

))) Roughly halfway through the so-called
Bone and Joint Decade, it's time
to ask a simple question:
Who's selling osteoporosis?

BY JAMES KEOUGH

EXPERTS DEVOTED TO BONE HEALTH HAVE proclaimed for years that we face an osteoporosis crisis of epidemic proportions. And they marshal an arsenal of statistics to prove their point. The National Osteoporosis Foundation says one in two women and one in four men over the age of 50 will have an osteoporosis-related fracture in their remaining lifetime and that osteoporosis is responsible for 1.5 million fractures a year in the US—300,000 of the hip; 700,000 of the vertebra; 250,000 of the wrist; and 300,000 other. Ten million people in the US (80 percent of them women) are said to have the condition, and almost 34 million are at risk because of low bone mass. According to *The Mayo Clinic on Osteoporosis* (Mayo Foundation, 2003), only a third of the people who break a hip return to being as active as they were before the fracture, and nearly another third wind up in a nursing home permanently. More frightening, a study in 2002 reported that as many as 20 percent of hip fracture patients die within a year of their injury.

Dire statistics like these, repeated without question on TV and the Internet, and in various print media over the past two decades, have created a climate of fear among women in particular about what seems to be their very high odds of succumbing to this “silent crippler.” Is that fear warranted? Not really, especially if you step back and look at how osteoporosis became front page news and who stood to gain from getting it there.

BONES of Contention

Creating a high-profile disease

Before the 1970s, osteoporosis was considered a rare disease that affected people in extreme old age. People learned they had it when they incurred what's called a fragility fracture—a break resulting from slight impact to a bone that had become brittle and had lost its strength and flexibility. Typically, a fall might result in a broken wrist or, more seriously, a hip, or someone might fracture a vertebra or two lifting something. Break enough vertebrae in the thoracic spine (actually they collapse on themselves rather than fracture) and, over time, you would develop a dowager's hump—but that was rare, too (and, if you look around, still is).

The perception of osteoporosis began to change in the late '70s and early '80s. In a 1998 article in *Nexus*, an Australian magazine that focuses on what the editor calls "suppressed information," Sherrill Sellman, ND, author of *Hormone Heresy: What Women MUST Know About Their Hormones* (Getwell International, 2000), links this change to the widespread use of synthetic estrogen for the symptoms and supposed problems of menopause during the 1960s and '70s, and to a 1975 report in the *New England Journal of Medicine* that claimed "the risk of endometrial cancer increased 7.6 times in women using estrogen." After another study confirmed these findings later that same month, estrogen sales, specifically of a popular brand called Premarin, plummeted, despite a belated attempt to rectify the problem by adding synthetic progesterone to the estrogen (as occurs naturally in a woman's body) and renaming the new drug hormone replacement therapy. According to Sellman, sales remained depressed, leading Ayerst, the manufacturer of Premarin, to hire a top public relations firm in 1982 to market osteoporosis to the public using TV, radio, and magazine ads. An old woman with a dowager's hump was the campaign's poster child. Prior to this effort, says Sellman, 77 percent of women had never heard of osteoporosis.

But the idea soon caught on. In 1984—two years after the start of Ayerst's marketing campaign—a group of doctors founded the National Osteoporosis Foundation. Its mission: Prevent osteoporosis and find a cure. In 1988, the first dual energy X-ray absorptiometry (DEXA) machines made their debut with the promise of predicting the risk of bone fracture by measuring bone mineral density (BMD). And in 1994, the World Health Organization (WHO) redefined osteoporosis as extremely low bone density—2.5 standard deviations (SD) below "normal," which they set as the average peak bone mass of healthy young white women. (The WHO definition also mentioned the presence of at least two other risk factors, but they got lost or at least underplayed in drug company marketing.) At the same time, WHO described a new precursor to osteoporosis, which it christened osteopenia, as 1 to 2.5 SD below normal. Together, these two definitions shifted the diagnostic focus from brittle, weak bones that break easily to low bone density. They also turned osteoporosis into a woman's disease, despite the fact that men incur a third to half as many fractures as women and are more likely to die because of them. According to Gillian Sanson, author of *The Myth of Osteoporosis* (MCD Century Publications, 2003), as the result of the new definition, low bone density, just one of the many risk factors for osteoporosis, suddenly *became* the disease.

