# Osteoporosis in men

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**Abstract**

This article gives an overview of what is known and unknown about the epidemiology, diagnosis, risk factors, prevention and treatment for osteoporosis in men. © 2004 WPMH GmbH. Published by Elsevier Ireland Ltd.

## Epidemiology of osteoporosis in men

It is, in general, agreed that the life-time risk of osteoporotic fracture in men is around one-third of that in women [1]. The life-time risk of a hip fracture in Caucasian men is 13 to 25%. The prevalence of vertebral fracture is as high in men as in women. For instance, in the United Kingdom it is 12% in men and 10% in women [2].

The epidemiology of osteoporosis in Asian men varies between countries, and the condition is much more prevalent in urbanized Asian countries. For instance, the age-adjusted incidence of hip fracture is 70% higher in Hong Kong Chinese men than in Thai men [3].

In Hong Kong Chinese, the incidence of hip fracture was around 5 in 1000 for elderly men and 8 in 1000 for elderly women [4], and the prevalence of vertebral fracture was 17% in men [5] and 30% in women [6].

## Diagnosis

Osteoporosis can be defined as "a skeletal disease" characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk [7].

The World Health Organization has definitions for osteopenia and osteoporosis in women, but not in men [8]. In women, osteopenia is defined as a T score of between −1 and −2.5, and osteoporosis as a T-score of −2.5 or more. The T-score is the number of standard deviations by which the bone mineral density of an individual person differs from that of the young, normal mean of the same population. It is not known if this definition can be applied to men because there is no large prospective database on the relation between bone mass density (BMD) and fracture risk in men. Preliminary studies suggested that the relation between BMD and fracture in men is similar to that in women [9,10], but in one study, the T-score of men with fracture was found to be larger than those in women [11].

## Risk factors for osteoporosis in men

Low bone mass and falls are both determinants of osteoporotic fracture in men. The following are a list of risk factors which could be associated with idiopathic osteoporosis in men.

| Risk factors which could be associated with idiopathic osteoporosis in men |
|---|
| • Low body mass index<br>• Cigarette smoking<br>• A family history of osteoporotic fractures<br>• Alcoholism<br>• A lack of physical activity<br>• A low dietary calcium intake |

The National Osteoporosis Foundation of the United States has advocated the use of risk factors to determine which women should have their BMD assessed [12]. Similar guidelines, to be based on prospective studies, should be established for men.

Medical disorders are major causes of osteoporosis in men. The following are some

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of the more common medical conditions which could lead to osteoporosis [13].

| The more common medical conditions which could lead to osteoporosis |
|---|
| • Hypogonadism<br>• Gastric or bowel resection<br>• Coeliac disease<br>• Thyrotoxicosis<br>• Hyperparathyroidism<br>• Ankylosing spondylitis and rheumatoid arthritis<br>• Cancer<br>• Prolonged immobilization<br>• Alcoholic liver disease<br>• Chronic renal failure<br>• Corticosteroid therapy |

Secondary causes of osteoporosis should be excluded before the diagnosis of idiopathic osteoporosis can be made [14].

## Treatment of osteoporosis in men

Few randomized controlled clinical trials on drug treatment for osteoporosis have been conducted in men. Evidence available in women can be referred to in some instances.

### Bisphosphonates

The results of a randomized, controlled clinical trial showed that alendronate, given with calcium and vitamin D, was effective in preventing bone loss in men [15]. The BMD increased by 7.3% at the lumbar spine and 2.5% at the femoral neck in the treatment group ($P < 0.05$ compared with placebo). Moreover, vertebral fracture risk was significantly reduced (0.8% in the treatment group compared with 7.1% in the placebo group). The efficacy of alendronate in treating osteoporosis in men has been confirmed [16]. Bisphosphonates increased BMD and reduced fracture risk in men with glucocorticoid or leuprolide-induced bone loss [17–20].

Bisphophonates are currently the treatment of choice for idiopathic osteoporosis in men.

### Calcium and vitamin D

In two recent studies, injections of vitamin $D_2$ (ergocalciferol) in men living in nursing homes resulted in reduced appendicular fractures [21,22]. On the other hand, the efficacy of 1,25 $(OH)_2D3$ (calciferol) remains controversial.

## Androgen replacement therapy

Testosterone therapy caused a 5% increase in lumbar spine BMD and markers of bone turnover in eugonadol men [23,24].

The effects of long-term testosterone replacement therapy were larger in men with primary or secondary hypogonadism. For instance, a 26% increase in spine volumetric BMD has been found [25]. Moreover, testosterone has been shown to be effective in men receiving steroid therapy [26].

## Conclusion

In conclusion, osteoporosis is a prevalent health problem in men. An evidence-based approach should be adopted in the clinical investigation and drug treatment for osteoporosis in men. Further research into the validity of diagnostic criteria, risk factors and emerging therapeutic agents for osteoporosis in men is however urgently required.

*This article introduces a series of articles on Osteoporosis. Further articles in the series will take up specific areas of the subject in detail and will be published in future issues of the journal.*


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