

## **Osteoporosis**

Osteoporosis is a condition characterised by weakened bones that fracture easily. After menopause many women are at risk of developing osteoporosis.

Peak bone mass is usually reached during a woman's 20s to 30s when the skeleton has stopped growing and bones are at their strongest.

The female sex hormone oestrogen plays an important role in maintaining bone strength. After menopause oestrogen levels drop and this may result in increased bone loss. The average woman loses up to 10 per cent of her bone mass in the first five years after menopause.

Research suggests that about half of all women over the age of 60 years will have at least one fracture due to osteoporosis.

### **What is osteoporosis?**

Bones are constantly changing through life – breaking down (resorption) and being renewed (formation). Osteoporosis is what happens when resorption occurs more quickly than formation, leading to loss of bone strength and density. The bones become fragile and fracture more easily.

Usually there is no sign that osteoporosis is developing until a fracture occurs. Pain in the spine will occur most commonly with arthritis. Pain only occurs with osteoporosis if there has been a fracture. Fractures are most common in the spine, hip and wrist and can occur after only a minor fall (a minimal trauma fracture). Osteoporotic fractures of the spine cause loss of height, and gradual development of a rounded and stooped appearance. Spinal fractures do not always cause pain.

### **Minimising the risk of osteoporosis**

To minimise the risk of osteoporosis, you should:

- Ensure adequate dietary calcium –1300mg/day for women over 50 (equivalent to 3-4 serves of dairy food per day)
- Maintain adequate vitamin D levels – approximately 5-15 minutes of sunlight (midmorning
- or mid afternoon) will provide the necessary daily requirement (although this varies depending
- on the season and where you live). Some people are unable to obtain adequate Vitamin D
- through sun exposure and Vitamin D supplements may be required.

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- Do regular physical activity (Ask your doctor to advise what is appropriate)
- Stop smoking
- Use caffeine in moderation. Drinking tea does not have an adverse effect on bone health.

### **Physical activity**

Exercising regularly throughout life may reduce the risk of osteoporosis. Doing some type of physical activity on most days of the week for 30-40 minutes is recommended. Physical activities that are beneficial in preventing fracture are weight bearing and resistance training exercises.

Weight bearing exercise refers to any exercises performed on your feet.

### **Examples include**

Walking, running, tennis, Tai Chi and dancing. Studies have shown that vigorous exercise (e.g. walking at a fast pace) gives the greatest benefits. Resistance training exercises are also known as strength training exercises. Strength training uses weights of some kind – for example machines, dumbbells, ankle or wrist weights – to create resistance, which helps build muscle mass and places an extra load on the involved limb bones.

Recent studies have also shown that swimming is helpful, since it requires your body to move against the resistance of the water. Physical activity improves muscle strength, balance and fitness, which reduces the risk of falls and fractures.

General recommendations for physical activity:

- Avoid high impact activities or those that require sudden, forceful movements.
- Do weight bearing exercise such as Tai Chi, dancing and weight training
- Do aerobic activity (anything that increases your heart rate, such as walking, jogging, cycling etc) three times a week
- Undertake strength training twice weekly
- Include flexibility exercises or stretching

Be guided by your healthcare professional when deciding on your exercise program.

### **Diagnosing osteoporosis**

Risk assessment, diagnosis and management of osteoporosis are summarized in this algorithm from Osteoporosis Australia.

<https://www.osteoporosis.org.au/sites/default/files/files/RACGP%20Osteoporosis%20Summary%20Guideline%204428%20Nov%202017.pdf>

Osteoporosis is commonly diagnosed with a bone mineral density scan which uses a specialised x-ray technique called DXA (DXA).

Bone density scans may be advised around the time of menopause for women with risk factors such as early menopause, family history of osteoporosis, thyroid or parathyroid disease, coeliac disease, rheumatoid arthritis, chronic kidney or liver disease, those taking

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corticosteroids, or a history of previous fractures from a minor incident.

DXA test results are presented as a T-score and a Z-score. The T-score compares the bone density of the woman being scanned with that of a young woman (when peak bone mass is at its best). The Z-score compares the bone density of the woman being scanned with that of a woman of the same age. Z-scores, not T-scores, are used in premenopausal women.

- A T-score greater than -1 indicates **Normal bone density**.
- A T-score between -1 and -2.5 indicates **Low bone density**, sometimes called osteopaenia. (This means there is some loss of bone mineral density, but it is not severe enough to be called osteoporosis)
- A T-score of -2.5 or less indicates **Osteoporosis**.

When a person has a minimal impact fracture of a major bone, regardless of the T-scores, osteoporosis is also diagnosed.

### **Fracture Risk Calculators**

In recent years there has been a trend towards using fracture risk calculators such as FRAX and GARVAN as an assessment of osteoporotic fracture risk. These tools can be used in people over the age of 40-50 to calculate the probability of an osteoporotic fracture based on a variety of established clinical risk factors and do not always require a DXA scan measurement.

Although osteoporosis indicates a high risk of fracture, many fragility fractures occur in people with bone density levels greater than -2.5. Risk calculators take into account other factors that increase risk of fracture and are useful in deciding who needs drug treatment to reduce their risk of fracture.

[www.shef.ac.uk/FRAX/](http://www.shef.ac.uk/FRAX/) [www.garvan.org.au/bone-fracture-risk](http://www.garvan.org.au/bone-fracture-risk)

### **Treatments**

A number of medical treatments are available for the management of osteoporosis. Treatments aim to strengthen existing bone, help prevent further bone loss and most importantly reduce the risk of broken bones.