By the early '90s, osteoporosis had become a major symptom of menopause, but according to the Ayerst campaign, one with a specific treatment: hormone replacement therapy. Soon Premarin would become the highest selling pharmaceutical of all time.

If this is starting to read like the ravings of conspiracy theorists, consider the size and value of the osteoporosis "market." Based on the WHO definition, the Swedish Council on Technology Assessment in Health Care determined that more than 70 percent of all women over age 50 have either osteoporosis (22 percent) or osteopenia (52 percent). The National Osteoporosis Foundation's 2005 annual report calls osteoporosis a



Osteoporosis is a

"major public health threat for an estimated 44 million Americans, or 55 percent of the people 50 years of age or older." That adds up to lots of bone mineral density tests and lots of pharmaceuticals. In 2005, physicians wrote 39 million prescriptions for bisphosphonates, including 22 million for Fosamax, which racked up \$3.2 billion in sales for the pharmaceutical giant Merck. And just last year, *Business Week Online* estimated the global osteoporosis market at \$6 billion and said it was growing at a rate of 25 percent a year. As Senator Everett Dirksen so aptly mused, "A billion here, and a billion there, and pretty soon you're talking about real money."

Putting motives aside for a minute, all of this raises the question, has osteoporosis been overhyped? Yes, according to Mark Helfand, MD, MPH, MS, of Oregon Health and Science University in Portland. In 2000, the *Washington Post* quoted him as follows: "I think even people who agree that osteoporosis is a serious health problem can still say it is being hyped. It is hyped." Susan Brown, PhD, director of the Osteoporosis Education Project, thinks so, too. But, she says, "It's difficult to have clear thinking when there's one financial interest that is so great." So maybe we can't put motives aside. Marcelle Pick, OB/GYN NP, cofounder with Christine Northrup, MD, and others of the medical clinic Women to Women, makes the connection clear on the clinic's website: "I rarely criticize the drug companies, but in this case I have to say the publicity about osteoporosis is mostly about profits, not about women's health." Or, as Helfand put it for the *Post*, "Most of what you can do to prevent osteoporosis later in life has nothing to do with getting a test or taking a drug."

Flies in the ointment

The trouble with the current definition of osteoporosis, beyond the fact that it spreads too wide a net and in the process sells billions of dollars of medications to women who don't need them, is that the main premise is wrong. Low bone density alone does not predict fractures. Study after study has demonstrated this, and, Sanson tells us, at least five government agencies in Canada, Australia, France, and Sweden have come to the same conclusion. She cites a 1997 review by the British

Columbia Health Technology Assessment Agency: "Even the most favorable reports on the effectiveness of bone mineral testing reveal that BMD testing does not accurately identify women who will go on to fracture as they age." In fact, Brown points out that in several large studies, "almost 50 percent of the people who fracture do not have severely low bone density." We now know, she goes on to say, that we cannot determine fracture risk by bone density. "It's no more important than family history, and it's not as important as weight."

Proponents of bone density testing claim that DEXA machines are the gold standard for measuring bone health: The tests are objective and hence rigorously scientific, the argument goes. Unfortunately, the logic doesn't really hold up. The machines measure a patient's bone density against the average peak bone mass of a healthy young Caucasian woman. That in itself begs obvious questions: What if you're not Caucasian? Why should someone 50 or 60 years old (or older) be compared to a 20-something-year-old? But a more critical eye would zero in on this notion of peak bone mass. Turns out, it's not necessarily finite: It varies with ethnicity, age, country (and even regions within countries), and season—bone mass is lower in the winter than in summer. These variables could all be factored in to create a standard, but surprisingly no accepted national or international standard exists for peak bone mass. In fact, the manufacturers of the DEXA machines determine the average peak bone mass that their machines read as "normal." This means that bone density readings vary from brand to brand, sometimes quite considerably, making any comparison of their different test results meaningless. Some manufacturers take a more conscientious approach to establishing their peak bone mass standards than others, but the opportunity to put a thumb on the scale, so to speak, is pretty obvious. And apparently it's hard to resist. Sanson points out that two large studies in the US and Canada measured more diverse samplings of young people to establish independent DEXA standards. In the

degenerative disease of western culture

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US, the third National Health and Nutrition Examination Survey (NHANES III) found in 1995 that the peak bone mass established from this survey was much lower than those used by the manufacturers and using it "cut the prevalence of osteoporosis, as defined by BMD, by more than half." The

would also expect that the average age of women with hip fractures would have dropped over the past 20 years, but that's not the case either. In fact, most every researcher or author who mentions it says the average age stands around 79 or 80, and the Osteoporosis Education Project says it's 82 in New York City.

