

# Falls Prevention

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**Transcript**

## **[0:00 Importance and impact of falls]**

*Dr. Marla Beauchamp:* Thank you very much for having me today. It's truly a pleasure. Falls is something near and dear to my heart as a physiotherapist. And so it's great. And as Christine said at the beginning, it's incredibly timely on the first snowfall of the year. So, I hope that you'll get something out of this talk tonight.

So, today I'm going to outline the importance of falls in older people and share with you some statistics about the burden of falls. We'll go over the common causes of falls and risk factors for falls. What can you do at home to prevent falls? And then we'll end with a little bit of what's new and ongoing in research on fall prevention.

We'll start with some kind of statistics. Falls really have devastating consequences for older people. About 30% of people over the age of 65 fall each year. And as we get up to 75 and older, that number kind of increases to, you know, 43%, 45%. When someone does fall, it is really a leading cause of injury and it's also a leading cause of death from an injury in older people. Falls cause about 95% of all hip fractures. And when someone's hospitalized other causes. And again, after hospitalization for a fall, about a third of older adults are then admitted to long-term care. So, it's really a public health problem that's very common and very costly.

As we look at data in Canada and around the world, because of the shift in the population, as our population gets older, we're actually noticing that falls are on the rise. So, this is data, the hospitalization data from 2008/2009 to 2019/2020. And if you just look at the purple bars, we can see that there has been an increase in the number of hospitalizations from falls over the last decade or so. And this increase is actually about 47%. So, really significant public health problem that's growing not only in Canada. We can look at these charts from almost anywhere around the world and we see this rise in falls.

## **[02:50 Preventing and understanding falls]**

*Dr. Marla Beauchamp:* Now, I've given you a lot of the bad news, but the rest of the talk is really we're going to focus on the good news. The thing about falls is that we can prevent them. If we identify risk factors and we provide tailored treatment targeting those risk factors, we can reduce both the rate and risk of falls by 25 to 40%, and this is huge. There's not a lot of conditions that have this many devastating consequences that we can actually do something about. So this brings me to the first key message from my talk. Falls with aging are a common and growing problem, but many falls can be prevented.

So if we're going to talk about preventing falls, we first need to understand how they occur or why they occur. And what do we mean by a fall? So the World Health Organization defines a fall as an unexpected event where an individual comes to rest on the ground floor or lower level. And actually, when we think about how falls happen, most falls actually occur while we're walking or standing. And they occur specifically because we lose balance while walking or standing. In the table below, I provided some data from one of our own cohort studies. This is a study where we're following older people over time, and we have them every month record on a diary postcard for each day, whether or not they have fallen. We have data from 954 older adults, 12 months of longitudinal data following those 954 older adults, and they've reported a total of 891 falls. And if we look at those 891 falls and we categorize them, we see that 56% of those falls occurred while someone was standing or walking. 19% occurred while someone was doing stairs or steps. And then about 9% were from a fall on ice or snow. And of course, that will have a seasonal effect as we head into the winter.

### **[04:52 What is balance?]**

*Dr. Marla Beauchamp:* What do I mean about falls occur because of a loss of balance? It's really important to understand what is balance. It seems simple, but it's actually a really complex task. Balance is the ability to sort of maintain the center of mass within the base of support. So what do we mean by center of mass? It's an imaginary point at the center of the body's total mass. We can see it on the diagram here, just around the hip level. The base of support is the area of the body that's in contact with the support surface. We need to keep our center of mass within our base of support in order to maintain our balance. If that center of mass goes outside our base of support, or if our base of support becomes really narrow, then we can lose our balance and fall.

I really like this slide. This is a slide that was originally made by a colleague of mine, Dr. Katherine Sibley from the University of Manitoba. But it really illustrates the importance of balance and our balance reactions for avoiding falls. On the left, we can see a gymnast who's very, very clearly lost her balance. Her center of mass is now behind her base of support and she has become unstable. In the middle are tracings, EMG tracings of specific muscles. It doesn't matter what the specific muscles are, but you can see that the speed at which these muscles have to turn on to initiate an effective balance recovery reaction are incredibly fast. It's 100 and 150 milliseconds after someone becomes unstable that our muscles need to respond in order to prevent a fall. And you can see here that she's done it, and now she's recovered her balance, her center of mass is back over her base of support on the right-hand side. So it's really, balance is really a complex skill that our body does almost automatically, but it's also something we can train. And we'll talk more about that a little bit later, but this is the key message number two here, is that most falls happen while we're standing or walking, and the balance is absolutely critical to avoid falls.

