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Introduction

A Common Concern

When I was 33 years old, I was operated on for ovarian cancer. At the time, I was understandably concerned about one thing: removing the cancer. What I didn't realize was that there would be unforeseen outcomes of the surgery unrelated to the cancer that would increase my risk of developing other serious illnesses.

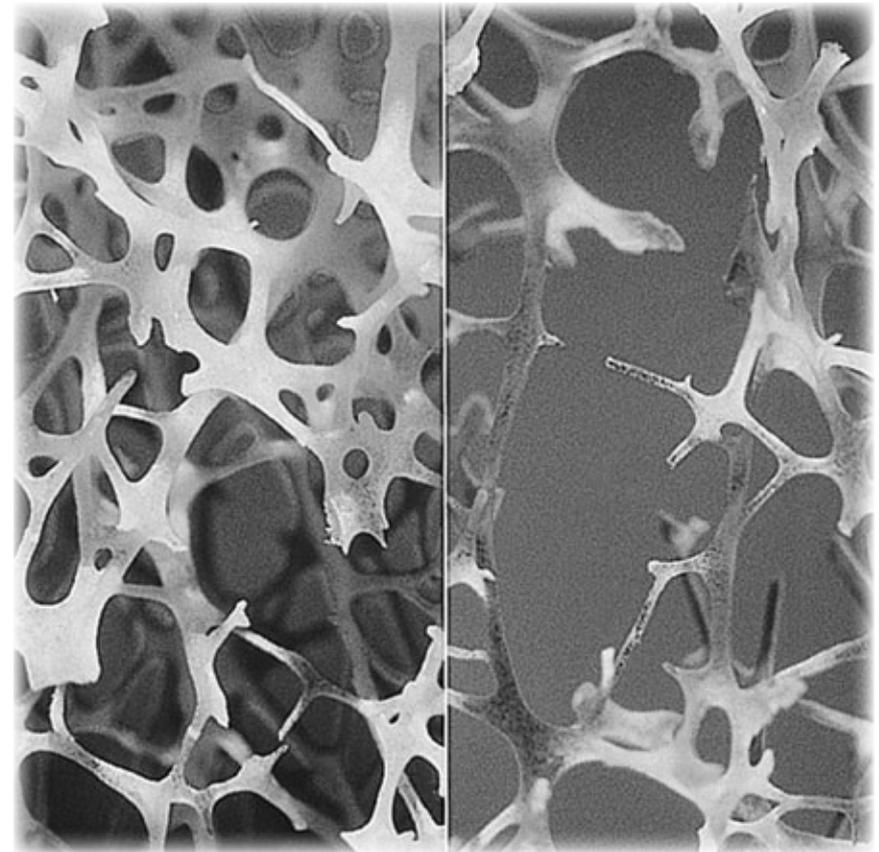
When a woman has her ovaries and uterus removed before menopause, she is immediately thrown into a menopausal state. This is known as surgically-induced menopause and it is what happened to me. As a result, even though I was chronologically age 33, after my surgery I felt more like I was 53. As if someone flipped a switch, I quickly began developing all of the telltale signs of menopause: Hot flashes, night sweats, insomnia, etc. It seemed like even my skin tone and texture changed practically over night.

Of course, I wanted to know exactly what was going on with my body. I researched surgically-induced menopause extensively. It was then that I discovered the menopausal symptoms were just the tip of the iceberg—not just for women who have experienced surgically-induced menopause, but for many menopausal women in general. Because the key hormone-producing organs in my body were removed, I was at risk of developing all sorts of illnesses including heart disease, dementia, and osteoporosis. I immediately began researching how I could help prevent such a trifecta of diseases. This booklet on osteoporosis is a reflection of that research.

Osteoporosis Defined

Even for women who are not at high risk, the thought of developing osteoporosis is upsetting. Have you ever broken a bone? Many of us have. For people with osteoporosis, a broken bone is often the first sign of trouble. Bones in the hip, spine, and wrist can continue to break because they have become thin and frail. In severe cases, the spine can become so porous and weak that the vertebrae can fracture spontaneously. This can lead to kyphosis, which is also referred to as a dowager's hump.

Osteoporosis is a disease characterized by loss of bone mass severe enough to actually change the composition of the bone from dense and strong to porous, weak, and fragile. Over time if bone mass is not protected or restored, osteoporotic bones can become extremely thin and brittle. Healthy bones are like a branch on the tree that will not break



The bone to the left is healthy bone and the bone to the right is osteoporotic.

in turbulent winds. Osteoporotic bones are like the twig that snaps with only the slightest breeze. In advanced cases of osteoporosis, the bones actually become too weak to support the body.

The strength of our bones is measured by using a bone mineral density (BMD) test (more on that in the next chapter). If a person's BMD is lower than normal but not low enough to be classified as osteoporosis, the term used is osteopenia. Some people with osteopenia may never develop osteoporosis, they may just have a naturally lower bone mineral density; however, for most people with osteopenia BMD must be monitored carefully to prevent significant bone loss and the development of osteoporosis. If you have been diagnosed as having osteopenia, you can prevent further bone loss through a combination of diet, lifestyle, and the dietary supplements featured in this booklet. In some cases, a prescription drug

Did You Know?

According to the authors of *The Bone-Building Solution*, “At any given moment, you can have up to 8 million sites throughout your 206 bones where small patches of old bone or injured bone are being dissolved and new bone is being laid down.” The process of rebuilding and repairing bone is never-ending and takes place 24 hours a day, 7 days a week.

may be needed if bone loss progression appears to be increasing. Prescription medications will be discussed in more detail in the next chapter.

