

Maine Falls Prevention Coalition

Falls Prevention Awareness

Bone Health Discussion Aid



This document is meant to facilitate discussion and provide general education; it should not be presented as medical advice. Participants seeking specific guidance should consult their healthcare provider.

General Bone Health

What is osteoporosis?

Throughout life, bones are built, broken down, and rebuilt—this is the life cycle of the skeleton. Osteoporosis is a bone disease that occurs when the body loses too much bone, makes too little bone, or both. As a result, bones become weak and may break easily.

Osteoporosis is a silent disease with few, if any, warning signs. Often, a fracture is the first indication of osteoporosis. Even then, osteoporosis might not be diagnosed until the second or third fracture. The main concern with osteoporosis is fractures—the damage caused by poor bone density. This is similar to another silent disease—high blood pressure, where the concern is about the damage caused, such as heart attack, stroke, and kidney disease.

About 60% of your bone density is determined by genetics.

- **Primary osteoporosis** occurs when age-related changes cause your bones to lose mass and density, increasing your risk of fractures. This condition is commonly linked to normal aging changes such as hormonal drops after menopause or reduced calcium and vitamin D absorption in people over 70.
- **Secondary osteoporosis** is often due to the effects of certain health issues such as cancer, endocrine disorders, and others.

How do factors like post-menopausal status affect my bone health and fall risk?

Post-menopausal women are at higher risk for osteoporosis due to decreased estrogen levels, which can lead to bone loss.

Are there medications or medical conditions that affect my bone health and fall risk?

Long-term use of steroids is high on the list of medications that affect bone health and fracture risk. The list also includes some chemotherapy drugs, antiseizure medications, blood thinners, proton pump inhibitors (PPIs—medications used to reduce stomach acid), selective serotonin reuptake inhibitors (SSRIs—medications commonly used to treat depression and other psychiatric disorders), and others.

Additionally, some medications can cause dizziness, disorientation, hypotension, neuropathy, and other conditions that can lead to falls.

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Are there specific tests to measure my bone density?

The "gold standard" for measuring bone density is a DXA scan (dual-energy X-ray absorptiometry). DXA results are reported as a T-score—a statistical measurement that tells you your bone density compared to that of a healthy person at peak bone mass (around age 30). A Z-score compares your bone density to the average bone density of people your own age and gender.



- A T-score of -1.0 or greater is classified as normal bone density.
- A T-score between -1.0 and -2.5 is classified as low bone density, also known as osteopenia.
- A T-score of -2.5 or lower is classified as osteoporosis.

A confirmed osteoporotic fracture is classified as osteoporosis regardless of the T-score.

A healthcare provider may also order tests of bone turnover markers to determine the cause of bone loss.

How often should these tests be done?

The Bone Health and Osteoporosis Foundation and the International Society for Clinical Densitometry recommend a DXA scan for:

- Women over 65
- Men over 70

Younger individuals with prior fractures and/or certain medical conditions

Those with risk factors for osteoporosis may need testing earlier or more frequently, as recommended by their healthcare provider. Some new diagnostic technologies are being developed but may not be available in all areas.

Bone Density, Falls, and Fractures

How does overall bone health impact my risk of falling?

Overall bone health does not significantly impact your risk of falling. However, it greatly affects the damage from a fall. Weaker bones make you more prone to fractures, even with minor falls.

A diagnosis of osteoporosis or osteopenia can lead to a fear of falls and potential injuries, which might cause people to reduce their physical activity. This, in turn, further weakens muscles, decreases balance, and increases the risk of falling.

How are osteoporosis (BMD) and fractures related?

Fractures occur when the load on the bone exceeds its strength. Fractures can happen at all bone densities. Traumatic fractures, such as those from falls from ladders or car accidents, can occur even in strong bones. Fragility fractures—osteoporosis fractures—occur from events that you wouldn't expect to cause a fracture, such as a fall from standing height.

Osteoporotic fractures can be life-altering or life-threatening.

A major concern for those with osteoporosis and osteopenia is fractures. Bone mineral density accounts for only about 50% of fracture risk. It is important to consider other risks for fractures. Several fracture risk calculators—such as FRAX and the BHOF's Fracture Risk Calculator—can help you better understand your



These assessments can guide discussions with your healthcare provider. Although it may be tempting to interpret the results yourself, your healthcare provider's clinical insights are valuable in understanding them.



