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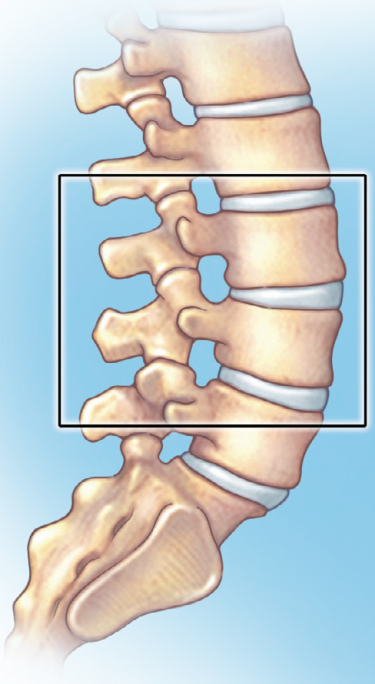
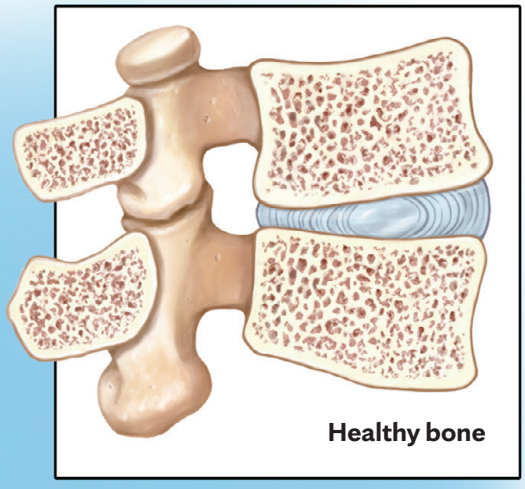
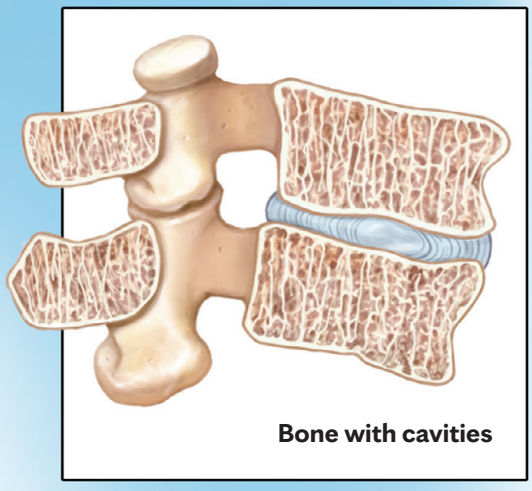


Special Report

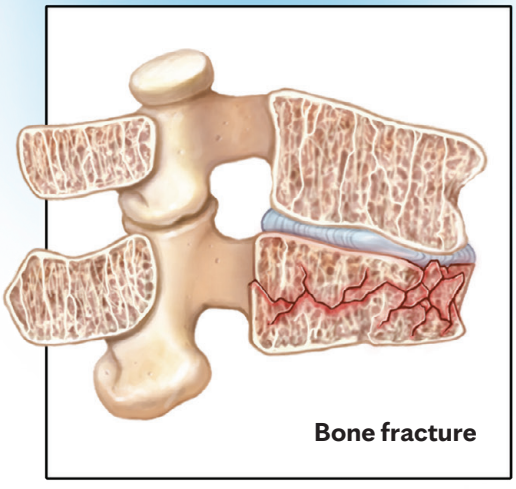
A supplement to Mayo Clinic Health Letter • November 2024



Healthy bone



Bone with cavities



Bone fracture

When you're young, your body adds more bone than it removes. Around age 30, bone building slows while bone removal speeds up. In some people, the mismatch between bone loss and bone gain can allow small cavities to grow. Bones can appear honeycombed, with large holes that make them more vulnerable to fractures.

Stronger bones

Newer, safer and more-effective options for osteoporosis

When Pamela W. was first diagnosed with osteoporosis, she wondered if there had been a mistake. What if the result stemmed more from her small body size than from bone weakness?

Still, upon the recommendation of healthcare professionals, Pamela tried various medications over the years to improve her bone health. However, side effects and other health concerns interrupted her treatment.