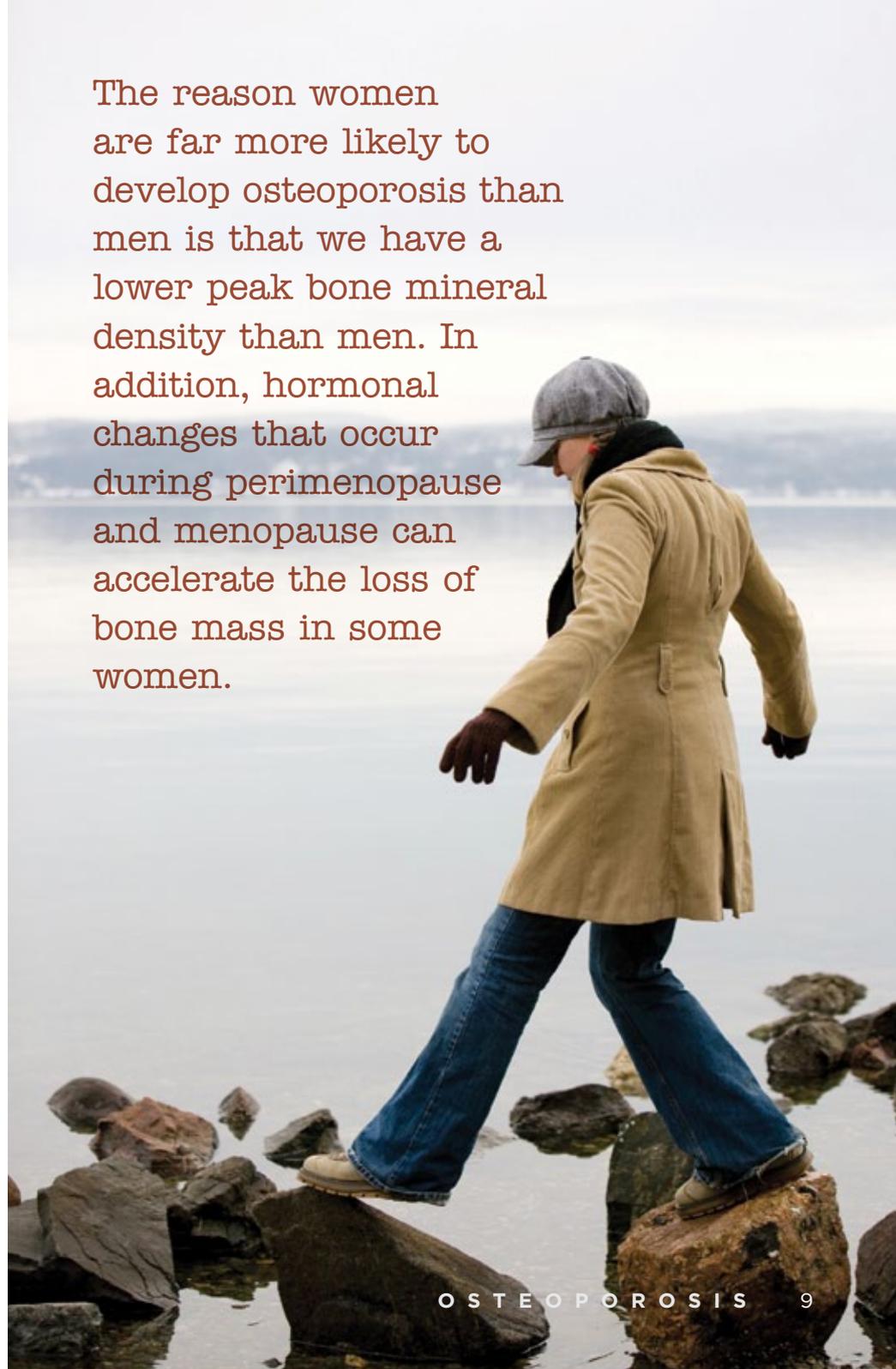
Osteoporosis is one of the most commonly diagnosed bone diseases. Osteopenia, which can be a prelude to osteoporosis, is even more prevalent. Preventing and reversing bone loss should be a top priority, especially for people who have a higher risk. Before we can look at risk factors and conventional treatment, let’s take a closer look at how bones actually form.

Understanding Bone Formation

Bones create the rigid frame of the human body and account for only about 20 percent of our overall body weight. Although our skeletal system is light weight, it is strong enough to carry out a variety of important functions including helping us move, as well as supporting and protecting our internal organs. Bones are living material and a flurry of activity constantly takes place inside the structure of our bones. Important immune and blood cells are formed and stored in our bones. In addition, bones store and release calcium and other minerals so our bodies can perform vital metabolic tasks. Calcium, magnesium and other minerals assist with clotting of the blood, beating of the heart, maintaining nerve responses, and transporting oxygen. In addition to being important to bone and tooth formation, minerals also help build and regulate soft tissues that connect, support or surround body organs. I’ll discuss minerals in much more detail in chapter 2.

Because bones are living material, they are very dynamic and active. Bones consume nutrients, require blood and oxygen, and give off wastes. The 200-plus bones in the human body can also change shape. Bones must be stiff enough to hold us up but also flexible enough to handle impact and muscle contraction. Bone growth begins in the womb but continues even until early adulthood. While the length of our bones stops growing in our 30s, the diameter and thickness can change throughout our entire lives. Our most important bone-building years occur in our teens and last until we are about 20 years old. During those years, our

The reason women are far more likely to develop osteoporosis than men is that we have a lower peak bone mineral density than men. In addition, hormonal changes that occur during perimenopause and menopause can accelerate the loss of bone mass in some women.



bones become denser and denser until we reach our peak bone mass. During that time, we are actually making more bone than we are losing. Bone material constantly turns over through a process of formation and breakdown (also known as modeling and remodeling).

Osteoblast cells help form bone while osteoclast cells help digest old bone. The balance of formation and breakdown between the osteoblast and osteoclast cells is important to maintaining bone strength and density. A hormone produced in the parathyroid gland known as parathyroid hormone (PTH) binds to osteoclast cells to encourage their activity. PTH also helps enhance reabsorption of calcium and magnesium, and helps balance calcium and phosphorus in the bones.

In addition to PTH, bone health is partially influenced by sex hormones from the ovaries in women and testes in men, as well as from growth hormones secreted from the pituitary gland in the brain. One of the reasons removal of the ovaries before menopause causes an increased risk of osteoporosis is because there is a reduction in hormone production and, therefore, bone modeling and remodeling can be negatively affected. Bones naturally become thinner as we age because there is a natural reduction in hormone production as seen with natural menopause (versus surgically-induced menopause). After about age 30, existing bone cells are reabsorbed by the body at a faster pace. At the same time, the production of new bone is slowed and bones lose vital minerals to keep them strong. By the time the bones are weak enough to break, osteoporosis may have already set in.

The reason women are far more likely to develop osteoporosis than men is that we have a lower peak bone mineral density than men. In addition, hormonal changes that occur during perimenopause and menopause can accelerate the loss of bone mass in some women. It is estimated that in the five years following menopause, a woman will lose as much as 20 percent of her bone density. While this is a natural part of the aging process, osteoporosis occurs when the bone loss is extreme or when bone formation declines dramatically—or both.

While reduced hormonal activity influences bone loss, one of the most overlooked areas that impacts bone health is diet. Our diet can either contribute to bone growth or bone loss. In Chapter 4 I will discuss how an alkalizing diet can help strengthen your bones. When combined with weight bearing exercise and appropriate dietary supplements, your diet is a powerful natural way to prevent and treat osteoporosis.

