

# Osteoporosis and Coeliac Disease

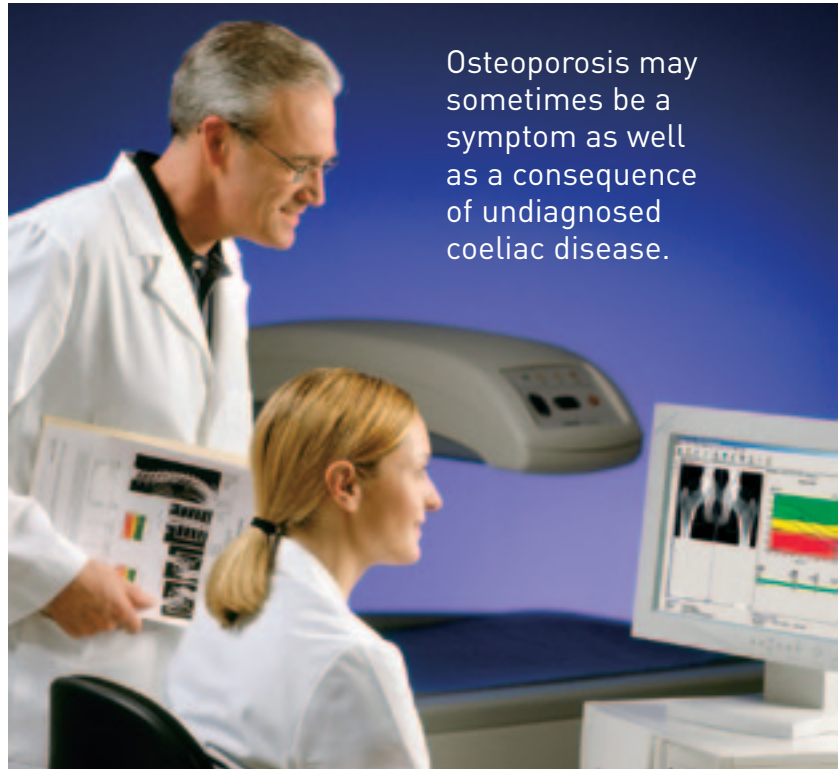
Osteoporosis is a common problem in our society and will affect 2 in every 3 women who reach 60 and 1 in every 3 men. The risk is even higher in those with coeliac disease.

\*Associate Professor Nick Pocock and Kate Noakes report.

## What is osteoporosis?

Osteoporosis is most easily thought of as a thinning of bones. Our bones are dynamic organs and are constantly being 'remodelled' to cope with changing stresses imposed by our lifestyle and to repair microscopic damage to the bones which happens as a normal part of living. The remodelling of bones involves an initial 'resorption' phase where the old bone is removed, followed by a 'formation' phase where new bone is formed. Osteoporosis occurs when the resorption phase is not matched by the formation phase resulting in a net loss of bone from our skeleton. Our bones, which contain a large amount of calcium bound to a protein framework, subsequently become more porous and fragile which causes them to break more easily. This is often referred to by health professionals as a fracture, which simply means a broken bone. An osteoporotic fracture is a broken bone which has occurred after relatively little force; often as mild as coughing, sneezing or lifting. Osteoporosis usually does not cause any signs or symptoms, or result in any medical problems, until a fracture occurs. Consequently, individuals with osteoporosis will commonly not be aware of the problem until they break a bone.

Common sites of osteoporotic fractures are the ribs, wrists, spine and hips. Most non spine fractures cause significant pain, deformity and loss of lifestyle. Hip fractures in particular are a major health problem, leading to hospitalisation and may cause complications sometimes resulting in death. Spinal



*Bone Density Scanner*

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fractures involve the vertebrae and typically result in the spinal bones, the vertebrae, being crushed by the weight of the body. These spinal fractures however often go unnoticed and may cause no symptoms even though a vertebra has been crushed. Eventually the loss of height due to these spine fractures and the resulting stooped spine cause the classic 'Dowager's Hump' seen in many elderly women, which can be an uncomfortable and debilitating condition.

Once a person has a history of any osteoporotic fracture, they are far more likely to suffer another, perhaps more serious, osteoporotic fracture. Osteoporosis can however be diagnosed before a fracture has occurred by measuring the bone density. Bone density, which is a measure of bone strength, increases through our childhood, teenage and young adult years, until we reach our peak bone density; the maximum strength our bones will obtain. From the age of about 30, our bones start to deteriorate in strength as

they lose calcium and the protein framework. After the menopause the bone density in women, and consequently bone strength, decreases more rapidly due to the loss of their sex hormone oestrogen. Men also progressively lose bone density and strength after about 30 but on average start declining from a higher peak bone density and don't suffer as sudden a reduction in sex hormones as occurs in women (sex hormones in general have a protective effect on the bones). When the bone density goes below a certain value ( $T = -2.5$ ), osteoporosis can be diagnosed even if a fracture has not occurred.

