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

Introduction
Typically strong and resilient in childhood, bones have a dense, ivory-like outer casing or cortex, enclosing an inner core or medulla of soft marrow filling up the gaps and spaces of the spongy interior. Like all living tissue, they are able to absorb and utilise a range of proteins and mineral salts from the bloodstream for renewal and repair. Bones generally stop growing in length after the age of 16 – 18 years, but their density and strength increase until the late 20s.

From the age of around 35 onwards, however, bones become weaker and more fragile due to a loss of mineral salts. This loss intensifies in women as their oestrogen levels fall, reaching a peak at the menopause when the production of this hormone from the ovaries ceases altogether.

Thinned-down bones are weaker and more fragile, and the full-blown disease of osteoporosis is responsible for approximately 230,000 fractures yearly. The most serious of these is a fractured neck of femur (thigh bone) because the long period of immobility during recovery increases the risks of life-threatening conditions such as bronchopneumonia, and DVT (deep vein thrombosis) with subsequent blood clot on the lungs (pulmonary embolism), heart attacks and strokes. Between 20 and 35 per cent of sufferers between the ages of 75 and 90, die within 12 months of fracturing their hip joint, around 80 per cent of whom are women.

Diagnosis
The dual energy X-ray absorptiometry – DEXA – scan provides the gold standard means of diagnosing osteoporosis. It expresses 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
- 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 gold standard drug for osteoporosis is the bisphosphonates, which reduce the resorption of bone as it normally occurs. The best-known, sodium alendronate (Fosamax), is poorly absorbed and tends to irritate the food pipe or oesophagus. It is given once a week on an empty stomach, and the patient advised to remain upright for an hour after taking it. It often causes heartburn, however, and many patients cease to take it for this reason.

Calcium compounds such as carbonate and citrate, and calcium + vitamin D combinations are also widely prescribed to help re-mineralise osteoporotic bones, and on the whole are better tolerated by patients than alendronic acid medications.

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

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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.

Supplementary nutrients for healthy, strong bones

Our Western diet is typically rich in proteins, the breakdown products of which increase the body’s acidity and adversely affect calcium metabolism. More calcium and magnesium are lost in acidic urine, and an acidic environment reduces the availability of calcium to bone tissue.

The best dietary supplement for osteoporosis, therefore, is one which increases the bone-strengthening effects of calcium by neutralising excess acid. A recently developed one also provides vitamin D, which supports calcium uptake by the bones, and a substantial dose of natural vitamin K2.

Vitamin K2 activates a protein called osteocalcine. This protein helps to bind the calcium to the bone. The more active this protein is, the better protection one will have against osteoporoses.

Vitamin K2 is new for many people. This vitamin is in the spot light of scientists, because it possesses strong characteristics to prevent calcium depositing in the arteries and helps to bind calcium in the bones.

Vitamin K2 is found in fermented foods, while the more common vitamin K1, the type usually found in supplements, is sourced from plants.

Vitamin K2, however, it is the more effective of the two in encouraging the bones’ calcium uptake and building up bone mass, i.e. bone mineralisation. It also stimulates the formation of bone matrix, the scaffold within which bone minerals are deposited. (Without this scaffold, calcium is unstructured, like a lot of loose sand).

About the author

Dr Caroline Shreeve is a qualified doctor working in hospital medicine. Since qualifying in the seventies, she has pursued several successful parallel careers in general medicine, psychology, complementary therapies and health journalism and is specially interested in herbal treatments, nutrition and dietary supplements.

Dr Shreeve has written regularly for the women’s press, national and regional newspapers, medical journals and trade magazine, appeared on Pebble Mill, the Gloria Hunniford Show, TV-AM and most UK regional radio stations. Her twelve books include titles on depression, the premenstrual syndrome, the menopause, and the ‘Alternative Dictionary of Symptoms and Cures’, which was a runner-up for the 1987 Booker Health prize.

Useful contacts

National Osteoporosis Society
www.nos.org.uk
Helpline: 0845 450 0230 (Monday-Friday 9am-5pm)
Email: nurses@nos.org.uk

International Osteoporosis Foundation
www.iofbonehealth.org

Medicine Guide website
Medicines used to manage osteoporosis:
www.medicines.org.uk/guides

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It is for your information and advice and should be used in consultation with your own medical practitioner. Updated: October 2010.