

## Osteoporosis in men

Osteoporosis is a chronic condition that leads to reduced bone strength, weakness of the skeleton and increased risk of fracture. Osteoporosis is a leading cause of morbidity and mortality in older people. There is less awareness of osteoporosis in men compared with post-menopausal women. Over 13% of men aged 70 years or older have osteoporosis. Men have larger and stronger bones at peak bone mass; and with ageing, more bone is deposited in long bones compared with women. Men tend to have osteoporotic fractures about 10 years later in life than women.

Fractures occur predominantly in the distal forearm, proximal humerus, thoracic and lumbar vertebra, and proximal femur. Forearm fractures are less common in men than women; however, hip fracture rates are similar. The mortality rate associated with hip fractures, as well as vertebral and other major fractures, is higher in men than in women. Men older than 60 years who have fractured their hip have an 8-fold increase in mortality risk during the first 3 months after hip fracture. Mortality rate also increases after vertebral and other osteoporotic fractures.

### Risk factors

Men at high risk for an osteoporotic fracture include those men who have already had a fragility fracture, men on oral glucocorticoids or those men being treated for prostate cancer with androgen deprivation therapy. Many coexisting medical conditions that contribute to bone loss, including rheumatoid arthritis, inflammatory bowel disease, diabetes, coeliac disease, chronic obstructive pulmonary disease (COPD), chronic kidney disease and alcohol abuse. After a hip fracture, there is a 3-fold relative risk of dying from cardiovascular disease among men.

### Causes

Hypogonadism, glucocorticoid therapy, gastrointestinal disease, vitamin D deficiency, antiseizure medication therapy, hypercalciuria, and alcohol use disorder were among the most common causes of osteoporosis.

Medications that may cause osteoporosis include:

- Oral corticosteroids (prednisone, prednisolone)
- Proton pump inhibitors
- SSRI antidepressants
- Dopamine antagonists (bromocriptine, cabergoline, pramipexole, ropinirole, rotigotine)
- Thiazolidinediones (pioglitazone)
- Some anti-epileptics
- Chronic opioids
- Protease inhibitors
- Cancer chemotherapy
- Androgen deprivation therapy

Patients on long-term oral corticosteroid therapy (> 7.5 mg prednisolone daily for more than 6 months) have a 2-fold risk of developing osteoporosis.

All men commencing androgen deprivation therapy for prostate cancer should be assessed for fracture risk and require anti-resorptive therapy after minimal trauma fractures. Bone health should be reviewed every 1-2 years.

### Treatment

The treatment of osteoporosis in men consists of lifestyle measures, hormonal therapy (when indicated), and/or drug therapy. The goal of therapy is to prevent fractures and associated morbidity. Medications that cause postural hypotension and sedation should be avoided. The risk of falls can be reduced with exercise programs, environmental safety precautions and Tai Chi.

### Lifestyle modifications

Lifestyle modifications should be encouraged for all men with osteoporosis. Weight-bearing exercise and balance training may be beneficial. Smoking and excessive alcohol intake should be avoided.

Sufficient calcium (dietary and supplements) and vitamin D (sun exposure or supplements) are recommended for people prescribed medications for the prevention and treatment of osteoporosis. The Recommended Daily Allowance for total calcium intake (from diet and supplements) in men over 70 years is 1300mg per day. Men over 70 years who have some sun exposure but not at the recommended level should have at least 800IU per day from supplements. Sun avoiders or men at risk of vitamin D deficiency require 1000-2000IU per day. Food does not contain adequate amounts of vitamin D.

## Medication therapy

Osteoporosis treatment for men includes:

- Bisphosphonates (alendronate, risedronate and zoledronic acid)
- Denosumab (*Prolia*)
- Anabolic agents (teriparatide)

These medications all increase bone mineral density (BMD) in men and have similar effects on bone turnover markers as in women. Bisphosphonates have shown the strongest evidence for treatment efficacy and cost-effectiveness in men.

Bisphosphonates are anti-resorptive agents that reduce the risk of vertebral and non-vertebral fractures by about 40-70%. Oral bisphosphonates alendronate (*Fosamax*) and risedronate (*Actonel*) can cause oesophageal irritation and should be taken with a full glass of water. *Actonel EC Once-a-week* tablets may be taken with or without food. Zoledronic acid (*Aclasta*) is administered once a year by intravenous infusion and may cause fever and arthralgia. There is an increase in the risk of atypical femur fractures with the length of treatment with bisphosphonates. People complaining thigh, hip or groin pain should be assessed immediately. Other side effects of bisphosphonates include osteonecrosis of the jaw and allergic reactions including angioedema.

Denosumab (*Prolia*) inhibits bone resorption and is administered by subcutaneous injection every 6 months. Adequate calcium and vitamin D is necessary as hypocalcaemia may occur, especially in people with chronic kidney disease.

Teriparatide (*Forteo*) stimulates bone formation in men. Teriparatide treatment is recommended to reduce fracture risk in men over 50 years of age with osteoporosis who have sustained a subsequent fracture while on anti-resorptive therapy. It is given by daily subcutaneous injections for up to 2 years. Teriparatide should be followed by anti-resorptive therapy to prevent loss of bone. It can cause hypercalcaemia, dizziness, nausea, and headache.

Romozosumab (*Evenity*) is indicated for men with established osteoporosis and a high risk of fractures. Treatment must not exceed a lifetime maximum of 12 months therapy. It is administered by subcutaneous injection once a month. The injection site should be rotated. To reduce the risk of hypocalcaemia, residents should be adequately supplemented with calcium and vitamin D.

Low testosterone concentration is often found in older men and can be due to obesity and the use of drugs such as antiandrogens for prostate cancer. Replacement of testosterone does result in small increases in BMD but much less than other anti-osteoporosis treatments.

## Duration of use

Optimal duration of treatment with bisphosphonates is uncertain. After a 5 year course of oral bisphosphonates or a 3 year course of zoledronic acid, a 2 year break from medication should be considered.

Unlike bisphosphonates, the effect of denosumab on bone does not persist after discontinuation. Stopping denosumab increases the risk of vertebral fractures.

## Summary

**Osteoporosis is a largely preventable condition in older men. Men are at risk of fragility fractures and have higher mortality than women after a fracture. Adequate diet (calcium, protein, vitamin D intake), regular exercise within limits, and avoidance of smoking and excessive alcohol consumption are recommended. Early detection and effective treatment are critical to reducing the risk of fractures among older men. Anti-resorptive and anabolic agents reduce the risk of fractures in men with osteoporosis.**

## Further information

<https://healthybonesaustralia.org.au/>

### References

*Bone Research* 2014;2:14001.

*Lancet Diabetes Endocrinol* 2022.

*Osteoporosis prevention, diagnosis and management in postmenopausal women and men over 50 years of age. RACGP, 2017.*

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