Genetics is one of the most important factors determining your fracture risk. About 60% of your bone density is influenced by genetics. A family history of broken bones means you are at a higher risk.

How are falls and fractures related?

Falls are the main cause of three of the four major types of osteoporotic fractures—wrist, hip, shoulder/upper arm. The fourth major osteoporotic fracture—spine/vertebrae—is less often related to falls. Vertebral fractures occur when the load exceeds the vertebrae's strength, causing crushing or wedging of the vertebrae. These fractures can be caused by lifting a heavy object, opening a stuck window, or simply loading the bones in the wrong position.

Risk Factors

What are the main risk factors for poor bone health that might increase my likelihood of falling?

The risk factors for osteoporosis/osteopenia and falls share some common elements, even though poor bone health does not cause falls.

| Risk Factors | Osteoporosis/Osteopenia Risk | Fall Risk |
|--|--|--|
| Age | BMD decreases with age, especially after menopause | Falls increase with age, partly due to declines in vision, hearing, and muscle |
| Muscle loss/sarcopenia | Can impair BMD and bone remodeling | Loss of strength and balance impairment |
| Lack of physical activity | Can impair BMD and bone remodeling | Loss of strength and balance impairment |
| Excessive alcohol consumption | Can impair BMD and bone remodeling | Can lead to balance issues |
| Smoking | Can impair BMD and bone remodeling | Can lead to neuropathy |
| Certain medications and medical conditions | Can impair BMD and bone remodeling | Can cause fatigue, weakness, dizziness |

Main risk factors include low body weight, poor nutrition (especially low calcium and vitamin D intake), and a family history of osteoporosis.

Prevention



What lifestyle changes can I make to reduce the risk of falls?

There are several lifestyle changes that may reduce the risk of falls while also strengthening bones.

- Engage in regular weight-bearing and muscle-strengthening exercises
- Avoid smoking and limit alcohol consumption
- Maintain a balanced diet rich in calcium and vitamin D

Are there specific exercises or physical activities that can strengthen my bones and improve balance?

Many exercises and physical activities can strengthen bones and improve balance in pre-menopausal women:

- Weight-bearing exercises like walking, jogging, and dancing
- Muscle-strengthening exercises like lifting weights
- Balance and coordination exercises, such as tai chi and yoga
- Mindfulness activities

After menopause or a fracture, some exercises may need to be modified for safety. Consulting a physical therapist or an exercise professional with specialized training is recommended.

Nutrition

What dietary changes can support better bone health?

Calcium and vitamin D are crucial for maintaining bone health. Eat a balanced diet with plenty of fruits and vegetables.

It is best to get calcium from your diet, but many people can't. If you need to get a bit more, you can take a calcium supplement. Stick to the appropriate amounts for your age, gender, and life stage. Taking more than what is recommended does no good, so talk to your healthcare provider before taking any new supplements.

Most of us, as we get older, can't effectively get vitamin D from sunshine anymore, and there is very little vitamin D in food. So, most of us have to take a vitamin D supplement if we have a low level and want to maintain a normal level.

Always consult your healthcare provider before starting any supplements.

Why are calcium and vitamin D important for bone health?

Calcium and vitamin D are crucial for maintaining bone health. Calcium supports bone structure, while vitamin D improves calcium absorption.



What are the best sources of calcium and vitamin D?

Some of the best sources include dairy products, leafy greens, and fortified foods. Few foods contain high levels of vitamin D. As we age, it becomes more difficult to get vitamin D from sunlight, so most people need a vitamin D supplement to maintain normal levels.



Medical Conditions

How do chronic conditions like arthritis or diabetes impact bone health and fall risk?

Chronic conditions like arthritis and diabetes can negatively impact bone health. Arthritis can lead to joint pain and reduced mobility, increasing fall risk. Diabetes can affect bone quality and increase the risk of fractures.

Low insulin levels in childhood or adolescence may lead to weaker bones and an increased risk of fractures in adulthood. Excess blood sugar affects collagen in the bones, making them brittle and more likely to break. Diabetes medications also increase fracture risk. You are also at an increased risk of falling and fracturing due to blood sugar levels, declining vision, associated peripheral neuropathy



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