Menopause (the natural ending of menstruation that usually occurs between the ages of 45 and 55) can increase your risk of developing osteoporosis, a condition in which bones become thin (less dense) and may fracture easily.

The drop in oestrogen levels that occurs around the time of menopause results in increased bone loss. It is estimated that, on average, women lose up to 10 per cent of their bone mass in the first five years after menopause.

To reduce your risk of osteoporosis, eat a diet rich in calcium and do regular weight-bearing exercise. These lifestyle habits are best started younger in life to get the most benefits.

While prevention is best, medical treatments are available for osteoporosis management.

How menopause influences osteoporosis

Peak bone mass is reached around the age of 25 to 30 years, when the skeleton has stopped growing and bones are at their strongest and thickest.

The female hormone oestrogen plays an important role in maintaining bone strength. Oestrogen levels drop during menopause, at around the age of 50 years, resulting in increased bone loss. If your peak bone mass before menopause is less than ideal, any bone loss that occurs around menopause may result in osteoporosis.

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

Diagnosis of osteoporosis

Osteoporosis is best diagnosed using a specialised x-ray technique called dual energy x-ray absorptiometry (DEXA or DXA). A DEXA scan measures bone density (or thickness), usually at the lower spine and at the upper part of the hip.

The results of a DEXA scan are reported as a Z-score and a T-score. The Z-score compares your bone mass with what would be expected for a person of your age. The T-score shows how much your bone mass varies from that of a young person with peak bone mass. T-scores are interpreted as follows:

- between 1 and -1 indicates normal bone density
- between -1 and -2.5 indicates osteopaenia – this means some bone density loss, but not enough to be called osteoporosis. (Even though the bones are less dense, the risk of fracture with minimal trauma is very low)
- less than -2.5 indicates osteoporosis – substantial loss of bone density means a much higher risk of having a fracture with minimal trauma.

Reducing the risk of osteoporosis during menopause

Around the time of menopause, you can reduce your risk of developing osteoporosis by making a few lifestyle changes, such as:
Aim for 1,300 mg of dietary calcium intake every day. This equals about three to four serves of dairy food. A wide range of non-dairy foods also contain calcium, such as calcium-fortified soy or almond drinks, firm tofu, almonds, brazil nuts, unhulled tahini, dark green leafy vegetables and fish with edible bones, such as sardines or tinned salmon.

Do regular and appropriate **weight-bearing physical activity**, including resistance training exercise with weights (always do this type of exercise under supervision).

Maintain adequate vitamin D levels. Vitamin D helps the body to absorb calcium. It is made in the skin following sun exposure, and is found in very small amounts in some foods. Guidelines are available for **the amount of sun exposure needed** for the season and one’s geographical location. Vitamin D levels can be measured by a simple blood test.

Avoid excessive alcohol intake (**current guidelines** recommend a maximum of two standard drinks per day with two alcohol-free days per week for women).

**Stop smoking** (smoking cigarettes is associated with a higher risk of developing osteoporosis).

Avoid excessive caffeine intake.

These lifestyle habits are best started younger in life to get the most benefits.

**Physical activity reduces osteoporosis risk**

Exercising regularly throughout life can reduce the risk of osteoporosis. Doing some type of **physical activity** on most days of the week for between 30 and 40 minutes is recommended.

Two types of physical activities that are most beneficial to bones are weight-bearing and resistance-training exercises. In addition to reducing bone loss, physical activity will improve muscle strength, balance and fitness, and also reduce the incidence of falls and fractures.

**General recommendations for exercise**

Be guided by your healthcare professional when deciding on your exercise program. General recommendations include:

- Avoid high-impact activities or those that require sudden, forceful movements.
- Do weight-bearing exercise such as brisk walking, **tai chi**, **dancing** and weight training.
- Do aerobic activity two or three times a week.
- Undertake strength (resistance) training once or twice weekly.
- Include flexibility exercises or stretching in your routine.

**Weight-bearing exercise**

Weight-bearing exercise refers to any exercises where your feet and legs bear your body weight. Examples include walking, running, tennis and dancing.

