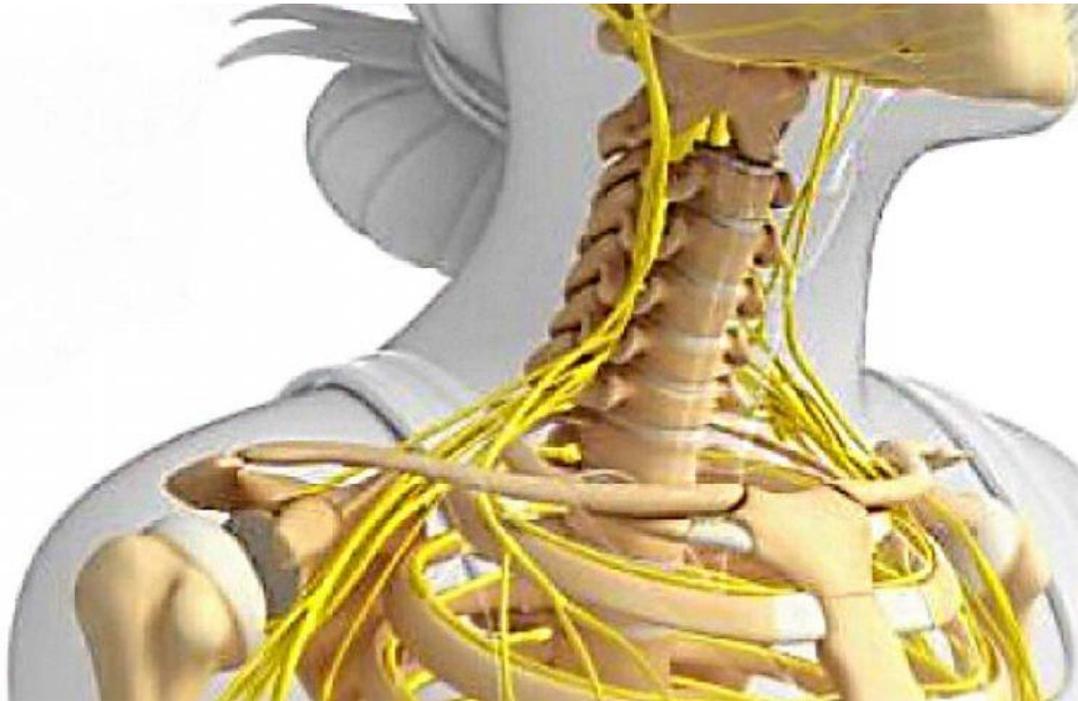


## Micronutrients Are Needed For A Healthy Skeletal System

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**The skeletal system is made up of bones and joints and provides support, mobility, and protection to various organs in the body. We are born with more than 300 bones. Many of them – such as the skull bones – gradually fuse together with the result that, as adults, we have a total of 206 bones. The largest bone in the human body is the femur (thigh bone); the smallest ones are the three bones of the middle ear.**

Maximum bone growth occurs during childhood and puberty, and tapers off as a person approaches 16-18 years of age. While the bones do not grow in size after the age of about 20, they are not hard and inert structures. Continuous metabolic processes known as bone remodeling, during which bone is resorbed and formed again, occur throughout our lives. Specialized bone-lining cells in the skeletal system known as osteoblasts play a major role in this process, as also do bone-dissolving cells called osteoclasts. Our entire skeleton is renewed every few years and it is estimated that, at any one time, around 20 percent of an adult bone is undergoing remodeling.

The framework of our bones is made of collagen, a protein upon which minerals are deposited, hardening the entire structure. The overall health of bones and joints depends on the optimum production and structure of collagen. But bones provide more than simple structural support and protection to the organs of the body. They are also an important reservoir for minerals such as calcium and phosphorus, which are essential for maintaining heartbeat, muscle contractions, and other functions. In the case of an insufficient dietary intake, these minerals are extracted from bone in order

to maintain optimum levels in the blood. The bone also contains marrow, where various blood cells are produced. Certain lipids are also stored in the bone marrow, acting as energy storage.

Just like other cells in our bodies, the cells that build bones require not just calcium and vitamin D, but multiple other micronutrients as well. Vitamin D is essential for the optimum absorption of calcium, the most important mineral in bones. In addition, however, vitamin C and the amino acids lysine and proline are critical in building strong and healthy collagen, which in turn forms the strong internal skeleton of bone. The alignment of collagen fibers determines how calcium and other minerals are deposited and assures metabolic stability and strength of the bones. But there are also other important micronutrients that help build maximum bone mass. These include the B group of vitamins, vitamin K, and minerals such as copper, phosphorus, magnesium, boron, and zinc.

A healthy diet, exercise, and a synergistic combination of micronutrients are essential for maintaining healthy bones. A chronic deficiency of micronutrients can lead to weakening and mineral depletion in the bones. When the rate of bone dissolution is higher than bone formation, a net bone loss occurs. This can result in conditions such as osteoporosis (thinning bones) or osteomalacia (failure of bone mineralization), leading to deformities. Due to our modern and increasingly sedentary lifestyle, the occurrence of bone diseases such as osteoporosis is not limited to the ageing process. Even women as young as 25 may experience the initial stages of osteoporosis. Other factors, including an estrogen, testosterone, or parathyroid hormone imbalance, can also affect bone metabolism.

Most of the micronutrient supplements commonly recommended for bone health contain mainly calcium, with or without vitamin D. However, if collagen is not formed properly, then calcium and other minerals cannot be optimally incorporated into the bone and thus the strength and stability of bone tissue may be compromised. It is therefore important to pay attention to the proportions of ingredients in bone-supporting supplements and to choose products that [synergistically](#) support the strength and function of the skeletal system.