



Research – Osteoporosis: Evidence Based Treatments

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| Brief | Evidence Based Treatments for <i>Osteoporosis</i> |
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Please note:

The research and literature reviews collated by our TAB Research Team are not to be shared external to the Branch. These are for internal TAB use only and are intended to assist our advisors with their reasonable and necessary decision-making.

Delegates have access to a wide variety of comprehensive guidance material. If Delegates require further information on access or planning matters they are to call the TAPS line for advice.

The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters.

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2 Summary

- Treatment for osteoporosis is based on bone health maintenance and the prevention of fracture
- Treatment for osteoporosis is largely pharmacological where pharmacological interventions prevent further bone loss and reduce fracture risk
- Treatment decisions should be based on age, sex, medical history, severity of the condition and estimated absolute risk of fracture [1]
- Most current osteoporosis medications are anti-resorptive, and reduce the natural but excessive process of bone loss [1]
- Other agents increase the formation of new bone; these are most appropriate for more severe osteoporosis, especially if a patient is unresponsive to anti-resorptive therapy [1]
- Osteoporosis medicines are grouped into different 'classes' depending on their 'active ingredient' [2]:
 - Bisphosphonates (tablets)
 - Denosumab (injection)
 - Selective oestrogen receptor modulators (SERMS) (tablet)
 - Hormone replacement therapy (HRT) (tablets)
 - Teriparatide (injection)
- Management of Osteoporosis includes diet and lifestyle, education and psychosocial support, and supplementing calcium and vitamin D.

3 Introduction

This document summarizes the latest evidence based research detailed in the guideline produced by the Royal Australian College of General Practitioners (RACGP) and Osteoporosis Australia in 2017 [1].

The guideline is designed to provide clear, evidence-based recommendations to assist general practitioners and other health professionals in managing older patients with osteoporosis. The purpose of the guideline is to support clinical judgement.

The majority of the recommendations in the guideline are based on critical analysis of the body of published, peer-reviewed evidence that has accumulated from September 2006 to February 2016, following a systematic review of the available evidence to support the recommendations. Where insufficient evidence was available, or where the quality of the evidence did not meet minimum requirements set by the RACGP research working group, recommendations were developed through working group consensus.

4 What is Osteoporosis?

Osteoporosis is a condition where bones become thin, weak and fragile, such that even a minor bump or accident can cause a broken bone (minimal trauma fracture). It is most common in older women, affecting over 1 in 4 aged over 75. The hip was the most common site for minimal trauma fractures (32% of fractures). In 2017–18 there were 93,321 hospitalisations for minimal trauma fractures in people aged 50 and over. An estimated 924,000 Australians have osteoporosis, representing 3.8% of the population [3].

Osteoporosis is characterised by both low bone mineral density (BMD) and micro-architectural deterioration of bone tissue, leading to decreased bone strength, increased bone fragility and a consequent increase in fracture risk. BMD is usually reported as a T-score, the number of standard deviations (SDs) of the BMD measurement above or below that of young healthy adults of the same sex. Approximately 50% of first or subsequent minimal trauma fractures occur in people who have T scores in the normal or osteopenic range [1].

5 Treatment and management of osteoporosis recommendations

5.1 General bone health maintenance and fracture prevention

5.1.1 *Diet and lifestyle*

Promote the following important lifestyle choices for all postmenopausal women and men over 50 years of age:

- Adequate calcium and protein intake
- Adequate but safe exposure to sunlight as a source of vitamin D
- Maintenance of a healthy weight and body mass index
- Cessation of smoking
- Avoidance of excessive alcohol consumption

5.1.2 Education and psychosocial support

- Provide postmenopausal women and men over 50 years of age at risk of or diagnosed with osteoporosis, access to education, psychosocial support and encouragement to seek support from appropriate sources according to individual needs

5.1.3 Reducing the risk of falls

- Conduct falls risk assessments and initiate targeted fall-prevention programs in older adults

5.1.4 Exercise

- Individuals over 50 years of age without osteoporosis should participate regularly in progressive resistance training and balance training exercises. Resistance exercise should be regular (2–3 days per week), moderate–vigorous, progressive and varied to influence BMD and reduce fall and fracture risk
- Prescribe high-intensity progressive resistance and balance training to older adults with osteoporosis to prevent further bone loss and/or improve BMD, improve function, treat sarcopenia, and decrease fall and fracture risk.
- Prescribe extended exercise therapy, including resistance and balance training, after hip fracture to improve mobility, strength and physical performance. Evidence for the benefits of exercise after vertebral and non-hip fractures is limited.

5.1.5 Calcium and vitamin D supplementation

- Calcium and vitamin D supplements should not be used routinely in noninstitutionalised elderly people. The absolute benefit of calcium and vitamin D supplements in terms of fracture reduction is low. There is evidence of significant benefit in people at risk of deficiency, particularly institutionalised individuals. Calcium and vitamin D supplements should be offered to people taking osteoporosis treatments if their dietary calcium intake is less than 1300 mg per day.

5.2 Pharmacologic approaches to prevention and treatment

5.2.1 *Bisphosphonates*

- Bisphosphonate therapy should be considered for the primary prevention of vertebral fractures in women with osteopenia who are at least 10 years post menopause.
- Bisphosphonate therapy (alendronate, risedronate or zoledronic acid) is recommended for reducing the risk of vertebral and non-vertebral fractures in postmenopausal women and men over 50 years of age at high risk of fracture (those with osteoporosis by BMD criteria or a prior minimal trauma fracture)
- Reconsider the need to continue bisphosphonate therapy after 5–10 years in postmenopausal women and men over 50 years of age with osteoporosis who have responded well to treatment (T-score ≥ -2.5 and no recent fractures). If BMD remains low (T-score ≤ -2.5) and/or there are incident vertebral fractures, continue treatment. Treatment should be restarted if there is evidence of bone loss, especially at the hip, or if a further minimal trauma fracture is sustained.

