



The bones and IBD

Bone is live body tissue filled with minerals, particularly calcium. There is a continuous change in bone tissue with some cells dissolving bone and other cells laying down new bone. The structure of bone is maintained by the balance of the activity of these two types of cells, and IBD may be a factor that predisposes sufferers to develop weak bones. The following information looks at whether you are at risk of bone loss and the recent developments in diagnosis, treatment and prevention.

What causes bone loss in the general population?

During childhood and early adult life the bone mass increases, reaching a peak by around 30 years of age. Following this, the bone mass generally declines. Normal peak bone mass may never be reached if a disease affects bones during early life.

The structure of bones is weakened if there is insufficient calcium in the body to lay down enough bone tissue. Vitamin D is important because it helps the body to absorb calcium. Exercise is another factor, because regular impact exercise stimulates the body to strengthen the bones. A shortage of sex hormones (oestrogen and testosterone) can also lead to a reduction in bone formation, for example, after the menopause.

What types of bone changes are there?

- **Osteoporosis** is loss of bone structure (thin bones) and is the most common serious disease of weak bones in people who have IBD.
- **Osteopenia** is a term used to indicate mild loss of bone density which is not severe enough to be labelled as osteoporosis.
- **Osteomalacia** is the loss of calcification (or softening) of the bones caused by a shortage of vitamin D. When osteomalacia occurs in growing children it is known as Rickets and can cause bone deformity.
- **Avascular necrosis** is a rare complication of treatment with steroids that affects the hips, resulting in an unstable joint.

Why are bone changes important?

Weaker bones fracture (break) more easily than healthy bones. Fractures may affect any bone, but most commonly the spine, or after a fall, the hip or forearm.

Fractures of the hip are a serious complication, particularly in the elderly, and may lead to hospitalisation and prolonged treatment. Fractures of the spine may cause back pain, loss of height and a change in posture.

How can I tell if I have loss of bone density?

There are usually no obvious symptoms of bone loss. So the best way of judging how likely you are to be affected is to consider whether you are at risk.

What are the risk factors in the general population?

Loss of bone density can affect any age group and both sexes, but is most common in post-menopausal women and the elderly.

Other factors associated with higher risk of weak bones are:

- smoking;
- premature menopause – before the age of 45 years
- amenorrhoea (absence of menstrual periods)
- lack of physical activity
- being underweight
- alcohol excess
- caucasian or asian race
- family history of osteoporosis
- previous fractures
- diet – if low in calcium and vitamin D

What are the additional risks if you have IBD?

The risks of vertebral fracture and hip fracture are increased approximately one and half times in IBD sufferers compared to the general population. The risk of hip fracture is greater in sufferers from Crohn's disease compared with sufferers from ulcerative colitis.

If you have Crohn's Disease all the following additional risks can be relevant. If you have Ulcerative Colitis only the first two – steroids and dairy foods – may be relevant.

- **the use of corticosteroids – 'steroids'**
Treatment of Ulcerative Colitis or Crohn's Disease with steroids is a significant cause of weak bones, as steroids inhibit bone formation and accelerate bone loss. The bones begin to be affected soon after starting steroid treatment. Rectal use of steroids might rarely cause weak bones, but to a very much lesser extent than steroids taken by mouth.
- **avoidance of dairy foods**
If you avoid dairy products, perhaps because of lactose (milk sugar) intolerance or abdominal pain, you are likely to have a shortage of calcium in your diet, unless you are taking a regular supplement. Calcium is needed for bone formation.
- **the inflammatory process itself**
Recent research has suggested that the inflammatory process in Crohn's Disease may affect bone formation, although the way in which this happens is not well understood. Cytokines (hormone-like proteins), which are released as part of the inflammatory process, may play a role, as they are also involved in bone formation.

- **poor absorption of nutrients because of inflamed intestines**

An inflamed small intestine may make it more difficult to absorb nutrients. The nutrients important to bone formation, especially calcium and vitamin D, are absorbed in the small intestine. So if you have Crohn's and have had parts of your small intestine removed or you have extensive disease, you may be at additional risk.

How do doctors diagnose weak bones?

