

# **Osteoporosis: Strength for Life**

## \*\*\*\*\*Osteoporosis: Strength for Life (Part 1)\*\*\*\*\*

### **Narrator**

Without medical intervention, it's a condition that can go unnoticed until the instant it strikes, when a fracture occurs in the hip or spine. Osteoporosis attacks the main infrastructure of the body, the bones.

### **Karl Insogna, MD, Yale School of Medicine**

When you lose enough skeletal mass that you develop fractures from minimal trauma, or just activities of daily living, then you are defined as having osteoporosis.

### **Dr. Joseph Kleinman, MD, Boca Radiology Group**

It's been estimated that about 400,000 to 500,000 admissions every year to hospitals are related to people with osteoporotic fractures. And the cost to the health-care system is enormous.

### **Narrator**

Here's how osteoporosis develops. Bones make up our skeletal framework. They're composed mostly of calcium phosphate, and a small amount of calcium carbonate. Calcium is stored in bones and gives them their thickness and strength.

Bone is living tissue, just like the skin, and older bone needs to be continuously replaced with new bone. But when the creation of new bone doesn't keep up with the amount that needs to be replaced, it becomes thin. The result is called osteoporosis.

Older women are particularly at risk because the estrogen production that begins at puberty helps promote bone building, and at menopause the amount of estrogen a woman's body produces diminishes greatly.

What results is a loss of bone mass. In fact, according to the National Osteoporosis Foundation, within 5 to 7 years following menopause, a woman can lose 20 percent of her bone mass due to a lack of estrogen in her system.

Here are some more statistics: in the United States alone, osteoporosis affects about eight million women, and nearly two million men. Eighteen million more have low bone mass, placing them at increased risk for developing the condition. Osteoporosis contributes to as many as one and a half-million bone fractures every year.

And a fractured bone doesn't simply mean a painful inconvenience. At its most extreme, for example, within one year after a hip fracture the risk of death increases 20%. And one out of four people who have an osteoporotic hip fracture will need long-term care. Fractures of spinal vertebrae are just as serious.

Dr. Susan Broy is Professor of Medicine at Chicago Medical School and Director of Osteoporosis at Illinois Bone and Joint Institute.

### **Susan Broy, MD, Illinois Bone and Joint Institute**

Patients, after a vertebral fracture, can have significant symptoms. They can have chronic pain as their backs become bent over, they can have trouble breathing and have pulmonary problems, because there's not enough room for their lungs.

### **Narrator**

The National Osteoporosis Foundation estimates that 50% of Caucasian women will have at least one fracture in their lifetime. Hispanic women as well as African-American and Asian-American women are also at risk. Osteoporosis can strike anyone at any age. For the young, it can occur as a result of taking certain medications, or from being a premature infant with low bone mass. But for most people, osteoporosis shows up as their body ages.

Our skeletal framework like the rest of the body breaks down as we grow older. But this wasn't fully understood until people began living longer.

Bone fractures due to osteoporosis occur differently than fractures in people with normal bone density.

Healthy bones are typically dense. And because they are, they can do the important job of carrying the weight of the body, and are less likely to fracture or break when confronted with the typical thumps and bumps of life.

But with osteoporosis, bones become porous, thin, and brittle, and the bone density is low. The thinner the bone, the weaker it is, making fractures or breaks occur more easily. And these fractures often happen when doing simple, everyday tasks.

72-year-old Jean Oeste, of suburban Chicago, discovered her osteoporosis after helping a neighbor.

### **Jean Oeste, Patient**

Well, this one day I was helping a lady move from the second floor down to my car to carry things away and it didn't happen immediately, but I felt, "Oh, my back hurts" and it just seemed to hurt to where I said, "it really shouldn't hurt this much."

And I went over to the emergency room at one of the local hospitals and they took an X-ray and they said that there was a fracture in one of the vertebrae there.

### **Narrator**

Fractures of the vertebra, called spinal compression fractures, or vertebral fractures, are some of the most debilitating, and happen more often than other types of osteoporosis related bone fractures. Over time, they can cause the spine to bend forward in what is known as a Dowager's Hump.

When we return, we'll find out how osteoporosis is diagnosed.

\*\*\*\*\***Osteoporosis: Strength for Life (Part 2)**\*\*\*\*\*

### **Narrator**

Dr. Joseph Kleinman is a Radiologist in Boca Raton, Florida. He performs bone mineral density tests to assess whether patients have osteoporosis and if they are at risk of fracture or to determine if a fracture has already occurred.

### **Dr. Joseph Kleinman, MD, Boca Radiology Group**

The way that we diagnose osteoporosis as radiologists is using a machine called a bone mineral densitometer. And we're going to evaluate two sources. Generally the sources that we look at are the lumbar spine, and the left hip. And the reason that we choose these sites is these are sites that are very commonly prone to fractures. And these can be the first signs, if you will, of osteoporosis when somebody develops a fracture in these sites.

