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Balance Outcome Measures – Selection and Utilization

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- [Calista] Hello everyone. Our course title again today is Balance Outcome Measures, Selection and Utilization. And it is my pleasure to welcome back to PhysicalTherapy.com Dr. Jill Seale. Dr. Seale has been a licensed physical therapist for over 22 years, and she received her board certification in the area of neurologic physical therapy from the American Physical Therapy Board of Clinical Specialties in 2004, and her recertification in 2014. She has practiced almost exclusively in the field of brain injury, and stroke rehabilitation. And she has a variety of teaching experiences in physical therapy academia, as well as the health care community at large. She is currently faculty at the DBT program at South College, and she has also served as core faculty in the neurological physical therapy residency program, guest lectures at the Baylor College of Medicine's Master of Orthotics and Prosthetics program, and teaches several online and on site continuing education programs. Jill has taught and presented in the areas of neurological pathology, rehabilitation, gait, orthotics, mentoring and research, and is currently involved in clinical research in stroke rehab, orthotic management, and gait analysis and rehabilitation. So we are so glad that you are back with us today again Dr. Seale, and at this time I'm gonna turn the microphone over to you.

- [Jill] Great, thank you so much, Calista. And welcome everyone who's joining us. Let's see, so morning and still morning Central and Pacific time. The rest of you, and Mountain Time, the rest of you are starting to experience afternoon. So good all of that to you, and happy Friday. Thanks for taking time on a Friday to come to a continuing education course. So this is topic that I'm pretty passionate about. I was really excited to be able to talk about this. Before I get too off and running I do have to go over these learning outcomes for you. So, after this course participants will be able to identify at least three components of balance and postural control, list at least two arguments for the necessity for and barriers to, outcome measure use, identify at least two best practice evidence components for selection and utilization of balance outcome

measures, identify at least three resources for obtaining valid and reliable balance outcome measures, describe appropriate utilization of at least three common bounce measures, and select at least four appropriate balance measures for provided patient cases based on the patient's level of function, and the practice setting. So those are our learning outcomes. And wow, that's like how many ways could I use the word balance there? It seems like as I'm reading it out loud. But I want to start before I dive in with just kind of telling you a little bit about my story in outcome measures. And today we're focusing on balance and outcome measures, but I think in general some of us may have experienced a similar story to mine.

I grew up working in an inpatient rehab facility that was top notch, I mean we were always consistently ranked in the top in the various things, like US News and World Report and so it was a very high level rehab place, with lots of experienced and learned people working there. And we were doing good work. But at some point, and I'm not exactly sure how it came to be, probably a student maybe, or a resident, or I don't know. This conversation about outcome measures came up. And it's like what are we doing to actually measure our outcomes? And when I started looking around, especially like in balance, for example, which is what we're talking about today. I looked at how we documented our examination and evaluation of balance in our patients. And it was super subjective.

We use this scale, maybe some of you are familiar with it. Good, fair, poor. And that's not documented anywhere in the literature. That's not anything that's any sort of formal standardized scale, we just sort of. We even had pluses and minuses tacked on to that. So they were a fair plus, or a good minus. And it really just had to do with how far the patient could reach forward and to the side, and down to the floor. But there weren't any exact measures, there was no exact protocol for how we assessed that. And most the time how we assessed balance, and other functional outcomes was just to give some narrative explanation about it, just to write some stuff about how they did it, and

with actually no objectivity to it. And so for me, as I Started seeing this in my own clinical practice, and then probably it helped moving towards academia, and Starting to think a little bit more objectively. We really Started to have a big push not only just in that facility, but in other facilities, and sort of nationwide and as a profession towards more objective measures. But I'll tell you that this has been slow in coming. It's kind of just ground along, and because people are pretty entrenched and either doing no measures or doing the one measure that they kind of know to do, where that they think is the best. And so there's been some really good efforts, mostly led by the part of our profession, in terms of physical therapy towards improving this. So, I would hope to do today is kind of give you some, really some great resources to go to to find out more about this topic, but to take you through some of the most common balance measures, how they're done, and kind of what are some typical pitfalls.

But mostly talk about not just choosing them, but also how do we choose the best one? So those are kind of some of the things we'll focus on. So we're gonna Start just a little bit, because you can't talk about just balance as an outcome measure and not really kind of go back and talk about why do we need outcome measures in general. And so this was a pretty recent paper that was published in 2011 in the Journal of Neurologic Physical Therapy. And they talk about we need outcome measures to evaluate change, certainly we can understand that.

If I'm doing things with my patient that I think are improving them, I need to be able to evaluate that change. Or maybe the things I'm doing are not improving them, and I need to know that as well. To evaluate the effectiveness of an intervention. This for me is sort of like my asterisk bullet point here. This is what I feel like it's kind of the key. There's lots of reasons why we need outcome measures. But what it really comes down to, if I'm really working in a patient centered sort of way, I need to evaluate the effectiveness of what I'm doing. I've chosen intervention X, Y, and Z. And I need to determine if X, Y, and Z are making any difference at all. Or maybe I need to determine

is it X that's making the difference, Y that's making the difference, or Z that's making the difference to make myself, A to ensure effectiveness, and to make ourselves more efficient as well. We use outcome measures to guide our clinical decision making and to modify our plan of care. I'm doing a particular intervention. The outcome measure that I'm looking at is stagnant, it's not changing, it's not improving. Then that should prompt me to modify my plan of care, and change what I'm doing based on the information that I'm getting from the outcome measure. What's really lovely about balance outcome measures. That's an interesting statement there by itself, what's lovely about balance outcome measures.