It is important to diagnose weak bones before fractures occur, so that preventive measures can be taken.

Osteoporosis is best diagnosed by measuring the density of bones using a scanning machine called a DEXA, which uses low dose x-rays. DEXA machines are becoming more widely available, but many hospitals still do not have access to this expensive equipment.

A special ultrasound machine can also measure bone density by testing heel bones, but as with DEXA scanners, the results need to be assessed by a qualified person, and there is evidence to suggest this is a less accurate way of measuring bone density. Conventional x-rays are of little help, unless fractures have already occurred.

It is important to measure the bone density of people with IBD at high risk of osteoporosis, such as:

- post-menopausal women, especially if the menopause was before the age of 50
- women with amenorrhoea (absence of menstrual periods) for more than one year
- patients taking oral steroids for prolonged periods

Some doctors may measure your bone density, even if you do not belong to the above categories.

Osteomalacia is much less common. Biochemical tests, including blood vitamin D levels are helpful in diagnosis.

Avascular necrosis of the hips is uncommon, and is diagnosed by an x-ray of the hip joint, or by a radio-isotope bone scan.

What treatments are there?

If bone density is low, treatment may be necessary. The time to start treatment depends on the bone density 'score', which compares your bone density to the rest of the population, and other risk factors. Treatment may be started by the doctor caring for IBD, by a specialist in bone disease, or possibly your GP.

In the first instance, it is important to ensure an adequate calcium and vitamin D intake (see sources at the end). It is still debated whether supplements are sufficient to treat established osteoporosis and they are best regarded as an addition to other treatments.

For post-menopausal women, oestrogen preparations, also known as hormone replacement therapy – HRT, are an important and beneficial option, although they do not suit everybody and may have side effects such as blood clots (venous thromboembolism) and slightly increased risk of breast cancer. Because of this HRT

is currently used less frequently. Postmenopausal women who have discontinued HRT and suffer from IBD may be at particular risk and should ask their doctor about protecting their bones.

An increasingly used alternative, also suitable for men and pre-menopausal women, is the use of bisphosphonate drugs, such as etidronate (Didronel), alendronate (Fosamax), risedronate (Actonel), ibandronic acid (Bondronat). These reduce bone loss and recent evidence shows that they are safe and effective in IBD. They are licensed for the prevention and treatment of steroid-induced bone loss. Bisphosphonates may irritate the gullet and instructions for use must be strictly followed.

Strontium ranelate (Protelos) is a newly introduced drug for treatment of postmenopausal osteoporosis, but evidence for beneficial effect in IBD is lacking. However, it is occasionally used when bisphosphonate drugs are not tolerated.

In some men with osteoporosis, testosterone replacement may also be effective. Occasionally patients may be prescribed calcitonin (Miacalcic) as nasal spray or injection or recombinant parathyroid hormone (Teriparatide, Forsteo) under expert supervision.

In patients with malabsorption of nutrients, vitamin D deficiency should be corrected with high dose vitamin D, either taken orally, or by injection.

Improvement in bone density may be confirmed with serial DEXA scans, but such scans are not required more frequently than once a year, as bone strengthening is a gradual process.

Avascular necrosis of the hip is a serious, but uncommon, condition requiring attention from an orthopaedic surgeon, and often hip replacement. If you develop hip pain during steroid therapy, this should be reported immediately to your doctor.

How can bone loss be prevented?

Osteoporosis is far better prevented than treated.

- Take regular weight-bearing exercise, such as brisk walking, jogging, dancing, aerobics or active team sports. Weight-bearing exercise stimulates bone formation. Ask your doctor for guidance on exercise.
- Avoid smoking which is harmful for the bones.
- Ensure you have adequate calcium and vitamin D, which are important for bone strengthening (see list of sources at the end). You should have a total daily intake of calcium of 1500 mg. If dairy products are not tolerated or are avoided, combined calcium and vitamin D tablets are available on prescription. If you are on steroid therapy it may be sensible to take calcium and vitamin D supplements as well. If you are avoiding dairy products, note that hard cheese has very little lactose, and yoghurt, being fermented milk, is well tolerated. Some people wrongly assume they are lactose intolerant and avoid milk and milk products unnecessarily. So, this is worth checking with your doctor or a dietitian.
- Use steroids only when necessary and discuss prevention of bone loss with your doctor. It is recommended that you take 800 units of vitamin D daily

