Menopause and osteoporosis

Summary

- It is estimated that, on average, women lose up to 10 per cent of their bone mass in the first five years of menopause.
- Osteoporosis is when bones become thinner, causing them to fracture more easily.
- Women can reduce their risk of osteoporosis by eating a diet rich in calcium and doing weight-bearing exercise regularly.
- Medical treatments for osteoporosis are available.

Menopause (the natural cessation of menstruation that usually occurs between the ages of 45 and 55) can increase a woman’s risk of developing osteoporosis, a condition in which bones become thin 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 a woman’s peak bone mass before menopause is less than ideal, any bone loss that occurs during 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 DXA (dual energy X-ray absorptiometry). A DXA scan measures bone density (or thickness), usually at the lower spine and at the upper part of the hip.

The results of a DXA scan are compared to what would be expected for a person’s age (this is called a Z-score), and how they compare to a young person with peak bone mass (this is called a T-score).

The various T-scores used in diagnosis and their indications are:

- 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, women can reduce their risk of developing osteoporosis by making a few lifestyle changes, such as:

- Aim for 1,300 mg of calcium intake within the diet every day, which equals about three to four serves of dairy food.
- 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 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 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)
- hormone replacement therapy (HRT) – for example, tibolone is a type of HRT designed to relieve menopausal symptoms and prevent osteoporosis
- vitamin D and calcium supplements
- strontium ranelate
- denosumab
- parathyroid hormone.

**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. They are only available in Australia on the Pharmaceutical Benefits Scheme (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 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. Starting HRT soon after menopause will give maximum benefit.

HRT 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 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 for 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**

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

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 1300 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.

Denosumab is given as a twice-yearly injection under the skin. Studies with 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 pain and weakness of the bones in the jaw – this is known as osteonecrosis of the jaw.

**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 no longer available through the PBS for the treatment of postmenopausal osteoporosis, and has been recently discontinued such that supply will be very limited after August 2017.

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. There is also an increased risk of venous clots (blood clots in the veins) and an increased cardiac (heart disease) risk associated with this treatment.

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.

**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.