

## What is osteoporosis?

Osteoporosis is the most common metabolic bone disease. Increased bone fragility results in an increased risk of fracture, particularly of the spine, hips or wrist. Over 2 million Australians are currently affected by osteoporosis; this number will increase as the population ages and it has been estimated that 1 in 2 women and 1 in 3 men over the age of 60 will suffer an osteoporotic fracture. This is extremely painful and debilitating, with a serious effect on both quantity and quality of life. Females aged over 75 who suffer a hip fracture have been shown to have a 1 in 4 chance of death within the year.

## How is osteoporosis treated?

There are a number of strategies to manage osteoporosis, starting with prevention early in life. Exercise, dietary calcium, vitamin D and calcium supplements, when required, all play a role (ref 2010 RACGP Guidelines). In patients with osteoporosis, as measured by bone mineral density testing and in those with existing minimal trauma fractures, both oral and intravenous bisphosphonates have a key role. Intervention studies show increases in bone density and up to a 70% reduction in fractures. Bisphosphonates are effective and as few as 11 patients need to be treated for 3 years to prevent some fractures.

## What are the side effects of the bisphosphonates?

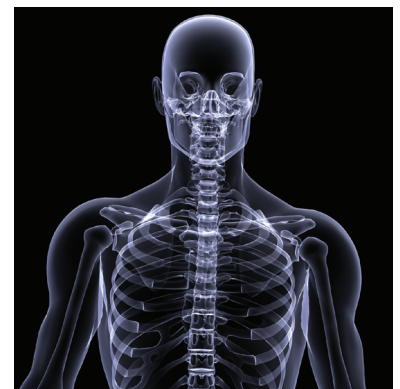
All medications have side effects, with the most common one for the oral bisphosphonates being gastrointestinal disturbance. **A serious complication is bisphosphonate-associated osteonecrosis of the jaw (ONJ).** This is defined as an area of exposed jaw bone which persists for more than eight weeks and is not associated with previous radiotherapy or underlying malignancy in the jaw. It is most commonly triggered by dental extractions (75%) but can result from trauma from ill-fitting dentures or even occur apparently spontaneously. The severity of ONJ ranges from mildly symptomatic exposed bone through to extensive jaw necrosis with severe pain, soft tissue infection and prolonged disability. Although the less severe types are more commonly associated with oral bisphosphonates, all stages may occur for patients on oral bisphosphonates.

## What is the incidence of ONJ and who is at risk?

The incidence of bisphosphonate associated ONJ was once thought to be low and of an order of 1 in 10,000 to 1 in 100,000. More recent studies show (ref Kaiser Permanente Study) the risk to be more likely to be closer to 1 in 1,000 (95% Confidence interval; 1:500 to 1:1500) although some specialist single centre studies show the risk following dental extraction to be of the order of 1 in 300 (Mavrokokki A et al). Hence the key is prevention. If a patient does not require an invasive jaw bone procedure, such as extraction, then the risk of ONJ is extremely low. Recently, a number of international studies have shown that a fasting serum beta C-telopeptide measurement (beta-CTX) could be a guide in evaluating the risk of ONJ. Although it has been shown that the level of bone turnover (as indicated by the serum beta-CTX test) is low (less than 70 pg / ml) for all patients studied who develop ONJ, there is a lack of data from case controlled studies. In conclusion, while not all patients with very low levels of serum beta-CTX will develop ONJ, it is possible, but not conclusive, a patient whose bone turnover is very low is at a higher risk (Kunchur et al). It is important to note there have been no reported cases of ONJ in children treated with bisphosphonates.

## What should you do if your patient requires an extraction whilst they are taking bisphosphonates?

The American Association of Oral and Maxillofacial Surgeons recommends drug holidays from bisphosphonates if extractions are indicated. However, it is important in patients who have a drug holiday for a few months that their osteoporosis is closely monitored and bisphosphonate therapy resumed 3 - 4 weeks after the dental treatment is complete.



