

**ANNE LAKE:** So, I know you see the postmenopausal women, right? And I'm going to nice to you today because I usually start out my presentation by asking questions like, what's the first thing you think about when you think of osteoporosis?

Most those people tell me-- and I won't make you answer because it's early. Most people tell me, hunched over, the walker, you know, a lot of us could be sitting in restaurants, and we'll see people pass by and go, patient. You know, we'll think, "We could do something for that patient."

But I want you to keep in mind that, actually osteoporosis is a teenage problem with geriatric complications, OK? And, I don't mean geriatric meaning like, older. I mean patients 50 and older, OK, which is me.

So anyway, I'm privileged to be here today to talk to such an elite group, and some of this is going to be a quick review. But the main thing is, I kind of want to just catch you up a little about what has changed in osteoporosis definition, and why it's important for you to capture it earlier than later. So you'll understand as we talk about some of the slides and what your role is an OBGYN gynecologist treating these people that present to your practice.

And I know there are some practices out there that still have bone density tests-- bone density units in their practices. And so you may actually see men in your practice as well. There are a lot gynecologists out there that are actually treating men for osteoporosis. Kind of a strange thing, I know it sounds weird, but it's true. It is going on. So, important for you to know.

So we're just going to quickly talk about some of the definitions of osteoporosis. Describe the type of fractures, morbidity, mortality, and cost of these osteoporotic fractures and why it's important for us as young healthcare providers to reduce those costs and we can do that by reducing future fractures.

What is your role in the management and current treatment modalities? And we're going to talk about the value of the bone density and monitoring for your fracture risk estimation, and those kinds of things.

So what's the old definition? 1947? Well, I could even say that I wasn't even born then. But anyway, a reduced amount of bone, but the bone was qualitatively normal. Well, we've found that changed. We had a new modern definition that came out a lot later and it just basically said that the skeletal disease was characterized by microarchitectural deterioration. So the bone was fragile and there was a susceptibility to fracture.

The new definition now is that osteoporosis is a skeletal disorder characterized by compromised bone strength predisposing someone to be at greater risk for fracture. So simply stated, the bone strength is equal to the bone quality and the bone density.

So all that being said is we used to actually diagnose patients just based on their bone density. And I can still tell you that I have patients that come in to see me on a daily basis that say-- they've had two compression fractures in their spine, or they've had a hip fracture from a low trauma fall, and they still say, but my bone density was fine the last time they checked it. So we have to sort of regroup and re-educate our patients that it's not just about what their number is, but it's actually about the quality of their bone and why they fracture.

So just a quick reminder, the composition of the bone is the bone matrix, the bone mineralization, and the bone cells. One of the common questions that I often get is, how do we know medications are working? Well in some medications, you won't see mineralization occur for one to two years. So if you check your bone density too soon, you're not going to really see that there's any effect there.

So keep in mind just the path of physiology related to osteoporosis and the basic bone metabolism that occurs. What we're looking at and what's important when you're trying to determine, why is this patient having more bone loss? Do I need to do bone markers, and those kind of things.

The basic cells, osteoclasts, osteoblasts, and of course your osteocytes and the lining cells. Your medications that you have that are currently available basically do something with the osteoclast, or they do something with the osteoblast.

We do have some new medications that I'll talk about briefly at the end that are coming out. We won't have any new therapies until 2017, but it looks pretty promising that we're going to have some new things on the horizon.

Basically, basic bone metabolism again is the modeling and the remodeling. The bone growth occurs from modeling. If the patient is losing too much bone, they're resorbing too much bone, they're going to have negative bone balance.

We need to figure out why they're losing so much bone. Do they new bone built, which will help with modeling. Or do we need to slow down the resorption process. So your osteoclasts are responsible for your resorption or your bone loss. And your osteoblasts produce new bone, and increase the bone matrix, and help with bone formation.

So the way I explain it to my patients is this, if we need to slow your bone loss down, and we don't want to stop your bone loss-- because they say to me, don't you want to stop my bone loss all together? No. Because if you don't lose that old bone you're going to be putting new bone on top of old bone and nobody wants to build their house on not a good foundation, right? Because it's still poor quality.

So what I explain to them is that the normal bone metabolism we still want to occur. We want you to lose bone and add bone, but we just want you to do it in a more balanced environment.

So what are the types of bones and-- Dr. Miller's going to be able to-- she's really got the best part of the presentation, actually, because she gets to show you some cool videos about these fractures that we actually see related to osteoporosis.