### **Narrator**

The result of bone mineral density testing is measured by a numeric system using what are called T-scores. T-scores compare the patient's bone density with the average density of a bone-healthy 25-year-old woman.

Normal bone density has a T-Score higher than minus 1. Osteoporosis is diagnosed when the T-Score is lower than minus 2.5. A T-Score between those two values (from minus 1 and minus 2.5) indicates some loss in bone mass, a condition called osteopenia.

Bone density tests are typically offered to all women 65 and older and to women under 65 with multiple risk factors such as being thin, on steroid therapy for long periods of time, and to older men who are at

increased risk. Tests are also used for anyone being treated for osteoporosis as a way to monitor the effectiveness of their treatment.

For those fortunate enough to live a long life, osteoporosis and bone loss may not be totally avoidable, but steps can be taken to lessen its impact. Increasing calcium intake is one.

Toddlers between the ages of 1 and 3 need 700 mg of calcium daily. For young growing children between the ages of 4 and 8, that increases to 1000 mg daily. Older children ages 9 to 18, should get 1300 mg of calcium daily. Doctors recommend that adults age 19 to 50, get 1000 mg daily, and people older than 50 should get 1200 mg of calcium each day. Consuming dairy products is an easy way to fulfill daily calcium needs. For instance, a cup of skim milk has 302 mg. of calcium and a cup of whole milk has 291 mg. An 8 oz. container of plain low-fat yogurt has 415 mg. And one oz. of cheddar cheese has 204 mg. of calcium.

Most Americans get less than 800 mg of calcium in their diet, so calcium supplements are often necessary to achieve the recommended total intake. Calcium with vitamin D is recommended by many doctors and can be purchased at pharmacies and most grocery stores.

From birth, our bodies begin the process of building up calcium levels. And by the time we're 35, we typically reach our maximum level of bone density. It's at that point we begin to lose calcium, and should start to replace this loss with more dietary intake and calcium supplements. For young women especially, the more calcium that can be stored prior to age 35, the better off they will be as calcium levels begin dropping after 35 and as menopause also begins.

Generally, people with large physical frames will have less trouble with osteoporosis because their bones are thick, and therefore will take longer to breakdown to the point of creating a fracture risk. In contrast, people with smaller physical frames have thinner bones, and will have a much greater head start to the kind of bone loss that can lead to a fracture.

Here in the Mineral Metabolism Laboratory at Yale School of Medicine, Medical Technologist Christine Simpson is conducting a procedure that separates the amount of vitamin D from the rest of the components of the blood. Without adequate levels of vitamin D, dietary absorption of calcium is impeded, potentially weakening existing bone, and stopping the formation of strong, new bone.

Studies by the National Institutes of Health show that vitamin D deficiencies exist in up to half of all elderly women who experience a bone fracture.

When we return, we'll meet three women who remain physically active as a way to fight osteoporosis and osteopenia.

\*\*\*\*\***Osteoporosis: Strength for Life (Part 3)**\*\*\*\*\*

### **Narrator**

Gina Epperson has lived an active life. She was born in Italy and came to the United States in 1958. Today, she lives in Waterbury, Connecticut. Gina is 73, and has suffered a great deal with osteoporosis. But like most people, she did not know she had the disease until a bone fracture actually occurred, the first of 11.

### **Gina Epperson, Patient**

I was working, I was, take paint off a door, doing some work outside and I did a lot of work that week. Then I went to bed, a bit uncomfortable, but the next day I couldn't get up, I was, I was just like this, I could not move, it was such pain.

### **Narrator**

At the Yale School of Medicine, the Director of the Yale Bone Center, Dr. Karl Insogna, is an internationally recognized expert in the field of metabolic bone disease. Dr. Insogna has been treating Gina Epperson for just over 2 years.

### **Karl Insogna, MD, Yale School of Medicine**

So, she is a woman who suffers from spinal osteoporosis, who was treated with the best available agents that we had at the time, and yet was left with really debilitating back pain that prevented her from working, getting her housework done and getting out into the community.

### **Narrator**

That's when Gina went to see Dr. Insogna.

### **Karl Insogna, MD, Yale School of Medicine**

And we were able to, with a combination of new therapies and physical therapy, really allow her to reclaim her life. She's now much more physically active, going to the gym, exercising, going back to volunteering in the community and just feels a lot better and has a lot less pain.

### **Gina Epperson, Patient**

Even now, I join the classes sometimes, I do the stretching then, because I like it, I do a little bit of the movement, you know, but not like I used to.

### **Narrator**

And although she remains concerned about her osteoporosis, she has been fracture free for 2 years. The place is Miami, the sound is Latin music, and the class, called Zumba, is for people over 50. Linda Schneider comes here to stay physically active, and to help her take active steps in her fight against osteopenia.

### **Linda Schneider, Patient**

Dancing is something I've done all my life, I was a dance major in college so I've just continued on with that. And I tend to be a dancer, once a dancer, always a dancer. I have something called osteopenia, which is the step right before osteoporosis. Uh, you don't have as much bone loss but you can see the signs of bone loss.

