

Osteoporosis

– bone health following the menopause

Osteoporosis – the thin bone disease – affects over three million people in the UK. Post-menopausal women are by far the commonest sufferers, although osteoporosis can also affect younger women, men and very occasionally children.

Introduction

Bone is living tissue that has to be constantly repaired and renewed because of microscopic damage that occurs with daily physical activity. This process of renewal is called bone turnover and is carried out by two sets of cells; one set (osteoclasts) dig up bone whilst the other set (osteoblasts) lay down new bone. The two processes are linked (coupled) together so that they balance each other. If there is a relative increase in bone removal, as happens following menopause, then bone tissue is lost and bones become thinner. The maximum amount of bone in the skeleton (peak bone mass) is achieved soon after linear growth ceases. There is gradual loss of bone with aging in adults, but major bone loss in women occurs with loss of oestrogen at the menopause.

Increased digging up of bone compromises the micro-architecture and makes bones more fragile. The full-blown disease of osteoporosis is responsible for over half a million fractures yearly. The most serious of these is a fractured neck of femur (hip) because it usually requires surgery and post-operative complications can occur. Between 20 and 35 per cent of sufferers between the ages of 75 and 90, die within 12 months of fracturing their hip, around 80 per cent of whom are women.

Diagnosis

A classical osteoporotic fracture of the wrist, spine or hip with relatively little trauma will give a diagnosis of osteoporosis. But diagnosis can be made before a fracture has occurred using a dual energy X-ray absorptiometry (DEXA) scan. DEXA presents a patient's bone mineral density in terms of standard deviations (a statistical unit) below that of a young adult reference population. The unit used is presented as a T-score, and the World Health Organisation (WHO) has established the following guidelines:

- T-score of -1.0 or greater = normal
- T-score between -1.0 and -2.5 = low bone mass (osteopenia)
- T-score of -2.5 or less = osteoporosis.

X-rays are helpful for confirming fragility fractures e.g. of the ribs or vertebrae. However, they are relatively insensitive to the identification of early disease, requiring a bone mass loss of at least 30 percent before picking up diagnostic changes.

Treatment

The available treatments to reduce risk of fracture act in different ways, either to reduce resorption or to increase formation of bone. The commonest medications used are bisphosphonates, which reduce the resorption of bone as it normally occurs. The most commonly used, sodium alendronate, is known to be very effective at preventing bone loss and fractures. It can irritate the food pipe (oesophagus), and so is given once a week on an empty stomach and the patient is advised to remain upright for an hour after taking it. It still often causes heartburn, however, and many patients cease to take it for this reason. Other types of oral bisphosphonates are available given weekly or monthly. Bisphosphonates can be given as a 3-monthly injection into a vein or a yearly infusion into a vein. There is a very small risk of unwanted effects such as heart rhythm disturbances, osteonecrosis of the jaw where a bit of jaw bone dies (usually following a tooth extraction), and fragility fractures of the thigh bone. To minimise these risks bisphosphonates are usually given for 3 to 5 years followed by a treatment-free "holiday".

Hormone Replacement Therapy (HRT) has been shown to reduce the risk of fracture and can be used to prevent or treat osteoporosis in women. It is a safe and effective treatment, and has many additional benefits other than to the skeleton.

Parathyroid hormone boosts bone formation but has to be given as daily injections under the skin and is extremely expensive.

New treatments are focussing on modifying signals to the bone cells. Denosumab is an antibody (blocker) to a major signal that drives the. It is thus very effective in stopping bone breakdown. It is easily given as an injection under the skin just once every 6 months. However, it does have the same risks as bisphosphonates for osteonecrosis of the jaw and fragility fractures of the thigh bone. There are also some concerns that there may be excessive loss of bone, and potentially increased fracture risk, on stopping this treatment. Other treatments under development are aimed at blocking factors that inhibit the main signals for stimulating bone formation, thereby boosting bone mass.

Calcium compounds such as carbonate and citrate, and calcium + vitamin D combinations are also widely prescribed to help improve bones, particularly in patients who are taking oral corticosteroids (such as prednisolone). These should not be regarded as treatments by themselves but are an adjunct to other treatments such as bisphosphonates and HRT.

Better bone health

Exercise, sunshine and diet are all needed for healthy bone growth and maintenance.

Exercise – walking and gentle aerobics are excellent for bone health because they promote the entry of calcium into the bone mass where it is used for improved strength and growth.

Nutrition – a healthy and balanced diet is fundamental to bone (and general) health because it supplies the protein, carbohydrate and fat, vitamins, minerals and other nutrients vital for tissue renewal and growth. This is important during childhood when new bone is being constantly laid down, and also throughout adult life when old bone is broken down and destroyed, and new bone built up to replace it.

Fresh fruit and vegetables supply a vast range of essential minerals and other nutrients needed to maintain a sturdy skeleton. Dairy foods are rich in calcium, and eating them need not increase one's saturated fat intake because the reduced fat versions supply just as much of this mineral, and often more – weight for weight. Other sources of calcium include green leafy vegetables such as spring greens, spinach and broccoli, baked beans, dried fruit, bottled mineral water, soya beans, sardines, salmon, nuts, dried beans and sunflower seeds.

Vitamin D is also essential because it enables calcium and phosphorus to be used to form strong bones and teeth. It can be obtained from sunshine and as a supplement. Sunshine on the skin creates vitamin D and the advice is exposure of a reasonable body area for 20 minutes/day from May to October. Vitamin D can also be obtained from food, e.g. milk and dairy products, fish liver oils, sardines, herring, salmon and tuna.

Prevention of falls

This is important for the elderly. Attention to loose mats, wires and other obstacles in the home is necessary, and care in walking out in icy conditions is obvious.

Useful contacts

National Osteoporosis Society

www.nos.org.uk
Freephone helpline: 0808 800 0035
(Monday-Friday 9am-5pm - now open until 7pm on Tuesdays)
Email: nurses@nos.org.uk

International Osteoporosis Foundation

www.iofbonehealth.org

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This fact sheet has been produced by Women's Health Concern and reviewed by British Menopause Society Medical Advisory Council. It is for your information and advice and should be used in consultation with your own medical practitioner.

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We provide an independent service to advise, reassure and educate women of all ages about their health, wellbeing and lifestyle concerns.

Go to www.womens-health-concern.org