Osteoporosis can be devastating, however it is a condition that responds extremely well to aggressive prevention and early detection. The next chapter provides an overview of causes, risk factors, diagnosis, and conventional treatment.

Chapter One

Osteoporosis Overview

According to the National Osteoporosis Foundation, 10 million Americans have osteoporosis, 80 percent of whom are women. But men are not immune to this condition. Every year about 2 million men are diagnosed with osteoporosis. Estimates show that an additional 34 million Americans have low bone mass, placing them at high risk of developing osteoporosis. Although osteoporosis can strike at virtually any age, it is a major health threat for people 50 years old or older. In fact, 55 percent of people 50 or older are at risk of developing the condition at some point in their lifetimes.

The human suffering and financial healthcare implications created by this condition are devastating. Hip and vertebral fractures are common among people with osteoporosis. These fractures are painful and can cause disability, deformity, dependence, and substantially reduced quality of life. Conservative estimates show that the financial cost of osteoporosis in the United States each year is \$10 billion. Prevention and early detection are critical. Understanding the causes and risk factors can help with prevention and early detection.

Causes And Risk Factors

Our bones naturally become thinner as we age, so getting older automatically puts us at risk of developing osteoporosis. Reduced hormone production in both older men and women can cause bone cells to be reabsorbed faster than the body can make new bone cells. Fortunately, there are things we can do as we age to offset this risk factor (more on that in Chapters 3 and 4). Following is a list of some of the other causes and risk factors associated with osteoporosis:

- Eating disorders cause metabolic problems, reduced mineral intake, and hormonal imbalance.
- Medications such as chemotherapy for cancer, steroids (Prednisone), anticonvulsant seizure drugs or aluminum-containing antacids can encourage bone loss.
- Exposure to radiation can weaken bones.

- A family history can pre-dispose an individual to osteoporosis.
- Smoking and drinking alcohol in excess can reduce bone mass.
- Being Caucasian, and to a lesser extent Asian, as well as having a thin frame and low bodyweight.
- Being inactive for a long period of time.
- A poor diet, specifically a high acidic diet (more on that in Chapter 4).

In addition to these causes and risk factors, there are several diseases that can contribute to bone loss including:

- Celiac disease (individuals allergic to gluten)
- Inflammatory bowel disease
- Rheumatoid arthritis
- Anorexia
- Depression
- Hyper- or hypothyroidism
- Hormone dependent cancers such as breast and prostate

If you have any of the previously listed risk factors or illnesses, you will need to be especially diligent about protecting and strengthening your bones. While there are no overt signs of osteoporosis, there are just a few things that can indicate your bones are getting weaker:

- Back pain
- Loss of height over time with a stooped posture
- Fractures of the vertebrae, hip or wrists

Unfortunately, as bones become thin, symptoms can be very subtle if they are even noticed at all. In most people, diagnosis of the disease occurs following a fracture or several consecutive fractures. Individuals with osteoporosis may break a bone by doing simple everyday tasks such as bending over to pick something up, reaching for something on a high shelf or even coughing. Early diagnosis, long before such fractures occur, is critical.

It's very important to understand the risk factors for the development of osteoporosis and monitor your bone health accordingly. Discuss any concerns with your doctor as soon as possible.

Screening And Diagnosis

Loss of bone mass can be detected using a variety of screening tests, however the most common test used is dual energy X-ray absorptiometry (DEXA). This test is considered to be economical, quick, simple, and

accurate. It can detect as little as two percent bone loss. The DEXA test allows for less radiation and measures the density of the bones in the spine, hip, and wrist, which are the areas most commonly affected by osteoporosis. The patient lies on the DEXA examination table as X-ray beams are aimed at the key sites. Other tests to determine the thickness of bone include a computed tomography (CT) scan or ultrasound.

The results of the DEXA test will reveal two numbers: T score and Z score. The T score shows the amount of bone you have compared to a young adult of the same gender who has peak bone mass. Here are the T score categories:

- above -1 = normal
- between -1 and -2.5 = osteopenia (low bone mass)
- below -2.5 = osteoporosis

The Z score compares the amount of bone you have to other people in your same age and gender group. Because bone thins as we age, the Z score may be more valid than the T score because it compares your density to that of people the same age.

Remember, the DEXA test only measures how dense your bones are, not the actual strength of your bones. The fact is there are many people who have thin bones but never experience a fracture. "More than half of the people with thin osteoporotic bone never fracture," explains bone health expert and author Susan Brown, PhD. "Here in the United States, by the time women reach the age of 80 most have osteoporotic hip bone density, yet only a small percentage ever fracture any bones."

Some healthcare professionals believe the NTx test is a better tool to use because it measures the rate of bone breakdown or resorption. This

Top 10 Osteoporosis Risk Factors

- Age
- Family history
- Body composition (thin, small frame)
- History of broken bones
- Poor diet
- Inactivity
- Smoking
- Alcohol abuse
- Certain medications and/or certain illnesses
- Being a woman (especially a menopausal woman)

test measures N-telopeptide levels in the urine or blood. This molecule is released during the bone breakdown process. If NTx levels are elevated, bone is breaking down faster than it can be replaced, which is a key risk factor for osteoporosis. An NTx test result is not meant to diagnose osteoporosis, rather it provides valuable information regarding the complete picture of bone health. Many healthcare professionals will use this test to determine if lifestyle changes, dietary supplements or medications are working to restore bone health.

Is Screening For You?

According to the National Osteoporosis Foundation, unless you have risk factors for developing osteoporosis, you don't need to have your bone density tested until you are age 65. If you are under age 65, you may want to consider having your bone density tested if:

- you are postmenopausal with at least one of the risk factors mentioned previously (also refer to the side bar "Top 10 Risk Factors" on page 11);
- you have an abnormality with your spine or a history of fractures;
- you use medications such as prednisone, proton pump inhibitors, or have been on chemotherapy;
- you have a history of breast or prostate cancer;
- you have other illnesses such as type 1 diabetes, severe depression or liver, kidney or thyroid disease; or
- you have a family history of osteoporosis.

If you are under age 65 and concerned about your bone health, talk to your doctor about your risk factors and the possibility of being tested. Although testing before age 65 is not often covered by insurance, it's an effective way to get a baseline picture of bone health that can later be referred to if there is a problem. Doctors don't typically recommend testing for men, but men should also be aware of risk factors and the potential need for testing.

