

To Your Health – February 2010 issue
By Dr. Richard Drucker

The Importance of Good Bone Health

Bone disease has reached near epidemic proportions in America today. Millions of people currently are suffering the often crippling and devastating effects of diseases such as osteoporosis and osteopenia. Even greater are those at *risk* for bone maladies, decreased bone density and related fractures.

According to the National Osteoporosis Foundation (NOF), an estimated 10 million Americans over the age of 50 have osteoporosis (the most common bone disease)¹, while another 34 million have osteopenia (softening of the bones)². Unfortunately, the problem continues despite the enormous consumption of calcium supplements.

Specifically, osteoporosis is a condition of the skeleton that results in a "demineralization" of the bone matrix, thus causing bones to become less dense over time. This decrease in density results in an increased risk of pathological fractures, especially of the spine, wrist and hip (femur).

In response to this current health dilemma, we will address the importance of good bone health, the consequences of *poor* bone health, as well as pros and cons for current bone support supplementation.

It is important to realize that a healthy skeletal system consisting of mineral dense strong bones is essential to overall health and quality of life, since bones help support the body, provide attachments for skeletal muscles, and protect vital organs such as the brain, heart and lungs. Bones also are a storehouse for life supporting minerals including potassium, calcium and magnesium. When needed, these minerals may be released from our bones into the bloodstream for delivery to the body's cells.

The importance of good bone health can best be demonstrated by realizing the negative consequences that occur from reduced bone health. Over time, bone disease can lead to a steady decrease in the ability to perform everyday normal functions such as walking, standing, or dressing, and can even lead to premature death.

Each year, an estimated 1.5 million people suffer an osteoporosis-related fracture which can lead to severe consequences. For example, 20 percent of senior citizens often die within one year of suffering a hip fracture and another 20 percent are confined to a nursing home. A long-standing misconception is that these situations apply only to older women. However, bone disease affects men and women of all ages and ethnicities, and is growing in severity and frequency. At the current rate, one out of two Americans over the age of 50 will be at risk for fractures from low bone mass by the year 2020, according to U.S. Surgeon General Richard H. Carmona, M.D., M.P.H., F.A.C.S.³

¹ NOF, *National Osteoporosis Foundation 2008*, www.nof.org

² *Ibid*

³ Carmona, Richard, *Surgeon General Outreach Toolkit*, 2004 p.2

Additional statistics reveal that osteoporotic hip breaks make up the majority of fractures and account for more than 300,000 hospitalizations each year. Amazingly, the direct care costs for these fractures alone add up to more than \$18 billion each year. The cost of a hip fracture for one individual can be more than \$81,000 during their lifetime.⁴

There are two important points that should be stressed regarding hip fractures. Contrary to popular belief, falling down generally does not cause the specific break. When standing, walking or running, there is normally a significant amount of axial compressive force on the strong neck of the femur near the hip joint. Due to a weakening of the femur neck from osteoporosis or similar bone-weakening conditions, it will tend to break *first* resulting in a fall, not the other way around. Additionally, falling down is *not* necessarily a part of the aging process. Children fall down much more frequently than adults, yet they are able to withstand the fall and/or recover much more quickly. It is the strength of the bones that determines the extent or lack of damage when a fall does occur.

Most falls can be prevented, yet they typically are more dangerous in the elderly. So, an important aspect of preventing bone fractures is to improve home safety and reduce accidents in addition to improving bone density and strength.

The good news is that it is never too late to improve bone health. With good nutrition, daily exercise and attention to our surroundings, people of all ages can strengthen and keep strong bones resulting in longer and healthier lives. Therefore, it is vital that individuals know how to treat and/or prevent bone disease starting in childhood and continuing throughout life, beginning with the following recommendations.

The first and most important aspect of strong, healthy bones is physical, weight-bearing exercise. In the last few decades, there has been mounting evidence that most people do not participate in enough physical exercise to support strong skeletal growth. A research review published in *Sports Health* highlights that weight bearing exercises, especially those that include higher levels of strain such as running or jumping, can be effective in enhancing bone health and preventing future diseases and injury.

"There are many facets related to maintaining bone health, including genetic, intrinsic and environmental factors, but physical activity is by far one of the strongest means to develop and maintain healthy bone mass," explains Ron Zernicke, PhD, DSc, Director of the Bone and Joint Injury Prevention and Rehabilitation Center at the University of Michigan. "Because a high number of older women experience osteoporosis, postmenopausal women may receive the most benefits from improving bone mineral density (BMD) through weight bearing exercise. Regardless of age, weight bearing exercises are extremely beneficial."⁵

While most exercises do provide an increase in bone density, there are a few in particular that are more beneficial. For instance, those that put a larger strain on the body (gymnastics, dance and power sports such as weightlifting), those that have a higher strain rate (e.g., jumping activities), and those that have a higher strain frequency (e.g., running) also appear to increase bone density. Research also notes previous studies in which the benefits of exercise were achieved with less time consuming programs such as 12

⁴ *Ibid*

⁵ Dr. Carmona: *The 2004 Surgeon General's Report on Bone Health and Osteoporosis: What It Means To You*

minutes per session, three days a week. In the end, weight bearing exercise, even for just 20 minutes per day, can strengthen the skeleton significantly.⁶

Physical skeletal resistance is essential for elevated bone mass. Regardless of the amount of calcium ingested, unless there is a physical need for the bones to get stronger from a stress demand, supplementation is almost useless as explained below.