But many of the balance outcome measures can really just guide us into the area that we need to be focusing on in our treatments. I always tell our students who are so worried about not knowing what to do with the patient. I'm like specifically for balance it's great, because many of the measures say hey, they have difficulty with single leg stance, or hey they have difficulty with compliance services. I said that guides you right into what you need to be doing. To assist in communicating and motivating patients. And so I would say that this is something that consistently I feel like has not been done in patient care.

But if you happen to join us a few weeks back for the talks on motor learning, some of the newest information out about motor learning is that we can really improve motor learning by motivating, increasing the motivation of the patient, helping to motivate the patient or the client. And so we can use outcome measures to do that. We can show them the change that they're making. And use those outcome measures to motivate them, and I think that's really important. To assist in communication with the healthcare team and the payer source, and this is really critical. I use my outcome measures to be able to describe to other people in the healthcare team how the patient's doing with balance, what kind of safety measures need to be put in place. I use my balance outcome measures to talk about what level of fall risk the patient is to that payer

source to justify why we need more time, or why we need an assistive device, or why they need a wheelchair, potentially. I'm using those outcome measures to give me some objectivity, and to have some sort of evidence to support what I'm asking that payer source for. We can use our balance measures to assist in our diagnosis. Balance problems as we're gonna talk about are really multifactorial, and oftentimes I need to figure out exactly what part of balance is problematic for this person. And there are some outcome measures that we use that can help in assisting that. Used as a prognostic indicator. So oftentimes we use balance measures to talk about predicting fall risk, being kind the most common thing that we use our balance measures for. And changing our healthcare environment, and shifting to a pay for outcome. So I've been talking about bounce measures for about a decade now, I feel like in one capacity or another, and I feel like when I first Started talking about this I was saying it, one day we will be paid for our outcomes, not for showing up, not for 15 minute units, but we will be paid based on our outcomes.

And that day has come, at least to some degree, that day has come, that we're being more and more paid for the outcomes that our patients achieve. So before we jump in, and I don't want you, you don't have to type anything into the answer, into the chat, but I want you to just pause for a moment and think about a few questions. So do you use, do you consistently use some type of functional outcome measure to assess or evaluate balance? So do you use them, first question. Would you say you always use them, you sometimes use them, or never use them? Sort of put yourself in a lane there. And then maybe take a moment to jot down what outcome measures you typically use for balance. So what are your common things that you go to when you're assessing a patient, and you're going to try to examine what's going on with them in terms of balance. And then my last question for you is how do you choose which outcome measures you use? And again this is just for you to think for a minute, just to reflect. How do we choose the outcome measures that we, that we're going to utilize with our patients? And I'll tell you as you're sort of thinking through those, I think a lot of us sort

of have the same little group of outcome measures that we always use, or these are the standard ones I use. And that's not a bad thing. We'll talk about it's good to have sort of some standardization to the measures that we use. I think where we sometimes have our problem is how we choose the ones that we're gonna utilize. Sometimes it's just like, oh this is a patient with a stroke therefore, I'm gonna do a Berg period, end of story. Or this is a patient who has this type of diagnosis. I'm going to choose, this is an older adult who falls. I'm going to choose the Tinetti potentially. And we don't necessarily know why we're choosing those. It's just the way it's always been done. So we're gonna talk about that, how we select well.

Because selection makes a big difference. Selection is gonna determine if I get good information from my balance measure that's really usable, or if I get some not so good, and not so usable information. That's kind of where we're headed. So when we think about balance outcome measures specifically, balance is a really critical skill set. It's a critical skill for function. For me to be able to move about my home, for me to be able to do my job, take care of my daily roles that I have in life. And it's also critical for fall avoidance. I don't know about you guys, I always joke to my entry level students I'm pretty klutzy. And I should probably track the number of falls that I have, but I have a few, or near falls that tripping falls.

Slip, or almost fall, where you sort of like trip and then you pretend like you didn't just trip. You were just Starting to jog. I actually stole that bit from Ellen DeGeneres, she does a great little bit about that. But we all have some fall issues. But for our patients, for our people that are aging, or for our patients with some type of impairment that fall avoidance is important. So we want to have a good measure of balance. Balance impairment is really common across all health conditions, not just neurological issues, but musculoskeletal, things even related to cardiopulmonary oftentimes. They can have balance impairments related to their inability to have all the necessary cardiovascular, cardiopulmonary function to maintain normal balance. So it really goes across health

conditions. And we know that balance is a common problem, can be a common problem with aging. So as we get older maybe we have more frequent issues with balance. And when a person has poor balance, it can really be catastrophic. It doesn't take a big fall, it doesn't take a fall from a high surface. People can literally trip while they're walking, fall, hit their head and have a really significant brain injury, or break something. So the consequences are big. So it's a really high stakes sort of skill that we're that we're talking about here. And so we really need a comprehensive assessment of balance in order to identify those specific postural control and balance impairments, so we know specifically what we need to go after in order to optimize treatment. So what happens when we don't know, when we don't have that comprehensive assessment, when we kind of don't know the specific balance problems that are causing the issue? Well we still might not be able to provide some successful treatment, but it's very unspecific, it's very untailored, our treatment approach is probably gonna be sort of inefficient.

