

Osteoporosis

If Bones Could Talk

by Margy Squires

Is a fracture in your future? Sticks and stones will break your bones and so will osteoporosis.

More than 10 million Americans have this fragile bone disorder and another 34 million totter on the edge of developing it. Osteoporosis (OP) is an international problem with an effective, safe treatment yet to be found. Prescription hormones raised cardiovascular and cancer risks. Bisphosphonates offer fragmentary bone help. Increasing dietary calcium is a partial solution. There must be a better way to bone up without breaking up and there is. The answer lies deep inside the bones themselves.

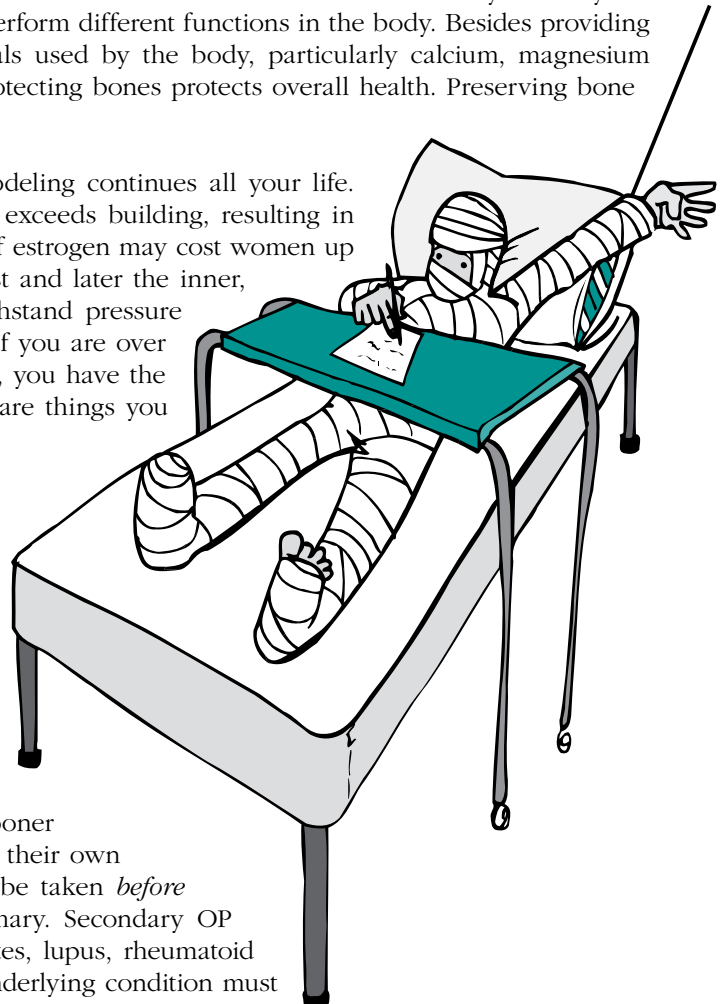
BONE IN, BONE OUT

As living tissues, the very nature of bones is change. A process called *modeling* allows bones to lengthen, widen and become more compact from infancy to adult stature via specialized bone cells. Osteoclasts break down bone (resorption) and osteoblasts rebuild and repair inner and outer bone structure, in a balanced cycle of layering. Each individual bone has a center marrow, surrounded by a spongy, honeycomb *trabecular*. The honeycomb allows tensile strength in several directions to resist pressure and makes bones light for movement. Trabecular bone makes up 80% of the skeleton and has a high remodeling rate. The compact *cortical* layer is next. Its densely packed parallel units have a slower remodeling rate. Finally, a double layer membrane contains the blood vessels and nerves that nourish cells. The 206 bones in your body are various shapes—long, short, flat, irregular, sesamoid, sutural—to perform different functions in the body. Besides providing support and structure, bones are important reservoirs for minerals used by the body, particularly calcium, magnesium and phosphorous. Adult marrow produces all your blood cells. Protecting bones protects overall health. Preserving bone density is your best defense against OP fractures.

Peak bone density occurs between ages 25 to 30, although remodeling continues all your life. Somewhere around age 35, disequilibrium occurs and resorption exceeds building, resulting in about 0.5% bone density loss per year. Menopause and a decline of estrogen may cost women up to 20% over a 10 year period, affecting the hard cortical layer first and later the inner, spongy trabecular. This dual loss reduces a bone's ability to withstand pressure and injury. Fractures occur, primarily in the spine, hip and wrist. If you are over 50, female, Caucasian or Asian and have a small, thin body frame, you have the highest risks for OP. While these factors are unchangeable, there are things you can change.

