An Information Booklet

Osteoporosis

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CONTENTS

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About this booklet

This booklet has been produced for anyone interested in finding out more about osteoporosis. You may have the condition yourself, or you may be a friend or relative of someone with osteoporosis. Whatever reason you have for reading this, we hope you will find it useful.

We want to explain as much as we can about osteoporosis – what causes it, how it can be prevented, and how it can be treated.

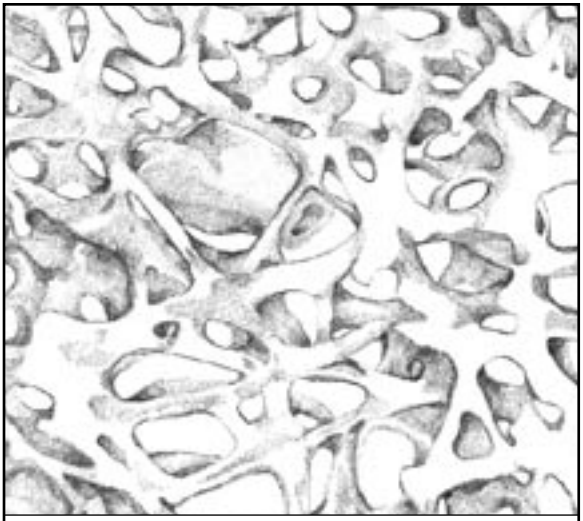
Unfortunately we cannot hope to answer all your questions, because everyone is different and this booklet is no substitute for individual consultation with a doctor. If you want to find out more after reading this booklet, the organizations in the 'Useful addresses' section may be helpful. Terms that appear in *italics* when they are first used are explained in the glossary at the end of the booklet.

What is osteoporosis?

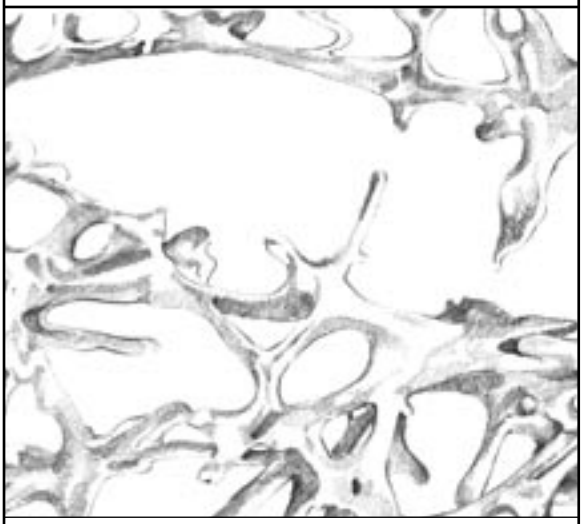
The word 'osteoporosis' means, literally, 'porous bone'. It is a condition where you gradually lose bone material so that your bones become more fragile. As a result, they are more likely to break even after a simple fall. Osteoporosis is quite common in Britain. Each year there are around 70,000 hip, 120,000 spine and 50,000 wrist fractures due to osteoporosis.

How does osteoporosis affect the bones?

Bone is made of fibres of a material called *collagen* filled in with minerals – mainly calcium salts – rather like reinforced concrete. The bones of the skeleton have a thick



(a) Normal bone



(b) Bone affected by osteoporosis

Figure 1. The effect of osteoporosis on bone

outer shell or 'cortex', inside which there is '*trabecular*' bone which is formed in a meshwork, as shown in Figure 1(a). Osteoporosis causes bone to be lost, leaving gaps in the bone material, as shown in Figure 1(b).

What causes osteoporosis?

Our bones grow during childhood and adolescence and are at their strongest in the late 20s. As middle age approaches the bones very gradually begin to become weaker. This weakening or thinning of the bones continues as we get older.

The process speeds up in women in the 10 years after the menopause. This is because the ovaries stop producing the female sex hormone *oestrogen* – and oestrogen is one of the substances that helps keep bones strong. Men suffer less from osteoporosis, because their bones are stronger in the first place and they do not go through the menopause.