And it may not really get the optimal improvement. It's like not really know what medication, or what virus I'm trying to treat. I'm just gonna throw a bunch of different medication at it, and hope that one of them works. That's kind of the same thing when we don't identify some details about the patient's balance problems, and about where they sort of fall in terms of balance function before we apply some type of balance outcome measure. Hopefully that makes some sense. So if we look at some literature about outcome measure utilization in general, and again a lot of this applies to balance measures. There was a kind of a seminal work that was done back in 2009 that looked at a survey of physical therapists, and asked about use of outcome measures. And this was really sort of one of the papers that I feel like raised the red flag that said hey, we really aren't doing a very good job with this outcome measure stuff. They surveyed 1000 PTs, and less than half of them use standardized outcome measures. So that means no standardized outcome measures for balance, or gait, or whatever. There's also studies that have reported that the use about commissioners is lacking in the

research. I think that that's greatly changing at this point. And we're looking again at at literature that's about a decade, or a little bit more than a decade old. And at that point, when this was done, when these two studies were done, they really pointed to a lack of evidence based recommendations about how do we choose outcome measures? Whether it's for stroke, in this case they were talking about stroke, but for any kind of measures. Now, I would say that this last statement, I left that in there is an example of kind of what was the feeling at the time that these two papers were published. But that's really not true, we have actually lots of good evidence based recommendations and I'm gonna share those with you today, and share with you the resources where you can find that. But there's been a lot of change, and a lot of work and growth in this area in the last five to 10 years, thankfully.

And what I hope from today, what I hope you get from today is that you can benefit from this work that's been done in the last decade, and get a better appreciation of what measures are out there, how you select them, and make the best choices, and where you can find all this stuff easily so that you don't have sort of any reasons for not using them. So we talked about this earlier, sort of the why we do them in general. In this paper that was done at 2009, which I said, referenced already is being really important in this area. These were some of the reasons why they determined that we need to use outcome measure.

Quality assurance, communication, which we talked about, determining progress, examining practice effectiveness. So not just looking at a clinician, our clinician effectiveness, but looking at an overall practice's effectiveness. Or it could be an overall treatment approach effectiveness. And then, of course, for research. So these were some of the top reasons that they identified why we need to use them. There were lots of benefits that were identified. When they asked these therapists that were in the survey what are the benefits of using them, they listed tons of them, and they were right on with the things that we've already talked about, enhancing

communication, directing the plan of care, enhancing communication with the payers, enhancing the thoroughness of the examination. They said the benefit was direct, improved patient outcomes. That's not might improve patient outcomes. These therapists perception were when we use them, it improves patient outcomes, helps to focus the intervention, motivate the patient, which we already said, super important. Enhance efficiency, decrease insurance denials, a big one. And also enhance marketing, so better say what it is that we do. We know as physical therapists, and I would say as healthcare professionals involved in rehab. So that includes PT, OT, speech. I think we're all, we don't market ourselves well. We don't market ourselves well, we don't sort of toot our own horn to say, we don't often times talk about the things that we do well. And having good outcome measures that we can then sort of put on display, certainly can help with marketing. So these were benefits that were identified by those 1000 folks that were surveyed but remember, less than half of them are actually using outcome measures.

So even the people who aren't using them, can identify the benefits of them. And they identified the benefit specifically that it improves patient outcomes. So they know it improves patient outcomes, but they're not necessarily using outcome measures. And I think that's an important thing to keep in mind. And this is not unusual, we do this, this is sort of human behavior. We know something we should be doing because it improves our health, or whatever. But we don't necessarily always do it. So I always find that interesting in the story that that research tells. So among those therapists who utilized outcome measures, so in the group that we're actually utilizing outcome measures, the problems they perceived is that if they use like self evaluation, self assessments, it was confusing to the patient. It was maybe difficult for patients to complete either the self assessment, or some of the outcome measures. Takes too much time, that's one of the big ones, for the patients and for the clinicians. Often didn't get things completed that needed to be completed in the timeframe that it needed to happen. It might make the patients or clients anxious. They feel like they're,

they perceive that they're being tested, nobody wants to feel like they have an exam. And then difficult to interpret. So I get this information back from these outcome measures and then what do I do with them? So these were the top problems that were perceived by the group who was using outcome measures, who were using outcome measures, sorry. Now they also asked the group that wasn't using any outcome measures, they reported that they didn't use them. They said well why, what are the barriers to outcome measure use, and you'll see that a lot of the things that they report are the same sort of problems that the people who are using them.

