



# Implementing the Techniques Regarding Healthier Bones: Dietary Intake and Bone Development

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## DESCRIPTION

Bones are living tissues that provide structure, support, and protection to the body. They also store minerals, produce blood cells, and regulate hormones. Bones are constantly changing throughout life, with matured bone being broken down and new bone being formed. To maintain healthy bones, it is important to have adequate nutrition, especially of calcium, vitamin D, and protein. Calcium is one of the main components of bone, and it is also essential for muscle contraction, nerve transmission, blood clotting, and enzyme activity. The body cannot produce calcium on its own, it must obtain it from dietary sources or supplements. If the blood calcium level is too low, the body will withdraw calcium from the bones to maintain normal functions. This can lead to bone loss and increased risk of fractures.

The Recommended Dietary Allowance (RDA) of calcium for adults aged 51 or older is 1,200 milligrams (mg) per day for women and 1,000 to 1,200 mg per day for men. The best sources of dietary calcium are dairy products, such as milk, cheese, and yogurt. Other good sources include nuts, seeds, beans, soy products, leafy green vegetables, fortified cereals and juices. Calcium supplements can also help meet the daily requirement, but they should not exceed the upper limit of 2,000 to 2,500 mg per day. Calcium supplements should be taken with food and spaced throughout the day for better absorption. Vitamin D is another key nutrient for bone health, as it helps the body absorb calcium from food and supplements. Vitamin D also regulates bone remodeling, the process of breaking down and forming new bone. Vitamin D deficiency can cause rickets in children and osteomalacia in adults, which are characterized by softening and weakening of bones.

The RDA of vitamin D for adults aged 51 or older is 600 to 800 international units (IU) per day. The main source of vitamin D is sunlight exposure, which triggers the skin to produce vitamin D. However, many factors can affect the amount of vitamin D produced by the skin, such as season, time of day, latitude, cloud

cover, air pollution, sunscreen use, and skin pigmentation. Therefore, it is recommended to get vitamin D from dietary sources or supplements as well. The best dietary sources of vitamin D are fatty fish, such as salmon, tuna, and mackerel. Other sources include egg yolks, liver, cheese, mushrooms, and fortified foods such as milk, cereal, orange juice. Vitamin D supplements are also available in different forms and doses. The upper limit of vitamin D intake is 4,000 IU per day for adults. Vitamin D supplements should be taken with a meal that contains fat for better absorption.

Protein is another essential nutrient for bone health, as it plays a crucial role in maintaining bone health by serving as the foundational component for the proteins that comprise the bone matrix, including collagen. It also helps maintain muscle mass and strength, which can prevent falls and fractures. Protein intake can also affect calcium balance in the body. Too little protein can impair calcium absorption and increase bone loss. Too much protein can increase calcium excretion in urine and lower blood pH. The RDA of protein for adults aged 51 or older is 0.8 grams (g) per kilogram (kg) of body weight per day. This means that a person who weighs 70 kg (154 pounds) needs about 56 g of protein per day. The best sources of protein are animal products such as meat, poultry, fish, eggs, and dairy products. Plant-based sources include beans, lentils, nuts, seeds, tofu, and soy products. Protein supplements such as whey, casein, or soy protein powders can also help meet the daily requirement, but they should not replace whole foods. Besides calcium, vitamin D, and protein, there are many other nutrients that play a role in bone health. Some of them are magnesium, phosphorus, potassium, vitamin K, vitamin C, zinc, copper, manganese, and boron. These nutrients are involved in various aspects of bone formation, mineralization, and metabolism.

## CONCLUSION

Nutrition is a key factor in maintaining bone health throughout life. Calcium, vitamin D, and protein are the most important

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nutrients for bones, but they are not the only ones. A healthy diet that provides adequate amounts of all the essential nutrients can help prevent osteoporosis and fractures. Supplements can also help fill the gaps when dietary intake is insufficient, but they should not exceed the recommended doses

and taken under medical supervision. They can be obtained from a balanced diet that includes a variety of fruits, vegetables, grains, legumes, nuts, seeds, and animal products. Some of these nutrients may also be found in multivitamin or mineral supplements.