### **[07:17 Top risk factors for falls]**

*Dr. Marla Beauchamp:* So, because of the devastating consequences of falls, there's been a ton of research devoted to looking at different fall risk factors. And these are the fall risk factors that are really commonly talked about. They're commonly looked at in a number of different research studies. So health conditions like arthritis, diabetes, COPD, depression, stroke, Parkinson's

disease, and conditions like frailty and incontinence have all been identified as fall risk factors. Anything that affects our sensory system because this impacts our balance is also something that can increase our risk. So, vision and hearing loss, peripheral neuropathy, which is loss of sensation in our feet and legs, dizziness in vertigo, and then it goes without saying that problems with balance and walking are important for predicting falls, muscle weakness, and then other factors like age, female gender, fear of falling, and history of falls have also been commonly examined. Now, these are the ones that we see in the literature the most often. They're the ones that people talk about. But which ones are the top risk factors?

And this is really excellent work from one of my PhD students, Stephanie Saunders. She's a physiotherapist and she's in her final year of her PhD, and she did something called an umbrella review, which takes sort of a really, really high-level look at the literature. So she looked at 53 different systematic reviews. So these are already reviews that have rigorously gone through a bunch of different studies. And, and she summarized the top predictors of falls from 355 different primary studies. And you can see here on the bar graph in gray are the number of times the relationship was looked at. So the relationship between the risk factor and falls was studied. And in the dark blue is when that relationship was found to be significant using a technique called a meta-analysis, so when you pool results from different studies together and you can look statistically to see if there's, there's an effect. And here we can see that the top predictors of falls from all the different ones that have been examined are frailty, balance, chronic conditions like stroke and Parkinson's and diabetes, psychosocial issues, this includes depression and social isolation, mobility problems, which go hand in hand with balance, cognition, cognitive impairment and dementia, and then strength, which also goes hand in hand with balance and mobility problems. So these were the top predictors.

Now it turns out that measuring those predictors and coming up with a screening tool is actually not that easy. And there are screening tools that we can use to look at risk of falls, and we've given you one as a handout, the Stay Independent Questionnaire that you can fill out. But really, really simply also, there's three really easy questions that you can use to assess your risk of falling, and this is recommended by the World Falls Guidelines. These three really simple questions are simply, have you fallen in the past year? Do you feel unsteady when standing or walking, or do you have worries about falling? If you answered yes to any of those three questions, key questions, it may indicate that you're at a higher risk of falling. And so in your handout, there's more examples of risk factors that you can go through to look at your risk, and there's a total score that you can use to determine your risk. But I just want to caution everyone, even with respect to these three questions, even if you say no to these three questions, low risk doesn't equal no risk.

So up to 30% of community-dwelling older adults who fall do not have a history of falls or a gait or balance problem. So it's just really important to keep this in mind. So this brings us to our key message number three. The top risk factors for falls are having a history of a previous fall, having chronic conditions, different chronic conditions, and more of them the worse your risk. So things like stroke or Parkinson's disease or diabetes, being frail and having poor, poor balance, as we've talked about.

## **[12:04 Preventing falls in the home]**

*Dr. Marla Beauchamp:* So now we get to move on to what we can do about it. So what can we do to prevent falls? And we're going to talk today about four really simple strategies that you can do as part of, you know, incorporate into your routine to reduce your risk. So the first one is incorporating exercise to improve your balance and strength. The second one is making your environment safer. So this includes your home environment and thinking about your environment as you're outdoors. The third one is asking a healthcare provider to review your medications. And the final one is having your eyes and feet checked regularly. And we'll go through each in turn.

## **[12:44 Exercise is medicine for falls]**

*Dr. Marla Beauchamp:* The first one we're going to talk about is exercise. I'm sure you've all heard the word or heard the term 'exercise is medicine', but it actually really is. In this case, balance and functional strengthening exercises can reduce falls by 24 to 34%. This is huge. Most medications don't have that kind of effect. In this case, balance and functional strengthening exercises are medicine. If we think about type, we'll talk more in the next slide about what kinds of balance and functional exercises we mean, but another kind of exercise that has been shown to reduce falls is Tai Chi. So, if you have a Tai Chi program near you and you're interested in checking it out, it's definitely worth doing that.

What do we mean by balance and functional exercises? So I'm just going to give some ideas of what they are, and then we'll talk more about some general guidelines in the next slide. Functional exercises are things you do in your daily life, and you need balance for pretty much all activities of daily living. So the first exercise that I have here on the slide is a sit-to-stand or a chair stand. So this is simply just getting in and out of a chair. So standing up from a chair, that not only challenges your balance, but it challenges your strengths.

