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## Standing Up to Osteoporosis

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## Case Study: Standing Up to Osteoporosis

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Dr. Robert Downs went to medical school at Duke University and received further training in Internal Medicine at Barnes Hospital in St. Louis and in Endocrinology at the National Institutes of Health, with a special emphasis on calcium related disorders and metabolic bone disease. He has been on the faculty at MCV/ VCU since 1983, and has been a principal investigator in clinical trials which have resulted in the development of new drugs for the treatment of osteoporosis. He is a co-director of the MCV/VCU Center for Osteoporosis and Metabolic Bone Disease.

### **Objectives**

1. To provide basic information about osteoporosis, including risk factors, diagnostic testing, treatment, and prevention.
2. To get you to help us spread the word that osteoporosis can be diagnosed and treated, and that there are things you can do to decrease your future risk for developing osteoporosis.

### **Case Study**

Mary Smith is a 67 year old woman who is at her doctor's office for a routine visit. She takes good care of herself, and she exercises by walking several times each week. With the encouragement of her family, she stopped smoking about 5 years ago, and she feels well. While she waits to see the doctor, she reads a brochure about osteoporosis, and she asks the nurse about osteoporosis while she is having her blood pressure checked. The nurse measures Mary's height, and together they discover that Mary has lost one inch, from her usual height of 5'5" down to just barely over 5'4".

Mary does have several risk factors for osteoporosis, as it turns out. She has never really liked milk. She exercises regularly now, but until the last few years, she was fairly inactive. She smoked a little less than one pack of cigarettes daily. Mary is white, and of average body build. At the time of menopause, she took estrogen for about 6 months to relieve frequent hot flashes, but then was able to stop the medication. Although some of her friends take estrogen, she has worried about the risk of breast cancer and she does not want to have periods again.

She broke her wrist in a fall about 6 years ago. She tripped over the loose edge of a rug at home, and caught herself by extending her arms forward. The fracture healed normally and she has not had any other broken bones.

Mary's doctor is concerned that she may have osteoporosis, even though she feels well. The doctor sends her for a bone density test, and schedules another appointment in two weeks to discuss the result with her.

### **What is osteoporosis?**

Osteoporosis is the major cause of fractures in older women, and also the major cause of fractures in older men. We hardly ever hear of hip fractures or other broken bones in younger people unless there is severe trauma, but most of us know someone over the age of 70 who has had a hip fracture caused by a simple fall, or severe loss of height associated with curvature of the spine.

As we grow, our bones grow and become stronger, particularly during the teenage and young adult years. By the age of about 25, our bones are about as strong as they will become. But bone is not a static tissue. Bone cells called osteoclasts are continuously breaking, removing calcium from our bones, and other bone cells called osteoblasts are continuously forming new bone. This process of bone turnover allows our bones to be a source of calcium when we need it, and it helps the bones grow strong when the bones are under more stress. For example, the tennis arm of some frequent players can have stronger bone than the other arm.

Unfortunately, as we get older, the cells that form new bone do not quite keep up with the cells that remove bone, so we begin to lose bone, just a bit each year. And for women, estrogen deficiency at the time of menopause increases the rate of bone loss, by increasing the rate of this bone turnover process. Men also have bone loss as they get older, but it is usually not so fast unless they become ill and testosterone levels fall.

*Osteoporosis occurs when bone loss becomes severe enough to increase the risk for fractures.*

### **Is osteoporosis an important problem?**

Osteoporosis is common. Osteoporotic fractures are a major cause of disability in older women and men. For many, the occurrence of a hip fracture marks the transition from independence to nursing home care or dependence on family members for at least some care. In addition, osteoporosis is costly to our health care system. The most recent figures from the National Osteoporosis Foundation indicate that the direct care costs and the indirect costs associated with osteoporosis amount to about \$12 billion dollars each year; and the costs are expected to increase rapidly as more people live longer, and the baby boom generation gets older.

### **How do I know if I have osteoporosis?**

If you are over the age of 65, and are a woman, there is a good chance you might have osteoporosis. Bone loss occurs in almost all of us as we get older, and osteoporosis does not cause pain until there is a fracture. So many find out they have osteoporosis when they have a fracture. Sometimes, since patients and doctors expect more fractures in older people, osteoporosis may not be mentioned even when there is a fracture! But having broken bones is not normal, and there are ways to find out if you have osteoporosis before you have a fracture.

**Risk Factors for Osteoporosis have been established. The most important ones are:**

- \* Being a postmenopausal woman
- \* Having early menopause, or a history of loss of periods
- \* Whites and Asians are more at risk than African-Americans and Hispanics
- \* Family history of osteoporosis
- \* Slender body build
- \* Low dietary calcium intake, particularly during teenage years
- \* Sedentary life style
- \* Smoking
- \* Excessive caffeine use (more than 4 cups of coffee/day)
- \* Alcohol abuse.

In addition, certain diseases and medications may be associated with a higher risk of osteoporosis. Prednisone and similar steroid medications significantly increase the risk of osteoporosis, and excessive thyroid hormone use can also speed bone loss.