So there's consistency with that. Time constraints really rising to the top for these folks. I don't have time to do them, difficult for patients to complete, lack of equipment. Oftentimes people perceive outcome measures as being something that I have to have maybe some expensive piece of equipment, or I have to have a box full of stuff to carry around. They maybe have that perception that equipment is required for outcome measures. And in a little bit we'll talk about what utility, good utility of an outcome measure means. But good utility would mean I don't have to have a bunch of tools or, I don't really have to have anything other than what I carry in my mind, and in my pocket potentially.

They also cited a lack of therapist knowledge of outcome measures, which I think is great that some of them were able to self assess that it was their lack of knowledge that was the barrier to utilization. And certainly I can see this being the case. But in today's day and time I think that we really need to retire that barrier because information is readily available to help us understand how best to, which outcome measures to use and how best to use them. Not knowing how to select or apply, which is what we're talking about today. How do I choose the best one and apply it correctly? Lack of relevance to patients. This is really important. How many of us really think about that when we choose our outcome measures? Do we think about is this a relevant measure to the patient? And if we're truly practicing in a patient centered way,

then that patient centeredness should come into our selection of measures. What are the things my patient really wants to be focusing on, then I need to choose measures that are going to reflect that. Merging it with the electronic medical record. This was a huge issue, especially back when folks were just starting to transition to electronic medical records, that certainly occurred in almost all settings now. But this was a huge issue, because how do you get a Berg Balance Test in there? How do you get Timed Up and Go? Do you just have a place where you put the score, but you don't actually have the raw information? So this is something that's that's been an issue. And the best way that this has been solved is by people in the therapy world working in the, information technology or whatever sort of branch of your facility, works on the EMR, getting those people into creating and building those EMRs.

But that's certainly something that can be worked around, and we can certainly merge our outcome measures into that EMR, but therapists have to be more proactive about wanting that and how they want that information to be there, how they're gonna manage that. At the actual assessment, being able to carry out the tests and measures, and then being able to interpret that. So I have this data, but what does this mean, and how do I utilize that, and that's a valid concern.

Why get this information if I don't really know what to do with it. And as I said, I think we're an advantage today when we talk about most of the balance measures. The balance measures give us some really direct information to guide how we then apply that to our patients. So the study that was done in 2009 also found some interesting relationships. They found that there was a relationship between specialty certifications, so people that had a clinical specialty were nearly two times more likely to use outcome measures than those without specialization. And I think that makes sense. These are folks that have done, who A, have quite a bit of experience in most cases. And B, have done some extra work in their field. And so that makes sense that they might use outcome measures more readily. And there were some interesting facts

related to practice setting, so if you looked at it acute care settings we're sort of the lowest in terms of utilization of outcome measures. And that makes sense, I don't know how many of you might be working in acute care at this point. But oftentimes acute care therapists, A, you're incredibly busy, you have a really short period of time often time to see these folks. And you may only be seeing them for a couple of days. And so most folks in acute care say outcome measures are not for me, because there's just no measures that really capture what's going on my patient in acute care. And we'll talk today about that's not always the case. There are some some good measures, and there's been more effort in the last decade to create some measures that are more acute care specific for balance and other functions. I think balance is probably the thing we most need to be assessing at the acute care level.

But anyway, back to the relationships that were found in this study. Acute care folks did it the least. Outpatient folks did it more, so those in outpatient were seven times more unlikely to use outcome measures than folks in acute care. And those in home health settings, they were the winners, they were 12 times more likely. And you might already be thinking, for me when I first read that I was like why? I don't quite understand that. Because I didn't really do home health.

But in home health, at this point, and moving forward there's been others but the Oasis was mandated. So there was a mandated outcome measure that had to be done for a home health. And so again, when we're mandated to do something that can be one way we can get outcome measures into our practice. But they did find these interesting relationships in this study that was done, again about a decade ago. So we kind of have set the stage for why we need to use them, are we really using them, how does that all come into play. But how do we actually improve outcome measure selection just in general? And then again, we'll dive into balance measures. But when we think about selection, there's a really nice paper that I've referenced here. It was done in 2011, again in the Journal of Neurologic Physical Therapy, and they talked about that

there are these factors that are listed here for consideration when selecting outcome measures for clinical practice. And the first one is what is it that I want to measure? So if we're thinking about balance, if we think about the ICF, we think about the ICF being body function and structure, activity, participation. And balance, there's sort of a debate about where balance falls on that. Is it a body structure and function, is it an activity? Certainly there are activities like walking and transfers, and other kinds of activities that rely a whole lot on balance.

But most people agree that balance falls into that body structure and function, because it's a body function. And so if we're thinking specifically today, about we're measuring balance, then we're thinking about more in that body function and structure category of the ICF. The second thing they say you have to consider is what type of measure are you giving? Are you looking at something that's looking at being discriminative, so an outcome measure that's trying to distinguish between individuals or groups of individuals based on a particular characteristic? Are you looking for something predictive? Oftentimes with our balance measures we're looking for something predictive, we're looking for something that's intended to forecast the future, to tell us is this person at a fall risk, or where is this person likely to discharge?