Standing balance is also another important example of a balance exercise. So in this picture, this is one of my research coordinators, Sashi, she's standing on one leg. But you can also anything that you use to sort of narrow your base of support so you can put your legs also, if that's too difficult, you can try standing with your feet side by side and then try standing in tandem stance. So that's with your foot, heel to toes. Your heel to toes are touching on your two different feet, and then standing on one leg. So those are all kind of what we call static balance exercises that can challenge your balance.

And then walking tasks like walking sideways, walking backwards, and doing, figure of eight walking, so that means walking while turning. All of those types of walking activities are good exercises for your balance. They're functional. They're things we have to do in daily life, but they also challenge our balance.

And then when we think about incorporating strength training, I always want to think about incorporating functional strength training. So we want to use. It doesn't have to be at a gym, we

want to do exercises like squats or like heel raises, or just think of it as standing on your toes. Those are really easy ones to do.

When we think about general guidelines for doing these exercises, it's always good to start by speaking to a physiotherapist or a healthcare provider, especially if you're new to exercise or you have a medical condition that might increase your risk of falling or where you're not sure if it's safe to exercise. It's really, really important to do that.

With balance exercises in order to reduce fall risk, we want to aim for three times a week. So we want to do those balance exercises three times a week on an ongoing basis. Each exercise should be done 10 times and then repeated. So the idea is we're doing two sets of 10 each time we do a new exercise.

And the thing about balance training, if we want to reduce the risk of falls, we have to progress our exercises, and each exercise needs to challenge your balance as much as is possible while still being safe. So ways to progress your exercises are to kind of decrease the support. So we talked about those sit to stand exercises. When you come up from a chair, if you need to start by holding on to the, to the, to the rails on your chair, you can do that, but then moving to trying to get out of your chair without using your hands for support. Same thing with standing on one leg. If you need to start by holding onto a countertop, that's okay, and then moving to like a light fingertip touch and then moving to no support altogether. And then of course, we can add resistance or extra weight. We can hold weights in our hands as we do these exercises, and that also increases the challenge.

If you're working with a physiotherapist in the gym, like in this picture, you can get much more creative on the types of exercises you can do that really challenge your balance. And sometimes they might even challenge your cognitive ability, while you're working on these exercises. Your therapist might ask you, for example, to try and think of all the words that start with the letter M while at the same time you're doing a walking task or trying to stand on one leg.

The key is really to incorporate balance training as part of a healthy lifestyle. We know that the movement guidelines, the 24-Hour Movement Guidelines in Canada, recommends for older adults that they engage in 150 minutes a week of moderate to vigorous activity, physical activity. Now, that might seem like a lot, but walking counts as a moderate physical activity intensity exercise for most people. So if you go outside and do some brisk walking, that can count towards your 150 minutes. And even just being active around the house and cleaning the home can be moderate physical activity. So the key with all of this is that it needs to be integrated as part of your lifestyle so that you can keep it up. Because just like with a medication, if you stop a medication, you often no longer get the health benefits after that medication stops. It's the same thing with balance training or exercise for reducing falls. Once we stop, once we stop doing those exercises, we lose some of those gains and our risk increases again. So it's really important that we do this on an ongoing basis. That's key. Message number four: Exercise that challenges balance can reduce your risk of falls. And it can do so quite significantly.

## [19:12 Making Your Environment Safer]

*Dr. Marla Beauchamp:* The next strategy is making your environment safer. You can see here on the left there's a cartoon picture of a very cluttered house. If you look very carefully at the picture, you can see a number of different tripping hazards. You see cords on the ground. You see loose throw rugs. There's objects on the stairs. A throw rug near the stairs. There's no handrail on this, there's no railing, sorry, on the stairs. So all of these things can be, can be removed and that helps you to avoid the risk of tripping. So decluttering, putting double-sided tape underneath throw rugs, taking care to clean up any loose wires and tape those or get an electrician to help you conceal those. Installing bars, grab bars in the bathroom is a really important one. And non-slip mats both outside and in the tub. And then lighting is a really important thing to consider. So especially if you're someone that needs to get up and go to the washroom during the middle of the night, you need to make sure that you have some night lights or that the path to get to the washroom is really, well, easy to light up for yourself.

And then we have to think about when we're outdoors on conditions like today is a perfect example. It's snowing outside. We need to think more carefully about our shoe wear. Okay, so what kind of shoes do we put on? We need to have firm soles. We need to look for shoes that have good treads in the wintertime. We need to really think about taking our time in icy weather, using handrails if they're available, and then being mindful of curbs, steps, and ramps. All things that we can do when we live in a country like Canada.

