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Managing Osteopenia & Osteoporosis

This guide is based on a review of current evidence and research by Osteoporosis Australia.

The incidence

Osteoporosis is characterised by low bone mass and poor bone quality. This leads to an increased risk of fracture, and can cause significant disability. The incidence is rising around the world as the population ages: up to 2 million Australians are affected by osteoporosis, with more than 70,000 osteoporotic fractures per year.

What happens?

Bone is remodelled (bone turnover) throughout adult life by discrete remodelling units of osteoclasts (cells that resorb a volume of bone) and osteoblasts (cells that lay down new bone matrix). After about the age of 50 years, the volume of bone resorbed is greater than the volume formed in each bone remodelling unit. This process is accelerated during menopause and continues in older age.



During menopause, the decrease in oestrogen enhances the rate of bone dissolution, and most women begin a period of accelerated bone loss averaging 2-5% per year over the next 10 years. Accelerated bone loss is greatest in the first 3 to 6 years after menopause and then gradually resumes the level of premenopausal bone loss. In women after the age of 70, bone loss begins to accelerate again reaching 1-2% per year, and in men older than 80 years. Men do not have a midlife increase in remodelling so that structural integrity of bone is maintained for longer.

A 10% loss of bone mass in the vertebrae can double the risk of vertebral fracture, and a 10% loss of bone mass in the hip can result in 2.5 times greater risk of hip fracture. 30-50% of Australian women and 15-30% of men will develop osteoporotic fractures. Of all reported osteoporotic fractures, 40% are vertebral, 16% are hip and 15% are wrist fractures.

Diagnosis of Osteoporosis



- The diagnosis of Osteoporosis is based on the measurement of bone mineral density (BMD) and clinical assessment.
- BMD is expressed in terms of a T-score; this is the number of standard deviations (SDs) from the young and normal mean BMD.
- **BMD predicts fracture risk. For every standard deviation (SD) below peak bone mineral density, fracture risk increases by 50 – 100%**

World Health Organisation definitions based on bone density levels

- Normal BMD is within +1 or -1 SD of the young adult mean.
- Osteopenia (low bone mass) BMD is between -1 and -2.5 standard deviations below young adult mean.
- Osteoporosis BMD is -2.5 SD or more from the young adult mean.
- Severe (established Osteoporosis) BMD is more than -2.5 and one or more osteoporotic fractures have occurred.

Treatments

Drug Therapy – speak with your GP about which is suitable for you

First Line Therapy

- Calcium supplements and vitamin D assessment/replacement plus appropriate lifestyle measures should be considered as first line therapy.
- The potent bisphosphonates – risedronate (Actonel) and alendronate (Fosamax) – are effective first line options for vertebral, hip and non-vertebral fracture prevention, demonstrating approximately 50% reduction in vertebral fractures in studies of women with one or more baseline spinal fractures. The reduction in fracture rate is seen within 12 – 18 months.

New First Line Agents

- Stontium ranelate (Protos), is a new agent that has both antiresorptive and bone-forming properties that has recently received PBS listing for prevention of vertebral and hip fractures in women with osteoporosis. It is a daily oral medication.
- Ibandronate sodium (Bon Viva), is a new bisphosphonate which has TGA approval but is not yet listed on the PBS. It is a once monthly oral bisphosphonate for the management of postmenopausal osteoporosis.

What else can you do?

Lifestyle management plays an important role in maintaining bone strength throughout life and can help prevent falls and fractures, and speed rehabilitation in later life.

Nutrition – the two key nutrients to consider for bone health are calcium and vitamin D

Calcium - More than half of all Australians do not meet the recommended intake of calcium



- The efficiency of calcium absorption declines with age so over time people require higher amounts of calcium.
- The nutrient reference value (NRV – previously known as the *Recommended Daily Intake*) is 1000mg of calcium per day for most adults. **1300mg of calcium per day is recommended for all postmenopausal women and men aged over 70 years.**
- Dairy products are a rich source of calcium. For sufficient daily calcium intake, include 3

serves per day of high-calcium foods such as milk, cheese or yoghurt. Many calcium-enriched products are now available for those who cannot tolerate dairy products.

Check the calcium content recorded on foods in the supermarket!

- Other good sources of calcium include green vegetables (eg broccoli, curly kale, bok choy); whole canned fish with soft edible bones (eg sardines, pilchards); nuts (especially almonds and Brazil nuts); and tofu set with calcium.



Calcium Supplementation

- Calcium supplements are recommended for people over 65 years, those with insufficient dietary calcium intake, as secondary therapy for the treatment of postmenopausal osteoporosis and for those taking corticosteroids for more than 3 months.
- Calcium supplementation in postmenopausal women and the elderly has been shown to have a moderate effect in slowing the rate of bone loss.
- Calcium supplementation of between **500-1500mg per day** is generally safe although constipation has been reported. There is no evidence of increased kidney stones from taking calcium supplements in the recommended amounts.

It is critical that calcium supplements and oral bisphosphonates (eg Fosamax & Actonel) are taken at least several hours apart, as calcium binds with these medications and prevents their absorption.

Vitamin D

- Vitamin D is essential for the development and maintenance of bone. It assists calcium absorption from foods in the intestine and ensures the correct renewal and mineralisation of bone tissue.
- For most Australians the main source of vitamin D is sunlight exposure.
- Vitamin D is obtained from the diet as ergocalciferol (vitamin D2). Food sources of vitamin D are limited; it is found in small quantities in foods such as fatty fish (salmon, herring, mackerel), liver, eggs & fortified foods.

To get enough sunlight to produce vitamin D, a person needs to expose their hands, face and arms (or equivalent area of skin) to sunlight for about 6-8 minutes each day. This would produce around 1000 IU of vitamin D – around one third of a minimal erythemal dose. In Adelaide during summer this would be achieved by a 5-7 minute exposure to sunlight, in winter 25 – 38 minutes.



Vitamin D Supplementation



- The daily vitamin D requirement is at least 400 – 600 IU
- For people who do not get adequate sun exposure for a variety of reasons, then a supplement for at least 400 IU per day is recommended.
- Vitamin D replacement is safe.

Physical Activity & Exercise – exercise helps to build and maintain strong bones and prevent falls and fractures

- Exercise and bone maintenance are inextricably linked.
- **Regular** weight-bearing exercise and strength training can prevent bone loss associated with ageing and menopause.
- By improving balance, co-ordination, strength and agility exercise helps to prevent falls that lead to fractures.
- Regular weight-bearing, impact and resistance exercises are best for people with osteoporosis. ***High-impact activities are only recommended for people with osteoporosis who don't have fractures.***
- Exercise can help to relieve pain and some of the symptoms of increased kyphosis (rounding of the upper back) and other postural changes.
- As the response of the bone to muscle contraction is a local phenomenon, muscles connected to clinically important bones susceptible to osteoporotic fracture (hip, wrist, thoracic spine) need to be targeted specifically to achieve protection at those skeletal sites.



Ask the physiotherapists at Bayside Physio & Pilates for advice for your individual exercise needs. Pilates exercise uses spring resistance and improves balance, co-ordination, strength and can provide weight bearing compressive forces that are good for your bones. Our physios can devise a program to suit your individual needs.