Treatments include:

- Vitamin D and calcium supplements
- Hormone therapy (MHT) including Tibolone
- Selective oestrogen receptor modulators (SERMs)
- Bisphosphonates
- Denosumab (Prolia)
- Teriparatide

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

Vitamin D deficiency is common in Australia and New Zealand. Studies indicate that 30 to 50 per cent of postmenopausal women are deficient in vitamin D. Up to 60 per cent of

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postmenopausal women are not meeting their required dietary calcium intake. Calcium is the main mineral within the human skeleton and vitamin D is important for helping the calcium get into bone. Five to fifteen minutes of exposure to sunlight every day can also boost vitamin D production and contribute to bone health. The recommended daily intake of dietary calcium is 1000-1300mg.

Using combined calcium and vitamin D supplements can give a small reduction in fracture risk.

Most research into the effect of specific osteoporosis therapies has used these treatments in combination with calcium and vitamin D supplements. Therefore it is likely that your doctor will prescribe vitamin D along with calcium supplements, if dietary calcium is insufficient. The need for supplementation will be determined by your doctor (please refer to AMS information sheet [Calcium supplements: A patient's guide](#)).

### **Hormone therapy**

Menopausal hormone therapy (MHT) relieves menopausal symptoms such as vaginal dryness, hot flushes and night sweats. When taken at the beginning of menopause, MHT can also prevent bone loss and should be started soon after menopause for maximum benefit. Some studies have shown that MHT can increase bone density by around five per cent in two years. On average, MHT reduces the risk of spinal and hip fractures by 40%.

MHT is of greatest benefit to women under 60 who are at risk of fracture and especially those who have undergone early menopause (before 45 years of age).

After 60, there is a higher risk of cardiovascular disease (stroke and heart attack), blood clots (DVT), and breast cancer. MHT may increase these risks so other osteoporosis medicines may be more useful after 60. However, some women may elect to continue hormone therapy to protect against osteoporosis– this needs to be done in consultation with the woman's doctor and the woman needs to understand the risks and benefits of this therapy (please refer to AMS information sheets on [Combined MHT](#) and [Oestrogen only MHT](#)). It is also important to understand that bone loss will resume once MHT is stopped. The rate of bone loss is more rapid than normal for the first 4-5 years after stopping MHT. If your bone density is already low before you stop MHT, alternative treatments to preserve bone density will be needed.

### **Tibolone (Livial)**

This therapy is a different form of hormone therapy for treating menopausal symptoms. There is evidence that tibolone has beneficial effects on bone and leads to an increased bone density and fracture prevention. It may have the same risks as conventional MHT (please refer to AMS information sheet [Tibolone for post-menopausal women](#)).

### **Selective oestrogen receptor modulators (SERMS)**

The female body contains oestrogen receptors located on many body tissues including bone.

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These receptors respond to 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, these medications work like oestrogen and lead to an increase in bone mass (density) and reduce vertebral fractures in women with low bone density. The main SERM medication in Australia is raloxifene (Evista). Potential side effects of SERMs include hot flushes and a slight increased risk of deep vein thrombosis (DVT), but SERMs do not increase the risk of breast cancer (please refer to AMS information sheet [SERMs – their role in menopause management](#)).

### **Bisphosphonates**

Bisphosphonates are medications that reduce the resorption of bone. They reduce vertebral, hip and other fractures. Possible side effects of treatment include gastrointestinal upset and in particular, gastroesophageal reflux (heartburn), and a rare, but important side effect of osteonecrosis (death of bone) of the jaw.

Bisphosphonates may be taken daily, weekly or monthly. The most commonly used bisphosphonates are alendronate (Fosamax), risedronate (Actonel) and a yearly intravenous form of bisphosphonate called zoledronate (Aclasta).

### **Denosumab**

Denosumab (Prolia) is given as a 6 monthly injection. It works in a different way to bisphosphonates but has the same effect of slowing the rate of resorption. It reduces the risk of vertebral, hip and other fractures. It can increase the risk of skin infections.

### **Teriparatide (Forteo)**

Teriparatide (parathyroid hormone) is administered daily via an injection just below the skin. It increases bone formation and absorption of calcium from the gut and kidney. Calcium and vitamin D supplements may be necessary with this medication and must be monitored under the care of a specialist doctor. It reduces fractures in postmenopausal women.

Treatment is limited to one 18-month course per lifetime. Its prescription for use is confined to specialists in osteoporosis.

### **Prevention of falls**

Prevention of falls can assist in decreasing the risk of an osteoporotic fracture, particularly of the hip and wrist. Factors to consider include:

- Exercise and balance training as described above
- Adequate Vitamin D. Vitamin D deficiency is associated with decreased muscle strength and increased risk of falls.
- Review of medications that may contribute to unsteadiness and increase the risk of falling
- Check your environment- e.g. fix that loose step or loose rug.

Refer to AMS information sheet [Prevention of falls and fractures](#).

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## Where can I get more information?

[www.osteoporosis.org.au](http://www.osteoporosis.org.au) Osteoporosis Australia (02) 9518 8140

[www.bones.org.nz](http://www.bones.org.nz)

[www.jeanhailes.org.au](http://www.jeanhailes.org.au)

[www.bonehealthforlife.org.au](http://www.bonehealthforlife.org.au)

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