Then, nearly 15 years after her diagnosis, Pamela bent forward from a seated position. It was a bodily movement that her younger, stronger-boned self would have done easily. This time, however, there was a ripping sensation, loud noise and extreme pain. An X-ray showed three spine fractures.

"I've had three children by natural childbirth, and this was more painful," says Pamela, now 73.

Even after the bones eventually healed and the intense pain subsided, Pamela continued to deal with the effects of the fractures. The changes in the mechanics of her spine left less room for internal organs such as her stomach and diaphragm. If she ate a large meal, she felt out of breath.

"I felt helpless. It was life-changing," she says.

Each year, osteoporosis leads to about 9 million fractures like Pamela's. Typically, they occur in the spine, hip or wrist, though other bones can fracture. The good news is that the risk of disease can be reduced, and the disease is treatable. Healthy lifestyle approaches, sometimes along with medications, can slow the rate of bone loss and even reverse it. Even if you already have osteoporosis, good nutrition, exercise and medications can lower your chance of being sidelined with a broken bone.

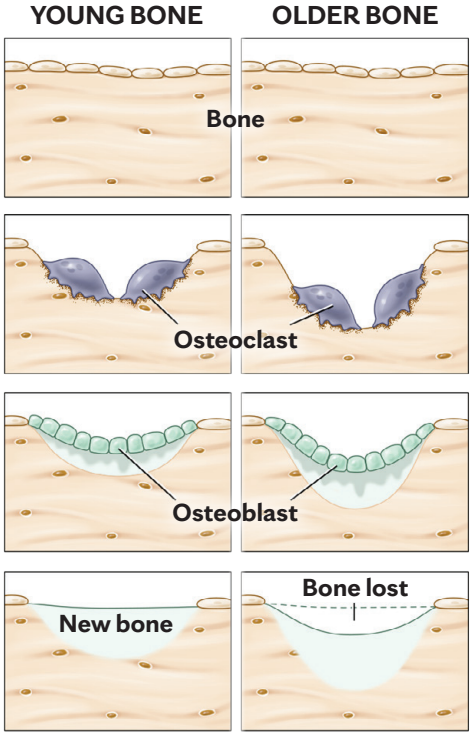
Bone anatomy

Your skeleton functions like a never-ending home repair project. Every day, specialized cells called osteoclasts break down old bone, leaving small cavities behind. Different cells, called osteoblasts, fill those cavities with collagen. Calcium and other minerals mix with the collagen. Then the mineral-collagen substance hardens.

Through this process, your bones renew and maintain themselves. This process completely regenerates your entire skeleton roughly every 5 to 10 years. When you're young, your body adds more bone than it removes. This allows tiny toddlers to grow into taller teenagers and then into young adults. Around age 30, however, bone building slows while bone removal speeds up.

"As you age, you have an imbalance, with more bone removal than bone building, so you end up losing bone," says Jad Sfeir, M.D., M.S., an endocrinologist and geriatrician at Mayo Clinic in Rochester, Minnesota.

Some age-related bone loss is expected, with many people initially losing 3% to 5% of bone each decade. Bone loss accelerates with menopause in women, who can lose as much as 20% to 30% of bone in the spine and 5% to 10% of bone in the forearm during the period around menopause. In most people, the mismatch between bone loss and bone gain can allow small cavities to grow. Bones can appear honeycombed, with enough gaps in their structure that make them more vulnerable to fractures.



How bones age

As you age, your body produces fewer bone-forming osteoblasts while levels of bone-removing osteoclasts go up. In addition, several other factors contribute to bone loss:

- *Calcium stores decrease* — As you age, your intestines gradually absorb less calcium from what you eat. The kidneys also appear to lose some of their ability to conserve calcium, so you also may lose more calcium in urine. In addition, some people are less tolerant of the sugar (lactose) in dairy products. As a result, they may reduce or stop their consumption of dairy products, resulting in less calcium intake.
- *Vitamin D production diminishes* — Vitamin D helps shuttle calcium into bones. The skin produces this vitamin when exposed to sunlight. However, skin becomes less efficient at synthesizing vitamin D from the sun's rays with age. In addition, the digestive system's ability to absorb vitamin D can decrease due to other health conditions. Absorption also is affected by liver and kidney health.
- *Hormone levels change* — The hormone estrogen slows bone breakdown. During the 5 to 7 years after the estrogen drop with menopause, women may lose around 10% or more of their overall bone mass. Although men don't experience comparable bone loss at midlife, estrogen levels do affect men's bone density as well.
- *Some medications accelerate bone loss* — People generally take more medications as they get older, and some of them can weaken bones. Common ones include corticosteroids such as prednisone, antiseizure drugs, and diuretics such as bumetanide (Bumex) or furosemide (Lasix). Others include proton pump inhibitors such as lansoprazole (Prevacid) or omeprazole (Prilosec), aromatase inhibitors used to treat or prevent breast cancer, and certain blood thinners. That's not to say you should stop taking these drugs. Rather, talk with your healthcare team to determine your risk and discuss strategies to balance that risk.