The risk of osteoporosis as we age is increased by many factors, such as certain medications, smoking, heavy alcohol consumption, poor diet, a family history of osteoporosis, lack of exercise, malabsorption, small stature and some diseases. Coeliac disease, by affecting the small intestine, causes malabsorption of food including calcium. Calcium is used by the body to maintain

proper function of the major organs and it is essential that normal blood levels be maintained. Consequently if not enough calcium is obtained by absorption from the diet, it may be 'leached' from the bones by increasing the resorption phase of the bone remodelling. This reduces the amount of bone, causing them to become 'thinner' and weaker and may eventually lead to osteoporosis. Children who develop coeliac disease are affected slightly differently and the reduced absorption of calcium may impair the skeleton's ability to grow and develop normally. This may result in reduced bone growth or strength during the growing years.

Osteoporosis may sometimes be a symptom as well as a consequence of undiagnosed coeliac disease. This occurs in patients who present to their doctors with fractures, or low calcium levels, and subsequent investigations diagnose coeliac disease, despite there being no prior gastrointestinal symptoms. Many other patients, who do have gastrointestinal symptoms and who end up with a diagnosis of coeliac disease, often have unsuspected osteopenia, which is a low bone density, or even osteoporosis, when a bone density test is performed. Some have already developed osteoporotic fractures, even at a young age. Although there is often a significant increase in bone density and strength in individuals with coeliac disease after the commencement of a gluten free diet, the improvement may not be sufficient to prevent problems occurring later in life and in some patients there may be no improvement at all. Even young adults with coeliac disease who present with osteopenia or osteoporosis may sometimes show little or no improvement in bone mineral density despite normalisation of absorption of calcium following a gluten free diet. Women who have gone through menopause with coeliac disease are particularly at risk and may similarly show lack of improvement in bone mineral density even after a gluten free diet is followed strictly for a prolonged period.

Due to the risk of osteoporosis it is recommended that all adults diagnosed with coeliac disease have a bone density test performed regardless of age, sex or menopausal status. Individuals medically diagnosed with coeliac disease are

entitled to a Medicare rebate for a bone density measurement under item number 12315, having 'a proven malabsorptive disorder'. Repeat bone density scans are also covered by Medicare, up to one scan every two years. Despite this, many of those diagnosed with coeliac disease are either unaware of the importance of having a bone density test, or are unable to receive a referral for one to be performed.

#### What is a bone density test?

A bone density test is performed using a bone densitometer. This is sometimes referred to as DXA (Dual energy X-ray) bone density which involves a special very low dose X-ray technique. The bone density scans provide a measurement of how dense, or strong, the bones are and allow a comparison with 'normal' values for the same age. Bone densitometers are located at hospitals, usually in either the nuclear medicine or radiology departments, in private clinics, or in specialists' rooms. The test requires no preparation, is non-invasive and takes approximately 10-20 minutes to perform.

Usually the spine and hip bone density are measured as these are the two sites which are of most concern for osteoporotic fractures. If either of these sites are unable to be measured, for example due to the patient having artificial hips, or having severe osteoarthritis in the spine, another site can be measured, such as the wrist, where osteoporotic fractures also commonly occur.

During a bone density scan the patient lays on a scanning table and the technologist positions the machine's scanning arm above the part of the skeleton to be measured. If the spine is being measured, the technician will position the patient's legs on a block-shaped cushion. This causes the spine to straighten giving a clear picture of each vertebra. When the hip is measured, the leg will be moved at an angle away from the body and slightly rotated.

The densitometer uses low dose X-rays to measure bone density and the results are plotted on a graph comparing the patient's bone density measurement to the normal range for their age, sex and weight. The patient's bone density is also compared to the normal range of healthy young people, which provides an indication as to how much their

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bone strength has decreased from their peak bone density (the T score) and therefore how likely they are to suffer a fracture. As bone density measurement decreases, the risk of fracturing a bone progressively increases. Osteopenia is a term which is used to mean a low bone density measurement which however is not yet in the osteoporotic range. The diagnosis of osteoporosis occurs when the patient's bone density measurement falls below a certain level compared to young people (less than T = -2.5). Treatment however may sometimes be recommended before this level is reached.

