



SKELETAL FACTORS™

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SKELETAL SYSTEM

The skeletal system is one of the most fundamental support structures of the body. The skeleton enables humans to stand erect and serves as a foundation for muscle tissue, giving us movement. In addition, the skeleton houses bone marrow, important for the function of manufacturing antibodies.

The bones are a composite of minerals, with calcium being the most abundant. Throughout life, the bones constantly change and remodel, but different rates of bone resorption and formation occur at different times of the life. At puberty, bones grow at an accelerated pace, resulting in increases of both length and density of the skeletal structure. After puberty, the bones continue to grow in width and mass, for the next 10 to 15 years. A person is considered to be at peak bone mass at 35 years of age.¹

At midlife, the bones continue to remodel, but bone mass remains constant. After 45 years of age, the bone mass begins to shrink, from about .2-.5 percent per year. Prior to the menopause, women lose bone mass at a greater rate than normal, largely due to hormonal changes.

Experts state that two factors, physical activity and adequate calcium intake, have the greatest bearing on the growth and maturity of the bones. They also hold that inadequate calcium intake, during the years of childhood to young adulthood, could result in the bones not reaching their full maturity. These factors contribute to the risk of a common disease, known as osteoporosis.²

OSTEOPOROSIS

Osteoporosis is a disease characterized by low bone mass, where the internal structure of the bone has eroded to the extent that even a slight trauma will cause the bone to fracture easily.³ An estimated 75 million people are afflicted with the disease in the United States, Europe, and Japan, with 1.3 million bone fractures attributed to the condition annually, in the United States alone. One in three women over 65 years of age and more than one-half of men and

women over 75 years are affected by osteoporosis. In 1991, the cost of hospitalization and acute and long term care for osteoporosis exceeds ten billion dollars.

Some studies stress the frightening numbers of injuries and deaths associated with osteoporosis. For instance, an estimated 12 to 20 percent of hip fracture victims die within a year following the fracture. Therefore, it is not surprising to note that the disease is considered the 12th leading cause of death in the United States.⁴

Hormonal status and age are factors in the risk of development of osteoporosis. Hormonal changes associated with the menopause place women at increased risk.⁵

In essence, this condition is the result of a demineralization of bone matter. In the years between puberty and mid-life, sex hormones, (several estrogens in women and testosterone in men) and other hormones, help to maintain bone tissue by stimulating osteoblasts to form bone mass. After the menopause, women produce less hormones which causes less stimulation, resulting in a decrease of bone mass.⁶

Victims of osteoporosis risk greater chance of fracturing important bones of the skeleton, including hips, wrists, ribs and the spine. The bone matter is simply too weak to support the day-to-day stress of the body's movement. For example, a person may suffer a hip fracture from sitting down too quickly. Tortora and Grabowski, in *The Principles of Anatomy and Physiology*, state, "Osteoporosis causes more than 250,000 hip fractures a year."⁷ Other complications include shrinkage of the backbone, height loss, hunched backs.

HOMEOSTASIS OF THE SKELETAL SYSTEM

We usually think of bones as hard, unyielding substances which grow to a specific size, then remain so until death. This is far from true. The skeletal system constantly remodels old bone tissue with new. The metabolism of bone tissue is an ongoing process, as new tissue is formed to replace either old bone matter or injured

tissue. The bone structure houses calcium, which not only nourishes the bones, but other tissues in the body as well. Calcium is regulated between the bones and the blood by several hormones.

The main work in the metabolism of bones is accomplished by osteoclasts and osteoblasts. Osteoblasts are cells that begin in the embryo to form the skeleton and replenish bone matter by bringing together all the necessary substances to form bone groupings. On the other side of the metabolic interaction are osteoclasts, which destroy bone tissue with enzymes and acids (lactic, carbonic, and citric) in a process known as resorption.⁸

As the metabolic process takes place, a delicate cooperation exists between the two cell types. Osteoclasts destroy old tissue and rid the metabolism of minerals and collagen, and the osteoblasts begin the process of bone formation and enrich the metabolism with minerals and collagen. The metabolic process requires the precise cooperation between all the cells and the enzymatic processes, so that there is enough calcium and minerals to form the bones.

So you might imagine each of the cells important to bone growth as little factories, each working with the others to process bone tissue. The factories, running non-stop to produce or destroy materials in the resorption process, all have a like goal -- that of cooperating and contributing to the process, so that bones will grow properly and remain strong throughout our lives. When all the elements of this system work properly, we can refer to the process as bone homeostasis.

HOMEOSTASIS

Homeostasis (*homeo*=same; *stasis*=standing still) is defined as balance and harmony within the body. It is the condition created when each cell in the body functions in an internal environment which remains within certain physiological limits. Homeostasis is achieved when the body: (1) has the proper amounts of gases, nutrients, ions, and water; (2) maintains the optimal temperature and; (3) has an optimal volume

for the health of the cells. When homeostasis is disturbed, health may be affected.⁹

NUTRITIONAL SUPPORT

In the homeostasis of bone structure, several minerals play an important role in nourishing the bone cells. Sufficient amounts of calcium and phosphorus, components of hydroxyapatite, the primary salt that makes bones hard, must be included in the diet.¹⁰

Vitamins also play a major role in the homeostasis of bone building. Vitamins A, C, and D all benefit the process in different ways. Vitamin A helps to control the activity, distribution, and coordination of osteoblasts and osteoclasts during the stage of development. Vitamin C is important because it helps to maintain the matrix of bone and other connective tissues.