What has changed is the incidence of hip fractures as a growing part of our population has aged. That makes perfect sense, but the increase is linked to demographics—age, diet, lifestyle, and more—not bone density.


The truly startling thing about the number of hip fractures is how much higher they are in the US and Europe than in many undeveloped countries throughout the world. According to Brown, hip fracture rates worldwide vary 30- to 40-fold. But as countries in Asia and elsewhere Westernized, hip fracture rates increase, which has led Sellman to call osteoporosis "a degenerative disease of

Western culture." If you ignore the implicit moral judgment, osteoporosis is in the same league as cardiovascular disease and type-2 diabetes, which everyone seems to agree are diet and lifestyle related.

A new paradigm

We tend to think of the 206 bones in our bodies as hard, almost inert things. Indeed the word *skeleton* comes from the Greek word *skeletos*, meaning "dried up." Yet healthy bones are anything but dry, and they're never uniformly hard. Instead, our bones are living organisms that, once they stop growing in size, undergo constant repair and maintenance in a process called remodeling. Two types of cells, osteoclasts and osteoblasts, perform this continual bone improvement project. The osteoclasts seek out old or injured bone and then produce an acid to dissolve it into its constituent parts—calcium, magnesium, and other minerals. This signals the osteoblasts to begin making new replacement bone, a much slower process that takes anywhere from three to 18 months to complete, depending on one's age.

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Canadian Multicentre Osteoporosis Study (CaMOS) bore similar results in 2000: "They found the actual prevalence of osteoporosis (as defined by low bone density) to be 16 percent in women and 5 percent in men, as opposed to the official Canadian estimates of 50 percent and 12 percent," Sanson says. Studies in Turkey and the United Kingdom produced strikingly similar readings. As Woody Allen reputedly said, "No matter how cynical you are, it's hard to keep up."

If we go back to the pre-WHO definition of osteoporosis as a fragility fracture, then a true measure of our osteoporosis epidemic would be the rate of hip fractures, which cost \$10.3 billion to \$15.2 billion a year in the US alone and likely will top \$131.5 billion worldwide by 2050. The emotional, psychological, and physical tolls simply can't be measured. Sanson calls attention to a National Institutes of Health report finding that 80 percent of women 75 or older would rather die than experience a hip fracture that landed them in a nursing home.

One would assume that hip fracture rates have been rising steadily as the crisis has deepened. But that's not the case. "It's quite interesting that hip fracture rates in this country really haven't changed much since the late 1950s," says Brown. One

Bad to the Bone

Women diagnosed with osteoporosis are invariably told they need to start drug therapy to cut their risk of fractures. All of the drugs in the medical arsenal increase bone density and, according to the studies, have some short-term benefit in reducing fractures. However, most of the drugs slow down or halt bone remodeling, the natural process the body uses to get rid of old bone and replace it with new. The long-term implications aren't yet known, which should engender caution, and most of the drugs have some serious side effects. Here's what you should know before you start using them.

Bisphosphonates. Despite their humble beginnings as industrial chemicals used for corrosion prevention and the manufacture of laundry soap and fertilizer, bisphosphonates like Fosamax and Actonel have become mainstays in the treatment of osteoporosis. Called anti-resorption drugs, they suppress the activity of osteoclasts, the cells that dissolve old or injured bone. And they seem to work. "They halt bone breakdown by perhaps 90 percent," says Susan Brown, PhD, director of the Osteoporosis Education Project (OEP), "but they also halt bone formation by that much." A number of studies have shown that bisphosphonates increase bone density in almost all women who take them and that they reduce fractures by 30 to 50 percent in people with a high risk of fracture. OEP's ongoing vitamin D analysis reports similar results with adequate amounts of vitamin D, calcium, and other key bone nutrients.