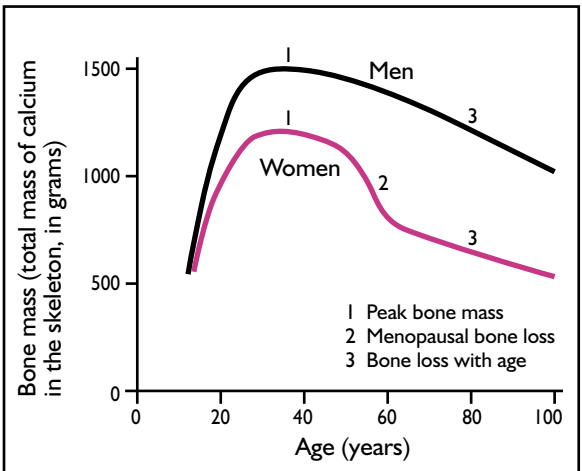


Figure 2. Graph showing typical total bone mass in men and women. Men develop a bigger skeleton during the years of growth and have a higher peak bone mass. Women have smaller skeletons and lower peak bone mass, and lose bone mass at an increased rate during the menopause.

Who is at risk?

All of us are at risk of developing osteoporosis as we get older, which is why elderly people are more likely to break bones when they fall. But there are some people who are more at risk of osteoporosis than others. These are some of the factors that can make a difference:

- **Steroids** If you take prednisolone over a long period of time, it can lead to osteoporosis.
- **Oestrogen deficiency** Women who have had an early menopause (before the age of 45), or a hysterectomy where one or both ovaries have been removed, are at greater risk. Removal of the ovaries only (ovariectomy) is relatively rare, but is also associated with an increased risk of osteoporosis.
- **Lack of exercise** Moderate exercise keeps the bones strong during childhood and throughout adulthood. Anyone who does not exercise, or has an illness or disability which makes exercise difficult, will be more prone to losing calcium from the bones, and so more likely to develop osteoporosis. Exercise is therefore very important in preventing osteoporosis. (However, there is one case in which this is not true: for the small number of people who exercise very intensively, particularly women who exercise so much that their periods stop, the risk of osteoporosis may actually be increased.)
- **Poor diet** A diet which does not include enough calcium or vitamin D can make osteoporosis more likely (see below).
- **Heavy smoking** Tobacco lowers the oestrogen level in women and may cause early menopause. In men, smoking lowers testosterone activity and this can weaken the bones.
- **Heavy drinking** A high alcohol intake reduces the ability of the body's cells to make bone.

- **Family history** Osteoporosis does run in families. This is probably because there are some inherited factors which affect the development of bone.

Can you prevent osteoporosis?

There is a great deal which can be done at different stages in your life to guard against the condition.

- **Healthy diet** Children and adults need a diet which contains the right amount of calcium. The best sources of this are milk, cheese and yogurt and, as shown below, certain types of fish which are eaten with the bones. If you are watching your weight it's worth knowing that skimmed or semi-skimmed milk actually contains more calcium than full-fat milk. We recommend a daily intake of calcium of 1000 milligrams (mg) or 1500 mg if you are over 60. A pint of milk a day, together with a reasonable amount of other foods which contain calcium, should be sufficient (see Table 1). **Vitamin D** is needed for the body to absorb calcium. Vitamin D is produced by the body when sunlight falls on the skin, and it can be obtained from the diet (especially from oily fish) or vitamin supplements (see **arc** booklet 'Osteomalacia'). For people over 60 it may be helpful to take a supplement containing 10–20 micrograms (μg) of vitamin D.
- **Children's exercise** Children should actively take part in sports or other types of exercise to help strengthen their bones.
- **Adult exercise** For the same reason, adults should keep physically active all the way into retirement. Choose 'weight-bearing' exercises (any activity which involves walking or running) which are of more benefit for bone strength than non-weight-bearing exercises such as swimming and cycling.
- **Smoking** Avoid smoking. As previously men-

Table 1. Approximate calcium content of some common foods

Food	Calcium content
115 g (4 oz) whitebait (fried in flour)	980 mg
60 g (2 oz) sardines (including bones)	260 mg
0.2 litre (1/3 pint) semi-skimmed milk	230 mg
0.2 litre (1/3 pint) whole milk	220 mg
3 large slices brown or white bread	215 mg
125 g (4 1/2 oz) low-fat yogurt	205 mg
30 g (1 oz) hard cheese	190 mg
0.2 litre (1/3 pint) calcium-enriched soya milk	180 mg
125 g (4 1/2 oz) calcium-enriched soya yogurt	150 mg
115 g (4 oz) cottage cheese	145 mg
3 large slices wholemeal bread	125 mg
115 g (4 oz) baked beans	60 mg
115 g (4 oz) boiled cabbage	40 mg

Note: measures shown in ounces or pints are approximate conversions only.

tioned, smoking can affect the hormones (in men and women) and may therefore increase the risk of osteoporosis.

- **Drinking** Avoid drinking too much alcohol. The recommended daily maximum for a woman is 2–3 units. For a man it is 3–4 units. A unit is a single measure of 25 ml of spirits (40% alcohol by volume, or abv), or half a pint (0.3 litre) of normal-strength beer, lager or cider (3.5% abv), or a *very* small glass (no more than 85 ml) of wine (12% abv).

