

# Bone Density Measurement

A GUIDE FOR PATIENTS

**Effective Date:** May 1, 2005

## What is osteoporosis?

Bone is a living, growing tissue. It contains proteins and minerals that are arranged in a honeycomb-like structure called a matrix. The larger the amount of minerals, the higher the density. However, it is the combination of mineral deposits (bone density) and the microscopic structure (matrix) that gives bone its overall strength. Your body is constantly making new bone tissue and breaking down older bone. During your youth, your bone mineral deposits are greater than bone loss. At some point as a young adult, your skeleton reaches peak bone mass. After this point, bone loss slowly begins to outpace bone growth. Your bones naturally become less dense and weaker with age. Osteoporosis ("porous bone") is a disease characterized by low bone mass and deterioration of bone tissue which leads to increased bone fragility and risk of fracture. It is most common in post-menopausal women, but may also occur in men and in people who have certain diseases or take particular medications.

## How do I know if I have osteoporosis?

You may not know you have osteoporosis as it typically progresses without symptoms and may not become apparent until a fracture occurs. You may even have a fracture and be unaware of it unless it is diagnosed on an x-ray. The first sign of osteoporosis may be a decrease in height, rounded shoulders, and hip or back pain. A broken bone after a minor fall may also indicate osteoporosis. If your doctor suspects osteoporosis, he or she may recommend a test to measure your bone density.

## What is bone mineral density (BMD) measurement?

BMD measurement is a diagnostic test used to measure the amount of mineral in bones. The most commonly used test is dual energy x-ray absorptiometry (DXA). It involves lying on a table for 10-20 minutes while a low dose x-ray beam scans your spine, hip or both. The test involves no pain and no known risk other than minimal radiation exposure.

## What does bone density measurement show?

BMD measurement only measures the amount of mineral in bones, not microscopic bone structure. Since bone strength depends on both bone density and microscopic bone structure, BMD measurement cannot provide a complete assessment of bone strength. The results are compared to the range of measurements occurring in normal young adults. Based on this comparison, you may be told that your bone density is normal or that you have osteoporosis or osteopenia (reduced bone density). Because bone density naturally decreases with age, most older people will have lower bone density than young adults. According to one estimate, approximately 66% of B.C. women over 40 years-of-age would be considered to have osteoporosis or osteopenia when their bone density results are compared to those of young adults.

## **Why is bone density testing so controversial?**

Just about every aspect of bone research is a matter of debate. Several scientific reviews of the evidence have concluded that BMD measurement is poor at predicting which women will go on to have a fracture in later life. There are a number of reasons for this.

Bone density is only part of what determines strength in bone. Bone strength cannot be measured directly since it depends on both bone density and microscopic bone structure, and there is no simple test to measure microscopic bone structure.

Low bone density is only one of many factors that can increase the risk of fracture. Factors such as inactivity, balance problems, poor vision, inappropriate footwear, the use of certain drugs, and household hazards can all increase the risk of falling and fracturing a bone. Some people believe that bone density testing and medical treatment of osteoporosis are examples of the “medicalization” of natural processes such as menopause and aging. “Medicalization” means treating natural processes like diseases and relying too heavily on highly technological medical treatments when less invasive approaches could be just as beneficial. However, bone density testing can provide valuable information and help women decide when hormone or drug treatment may be beneficial.

Despite these controversies, there is general agreement that doing some simple things can protect your bones. No matter what your bone density, it is a good idea to get enough calcium, participate in regular weight-bearing exercise, avoid smoking, and remain as active and medication-free as your health allows.

Bone density testing may not be perfect, but it is currently the most accurate test available for osteoporosis.

For ongoing BMD monitoring it is important for you to attend the same facility at the same time of year, if possible, to get the most accurate BMD assessment because no two DXA machines are exactly alike.

## **When does the Medical Services Plan (MSP) pay for bone density tests?**

MSP policy is to provide coverage for services that are considered medically necessary. The guideline for Bone Density Measurement, developed by doctors in B.C., outlines the most common circumstances when bone density tests are considered medically necessary. Generally speaking, MSP will pay if the results would affect decisions about your treatment. In order for MSP to pay, your doctor must explain why you need the test on the order form when referring you for bone density testing.

MSP does not pay for bone density tests unless they are necessary to make treatment decisions.

BMD may be of value in assessing the risks and potential benefits of pharmacotherapy in women with risk factors for osteoporosis.

## RISK FACTORS FOR OSTEOPOROSIS (Modified from 1)

Major Risk Factors	Minor Risk Factors
<ul style="list-style-type: none"><li>• Age <math>\geq</math> 65 years</li><li>• Low trauma vertebral compression fracture</li><li>• Low trauma fracture over age 40</li><li>• Family history of osteoporotic fracture (especially maternal hip fracture)</li><li>• Current systemic glucocorticoid therapy of <math>&gt;</math> 3 mos duration</li><li>• Malabsorption syndrome</li><li>• Primary hyperparathyroidism</li><li>• Hypogonadism</li><li>• Early menopause (before age 45)</li></ul>	<ul style="list-style-type: none"><li>• Past history of clinical hyperparathyroidism</li><li>• Chronic anticonvulsant therapy</li><li>• Low dietary calcium intake</li><li>• Smoking</li><li>• Excessive alcohol intake</li><li>• Excessive caffeine intake (e.g. <math>&gt;</math> 4 cups coffee/day)</li><li>• Weight <math>&lt;</math> 57 kg</li><li>• Short term weight loss <math>&gt;</math> 10% from weight at age 25</li><li>• Chronic heparin therapy</li><li>• Rheumatoid arthritis</li></ul>

## PREVENTION OF BONE LOSS AND FRACTURES

### Things you can do to reduce bone loss

- Make sure you get enough calcium and Vitamin D
- Avoid smoking
- Avoid rapid weight loss
- Participate in regular weight-bearing exercise (walking, running, weight training or aerobics)

### Things you can do to prevent falls

- Exercise regularly
- Avoid heavy alcohol use
- Wear low-heeled shoes with firm, non-slip soles
- Have regular vision checks and wear glasses if needed
- Take safety measures to prevent falls in the home
- Avoid tranquilizers and sleeping pills, which could make you dizzy or unsteady

### Things to discuss with your doctor if you have osteoporosis

- Lifestyle and diet changes
- Drug therapies
- Whether any of your medications could cause dizziness or loss of balance

## References

1. Brown JP, Josse RG. Scientific Advisory Council of the Osteoporosis Society of Canada. 2002 Clinical Practice Guidelines for the Diagnosis and Management of Osteoporosis in Canada, Revised 2002. CMAJ 2002 Nov 12;167(10 Suppl):S1-34.

For various perspectives on osteoporosis and bone density testing, contact the following:

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The Osteoporosis Society of Canada  
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For more information about guidelines and protocols, visit the Guidelines and Protocols Web site:  
[www.BCGuidelines.ca](http://www.BCGuidelines.ca)