The goal of conventional treatment is to slow bone loss. There are several categories of drugs presently being used.

Conventional Treatment

While there are many drugs available to treat osteoporosis, many of them have serious side effects. Careful consideration, and weighing of the pros and cons, must be done before taking any of the osteoporosis drugs on the market today.

The Failure of Fosamax?

The bisphosphonate drug Fosamax was developed to help prevent bone loss. New research, however, indicates that Fosamax (and most likely all bisphosphonates) can increase the chance of developing a fracture. According to Carolyn Dean, MD, ND, author of *The Magnesium Miracle*, "X-rays of bones under the influence of Fosamax may look like they have more calcium but without the remodeling capacity, the bones' internal structure is in disarray—and bones are more brittle and may actually break more easily." If you are on a prescription bisphosphonate or considering taking one, discuss this issue carefully with your doctor. Never discontinue taking a prescription medication without your doctor's knowledge.

Hormone replacement therapy (HRT). HRT such as Premarin, Prempro, and others were previously thought to be the gold standard of osteoporosis prevention among menopausal women. Based on the widely-publicized Women's Health Initiative (WHI) study, the widespread use of HRT has fortunately declined. The WHI and several other long-term studies have clearly demonstrated long-term use of HRT (more than five years) increases the risk of congestive heart failure, stroke, breast and ovarian cancer, gallbladder inflammation, and increased blood clots which can contribute to heart attack. Women with a family history of hormone-dependent cancers are advised to avoid HRT.

Bisphosphonates. These drugs (Fosamax, Boniva, Actonel, Reclast) destroy osteoclasts, cells important in the bone remodeling process, in an effort to prevent bone breakdown. Unfortunately, the side effects of these medications are severe and can include nausea, abdominal pain, and an inflamed esophagus or esophageal ulcers. Although a few studies show a significant reduction of spine and hip fracture, far more studies show that bisphosphonates can actually increase a person's risk of developing a thigh fracture. It is believed that long-term use of these drugs cause an over-suppression of bone turnover resulting in brittle bones despite improved density. Common side effects of bisphosphonates can include joint and muscle pain, fever, high blood pressure, headaches, and flu-like symptoms. In addition, some bisphosphonates can cause osteonecrosis of the jaw, which is when the bone loses its blood supply, eventually dies and collapses causing severe pain and arthritis in the affected area. For more information, refer to the side bar above.

Calcitonin. Calcitonin is a hormone produced in the thyroid that reduces bone resorption and may slow bone loss. This drug is typically given as a nasal spray and can therefore cause nasal irritation. It can also

be administered via an IV. Other side effects can include diarrhea, nausea, metallic taste in the mouth, loss of appetite, difficulty breathing, and other allergic reactions.

Raloxifene. Sold under the trade name Evista, this medication is a part of a group of drugs called selective estrogen receptor modulators (SERMs). Raloxifene mimics estrogens effects on bone density in postmenopausal women. It is a hormone therapy drug also given to postmenopausal women to reduce their risk of developing breast cancer. Side effects of raloxifene can include hot flashes, flu-like syndrome, joint pain, infertility, and symptoms of the common cold. Although more rare, some women taking raloxifene develop blood clots.

Tamoxifen. This is a synthetic hormone prescribed to reduce the risk of breast cancer in high-risk women or to reduce the risk of breast cancer recurrence in women who have had breast cancer. Some studies indicate that tamoxifen can also reduce the risk of fractures especially in women over age 50. Side effects can include hot flashes, vaginal discharge, fluid retention (especially in the hands, ankles and feet), and loss of libido. In some cases, tamoxifen can cause nausea, weight loss, and mood changes (specifically anxiety and/or depression).

Teriparatide. This new class of drugs (most commonly sold under the trade name Forteo) is a synthetic parathyroid hormone and is the only drug that has been shown to actually stimulate new bone growth. Unfortunately, long-term effects are still being studied and there are numerous side effects including dizziness, leg cramps, chest pain, nausea, muscle weakness, rash, and swelling. Preliminary animal studies show that there is an increased risk of bone cancer in individuals taking this drug. This drug is given as a once-a-day injection under the skin of the thigh or abdomen.

As you can see, there are several choices regarding the conventional treatment of osteoporosis, however all of these choices are not without risk. Most doctors will choose the route of least toxicity when trying to prevent osteoporosis or prevent further bone loss. A thorough discussion of dietary supplements, diet, and lifestyle factors designed to strengthen bone health is prudent. Please note: Never discontinue taking a prescription medication without first talking to your doctor and always tell your doctor about the dietary supplements you are taking.

There is no cure for osteoporosis; however, as they say in the world of sports, “the best offense is a strong defense.” Defending against further bone loss through a comprehensive approach will give you the best chance at also increasing bone density. The next several chapters will describe how a combination of dietary supplements, diet, and lifestyle choices can help you do just that.

Chapter Two

The Calcium Magnesium Combo

As I mentioned previously, bones are comprised of living cells that are constantly turning over. Bones are also made up of mineral deposits, namely calcium, phosphorus, and magnesium. The minerals that are deposited alongside the living cells in our bones determine the strength of our skeletal matrix. Without these important minerals, bones would be soft and pliable. There are two key minerals for bone health but, unfortunately, we often only hear about one of them—calcium. In fact, in conventional medicine, magnesium for bone health is pretty much ignored. Calcium and magnesium in the proper ratio are both absolutely vital to the prevention and treatment of osteoporosis. Let’s start by looking at calcium.

Calcium is Critical

It’s not surprising that calcium is revered as the preeminent mineral for bone health. After all, it is the most abundant mineral in the human body with 99 percent of it stored in the bones and teeth. In addition to supporting the structure of bones and teeth, calcium is critical to the function of muscles, blood vessels, hormones, enzymes, and nerves.

Specifically regarding bone health, calcium is the key mineral deposited during the bone formation phase. There are three ways that calcium can be linked to bone destruction:

- excess calcium excretion;
- poor calcium absorption; and
- consistently low intake of calcium.

When one or more of those three scenarios occurs, the body uses the calcium stored in the bones to carry out important metabolic functions, which in turn weakens bone structure. Conventional wisdom has focused on only one of those factors, the chronically low intake of calcium; however, we are finding out that the other two factors are just as important and just as prevalent. Simply taking more calcium is not the answer.

“More doesn’t equal better,” explains Carolyn DeMarco, MD, author of *The Bone-Building Solution*. “The body cannot absorb more than 600 mg of calcium at one time.” Dr. DeMarco and many other physicians believe

the present recommendation of 1,000 mg or more of calcium in a single dose is too high.

