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Exercise in Osteoporosis Care: Guideline-Based Strategies for Fracture Prevention

**Announcer:**
You're listening to *On the Frontlines of Osteoporosis* on ReachMD. And now, here's your host, Ryan Quigley.

**Ryan Quigley:**
This is *On the Frontlines of Osteoporosis* on ReachMD. I'm Ryan Quigley, and joining me to discuss exercise interventions for osteoporosis and fracture prevention through the lens of the 2023 *CMAJ* clinical practice guideline is Dr. Lora Giangregorio. Dr. Giangregorio is a Professor and the Tier One Canada Research Chair in Bone Health and Exercise Science at the University of Waterloo in Ontario. She's also one of the contributors to the guidelines we'll be discussing today. Dr. Giangregorio, welcome to the program.

**Dr. Giangregorio:**
Well, thanks very much for having me.

**Ryan Quigley:**
Absolutely. It's a pleasure. So let's start with some context. Can you walk us through why exercise plays such a central role in the updated guideline?

**Dr. Giangregorio:**
Exercise was actually included in prior guidelines—I mean the 2010 guidelines, which is the one that was being updated, also included exercise—and I think in this case, we took a different approach to guideline development. We used the GRADE method, and we established four working groups related to risk assessment, medications, nutrition, and exercise because all of those things were included in the prior guidelines, but this time, we used the same approach across all of them. And so I guess exercise was addressed a little bit more thoroughly, mainly because we changed the approach for all of the aspects of the guidelines.

**Ryan Quigley:**
And so looking a little bit closer at the recommendations, why is functional and balance and resistance training preferable to general aerobic activity for fall prevention?

**Dr. Giangregorio:**
So when you look at how fractures happen, a large number of fractures occur due to falls. So if you can prevent falls, you can prevent fractures. We looked at all the different types of exercise, and we looked at how it affected outcomes that were important to clinicians and important to patients, so fractures, falls, physical functioning, and quality of life. When we look at data on fractures, there aren't a lot of studies that look at fractures as a primary outcome. When you start pooling studies like fall prevention studies, there are some data on fractures, and they do show that there is some evidence to suggest that functional training and balance training may prevent fall-related fractures. There's very strong evidence that balance and functional training can prevent falls, so just based on that alone, it is a good rationale for including that type of exercise in the recommendations.

When we look at the studies that look at other outcomes, like bone mineral density, we see that most of the interventions that have been shown to improve bone mineral density often include strength training in combination with impact exercise, so probably, if people want to move the dial in bone mineral density, they want to do that. I will say though that impact exercise is a funny one because a lot of the times, the studies are using moderate to high impact or a progressive impact program, and not all people want to do that. So when we considered the guidelines, we considered feasibility, and we considered what patients would value. And so there was some

consideration for the fact that not everybody would be able to do moderate to high-impact exercise, so the guidelines do actually say if you want to do impact exercise to improve BMD, you can consider doing it if it's safe for you, but you may want to start with a lower impact and progress to moderate or high impact. So there were some caveats around the impact. I would say the same is true for strength training in that we encourage people to seek some guidance on selecting the right exercises, intensity, and progression because a lot of the programs in the studies looked at progressive resistance training and not really low-intensity exercise that doesn't progress, for example.

But we also say in the guidelines that if you want to do other types of exercise for fun or for fitness, you are encouraged to do those things. So we're not saying "do this instead of this." We're more just saying that if your goal is fracture prevention, do balance and functional training and add in strength training as well and don't do aerobic exercise instead of that type of exercise if your goal is fracture prevention. That's the messaging. So I think we encourage people to do lots of different types of physical activity, and that's consistent with our national physical activity guidelines. I think the emphasis is slightly different because the outcomes of interest are slightly different.

**Ryan Quigley:**
As a follow-up to that, what role does posture-focused exercise play in osteoporosis management, particularly for patients with hyperkyphosis or vertebral fractures?

**Dr. Giangregorio:**
So there are people who are concerned about their posture because they maybe don't want to develop a hyperkyphosis or an exaggerated curvature of the upper back or the thoracic spine. So for people who have concerns about that, they may want to do exercises to train the muscles that stabilize the shoulder and also their back extensor muscles. And there is research to suggest that in people with hyperkyphosis, doing those types of exercises specifically can have an effect on the kyphosis outcome, like the curvature; a small effect on Cobb angle is what they measure usually.

In people with vertebral fractures, it's a bit trickier because when you have a vertebral fracture, the kyphosis associated with a vertebral fracture is sometimes fixed, right? Kyphosis can happen if you have a structural change, like a Scheuermann's kyphosis. Or if you have ankylosing spondylitis or you have fractures in your spine, that can cause a structural change whereas it can also happen if you kind of sit slouched a lot and you have really tight soft tissue. I think you might be able to change the kyphosis angle slightly. It's really more of a soft tissue change, but you may not be able to change a fixed kyphosis because if someone has multiple fractures and that's causing their spine to curve, exercise may not fix that, right? It may help a little bit because they're going to stand up a little straighter because they're using their back extensors, but I don't know that it's going to change it that much.

**Ryan Quigley:**
For those just joining us, this is *On the Frontlines of Osteoporosis* on ReachMD. I'm Ryan Quigley, and I'm speaking with Dr. Lora Giangregorio about how we can optimize osteoporosis care through exercise interventions.

So, Dr. Giangregorio, shifting gears to safety, are there any considerations to keep in mind when recommending exercise to patients at high fracture risk?