What is this person's end function likely to be? Or is it something that's evaluative? And this is the other reason we primarily use outcome measures, especially balance measures, is we're using them to help us determine the effectiveness of our intervention by looking for change over time. So we're looking at, is something discriminative, is it predictive, or is evaluative? And I would say that mostly for our balance measures, we're looking at the predictive nature of the measure, and we're looking at the evaluative nature the measure. In terms of type of measure we have disease specific, and we have more generic kinds of measures. And we have performance measures, and we have self report, and we're gonna talk about that in a second. You have to think about the patient and the clinic factors. Again, is this

balance measure that I'm choosing, is it relevant to the patient, does it relate to the patient's goals? And is this appropriate for my clinic in terms of space that we have, is it appropriate for sort of where this patient is on the continuum of care? Really important you have to think about the psychometric factors, and this is where most people tend to fall asleep, because this is things like reliability, validity, diagnostic accuracy, responsiveness. And those are all things that for most clinicians working day in day out in the clinic, those are things that they may know some about. But some may say I know nothing about any of those.

I don't really understand those. And the good news is that for all the measures that we're gonna be talking about today, that work has already been done. And I'm gonna show you resources that are gonna tell you here's what you need to know about the psychometrics just in terms of, they're really good for this measure, or they're really poor for this measure. That's all I really want to know. I don't need to know the details. And so fortunately that's all sort of been pre-done for us, and we'll look at that. And then the last one being really important, I think for clinicians, I think about this as being sort of where the rubber meets the road. Feasibility has to do with things like the time it takes to do the measure, space that's necessary, equipment.

Do I have to have any special training, does it cost? Some outcome measures cost us to download, or to buy? Is it appropriate across cultures and languages? Those kinds of things. Is it something, again, that I'm gonna have to purchase? So those are the feasibility things. And so, again, all the things that we're gonna be talking about today are ones that have really strong feasibility, they have good clinical utility. Meaning, you as a clinician, wherever you are in whatever setting should be able to do this measure easily without any sort of big burden on time, or cost, or any of those things. So we're only looking for things that are really feasible as we talk today. So the other thing that this paper brought out is that we start thinking about our outcome measure selection right from the very beginning. So I look at the referral, I see maybe what kind of

diagnosis it is, age of the patient, I don't know, whatever is on that referral. And I might, I really can initially Start making my list of outcome measures at that point. Now it might be kind of long list, or big general, wide list, cast a wide net but then the patient walks in the clinic, or rolls in the clinic, or I walk into the hospital room and I see the patient there in the bed or in the chair, wherever. And sort of in that initial observation, and hearing their history I'm narrowing down my list of outcome measures I'm thinking about. And then I go through my systems review with the client, or the patient, and as I'm doing that, again, I'm further whittling it down. And so once I'm done with that systems review, I should have a pretty refined focused list of where to Start my examination in terms of outcome measures, and impairment measures as well. Now I would pause here and I would ask you just to self reflect a little bit.

Do you work that way? Do you Start thinking about your outcome measures when you first read whatever that referral is, when you first see who that patient is, what that diagnosis is, their age, or anything like that? Do you keep thinking about your outcome measure list as you go through your history and initial observations, as you go through your systems review? And I think for me, I certainly didn't always. I think I do now, I think I'm pretty in line with this now. But why this is important, it just helps us be efficient. It helps us A, cast a wide net, and not get tunnel vision. Oh this is a patient with a stroke so I'm gonna do this outcome measure. I can Start with that maybe, but then I'm narrowing it down as I move, and I'm getting it very tailored down to the patient. And I think that's gonna be important.

So I want to stop here because there was a question about, or a comment about language. Yeah so, Maroi, you do have to look for what's been translated, but I'm gonna show you some resources today that will tell you if the outcome measure has been translated to other languages, and what the reliability, and validity, and all those psychometrics are related to that translation. So that can certainly be a limiting factor if you're working in a population where most of the folks there speak a language that you

don't think has been utilized much in outcome measures. However, the good news is many of the outcome measures have been translated into a variety of languages. It just may be a little bit hard in tracking that down. So that's that's definitely a challenge there for sure. The other option would be using translations. So you have a translator, but that that becomes complicated. It does become complicated. Now I mentioned that in this list we talk about the type of the measure. So let's go back to that for a second. So we have generic and we have disease specific. So a generic measure is a measure that's intended to be used across all populations, not diagnostic specific. So for this you're more likely to have normative data and I can use this to sort of evaluate a whole program, or a whole clinic, irrespective of any of the diagnostic categories. And so those are likely to measure constructs that are broad in general, versus disease specific is designed for use with only one specific disease or diagnostic population, generally. And so this is likely to measure constructs that are more meaningful to the patient, and may be more beneficial when you're setting goals and determining the plan of care for this patient.