The following information is provided to help you better understand the role that certain nutrients play in the overall health of the body. Those nutrients are:

CALCIUM is an essential mineral which is necessary for healthy, strong bones and teeth. Within plasma and cells, calcium functions in blood clotting, membrane stability and permeability, nerve conduction, muscle contraction, cellular secretion, enzymatic activity, and cell growth.¹¹

MAGNESIUM is essential for the metabolism of potassium and calcium. It is also required for the mobilization of calcium from bones.

PHOSPHORUS plays a fundamental role in modifying the development and maturation of bone. Because it plays a role in bone resorption, mineralization and collagen synthesis, it plays an integral role in calcium homeostasis.

VITAMIN C has many uses in the body. It is needed for healthy teeth, bones and blood vessels.

VITAMIN A is a fat-soluble nutrient which plays an important role in the immune system and the healthy formation of bones, and teeth.

VITAMIN D is very important. It participates in healthy bone formation at all ages. It is essential for normal mineralization of bone and cartilage.

HOW TO OBTAIN NUTRITIONAL SUPPORT

Calcium supplements provide nutrients essential for the development and maintenance of the bone structure. These supplements have been reported useful at restoring calcium balance in post-menopausal women and reducing the risk of osteoporosis.¹² **MICHAEL'S® SKELETAL FACTORS™** combines nutrients known to be essential for bones and bone growth, complemented by herbs, such as horsetail grass and alfalfa, known for their healthful attributes.

ABOUT MICHAEL'S® PRODUCTS

Seasoned health food shoppers already know that a combination of nutrients is always more effective than taking single nutrients one at a time. Add in the cost savings of taking combinations, with herbs included, and the math proves to be more efficient, too. Combinations increase assimilation and reduce the amount of binders and fillers. That's why **MICHAEL'S®** created the **FACTORS OF LIFE®** programs. Your life is busy enough as it is. Why worry when synergistically complete nutrition is conveniently at hand?

MICHAEL'S® products include an expiration date to ensure freshness. He personally guarantees purity and specified content. Each product is hypo-allergenic with no artificial colors or flavors. The formulas contain cold-pressed or organically grown (when available) herbs to ensure the highest quality. Additionally there is no sugar, wheat, corn, gluten, sodium, or anything artificial in any of our supplements. These high-potency, all-natural products are even manufactured with food-grade fillers, binders and enteric coatings. Most are suitable for vegetarians and tell you so right on the front label. Every product is double safety sealed with an outer shrink wrap and inner bottle freshness seal. As is normal in all-natural products, some color and texture variations may occur, but do not affect product purity, potency or assimilation.

Above all else, all **MICHAEL'S® NATUROPATHIC PROGRAMS** are designed to produce physical results you can feel, due to the innovative nutritional supplementation with specific, targeted **FACTORS OF LIFE®** programs. As always, the newest developments, the finest ingredients and the most effective formulations for your total healthcare from **MICHAEL'S® NATUROPATHIC PROGRAMS**.


Sources Cited:

^{1,2,3,4,9}21 CFR Part 101 (Docket No. 91N-AB67. Food Labeling: Health Claims; Calcium and Osteoporosis. Federal Register, v.56, No. 229, November 27, 1991.

^{6,7,8,9,10,11}Tortora, Gerard and Grabowski, Sandra. The Principles of Anatomy and Physiology. New York: HarperCollins, 1993. p. 162.

¹²Paige, David. Clinical Nutrition, 2nd ed. St. Louis: Mosby, 1988. p. 308.



	
Skeletal Factors™	
Supplement Facts	
Serving Size: One (1) Tablet	
Amount Per Serving	% Daily Value
Vitamin A (as Beta Carotene)	1,500 IU 30%
Vitamin C (as ESTER-C ™)	25 mg 42%
Vitamin D (as Calciferol)	54 IU 14%
Calcium (as Calcium Amino Acid Chelate)	250 mg 25%
Phosphorus (as Phosphorus Amino Acid Chelate)	55 mg 6%
Magnesium (as Magnesium Amino Acid Chelate)	150 mg 38%
Zinc (as PICTURIN ™)	8 mg 50%
Alfalfa Leaf (Medicago sativa)	90 mg *
Horsetail Grass (Herb) *
(Equisetum arvense)	30 mg *
Betaine Hydrochloride	18 mg *
Boron (citrate)	2 mg *

*Daily Value not established.

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OTHER INGREDIENTS: Dicalcium Phosphate, Maltodextrin, Stearic Acid and Magnesium Stearate.