**Dr. Giangregorio:**
So I think the first thing is understanding the person's risk and also the risk factors that they have. So when we do an assessment of fracture risk, we often use a tool, like FRAX, where we actually look at their fracture risk factors and calculate a number, which is usually a probability of fracture in the next 10 years, so that you're understanding where the risk is coming from. That's a good first step. And then what the level of risk is. So if someone has a high risk because of FRAX versus a lower risk, I think I'm a little bit less worried in people who are lower risk than the higher-risk people. If someone has a vertebral fracture or hip fracture already, I would say they're very high risk, and those are the people that I would say you may want to be really cautious when it comes to impact exercise or movements that may put them at increased risk and also fall risk, right? So when you're prescribing exercise, you have to think of all of these things. You have to think about the fall risk associated with the exercise you're prescribing, and you want to do what you can to reduce that risk. And you want to do that in everyone, but you want to be more attentive to people who are high risk.

And then the second would be things that might increase a person's risk of spine fracture. So there's kind of two layers there. One would be impact, right? So ground reaction forces. For example, a lot of people quote the LIFTMOR study, and I think that was a great study to move us forward to be a little bit less scared about doing exercise with people with osteoporosis, but some of the folks in that study were doing fairly high impact, and I would maybe be a bit more cautious or be less confident having someone with multiple spine fractures doing that type of high-impact exercise, for example, because they would be much higher risk; when you've had one spine fracture, you're much higher risk for another one.

And then the other thing would be understanding the types of movements that are thought to be risky, and people will often say, “Oh, don’t, don’t bend or twist.” It’s hard to get through the day without bending or twisting. I mean, you can’t put socks on without bending over, right? But it’s how you do it, so it’s rapidly bending or twisting, and that includes lateral and forward flexion as well as twisting the spine. So it’s thinking about the types of movements and trying to do what we call ‘spine sparing,’ where you try to avoid the riskiest versions of those movements. So can you modify the exercise so it’s less risky in a high-risk person?

Then it’s also about careful attention to progression, so you don’t progress people too quickly, or if you’re adding weight, you’re not progressing too quickly without them having really good form and a foundation because if you’re progressing back squats really quickly and then all of a sudden they’re unstable, that’s where you can run into trouble. So I think it’s thinking about the types of movements they’re doing, the fall risk, and the impact that they’re doing, and then how do you take an intentional slow approach to progression; those are the kinds of things that I like to think about.

**Ryan Quigley:**
And now, when it comes to personalization, how can we tailor exercise prescriptions based on an individual’s fracture risk, mobility, or comorbidities?

**Dr. Giangregorio:**
I think it’s just about making good clinical decisions. You have to look at the person in front of you and think about what their risk is and weigh the risks and the benefits. So there are some people who are really keen to try to improve their bone mineral density, and yeah, if they’re younger and fitter and their fall risk is quite low, you might slowly and cautiously push them towards a higher-intensity strength training or more impact. If you’ve got someone who’s fallen three times in the last month and has three vertebral fractures, the priority there might be fall prevention, right? So you’re not as focused on the bone density but on the presenting issue. So I think you just have to think about prioritizing your goals of your training, first of all, to where you’re going to have the most bang for your buck, and also understanding the person’s risk and making sure that you’re making good decisions.

And then in terms of comorbidities, again, you just have to be smart. So a good example is we see a lot of people who have osteoarthritis and osteoporosis. So for osteoporosis, people are often like, “Oh, you want to lift weights, you want to do balance exercises, and you want to do impact exercises.” With the osteoarthritis, you have unstable knees, and you don’t want to do impact exercise because it hurts and doing squats can hurt. Like, we had a person in one of our studies who had knee osteoarthritis, and we were getting her to start learning how to do squats, and she was finding it painful, and so unbeknownst to us, she went to her physio and was like, “I’m doing the study, and we’re doing squats,” and the physio said, “You shouldn’t do squats because you have osteoarthritis.” And so she came back to us and was worried we were going to kick out of the study, and I said, “No. We’ll find a version of the squats that you can do.” So we did some trial and error with her; I had her do high box squats with a band around her thighs, and she found that that wasn’t painful, so we got her doing that and then eventually started adding weight so that she was doing squats with weight. And then I started dropping the box and then dropping the weight a little bit so she could get used to it, so now she was doing it in an increased range of motion and then started weighting it back up again. So it’s being smart about what’s the person’s limitations and how do you work around it and still find a version of what they can do.

**Ryan Quigley:**
And before we wrap up, Dr. Giangregorio, what would you say is the biggest takeaway for clinicians looking to integrate exercise into osteoporosis and fracture prevention plans?

**Dr. Giangregorio:**
I think the most important thing is to have a lot of options in your toolbox. So every person is going to have different goals, impairments, and preferences, and so there’s going to be some people who are going to be keen to go to a gym and pay for a gym membership and work with a personal trainer or an exercise physiologist and learn how to do exercises, and there’s going to be other people who prefer to work out at home, and there’s going to be people who have arthritis and are fearful. And so you have to have options so that you can meet people where they’re at because ultimately, if we get them engaged at some level, hopefully, we can convince them to stay and then eventually try new things. I think you want to not assume there’s only one approach, and I think that’s where people are like, “everybody doing exercise has to do this type of program to increase bone density.” And that’s not realistic for everyone, so that’s where we went with the guidelines. It’s like, okay, most bang for your buck, if we could get everyone doing balance and functional training, at least that’s one step. And yes, we definitely want people strength training, and sure, add on other exercises as well because it’s good for fun and fitness, but you want to think about priorities based on the person’s goals and preferences and impairments because you’ve got to meet them where they’re at.

**Ryan Quigley:**
Well, with those closing thoughts in mind, I want to thank my guest, Dr. Lora Giangregorio, for joining me to discuss recommendations

for incorporating exercise into osteoporosis management. Dr. Giangregorio, it was great having you on the program today.

**Dr. Giangregorio:**
Thanks for having me. I really appreciate it.

**Announcer:**
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