They may relate a little bit more closely to the patient. Still may have that normative about data, potentially available, but again a little bit more meaningful when I choose disease specific. So we'll talk about as we go through the balance measures, there are some that are diagnostic specific, and there are some that are more general across all diagnoses. Many of the measures that we're gonna talk about have been looked at in multiple diagnoses. And so you can go in and you can see the data that's diagnostic specific that's available. And I'll tell you where to find that as we move through today. So the other thing that I mentioned in terms of type of measure is that we can have performance based versus self report. Excuse me, so performance based means that I'm assessing performance on some predetermined activity, and usually in a specific environment. So it's looking at their actual capacity, or their actual capability for a specific movement. So today when we're talking about performance specific balance measures, we're looking at their balance capability for specific balance task. And so

the problem here is that this is where we oftentimes do a lot of our outcome measures. A lot of our outcome measures that we utilize in physical therapy fall into this category. But we have to keep in mind that this is testing them in the specific environment where we are. And clinic performance doesn't always equate to real life performance. Home health is great because we can assess balance, and all the other things we want to assess in their real life, hopefully. But we do need to keep in mind that the clinic performance might not always equate to that. In terms of self report, this is where we get the patient's perspective, the patient's perceptions and opinions of the impact of whatever it is we're looking at on, the impact of this health condition on their life.

So this may provide us a look into more real world performance, but we also know that self report may over or underestimate, or even give us some insight into what they think they should say, or what we want them to say. So we know that this isn't necessarily completely accurate. But it can be a very important piece of the information that we're gathering. And so data suggests that really both are equally important. I don't know if data suggests equally, but it suggests that they're both important. And I would say especially in balance outcome measures which we're gonna talk about, which is our focus for today. Getting self report is gonna be really critical when we think about balance, and we'll talk about that in a second.

So Sara is saying that the audio is breaking up badly. I'm not sure Calista or Kathleen if you have any suggestions for her. I will try to make sure that I'm being extra still, if any of my movement might be causing that. Sometimes I'm an animated talker and I use my hands too much, and that can cause a little background noise but I'll try to be careful. So strategies to improve outcome measure use. This is just an example paper that I like to use. This was actually in the Journal of Manual Therapy. And again it was published over a decade ago, so it's a little bit old, but I think it's a good example. And it also sort of was a good forecast for us about where our profession was going. So they sort of had a professional organization mandate that said we're gonna require

outcome measures. This was done in Melbourne, Australia. And so they put into place these practice guidelines about outcome measures by their, these were adopted by their accrediting agencies there in Australia. And it required outcome measures to be submitted with the treatment plans. They also put into effect ways to support this initiative. They did educational seminars, they provided standardized outcome measures, gave them out, free access, open access to these. And they used consultants to help to spread this information, and teach people how to do this. And so they didn't just make a mandate, but they also put into place some really good supports to make this initiative work. And low and behold it did work.

They had an increased use of outcome measures. They had a decrease in therapists perception of barriers. Especially folks reported being more familiar with the measures, and having better access to the measures. There was a change in attitude, but very small, related to outcome measures that really wasn't significant. But they were able to get folks to utilize outcome measures on a really regular basis with this initiative. And so I think this was probably a piece of evidence that folks here, especially the American Physical Therapy Association looked at and said hey, there are things that we can do, that we can help to increase and sort of drive this bus of outcome measures. And so they did. And we'll talk about some specific organizational ways where that's occurred. But let's get back on the balance track here for a second.

Because that is what we're talking about. So we've talked about outcome measures are important. We talked about types of outcome measures, how to select outcome measures, all the things that we need to consider. Now let's drill down to balance specifically. So balance is complex, balances is complex because it's multifactorial, there is no one thing that is problematic when we're looking at balance. There are a lot of different areas of our musculoskeletal system, of our neuromuscular system, of our cardiopulmonary system that could impact balance in certain ways. So we need a good understanding of what makes up balance in order to select appropriate outcome

measures. And I think understanding balance could be a whole course in itself. But for now I think it's important to think about what are the components that make up balance and postural control? And so I pulled from recent literature to find sort of what's a current and well accepted framework for postural control. And this paper by Sibley, et al, which was published in 2015 identified six components that are required for maintaining postural control. And they talk about the biomechanical system, the constraints on the biomechanical system. If anything is going on that disrupts my biomechanical system, that's gonna impact my balance. My movement strategies, my sensory strategies, my orientation in space, my dynamic control, and my cognitive processing. And so we'll talk just a little bit about each of these without spending too much time.

Again, it gets a little bit more, don't have that time to go into huge depth about balance and postural control. But when they talked about biomechanical constraints, they're talking about things like degrees of freedom. So my ability to control all the amount of movement that I have available to me. Things like strength come into into play here. Limits of stability, so can I control my base of support within my limits of stability? Can I make those, can I move my center of mass within those limits of stability. The second one was orientation in space, and this has to do with perception of gravity and verticality. So verticality, being able to orient myself upright in respect to gravity.