Falls and fractures

Without screening, it's hard to know if bones are weakened. You may not know until one breaks.

Fractures may occur in any bone, especially in a vertebra or the hip — bones that directly support weight. Fractures also may occur in the pelvis, thigh bone, wrist and upper arm bone.

Though these breaks can stem from falls, weakened bones also can fracture during activities and movements you would typically consider routine. In the spine, the vertebrae can lose so much bone density that they collapse or cave in during everyday activities such as coughing, sneezing or lifting. Some people break these spinal bones, as Pamela did, when bending forward, twisting or reaching for an object.

Though Pamela heard and felt her spine fracture, these breaks may be "silent" and involve no sounds or sensations. Many people don't know a fracture has happened until healthcare professionals remark on their loss of height or curved spine.

Screening

To measure bone density, you may have a dual-energy X-ray absorptiometry (DXA or DEXA) scan. This testing is recommended routinely for:

- Women age 65 and older.
- Women younger than 65 who have osteoporosis risk factors such as low body weight, fracture history, certain medication use or loss of height.
- Men age 70 and older who are at a higher risk of osteoporosis.
- Anyone who has a fracture after age 50.

The DXA scan uses X-rays to measure how much bone mineral content is packed into a square centimeter of bone in specific areas, including the bones of the lower back, upper leg and possibly the forearm. Generally, the higher your bone mineral content, the denser your bones. The denser your bones are, the less likely they are to fracture.

The radiation exposure from bone density testing is very low — equivalent to a standard X-ray. The test usually takes 10 to 30 minutes.

Understanding your test results

When you receive your DXA results, you'll see a T-score. This score represents how your bone density compares with the average bone density of a young adult with peak bone mass.

The T-score uses a measurement called standard deviations. If your T-score is 0.0, your bone density is average. That means you've lost very little bone since you were in your 20s. If it's -1.0, your bone density is lower than average by one standard deviation. This is considered typical age-related bone loss. (See "What T-scores represent," top of page).

A T-score between -1.0 and -2.5 is considered low bone mass, also called osteopenia. Having low bone mass doesn't guarantee that you'll develop osteoporosis or break a bone. But it can be a warning sign to take action.

Your healthcare team evaluates your risk of fracture using tools such as the Fracture Risk Assessment Tool (FRAX). FRAX is used to predict your risk of breaking a bone in the next 10 years based on information such as your T-score, age, sex, weight, height, personal and family fracture history, medication use, alcohol use, and smoking history. For example, a 53-year-old woman of moderate build with few, if any, osteoporosis risk factors might be considered to have low to moderate risk of having a fracture, despite having a T-score in the osteopenia range. On the other hand, an 83-year-old woman with the

WHAT T-SCORES REPRESENT	
-1.0 and above	Normal bone density and low fracture risk
Between -1.0 and -2.5	Low bone mass (osteopenia) and increased fracture risk
-2.5 and below	Osteoporosis and high fracture risk

CHOOSING CALCIUM SUPPLEMENTS

Ideally, you can get calcium from food rather than from a supplement, says Ann Kearns, M.D., Ph.D., an emeritus endocrinologist at Mayo Clinic in Rochester, Minnesota. That's because foods rich in calcium generally also contain other vital nutrients. For example, milk also provides protein; vitamins A, D and B-12; magnesium; riboflavin; potassium; and zinc.