## [21:10 Reviewing your medications]

*Dr. Marla Beauchamp:* The final, no, not the final second to final strategy is reviewing medications. As we get older, we develop more health conditions. We're often prescribed multiple medications and the body's physiology changes as we get older, so those medications may not react together the same way they used to as we start to age. So if you notice that your medications make you feel sleepy, dizzy, or affect your vision or sense of balance, it's really important to talk to your doctor or your pharmacist. And you can ask a pharmacist to review your medications and tell them about all the medications you're taking, even the over-the-counter ones. And there are certain tools that are available that your physician can use to help deprescribe medications if you think you might be on too many. A common tool is called Start-Stop. And there is evidence to show that when inappropriate medications are stopped, it can help reduce your risk of falling.

## [22:17 Checking your eyes and feet]

*Dr. Marla Beauchamp:* And the final strategy we'll talk about today is having your eyes and feet checked. Unfortunately, another consequence of getting older is our visual acuity, our contrast and depth perception, those all decrease as we get older. We can also lose sensation in our limbs and feet with aging and with certain health conditions that are common with aging, like diabetes. What happens is the poor vision and decreased sensation in our feet all affect your balance and increase your risk of falling. So we recommend that once a year you go to the eye doctor to have your prescription updated and to check for new conditions like cataracts or glaucoma.

And you want to ask your doctor or healthcare provider also to check your feet once a year. And it's not on here, but it's also probably, it's also good practice to check your hearing if you're noticing trouble with your hearing as you get older as well. So this brings us to key message number five.

So this brings us to key message number five. Other interventions that can reduce falls are minimizing environmental hazards, reviewing your medications, and having your eyes and feet checked regularly. So five really simple, four sorry, really simple strategies that can reduce your risk of falls.

### **[23:44 New and ongoing research]**

*Dr. Marla Beauchamp:* I just want to talk now a little bit about ongoing areas of research because the field is really, really active. And I think as technology becomes more advanced, this is an area where more and more research is emerging. Hopefully if we did this talk again in five years, we'd have a lot more to share.

There's a lot of research into things like protection aids. These are special hip protectors that you can put to prevent hip fractures. And they're even looking at trying to make garments, so actual clothing that you wear, that's really not, it's not overly bulky but can still provide some cushioning in the event of a fall. There's also garments that people are trying to develop that actually provide further strength to your muscles, help make you stronger. And we know that loss of strength is a risk factor for falling. Then there's advanced eyewear and hearing aids that not only correct your vision and your hearing, but can also have elements that can help with signaling and warning you when you might be off balance. And there's research, active research going on to develop those kinds of tools.

Another area where there's been a lot of promising work is on perturbation training. So we talked about when you fall, you lose your balance, you become unstable, right? And you have to initiate these really, really quick reactions in order to stop you from falling and recover your balance. Well, you can actually do that in a lab. You can bring people in and put them in harnesses and on special platforms. Kind of like imagine you're in an airplane and you're trying to balance and the plane has a lot of turbulence. So there are ways that you can actually simulate situations that are like falls and actually practice how to recover your balance in those situations. And they've actually shown that that's quite effective. The issue with that is that it's not available for everyone and it can be costly technology to use. How do we get those kinds of interventions into the community?

There's also some work on how we can, if we can't, avoid all falls. So are there ways that we can help people recover after they have a fall? So if someone falls, if someone is taught how to fall and then how to get up after a fall, does that make a difference in preventing injuries? And then, of course, you see here from the picture, there's tons of work on smart home monitoring. So putting different sensors around your home that can help, number one, identify if

you have a fall or identify if something is off that might predispose you to having to having a fall and different alarm technology.

In our own lab, we are doing a study called McMaster Monitoring My Mobility, or MACM3. And this is a study where we're leveraging wearable technology. The study is funded by AGEWELL, which is Canada's Technology and Aging Network, and by the Labarge Center for Mobility and Aging. And so we have about 1,500 people enrolled in our study and we're following them with wearable technology every four months for two years. One of the outcomes that we're tracking is falls. So we're measuring every month whether or not someone's had a fall and then we're calling them to figure out what are the circumstances of the fall, to meet that the fall, to confirm that the fall meets the definition of a fall, and to categorize any fall-related injuries. Using the wearable technology, we can look at things not only about how someone's moving in their daily life, but even where they're moving. We have some GPS sensors that we use that can look at patterns of movement in daily life. We're hoping that this can give us really new insights into the reasons why some people fall and that we can identify people earlier on that might benefit most from prevention.