whilst taking steroid treatment. Some of the newer steroids, such as budesonide (Entocort), that act mainly locally on the small intestine may be less harmful to the bones and might be suitable if you have Crohn's Disease of the terminal ileum (at lower end of the small intestine). Prolonged use of steroids can often be avoided by the use of steroid-sparing drugs such as azathioprine (Imuran) and infliximab (Remicade). Surgical resection (removal) of diseased bowel may, at times, be preferable to long-term high-dose steroid therapy.

- For most women with IBD who have reached the menopause, consider therapy to prevent bone loss, and discuss with your doctor the most appropriate choice of therapy.
- Recent research suggests that Vitamin K may help in preventing bone loss. So eating foods rich in Vitamin K may be a good idea. (See list of sources at the end).
- Continuing medications such as azathioprine or mesalazine, on the advice of your doctor, even when you are feeling well may reduce the risk of osteoporosis by minimising the amount of ongoing inflammation in the gut.

By being aware of the risk of bone disease if you have IBD, especially Crohn's Disease, you may be able to change your diet or lifestyle to help prevent it. Also, appropriate treatment can now significantly reduce the risk of bone disease and it is advisable to discuss this with your doctor. Further information is available from the British Society of Gastroenterology website: www.bsg.org.uk, which has published Guidelines for osteoporosis in inflammatory bowel disease in 2000.

Sources of Calcium

Dairy sources

- Milk (skimmed milk contains the same amount of calcium as whole milk)
- Hard and soft cheeses
- Yoghurt
- Fromage frais
- Dairy ice cream

Non-dairy sources

- Fortified soya milk
- Green vegetables, eg: spinach, kale, broccoli, watercress and okra
- Oily fish such as salmon, pilchards and sardines; especially if eating the bones, as in tinned fish
- Prawns
- Pulses, eg: baked beans, lentils, kidney beans, chick peas
- Dried fruit
- Tofu (soya bean curd)
- Nuts eg almonds, peanuts (peanut butter)
- Seeds, especially sesame (tahini – an ingredient of houmous – is ground sesame paste)
- Cereals, eg: Swiss-style muesli, bran, oatmeal
- Fortified bread
- Soybean flour
- Fortified fruit juice or mineral water

Sources of Vitamin D

- Exposure to sunlight
- Oily fish such as mackerel, herring, salmon and sardines
- Egg yolk
- Fish liver oil
- Milk
- Butter
- Fortified margarine

Sources of Vitamin K

- Most green vegetables, but especially kale, spinach, broccoli, Brussels sprouts and lettuce
- Parsley
- Margarine and oils such as olive oil, soybean oil and rapeseed oil
- Egg yolk
- Dairy products including milk, cheese, yoghurt and butter
- Beans such as butter beans and soya beans
- Meat and fish

Further help

National Osteoporosis Society

Camerton

Bath BA2 0PJ

General enquiries: 01761 471771 (weekdays 10am-4pm) email: info@nos.org.uk

Osteoporosis Helpline: 0845 450 0230 (weekdays 10am-3pm) To speak to a nurse

Email: nurses@nos.org.uk Website: www.nos.org.uk

NACC hopes that the information contained in this Information Sheet has proved helpful. If you have any further questions you may wish to telephone our **Information Line: 0845 130 2233**. Or you might like to speak with a volunteer in our **NACC-in-Contact** supportive listening service: **0845 130 3344** (national line, at local call rates from most telephones).

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This document has been prepared by NACC as general information on the subject and is not intended to replace specific advice from your own doctor.

NACC is a voluntary Association which has 30,000 members and 65 Groups throughout the United Kingdom. The Association also provides a supportive listening service called NACC-in-Contact which is available to anyone affected by Inflammatory Bowel Disease.

Membership of the Association costs £12 for the first year and £10 subsequently. Additional donations to help the work of the Association are always welcomed.

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