



# Bisphosphonates in the Treatment of Osteoporosis

Weighing the benefits and the risks of this **drug formulation**

IT IS ESTIMATED THAT BISPHTHONATES REDUCE VERTEBRAL FRACTURES BY 70%, HIP FRACTURES BY 41%, AND ALL OTHER FRACTURES BY 25%.

**T**he life expectancy of both men and women has increased significantly over the last couple of centuries. Better nutrition and medical care have allowed Americans to live longer, healthier lives. This aging population, however, presents unique challenges that were not an issue just a couple of generations ago.

One of those major issues facing women above the age of 60 is osteoporosis. Young women reach their greatest bone density in their early 20s. By their 30s they are losing bone mass. But it is when they reach the age of menopause that bone density drops precipitously due to the loss of estro-

gen production.

The National Institute of Health defines osteoporosis as a “skeletal disorder, characterized by compromised bone strength predisposing a person to increased risk of a fracture.” In the United States there are 1½ million fractures in women every year. A woman is five times more likely to have an osteoporosis-related fracture than breast cancer. The cost of medical care for this disease is about 20 billion dollars a year in the United States.

Osteoporosis occurs when more bone is being removed than new bone is being laid down. Bone is a living organ that renews itself by two main groups of cells – osteoblasts lay down new bone and osteoclasts remove old and damaged bone. Risk factors for osteoporosis include genetic predisposition, physical inactivity, smoking, alcohol abuse, low calcium intake, early menopause, and certain medications. In addition, a variety

of systemic diseases can make you more prone to osteoporosis, such as hyperparathyroidism, leukemia, and celiac disease.

## Treatment

The treatment goals for this disease are to maintain bone strength and prevent fractures. For women over 50 it is recommended they take 1200mg of calcium per day and 800-1000 IU of vitamin D per day. However, it has more recently been shown that calcium supplements may not be very helpful in treating this disease because they are not well absorbed by the body, and also because the cause of the disease is not low calcium but rather changes in bone turnovers and renewal.

Biophosphonates are a group of drugs that are used to treat osteoporosis. There are intravenous formulations as well as oral formulations. Intravenous bisphosphonates are helpful in cancer patients to prevent the

spread of the cancer to bone. The way bisphosphonates work is by interfering with the function of the osteoclasts (the cells that remove bone). This results in an increase of bone mass.

Bisphosphonate do not grow new bone; bisphosphonates actually inhibit the growth of new bone by interfering with bone turnover. They increase the density of the existing bone. About one third of the dose of the oral bisphosphonate is absorbed by the stomach and incorporated into the body. The rest is excreted in the urine, whereas 50% of I.V. dose of bisphosphonates is absorbed and deposited in bone, making it a much

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more potent drug.

It is estimated that bisphosphonates will stay in the bone for 10+ years after the patient stops taking the medication. A low-risk side effect of taking bisphosphonates has recently been identified and is called Osteonecrosis of the Jaw (ONJ), and has in recent years received a lot of publicity. The exact cause of this side effect is not well understood. It is most likely multi-factorial including impaired bone remodeling and impaired blood supply resulting in bone death and exposure of that bone within the oral cavity. Most of the cases reported have been in patients receiving the I.V. form of bisphosphonates and usually is associated with oral surgical procedures. The estimated incidence of ONJ occurring in patients on oral bisphosphonates is one in 100,000 patients.

The current definition of Osteonecrosis of the Jaw is exposed bone in the oral cavity that has not healed for eight weeks with a current or past treatment with bisphosphonates. However, the benefits of bisphosphonates are very high. It is estimated that bisphosphonates reduce vertebral fractures by 70%, hip fractures by 41%, and all other fractures by 25%. This is a huge medical benefit, improving quality of life and reducing morbidity.

As an oral health professional I must inform my patients that there is a low risk of ONJ associated with oral surgical procedures for patients on bisphosphonates. There are ways to minimize that risk, but not completely eliminate it. Good oral hygiene and regular dental care is the best way to lower your risk. Surgical procedures can be done on patients on bisphosphonates, but the advice is to start small and proceed judiciously, especially with bone manipulatory grafting and implants. This is especially true in patients who are receiving I.V. bisphosphonates. The benefits of treatment with bisphosphonate must always be weighed against the possible risks as with any medication.

**IMAGE**