How can osteoporosis be detected?

There are no obvious, physical signs of osteoporosis, because no one can see the bones getting 'thinner'. Osteo-

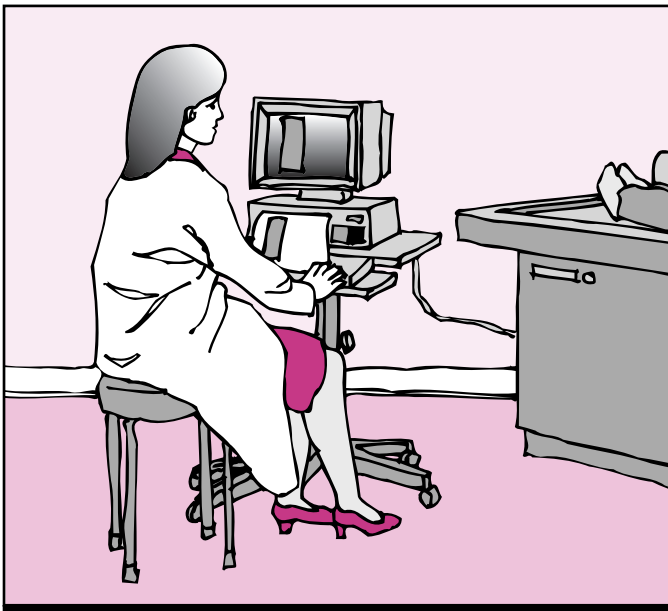
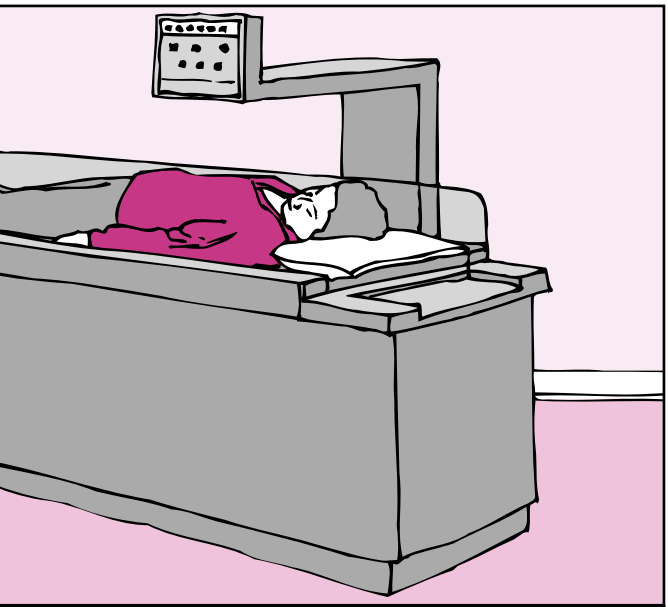


Figure 3. Your doctor can ask for a bone scan to be ca

porosis can go unnoticed for years without causing any symptoms. Quite often the first indication that someone has a problem is when s/he breaks a bone in what would normally have been a minor accident. Relatively minor fractures of the spinal bones can cause you to become round-shouldered and to lose height. These minor fractures may be painless but can cause back pain in some people.

If a doctor suspects osteoporosis, s/he can order a scan to test the strength or density of the bones. This scan is now available at many hospitals throughout the country. The results will tell how much risk there is of the bones fracturing. You will need to lie on a couch, fully clothed, for about 15 minutes while your bones are x-rayed. The dose of x-rays is tiny – about the same as spending a day out in the sun. The technique is called dual energy x-ray absorptiometry (DEXA).



arried out to test the strength or density of the bones.

What are the consequences of osteoporosis?

People with osteoporosis are more likely to break a bone even after a relatively minor accident. Fractures are most likely to the hip, spine or wrist. Hip and wrist fractures are usually sudden and the result of a fall. People who have previously had a fracture after a minor fall are at greater risk of further fractures.

Spinal problems occur if the bones in the spine (vertebrae) become weak and crush together. If several vertebrae are crushed, the spine will start to curve. This may cause back pain and loss of height and because there is then less space under the ribs, some people may have difficulty breathing. People who have this type of spinal problem also have an increased risk of fractures.

How can osteoporosis be treated?

Apart from the preventative measures already described there are other treatments available if you have osteoporosis. These may slow down the loss of bone or reduce the risk of fractures.