Critics say bisphosphonates increase bone density at the expense of new bone, which is always stronger and more flexible than old. "This explains the increase in bone density that occurs in the first year or so of use," writes Gillian Sanson in the *Myth of Osteoporosis*, "but

[it] also explains the subsequent plateau effect." The question is, says Brown, "Are you going to end up with bone that looks sturdy . . . but is fragile because it's bone that hasn't renewed itself?"

A partial answer may lie in a serious bisphosphonate side effect called osteonecrosis of the jaw—a condition in which part or all of the jaw bone dies. First encountered in patients who received intravenous doses of Fosamax, it has more recently surfaced in people taking the tablet form for a long time. The reported number of cases remains small, but a June 2006 article in *Lawyers and Settlements*, estimates that up to 10 percent of the people who've taken Fosamax are at risk.

Comparatively less serious side effects include digestive reactions: heartburn, indigestion, nausea, diarrhea, and inflammation or ulceration of the esophagus.

Hormone replacement therapy.

What started as a "cure" for menopause "disorders" has now been repackaged as preventative treatment for osteoporosis after synthetic estrogen was shown to cause endometrial cancer. According to *The Mayo Clinic on Osteoporosis*, HRT "effectively reduces bone breakdown and may result in a 5 to 6 percent increase in bone density in lumbar vertebrae over one to three years of use."

The safety of HRT took another blow when the Women's Health Initiative stopped its study in 2002 upon finding increased risk of breast cancer, stroke, and heart attack in women taking Prempro, a combined estrogen/progestin pill. The study also showed, however, that Prempro reduced risk of hip and other fractures.

Other studies have shown that the bone density increase derived from HRT fades quickly after women stop taking the drug, returning to age-related levels in as little as a few months. And therein lies the

dilemma: Short-term use provides only transitory results, and long-term use is fraught with dangerous side effects.

Raloxifene. Marketed as Evista and sometimes called a "designer estrogen," this selective estrogen receptor modulator (SERM) slows bone loss to a degree similar to estrogen, and after three years of daily treatment, it reduced vertebral fractures (but not other types) by 36 percent.

While raloxifene appears to lack the more severe negative effects of HRT, it still increases the risk of blood clots threefold. It also can cause leg cramps, hot flashes, leg swelling, and flu-like symptoms.

Teriparatide. Unlike bisphosphonates, which suppress bone remodeling, parathyroid drugs like teriparatide (Forteo) actually stimulate bone growth in both the hard cortical layer of bone and the softer, more flexible trabecular bone. According to the Mayo Clinic, daily injections combined with calcium and vitamin D increased spinal bone density in women with osteoporosis and previous vertebral fractures by 9 to 13 percent and reduced other fractures by 35 to 54 percent.

There's some question about the quality of the bone that's being grown, and about 10 percent of teriparatide users develop hypercalcemia, so serum calcium levels need monitoring. But more seriously, the drug comes with a warning about the possibility of osteosarcoma. In fact, the drug can only be taken for two years because clinical trials found no incidence of bone cancer in that time frame.

Calcitonin. The Mayo Clinic says calcitonin "may slow bone loss and increase bone density modestly" by affecting bone resorption, and studies have found that over a five-year period it reduced risk of vertebral fractures by 36 percent. Sanson says that it may have an analgesic effect on pain from vertebral fractures. Milder and seemingly safer than the other drugs, it is also less effective. Taken as a nasal spray, it can cause nasal dryness and irritation, back and joint pains, and headaches.