And that becomes important, especially in some of our patients we'll talk about in a second. They talked about movement strategies. Hopefully you all remember that we have reactive, and we have anticipatory balanced responses. As well as we have volitional movements that we make. And so all of those mix and work together to help us to maintain our balance. And so being able to understand what's reactive, meaning the ability to recover stability after an external perturbation, versus anticipatory, being having the ability to shift the center of mass before that perturbation occurs, before I have that voluntary movement, and then of course voluntary movement being really

clear. I intentionally make certain volitional movements to help maintain balance. Those reactive anticipatory, sorry I ran that together. The reactive and anticipatory, those both really occur subconsciously, that's not a volitional movement. Those occur very reflexively. And so I need to understand in my patients, which of those are they having most difficulty with? That's gonna help me retrain them. So I look for balance measures that are going to assess all of those. Controlling of the dynamics, so looking at gait, being able to control balance during gait, being able to have more proactive, again, or anticipatory control of balance. Sensory strategies, obviously our patients may have sensory difficulties. Can I utilize my sensory information appropriately? So vision, vestibular, and somatic sensation. Can I integrate that, can I re-weight that? If I have damage to one system can I then sort of up regulate the other systems to help me maintain balance? And then last but certainly not least, cognitive processing. And this really is thinking about more the attention that's necessary for balance, or my ability to relearn balance once it's been affected by some sort of disease process or diagnosis.

So if we think about that as our framework for what does balance even mean, all of this. Let's go through what are the recommended outcome measures. And I divided this really simply into neuro, and sort of non neuro, or neuro and more musculoskeletal. I feel like most of the stuff that we're doing where we need to assess balance, really and definitely, most of it falls into this sort of neuro diagnosis category. And so that's where we'll spend most of the time. We will talk a little bit about some measures, common measures that are used in more musculoskeletal, sports diagnosis. So in terms of what are the recommended outcome measures, there's really good news here. In today's world we have some really great resources that can help guide us in outcome measure selection, and teach us how to use them correctly, and interpret them correctly, so it's all there for us. We just need to use them. There haven't been, to my knowledge, there really haven't been any repeat study since that study in 2009 that Jetty et al did. I don't think they've really repeated that, where they've looked at outcome measure use. But I think it's probably time, because now we have some really

great resources in place. I think people are doing courses like this to sort of spread the word about resources that are available. And hopefully if we were to repeat that study, that survey study looking at outcome measure utilization, we would find that the percentage of folks that's using them is higher, I sure hope so. But again it's all there for us. We just need to now take advantage of it. So let's learn what's there and where to get it, and kind of how we use it. So I'm not promoting any one particular group who's done work in, this there's quite a few. Because I'm a physical therapist I sort of stick with kind of what's been done, or Started in physical therapy.

And so back probably a decade ago, or almost a decade ago, the American Physical Therapy Association said hey, we really need to do better work in our outcome measures. And how can we do this? And they looked too what was then called the sections of the APTA, now we call many of them academies. And so the Academy of Neurologic Physical Therapy said hey, we can take this on in patients with neurological diagnosis. And so they created what was called the EDGE. So EDGE stood for Evidence Database to Guide Effectiveness.

So these EDGE groups, they commissioned these groups of experts within our field of practice, so experts within physical therapy, to come together and figure out how do we select the best measures for various neurological diagnosis? And so what they did is they Started the very first one, which happened to be around stroke, so it was called the stroke EDGE. And these folks got together and they created a method by which to really sift all of these outcome measures that are available. So they first went through the literature and they found what are all the outcome measures that have been utilized in the evidence related to stroke? And there was lots, unbelievably lots of measures. And then they said okay how do we determine which of these measures is good and worthy to keep, and which we should throw away? And so what they did is they created this process where they essentially filtered all those outcome measures through this sifter if you will, that looked at all those psychometric properties we talked

about that many of us don't really have a good grasp of, reliability, validity, sensitivity, specialty, all those things related to statistics. And they also sifted it through a filter for clinical utility, so they looked for measures that could be done in a relatively short amount of time, 10 to 15 minutes, measures that were free, measures that didn't require a bunch of equipment. Again, really trying to keep it to what can I carry in my pockets, or have readily available in any setting? And so they filtered all of these measures through those kinds of filters, and they saw what what shook out. So ones that weren't psychometrically sound were tossed.

Ones that didn't have good utility were tossed. And then they rated the ones that remained, whether or not they really had very strong psychometric properties, and good utility they had a rating process. And so they kept only the ones that had the best psychometrics, and the best utility. Then they went a step further and they looked at those and they said which of these would be best to use in which practice setting? Because they realized that not all measures were good in acute care, and not all measures were good and outpatient, and so forth. So they tried to sort of group them based on the setting and the patient's kind of level of function.

So they were the first group. Now, I will tell you that they've gone on, and we'll go through these, they've gone on to create these for many other neurological diagnosis. All of this is available to all of you. It's free, there's no membership required. If you go to the, let me go back here, maybe forward, sorry. Oh yeah, sorry, I'm on the right page. What am I thinking here? If you go to this website here that the link is provided for you, this will take you right to the neurologic, the Academy of Neurologic Physical Therapy, where you can find these resources. So it's all available there and free. Not only will you see what are their recommendations for every diagnostic group, but you'll also be able to have access to the actual outcome. They provide them all there for you free. And you can download the outcome measure itself with its instructions and all of its useful information. And there's multiple places where we can find this, and I'm

gonna show you multiple resources. But I'm gonna kind of use this one to guide our talk. So I've gone through and I've pulled out looking only at balance related measures. Just know that for each one of these diagnostic categories, they show all the measures, they show measures related to walking, measures relate to balance, measures related to other functional mobility, and so on and so forth. Measures, they show all of them there. So if we go through and we look first at stroke, again they parsed it out by acute, versus inpatient and outpatient. So they looked at what was appropriate in acute, and what was appropriate for inpatient and outpatient. And you're gonna see there's a lot of overlap. And some of these especially balanced, they may have found that there was several of them that could be used in both settings. But let's go through and talk about them.