- **Calcium and vitamin D** As mentioned earlier, people over 60 may benefit from taking small daily amounts of vitamin D, along with 1500 mg of calcium. Stronger vitamin D preparations are sometimes used to treat osteoporosis in younger people.
- **Bisphosphonates** This group of drugs works by slowing bone loss; in many people, an increase in bone density can be measured over 5 years of treatment. Both **alendronate (Fosamax)** and **risedronate (Actonel)** reduce the risk of hip and spine fractures in patients with osteoporosis. These drugs cannot be taken with food, and specific instructions on how to take the tablets are provided as they can cause irritation of the gullet. They are available either as daily-dose tablets or weekly-dose tablets. **Etidronate (Didronel)** is a slightly weaker drug of the same group, which is well tolerated and is taken in 3-month cycles.
- **Hormone replacement therapy (HRT)** Women who have been through the menopause may consider using hormone replacement therapy to reduce their menopausal symptoms. HRT is only beneficial for bones while it is being used. A very large clinical trial reported in 2002 that using the commonest type of HRT tablet is associated with a reduction in fracture, but also with an increase in the risk of heart disease and breast cancer. It can also increase the risk of *venous thrombosis*. If you are considering long-term HRT use, discuss the potential risks and benefits with your doctor.

- **Selective estrogen receptor modulators (SERMs)** As previously mentioned, the hormone oestrogen helps to keep the bones strong. **Raloxifene (Evista)** is a SERM which mimics this effect and reduces spine fractures. It also reduces the risk of breast cancer without increasing the risk of heart disease. It is taken by mouth once a day without the need to follow special instructions. It may cause side-effects like menopausal 'flushing' and, as with HRT, may increase the risk of venous thrombosis.
- **Calcitonin (Miacalcic)** Calcitonin is a substance which the body produces naturally and which helps keep the bones healthy. When used as a treatment it has enabled the bones of people with osteoporosis to grow stronger. Calcitonin can only be given in the form of an injection or by nasal spray. Injections of calcitonin are normally given only as a short-term treatment for painful vertebral fractures, but the nasal spray may be used as a long-term treatment for osteoporosis. Possible side-effects include hot flushes, nausea, an unpleasant taste in the mouth, tingling in the hands and, rarely, an allergic reaction. The nasal spray may also cause a blocked or runny nose, sneezing and headaches.
- **Teriparatide (Forsteo)** Teriparatide is a new drug which helps new bone to form and therefore reduces the risk of fractures. It is taken by daily injection into the thigh or tummy (patients are shown how to do this themselves). It is used for up to 18 months, during which time the bones are strengthened. At present it is used mainly for people who have had fractures despite using other treatments, or who have had side-effects from other treatments. Side-effects of teriparatide include nausea, limb pain, headaches and dizziness, but because it is a new drug the long-term side-effects are not known.

Finally...

Leading an active healthy life and maintaining a diet with sufficient calcium is the best way of preventing osteoporosis. If you have the condition already, there are a number of treatments which can be effective, as described above.

Glossary

Collagen – the main substance in the white, fibrous connective tissue which is found in tendons, ligaments and cartilage. This very important protein is also found in skin and bone.

Oestrogen – one of a group of hormones in the body which control female sexual development.

Trabecular bone – this forms the inside part of bones in the skeleton. It is formed in a meshwork and is surrounded by a more dense outer shell of 'cortical' bone.

Venous thrombosis – a blood clot forming in a vein.

Useful addresses

The Arthritis Research Campaign (arc)
PO Box 177
Chesterfield
Derbyshire S41 7TQ
Phone: 0870 850 5000
www.arc.org.uk

As well as funding research, we produce a range of free information booklets and leaflets. Please see the list of titles at the back of this booklet.

Arthritis Care

18 Stephenson Way
London NW1 2HD
Phone: 020 7380 6500
Helplines: 020 7380 6555 (10am–4pm Mon–Fri)
or freephone: 0808 800 4050 (12pm–4pm Mon–Fri)
www.arthritiscare.org.uk

Offers self-help support, a helpline service (on both numbers above), and a range of leaflets on arthritis.

