

DRUG TREATMENTS

Their role in fracture reduction and treatment of osteoporosis

Osteoporosis leads to fragility fractures. These are broken bones that happen from a minor injury but that have major consequences such as pain, disability and sometimes death. Therefore, Osteoporosis Canada supports the use of medications that have been proven, in good clinical trials, to significantly reduce a person's risk of fracture.

An individual's risk of fracture is determined by undergoing a comprehensive fracture risk assessment. This begins with a detailed discussion with your healthcare provider. If you are found to be at risk of osteoporosis or an osteoporosis related fracture, you may need a bone mineral density (BMD) test, the results of which are then incorporated into one of the new fracture risk assessment tools - CAROC or FRAX. This process allows your doctor to calculate your fracture risk. Fracture risk assessment is covered in detail in Osteoporosis Canada's Diagnosis fact sheet.

Osteoporosis medications are *strongly* recommended for individuals who have a high fracture risk and generally not recommended for people who are at low risk of fracture. Those who are at moderate risk may or may not need osteoporosis medications. They should discuss the various options with their physician.

HOW OUR BONES WORK

Bone is living tissue. It is constantly being repaired. As old bone is removed it is replaced by new bone. Cells called osteoclasts chew up the



old bone (this is called resorption), creating small cavities; bone-forming cells called osteoblasts then fill in the cavities with new bone. This is nature's way of repairing bone and keeping it healthy.

In younger people with healthy bones, the osteoclasts and osteoblasts work together, in perfect balance. However, after our mid 30s, this balance is shifted and we begin to gradually lose more bone than we replace. In someone with osteoporosis, bone loss occurs to a much greater extent, causing the bones to become thinner and weaker over time, which increases the risk of fracture.

FINDING THE MEDICATION THAT'S RIGHT FOR YOU

If you are at high risk of fracture, you should review the various osteoporosis drug treatment options with your physician, assessing the benefits and risks of each and choosing the best treatment for you. Medications used to treat osteoporosis fall into two broad groups: *anti-resorptive* medications slow down the work of the bone removing cells (osteoclasts); *bone formation* medications increase

the work of the bone building cells (osteoblasts).

Each individual is different. Your other health conditions and how you prefer to take medication will influence your decision about which drug to use. Some people respond better to one drug than another, or may have side effects on one drug and not another. Cost may be another consideration. Provincial and private drug plans may not cover the cost of all available osteoporosis medications. All of these factors will need to be considered before you make your final decision. The following brief descriptions of drug treatment options may help you discuss with your doctor the most appropriate treatment for you.

BISPHOSPHONATES

Bisphosphonates are the most common family of drugs used to treat osteoporosis. They are part of the group of osteoporosis medications known as anti-resorptives. Four bisphosphonates are currently used for osteoporosis in Canada: alendronate (Fosamax®, Fosavance® and generics), risedronate (Actonel®, Actonel DR™ and generics), zoledronic acid (Aclasta®) and etidronate (Didrocal® and generics).

HOW DO THEY WORK?

Bisphosphonates bind to the surfaces of the bones and slow down the bone resorbing action of the osteoclasts. This alters the balance between the osteoclasts and the osteoblasts such that bone loss is usually stopped and bone strength is improved.

HOW EFFECTIVE ARE THEY?

The most effective and preferred bisphosphonates are alendronate, risedronate and zoledronic acid because they reduce the risk of fractures in all bones (hip, spine and other areas). Etidronate is the oldest and least preferred bisphosphonate because it is not as effective as the other three bisphosphonates and only reduces the risk of fracture in the spine. *Individuals taking etidronate are encouraged to discuss with their doctor the option of switching to one of the other available bisphosphonates.*

WHO CAN TAKE THEM?

Bisphosphonates can be used to reduce the risk of fractures in postmenopausal women and men with osteoporosis as well as in people who are on steroid medications such as prednisone.

HOW ARE THEY TAKEN?

There are very specific instructions about how oral bisphosphonates must be taken. Following the directions will allow your body to absorb the drug properly so that it works well and helps you avoid possible side effects. Make sure you understand these instructions. With the exception of Actonel DR™ (delayed release), which can be taken with food, all other oral bisphosphonates should not be taken with any food or liquid (other than water) and they should not be taken at the same time as other vitamins, supplements or medications. If you need to take a calcium supplement, you should ensure that you wait at least one hour after taking your bisphosphonate. Calcium supplements are best taken with food. These instructions do not apply to the bisphosphonate zoledronic acid, which is given as an intravenous infusion once per year. For more details, see the table on the right.

ARE THERE SIDE EFFECTS?

The most common side effect from the bisphosphonate pills is heart burn related to irritation of the esophagus.