In conclusion, we talked about five key messages today. The first is that falls with aging are a common and growing problem, but that many falls can be prevented. Most falls happen when we're standing or walking and having an effective balance recovery reaction is critical to avoid a fall. The top risk factors for falls are having a history of a previous fall, having chronic conditions like stroke or diabetes or Parkinson's, being frail, and having poor balance. Exercise that challenges balance can reduce your risk of falls, and it can do it in a significant way. Other interventions that can reduce your risk of falls are minimizing environmental hazards, reviewing your medications, and checking your eyes and feet regularly. So thank you very much. This is the end of the talk.

I do have one more slide and I've given here my email in case you have any further questions. But if you have any further questions, I really encourage you to do our survey. So our lab is conducting a survey to understand what are priorities for fall prevention in older people. We've done a lot, research is doing a ton of work on falls in older people, but we actually haven't done a very good job at consulting with people that have lived experience and asking them 'what do you think is important?' 'What do you want to know about?' And so, we've been funded by CIHR to do this Canadian Institutes of Health Research to do this study where we're trying to get your perspective on what's important for fall prevention and what we should be studying. So there's a link provided. There will be a link provided actually in your post in the survey, that's that an email that goes out to you after this webinar. And so if you'd like to participate. It's a 20-minute survey and we'd certainly appreciate it. So thanks again.

*Dr. Anthony Levinson:* That's fantastic. Thank you so much, Marla. That was a great overview and I think highlighted both the scope and magnitude of the issue. The potentially devastating outcomes but also that there is a lot that people can do to prevent falls. So I'm going to just start doing some of the Q and A. There were some really great questions submitted and others that are coming in.



## [30:55 Safe ways to fall]

*Dr. Anthony Levinson:* One of the questions that came up was talking about is there a particular safe way to fall? Let's say you are standing, or you feel yourself falling, or you say want to do exercises and practice. How can I fall as safely as possible? Is there any literature on that?

*Dr. Marla Beauchamp:* Well, there's a little bit of literature on that, and I think it's something that we're looking into more. Of course, as we, as we sort of looked at in the presentation, fall reactions need to happen very, very quickly. So don't beat yourself up if you can't do this. But this is more, if you can, if you can see it coming, there's, you know, always looking for softer ground, right, is the first thing. So if we're, if we're going down and we're on the sidewalk, we can try and go for that patch of grass instead of the concrete. That's always a good thing. In terms of falling, there is some research on, like, how do we reduce our impact when we fall to avoid an injury. So an example is if we're falling backwards, right. These can be kind of very dangerous falls, especially if we say if our body stays quite stiff. So, if we're falling backwards, a good way to reduce impact is to try and kind of squat forwards and bend forwards so that we're not falling completely outstretched. When we're falling forwards, if we want to reduce impact, we want to fall, we want to catch ourselves with our hands, but at the same time, we don't want to have our arm completely outstretched, so it's good to keep your arm bent falling forwards. If you are falling sideways, if you're able to kind of rotate forwards and use that hand strategy, that's a good one. There's like martial arts type programs which teaches you how to kind of roll and fall sideways and roll, but I'm not confident in being able to teach that further.

*Dr. Anthony Levinson:* I think we actually had an article, I believe, on the Portal about judo, you know, teaching the sort of rolling technique to, to try to reduce impact.

*Dr. Marla Beauchamp:* Right. So that's, I'm, so that, I mean, that is an area of research. I'm not, I'm not entirely sure how, how to teach that, but, but that's, that's another. I'm trying to think if there's anything else. If you're falling to the side, and if you can try and get your feet out from under you so that you're again, trying to really increase your base of support as much as possible and not keeping your feet all tangled up together, if there's a way to get your foot out to the side, that can also reduce the impact. Those are strategies that have been shown to reduce the impact of a fall, and it's likely that they would reduce injury from a fall, but it's not that we've done a lot of these interventions about teaching people how to fall. That's probably an area for ongoing research.

*Dr. Anthony Levinson:* Interesting. I was curious. You talked about the majority of falls occurring while either standing or walking. And the walking part makes sense to me. I'm wondering, why is standing itself kind of a higher risk than, say, something like stairs, which I might have thought were more common?

*Dr. Marla Beauchamp:* I think probably, if I had to guess there, stairs is something that we know can cause falling and we're more aware, we pay more attention to it. We might use handrails. Standing falls that occur while standing are often from reaching. So if we're standing and we're

reaching for something and we lose our balance. It's when we're not paying attention, potentially. Okay. And then those can also happen to those people that might be more, have more mobility problems to begin with.

*Dr. Anthony Levinson:* To begin with, yeah.

### **[35:00 Getting up from a fall]**

*Dr. Anthony Levinson:* One of the other questions, I guess a bit related to that is, is there a preferred way to get up from a fall?