FIRST THINGS FIRST

Assess your current bone density. A standard for OP *diagnosis* was established by the World Health Organization (WHO) based on bone mineral density (BMD). The gold standard for *checking* BMD is by a Dual Energy X-ray Absorptiometry or DXA. It's a painless, non-invasive test that examines the bones at risk with a special x-ray. The DXA result (T-score) compares your BMD to that of a "young normal" of the same sex. Numbers below normal are indicated by a minus and -2.5 is diagnosed as OP. [See chart on last page]. For most DXAs, a -1 equals about a 10-12% decrease in bone density. Although WHO recommends a DXA by age 65 (or sooner with risk factors), I believe one at age 30 would let women know their own "young normal" at peak. If bone density is low, measures could be taken *before* major bone loss occurs at menopause. Most osteoporosis is primary. Secondary OP caused by cancer or other medical conditions (steroid use, diabetes, lupus, rheumatoid arthritis, Celiac Sprue, etc) may be more difficult to treat as the underlying condition must be managed as well.



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CURRENT OPTIONS

The main treatment goal of OP is to reduce fractures. Most women will suffer a fracture within 10 years of their last menstrual period, which can affect independence and quality of “later” life. For some of us, later is now. Several hormones play a part in bone health and the decline of estrogen at menopause is one risk to BMD. When estrogen replacement raised uterine cancer, progestin was added for protection. Still, a landmark study of 16,000 women was halted early because the synthetic duo increased the incidence of heart attack, stroke, uterine and invasive breast cancers. In the next three years, deaths from breast cancer declined for the first time in decades. Coincidence or did women decide that bones were not a trade off for healthy breasts and stop taking hormones? Research shifted its focus to slowing resorption with bisphosphonate drugs (Boniva®, Actonel®, Fosamax®). However, the ability of osteoblasts to regrow and heal bone properly was questioned when rare cases of jaw osteonecrosis were reported on Fosamax®. Bisphosphonates also lower blood calcium levels. Not good news for bones, either.

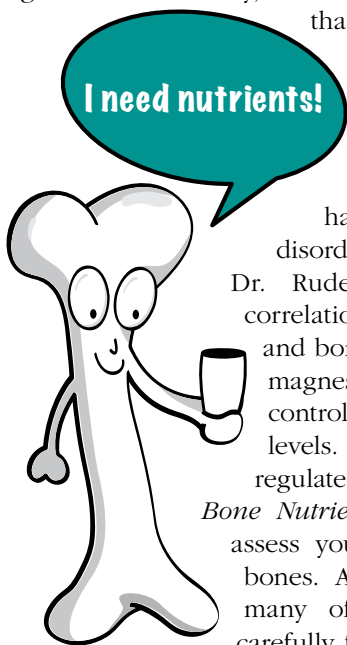
A DIFFERENT APPROACH

If bones could talk, they would ask you to look at things from their point of view. As reservoirs for minerals, bones must break down (literally!) and give up the very nutrients they need. Calcium is the most abundant mineral in the bones and body. It's critical for heart rhythm and nerve conduction so when blood levels are low, the parathyroid stimulates osteoclastic activity to release calcium from bones. However, calcium is only part of the equation. The truth is several nutrients are involved in bone health and in any given research study, a nutrient combination increased BMD better

than calcium alone. One understudied element is magnesium, an oddity given that 50% of this mineral is found in bone. Physician and researcher, Dr. Robert K. Rude of the University of Southern California, has authored numerous studies on disorders of bone and mineral metabolism.

Dr. Rude showed a direct and definite correlation between magnesium deficiency and bone density. He also demonstrated that magnesium affects osteoclastic activity by controlling the parathyroid and vitamin D levels. No wonder, given that magnesium regulates more than 300 bodily enzymes.

Bone Nutrients Defined will quickly help you assess your ability to positively support your bones. A high potency multiple will supply many of these nutrients. Read the labels carefully for form and amounts.



CHANGEABLE FACTORS

These lifestyle habits make bones happy, too. **EXERCISE.** Weight-bearing exercise stress bones in a good way, triggering them to increase density to withstand the pressure. Exercise improves blood flow through vessels and accelerates bone calcium deposits.

BONE NUTRIENTS DEFINED

Absorption of nutrients is critical, especially for minerals which are supplied through diet. A healthy GI tract and Acidophilus/FOS increase nutrient uptake. If you supplement, look for bioavailable chelates like Albion on the label or a mineral imbalance can occur as minerals compete for cell access. Here's the top bone nutrients and what they do.