The best way to improve absorption of calcium is to take the right form of calcium and eat a diet that supports proper calcium absorption. It's not surprising that a healthy diet featuring lots of fresh fruits and vegetables will enhance calcium absorption, while a diet high in animal protein, sodium, and caffeine will interfere with calcium absorption.

As for the types of calcium, Dr. DeMarco says the three most bioavailable forms of calcium are citrate/malate, formate or bisglycinate. There is also a high-end proprietary form of calcium known as GloCal or calcium lactate gluconate. This premium form of calcium has been shown to have enhanced absorption. It is available in a liquid supplement known as OsteoCalm. OsteoCalm by Natural Vitality is the brand that I take and a brand that Dr. DeMarco recommends. "The Natural Vitality product is sweetened with agave and stevia which is far more health-promoting than other sweeteners such as high fructose corn syrup which can actually damage bone," explained Dr. DeMarco. "I examined the Natural Vitality formula carefully and found it to be excellent."

In addition to enhancing calcium absorption, it is important to prevent excess calcium excretion. A high protein diet can contribute to calcium loss. In addition, reduce or eliminate the following:

- Caffeine
- Alcohol
- Dietary sodium

High Calcium Foods

- 8 ounces of plain, low fat yogurt = 415 mg
- 1½ ounces of cheddar cheese = 306 mg
- 8 ounces of non fat milk = 302 mg
- 20 medium oysters = 300 mg
- 1 cup of cooked spinach = 292 mg
- ½ cup of firm tofu = 253 mg
- 1 cup bok choy = 252 mg
- 2 ounces of almonds = 140 mg
- 6 scallops = 115 mg

NOTE: Choose organic food sources whenever possible, especially when choosing dairy products. For more information on organic foods refer to the side bar in Chapter Four.



Giving Back

Virtually all soil in the United States is mineral deficient. Toxic pesticides and herbicides inhibit the absorption of minerals from the soil into the foods. Modern agricultural practices have severely decreased the mineral content of food. That's why taking a high quality supplement that contains important minerals is so important.

When I found out that Natural Vitality gives a portion of their profits to Remineralize The Earth, I asked the president, Ken Whitman, about this. I explained to Ken that if he helps remineralize the Earth, foods will contain more minerals and they won't need his products. "That would be a great problem to have," he said. "I'm sure we would find something else to do. It's more important to find ways to restore ecological balance, stabilize our climate, and grow nutrient-dense foods."

The Remineralize The Earth effort is a non-profit initiative to regenerate soils and forests worldwide. They use finely ground rock dust as a sustainable alternative to chemical fertilizers and pesticides. The organization's goal is to help create healthy crops by returning organic mineral nutrients to the soil. You can learn more at www.remineralize.org.

"Avoid all sugar and sugar substitutes," warns Dr. DeMarco. Too much simple sugar can decrease bone mineral density.

Complimentary nutrients such as magnesium, vitamins D3 and K2, trace amounts of boron, zinc, copper, and manganese will help enhance the absorption of calcium. It's critical to take a dietary supplement that contains these synergistic vitamins and minerals. In addition to the GloCal calcium, OsteoCalm contains these important bone-building nutrients.

The development of osteoporosis is when bone breakdown exceeds bone formation. Calcium is important to bone formation, but that's just one side of the equation. I agree with many innovative natural health practitioners who believe magnesium is just as important as calcium when it comes to protecting and enhancing bone health.

"It is unfortunate that the treatment for osteoporosis has been simplified into the single battle cry 'take calcium'," explains Carolyn Dean, MD, ND. "Calcium dominates every discussion about osteoporosis . . . but it cannot stand alone."

More Magnesium

Conservative estimates indicate that 60 to 75 percent of North Americans do not meet the recommended daily amount of magnesium, which

is 400 mg per day. According to Susan Brown, PhD, director of the Osteoporosis Education Project, “the use of calcium supplementation in the face of magnesium deficiency can lead to a deposition of calcium in the soft tissue such as the joints, promoting arthritis, or in the kidney, contributing to kidney stones.”

Several animal studies and a few human studies have shown that low magnesium levels in bones is linked to the development of osteoporosis. An animal study conducted at the University of Southern California demonstrated that a 50 percent reduction of dietary magnesium resulted in significant disruption of bone and mineral metabolism. As magnesium content in the bone decreases, bone crystals become larger and more brittle. More than 60 percent of all magnesium in the body is located in our bones. Magnesium is involved with more than 300 essential metabolic reactions in the human body. Of most significance are the roles it plays in bone health. Magnesium:

- is essential for the absorption and metabolism of calcium;
- stimulates calcitonin, a hormone that is significant to building healthy bone structure;
- converts vitamin D into its active form so it can enhance calcium absorption;
- activates the enzymes necessary to form new bone;
- regulates the transport of calcium; and
- suppresses parathyroid hormone (PTH), which helps prevent excess bone break down.

Magnesium is critical to PTH. If magnesium levels are too low, less PTH is released so bone builds up. Elevated levels of PTH will cause calcium to leach from the bones. Normal PTH levels contribute to an appropriately balanced bone remodeling system.

A cellular study conducted at the University of Quebec in Montreal, Canada, that was published in May 2009, demonstrated that magnesium deficiency has a negative effect on the bone remodeling process. The researchers concluded, “Magnesium deficiency, a common condition among the general population, may be associated with altered osteoblast functions leading to inadequate bone formation and the development of osteoporosis.”

“Magnesium deficiency can compromise calcium metabolism and also hinder the body’s production of vitamin D, further weakening bones,” writes Dr. Dean. “Magnesium is just as important as calcium to prevent and treat osteoporosis.”

The number of studies involving calcium for bone health compared to magnesium is staggering. Unfortunately, the scientific community has

Too Much Calcium

There is no question that calcium is absolutely vital to strong bones and the prevention of osteoporosis. However, large doses of calcium coupled with magnesium deficiency is a dangerous combination. The fact is, as a society, we are getting too much calcium and not nearly enough magnesium. The result: calcium deposits, muscle spasms, kidney stones, fatigue, and even hardening of the arteries. Without magnesium, calcium is not properly dissolved and absorbed. The whole foods Paleolithic (Stone Age) diet provided a 1:1 calcium to magnesium ratio. Today, that can be as high as 15:1, with the average person getting ten times more calcium in the diet than magnesium. “Both our current diet and tendency to over-supplement with calcium makes getting enough magnesium almost impossible,” explains Carolyn Dean, MD, ND, author of *The Magnesium Miracle*. Dr. Dean says large doses of calcium are especially harmful to women after menopause because it can lead to soft tissue calcification (especially in the arteries) and can have serious side effects, such as hardening of the arteries. There is some speculation that too much calcium and not enough magnesium could be a cause of heart disease among menopausal women. More research is needed to confirm this effect.