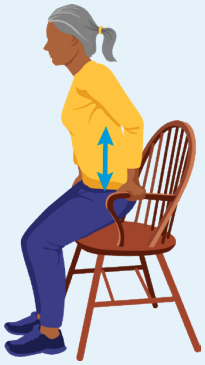
If, however, you can't consume enough calcium from food alone, a supplement might make sense. When choosing a supplement:

- *Check the Supplement Facts label* — Make sure you read supplement labels carefully, as the serving size may be more than one pill and the amounts listed are per serving. In addition, different calcium forms offer varying amounts of elemental calcium. For example, calcium carbonate is 40% elemental calcium. That means a supplement that provides 1,250 milligrams (mg) of calcium carbonate has only 500 mg of elemental calcium. Your body won't absorb more than 500 to 600 mg of calcium at one time, so you don't need a supplement that provides more than this amount.

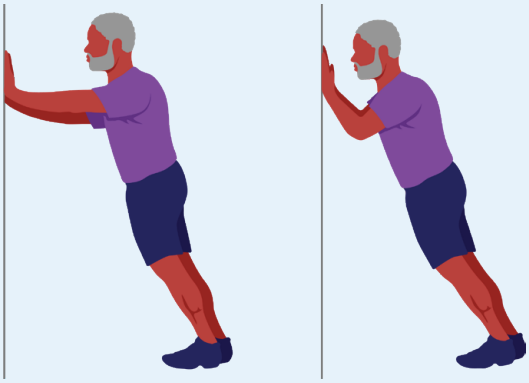
Calcium compound	Amount of elemental calcium in 1,250 mg
Calcium carbonate (40% elemental calcium)	500 mg
Calcium citrate (21% elemental calcium)	263 mg
Calcium gluconate (9% elemental calcium)	113 mg
Calcium lactate (13% elemental calcium)	163 mg
Calcium phosphate (39% elemental calcium)	488 mg

- *Experiment with different types of calcium* — Supplements with calcium carbonate tend to be the least expensive and contain the most elemental calcium. That makes them an excellent first choice. However, some people find this form of calcium causes constipation. Calcium citrate, which contains about half as much elemental calcium, may be easier on the digestive system. Calcium citrate also may be better absorbed if you take medication that reduces stomach acid, such as proton pump inhibitors.
- *Consider quality* — Some companies have their products independently tested by the U.S. Pharmacopeial Convention (USP), ConsumerLab.com (CL) or NSF International. Brands with these stamps of approval meet voluntary industry standards for manufacturing quality and purity.

EXERCISES TO STRENGTHEN BONES AND MUSCLES



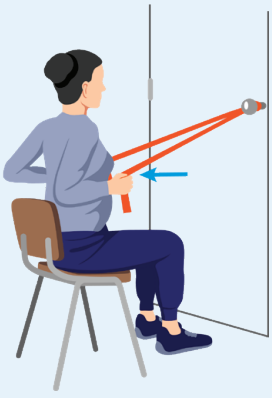
Chair up and downs — Use only your arms to raise your body from a seated position. Hold for 10 seconds. Relax and repeat.



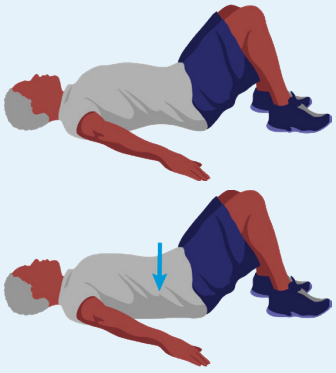
Wall pushups — Stand far enough away from a wall that you can place your palms on it with your elbows slightly bent. Keep your feet flat. Slowly bend your elbows and lean forward, supporting your weight with your arms. Try to keep your back straight. Straighten your arms and repeat.

Low back extensions — Kneel on your hands and knees. Keep your knee bent at 90 degrees. Then raise one leg at the hip and bring the sole of your foot toward the ceiling until your thigh is parallel with the floor. Keep your trunk straight. Maintain this position for five seconds. Lower your leg and repeat with the other leg, switching back and forth.

Biceps curls — Sit with a dumbbell in each hand. Start with your arms extended and at your sides. Bend one arm at the elbow, lifting the weight to your shoulder while keeping your elbow close to your torso. Lower the weight slowly. Repeat with the other arm, switching back and forth. Increase the weight as your strength improves.



Upper back extensions — Sit upright with a resistance band looped around a stable object such as a doorknob or a staircase banister. Grab the band in each hand. Squeeze your shoulder blades together as you pull the band toward your belly button with your arms bent at 90 degrees. Hold for five seconds. Relax and repeat.