HOW TO TAKE A BISPSPHONATE

Name	Frequency	Time of Day	Instructions
Alendronate (Fosamax®) 10 mg	every day	Take first thing in the morning, at least 1/2 hour before eating	Take with a full glass of water. Stay upright (don't bend or lie down) for the first 1/2 hour AND until after the first food of the day
Alendronate (Fosamax®) 70 mg	once a week	same as above	same as above
(Fosavance®) 70 mg alendronate + 2800 IU or 5600 IU of vitamin D	once a week	same as above	same as above
Risedronate (Actonel®) 5 mg	every day	same as above	same as above
Risedronate (Actonel®) 35 mg	once a week	same as above	same as above
Risedronate (Actonel®) 150 mg	once a month	same as above	same as above
Risedronate (Actonel DR™) 35 mg DR = delayed release	once a week	Take first thing in the morning WITH breakfast. Do not take with iron/calcium supplements or antacids.	Take with a full glass of water. Stay upright (don't bend over or lie down) for the first 1/2 hour
Zoledronic acid (Aclasta®) 5 mg	once a year	not applicable	Given as a 15-minute intravenous (IV) injection by a certified healthcare professional
Etidronate (Didrocal®) 400 mg	The white etidronate tablet is taken daily for two weeks followed by a blue calcium tablet taken daily for an additional 10 weeks.	Take the white etidronate tablet (first 2 weeks) mid-morning, mid-afternoon or evening (at least two hours before and after food) Take the blue calcium tablet (next 10 weeks) with food	Take the white etidronate tablet with a full glass of water. Do not eat or take any additional supplements or vitamins for 2 hours before or after taking etidronate Take the blue calcium tablet with food

There is a small risk of ulcers in the esophagus with both alendronate and risedronate, especially if taken incorrectly (if there is insufficient water taken or the individual bends over or lies down soon after taking these drugs). Rarely, nausea, abdominal pain and loose bowel movements may occur. The most common side effects of zoledronic acid, which usually only last a few days, are flu-like symptoms such as low grade fever, pain and stiffness in the muscles, bones or joints, and headache.

Bone, joint and/or muscle pain has been reported infrequently in

patients taking bisphosphonates.

There have been a few reported cases of kidney dysfunction following the use of zoledronic acid. In the vast majority of cases, this has been reversible. Zoledronic acid should not be used in patients with severe kidney impairment.

Bisphosphonates have been linked to a rare condition called osteonecrosis of the jaw, which is a breakdown of the jaw bone especially following dental surgery. Most of these cases have occurred in cancer patients using very high doses of these drugs. Bisphosphonates have also been linked

to rare cases of unusual fractures of the thigh bone. Notify your physician if you experience pain in the groin or thigh while taking a bisphosphonate. Despite these side effects, in the vast majority of high fracture risk patients, the benefits of taking a bisphosphonate greatly outweigh the risks of potential side effects.

DENOSUMAB

Denosumab (Prolia®) belongs to a new class of osteoporosis treatment called a RANK ligand inhibitor.

HOW DOES DENOSUMAB WORK?

Denosumab is a medication that inhibits the development and activation of osteoclasts (the cells that eat away bone). Although it works in a unique way compared to other osteoporosis agents, it is part of the anti-resorptive group of medications.

HOW EFFECTIVE IS IT?

Denosumab reduces the risk of fractures of the spine, hip and other sites in women with postmenopausal osteoporosis.

WHO CAN TAKE IT?

Denosumab can be used to reduce the risk of fractures in postmenopausal women with osteoporosis and to increase bone mass in men with osteoporosis at high risk of fracture.

HOW IS IT TAKEN?

Denosumab is an injection under the skin given by a trained healthcare professional, every six months. The dose is 60 mg.

ARE THERE SIDE EFFECTS?

Some possible side effects of Prolia® include body aches, bladder infection, an increase in cholesterol or a skin condition with itching, redness and/or dryness. It also slightly increases the risk of cellulitis, a skin infection that is treated with antibiotics. Jaw bone problems (ONJ) and unusual fractures of the thigh bone may also occur.

HORMONE THERAPY (HT)

HT (estrogen with or without progesterone) is commonly used to relieve the symptoms of menopause. HT is also an effective treatment to help reduce the risk of osteoporotic fractures. Treatment can consist of estrogen alone or estrogen and progesterone in combination.

HOW DOES HT WORK?

During their reproductive years, women produce significant amounts of estrogen in their body. Estrogen helps to build and maintain bone density. During menopause, a woman's estrogen level decreases as her ovaries cease to function and this leads to a loss in bone density. In some women, this loss in bone density is significant enough to cause osteoporosis. HT supplements the very low levels of menopausal hormones.