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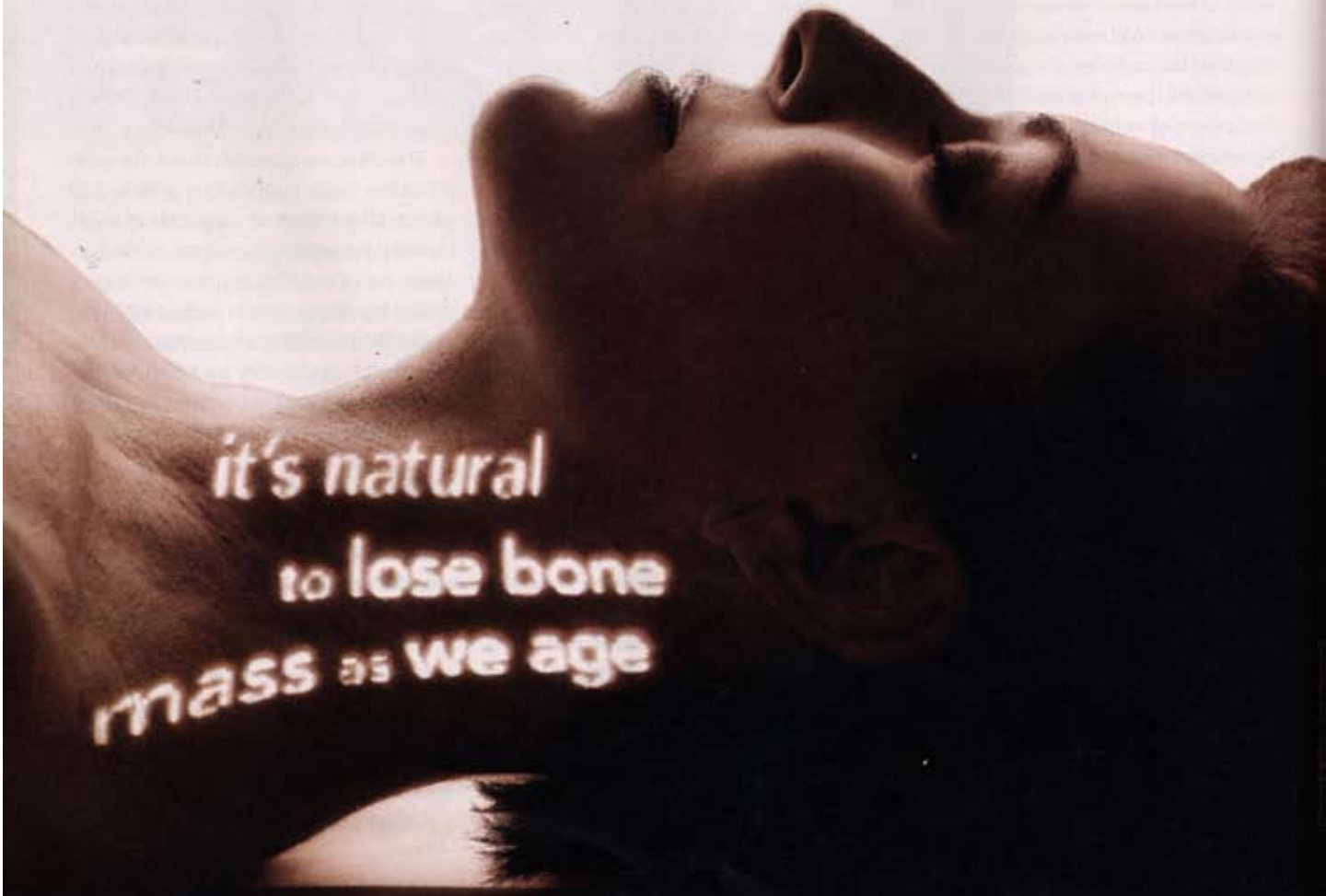
In our youth, the osteoblasts outperform the osteoclasts, and our bones and bone mass grow. In *Strong Women, Strong Bones* (G.P. Putnam's Sons, 2000), Miriam E. Nelson, PhD, explains how our bone mass doubles from birth to age 2 and then doubles again by age 10 and again by the end of puberty so that by age 18 we have about 90 percent of our peak bone mass. After a period of relative equilibrium, Nelson explains, the balance between osteoclast and osteoblast activity shifts in our mid-30s (somewhat later in men), and we start losing bone mass at the rate of 0.5 to 1 percent a year.

Unfortunately for women, bone loss accelerates in the years surrounding menopause to anywhere from 1 to 3 percent (and as high as 5 percent) a year. It tapers off about five to six years after a woman's last period until age 70 when bone loss drops back down to the rate before menopause. Depending on how high the rate of loss gets and how long it occurs, a woman could reach her late 80s or early 90s—the prime fracture years—with just 50 percent of her peak bone mass left.

