



STAYING HEALTHY

Osteoporosis Prevention and Treatment

Bone is a living tissue, composed mainly calcium and proteins. Healthy bone is continuously being remodeled; that is, small amounts are being absorbed in your body and small amounts are being replaced.

If more bone calcium is absorbed than is replaced, the bone's density, or mass, is reduced. The bone becomes progressively weaker, increasing the risk that it may break.

<u>Osteoporosis(/en/diseases--conditions/osteoporosis/)</u> means "porous bone." This condition develops when bone is no longer replaced as quickly as it is removed.

Cause

More than 2 million osteoporosis-related fractures

(/en/diseases--conditions/fractures-broken-bones/) occur each year. Many people are unaware that they have osteoporosis until they suffer a fracture.

The exact medical cause for osteoporosis is not known, but many factors are known to contribute to osteoporosis, including:

- Aging
- A sedentary lifestyle (lack of physical inactivity)
- Reduced levels of estrogen
- Heredity
- Excessive use of cortisone or thyroid hormone
- <u>Smoking(/en/staying-healthy/smoking-and-musculoskeletal-health/)</u>
- Excessive alcohol intake

The loss of bone tends to occur most in the spine, lower forearm above the wrist, and upper femur or thigh — the site of hip fractures. <u>Spine fractures</u>

(/en/diseases--conditions/osteoporosis-and-spinal-fractures/), <u>wrist fractures</u> (/en/diseases--conditions/distal-radius-fractures-broken-wrist/), and <u>hip fractures</u> (/en/diseases--conditions/hip-fractures/) are common injuries in older adults.

Everyone inevitably experiences a gradual loss of bone mass, generally beginning about age 35. After growth is complete, women ultimately lose 30 to 50% of their bone density, and men lose 20 to 30%.

Women lose bone calcium at an accelerated pace once they go through menopause. Menstrual periods stop because a woman's body produces less estrogen hormone, which is important for maintaining bone mass or bone strength. Your family doctor or gynecologist may recommend a treatment program of estrogen replacement therapy, calcitonin, or other medications for you. To be most effective, the treatment program should begin at menopause.

Prevention

The goal in osteoporosis prevention is to slow down the loss of bone strength over time to reduce the risk of fractures. You can strengthen your bones with certain exercises, lifestyle changes, and, in some cases, bone medications. Improving muscle strength and balance can also help prevent falls that lead to fractures and disability.

Exercise

Weight-bearing exercise is the most important type of exercise for preventing osteoporosis. Your body supports its own weight against gravity, and the load of gravity on your bones activates bone cells to strengthen weaker areas. That is why astronauts can lose bone when they are in outer space, where gravity has much less force.

Doing regular weight-bearing exercise after young adulthood can help prevent further bone loss and strengthen bone. It also strengthens your muscles and reduces your risk of falls.

If you have osteoporosis or osteopenia (now called low bone mass), these are some good weightbearing exercises to try:

- Walking on level ground or a treadmill
- Hiking (use a walking stick for extra support, if needed)
- Walking in place in the corner of a room, holding the back of a chair, if necessary, for balance

- Running on level ground or a treadmill
- Climbing stairs (use the handrails for safety)
- Dancing, including aerobics or Zumba
- Lifting weights without straining your back (lying down can protect your vertebrae)
- Doing sit-to-stand exercises starting with an elevated seat height, and progressing to a lower chair as your legs get stronger
- Standing against a wall and sliding down into a slight knee bend, holding that position for 10 seconds, and repeating this a few times (you can hold the back of a chair, if necessary, for support). This can strengthen your thigh
- Yoga and Tai-chi for balance and strengthening

Lifestyle Changes

Quit smoking – <u>Smoking(/en/staying-healthy/smoking-and-musculoskeletal-health/)</u> is a major contributor to osteoporosis:

- It acts directly on bone-forming cells to decrease bone formation
- It contributes to poor nutrition by suppressing your appetite
- It affects estrogen metabolism and can even result in earlier menopause
- It can slow the healing of fractures

Limit alcohol consumption – Don't exceed the recommended amount of alcohol (1 daily drink for women and 2 for men):

- Drinking excessively increases your risk of falling and breaking a bone
- Alcohol can fill you up and keep you from eating healthy foods that contribute to strong bones

Prevent falls – Because loss of bone strength increases your risk of fractures, falling is more hazardous for people with osteoporosis than for those with healthy bones. You are more likely to break a bone in a minor fall. And if you break a large bone, such as your hip, you could have serious problems. About half the people who <u>break a hip</u>(/en/diseases--conditions/hip-fractures/) never walk again without a cane or walker, and many people lose their independence after major fractures.