### What can doctors do to try to prevent ONJ?

Medical practitioners need to carefully assess and monitor the patient's degree of osteoporosis and their fracture risk based on the history of bone mineral density and radiographic demonstration of any fractures. As with all prescribing, patients need to be advised of potential side effects including the possibility of ONJ. Clearly in patients with severe osteoporosis and pre-existing fractures, for whom the risk of debility from further fractures is considerably higher than the risk of ONJ, the benefit/risk ratio strongly favours treatment.

### What should you do if a patient requires an extraction?

Medical practitioners should advise their patients to see a dentist for oral evaluation prior to or shortly after commencement of oral bisphosphonates. If cost is raised as an issue then they can be referred under the Medicare EPC Scheme or any future such schemes the Government may introduce for chronically medically ill patients.

Dentists on receipt of referral for an oral health assessment prior to bisphosphonate commencement should completely evaluate the patient's teeth, clinically and radiographically to determine the likelihood of the patient requiring extractions or other bone invasive procedures. It is important to detect and treat periodontal disease. It was previously thought that there was a safe window period of up to five years after the commencement of bisphosphonates where ONJ did not occur. However, recent studies show that up to 25% of all cases of ONJ occur before three years. Thus window periods are of doubtful value. If the patient's dental condition can be reasonably reliably improved with conservative dental treatment then this should be done. If however this conservative treatment is merely going to delay inevitable extractions then it is best to proceed to extraction as early as possible, to decrease the risk of developing ONJ.

Patients with dentures need these to be carefully checked and either remade or relined as needed. Patients on long-term bisphosphonate therapy need regular dental monitoring. If their teeth become symptomatic and it is possible to treat the tooth endodontically rather than extract it, then endodontics is preferred. For patients with dental implants, these need to be carefully maintained, as bisphosphonate associated risk of loss of osseointegration of the implant has been reported to be approximately 1%.

A balanced and informed explanation of the risk of ONJ needs to be given to patients who require an extraction and who are on an oral bisphosphonate to obtain their consent for the procedure. A fasting serum beta-CTX test may be performed to determine the degree of bone turnover suppression. Generally, the level increases at approximately 25pg/month after cessation of bisphosphonate so this could be rechecked prior to extraction. Therapeutic Guidelines recommend a prophylactic dose of 2g amoxicillin one hour prior to the extraction.

Teeth should be extracted with the minimum of trauma, any exposed bone carefully removed and the socket sutured. Oral bisphosphonates can be commenced at approximately three to four weeks after the extraction or once there is primary mucosal coverage and commencement of socket healing.

**The key step for any patient who is on a bisphosphonate and requires dental treatment is that the patient's dental and medical practitioners should liaise to determine the optimum treatment for both the patient's mouth and their bones.**

### What are the risks for patients using intravenous bisphosphonates?

Recently, intravenous dosages of bisphosphonates have been introduced for osteoporosis. There are considerable advantages to the patient as it involves a single infusion rather than weekly tablets. It is important that such patients have their mouth checked by a dentist prior to the infusion. Bone turnover decreases rapidly in patients on IV bisphosphonates and remains low for one to two years. Thus drug holidays are more difficult and the second or subsequent infusion should be deferred until after dental extraction.

### How should established ONJ be treated?

Patients with established bisphosphonate associated ONJ are best treated by specialist dentists working in association with either the patient's medical practitioner or a metabolic bone diseases physician. If possible medically, the bisphosphonate should be ceased for a prolonged period. Treatment of established ONJ is preferably not aggressive and the use of 0.12% chlorhexidine mouthwashes and antibiotics for soft tissue pain and swelling is indicated. Surgery should only be performed for the removal of loose sequestrae or in the event of severely painful end stage ONJ, then jaw resection could be considered.

### Is ONJ more likely to occur in cancer patients?

It should be noted that ONJ is much more likely to occur in cancer patients on intravenous bisphosphonates. The risk there of ONJ following extractions is much higher, of the order of 1 in 10 to 1 in 15. Such patients are best managed by specialist oral and maxillofacial surgeons and the patient's medical oncologist.