Pelvic tilts — Lie on your back with your knees bent and feet flat. Tighten your abdomen as you roll your pelvis down, flattening the small of your back against the floor. Avoid using your leg and buttocks muscles. Relax and repeat.

same T-score who smokes, drinks alcohol and has a family history of hip fracture would have a much higher risk of a future break, says Dr. Sfeir.

Depending on your DXA score and fracture risk, your healthcare team may recommend retesting in about two years. If steps to improve your bone health have kept your T-score stable or improved it, your chance of developing osteoporosis may depend on how long you live and your health as you age.

Exercise: An essential bone protector

Weight-bearing exercise ranks as one of the most important ways to keep bones strong, says Ann Kearns, M.D., Ph.D., an emeritus endocrinologist at Mayo Clinic in Rochester, Minnesota.

When you do activities that put stress on your bones — whether it's hitting a tennis ball or doing squats — you stimulate those vital bone-building osteoblasts. This is why the bones in a tennis player's dominant arm are usually larger and denser than those in the other arm. Conversely, people on bed rest lose bone strength quickly due to lack of activity.

In addition, regular physical activity builds muscle, which cushions bones, improves balance and prevents falls, Dr. Kearns says.

Choose weight-bearing exercises

Weight-bearing movements include walking, climbing stairs, dancing and other movements you do on your feet. They also include resistance exercises such as weightlifting. These movements have an added benefit of strengthening the back because you use muscles around your spine to stay upright during activity.

For best results:

- Do 30 minutes of weight-bearing exercise most days of the week.
- Include resistance exercises 2 to 3 times a week.

Move safely

If you've been diagnosed with osteoporosis, you may want to consult a physical therapist or exercise physiologist who specializes in helping people with osteoporosis. These health professionals can show you exercises to help you strengthen your body and bones safely. Generally, you'll want to gravitate toward low-impact, weight-bearing activities such as walking, elliptical or stair step machines, low-impact aerobics, tai chi, dancing, light gardening, deep-water walking, and water aerobics.

Depending on the severity of your osteoporosis, the healthcare professional may recommend that you avoid risky movements that put undue stress on the spine. These might include:

- Forward bending, such as abdominal crunches and toe touches.
- Twisting motions such as those used during golfing, bowling and some yoga postures.
- Heavy lifting, such as opening windows or carrying heavy bags.

To strengthen your muscles and bones safely, you might try the exercise routine shown on page 4. Aim for 3 to 10 repetitions of each exercise.

Nutrition: Eating for healthy bones

Like any living tissue, bones need nutrients so they can grow and maintain strength. Calcium and vitamin D receive the most attention for their roles in preventing and treating osteoporosis, but other nutrients play supporting roles. Here are key recommendations for a diet that enriches your bones.

Consume foods rich in calcium

Calcium is a mineral that helps bones stay strong. Women older than 50 and men over 70 need 1,200 milligrams (mg) a day. However, most people consume less than that amount, with women getting about 800 mg and men getting about 1,000 mg.

To ensure that you get enough, try to include a calcium-rich food at every meal. To learn how much calcium is in your food, check the Nutrition Facts label on packaged foods. It will list a serving size and the amount of calcium that one serving of the food provides.

Dairy products play a starring role in a calcium-rich diet. (See "Calcium content of common foods," below.) So if your diet restricts or omits dairy, consider taking a supplement, says Dr. Kearns.

Get more vitamin D

Vitamin D helps lock calcium into your bones. Ultraviolet radiation from the sun stimulates your skin to synthesize vitamin D. Generally, 5 to 30 minutes of midday sun exposure on your face, hands and arms at least twice a week is enough to help your body produce the vitamin D it needs.

However, if your sun exposure is limited because of culture, clothing, sunscreen use or lifestyle, you may not be getting enough vitamin D. Similarly, in the Northern Hemisphere, if you live north of the 37th parallel, your skin can't make enough D from September to May due to the low angle of the sun. Because pigment protects the skin from ultraviolet light, people with Black or brown skin may produce less vitamin D as well. On top of this, only a few foods are rich in vitamin D. These include fortified milk, fatty fish, fish liver oils, liver and egg yolks.

If you suspect you're not getting enough vitamin D from the sun or food, talk with your healthcare team about whether a supplement makes sense. Look for a supplement that supplies 800 to 1,000 IU — equaling 20 to 25 micrograms (mcg) — a day or follow the advice of your care team.