The amount of calcium circulating in the blood is controlled by the parathyroid glands. Circulating blood calcium is removed and delivered to skeletal bones based on need, i.e., physical stress causing the bone to adapt under mechanical force. The specific mechanism that increases bone density is labeled the *piezoelectric effect*. Osteoblasts (bone building cells) are attracted by electrical dipoles produced by the piezoelectric effect from stress on the bone or outside electrical stimuli which, in turn, deposits minerals (primarily calcium) on the stressed side of the bone.⁷ Therefore, exercise stimulates bone cells to use calcium and increase the density of the stressed bone.

While bone density can improve at any stage of life, the most critical time is during the pre- and early-pubertal periods. Regular exercise for children is the key to developing healthy bone structure and long-term injury prevention. Younger children and teens need at least an hour of physical activity every day that includes strengthening exercises. Adults should get at least 30 minutes of moderate physical activity every day. Simple activities like walking and stair climbing will strengthen bones, but any form of resistance exercise, such as weight lifting, is ideal. In addition, exercise benefits the elderly by improving balance and coordination, thus resulting in fewer falls.

Another aspect of developing healthy bones is consuming good, healthy foods. Due to the mass consumption of processed, overcooked and nutrient-depleted foods, most people absorb and utilize too little of the proper calcium and vitamin D for good bone health. However, eating a diet that consists primarily of fresh organic fruits and vegetables will benefit, since most contain healthy levels of calcium, vitamin D and many other beneficial vitamins and minerals.

Contrary to popular belief and advertising, dairy products, including cow's milk, while containing high levels of calcium, are in a form not compatible with human digestion, assimilation and absorption. Typically, they also are high in saturated fat, can have high levels of pesticides, antibiotics and hormones, and if pasteurized, contain de-activated enzymes caused by high heat. Dairy products also contain lactose which many people have difficulty absorbing due to the lack of the digestive enzyme lactase. Many infants and small children, as well as some adults, have allergies to dairy products, especially milk. Therefore, it is important that we receive the right type of vitamins and minerals in the correct amounts as listed in the table below.⁸

NOF Calcium and Vitamin D Recommendations		
<i>Children & Adolescents</i>	<i>Calcium (Daily)</i>	<i>Vitamin D (Daily)</i>
1 through 3 years	500 mg	400 IU
4 through 8 years	800 mg	400 IU
9 through 18 years	1,300 mg	400 IU

⁶ *Ibid*

⁷ Fukada, E., and Yasuda, I., *J. Phys. Soc. Jap.*, 12, No. 10, 1158 (1957).

⁸ NOF, National Osteoporosis Foundation 2008, www.nof.org and the American Academy of Pediatrics

<i>Adult Women & Men</i>	<i>Calcium (Daily)</i>	<i>Vitamin D (Daily)</i>
19 through 49 years	1,000 mg	400-800 IU
50 years and over	1,200 mg	800-1000 IU
<i>Pregnant & Breastfeeding Women</i>	<i>Calcium (Daily)</i>	<i>Vitamin D (Daily)</i>
18 years and under	1,300 mg	400-800 IU
19 years and over	1,000 mg	400-800 IU

For most individuals, getting enough calcium and vitamin D through an organic diet is difficult, therefore supplementation becomes necessary. The best supplements incorporate organically complexed (carbon-bond) nutrients from live, whole plant foods of the highest quality that are synergistically blended and avoid the use of synthetic chemical ingredients, preservatives, binders, coatings, excipients and flow agents as much as possible.

Additionally, bone-weakening can be averted and calcium absorption enhanced by abstaining from smoking, limiting alcohol intake, and decreasing or eliminating caffeine and soft drinks.⁹

Another recommendation for good bone health is to screen women over 65 years of age and those who have had low-trauma fractures after age 50, as well as those with significant risk factors for bone density testing. Bone density tests are safe, painless and quick, and are a good indicator of bone health.

As little as thirty years ago, doctors believed weak bones and osteoporosis were a natural part of aging, but that view has changed. Much can be done to prevent bone disease.¹⁰ Health care professionals should be aware of early indicators of bone disease in their patients and evaluate potential risk factors for bone disease, as well as promote bone healthy behavior.

One of the most important signals that patients might have poor bone health is a previous fragility fracture or a family history of bone disease. Additionally, the patient's diet and lifestyle behaviors affecting bone health should be assessed. In addition to age and fracture-related screening indicators for bone mineral density testing, these risk factors should also be considered:

- Low body weight.
- Those on medications noted for causing bone loss, such as corticosteroids, glucocorticoids, chemotherapy and hormone replacement medications and antiepileptic drugs, hormone excesses or deficiencies, e.g., parathyroid hormone, estrogen, thyroxine, as well as vitamin and mineral deficiencies.
- Diseases that may lead to or aggravate osteoporosis such as hyperthyroidism, hyperparathyroidism, cancer, arthritic conditions Paget's disease, genetic abnormalities such as osteogenesis imperfecta, rickets, osteomalacia, kidney disease, and endocrine disorders.

Many bone diseases such as osteoporosis and osteopenia are preventable and treatable. Since there are no obvious warning signs for many bone ailments, it is important to be aware of the risks and

⁹ Demirbag D, Ozdemir F, Ture M: Effects of coffee consumption and smoking habit on bone mineral density. *Rheumatol Int* 2005, 16:1-6.

¹⁰ Dr. Carmona: *The 2004 Surgeon General's Report on Bone Health and Osteoporosis: What It Means To You*

be proactive in being responsible for one's own health primarily through diet, supplementation and resistance exercise.

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