5.2.2 *Denosumab*

- Denosumab is recommended for the treatment of osteoporosis in postmenopausal women at increased risk of minimal trauma fracture.
- Denosumab should be considered as an alternative to bisphosphonates for the treatment of men at increased risk of minimal trauma fracture.

5.2.3 *Hormone therapy*

- Consider oestrogen replacement therapy to reduce the risk of fractures in postmenopausal women. The increase in risk of adverse events associated with treatment should be weighed carefully against benefits. Long-term use is not recommended.
- Selective oestrogen receptor modulators (SERMs) should be considered as a treatment option for postmenopausal women with osteoporosis where vertebral fractures are considered to be the major osteoporosis risk (on the basis of low spine BMD and/or an existing vertebral fracture) and where other agents are poorly tolerated. SERMs may be particularly useful in younger postmenopausal women at risk of vertebral fracture and who have a prior or family history of breast cancer.

5.2.4 *Parathyroid hormone*

- Teriparatide treatment is recommended to reduce fracture risk in postmenopausal women and men over 50 years of age with osteoporosis who have sustained a subsequent fracture while on anti-resorptive therapy, or in whom anti-resorptive therapy is contraindicated.

5.2.5 *Strontium ranelate*

- Strontium ranelate at a dose of 2 g per day is an effective second-line option for reducing the risk of further osteoporotic fractures in postmenopausal women with prevalent fractures. Strontium ranelate should not be used in patients with previous or clinically active cardiovascular disease or uncontrolled hypertension and should only be used when other medications for the treatment of osteoporosis are unsuitable.

5.3 Ongoing monitoring

- Regularly re-assess fracture risk and requirement for anti-osteoporotic therapy in patients who are not receiving therapy, but remain at increased risk of fracture.
- Review all patients 3–6 months after initiating a specific pharmacological intervention for osteoporosis, and annually thereafter. BMD testing at the 3–6 month review is not indicated.
- Biochemical markers of bone turnover should not be routinely used for the diagnosis of osteoporosis in general practice. Measurement of markers should be confined to specialist practice, and may be useful for the monitoring of adherence to treatment and in the evaluation of secondary causes of bone loss.

5.4 Special issues

5.4.1 *Management of osteoporosis in the elderly*

- Calcium and vitamin D supplementation is recommended for the prevention of fracture in the frail elderly and institutionalised elderly. Optimisation of calcium and vitamin D should be the standard of care for this group.
- Consider the use of hip protectors to reduce the risk of hip fracture in residential-care settings, but not in community settings.

- Anti-resorptive therapy is recommended for reduction of fracture risk in people over 75 years of age with osteoporosis.
- Anabolic therapy with teriparatide may be considered for reduction of vertebral fracture risk in people over 75 years of age with osteoporosis.
- Multifactorial assessment of falls risk, exercise programs and home-safety interventions are recommended to reduce the rate of falls in community dwelling people over 75 years of age.
- Vitamin D supplementation of elderly people in care facilities is recommended to reduce the rate of falls. Vitamin D supplements given for falls prevention are normally combined with calcium to address the high rates of calcium deficiency also seen in this population.
- Evidence-based exercise modalities that progress in intensity as capacity improves are recommended for the maintenance of bone strength, muscle function and balance in people over the age of 75.
- Exercise programs for very frail elderly institutionalised people and those with vertebral fracture risk should be supervised, modified and tailored to minimise the potential to increase the risk of falls, injury and vertebral fractures.

5.4.2 *Aromatase inhibitor and androgen deprivation therapy*

- All women undergoing aromatase inhibitor (AI) therapy should have a baseline assessment of fracture risk prior to commencing therapy.
- Women undergoing AI therapy who fall within one of the following two categories should commence anti-resorptive therapy unless contraindicated:
 - 70 years or over with a BMD T-score ≤ -2.5
 - 50 years or over with a minimal trauma fracture (including radiological vertebral fracture) or a high estimated 10-year risk of fracture. There is limited evidence specific to women receiving AI to guide firm recommendations outside these criteria, especially in premenopausal women.
- The duration of anti-resorptive treatment in women who are undergoing or have completed AI therapy should be individualised and based on absolute fracture risk.
- General measures to prevent bone loss should be implemented in all women commencing AI therapy.
- All men commencing androgen deprivation therapy (ADT) should have a baseline assessment of fracture risk. BMD by DXA should be measured in all patients at the time of commencement of ADT.

- All men receiving ADT who have a history of minimal trauma fracture should be commenced on anti-resorptive therapy, unless contraindicated.
- Management of bone health should be reviewed 1–2 yearly in men on continuous ADT.
- General measures to prevent bone loss should be implemented in all men commencing ADT.

6 References

1. The Royal Australian College of General Practitioners and Osteoporosis Australia. Osteoporosis prevention, diagnosis and management in postmenopausal women and men over 50 years of age (2nd ed.)2017. Available from: <https://www.racgp.org.au/getattachment/2261965f-112a-47e3-b7f9-cecb9dc4fe9f/Osteoporosis-prevention-diagnosis-and-management-in-postmenopausal-women-and-men-over-50-years-of-age.aspx>.
2. Osteoporosis Australia. Treatment Options 2014 [Available from: <https://www.osteoporosis.org.au/treatment-options>].
3. Australian Institute of Health Welfare. Osteoporosis2020. Available from: <https://www.aihw.gov.au/reports/chronic-musculoskeletal-conditions/osteoporosis>.