Eat more vegetables, fruits and grains

Vegetables, fruits, and whole grains are generally lower in calories and fat and are often high in fiber and essential vitamins and minerals. They also contain phytochemicals, which are substances that can protect against various diseases, including osteoporosis.

CALCIUM CONTENT OF COMMON FOODS

1 cup plain, low-fat yogurt	450 mg
1 cup fat-free milk	300 mg
1 cup calcium-fortified soy milk or orange juice	300 mg
1/2 cup tofu	250 mg
3 ounces salmon	240 mg
1 cup kale, cooked	175 mg
1 cup great northern beans, cooked	120 mg
1 cup broccoli, cooked	75 mg
3 ounces shrimp	60 mg

Each day, aim for:

- Four or more servings of vegetables.
- Three or more servings of fruit.
- 5 to 10 ounces of whole grains.

Aim for adequate protein

Protein is one of the building blocks of bone and is essential for building and repairing tissue. Protein also aids in fracture healing and is necessary for the body's immune system to function.

It's important to focus on lean types of protein. Good choices include plant proteins — such as beans, lentils, soy and nuts — and fish, poultry and lean cuts of meat. Plant proteins are rich in vitamins, minerals and plant compounds that help preserve bone.

Aim for a total amount of 5 to 7 ounces of protein-rich foods daily.

Limit added sugar, salt and phosphorus

Consuming too much sodium can increase the amount of calcium you excrete in your urine Phosphorus can interfere with how much calcium is absorbed through your small intestine.

The recommended daily amount of sodium is no more than 2,300 mg, which is equivalent to 1 teaspoon of salt. Reigning in sodium involves doing more than limiting what comes from your saltshaker. Sodium is present in high amounts in many processed foods. So is phosphorus.

Do you need medicine?

In recent decades, medications for osteoporosis prevention and treatment have become safer and more effective. There are three main categories.

Antiresorptive medications

These medicines help prevent bone breakdown, preserve bone mass and reduce fracture risk. When you take an antiresorptive medicine, the rate at which you lose bone mass slows, and your bone density typically stabilizes as a result. The many classes of antiresorptive medicines include:

- Bisphosphonates such as alendronate (Fosamax), ibandronate, risedronate (Actonel, Atelvia) and zoledronic acid (Reclast).
- The RANK ligand inhibitor denosumab (Prolia).
- Hormone therapy, which is typically used in women younger than 60, especially if they have other menopause-related symptoms that also require treatment.
- The selective estrogen receptor modulator (SERM) raloxifene (Evista).
- The tissue-selective estrogen complex (TSEC) estrogen-bazedoxifene (Duavee).

Bisphosphonates are often the preferred antiresorptive medicines because of their effectiveness, relatively low cost and long-term safety data. The drugs are available as tablets and liquids taken daily, weekly or monthly; a shot given every three months; and an infusion given once every year or two.

Bisphosphonates may increase bone density of the lumbar spine by about 5% to 10%. They also reduce the risk of new spinal fractures by 40% to 70%, and some can reduce hip fractures by about 30% to 40%.

Side effects of these drugs include gastrointestinal upset and pain in the joints and muscles. Much more rarely, some people have experienced jawbone deterioration and thigh bone fractures. However, the risk of these extremely rare complications can be reduced by taking a break — known as a drug holiday — after five years of treatment. (See "Is it time for a drug holiday?" this page.)

Anabolic medications

Bone-building (anabolic) therapies work by boosting bone formation.

IS IT TIME FOR A DRUG HOLIDAY?

Bisphosphonates and other antiresorptive drugs can help prevent loss of bone density and treat osteoporosis. However, long-term use of some of these drugs has been linked to two extremely rare bone problems:

- *Fracture of the upper thighbone* — This injury, known as atypical femoral fracture, can cause pain in the thigh or groin. This side effect is very rare, but the risk is higher in people who have taken antiresorptive medication for more than five years, in women of Asian descent, and in people taking glucocorticoids for one year or longer.
- *Deterioration of the jawbone* — Osteonecrosis of the jaw is a rare condition in which a section of the jawbone dies and deteriorates. This can result in an open wound, generally after invasive oral surgery such as a tooth extraction. The risk is higher in people who take frequent doses of the medication by vein (intravenously) to treat cancer in their bones versus the lower frequency that typically is used for osteoporosis. The risk of osteonecrosis of the jaw with regular use of bisphosphonates for osteoporosis is very small.

