type 2 diabetes. A 2022 review in *The Journal of Nutritional Biochemistry* highlighted how nutrient deficiencies, particularly in calcium and vitamin D, exacerbate these conditions.

"Bone health is a window into overall health. If your bones are suffering, chances are other systems in your body are too," said Dr Sarah Johnson, a metabolic health specialist at Imperial College London.

Gut health

A healthy gut microbiome improves nutrient absorption and reduces inflammation, both of which are crucial for maintaining strong bones. Probiotic-rich foods like yogurt, kefir, and fermented vegetables are gaining attention for their potential to boost bone health.

"Your gut and bones are more connected than you think. A healthy microbiome ensures optimal calcium and vitamin D absorption," said Dr Jean-Luc Dupont, a gastroenterologist at the University of Paris.