*Dr. Marla Beauchamp:* Yeah, and there are strategies. You can work with a physiotherapist that can go over how to get up from a fall. But it's important to take a moment, make sure you're okay, call for help if you can. And then there's ways to kind of get up slowly. And then it depends on what's around you. Like getting up on all fours at first, and then looking for a bench, something sturdy, a bench or a chair to help you lift one knee up and then push up with the other is a way to do it. But ideally calling for help, making sure you're okay before you do, before you move too quickly to try and get up.

### **[36:51 Winter footwear]**

*Dr. Anthony Levinson:* One of the other questions that came in was around whether there's any evidence around sort of ice grips or straps like that that might go on boots during the winter. Is there evidence to support that? I did see there was a photo of one on one of your slides. Or is it more like marketing hype?

*Dr. Marla Beauchamp:* No, I don't think it's completely marketing hype. I know that Toronto Rehab at Toronto Rehab institute, they have a lab that's actually specifically looking at these kinds of shoe wear and what kinds of shoes can prevent falls on ice. So, there is something to it. We know that a good tread is important in a shoe in the winter. We just have to be careful that whatever we're adding to our shoes is not posing more risk because sometimes if it's not put on properly or we're not used to walking with something attached to our shoes, this can also pose a problem. So we don't want to introduce another tripping hazard while we're trying to reduce another. So, I always just say look for a really good firm, like a really good firm rubber sole on a winter boot that has really, really significant treads on the bottom of it. I think that's, that's probably one of the best ways.

### **[38:39 Is aquafit good for balance?]**

*Dr. Anthony Levinson:* We had, you, you highlighted really nicely the range of different exercises that are effective. One of the questions that came in was asking about Aquafit. Is there any evidence around Aquafit or is it maybe less good for balance or strength because of the density of the water?

*Dr. Marla Beauchamp:* Well, I think Aquafit has shown, you know, or any kind of aquatic swimming type therapies are really good for you. Right. We know that it can improve your function and your strength and then it helps people. Like for example, if you have arthritis and you're trying to do low impact exercises that can reduce your risk of falls and it's a great tool for use in those kinds of populations. Aquatic exercise is not showing up necessarily as one, as a kind of exercise that has been shown to prevent falls. But just because, just because it's not showing up doesn't mean it has no benefit. And it probably and it has benefits on certainly on other outcomes. So it's not something I would avoid in any way. And it could also be that there just isn't as many studies looking at aquatic therapy-based exercises for fall prevention.

### [39:29 Using assistive devices]

*Dr. Anthony Levinson:* We had a question about use of an assistive device like a rollator walker. And I guess the question is once somebody is at a point where they might need a walker, is that a one-way street, so to speak, will they always need a walker? Or actually is it possible through strength and balance and exercise to actually, I guess, progress back to not requiring an assistive device? And I will say one other follow up question related to that is sometimes people will ask isn't it better not to use the walker? Am I somehow, is it a bandaid in some ways that's going to reduce the quality of my strength and mobility?

*Dr. Marla Beauchamp:* Well, good questions and that's always a bit of a heated question, working with patients. So, if you're prescribed a walker or any kind of assistive device for walking, there's a good chance that you need that device. And so it's really important to use the device as it was prescribed. If we're talking about a rollator or a walker, the key thing there is to make sure that we're using it safely. And when you get prescribed one of these devices, usually your therapist or healthcare provider will go over some strategies. Right. So, if you're using a rollator, for example, it's really important that you use, you put the brakes on the rollator. Right. Especially when you're, if you're using, if you're getting up from a chair and then you're going with your rollator, it's important to get up from the chair first, your brakes on the rollator, release the brakes, and then start walking. So assistive devices are great as long as you use them appropriately. If you start skipping steps and cutting corners, then they can themselves be a tripping hazard. So, that's what's really important to keep in mind. Same thing with canes, right. So we just want to make sure that we're using them in a way that it's not increasing our risk.

Is it impossible, once you've been prescribed an aid like that, that you will not need that you'll need that aid forever? Certainly, if you improve your balance and strength over time and your endurance, you may not need the aid as much, right. And so often a rollator can really help when someone doesn't have the endurance. Maybe someone is coming out of a hospitalization and they're quite weak and they need a rollator just to help them be able to walk for longer distances and that those longer distances are important for them to carry out their activities of daily life. Then it could certainly be that as that person progresses in their recovery and gets stronger, that they may not need a walker anymore. But I will say, if you've been prescribed something, there's a really good reason for that, and it's probably because you've had some unsteadiness with standing or walking or some problems with endurance where your therapist or healthcare provider really feels that it will make a difference.

