

What Women Need to Know

Osteoporosis is defined by the World Health Organization as a degenerative bone disease characterized by low bone mass and microstructural deterioration of bone tissue, which leads to bone fragility and increased risk of fractures (WHO, 1994). Postmenopausal females are the highest risk group for fractures, the majority of which are preventable.

Lack of exposure to estrogen, smoking, specific medications (glucocorticoids, PPIs, anti-convulsants, thiazolidinediones, aromatase inhibitors, anticoagulants, lithium) and certain medical conditions (hyperthyroidism, rheumatoid arthritis, malabsorption, cancer, hepatic/renal disease) are causative factors. It is the most common global metabolic bone disease, with the International Osteoporosis Foundation reporting that 1 in 3 women over 50, and 1 in 5 men will experience osteoporotic fractures in their lifetime and estimated to affect over 200 million people. In the US 10 million cases of osteoporosis have been diagnosed, of which 80% are women. With an additional 44 million having low bone density, (National Osteoporosis Foundation, 2020). Data from the UK reports approximately 536,000 fragility fractures occurring annually as a result. Ireland's climate plays a role in the development of osteoporosis, as the northerly latitude decreases exposure of UV light between October and March resulting in low levels of vitamin D.

It is estimated that around 300,000 people living in Ireland have Osteoporosis, but only 15% are clinically

diagnosed, and that 1 in 2 females over the age of 50 will develop an osteoporosis related fracture over their lifetime (Irish Osteoporosis society).

Dual-energy x-ray absorptiometry (DEXA) is the gold standard for evaluation of Bone Mineral Density (BMD). Peripheral DEXA is used to measure BMD at the wrist; it may be most useful in identifying patients at very low fracture risk who require no further work up. DEXA of the femoral neck is the method of choice in those displaying a higher fracture risk.

A T-score is calculated by comparing the BMD value with that of controls at their peak bone density, while a Z-Score is compared to an age-matched normal mean. World Health Organization criteria define a normal T-score value as within 1 standard deviation (SD) of the mean BMD value in a healthy young adult. Variations in these standards assist in diagnosis.

- T-score of -1 to -2.5 SD indicates osteopenia (Low bone mass)
- T-score of less than -2.5 SD in lumbar spine or femoral neck indicates osteoporosis (ISCD)
- T-score of less than -2.5 SD with fragility fracture(s) indicates severe osteoporosis

A DEXA scan should be performed for women aged >65 (Men >70). For postmenopausal women <65 (Men <70) it should be recommended only in the presence of additional risk factors such as low body weight, previous fracture, the use of high risk medication, or the presence of associated diseases. Rescreening intervals of 15 years are appropriate for women with normal BMD or mild osteopenia, but should be increased to 5 years with moderate osteopenia, or 1 year with advanced osteopenia.



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The Fracture risk assessment tool (FRAX) can be used as a prognostic marker. It calculates the 10 year fracture probability above that of a 65 year old Caucasian female without risk factors. The result can be used to assist when determining if BMD measurement or active treatment may be necessary, however, the thresholds for drug treatment have not been proven to be effective for fracture prevention. A particularly useful role for this marker is to assist when deciding if a DEXA scan is needed for women aged 40-65.

Treatment of low bone density includes a combination of dietary, lifestyle and medical interventions.

Optimisation of calcium and vitamin D status are important first line interventions. Risk appropriate exercise and prevention of falls are also needed. For women of low to medium risk for osteoporotic fracture, the consideration of hormone replacement therapy in the decade following menopause can be considered. In these patients Oestrogen replacement has been suggested to lead to a higher improvement in BMD, and better quality bone than alendronate.

For patients at high risk of fracture Anti-Resorptive treatment with bisphosphonates, Denosumab or SERMs are appropriate interventions. For very high-risk patients formation stimulating agents such as teriparatide, abaloparatide or romosozumab (sclerostin antibody) can be considered, followed by an inhibitor of bone resorption. Unfortunately the benefit of oestrogen therapy on bone density is lost within a few months of stopping treatment.

This is also seen with denosumab, raloxifene and teriparatide. After discontinuation of HRT in patients with significant osteopenia a short course of alendronate or zoledronate infusion may be considered.