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Spotlight on osteoporosis

Osteoporosis is a disease characterized by low bone mass and deterioration of bone quality. This results in bones becoming thin and weak, which increases the risk of fracture as they are easy to break. It is known as the "silent thief" because bone loss occurs without any symptoms. In fact, often it is not until someone fractures a wrist, spine, rib, or hip that osteoporosis is suspected (and often it is missed even after a fragility fracture).

As many as two million Canadians suffer from osteoporosis. One in four women, including a third of women aged 60-70 years and two thirds of women aged 80 years and older, will be diagnosed with osteoporosis.

Osteoporosis is less common in men than in women for a number of reasons. Men have greater peak bone mass and do not experience the accelerated bone loss women do at menopause. As well, they generally do not live as long and are less likely to fall than elderly women. But while it is often considered a "woman's disease", one in eight men over the age of 50 have osteoporosis.

In this issue we spotlight osteoporosis. We look at diagnosis, treatments and risk factors, including the risks associated with glucocorticoid therapy.

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Diagnosing Osteoporosis

Diagnosing osteoporosis can involve several steps including:

X-rays

X-rays may be used by your doctor, if you are experiencing back pain, as a way to determine if you have already had a fracture. Also, x-rays may be useful if a person has experienced a loss of height or change in their normal posture. However, it is important to note, that x-rays can only detect bone loss after 30% of the skeleton has been depleted. Therefore, x-rays may not detect early osteoporosis.

Laboratory Tests

Physicians may use a variety of laboratory tests on your blood or urine to determine the factors that may be contributing to bone loss. The most common blood tests focus on:

- Blood calcium levels
- Blood count
- Kidney function
- Thyroid function
- Testosterone levels (in men)

Occasionally other tests may be required such as:

- 24-hour urine collection to measure how your body metabolizes calcium
- Blood vitamin D levels
- Parathyroid hormone levels
- Blood estrogen
- Follicle stimulating hormone (FSH) test to determine menopause status
- Osteocalcin (protein found in bone) levels to measure bone formation.
- Tests to measure the rate at which a person is breaking down or resorbing bone.

Bone Mineral Density Tests

The best way to determine bone health is through the use of a bone mineral density (BMD) test. BMD tests can help identify osteoporosis and determine your risk for fractures (broken bones).

The most widely recognized bone mineral density test is called a dual-energy x-ray absorptiometry or DXA test. This test can measure bone density at your hip, spine, wrist and other areas. It is a painless test that is similar to having an x-ray. However, unlike x-rays, with BMD testing a person is exposed to much less radiation.

BMD tests provide doctors with a measurement called a T-score. This is a value calculated from comparing young-normal average bone density to your current bone density. A negative T-score, such as -1, -2 or -2.5, indicates low bone mass. Larger negative numbers mean that a person has a greater risk of fracture.

Access to BMD testing allows patients to get an early diagnosis, enables better management of their disease and helps to reduce their fracture risk by making changes to lifestyle and treatment regimens. Additionally, BMD testing serves as a valuable baseline measure that enables doctors and their patients to more effectively monitor their disease and treatment. Research shows that patients who have BMD testing are nine times more likely to be given treatment than those who do not. For example, without BMD testing, 80% of patients with a history of fractures are not given osteoporosis medications.

While BMD testing is critical to diagnosing osteoporosis, there is unequal access to this type of testing across Canada. In their 2008 National Report card, Osteoporosis Canada showed that provinces in Canada have widely different access to BMD testing, with most provinces receiving a grade of C or lower. The lack of access to BMD testing can delay treatment and increase the risk of fracture.

Treating Osteoporosis

The objective of osteoporosis treatment is to decrease the risk of fracture. The treatment of osteoporosis includes pharmacologic and non-pharmacologic approaches.

Pharmacological:

There are two types of osteoporosis medications:

1. Antiresportive – these medications interfere with bone eroding. They include:

- Estrogen
- Bisphosphonates
- Selective estrogen-receptor modulator (SERMs)
- Calcitonin

2. Anabolic – these are bone forming or bone building medications. The only agent currently available is:

- Recombinant human parathyroid hormone 1-34 (Teriparatide)

In Canada, there is a wide discrepancy in access to publicly funded medications for osteoporosis. For example, while Quebec openly lists most medications, in British Columbia, Alberta, and Saskatchewan many of the treatments are reimbursed only through special authority. This means that patients are required to meet certain criteria laid out by the public drug plan. In Prince Edward Island, only one bisphosphonate is reimbursed through the public drug plan and even then it requires special authority.

Non-pharmacological:

- Lifestyle behaviours:
  - Quit smoking
  - Maintain healthy body weight
  - Eat a healthy diet
  - Reduce alcohol and caffeine consumption
- Physical activity:
  Being physically active is an important aspect of reducing your risk for developing osteoarthritis and as a treatment. Exercise helps to build strong bones and bone mass, increases physical strength, and contributes to better balance and coordination. Exercise also helps to maintain a healthy body weight.
  - Weight-bearing exercises such as skating, walking, and aerobics.
  - Resistance exercises such as the use of exercise bands and hand weights.
  - Increase balance and coordination exercises, such as Tai Chi and Yoga.
- Dietary/Supplements:
  - Take adequate amounts of calcium and Vitamin D
  - Calcium is the primary mineral of bone and its ability to be absorbed and used by the body depends on Vitamin D.
  - Despite the importance of vitamin D, research shows that there is a high prevalence of vitamin D deficiency in many populations including women being treated for osteoporosis. One study showed that more than half of North American women receiving therapy to treat or prevent osteoporosis have vitamin D inadequacy.

