

# Postmenopausal Osteoporosis



Osteoporosis is a disease where decreased bone strength increases the risk of a broken bone. It is the most common reason for a broken bone among people who are old. Bones that commonly break include the back bones, the bones of the forearm, and the hip.[2] Until a broken bone occurs there is typically no symptoms. Bones may weaken to such a degree that a break may occur with minor

stress or spontaneously. Chronic pain and a decreased ability to carry out normal activities may occur following a broken bone.

Osteoporosis may be due to lower than normal peak bone mass and greater than normal bone loss. Bone loss increases after menopause due to lower levels of estrogen. Osteoporosis may also occur due to a number of diseases or treatments including alcoholism, anorexia, hyperthyroidism, surgical removal of the ovaries, and kidney disease. Certain medications increase the rate of bone loss including some antiseizure medications, chemotherapy, proton pump inhibitors, selective serotonin reuptake inhibitors and steroids. Not enough exercise and smoking are also risk factors. Osteoporosis is defined as a bone density of 2.5 standard deviations below that of a young adult. This is typically measured by dual-energy X-ray absorptiometry at the hip.

Prevention of osteoporosis includes a proper diet during childhood and efforts to avoid medications that cause the condition. Efforts to prevent broken bones in those with osteoporosis include a good diet, exercise, and fall prevention. Lifestyle changes such as stopping smoking and not drinking alcohol may help. Medication of the bisphosphonate type are useful in those with previous broken bones due to osteoporosis. In those with osteoporosis but no previous broken bones they are less effective. A number of other medication may also be useful.

Osteoporosis becomes more common with age. About 15% of White people in their 50s and 70% of those over 80 are affected. It is more common in women than men. In the developed world, depending on the method of diagnosis, 2% to 8% of males are 9% to 38% of females are affected. Rates of disease in the developing world are unclear. About 22 million women and 5.5 million men in the European Union had osteoporosis in 2010. In the United States in 2010 about eight million women and one to two million men had

osteoporosis. White and Asian people are at greater risk. The word osteoporosis is from the Greek terms for "porous bones".

Your bones are made of living, growing tissue. An outer shell of cortical or dense bone encases trabecular bone, a sponge-like bone. When a bone is weakened by osteoporosis, the "holes" in the "sponge" grow larger and more numerous, weakening the internal structure of the bone.

### **Causes of Postmenopausal Osteoporosis**

Bones are made of complex, constantly changing, living tissue. They are able to grow and heal, and are also susceptible to changes in diet, body chemistry, and exercise levels. These are the changes that can lead to osteoporosis.

Early in life, more bone is laid down than is removed by the body. People typically achieve peak bone mass by around age 30, after which more bone is lost than is replaced. Too much bone loss leads to osteoporosis.

Both of the two primary types of osteoporosis are far more common in women than men:

- Type I osteoporosis (postmenopausal osteoporosis) generally develops after menopause, when estrogen levels drop precipitously. These changes lead to bone loss, usually in the trabecular (spongy) bone inside the hard cortical bone.
- Type II osteoporosis (senile osteoporosis) typically happens after age 70 and involves a thinning of both the trabecular (spongy) and cortical (hard) bone.

In addition, certain medications and medical conditions can damage bone and lead to what is known as "secondary osteoporosis." Patients being treated for any of the following conditions should discuss the risk of osteoporosis with their physicians:

- Endocrine disorders
- Marrow disorders
- Collagen disorders
- Gastrointestinal disorders
- Seizure disorders
- Eating disorders (such as anorexia or bulimia)

### **Symptoms of Postmenopausal Osteoporosis**

One of the main issues with the onset of osteoporosis is that many people who begin developing it don't realize they are afflicted until they experience a bone fracture as a result. That is one reason it's important to take a proactive approach against osteoporosis. Symptoms generally begin to occur late in the disease when there are not many options to regain the necessary bone density. Below are the common symptoms that can indicate osteoporosis:

### **Common Symptoms of Osteoporosis**

- Loss of height as a result of weakened spine
- Fractured bones, especially hip bones
- Bone pain and tenderness
- Neck, spine, and lower back pain
- Broken bones, brittle fingernails
- Periodontal disease, tooth loss
- Spinal deformities become evident like stooped posture, an outward curve at the top of the spine as a result of developing a vertebral collapse on the back

### **Treatment of Postmenopausal Osteoporosis**

Each type of medical treatment for osteoporosis has associated benefits and risks. These need to be discussed with your doctor prior to commencing treatment. Your choice of treatment needs to be made after carefully considering your age, other health issues and your risk factors for fracture.

### **Medical treatments for osteoporosis include:**

- Bisphosphonates
- Selective oestrogen receptor modulators (SERMs)
- Hormone replacement therapy (HRT) or tibolone
- Vitamin D and calcium supplements
- Strontium ranelate
- Denosumab
- Parathyroid hormone (PTH).

### **Bisphosphonates**

Bone cells are constantly being broken down and renewed. Bisphosphonates prevent bone loss by hampering the 'breaking down' process and preventing absorption of bone cells.

Bisphosphonates may be taken by tablet daily, weekly, or monthly, or by an intravenous infusion once a year, but are only available in Australia on the Pharmaceutical Benefits Scheme (PBS) for use to treat established osteoporosis with fracture or in women over 70 years with osteoporosis. The most common side effect of treatment with bisphosphonates in tablet form is gastrointestinal (stomach and gut) upset.

### **Selective oestrogen receptor modulators**

The female body contains oestrogen receptors located on many body tissues, including bone. These receptors 'respond to the hormone oestrogen.

Selective oestrogen receptor modulators (SERMs) are medications that work by blocking the oestrogen effect at some receptor sites while prompting an oestrogen effect at others. In bone, they work like oestrogen and lead to an increase in bone mass (density), mainly in the spine (less in the hips).