But, when we think about what's actually happened. And we need to know what kind bone we're dealing with. Basically the trabecular bone or the cancellous bone, it makes up the inner part of the linings or the axial-- or 20% of the skeleton.

And what happens is, of course, when a patient goes through menopause the cancellous bone is rapidly lost. And so we actually will see a lot of wrist fractures after menopause. And that's actually one of those common areas of what we call fragility fractures. So, you can see they increased as the frequency of cancellous bone loss begins. And then, also you have the risk of increase vertebral fractures related to that loss of bone.

The cortical bone is what makes up the long bones and that's in your appendicular skeleton. And that's usually-- the cortical bone is thought to be gradual but more persistent. And, then of course, your risk of hip fractures due to that loss increases because of the loss of both types of that bone. Quick prevalence, and this is why it's so important for all of us to take an active role in identification of these patients.

You may not do the investigation. You may not do the initiation of therapy. But you need to identify the patient. Because that's the starting point for reduction of future fracture, reduction of future healthcare cost, and improve quality of life in our patients.

So, 10 million people in the United States have osteoporosis. 8 million are women and 2 million are men. So the way I put it, one in two women over the age of 50 are likely to have osteoporotic fracture, one in four males over the age of 50 are likely to have an osteoporotic fracture in their lifetime.

What is the one thing that I ask my male patients? Because they come in inevitably with their wives and they say, "It's a woman's disease." So I turn to them and I say, "Really? How tall were you when you were in your 20s? Because I see your shoulders are slouched." "Well, I've lost a couple of inches." "You need a bone density test."

So, these are things that we can point out. It's actually the things that we're supposed to do every day. It's called good assessment skills. And it's basically looking at the patient and talking to them and dialoguing. And not being so this savvy, that we forget to do this, OK?

What I tell my patients now with the computer is I say, "This is the new paper chart. We used to not look at you with our heads down, now we don't look at you with our heads forward." But they understand that, you know, we have to do it. But we want to engage with our patients and recognize those things.

So what is the estimation? The estimation is that number will climb from 14 million by 2020. So currently right now, the National Bone Health Alliance has an initiative out where it's a global along with International Osteoporosis Foundation to reduce the risk of fragility fractures by 20% by 2020. And we're on a good path to that. We don't have a lot of time left, but we're on a good path toward that.

So internationally, 200 million people have osteoporosis worldwide, and then hip fracture projected to increase by 240% in woman-- there you go, Dr. Miller, plenty of work. And then 320% in males by 2050, if she's still operating by then.

All right, again, approximately 1.5 million osteoporotic fractures occur per year. You can see 700,000 spine fractures. Those are the ones that are most commonly missed because about 70% of patients that have a compression fracture never know they had it. OK. That's why it's important to check the height on a regular basis. You do it daily. You do it on a regular basis when you see your patients.

Make sure that when you're measuring them, that you don't measure them on the old scale anymore. Make sure you have a stadiometer that is on the wall, that is stable, and you want to make sure that you're measuring their height correctly so you can notice height loss through their evaluations and care that you're giving them.

Fracture incidents, of course, it peaks in the youth, usually 15 to 25. And those are usually sports related injuries, or just crazy things that happen. And then again over the age of 45.

So this particular initiative that Dr. Miller and I have been working on is really targeting the patient 50 and over that's had a fracture. We don't just say fragility fracture, but we say fracture. The reason for that is because a lot of patients come in and even if they're in their young 50s, 51 to 55 and they're maybe just in their first five years being postmenopausal. They're losing that bone rapidly, but a lot of times that's what gets missed.

So they may have a motor vehicle accident, and they have an airbag that pops out and it breaks their wrist. OK, well, they come in to see you and they're in a cast, "What happened?" "Oh, I had a motor vehicle--" A lot of times we just go, "Oh, I'm so sorry you had an accident, was your car totaled?" And we don't even think about what's the quality of their bone? Why did they fracture?

But if you look at their medical history, and you see, oh, they're on medications that can cause bone loss. They have rheumatoid arthritis, or they have MS, or they have a seizure disorder. They've have been on PPIs for years. They haven't taken any hormone replacement therapy. Maybe they had early menopause. All of these little indicators would point you in the direction of saying, you know what, I'm wondering about their bone quality. Maybe we need to take a closer look at that.

So certainly it is a medically necessary reason to order a bone density in that patient. A lot of times we say these providers, well they won't be covered. It will be. Proper documentation shows the medical necessity of it. Put that in your note This is medically necessary because.