To help <u>prevent falls</u>(/en/staying-healthy/guidelines-for-preventing-falls/):

• Do exercises, like Tai chi and yoga, to help improve your balance. Non-weight-bearing exercises like swimming and biking can also help strengthen your muscles and improve your balance.

- If you have more serious balance issues, you may benefit from having a physical therapist work with you on balance training and strengthening.
- Look at your home environment and address anything that could contribute to falls, such as slippery surfaces (floors, shower, icy pathways, etc.), loose rugs, step-ups or step-downs (stairs, bathtubs, etc.), and tripping hazards (low furniture, cords, boxes, indoor pets, etc.).

Treatment

Your physician can evaluate whether you have low bone density and determine the cause. Early treatment for osteoporosis is the most effective way to slow bone loss and prevent fractures. However, treatment programs after a fracture also are of value and may help to prevent future fractures.

Medications

Most osteoporosis medications do not replace the bone you have already lost. However, they can help you prevent fractures and disability.

The most commonly used medications slow bone loss by decreasing the amount of bone your body is reabsorbing, which improves the bone remodeling balance in the skeleton. This protects the architecture of the bone from worsening.

You might need prescription medicines to treat osteoporosis if you are:

- A woman who has gone through menopause (your periods have stopped)
- A man over the age of 50

And you have 1 or more of the following conditions:

- A broken vertebra (spinal bone)
- A broken hip
- A T score (determined by a DEXA scan, or bone density test) of -2.5 or worse, measured in your hip or spine (a T score at this level means you have osteoporosis)
- A T score of -1 to -2.5, measured in your hip or spine (a T score at this level means you have osteopenia, now called low bone mass, and are at risk for future fractures)

Your doctor can use a computer scoring system developed by the World Health Organization to calculate your risk of breaking a bone. If your risk reaches a certain level and you have the conditions above, you will need prescription medicine.

These are the main types of medications available:

- **Bisphosphonates** These medicines slow down bone loss, improving the overall quality of your bones by allowing the body to build new bone at a rate closer to how quickly it is lost. Bisphosphonates include alendronate, risedronate, ibandronate, and zoledronic acid. They are available in different forms, including pills and infusions (given through an IV).
- Selective estrogen receptor modulators (SERMs) The hormone estrogen helps build bone and maintain its strength and quality, and lower estrogen levels after menopause can contribute to osteoporosis. SERMs like raloxifene and bazedoxifene behave like estrogen in bone tissue, helping to build it up again. They may be prescribed for certain postmenopausal women who are at increased risk for osteoporosis or who already have it.
- **Calcitonin** Calcitonin is a hormone that your body makes naturally and that helps control your calcium levels. You can take it in the form of a nasal spray. It can also help relieve pain, so your doctor might prescribe it if you have a painful broken bone in the spine.
- **Denosumab** By preventing bone from breaking down, this monoclonal antibody (a drug that targets only certain cells in the body) can reduce the risk of fractures. The drug is injected subcutaneously (under the skin) in the stomach, upper thigh, or upper arm by a health care provider about once every 6 months.
- Anabolic agents Teriparatide and abaloparatide contain a synthetic form of the natural human hormone PTH (parathyroid hormone). They work by stimulating the body to build new bone. These drugs come in prefilled dosing pens, and you self-inject them subcutaneously (under the skin of the thigh or lower stomach) once daily for up to 2 years.
- Estrogen replacement therapy Once the only FDA-approved treatment for preventing osteoporosis, estrogen replacement therapy is still an effective option for preserving bone mass and preventing osteoporosis-related fractures in post-menopausal women (it is not appropriate for men or pre-menopausal women). However, research has shown a link between estrogen replacement therapy and increased risks of breast cancer, stroke, heart attacks, blood clots, and uterine cancer, among other health issues. Your doctor can help determine whether it's a good option for you.

Summary

Current treatment methods focus more on preventing further bone loss, as we do not currently have reliable methods of restoring lost bone.

Because of this, it is important to take steps to prevent bone loss. Building strong bones through adequate calcium intake and exercise when you are young is an investment that will pay off — with a lower risk of fractures — later in life.



Information on this topic is also available as an *OrthoInfo* Basics PDF Handout.

For more information:

Basics Handouts

(/en/about-orthoinfo/OrthoInfo-Basics/basics-handouts/)

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