CALCIUM. A necessary and primary component of bones. Balance with a 2:1 magnesium ratio for optimal bioavailability. Limit doses to 500 mg as that's all you absorb at one time. *Suggested Daily Intake: 1500 mg in divided dose.*

MAGNESIUM. Activates 300 enzymes including those that regulate bone building osteoblasts and the parathyroid gland. Helps mineralization of phosphorous to bone matrix. Regulates calcium transport. Is a co-factor in vitamin D3 conversion. Women with OP have lower levels than normal. *Suggested Daily Intake: 750 mg in divided doses.*

VITAMIN D. Primary calcium mediator. Helps production of protein matrix of bone and collagen synthesis. Enhances calcium intestinal absorption. Decreases urinary excretion. Stabilizes blood levels. Inhibits parathyroid-related resorption. Needs healthy GI tract and liver for synthesis to active D3. *Suggested Daily Intake: 400-800 IU.*

VITAMIN K. Helps formation of bones, particularly non-collagen proteins in matrix. Speeds up healing of fractures. Supports bone mineralization. Made in the small intestines and requires friendly GI bacteria. *Suggested Daily Intake: 100-300 mcg.*

BORON. Mimics estrogen effects on bone. Decreases urinary magnesium and calcium. Increases vitamin D3 metabolites. *Suggested Daily Intake: 3 mg.*

VITAMIN C. Critical for formation of bone collagen fibers with vitamin D and silica. *Suggested Daily Intake: 1000 mg.*

ZINC. Found mostly in bones. Promotes healing by stimulating protein metabolism. Protects cell membranes. *Suggested Daily Intake: 15-30 mg.*

ADDITIONAL NUTRIENTS THAT ALSO SUPPORT HEALTHY BONES

VITAMINS B6, B12, FOLIC ACID. Reduces inflammatory homocysteine implicated in bone breakdown. B6 and manganese support magnesium uptake. *Suggested Daily Intake: B6 25 mg, Folic Acid 400 mcg, B12 1000 mcg.*

IPRIFLAVONE. Inhibits bone resorption. Stimulates bone formation. Works best when combined with calcium. *Suggested Daily Intake: 600 mg in divided dose.*

SOY ISOFLAVONES. Mimics estrogen without hormonal risks. Enhances bone density by preventing or slowing resorption. *Suggested Daily Intake: Per label.*

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Aim for 30 minutes three times a week or smaller increments daily. The old adage use them or lose them definitely applies to bones.

DRINK alcohol in moderation. Don't smoke or **QUIT** if you do as valuable vitamin C is used up. **WATCH** caffeine and elevated acidity as calcium is need as an alkalizing agent. Many women **DIET** to offset menopausal weight gain. Studies show even a 10% weight loss can reduce bone mass, perhaps because nutrients are sacrificed. Enhance your **GI TRACT** to support calcium, vitamin D and B vitamin absorption with friendly **ACIDOPHILUS ES™**. **FOS** increases mineral absorption, too. **HCL** improves stomach acid to digest nutrients. Likewise, **DIGESTIVE** enzymes will help maximize nutrient intake from foods. Limit daily **SALT** as more than 3000 mg causes urinary calcium loss. Adequate **PROTEIN** preserves bone mass. **WHEY** protein has full spectrum amino acids. Take a **MULTIPLE** to insure a balance of vitamins and minerals are covered daily.



MONITOR PROGRESS

Be vigilant. Monitor how your bones are doing. Have repeat DXA scans yearly at the same facility for comparison. Try to keep your T-score in the normal range. Laboratory tests are also helpful. One way to check for osteoclastic activity is by measuring NTx (N-linked telopeptides) in urine. NTx is a specific byproduct of bone breakdown. An overactive parathyroid gland may contribute to bone loss. Deficiencies in RBC magnesium and vitamin D3 jeopardize calcium

absorption and bone remodeling and can be checked with simple bloods tests.

SUMMARY

While you cannot change your sex, age or ethnicity risk factors, you can reduce your probability of an osteoporotic fracture by supporting healthy bone repair and rebuilding, and decreasing bone resorption. Calcium does not work alone and requires a team of bone builders, especially magnesium and vitamin D. Ipriflavone and soy isoflavones are helpful, along with weight bearing exercises that stress and strengthen bone density. While an early start is better, it's never too late. A 3-year study of men and women 65 and older who took supplements reduced fracture rate and bone loss without drugs. Change the way you take care of your bones now and your bones will take care of you later.

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Definition of Bone Mass Density By World Health Organization

NORMAL + 1 or -1 SD	Bone density within 1 SD (+1 or -1) of young adult normal
LOW BONE MASS -1 to -2.5 SD	Bone density between 1 and 2.5 SD below the young adult normal
OSTEOPOROSIS -2.5 & lower	Bone density 2.5 SD or more below the young adult normal
SEVERE OSTEOPOROSIS (established)	Bone density more than 2.5 SD below the young adult normal with history of one or more osteoporotic fractures