*Dr. Anthony Levinson:* I think for many people as well, types of patients that I will see in hospital, the walker enables them to be more physically active, less socially isolated, and so actually winds up improving their muscle mass and strength because they're more participatory.

*Dr. Marla Beauchamp:* Exactly. And people that have chronic lung conditions, for example, a rollator that allows them to walk for a distance and then put on the brakes and be able to sit and take a rest is huge. And that can mean the difference between, you know, going out and visiting friends or not, right. So it can really affect your social participation too.

### **[43:00 Regaining mobility after a fall]**

*Dr. Anthony Levinson:* So, we had a question that after a fall and a serious injury such as a broken hip, how, what are the best ways to say, regain mobility and prevent long-term inactivity that might further increase falls risk?

*Dr. Marla Beauchamp:* So the good news is that it looks a lot the same. So after you've had a fall and you've had an injury, you're going to use the same strategies to prevent further falls. So it's, you know, starting on an exercise program that challenges balance and improves your functional strength, that's going to be the number one priority in getting back on your feet and preventing the risk of further falls.

Now some people after an injurious fall can really develop a fear of falling. And the problem with fear of falling is that it sort of has this vicious cycle because we're afraid of falling, then we limit our activities even more, which makes us more weak and maybe more deconditioned and our balance gets a little bit worse. And so fear falling can actually increase your risk of further falls. So that's where it's really important to try and work with a therapist if you can, a physiotherapist. If you're over the age of 65 and you've had a hospitalization for any reason that might require physiotherapy, then you are eligible for government funded physiotherapy. So you can go into any physiotherapy clinic that offers these services to help you regain your confidence in being active and incorporating these balance, these balance-focused exercises as part of your routine.

*Dr. Anthony Levinson:* And from the psychological and psychiatric perspective, we do sometimes see people who develop such intense fear that in addition to exercise and physiotherapy, cognitive behavioral therapy has been shown to be one other component if people are so fearful that they're actually no longer going out or walking.

*Dr. Marla Beauchamp:* So absolutely, yeah.

### **[45:03 Parkinson's disease and falls]**

*Dr. Anthony Levinson:* We did have a couple of questions around specific medical conditions. I think you did a nice job outlining, you know, several of the ones that have risk factors. And

again, you know, when we start to veer into specific conditions, you know, really important to talk with your doctor, but is there anything individuals with Parkinson's disease specifically can do to reduce their falls risk and any specific strategies that might be more targeted to those with Parkinson's.

*Dr. Marla Beauchamp:* So when we think of a condition like Parkinson's, there's a couple of extra kind of considerations. So if you have Parkinson's disease you often have freezing of gait. And so that freezing of gait in and of itself is a risk factor for falls. And because of that, I would recommend if you do have Parkinson's, it's really again really important to work with like a trained therapist or part of a specific kind of exercise program that's designed for people with Parkinson's to work on your balance.

And there's other kinds of strategies that can be incorporated for people with Parkinson's like the use of visual or auditory cues that can help with freezing and help you train your balance. And what I wanted, and there's something else, and then I think there's dance actually has been shown to be a really nice therapeutic interventions for people with Parkinson's has been shown to be really helpful. So you know, there's a lot that can be done similar to other kinds of chronic conditions, but I do think with a condition like Parkinson's, because of some of those additional risk factors, it's really a good idea to work in a supervised way with a therapist or healthcare provider.

*Dr. Anthony Levinson:* Yeah, that's a good suggestion. There's also good sort of condition specific advice on some of the advocacy websites. So, the Parkinson's Canada website, the Michael J. Fox Foundation website do have articles on sort of falls prevention specifically, although in looking at them it's really a lot of what we covered today and highlighting sort of the types of exercise interventions or other interventions that you've spoken about. There are some studies with medications being looked at too in Parkinson's disease.

*Dr. Marla Beauchamp:* And the good news too Anthony with Parkinson's is that like we can reduce falls again by like 30% in people with Parkinson's, so just through exercise that challenges balance. So there is still, we can still be quite effective no matter what condition that you, you present with.

## **[48:00 Fall detection devices]**

*Dr. Anthony Levinson:* There was a question that was talking about some of what you picked up at on toward the end of your talk around fall detection devices. And are there, are there any types that you would recommend? There are some apparently, in the comment from the question, was one person had one that was almost too sensitive. So I guess it had automated detection rather than the ones that I guess are a bit more common where the person has like a lifeline and there's not an automated detection but it relies on the person to kind of notify or call or push the button.