It’s best to not take calcium without also taking the same amount of magnesium.

chosen to focus on just one key mineral. Fortunately, that seems to be changing. More studies are confirming the effectiveness of magnesium specific to osteoporosis prevention and treatment. A small human clinical trial published in June 2009 demonstrated that short-term supplementation with magnesium citrate significantly suppressed bone turnover in osteoporotic postmenopausal women. The dosage was 1,830 mg/day for 30 days, which was a fairly high dose. Subsequent studies involving lower dosages in this population are warranted.

One of the key reasons I was drawn to the OsteoCalm product was because of the amount of magnesium it delivers and the form of magnesium used. OsteoCalm contains 600 mg of magnesium and 500 mg of calcium, and the forms of both the magnesium (magnesium citrate) and calcium (calcium lactate gluconate) are high quality and are known to have superior solubility. The brand of magnesium used is Natural Calm magnesium, has been the best-selling form of magnesium in the natural products market for several years.

(continued on page 22)

Drug Interactions

If you are taking a prescription medication, please inform your doctor of all dietary supplements you are taking. Calcium and magnesium can interact with or be depleted by certain drugs. Here are some examples of drug interactions with calcium and magnesium:

Calcium

- **Alendronate** = Calcium may interfere with this osteoporosis medication (trade name Fosamax) so calcium containing supplements should be taken at least two hours before or after you take this drug.
- **Antacids that contain aluminum** = Calcium citrate can increase the amount of aluminum absorbed, which can be particularly problematic for people with kidney disease.
- **Antibiotics** = Calcium can interfere with some antibiotics (Cipro, tetracycline, and others) so it is best to take calcium supplements 2 to 4 hours before or after you take antibiotics.
- **Anti-seizure medications** = Some of these medications can lower calcium levels in the body; it is important to take these medications 2 hours apart from calcium supplements because of absorption issues.
- **Blood pressure medications** = The ability of calcium to interfere with beta-blockers and calcium-channel blockers is a bit controversial, but it is best to avoid calcium and discuss calcium usage with your doctor if you are taking a beta-blocker or calcium-channel blocker.
- **Cholesterol-lowering medications** = Cholesterol drugs known as bile acid sequestrants (Questran, Colestid and Welchol) may interfere with calcium absorption and increase calcium loss in the urine; taking additional calcium along with vitamin D is advised, but discuss this in detail with your physician.
- **Digoxin** = High amounts of calcium can increase the risk of toxic reaction to this drug, which is used to treat irregular heartbeat. Extremely low levels of calcium can cause digoxin to be ineffective, therefore calcium levels should be monitored closely by your physician if you are taking this drug.
- **Diuretics** = These drugs, in particular Lasix, Diuril and Dyazide, can cause excess excretion of calcium so levels must be monitored closely.



Magnesium

- **Alendronate** = Magnesium may interfere with the absorption of alendronate (trade name Fosamax) to treat osteoporosis so supplements containing magnesium should be taken at least two hours after taking these medications.
- **Antibiotics** = Magnesium can reduce the absorption of some antibiotics (namely Cipro, tetracycline and some others) so magnesium supplements should be taken one hour before or two hours after taking these antibiotics.
- **Blood pressure medications** = Magnesium can increase side effects of these medications.
- **Diabetic medications** = Magnesium hydroxide from antacids may increase absorption of some diabetes medications. Discuss this interaction with your physician.
- **Digoxin** = Low levels of magnesium can increase side effects associated with this drug.
- **Diuretics** = Some diuretics can deplete magnesium levels so discuss supplemental magnesium with your doctor if you are taking a diuretic.

NOTE: never discontinue taking medications without first talking to your doctor.

I also like the fact that OsteoCalm is a liquid, which gives me enhanced absorption of all of the important bone-building nutrients. This formula is highly bioavailable, meaning my body will more efficiently utilize the ingredients necessary for strong bones. Many people have digestive issues, which can make supplements in pill form more difficult to absorb. That's why I like to take some of my dietary supplements in liquid form. In addition to OsteoCalm, Natural Vitality has an energy drink that I like to take daily called NutraRev!, as well as a liquid multi called Organic Life Vitamins. All of the Natural Vitality liquid supplements are cruelty-free and do not contain dairy, gluten or any artificial ingredients.

Keep in mind that magnesium citrate is also used as a laxative because it increases water in the intestines. Due to this mild laxative effect, begin taking only 1/3 capful of the OsteoCalm twice a day and then work up to 1/2 capful twice a day. When taking any magnesium supplement, you can judge the optimal dosage when bowels are comfortably loose and do not cause diarrhea. I have found the OsteoCalm actually has a calming effect so I prefer to take my full dose in the evening. This seems to help with my periodic bouts of insomnia (another challenge delivered after my surgically-induced menopause).

Equally Important

Calcium and magnesium are important co-workers in our desire to prevent and treat osteoporosis. "These minerals work so closely together," writes Dr. Dean, "that the lack of one immediately diminishes the effectiveness of the other." When it comes to bone health, both minerals are equally important to get the job done.

High Magnesium Foods

- 1/4 cup roasted pumpkin seeds = 303 mg
- 1/2 cup almonds = 238 mg
- 1/2 cup firm tofu = 128 mg
- 3 ounces baked halibut = 78 mg
- 1/2 cup cooked oatmeal = 56 mg
- 3 1/2 ounces shrimp = 51 mg



Chapter Three Other Bone-Building Nutrients

Magnesium and calcium are significant bone-building nutrients, but they are not the only tools we can use to help prevent and treat osteoporosis. Building and maintaining strong bones for a lifetime requires several key nutrients beyond magnesium and calcium including:

- Vitamin A
- Vitamin C
- Zinc
- Copper
- Manganese
- Potassium
- Boron
- Vitamin D3
- Vitamin K2

Volumes could be written on these important nutrients, but I would like to focus on the last two, vitamins D3 and K2. These two vitamins in particular have been overlooked when it comes to bone health, but emerging science is confirming their importance. Let's start with vitamin D3.