Remember, though, that peak bone mass varies considerably from woman to woman and it doesn't correlate to fragility fractures. Remember, too, that it's natural to lose

bone mass as we age—our bodies have operated this way for millennia. The medical community has somehow forgotten this latter fact or consciously ignored it in its urge to stop bone loss, first with synthetic estrogen, which among other things stimulates osteoblast activity and suppresses osteoclasts, and then with anti-resorption drugs like Fosamax and Actonel, which suppress osteoclast activity. The problem with this approach? "You cannot have buildup of bone without breakdown of bone; they go together," says Brown. If you suppress osteoclast activity, you also suppress the osteoblasts. Brown says of these drugs, "They actually bring premature death to the bone breakdown cells." (See "Bad to the Bone" on page 67.)

A more holistic, and arguably more successful, approach championed by the Osteoporosis Education Project, Women to Women, and many other forward-looking practitioners, tackles both sides of the bone resorption equation by urging women to eliminate those activities and foods that contribute to bone loss and encourage those that build bone.



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Before the Fall

What you can do to prevent hip fractures as you age

The conventional view of osteoporosis sees hip, vertebral, and wrist fractures as the result of weak bones—strengthen an individual's bones (often with medications), and the risk of fractures declines. Nothing wrong with that approach, theoretically, but there's a simpler, faster, and less expensive way not only to cut fracture risk, but to cut the absolute number of osteoporotic fractures: Prevent falls.

The Centers for Disease Control and Prevention (CDC) report that falls cause more than 95 percent of hip fractures in adults 65 and older, which led to more than 309,500 hospital admissions in 2003. That figure represents a 19 percent increase over admissions in 1993. Looking at our aging population, researchers in 1990 predicted the number of hip fractures in the US would surpass 500,000 by the 2040. How important is fall prevention? A 2005 Swiss study of 7,788 women aged 70 or older found that a high risk of falling predicts a three times greater incidence of hip fracture, leading a researcher to say that the risk of falling may be more important than high calcium intake.

Here's how you can keep yourself or an elderly loved one from experiencing a fracture-causing fall.

Get lots of exercise. Weight-bearing physical activity like resistance training and some forms of yoga will help build strong bones, but it also increases muscle mass and strength. That strength will help a person rise from a chair or climb stairs more securely and will increase her confidence. Other forms of exercise help improve balance, a critical factor in avoiding falls. Studies have shown that the slow, graceful movements of t'ai chi measurably improve balance in people of all ages.

Check your meds. A number of prescription and over-the-counter drugs have side effects that increase the risk of falling, especially when more than one drug is involved. Sedatives, antidepressants, and antipsychotic drugs can reduce mental alertness, interfere with balance and gait, and cause a sudden drop in systolic blood pressure, any one of which could lead to a fall. Ask your physician to review all of your current medications, including those nonprescription items you use regularly, with preventing falls in mind. And limit alcohol intake when you take medications.

Get your eyes examined. This may seem like a no-brainer, but poor eyesight is a frequent cause of falls. Older eyes

can change quickly; a yearly visit to the optometrist could save your hip.

Reduce hazards in the home. Most falls occur in the "unsafety" of our own homes, so removing potential culprits can go a long way toward keeping us on our feet. Among the CDC's suggestions: Improve lighting; put nonslip mats under throw rugs (or remove them entirely); fix loose or uneven steps; fix loose handrails (and consider putting one on both sides of the stairs); and keep wires from lamps and electrical appliances coiled up and close to the wall.

Wear hip protectors. If you or someone you know is at high risk for a hip fracture, think seriously about wearing hip protectors. They won't do a lot for your figure, but they dramatically reduce hip fractures. A study in the *New England Journal of Medicine* found that hip protectors cut the rate of fracture by more than half and may also reduce pelvic fractures. A 2000 study in *Advance for Physical Therapists and PT Assistants* notes that a group of frail, at-risk women who wore hip pads fell without fracture five times more than the healthier control group.

In addition to the natural aging process and our genetic makeup, a number of lifestyle, medical, and dietary factors contribute to the loss of bone mass. Individually (and certainly combined), the following can increase normal bone loss to critical levels.

- **Smoking.** According to Nelson, "women with a smoking history have significantly lower bone density and are much more likely to suffer fractures than those who never lit up." Smoking further decreases estrogen levels, which drop considerably during and after menopause.