### **Narrator**

This Zumba class is designed to help older people maintain a healthy and active lifestyle. For people like Linda, the kind of weight bearing exercise found in dancing helps in her quest to build stronger bones. That's because weight bearing exercise creates stress on the bones, which causes them to retain more calcium. This is the body's natural way to add more bone where it's needed.

Michael Virga is a 56 year-old backpacker with osteoporosis. As she and her daughter, Kendall, walk along this scenic trail overlooking the Golden Gate Bridge in San Francisco, you'd never guess that Michael recently broke her leg. It's a common injury for those with osteoporosis.

### **Michael Virga, Patient**

I love the solitude I love getting away from all the mechanism and it also gives a great sense of independence to be totally self-sustained.

### **Narrator**

Michael has spent three decades traveling from her home in Bakersfield, California to backpack the wilderness trails in state and national parks. It is a passion she's passed on to her daughter who has been on the trails with her mother since she was an infant. Michael has been aware of the osteoporosis threat to

her health most of her adult life. She watched her mother and her grandmother suffer fractures and broken bones. It was on a visit to see her mother in Texas that Michael slipped on a step and broke her leg.

### **Michael Virga, Patient**

I had to fly across country in this full plaster leg cast to be back in California to get the bones set.

### **Narrator**

Michael Virga is organizing, "Hike for Osteoporosis," to raise awareness about the disease and highlight the benefits of knowing t-scores.

### **Michael Virga, Patient**

This idea of hike for osteoporosis in which women, especially women with osteoporosis or the potential, hike the national trails, backpack and hike the national trails hoping it to be something like the walk for breast cancer, the ride for AIDS.

### **Narrator**

Michael plans to take her message to women throughout the country. She believes bone health is too important to ignore.

Weight bearing exercise like dancing and hiking, are beneficial for all ages. Other forms of weight bearing exercise include free weights and other gym-oriented, muscle strengthening exercises. Most people associate this kind of exercise as a way to strengthen muscle only. But it actually helps build new bone as well.

For older people, balance enhancing exercise helps create a better, more secure sense of equilibrium. These exercises include things like walking, dancing, and tai chi. Better balance helps reduce the chance of falling, where thinning bone can easily fracture.

When we return, we'll look at pharmaceutical and surgical steps in the fight against osteoporosis.

### **\*\*\*\*\*Osteoporosis: Strength for Life (Part 4)\*\*\*\*\***

### **Narrator**

For many patients, oral medications are prescribed to help reverse bone loss due to osteoporosis. Bisphosphonates adhere permanently to the surfaces of the bones and slow down the bone-eroding cells. This allows the bone-building cells to work more effectively.

And altered forms of estrogen in pill form called selective estrogen receptor modulators are used for the prevention of osteoporosis in postmenopausal women. In a 2-year study, women using selective estrogen receptor modulators had significant increases in bone mineral density in bone scans performed on the lumbar spine, total hip, femoral neck and total body.

A natural hormone produced in the thyroid gland called calcitonin can also be used to treat osteoporosis. Available as a nasal spray or injection, calcitonin is normally prescribed for women who are 5 years post menopause. Whereas bisphosphonates, and selective estrogen receptor modulators, are considered the first line of therapy against osteoporosis, calcitonin is considered a second line of therapy. It works, but is not believed to be as effective as the other oral medications.

For those whose bone loss has led to a fracture, there are surgical procedures that are used to help correct the damage. Surgery for a hip fracture is necessary to keep the patient from being bedridden, which typically leads to increased pain and death. The type of surgery depends on how severe the fracture is, and can range from using metal screws to hold the bone together while the fracture heals, to replacing part of the femur if the broken bones are easy to align, or performing a total hip replacement altogether.

But with the medications, surgery, dietary advice, and physical therapy available today, some roadblocks still exist in getting treatment where it's needed.

**Susan Broy, MD, Illinois Bone and Joint Institute**

Just to give you an example, patients after a hip fracture, only about 10 to 20% of those patients will be treated for osteoporosis, and yet once they have a hip fracture they're at high risk of having a subsequent fracture. These patients need to be treated.

**Karl Insogna, MD, Yale School of Medicine**

I think we may come up with new therapies that will remarkably allow us to improve people's bone mass. I think that coupled with a really concerted public health effort to educate people about the things they can do right now to protect their skeleton, I think should help us to control this epidemic.

**Narrator**

The older our population becomes, the more important it will be to communicate the risk factors associated with osteoporosis. And an awareness of the steps that can be taken to reduce its effects is important no matter what our age. First, to stem the tide of bone loss, the proper amount of calcium is needed.

Vitamin D plays an important role in calcium absorption in bone.

Weight bearing exercise such as walking or moderate weight lifting, can increase calcium levels in bone.

Bone density measurements can give an accurate picture of potential spinal and hip fracture problems, and provide important T-Score information.

All of these tools are important in trying to turn the tide of osteoporosis. Taking these steps early could make a tremendous difference in fighting its debilitating effects, and keep everyone strong and moving for a lifetime.