Because of these risks, your healthcare team may recommend that you take a drug holiday, which is a break from bisphosphonate treatment. A bisphosphonate drug holiday reduces the risk of complications. Stopping bisphosphonates for even one year reduces the risk of atypical femur fracture by 70%. Several studies have suggested that these drug holidays harness the drugs' effectiveness while sidestepping prolonged complications.

However, drug holidays are only applicable to bisphosphonate drugs and not to other osteoporosis medications, including other antiresorptive medicines. That's because bisphosphonates function by firmly attaching to affected bone areas to prevent further bone breakdown. So even when you stop taking the drug, this newly built bone stays in place. Bisphosphonates take several years to completely get out of the bone.

Ann Kearns, M.D., Ph.D., is an emeritus endocrinologist at Mayo Clinic in Rochester, Minnesota. Here, she answers questions on osteoporosis.

Q: If people learn they have osteopenia or osteoporosis, do they need to see a specialist?
A: Primary care professionals must know about a lot of things. Someone like me gets to know one aspect of medicine in depth. There probably isn't a question about bone health that I haven't been asked.

However, not everyone with osteoporosis needs a specialist. Some primary care professionals are very comfortable initially treating people with osteoporosis. Others aren't as comfortable, so they refer people with osteoporosis to an endocrinologist, geriatrician or other healthcare professional specializing in bone health.

Q: Some people avoid osteoporosis medications because of the potential risks. Are those fears overblown?
A: For some people, medication is a hard stop. I'm in the business of providing information, not the business of twisting arms. So when someone is hesitant to try medication, I talk about the role fractures and muscle weakness play in disability and loss of independence. I explain that diet and exercise play an important role — but they aren't always enough. Finally, I talk about how medications really are very effective, as well as very safe.

Safety also has improved because the way bisphosphonates are prescribed has changed. It's now known that bisphosphonates last in the bones for a long time. So rather than staying on one long-term, it may be prescribed for just a few years to see how your bones do.

Q: Why do drug holidays only apply to bisphosphonates and not to other osteoporosis medicines?
A: With the other medicines, the positive effects start to go away as soon as you stop the drug. In that case, people usually transition from one drug to another.

Q: What about hormone therapy? Does it benefit bones?
A: According to multiple studies, estrogen replacement works to prevent broken bones. Higher estrogen doses lead to higher benefits in bones. However, higher estrogen doses also involve higher risk of side effects such as blood clots. There are trade-offs. However, for younger women who have menopause symptoms, it's generally safe. Estrogen therapy can help prevent some diseases, with bone health being the clear winner. As with any medication, a careful discussion with your healthcare team can help you assess your individual benefit and risks.

Q: Are there any osteoporosis myths that you'd like to dispel?
A: There's a myth that all supplements are safe and effective. In reality, experts don't know all of the pros and cons of most supplements.

Because of the knowledge gaps, I'm generally not a fan of using a lot of supplements — outside of calcium and vitamin D — because they are not well studied. Nor are they well regulated. So it can't be assumed that they are safe. On the other hand, much is known about the safety and effectiveness of prescription medicines for osteoporosis.

Ann Kearns, M.D., Ph.D.

That can help new bone growth outpace bone loss, increasing bone mass and density. This class includes the following medications, which are given by injection:

- *Teriparatide (Forteo)* — This drug is similar to the body's parathyroid hormone (PTH), which plays a critical role in bone health and the maintenance of blood calcium levels.
- *Abaloparatide (Tymlos)* — This medicine contains a component that has similar actions to PTH in bones and to parathyroid hormone-related peptide (PTHrP) in the kidneys.

Teriparatide and abaloparatide stimulate osteoblast cells to increase new bone formation. Abaloparatide may result in a slightly greater increase in bone density compared with teriparatide, although it has not been shown to be more effective at reducing fractures. Researchers studying postmenopausal women with osteoporosis and a history of spinal fractures have found that daily injections of these medications, along with calcium and vitamin D supplementation, increased bone density of the spine and hip bone.