Vitamin D3 (cholecalciferol)

Every year I choose a new favorite nutrient. For the past year, it has been green tea. My new favorite is vitamin D. As the co-author of the *Definitive Guide to Cancer* and as a cancer survivor, my obvious research and writing inclination is towards cancer. I enjoy reading new research about natural substances that can prevent cancer and offset side effects of conventional treatment. There is exciting research involving vitamin D and cancer prevention, and I am sure we will continue to hear more about this application of vitamin D. But vitamin D is most well-known as a significant contributor to bone health.

There are numerous studies involving vitamin D for osteoporosis prevention and treatment. Nearly all of the literature combines vitamin D3 with

calcium. In 2004, researchers from the University of Rome concluded “Our results showed the positive effect of calcium and vitamin D supplementation in women both peri- and postmenopausal status; for this reason a supplementation of calcium and vitamin D should be recommended as a strategic option in helping to prevent early postmenopausal bone loss.”

The reason vitamin D3 is paired with calcium is because of the key role vitamin D plays in promoting calcium absorption. However, vitamin D is also involved in bone growth and bone remodeling by supporting osteoblast and osteoclast activity. If our bones did not have enough vitamin D, they would become brittle and even deformed. Vitamin D also enhances immune function and reduces inflammation, which may, in part, explain its connection to cancer prevention.

Vitamin D deficiency is more common than previously thought, with people over the age of 50 at an increased risk of not getting enough of this bone-building nutrient. “I stress the extreme importance of adequate doses of vitamin D3 of at least 800 to 1,000 IU per day,” explains Carolyn DeMarco, MD, in a personal interview. “I would suggest double that dose if a person has been diagnosed with osteoporosis.”

Sunlight is the best source of vitamin D, however, cloud cover reduces exposure of vitamin D by 50 percent and pollution reduces it by around 60 percent. In addition, due to the risk of skin cancer, excess sun exposure should be avoided. In addition to the vitamin D3 supplied in OsteoCalm, I take additional vitamin D3 in a liquid form from Carlson Labs called Ddrops (supplying 2,000 IU per drop).

The RDA for vitamin D for young adults and adults is 200 to 400 IU per day. This dosage is hotly debated with many professionals agreeing with Dr. DeMarco that more than 400 IU is needed to get the bone-building and cancer protective effects of this important vitamin.

Vitamin K2 (menaquinone)

Another critical nutrient for bone health is vitamin K2. It is required to make the active form of osteocalcin, an important bone-building protein molecule. According to Dr. DeMarco, vitamin K2 also helps keep calcium from calcifying in tissues such as the heart and arteries throughout the body. Vitamin K2 deficiency is linked to poor bone health.

“Low serum levels of vitamin K have been linked to a greater risk of osteoporosis,” explains clinician Tina Kaczor, ND, of the Clinic of Natural Medicine in Eugene, Oregon. “In addition, medications that interfere with vitamin K, such as Coumadin, are associated with a greater risk of osteoporosis when taken long-term, confirming the integral role of vitamin K in bone health.”



Vitamin K is found in spinach, mixed greens, cabbage, cauliflower, and many other vegetables.

According to a 1999 report associated with the large Nurses’ Health Study, which followed more than 72,000 women for a decade, women whose vitamin K intake was the lowest had a 30 percent higher risk of hip fracture than women with the highest intake of vitamin K. A 2009 study featured in the *British Journal of Nutrition* found that vitamin K2 supplements improved osteocalcin activity in children. Dutch scientist Cees Vermeer confirmed, “There is a growing awareness that maximizing bone strength at childhood is an important strategy to prevent osteoporosis later in life.”

Vitamin K is found in spinach, mixed greens, cabbage, cauliflower, and many other vegetables. “It is important to note that the form of vitamin K in foods has a short half life and is essentially not circulating after 24 hours of consuming it,” says Dr. Kaczor. “That’s why it’s so important to eat your veggies daily.”

Not Just One

As you can see, there are many important nutrients that have been proven to protect and enhance bone health. When choosing a bone health dietary supplement, be sure it contains these key vitamins and minerals. I recommend Peter Gillham’s Natural Vitality OsteoCalm.

Chapter Four

Diet And Lifestyle Dos and Don'ts

Dietary supplements are meant to enhance a healthy diet and active lifestyle. There are so many things that can get in the way of eating a healthy diet. This increases the value of taking high quality dietary supplements. Stress, food processing, lack of minerals in our soil (for more information on that refer to the side bar “Giving Back” on page 17), and many other factors make it nearly impossible to get everything we need just from the foods we eat. But that should not be an excuse to eat poorly and simply pop a few vitamin pills. A healthy diet is the foundation of optimum health and wellness, and that includes the health of our bones.

When it comes to a healthy diet, the first place to start is always with vegetables and fruits. Increasing the amount of vegetables and fruits we eat daily is paramount to strong bones. Simply eating more vegetables and fruits has been shown in clinical studies to actually enhance bone density. According to a 2004 study featuring 891 women, which was published in the *American Journal of Clinical Nutrition*, fruit and vegetable intake was shown to be protective of femoral neck bone mineral density.

We should eat at least five servings of vegetables and two servings of fruit every day. That may sound like a lot but consider the fact that just one small cup of leafy greens or ½ cup of fresh vegetable juice is a serving. One-half cup of raw or cooked vegetables is also a full serving. When I make a salad, I definitely have more than a cup of greens and if I have a serving of vegetables with my meal it is more than a half cup. As for fruit, one medium fruit, a cup of berries, ½ cup of cut up fruit or four ounces of 100 percent fruit juice counts as a serving.

I want to emphasize again the importance of eating organic fruits and vegetables whenever possible (refer to side bar on page 27). If you can't buy organic, wash fruits and vegetables thoroughly with an all-natural cleaner.

Along with fruits and vegetables, protein is important for bone health—but not too much protein (about 45 grams per day for women and 52 grams per



Organic: The Healthier Choice

Organic foods are free of hormones, preservatives, and other toxic compounds. It is especially important to choose organic meat and dairy to avoid exposure to hormones and antibiotics, which can damage our health when consumed frequently. Organic foods are better for our health, our environment, and frequently have higher nutrient content than the processed alternatives. According to a presentation by Charles Benbrook, PhD, at the Ecofarm 2009 conference, an evaluation of 236 studies demonstrated that organic foods were nutritionally superior in 61 percent of the cases.

day for men). And be sure to choose healthy protein sources. Choose lean meat, organic chicken, and fresh fish over fatty, fried animal protein sources.

Avoid deep frying foods because they can damage your health in many ways. If you do deep fry using high heat, use a healthy oil such as macadamia nut, avocado or almond oils. Speaking of oils, choose olive oil over butter whenever possible and avoid margarine completely. For more information on healthy oils refer to the Healthy Living Guide I wrote called *Plant Oils*.