*Dr. Marla Beauchamp:* Yeah, again it's an area, I think, that has promise. I don't think we're there yet in terms of a wearable device that is accurate enough to detect all falls. Which is why the

gold standard way of measuring falls in research is still for people to take a calendar and to mark every day whether or not they had a fall. So as archaic as that seems in this digital age, that's still the best way and most accurate way to collect information on falls.

So, I think we'll get there as we gather more and more data and of course, artificial intelligence and machine learning, and there's lots and lots of new techniques being applied, but I don't know, I wouldn't know or be able to recommend offhand of any devices that are capable of doing that right now. I think those lifeline devices where you, where you have it around your neck and you do press a button, I think those work great. And I think also there are, you know, if you have a lot of financial means, there are sensors that can be put around your home that might work and might be able to do a better job. But again, you know, that that requires a financial investment. And we, you know, those haven't been tried in large groups of people and looked at and scrutinized. And so I, my guess is there would be some false alarms. And my guess is that there will also be some things that are missed.

### **[50:14 Yoga or Tai Chi for balance?]**

*Dr. Anthony Levinson:* One of the final questions here is about yoga and is that a good form of exercise for balance? Are there other exercises? You mentioned quite a few. Is Tai Chi better than yoga in that battle? And I guess, are there good resources where people could go for some of the specific exercise recommendations that you provided?

*Dr. Marla Beauchamp:* Yeah. So, Tai chi seems to be superior to yoga. First question, first response there. Yoga, the evidence is more mixed. And so I imagine this very, I imagine there's lots of different kinds of yoga practice, and it would depend on the skill of the teacher and the types of exercises. In general, if we just kind of blanket them all together and look at yoga exercises separately and Tai Chi exercises separately, it seems that Tai Chi is the only one that has good evidence to show that it can reduce falls. So I would, I would recommend Tai Chi over yoga in that sense, but not, I don't think that yoga is, again, I don't think that any activity is, probably better than no activity. And so I wouldn't say that yoga is necessarily bad, is bad at all, it's just that if we want to have the most effect on falls, the most evidence is for Tai Chi and those balance challenging exercises.

And I'm sorry, your second question. Just like other recommended specific resources where people could sort of get very specific exercise recommendations. So the Ontario government has a website, it's called Health811 and I wrote it down just so I would remember and of course, but if you also just call 811, you can get a sense of what are local fall prevention programs in your neighborhood. And so it's a really great way to start in terms of finding classes or programs in your neighborhoods that are that are designed for fall prevention. There are lots of ones online, also. One that we know works really well and it's been studied quite extensively is called Otago, O-T-A-G-O, and Otago has lots of different variations and it can be done at home by people to help reduce fall risk. It incorporates a lot of those exercises that I shared in the presentation. That's one that people can look up. Again though, try and speak with a healthcare provider if you can. If you are over the age of 65, you can go and speak to a physiotherapist and that's government funded and you can at least get a prescription to get you started that's tailored to

your particular abilities, because as we said, it's really, really important that any exercise that you do challenges is challenging enough to your balance. And we want to challenge you, but we also want to make sure you're safe while you're doing your exercises.

*Dr. Anthony Levinson:* That's great advice. I just want to finish off with a few slides. I want to thank you mentioned AGEWELL, who are a network, Canada's Technology and Aging Network. They're sponsoring some excellent research and they are also supporters and partners for the McMaster Optimal Aging Portal. Some of your work has been featured as well, including one of the studies that I think you mentioned that you're continuing to pursue. So, if you're not familiar with the McMaster Optimal Aging Portal, it's a great resource of continuously updated evidence-based content related to topics like falls prevention, but basically a large number of other content and evidence related to health and social aspects of aging. You can subscribe to the free weekly email alerts and get notified about new content and new webinars through the weekly email alerts with different content formats, such as blog posts and e-learning as well. We also post recordings of shorter videos as well as recordings of webinars.

So the Alumni Association will be sending out a link to this webinar and we'll also be posting it in a week or two on the Portal in the video section. And some on our e-learning page, there's actually quite a bit of content related to mobility and some specific exercises, including some of the ones that you mentioned, are featured on the walking speed e-learning lesson where we talk a little bit about challenging your walking by doing figure 8 or safely working on walking backwards or on uneven terrain if it's safe. And there's also content on osteoarthritis and specific exercises that may be helpful which was another question submitted. We do also have other formats that people seem to be enjoying including what we call micro-learning on various topics where you can get weekly emails on topics as disparate as dementia or anxiety, depression in that series. And in addition to posting videos on the Portal we'll also post videos on our YouTube channel if you prefer that. So, I want to thank you again, Marla. It was great to have you and just some some great resources and an excellent summary of the things that people can do.

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