Risk factors for osteoporosis

There are many factors that play a role in the development of osteoporosis. Some risk factors, such as age and family history, are considered to play a more influential role, however all are important:

- **Age** – People aged 65 or older are at higher risk for osteoporosis.
- **Female** – Women have lower bone mass and with menopause bone loss is accelerated.
- **Race** – People who are of Caucasian or Southeast Asian descent are at greater risk.
- **Family history** – Fragility fractures, especially if your mother had a hip fracture.
- **Frame size** – People with slender and small frames are at a higher risk for developing osteoporosis.
- **Glucocorticoid therapy** – More than five months of continuous use of glucocorticoid therapy such as prednisone may increase the risk of osteoporosis.
- **Medications** – Selective serotonin reuptake inhibitors (SSRIs), long-term use of the blood-thinning medication heparin, and some anti-seizure medications, diuretics and aluminum-containing antacids also can cause bone loss.
- **Rheumatoid arthritis** – People with rheumatoid arthritis are at greater risk due to their use of medications such as methotrexate and glucocorticoid therapy.
- **Medical conditions and procedures that decrease calcium absorption** – Examples are celiac disease and Crohn's disease
- **Lifetime exposure to estrogen** – Women who have infrequent menstrual periods or experience menopause before 45 have an increased risk.
- **Osteopenia** – Lower than normal bone mineral apparent on x-ray examination.
- **Hypogonadism** – Low testosterone in men, or loss of menstrual periods in younger women.
- **Thyroid hormone** – Too much thyroid hormone can cause bone loss. This can occur either because your thyroid is overactive (hyperthyroidism) or because you take excess amounts of thyroid hormone medication to treat an underactive thyroid (hypothyroidism).
- **Breast cancer** – Postmenopausal women who have had breast cancer are at increased risk of osteoporosis, especially if they were treated with chemotherapy or aromatase inhibitors, such as anastrozole and letrozole, which suppress estrogen. Women treated with tamoxifen are not at increased risk as this drug may reduce the risk of fractures.
- **Low calcium intake** – Low calcium intake contributes to poor bone density, early bone loss, and an increased risk of fractures.
- **Sedentary lifestyle** – Exercise throughout life is important. Children who are active and eat enough calcium-rich food have greater bone density. While you can increase your bone density at any age, beginning an active lifestyle in childhood contributes to adult bone health.
- **Excess soda consumption** – While the link between caffeinated sodas and osteoporosis is not entirely known, it is believed that caffeine may interfere with your body's ability to absorb calcium, which may contribute to bone and mineral loss.
- **Alcoholism** – Excess consumption of alcohol reduces bone formation and interferes with the body's ability to absorb calcium. Alcoholism is one of the leading risk factors for men.
- **Depression** – People who experience serious depression have increased bone loss.
- **Tobacco** – Smoking increases the risk of developing osteoporosis

It is important to note that the more risk factors you have, the greater your risk of developing osteoporosis.

Osteoporosis and inflammatory arthritis: glucocorticoid-induced osteoporosis

Many people living with types of inflammatory arthritis have been prescribed glucocorticoid steroids, such as prednisone, to help reduce inflammation. These drugs provide important benefits; however glucocorticoids also come with some risks, one of which is an increased risk of fracture.

What does the research say?

- The risk of fracture is associated with higher doses, but research has also shown that even with daily doses of prednisolone less than 7.5mg the risk of fracture is increased.
- It is important to note that while fracture risk increases rapidly after beginning glucocorticoid treatment, it also declines rapidly after stopping therapy.
- The loss of bone mineral density (BMD) associated with oral glucocorticoids is highest in the first few months of beginning treatment with glucocorticoid. Some research has even suggested that bone loss may be as high as 30% in the first six months of therapy
- With the same level of BMD, risk of fracture is higher with glucocorticoid-induced osteoporosis than in postmenopausal osteoporosis
- Research has shown that risk of fracture was doubled in a group of patients with rheumatoid arthritis taking glucocorticoids.
- Because bone loss can occur early, it is important to speak with your doctor about prevention strategies, such as the use of bisphosphonates, exercise, vitamin D, quitting smoking, and reducing caffeine.

Arthritis Consumer Experts

Who we are

Arthritis Consumer Experts (ACE) provides research-based education, advocacy training, advocacy leadership and information to Canadians with arthritis. We help empower people living with all forms of arthritis to take control of their disease and to take action in health care and research decision making. ACE activities are guided by its members and led by people with arthritis, leading medical professionals and the ACE Advisory Board. To learn more about ACE, visit **www.jointhealth.org**

Guiding principles and acknowledgement

Guiding Principles

Health care is a human right. Those in health care, especially those who stand to gain from the ill health of others, have a moral responsibility to examine what they do, its long-term consequences and to ensure that all may benefit. The support of this should be shared by government, citizens, and non-profit and for-profit organizations. This is not only equitable, but is the best means to balance the influence of any specific constituency and a practical necessity. Any profit from our activities is re-invested in our core programs for Canadians with arthritis.

To completely insulate the agenda, the activities, and the judgments of our organization from those of organizations supporting our work, we put forth our abiding principles:

- ACE only requests unrestricted grants from private and public organizations to support its core program.
- ACE employees do not receive equity interest or personal "in-kind" support of any kind from any health-related organization.
- ACE discloses all funding sources in all its activities.
- ACE identifies the source of all materials or documents used.
- ACE develops positions on health policy, products or services in collaboration with arthritis consumers, the academic community and health care providers and government free from concern or constraint of other organizations.
- ACE employees do not engage in any personal social activities with supporters.
- ACE does not promote any "brand", product or program on any of its materials or its web site, or during any of its educational programs or activities.

Thanks

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Arthritis Research Centre of Canada

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