Food Standards Agency

PO Box 369
Hayes
Middlesex UB3 1UT
Phone: 0845 606 0667
www.foodstandards.gov.uk

National Osteoporosis Society (NOS)

Camerton
Bath
BA2 0PJ
Phone: 01761 471771
Helpline: 0845 450 0230
www.nos.org.uk

Booklets and leaflets

These free booklets and leaflets are available from **arc**. To get copies, please send for our order form (stock code 6204) which gives a summary of the topics covered in each publication. Alternatively, write to: **arc** Trading Ltd, James Nicolson Link, Clifton Moor, York YO30 4XX **for up to 3 titles.**

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Carpal Tunnel Syndrome
Fibromyalgia
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Lupus (SLE)
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Osteoarthritis of the Knee
Osteomalacia (Soft Bones)*
Osteoporosis
Paget's Disease of Bone
Polymyalgia Rheumatica (PMR)
Polymyositis and Dermatomyositis
Pseudogout
Psoriatic Arthritis
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Rheumatoid Arthritis
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** Also available in Bengali, Gujarati, Hindi, Punjabi and Urdu.*

DRUG INFORMATION

Drugs and Arthritis (general info.)
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Anakinra
Azathioprine
Cyclophosphamide
Cyclosporin
Etanercept
Gold by Intramuscular Injection
Hydroxychloroquine
Infliximab
Leflunomide
Local Steroid Injections
Methotrexate
Non-Steroidal Anti-Inflammatory Drugs
Penicillamine
Steroid Tablets
Sulphasalazine

PARTS OF THE BODY

Back Pain
Feet, Footwear and Arthritis
Joint Hypermobility
Knee Pain in Young Adults
A New Hip Joint
A New Knee Joint
Pain in the Neck
The Painful Shoulder
Shoulder and Elbow Joint Replacement
Tennis Elbow

TREATMENT

Blood Tests and X-Rays for Arthritis
Complementary Therapies
Hand and Wrist Surgery
Hydrotherapy and Arthritis
Occupational Therapy and Arthritis
Pain and Arthritis
Physiotherapy and Arthritis

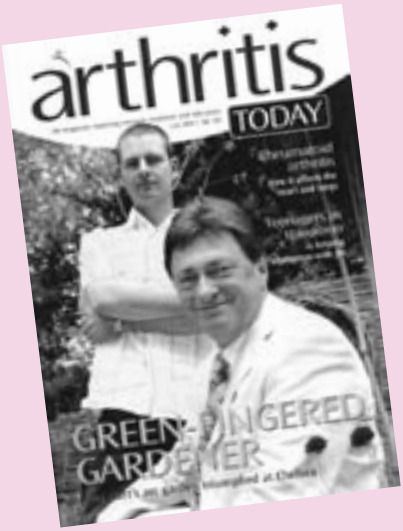
LIFESTYLE

Are You Sitting Comfortably?
Caring for a Person with Arthritis
Diet and Arthritis
Driving and Your Arthritis
Gardening and Arthritis
Keep Moving
Looking After Your Joints (RA)
Pregnancy and Arthritis
Sexuality and Arthritis
Sports Injuries
Stairlifts and Homelifts
Work and Arthritis
Work-Related Rheumatic Complaints
Your Home and Arthritis

JUVENILE ARTHRITIS

Arthritis in Teenagers
Growing Pains (for children)
Tim Has Arthritis (for children)
When a Young Person Has Arthritis (for schoolteachers)
When Your Child Has Arthritis

Arthritis Research Campaign



The Arthritis Research Campaign (**arc**) is the only major UK charity funding research in universities, hospitals and medical schools to investigate the cause and cure of arthritis and other rheumatic diseases. We also produce a comprehensive range of over 80 free information booklets and leaflets covering different types of arthritis and offering practical advice to help in everyday life.

arc receives no government or NHS grants and relies entirely on its own fundraising efforts and the generosity of the public to support its research and education programmes.

Arthritis Today is the quarterly magazine of **arc**. This will keep you informed of the latest treatments and self-help techniques, with articles on research, human interest stories and fundraising news. If you would like to find out how you can receive this magazine regularly, please write to: Arthritis Research Campaign, Ref AT, PO Box 177, Chesterfield S41 7TQ.

Please add any comments on how this booklet could be improved.

Feedback is very valuable to **arc**. However, due to the volume of correspondence received, we regret that we cannot respond to individual enquiries made on this form.

Please return this form to: Arthritis Research Campaign, PO Box 177, Chesterfield S41 7TQ

The Arthritis Research Campaign was formerly known as the Arthritis and Rheumatism Council for Research. Registered Charity No. 207711.

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A team of people contributed to this booklet. The original text was written by a doctor with expertise in the subject. It was assessed at draft stage by doctors, allied health professionals, an education specialist and people with arthritis. A non-medical editor rewrote the text to make it easy to understand and an **arc** medical editor is responsible for the content overall.

0870 850 5000
www.arc.org.uk

Committed to curing arthritis

Arthritis Research Campaign
Copeman House, St Mary's Court, St Mary's Gate
Chesterfield, Derbyshire S41 7TD

Registered Charity No. 207711

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