- **Alcohol consumption.** Studies have given us myriad reasons for the health benefits of drinking in moderation, but

they've also shown that drinking in excess increases the risk of low bone density and fractures. According to Nelson, alcohol suppresses osteoblast activity. High intake is also associated with bad nutrition and an increase in falls that produce fractures.

- **Caffeine.** As little as 300 to 400 mg of caffeine a day (two to four cups worth of coffee) doubles the risk of hip fracture. Coffee needn't be the main (or even primary) source: Black or green tea, chocolate, and sodas all contain caffeine.

- **Weight loss.** Strict dieting at any age can lead to malnutrition, especially of the nutrients bones need to stay strong and healthy. In postmenopausal women weight loss is even more insidious. Those annoying (and persistent) extra pounds that

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appear around a woman's midsection at that stage in her life serve a critical need: The fat cells they contain produce estrogen, one of the purposes of which is to stimulate osteoblasts to produce new bone.

• **Pharmaceuticals.**

While many of us benefit from prescription drugs, not all of them are benign when it comes to bone loss. Foremost among the most dangerous are corticosteroids (like Prednisone), which are used extensively to fight inflammation and skin irritations and to relieve arthritis and asthma. A 1993 study in *Annals of Internal Medicine* reported that steroids cause an 8 percent reduction in bone mass within four months of use. (Brown says that steroid use causes 20 percent of all osteoporosis.) Thyroid hormone therapy for hypothyroidism and goiter can lead to loss of bone calcium and increase the risk of fracture. This places older women at risk because they're much more likely than men to have thyroid problems. And researchers have linked antacids and, more recently, proton pump inhibitors like Nexium, Prevacid, or Prilosec, to an increased risk of hip fractures. They speculate that these drugs increase bone loss by inhibiting stomach acid and thus reducing mineral absorption.

• **Digestive disorders.** Celiac disease, Crohn's, colitis, and irritable bowel syndrome all interrupt the body's normal absorption of calcium and other critical bone-building minerals.

• **Stress.** Our bodies respond to the high stress of life today by engaging our fight or flight mechanism. It's a collection of involuntary responses the body makes to perceived danger so we'll be ready either to take action or run away. In normal circumstances, say a near miss involving a bus, it causes a hormone called cortisol to surge through the body and then diminish once the threat is gone. A more muted version of that reaction occurs when we're exposed to stress on the job or in our time-constrained lives, but because the stress doesn't subside, neither does the cortisol. The effect on our bodies and our bones is insidious: High levels of cortisol suppress the immune system, cause calcium to be released from the bones into the bloodstream, and suppress hormones and glands involved in bone remodeling.



if you
want to
live long,
take care
of your
infrastructure

• **Endocrine disorders.**

Hormones produced by the endocrine system—the thyroid, pituitary, and parathyroid glands—play a crucial role in bone remodeling. Problems occur when the thyroid produces either too little or too much thyroxin or its hormone, calcitonin, gets out of whack. Calcitonin and parathyroid hormone (PTH) regulate calcium levels in the blood and tell the body either to store excess calcium in the bones or to release it from them.

• **Acidosis.** To stay in balance chemically, the body needs to maintain a slightly alkaline blood pH level. To do this it must continually buffer the acids that get produced as we metabolize our food. This is a highly complex and exquisitely choreographed dance, but the upshot for bone health is as follows: The body looks first for alkalinizing buffer elements like potassium compounds in the blood and various organs; when those are exhausted, it turns to the bones, the body's great alkaline storehouse. And since maintaining homeostasis is a life-and-death matter, the body will sacrifice bone to bring serum

pH levels back to the alkaline side of the ledger. Under normal circumstances, borrowing from the bones is standard operating procedure, and the alkalizing mineral compounds get replaced once the crisis passes. But if we eat a highly acidic diet that's rich in sugar, animal protein, or refined carbohydrates—the standard Western diet, in short—our bodies have to work continually to find buffering minerals. The borrowing never stops, and the loan never gets repaid.

Building healthy bones

Losing bone mass might be an inescapable aspect of getting older, and fragility fractures are certainly a hazard in old age, but bone loss needn't lead to a fracture. Susan Brown jokes that we could cut hip fractures in half if we could get everyone to die five years earlier. The obvious (and far more attractive) alternative is to figure out how to keep people strong. "The

message to individuals," she says, "is if you want to live long, take care of your infrastructure."

