

Osteoporosis and Fragility Fracture

Osteoporosis makes bones weak and hollow inside like a sponge losing its struts, so get a DEXA scan (a special X-ray that measures how thick your bones are) at 65 for women or 70 for men, take 1,000 to 1,200 mg of calcium and 800 to 1,000 units of vitamin D every day, do weight-bearing exercise like walking, and start a bisphosphonate pill (like alendronate) or a denosumab shot if your T-score is minus 2.5 or lower or if you already broke a bone from a small fall.

THE ONE-LINE TRUTH

Bones become thin and full of tiny holes inside, so they break from small bumps or falls that would never hurt a healthy person.

The chain — how it unfolds

1. Estrogen drops after menopause, or steroids like prednisone are started, or aging slows the builder cells, or calcium and vitamin D intake runs too low for years. — why: Each of these triggers tips the bone remodeling balance so osteoclasts (digger cells) carve out more bone than osteoblasts (builder cells) can replace—nothing hurts yet because bone itself has no nerve endings to send pain signals, and blood calcium stays normal because the body just pulls more calcium out of the thinning skeleton.
2. Over months to years, tiny holes spread through the trabecular bone (the spongy inner part that looks like a honeycomb), making it thinner and weaker inside while the outer cortical shell (the hard outer layer) still looks normal on the outside. — why: The diggers hollow out the bone's internal struts faster than the builders can fill them back in, so bone mineral density falls and the skeleton loses its strength like a sponge losing its framework—but you feel fine and have no idea this is happening because there are no symptoms.
3. The first fracture happens from a small fall from standing height or less, a sneeze, a cough, or lifting something light—most often in the spine (vertebral compression fracture), wrist (Colles fracture, named after the surgeon who described it), or hip (femoral neck or intertrochanteric fracture). — why: When bone mineral density drops below a critical point (T-score ≤ -2.5 on a DEXA scan), bones cannot handle normal everyday stress anymore, so forces that would never break healthy bone—like body weight squishing down on a vertebra or the twist of catching yourself in a fall—now snap the weak, hollowed-out skeleton.

4. Spine fractures cause the vertebrae (the small bones stacked up to make your backbone) to collapse and wedge forward, so the person loses height (sometimes one to three inches over years), develops a hunched-forward back called kyphosis (a dowager's hump), and has chronic aching or sharp pain in the mid or lower back. — why: Each vertebra is mostly spongy trabecular bone, so when it thins, body weight crushes it like stepping on a marshmallow, and the spine curves forward because the front of the bone collapses more than the back, which also squashes the lungs and belly and makes breathing and eating harder.
5. Hip fractures almost always happen from a fall and require surgery (a metal rod and screws to hold the bone together, or a hip replacement); many people never walk independently again, lose the ability to live alone, and twenty to thirty percent die within one year from pneumonia, blood clots in the legs or lungs, or muscle wasting from being stuck in bed. — why: The femoral neck (the narrow part of the thighbone just below the ball of the hip joint) is under constant stress from body weight every time you stand or walk, so when it thins, even a small fall from standing snaps it, and the long, painful recovery keeps people in bed or a wheelchair, where immobility causes life-threatening complications like pressure sores, pneumonia from shallow breathing, and a clot in a deep leg vein (deep vein thrombosis).
6. After one fracture, the risk of another fracture doubles within the next year, because the rest of the skeleton is just as thin and fragile and the person may move less out of fear or pain, which thins bones even more because bones need weight-bearing stress to stay strong. — why: Osteoporosis is a whole-body problem, not a single weak spot, so every bone is at risk, and the cycle of fracture → fear → less activity → weaker bones → more fractures keeps spinning unless treatment stops it—this is why the first fracture is called a 'sentinel event' that demands immediate action.
7. Bisphosphonates (like alendronate or risedronate pills once a week, ibandronate once a month, or zoledronic acid IV once a year), denosumab (a shot under the skin every six months that blocks RANKL to stop osteoclasts), romosozumab (a shot that builds bone fast for one year in very high-risk patients), calcium (1,000 to 1,200 mg a day from food or pills), vitamin D (800 to 1,000 units a day), and weight-bearing exercise like walking, dancing, or lifting light weights slow or stop the bone loss, rebuild density by five to ten percent, and cut fracture risk in half. — why: These treatments put the brakes back on osteoclasts or give builders the raw materials and signals they need, so bone remodeling tips back toward building instead of breaking down, and the skeleton gets thicker and stronger again—fixing the one broken step upstream (the imbalance between diggers and builders) stops all the dominoes from falling and prevents the fractures that steal independence and shorten life.