Potential side effects of SERMs include hot flushes and a slightly increased risk of deep vein thrombosis (DVT).

### **Hormone replacement therapy**

Hormone replacement therapy (HRT, or sometimes simply hormone therapy – HT) relieves menopausal symptoms such as vaginal dryness, hot flushes and night sweats. When taken at the beginning of menopause, HRT can also prevent bone loss and should be started soon after menopause for maximum benefit.

HRT should be considered first-line treatment for osteoporosis in women less than 60 years of age, unless there is a medical reason for not taking HRT. Some studies have shown that HRT can increase bone density by around five per cent in two years.

On average, HRT reduces the risk of spinal fractures by 40 per cent. Bone loss will resume once HRT is stopped.

The use of HRT for preventing diseases such as heart disease or stroke is not recommended. Women who elect to use HRT should do this in consultation with their treating doctor and fully understand the risks and benefits of this therapy.

### **Tibolone**

Tibolone is a form of hormone therapy for treating menopausal symptoms. Tibolone may not have the same stimulatory effects on the breast as standard forms of hormone therapy – studies have shown no increase in breast cancer for up to five years of use. However, tibolone should not be used in women with breast cancer.

There is evidence that tibolone has beneficial effects on bone and leads to an increase in bone mineral density and reduction in fracture and risk.

### **Vitamin D and calcium supplements**

A woman experiencing menopause may be prescribed a vitamin D derivative and calcium supplements. Daily sunlight exposure can also boost vitamin D production and contribute to bone health.

### **Strontium ranelate**

Strontium is a trace element that is naturally found within soft tissues, blood, teeth and bone. How it combats osteoporosis is unclear, but it seems to reduce bone loss and may enhance bone formation.

Studies of strontium ranelate treatment for postmenopausal women have shown a reduction in vertebral (spinal), hip and other fractures. It is available through the PBS for the treatment of postmenopausal osteoporosis.

Strontium ranelate is taken in the form of granules in water and should be taken at bedtime at least two hours after eating. It appears to be well tolerated, but diarrhoea may be a side effect.

As is the case with other osteoporosis therapies, you may require vitamin D and calcium supplements in addition to strontium ranelate if your vitamin D levels are low or dietary calcium intake is insufficient.

### **Denosumab**

Denosumab is a human monoclonal antibody designed to target RANKL (a receptor activator of nuclear factor kappa-B ligand), which is a protein that acts as the primary signal to promote bone removal. This medication is available through the PBS in Australia for the treatment of postmenopausal osteoporosis.

Denosumab is given as a twice-yearly injection under the skin. Studies with this medication in postmenopausal women have shown a reduction in vertebral, non-vertebral and hip fractures. It appears to be well tolerated, but may have side effects of infections, rashes and joint pain.

## **Parathyroid hormone**

Parathyroid hormone is administered as a daily injection just below the skin (subcutaneous injection). It increases bone formation and absorption of calcium from the gut and kidney.

Calcium and vitamin D supplements may be necessary with parathyroid hormone treatment and must be monitored under the care of a specialist physician or endocrinologist. No long-term studies involving this medication exist.

In Australia, parathyroid hormone treatment is limited to one 18-month course per lifetime, and there are particular restrictions for its use in osteoporosis in the specialist setting. This treatment appears to have a clear benefit in reducing all types of fractures in postmenopausal women, except for hip fractures (but this may be due to deficiencies in research designs rather than the treatment; better studies are needed).

## **Things to remember**

- It is estimated that the average woman loses up to 10 per cent of her bone mass in the first five years of menopause.
- Osteoporosis is when bones become thinner, causing them to fracture more easily.
- A woman can reduce her risk of osteoporosis by eating a diet rich in calcium and exercising regularly, starting in childhood.
- Medical treatments for osteoporosis are available.

## **Prevention of Postmenopausal Osteoporosis**

The best way to avoid the painful and debilitating bone fractures that come with osteoporosis is to prevent the disease before it takes hold. Of course going back in time to the teenage years when bone growth is most crucial is not a possibility. However, there are still ways to increase bone mass, or at least limit the rapid destruction of bones common in menopausal women, before osteoporosis becomes a problem. Below is a list of prevention tips:

### **Prevention**

#### Tips for Osteoporosis

- Eat enough calcium
- Make sure to get enough vitamin D
- Get adequate physical exercise
- Avoid alcohol

- Avoid smoking
- Maintain a healthy weight

### **Staggering Statistics**

A 10% loss of bone mass in the vertebrae can double the risk of vertebral fractures, and similarly, a 10% loss of bone mass in the hip can result in a two and a half times greater risk of hip fracture.

More than 90% of hip fractures are associated with osteoporosis. Nine out of ten hip fractures in older Americans are the result of a fall. Most falls happen to women in their homes in the afternoon.

The above data shows how important it is to take care to avoid falling, especially after a certain age when osteoporosis is more common, namely after age 50 in women. Below is a list of tips to prevent falls:

#### Tips to Prevent Falls:

- Wear appropriate, flat shoes
- Wear glasses with the correct prescription and have this checked regularly
- Avoid having loose rugs and carpets or trailing electrical flexes. Repair any torn floor coverings
- Make sure the home is well lit

Be extra careful when taking medicines, especially sleeping pills and sedatives that may cause drowsiness, making a person more likely to trip or stumble. Anyone who experiences dizziness or is at risk of falling should talk to their doctor about how their medications might affect this

Anyone who needs to get up during the night to visit the toilet should consider using a chamber pot to avoid the risk of falling in the dark. Otherwise, leave some lights on where possible and make sure the route from the bed to the toilet is safe and clear of items that could cause a fall

### **Reference**

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