HOW EFFECTIVE IS IT?

Estrogen/progesterone treatment can reduce the risk of spine and hip fractures as well as other fractures due to osteoporosis.

WHO CAN TAKE IT?

In general, HT is used to treat osteoporosis only in women who also suffer from menopausal symptoms such as hot flashes, etc. Estrogen is an effective treatment to alleviate such menopausal symptoms.

HOW IS IT TAKEN?

HT can be taken in a variety of ways and is available as a pill, a gel or a patch. In women who have had a hysterectomy, estrogen is given alone. For women who still have their uterus, estrogen is given in combination with progesterone to reduce the risk of developing uterine cancer.

ARE THERE SIDE EFFECTS?

HT may increase the risk of heart attack, stroke and breast cancer. It also increases the risk of blood clots. Because of this potentially life threatening side effect, other options for the treatment of osteoporosis should be explored first

unless the woman is also suffering from significant menopausal symptoms.

PARATHYROID HORMONE (PTH)

Parathyroid hormone (PTH) and its related drugs are a class of osteoporosis treatments called bone formation agents. Teriparatide (Forteo®) is the only drug from this class currently available in Canada.

HOW DOES TERIPARATIDE INJECTION WORK?

Teriparatide works by activating the osteoblasts. With this medication, new bone is made faster than old bone can be resorbed.

HOW EFFECTIVE IS IT?

Teriparatide reduces the risk of both spine fractures and other fractures associated with osteoporosis. It is not as effective in reducing the risk of hip fractures

WHO CAN TAKE IT?

Teriparatide can be used in both men and postmenopausal women with osteoporosis. Teriparatide can also be used to prevent fractures in people taking prednisone.

HOW IS IT TAKEN?

It is taken as a subcutaneous injection into the thigh or abdomen, 20 mcg (micrograms) once a day. This medication is currently recommended to be used for a maximum of 24 months.

ARE THERE SIDE EFFECTS?

Possible side effects include dizziness, nausea and leg cramps. There may be mild redness and/or tenderness at the site of injection. There are some individuals who should not use Forteo®. A discussion with one's physician will address these issues before making the choice to use Forteo®.

SERMs

Raloxifene (Evista®) is from a family of drugs called SERMs (Selective Estrogen Receptor Modulators). Although SERMs are non-hormonal, they act like the

hormone estrogen in some parts of the body, such as the bones where they can be used to treat osteoporosis. In other parts of the body, such as the uterus and breast, they block the effects of estrogen.

HOW EFFECTIVE IS IT?

Raloxifene reduces the risk of fractures in the spine. It does not reduce the risk of fractures in other bones.

WHO CAN TAKE IT?

Raloxifene can only be used in postmenopausal women.

HOW IS IT TAKEN?

One 60 mg tablet is taken each day, preferably at the same time of day.

ARE THERE SIDE EFFECTS?

Raloxifene may increase hot flashes and may cause leg cramps. There is also an increased risk of blood clots (phlebitis and/or pulmonary embolism), similar to that seen in women using hormone or estrogen therapy. The risk of stroke is not increased with raloxifene, but should a stroke occur, the risk of dying is slightly increased while on this drug.

TESTOSTERONE THERAPY

Osteoporosis Canada does not recommend the use of testosterone for osteoporosis. There is no evidence that testosterone can reduce fractures in men, even in men with low testosterone levels.

USING OSTEOPOROSIS THERAPIES IN COMBINATION

The combination of osteoporosis drugs given together, such as a bisphosphonate with either HT or raloxifene, is not recommended as there are no studies that show that using two drugs is any more effective at reducing fractures than using a single drug. Using combination treatment will increase the risk of side effects.

HOW LONG SHOULD I STAY ON MY MEDICATION?

Individuals at high risk of fracture should stay on their osteoporosis medication indefinitely. There is not enough information to support a “drug holiday” in such patients at the present time.

CALCIUM AND VITAMIN D

Osteoporosis drugs work best when you pay attention to your bone health. No matter what drug therapy you choose, remember that you still need:

- a diet rich in calcium (take a calcium supplement only if your diet is low in calcium. You may wish to discuss this with your healthcare provider.)
- a vitamin D supplement
- physical exercise
- attention to posture and fall prevention

A FINAL NOTE

If you are at high risk of fracture, it is important that you take your osteoporosis medication as recommended. If you experience side effects or have concerns, please remember to mention them to your doctor. Always talk with your doctor before you make any changes to your medications.



Make your
FIRST break
your **LAST**

INSIST ON ASSESSMENT

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OSTEOPOROSIS

The information contained in this fact sheet is not intended to replace medical advice. Readers are advised to discuss their individual circumstances with their physician.

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