Spot it — what you see, and why

- Silent bone loss with no pain or warning: Bones slowly lose their inner scaffold (the spongy mesh inside called trabecular bone) and become thin and fragile, but nerves in bone don't signal this loss until a break happens—so you can't feel it happening.
- Fracture from a minor fall or bump (fragility fracture): When bone loses its mineral density and inner structure, even a small force—like falling from standing height or bumping into furniture—can snap it. The hip, spine, and wrist are the most common spots because they bear a lot of stress.
- Loss of height over time (getting shorter): The vertebrae (the stacked bones in the spine) can collapse or compress when they become too weak to hold the body's weight, making the spine shorter and the person lose inches in height over months or years.
- Sudden sharp back pain (especially mid or lower back): A vertebra in the spine can crack or collapse (called a vertebral compression fracture) from the weight of the body or even just bending forward or lifting something light, causing sudden, knife-like pain.
- Stooped or hunched posture (kyphosis): Multiple vertebrae in the upper back collapse and wedge forward, curving the spine and creating a rounded hump (sometimes called a dowager's hump). This happens because the front of each vertebra crumbles more than the back.
- Bone pain or tenderness in the spine, hips, or ribs: Tiny cracks (microfractures) or a full fracture in weakened bone can cause constant aching or sharp pain when you touch the area or move. The bone is trying to heal, and that process triggers pain signals.

Red flags — act now

- Fracture from a fall from standing height or less (suggests severe bone fragility and very high risk for more fractures)
- Sudden severe back pain after bending, lifting, or coughing (may be a vertebral compression fracture—needs imaging right away)
- Loss of more than 1.5 inches in height or new stooped posture (suggests multiple spine fractures have already happened)
- Hip fracture (very high risk for disability and death, especially in older adults—about 20% of hip fracture patients die within one year)
- Multiple fractures or fractures in unusual places like the ribs or pelvis (may signal severe osteoporosis or a secondary cause like cancer, hyperparathyroidism, or multiple myeloma)

Treat it — in this order

1. Calcium 1000–1200 mg daily (from diet + supplement if needed) and vitamin D 800–1000 IU daily → Gives bones the raw calcium they need to rebuild, and vitamin D helps the gut absorb that calcium. Without enough of both, bone-building cells (osteoblasts) cannot lay down new bone to replace what is lost each day.
2. Weight-bearing and resistance exercise (walking, jogging, dancing, lifting weights) most days → Physical stress on bones tells osteoblasts to build more bone and keep it thick. Regular load-bearing activity tips the balance toward building and slows age-related bone loss.
3. Bisphosphonates (alendronate, risedronate, or zoledronic acid) for T-score ≤ -2.5 , prior fragility fracture, or high FRAX score → These drugs stick to bone and poison the osteoclasts (bone-breakdown cells), slowing their work. This tips the balance toward building, so bone density climbs 3–5% over 1–3 years and fracture risk drops by roughly 50%.
4. Fall prevention — home safety check (remove rugs, add grab bars, improve lighting), vision correction, balance training, and review medications that cause dizziness (sedatives, blood-pressure pills) → Stops the fracture trigger. Even weak bones will not break if the person never falls. Reducing fall risk cuts fracture events as much as bone drugs do in many studies.
5. Denosumab (Prolia) 60 mg subcutaneous every 6 months, if bisphosphonates fail, cause side effects, or cannot be used (severe kidney disease) → Blocks RANKL (the signal that turns on osteoclasts), so bone-breakdown cells never form. Bone density rises more than with bisphosphonates (up to 8–10% in 3 years), and spine-fracture risk drops sharply.

Your top priorities at the bedside

1. Assess for acute vertebral fracture by asking about new or sudden back pain, checking height loss greater than 1.5 inches from younger adult height, and observing for kyphosis (forward curve of upper back) — why: Vertebral compression fractures cause severe pain and disability but are often missed because they can happen without trauma; early detection allows pain control and prevents additional spine fractures that occur in 20 percent of patients within one year
2. Complete fall-risk assessment including gait observation, home safety review (loose rugs, poor lighting, bathroom grab bars), vision screening, and medication review for drugs causing dizziness like sedatives and blood pressure pills — why: Falls cause 90 percent of hip fractures; identifying and fixing fall hazards prevents fractures even in patients with low bone density, and some fracture risk comes from falling rather than bone weakness alone

3. Teach proper bisphosphonate administration if prescribed: take first thing in morning on empty stomach with full glass of plain water, stay upright (sitting or standing) for 30 minutes, no food or drink except water during that time — why: Bisphosphonates are poorly absorbed (only 1 percent gets into body), and lying down or eating blocks absorption completely; staying upright prevents esophagitis (irritation of the swallowing tube) and ulcers that cause severe chest pain