Studies to evaluate the effects of weight-bearing exercises show a drastic improvement in bone mass when this activity is performed at high intensity (for example, walking at a fast pace or jogging).

**Resistance-training exercise**

Resistance-training exercise is also known as strength-training exercise. Strength training uses weights of some kind – for example, machines, dumbbells, ankle or wrist weights – to create resistance.

Resistance training helps build muscle mass and places a load (force) on the involved limb bones. It also includes exercises that use your own body weight as the load, such as push-ups, where the load is placed through the arms and shoulders.

To avoid injury, only perform these exercises under the supervision of an accredited trainer, exercise physiologist or physiotherapist.

**Treatment for 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 the benefits and risks.

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considering your age, other health issues and your risk factors for fracture.

Some treatments will only be available in Australia under the Pharmaceutical Benefits Scheme (PBS) based on your age, bone density test result and history of fracture.

Medical treatments for osteoporosis include:

- bisphosphonates
- selective oestrogen receptor modulators (SERMs)
- menopausal hormone therapy (MHT, previously known as hormone replacement therapy or HRT)
- vitamin D and calcium supplements
- denosumab
- parathyroid hormone.

**Bisphosphonates**

Bone cells are constantly being broken down and renewed. Bisphosphonates prevent bone loss by interfering with 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. They are only available in Australia on the PBS for use in treating established osteoporosis with fracture, or women over 70 years with osteoporosis.

The most common side effect of treatment with bisphosphonates in tablet form is gastrointestinal (stomach and gut) upset. A very rare side effect is osteonecrosis of the jaw, which involves death of the cells in the bone of the jaw, and is associated with prolonged healing.

**Selective oestrogen receptor modulators**

The female body contains oestrogen receptors in 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).

**Menopausal hormone therapy**

Menopausal hormone therapy (MHT, previously known as HRT)) relieves menopausal symptoms such as sleep disturbance, vaginal dryness, hot flushes and night sweats. When taken around the time of menopause, MHT can also prevent bone loss. Starting MHT soon after menopause will give maximum benefit.

MHT is considered first-line treatment for osteoporosis in women less than 60 years of age, unless there is a medical reason for not taking it. 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 fractures by 40 per cent. Bone loss will resume once MHT is stopped.

The use of MHT for preventing diseases such as heart disease or stroke is not recommended. If you choose to use MHT for this purpose, it is recommended that you do so in consultation with your treating doctor. Make sure that you fully understand the risks and benefits of this therapy.

**Tibolone**

Tibolone is a tablet form of low-dose hormone therapy for treating menopausal symptoms. 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**

Vitamin D enables the body to absorb calcium, and calcium is necessary for maintaining bone density. Women around the time of menopause may be prescribed a vitamin D derivative and calcium supplements.

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Excessive calcium supplementation has been linked to an increased risk of heart disease, so the current recommendation is to maximise the dietary consumption of calcium rich foods to achieve the target intake of 1,300 mg daily. However, some women will be recommended to use a calcium supplement by their doctor.

Daily sunlight exposure can also boost vitamin D production and contribute to bone health.

Denosumab

Denosumab is a medication used to treat bone loss. It is available through the PBS in Australia for the treatment of postmenopausal osteoporosis in those who have had a previous fracture, or are aged 70 years or older.

Denosumab is given as a twice-yearly injection under the skin. Studies of this medication in postmenopausal women have shown a reduction in vertebral, hip and other fractures.

Denosumab appears to be well tolerated, but may have side effects of skin infections, rashes and joint pain. A very rare side effect is osteonecrosis of the jaw, which can be associated with prolonged healing. If you are prescribed this medication you should discuss this treatment with your dentist.

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.

Due to the risk of side effects, 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.

Where to get help

- Your GP (doctor)
- Australasian Menopause Society Tel. (03) 9428 8738
- Musculoskeletal Australia National Help Line Tel. 1800 263 265
- Jean Hailes for Women’s Health Tel. 1800 JEAN HAILES (532 642)
- Osteoporosis Australia Tel. (02) 9518 8140 or 1800 242 141 (toll free)

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