An excess of the following can rob your bones of the important minerals and nutrients required to prevent and treat osteoporosis:

- caffeine
- alcohol
- simple sugar
- salt
- processed foods

Reduce or avoid these foods. In addition, although there is no definitive clinical substantiation, some experts feel drinking from aluminum cans can damage bone because the aluminum can accumulate in bone tissue and disrupt bone turnover and mineral absorption. When you increase your intake of vegetables and fruit and reduce the other dietary items mentioned previously, you are creating a more alkaline internal environment. Your bones will thrive in this environment versus an acidic situation. For more information, refer to the side bar on page 29.

One of the most effective ways to strengthen bones is through exercise.

Get Physical

Several animal studies have clearly demonstrated the positive benefits that physical activity has on bone health. More recently, human studies are confirming this fact. A 2009 study featured in the journal *Bone* featured one group of previously inactive young adult women who exercised consistently for eight weeks compared to a matched group who did not exercise. The women who participated in the exercise program had improved biomarkers of bone remodeling that showed increased formation without any increases in bone loss.

This study and several others confirm that exercise can help prevent and treat osteoporosis by increasing bone density and decreasing bone loss. In addition, other studies have shown that exercise can reduce the risk of fractures.

Proper pH is Critical to Bone Health

There are many experts who agree that your body's internal acid-alkaline balance is not only the key to healthy bones, it is significant to the prevention and treatment of most serious illnesses. Leading bone health expert Susan Brown, PhD, has advocated an alkaline diet for bone health for years. According to Dr. Brown, nutritional and lifestyle choices can keep our pH in the optimal range creating the precise acid-alkaline balance needed to prevent and treat osteoporosis.

pH is the amount of positively-charged ions present and pH measurement is the acidity or alkalinity of a specific solution. Measurement is based on a number from 0 (very acidic) to 14 (very alkaline) with neutral pH measuring in the middle (7). "Our bones are the guardians of our pH balance, so if our pH is outside the proper range, our bones give up minerals to restore pH—literally sacrificing themselves," explains Dr. Brown. The standard American diet of animal protein, sugar, and processed foods creates a very acidic environment. "Even a slightly acidic state, if maintained for a long period of time, can put your health at risk," warns Dr. Brown, "particularly when it comes to your bones."

Alkalizing fruits include limes, lemons, nectarines, raspberries, watermelon, pineapple, and raisins. Alkalizing vegetables include sweet potatoes, onion, garlic, asparagus, arugula, and broccoli. Cinnamon and ginger are great alkalizing spices. It's important to drink at least eight 8-ounce glasses of fresh water daily. Avoid drinking municipal tap water because it can contain toxic substances (even prescription drugs in one Associated Press report). To alkalize your diet further, periodically put fresh lemons or limes in your water.

You can track your pH via your urine. There are test strips available at your local health store or online at <http://www.women-towomen.com/products/betterbonesphtestkit.aspx>. If the number after your first morning urine (following at least six hours of sleep), is lower than 6.5, you are too acidic. A whole foods diet featuring mineral-rich and alkalizing fruits, vegetables and spices is the best way to correct the balance of your pH and help protect your bones for a lifetime.

If you have been inactive for a long period of time, check with your doctor before embarking on a new exercise program. When it comes to bone health, there are four types of exercises to consider:

Weight-bearing exercises = Walking, jogging, dancing, and hiking are great examples of weight bearing exercises because they bear your weight as you do them, which strengthens bones. Swimming and bike riding are not weight bearing exercises. Doing weight-bearing exercises for 45 minutes to an hour, three to five times a week is a great goal. But remember, if you have osteoporosis, you should not do high impact weight-bearing exercises such as jogging or high-impact aerobics.

Resistance training = Using weights or resistance bands are examples of resistance training. These exercises strengthen muscles, which stimulates bone growth by putting tension on the bones. Try to do resistance exercises at least two times a week. If you have osteoporosis, you will want to get advice from your physician or physical therapist.

Balance exercises = Enhancing balance and stretching tight muscles is a great way to maintain equilibrium and flexibility. Balance exercises can be done for short periods of time each day. Activities such as Tai chi can also help enhance balance and flexibility. Tai chi is a great low impact way to strengthen bones. According to a review featured in the May 2007 issue of the *Archives of Physical Medicine and Rehabilitation*, Tai chi appears to be a safe alternative to conventional exercise for postmenopausal women. The authors found that Tai chi was just as effective as conventional medicine and also helped improve balance, reduced fall frequency, and increased musculoskeletal strength.

Postural stretching = Reinforcing good posture will decrease stress on the back and hips. An example of a postural stretch is rolling the shoulder blades back and together while stretching your chest up and lengthening your spine. A physical therapist can provide you with many easy and quick postural stretches to do throughout the day. As a writer, I am often hunched over a computer keyboard so this is something I have had to pay special attention to. My physical therapist has been instrumental in helping me come up with a postural stretching program that I can stick with.

Please keep in mind that certain exercises may not be indicated for individuals with diagnosed osteoporosis. Consult with a physical therapist or an exercise trainer who has experience working with individuals with osteoporosis before participating in a new exercise program or doing new exercises at home.

The most effective way to prevent or treat osteoporosis is with a comprehensive plan that features consistent exercise, an alkalizing diet, and high-quality dietary supplements. Do your bones a favor, get started today.

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OSTEOPOROSIS

THE TRUTH ABOUT CALCIUM

Yes, calcium is critical to bone health. But has our fervor to boost bones with calcium caused us to miss the bigger picture? Respected health writer Karolyn A. Gazella explains that calcium is just one piece of the puzzle—often a small piece. “For decades, we’ve been overlooking other important nutrients such as magnesium, vitamin D, and vitamin K,” explains Gazella. Research shows us that key nutrients can help many women avoid dangerous drugs. Women who have been diagnosed with osteoporosis, have low bone density (osteopenia), or are at high risk of developing this condition, can strengthen bones through this comprehensive plan that includes diet, dietary supplements, and exercise.

ABOUT THE AUTHOR OF THIS BOOKLET



Karolyn A. Gazella is the coauthor of the *Definitive Guide to Cancer* and *Return to Beautiful Skin*. Karolyn has been involved in the natural health industry for more than 17 years. She is the publisher of the *Natural Medicine Journal* and has written hundreds of articles on the topic of natural health. Karolyn is a regular contributor to *Better Nutrition* magazine and the managing editor of the *Healthy Living Guide* series.


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