If possible, it is important to have your bone density test repeated on the same bone densitometer where you attended for your initial visit, as there may be slight differences in the results obtained on different machines. The doctor will usually decide when the next measurement is necessary, typically no sooner than every two years, unless there has been a change in the patient's condition or treatment.

Heel ultrasound is another useful tool for measuring fracture risk, and involves placing the patient's heel in a small machine which uses sound waves to measure the amount of bone contained in the heel bone. Although this type of measurement will give some indication of fracture risk, it should not be used to guide treatment and therefore does not replace a bone density test. At present heel ultrasound is not covered by Medicare.

#### Treatment of osteoporosis

The main goal in treating osteoporosis is to maintain or improve bone strength and prevent fractures from occurring. It is never too late to treat osteoporosis

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as even a small increase in bone strength can decrease significantly the likelihood of fracturing a bone. Treatment includes a combination of:

- calcium rich diet
- adequate Vitamin D
- weight bearing exercise, and lifestyle changes to avoid heavy lifting and falls
- Specific medications to improve bone strength

#### Calcium:

A diet high in calcium is important for the body to maintain normal function of the major organs and to continue the rebuilding of bone which continues throughout life. Dairy products are a good source of calcium but other foods also contain varying amounts. For those who are unable to obtain sufficient calcium from their diet, calcium tablets are available. Different amounts of calcium are needed throughout a person's life, depending on their sex, menopausal status, age, and in women, whether they are pregnant or breastfeeding. Your doctor will be able to tell you how much you require and whether calcium tablets are needed. Most adults require approximately 1000mg calcium per day.

#### Vitamin D:

Vitamin D is essential for the normal formation of bone and deficiency will result in increased bone resorption and osteoporosis. In any individual with malabsorption it is very important to ensure that the blood Vitamin D level is adequate. A Vitamin D level below 50 nmol/L increases the risk of osteoporosis. Vitamin D is normally made by the action of sunlight on skin. As we age however our skins become less efficient at making Vitamin D and many individuals do not obtain enough sun exposure. Vitamin D is

however also available from dietary sources, including meat, milk and eggs but most people get only small amounts of Vitamin D from their diets. Supplements of Vitamin D are however readily available and are relatively inexpensive. In many individuals these offer the easiest and most reliable means of ensuring adequate Vitamin D levels. For people who do not get adequate sun light exposure a supplement of at least 800IU (20 micrograms) per day is recommended.

#### Weight bearing exercise and falls prevention:

Weight bearing exercise helps stimulate the bone cells to build bone. It also increases strength and improves coordination, which helps to prevent falls. A good form of weight bearing exercise is walking. Before commencing any exercise program, talk to your doctor.

It is also very important to prevent falls from occurring. Some medications which cause drowsiness, poor balance, poor eyesight, ill fitting footwear, loose carpets and lack of care taken when walking can all lead to falls. A person whose bone density is only slightly low but who falls frequently may be more likely to break a bone than a person with osteoporosis who never falls. Balance and coordination can be improved through exercise, and studies have shown that Tai Chi also helps significantly. Sensible shoes, improved vision with the correct glasses and the removal of any items from the home which can cause tripping will also help to prevent falls.

#### Specific medications

Specific medications are now available which have been shown to be very effective for the treatment of osteoporosis and there are many that are gluten free and therefore suitable to be taken by those with coeliac disease. These



Associate Professor Nick Pocock

include a group of drugs called bisphosphonates. Most of these medications work by slowing the rate at which bone is resorbed. The bisphosphonates include 'Fosamax', 'Actonel' and 'Aclasta' and have been shown to decrease the risk of fractures by approximately 50%. Some of the bisphosphonates may be given at intervals of weekly or monthly and one is available as a once a year injection.

There are a number of newer medications which are also effective in the treatment of osteoporosis. These include strontium ranelate (Protos) and a group of medications related to oestrogens which includes drugs such as raloxifene (Evista).

#### In conclusion

Osteoporosis is a common problem in our society and will affect 2 in every 3 women who reach 60 and one in every three men. The risk is even higher in those with coeliac disease who are also at risk of developing osteoporotic fractures at an earlier age than in the general population. Early diagnosis by the use of bone density has proven to be an important intervention and can significantly reduce the incidence of osteoporosis and reduce the number of osteoporotic fractures in the future.

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## Gluten free hits prime time TV >>>

Recently on a high profile quiz program there was a question every coeliac could answer –

Which of the following grains is naturally gluten free:  
Wheat, Barley, Rye or Rice?

Who wants to be a millionaire??