The obvious first step is to find ways to avoid or minimize the lifestyle bone robbers. Quit smoking, drink in moderation, cut back on caffeine, reduce the stress in your life (or practice meditation or yoga), and stop trying to lose those last 5 pounds. You can't do everything on your own, however. Countering the effects of prescription drugs and endocrine disorders requires working with your healthcare provider to find alternatives and root causes—attempting that by yourself is simply too risky.

The second step involves getting off the couch and into your exercise or yoga clothes. Your body works on a demand and supply basis when it comes to bones—if your muscles and tendons put stress on your bones, your body will respond by strengthening them. Any number of studies have demonstrated this, and many of them have shown that you can build bone density/mass through exercise at any point in your life—even folks in their 80s and confined to wheelchairs improved their bone density by lifting 2-pound weights several times a week. But not every kind of exercise will do. Only weight-bearing activities like lifting weights, running, and certain types of yoga (think Downward Dog, handstands, and other arm-balancing poses) stress the bones enough to stimulate growth. Walking and swimming, both excellent aerobic activities and great for the heart, have little effect on bone health. Commit to a weight-bearing exercise routine for an hour two to three times a week. According to Sanson, this can significantly slow or prevent bone loss—a benefit, she says, equal to that achieved by those who exercise daily.

And finally, you can make dietary choices that will not only reduce acidosis-caused bone loss, but will provide your body with the key nutrients it needs to build bone.

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Reducing acidosis could require revamping your entire diet, and that could take a good deal of discipline. You won't have to eat the gustatory equivalent of a hair shirt, but you will need to reduce the amount of acid-forming foods, such as meat, dairy, sugars, and most grains, in your diet and increase those with alkalizing powers, such as most fresh fruits and vegetables. Ideally you'll find a balance

that will allow you to eat a healthy variety of foods that won't need buffering with minerals from your bones. You can learn more about these types of dietary changes from *The Acid Alkaline Food Guide* by Susan E. Brown, PhD, and Larry Trivieri Jr. (Square One Publishers, 2006) and *Food and Our Bones* by Annemarie Colbin, MA, CHES (Plume, 1998).

The last component in building healthy bones involves providing your body with what the Osteoporosis Educational



Project calls the 19 key nutrients. The most important, surprisingly, turns out to be vitamin D, not calcium. That contradicts conventional medical wisdom and the best efforts of the dairy industry, but there isn't any proof that consuming more dairy products or taking calcium supplements alone reduces the risk of fracture. For years advertisers have told us that milk builds strong bones, and even the government's new dietary guidelines urge anyone older than 8 to drink three cups of low-fat or fat-free milk a day or the equivalent in yogurt or cheese. But the Nurses Health Study, which followed 72,000 women over 25 years, found that women who drank milk twice a day were as likely to suffer a fracture as those who drank it once a week. A similar study for men, the Health Professional Follow-up Study, failed to find a link between calcium intake and fractures, and a Swedish study of more than 60,000 women produced the same results. There is, however, one rather strong relationship: The countries with the highest level of dairy consumption, like the US and Sweden, have the lowest bone density measures and the highest rates of hip fractures. Got myth?

Your body still needs calcium, of course, but only in a form it can use, and only with adequate vitamin D to help absorb it. As Brown points out, "If you're low on vitamin D, you absorb

65 percent less calcium." So get tested for vitamin D deficiency, and either get outside in the sun (15 to 20 minutes of full-body exposure a day without sunscreen) or supplement with vitamin D3, a natural form of the vitamin found in cod liver oil—it's twice as potent as synthetic vitamin D. Other crucial nutrients include potassium, magnesium, and vitamin K.

Once you get past all the hype and fear mongering about osteoporosis, you're still left with the disease itself and a set of risk factors against which you can measure your own likelihood of facing fragility fractures as you age. Forward thinking healthcare practitioners are trying to steer the medical profession away from its reliance on DEXA tests and drug therapy for everyone. "The new edge," says Brown, "is to sort out who's really at risk and then to decide on the various types of treatments for those people." **AM**

James Keough is the manuscript editor of *Alternative Medicine*.

For a complete list of the 19 key nutrients and a bone-strengthening meal plan, go to "Web Exclusives" at www.alternativemedicine.com.