So above the age of 45, the fracture incidence increases in women, we talked about and it's that of twice of males and the fractures are fragility type. Let me make a point to say this- men over the age of 65 that suffer a hip fracture have a higher mortality rate within that first year than women do. So keep that in mind as well. And the risk of an osteoporotic fracture is greater than the risk of getting a stroke, breast cancer, or having a heart attack. And we have not been doing great with bones.

In 2005 the cost was up to \$16.9 billion for these fragility fractures. You can see 52% of hospitalizations over half of the hospitalizations were related to that nursing home care, and of course 13% of out patient care. The indirect cost has to do with loss of productivity, and wages, and also rehab facilities, and those kind of things. Projected cost or total fractures by 2025 is to be around \$25 billion annually.

And then we talked a little bit about the morbidity and mortality with the mortalities increased 20% to 30% in the first 6 to 12 months. This is after a hip fracture, after a vertebral fracture, there's a gradual increase in mortality.

And if you think about, when a patient has a vertebral fracture, and they have a long problem already, think about their quality of life. OK? You know, so these are things you want to keep in mind. And they may have increased exacerbations of problems and they're getting shorter. Oh wait, maybe you've had a compression fracture. Five-year excess mortalities increase by 20% in both the hip and in spine fractures.

The changes in bone density related to age-- there's a dramatic increase in BMD during adolescence and you know all know this. Peak bone mass is achieved in the teens and in early 20s. Remember, calcium and vitamin D, still very important.

You're going to hear a lot of different thought experts say different things about calcium and vitamin D. It is still recommended, calcium and vitamin D supplements. Obviously, a little bit different related on your age group, but you want to make sure that especially in your adolescence, your young adults, that you're talking to them about nutritional issues. Look out for your female triath that has some menstruation problems. Keep those patients in mind, because that's when they're supposed to be building their bone. And if they have a nutritional issue, they're going to be losing a lot of bone at that point.

Age-related bone loss is approximately 5% to 1% per year and accelerates at menopause, and that phase can last 5 to 10 years. Eventually it does just go back to the pre-adolescent levels, but if you already have a negative bone bank account, you're already at risk.

So what are the types of fractures there we see? Traumatic, pathological, stress fractures, osteoporotic fractures, low trauma or fragility fractures. Pretty much in our fracture liaison service at Wake, we are capturing most all of these patients.

I will tell you that if, right now, if you have a patient that has an osteoporotic fracture as we transition into the ICD-10 codes, the word pathological is going to be connected to an osteoporotic fracture. Not just related to a fracture because of cancer.

So keep that in mind. If you see "pathological fracture", read a little bit more and make sure. Because we, in orthopedics, are going to be challenged to use the word "pathological" because osteoporosis is a pathological type fracture. And it may not be related to cancer. It may be postmenopausal, osteoporosis, or primary hypogonadal in the male.

Low trauma/ fragility fractures. Those are those-- everybody understand the definition of what low trauma is? Patient is standing at-- person is standing at a height of 3 ft or less, and they fall and they break something. Or they pick something up 5 to 10 lbs, and they break something in their back.

Common picture that we'll see is somebody bending down to pick up their grandchild, their back starts hurting. Or they're getting their Crock-Pot down out of their cabinet to cook Thanksgiving, or something, and they fracture. Maybe they're walking along in their yard, gardening, and they stumble, and they fall in a hole-- they trip in a hole and just roll their ankle, and all of a sudden they have this fracture. So those are low trauma fragility fractures.

It really should be part of your intake on any of your new patients. Have you have a fracture? Have you broken a bone since you've been over 50? And how did you do it? And that will give you a little clue of their bone quality at that point. So keep that in mind in terms of your intake forms.

You're in a unique position of identifying these patients. And so, the first thing that you can do if the patient has not had a fracture, obviously, is do a bone density test and see what their baseline is. Any of your postmenopausal females, go ahead and get one early.

Are you guys starting to do that a lot earlier now, in OBGYN? Getting those bone density tests more in the 50s now, instead of waiting until 65, or you're referring to us? Referring them to us?

**GYNOCOLOGIST:** I bet there's a gap.

**ANNE LAKE:**

OK, so, so yeah. Keep that in mind. If they're postmenopausal, first five years, a lot of bone loss. Get that bone density test done, OK? And then, basically, the approach would be history of fracture at 50. Height loss since their 20s. Family history of osteoporosis. Parental hip fracture over 50.

If they're smokers, we all have to ask that because it's meaningful use now. How much alcohol do they drink? If they drink more than 3 units a day, you need to consider that. History of steroid use. Prednisone usually orally, more than 5 milligrams for three months or longer in a lifetime. History of RA, and then a recent BMD score and any prior treatments in the past.