*In our case study, Mary Smith has some of these risk factors. Risk factors cannot tell you if you definitely have osteoporosis, but they can give an idea of whether you should be tested.*

Bone Density Testing for Osteoporosis is an accurate way to determine the amount of bone still present. Large groups of normal individuals have been used to establish a range of expected values for this test, and research studies have shown that the future risk of fracture can be predicted from the results of bone density testing. You can think of this testing as similar to checking blood pressure to see who has hypertension (and may therefore be at risk for stroke), or like checking cholesterol to see who may have a higher risk of heart disease.

Bone density testing is painless and easy. You just lie on a table, and an x-ray like machine scans the area to be tested. The amount of x-ray exposure is quite small, much less than the exposure from a standard chest x-ray. The test results go straight to a computer for analysis. Often, the results of the test are available while you are still at the testing center. For those who have positive risk factors or some indication of osteoporosis, the testing is usually covered by insurance. If you want to know your bone density as a matter of personal curiosity, the test may not be covered by insurance, but costs for the test are falling rapidly.

*In our case study, it turns out that Mary Smith's bone density was indeed low. On the return visit to her doctor, they review her results. Since she is at risk for future fractures, they discuss her treatment options.*

**Can osteoporosis be treated?**

Yes. Even if you have osteoporosis and have already had a fracture, treatment can reduce the risk of future fractures. And if you have not had a fracture yet, your bone density may increase with treatment and your future fracture risk can decrease too. There are a number of ways osteoporosis can be

treated, and patients with osteoporosis have more choices of treatment now than ever, thanks to the recent development of some new drugs.

Calcium and adequate vitamin D are essential basics in the treatment (and prevention) of osteoporosis. Unless you have had a history of kidney stones, the recommended amount of calcium for postmenopausal women is 1000 - 1500 milligrams per day, depending on whether other treatment is also used. For most women, a single multivitamin will supply the 400 units of vitamin D needed for good bone health.

Estrogen has been shown convincingly in many studies to prevent further bone loss in many women who have osteoporosis. Postmenopausal women who have taken estrogen for many years have a significant reduction in hip fracture risk, and there is also a lower risk of cardiovascular disease in women who have taken estrogen long-term. There are some risks of estrogen treatment, but for most women, the benefits of estrogen treatment exceed the risks.

Alendronate (Fosamax™) is the first of a new group of medications called bisphosphonates to be approved for the treatment of osteoporosis. Women with osteoporosis who are treated with alendronate gain bone mass, and their risk of fracture in clinical trials is reduced to about half that of a comparison group of women treated with calcium. Fosamax™ has to be taken on an empty stomach with special precautions to avoid irritation of the esophagus, but is very safe when taken as directed.

Nasal calcitonin spray (Miacalcin™) is also approved for the treatment of osteoporosis in postmenopausal women. It is not quite as effective in increasing bone density as Fosamax™, but it does not require special dosing precautions. The effectiveness of Miacalcin™ in reducing the risk of fracture is now being studied in clinical trials.

There are other new medications on the way, too. The MCV/VCU Center for Osteoporosis is conducting research trials of some these newer treatments. *So it is important for everyone who has had a fracture to find out whether they have osteoporosis, and for those with multiple risk factors to be tested, so that effective treatment can be started.*

*Mary's treatment was individualized after a thorough evaluation and discussion with her physician. Two years later, follow up bone densitometry showed a significant improvement in bone mass.*

### **I haven't had menopause yet. Can osteoporosis be prevented?**

There are steps you can take to decrease your risk for osteoporosis in the future. Teenagers who are still growing and building bone have the most to gain by increasing calcium intake (to 1400-1600 mg per day) and by engaging in regular weight-bearing exercise. Young adults should also be sure to maintain a calcium intake of about 1000 mg per day and get plenty of regular, weight bearing exercise. Other lifestyle risk factors, like smoking and excessive use of caffeine and alcohol, should be avoided to keep the bones as strong as possible.

At the time of menopause, a careful consideration with a physician of the need for estrogen replacement is appropriate for all women. Some of the newer osteoporosis medications may even become available in the near future for prevention of bone loss in addition to treatment of osteoporosis.

*Mary discussed her condition and experience with her daughter and granddaughter so that they can take appropriate steps, such as increased calcium intake and exercise, in order to prevent the occurrence of osteoporosis.*

### **Summary**

Osteoporosis is common, a major cause of disability, and expensive to our health care system.

Almost everyone loses bone with aging, so anyone can be at risk for osteoporotic fractures.

There are ways to determine whether you have osteoporosis, by analysis of risk factors and specific bone density testing.

There is good treatment for those who are found to have osteoporosis, even if fractures have already occurred.

There are steps that can be taken by teenagers, young adults, and postmenopausal women to maximize bone mass and reduce the rate of bone loss.

*So, there is something you can do to stand up to osteoporosis. Tell a friend, too.*

### **Study Questions**

1. What are the common osteoporotic fracture sites?
2. What risk factors make osteoporosis more likely, and what specific test can be done to establish a diagnosis?
3. What treatments are available to decrease the risk of future fracture for patients with osteoporosis, and what can be done to prevent the development of osteoporosis?