Because the long-term safety and effectiveness of abaloparatide are not known, the U.S. Food and Drug Administration advises that treatment should not last more than two years. Longer treatment with teriparatide may be considered for people who remain at high risk of fracture. After you stop taking these medications, you typically start taking an antiresorptive drug to help maintain improved bone mass.

Dual-acting medicines
Until recently, osteoporosis therapies worked by either promoting bone

formation or slowing bone resorption. Romosozumab (Evenity) is the first drug to do both.

It's an antibody to sclerostin, a naturally occurring protein produced in specific bone cells. Sclerostin controls bone mass by reducing the activity of bone-forming osteoblasts. Romosozumab binds to and blocks sclerostin. Think of it like taking your foot off the brake pedal in your car.

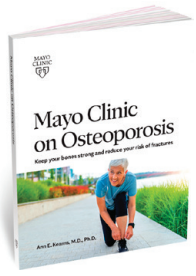
In addition, the medication slows the rate at which the body breaks down bone. Romosozumab, a monthly injection, can be taken for up to one year. Because the bone-building effects of the drug disappear quickly once you stop taking it, your care team then prescribes an antiresorptive therapy to protect the bone that's been built.

Weighing the pros and cons

For many people, the side effects of osteoporosis medicines are mild and manageable. However, occasionally, some people need to try several medicines and doses before finding one that works for them.

For example, Pamela first tried taking alendronate, a bisphosphonate, but couldn't keep taking it due to severe acid reflux and dizziness. Then she tried teriparatide, an anabolic medicine, but it worsened a preexisting heart condition. Eventually, by working closely with her doctor, she started taking a very low dose of abaloparatide, another anabolic medicine, slowly working her way up to a full dose. After 18 months, her spinal T-score had improved 20%.

"These medications can be very effective," says Pamela. "People are afraid of the side effects, which I understand. I've had most of the side effects, and I will say, fractures are worse." She continues: "Some people with osteopenia may want to try holistic methods. But for anyone who needs medication, as many people do, the message is you can make it work. Find a doctor who is flexible and who understands you. Keep persisting."



For more essential information on osteoporosis, look to *Mayo Clinic on Osteoporosis*, available at MCPress.MayoClinic.org.

Avoiding fractures

With osteoporosis, you're at a greater risk of injury from movements that involve twisting, lifting, carrying or bending. But needing to be a little more cautious doesn't mean you should stop being active. Take these precautions:

- *Lift safely* — Try not to round your back as you make the bed, tie your shoes, pull weeds or reach down to pick up objects. Instead, keep your back straight as you bend at the knees to reach down. Carry heavier objects close to your body.
- *Work on your posture* — Poor posture increases strain on your muscles and bones, causes fatigue, and makes you more prone to injury. Stand tall with your weight evenly distributed on both feet. When raking, sweeping or mopping, stand with one foot forward and move mostly with your arms and legs rather than with your back. When seated, the chair seat should be high enough that your thighs are horizontal on the seat and your feet flat on the floor. If you're in bucket seats or soft chairs, use a thick, rolled-up towel or pillow to support your lower back.
- *Support coughs and sneezes* — The force of a cough or sneeze can cause you to jerk forward. If your bones are weak, this could result in a spinal compression fracture. Get in the habit of placing one hand on the front of your chest or your thigh for support when you cough or sneeze.
- *Change how you sleep* — When lying down, use pillows to maintain your spine's natural curvature, as shown. In addition, avoid positions that can aggravate your back. If you sleep on your back, pay attention to how you sit up or get out of bed. Avoid lifting your head and upper back, which rounds the spine. Instead, roll to your side first and then use your arms to help you sit up.

SUPPORTIVE SLEEP POSITIONS

Sleep on your side with your thighs slightly drawn up toward your chest. Place a pillow between your legs.

If you sleep on your back, support your knees and neck with a pillow.

Sleep on your stomach only if a pillow cushions your abdomen.

Hardy and staying strong

An osteoporosis diagnosis can be life-changing, says Pamela, but it doesn't have to keep you on the sidelines.

To protect her bones, Pamela avoids twisting and bending. She asks for help opening windows. She slides pots along the counter rather than lifting them, and she carries only a few items at a time. To maintain strength, she walks 10 miles twice a week and regularly practices tai chi sword form.

"I've come up with ways to get things done," says Pamela. "For a fragile person, I'm pretty hardy." ■

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