These are a list of some contributing things that-- don't want to-- belabor this this morning but, know your meds list. Know what your patients are on. Everybody hears-- everybody hears the commercial about Nexium, and at the very end it says, "May cause atypical fractures." Right? Well, you know, everybody just kind of blows that off.

And when they come to see me, they go, I saw that commercial. Now that I've had a fracture, I saw that commercial, should I stop my medicines? Not necessarily. But we just need to know that you're on it. So know what your patients are taking, all right?

Once again, universal recommendations- calcium and vitamin D. Treat the vitamin D deficiency. we're very, very, very aggressive in orthopedics. If a patient is deficient and they've had a fracture, I'm going to treat them aggressively with 50,000 units twice a week for 12 weeks and then recheck their level. We want their level to be up around 45 to 60, and that's what we do in orthopedics.

So, just keeping that in mind. And then, regular weight-bearing exercises, muscle-strengthening, falls prevention and personal safety. If you have a patient-- you were all concerned about falls and balance get them referred to physical therapy.

Their insurance will cover it. It's medically necessary because their insurance would rather pay for them to have a couple of physical therapy sessions, then they would to pay for them have a hip fracture. Makes a difference. It doesn't cost \$45,000 to have physical therapy, but it does fix a hip fracture, or maybe more.

And then obviously talk to them about tobacco cessation, use and avoidance of alcohol-- excessive alcohol intake.

Your T-score is basically, if we're talking about bone density your T-score of minus 2.5 or greater, that would be osteoporosis. Between minus 1 to minus 2.5 is considered bone loss. This whole slide goes out the window when they present with the fragility fracture. Because just like in a card game, your fracture, your fragility fracture, will trump your T-score.

So now, remembering the definition, keep in mind that even if a patient only has a bone loss on their bone density test, and they've had a history of fragility fracture by definition, they now have osteoporosis and severe. It's not related to their bone density score anymore. It's only a piece of the puzzle.

In January, the guidelines have now been-- we've presented something through the National Osteoporosis Foundation to change the actual definition of fragility fracture. Sites, they used to just highlight the hip, the wrist, and the spine as being the main areas. Well, there's a position statement now that's gone to CMS that says, based on orthopedic evaluations and these fragility fracture presentations, we need to say that there's other areas of fragility fracture sites.

Including proximal humerus, ankle, not just the hip, not just the wrist, and not just the spine, but other areas. Sacral areas, pelvic insufficiency fractures, these are all being added to the fragility fracture definition for the pathological osteoporotic fractures.

Just to let you know some current pharmacological therapies, you know, we have-- basically make it real easy. There's a ton of medicines that are available. On the right side of your screen, those are the medicines that will slow the bone loss down. That's pretty much what I tell my patients. On this side, this is the medication that will actually rebuild the bone.

The only anabolic agent available that will actually rebuild the bone. It's the only one we have. We do use a lot of it over there in our orthopedic department, because it's all we got. The other medications will slow the bone loss down.

The gold standard is still your central DXA. Some people are ordering the QCTs. We're not doing that to possibly-- too much radiation exposure. You can do bone markers. Don't waste your time on those right now, because they are not standardized. We're not even using a lot of them. We only use them if we're doing a off label treatment for fracture healing.

We might use a bone marker there, but right now we're working on-- they are working on standardization of those markers and research. Vertebral imaging, very simple. If you're going to order a bone density test on a patient, and you're concerned about height loss, you used to be able to do a vertebral fracture assessment view, along with the bone density. It's no longer covered under Medicare. Don't order a V of A.

So just get a plain film, AP lateral of the spine. I think when you pop it up on Epic, if you type in "thoracic" it says, "thoracic and lumbar spine complete view" or something. Anyway, you can pop it up and just order that and that will tell you about vertebral height loss. New therapies that are available that are coming out-- there's an antibody for sclerostin.

It's an antibody that Amgen is actually working on now. That will not be on the market until 2017, but it's set to be the gold standard of treatment by 2021. So it's going to be interesting to see how that rolls out. It's still in phase three studies.

And then the next thing that's actually coming out is this cathepsin k and it's actually-- it has really good potential for the treatment of osteoporosis. Again, in phase three studies right now, so we don't really know what that's going to look like. But these are the things that we have better trending currently. And there are some stem cell therapies that are in testing at this point.

So just kind of a quick wrap and I won't do the Q&A because I'm going turn it over to Dr. Miller, but we'll be available for you if needed, so thank you all so much. I appreciate it.