And then as we go through looking at these diagnostic categories this will also give us an opportunity to talk about the specific measures. So at the acute level they found the Berg balance scale, the functional gait assessment, the activity specific balance confidence scale, and the postural assessment scale for stroke patients, or the PASS, to be useful. And then you can see there for inpatient and outpatient they were really the same, there was really consistency between inpatient and outpatient. But let's talk about each one of these, and what they are.

Because some of them are ones that you're probably familiar with, and some of them may be ones that you aren't familiar with. And even the ones that you're familiar with, I hope I give you a little bit of new information, or just think about it a little bit differently. So the Berg is probably one of the most familiar balance outcome measures ever. And you'll see that even though it's listed as being appropriate for all these different diagnoses that we're gonna talk about. It's a generic measure, there's no one diagnosis that this was created for. But if you go to the stroke EDGE, and some other resources which I'll show you later, you can find detailed information about how the Berg has been researched across all diagnoses. And what we'll talk a little bit more

about that in a minute, I'm probably getting ahead of myself. But the Berg is 14 items, relatively easy to do. Can be done relatively quickly. It looks at balance and functional mobility. So it looks at things like sit to stand, turning, step ups. It's considered by most people, people will say this is a dynamic balance measure. And it is, it's classified as both a static and dynamic measure because you look at can the patient sit unsupported, can the patient stand unsupported? I would say though in terms of dynamic-ness, if that's a word, it's kind of limited. Because if you think about the space that you're in to conduct the Berg, the patient is moving some, but they're moving relatively in a confined space. There's not a whole lot of translation in the body, a whole lot of translation of the center of mass. So it has some dynamic aspects to it, but I would say it's sort of low on the dynamic list. Less than a 45 is generally considered fall risk across most of the diagnosis, again that sort of varies some depending on diagnosis but in stroke, less than a 45 is considered a fall risk.

There is a short form of the Berg that supposedly can be done in about half the time. I don't find it to be used a lot in clinical practice, and it wasn't recommended in the stroke EDGE. But you can Google stroke Berg short form and you can find that as well. So that's the Berg, I feel like most people are familiar with that. The FGA, or the Functional Gait Assessment is a 10 item test looking at postural stability in walking. And this looks at multiple motor tasks while walking. So even though this is considered a balance assessment, it's balance while walking, so this is definitely a higher level on the on the dynamic-ness if will say of balance. This is getting way up there. So this is a 10 item test and this is actually a modification of a Dynamic Gait Index. We're not talking about that right now in this slide, but in a minute we will talk about it. The Dynamic Gait Index is eight items. The FGA has 10 items it has two additional, the DTI, that make it a little bit more complex, and a little bit more challenging. It has things like walking backwards, walking with eyes closed. So this is a great test for our more higher functioning folks to look at balance in lots of different components of walking. Then we have the ABC or the Activities Balanced Confidence scale. This is a self

report, or I can conduct it as an interview. I can actually read the questions to the patient. And this looks at their balance confidence with various activities, so you're gonna be asking them how confident are you when you walk around the house? How confident are you that you're not going to fall? Sorry I should have said that whole thing. How confident are you that you're not gonna lose your balance, or become unsteady when you walk around the house, when you walk up stairs, when you bend over to pick up an item off the floor. And so it takes you through 16 items. For stroke the accepted cutoff score is an 81%. So anyone that scores below that 81%, you have some concern about their balance confidence. And that can be more indicative of risk for falls. But again, this is a self report.

So you're getting their perception of their balance, or the perception of their confidence with their balance. And sometimes this matches their balance outcomes. I do a functional balance measure, and it's pretty good, and their balance confidence is pretty good. Sometimes this there's a big mismatch between their functional, or their performance based measure and their self report. So they may report a high confidence, but their balance score on the outcome measure may be very low, or the opposite. They may score pretty well on their balance measure, their performance measure, but their balance confidence is really low.

So we're looking for what's not just what this says by itself, but how does this compare to their performance based measure, and is there a match or a mismatch there? And we'll talk more about why doing an ABC is really important in a little bit later slide. And then we have the postural assessment scale for stroke. This is 12 items. This looks at assessing and monitoring postural control. It is specific to stroke, it's one balance outcome measure that was created specifically for stroke. The cutoff, I've tried to provide you cut offs where I could, is 12.5, you get a total of 36 points, and it's really looking at your ability to maintain stable postures or equilibrium during static, sitting or standing but also while you're changing postures. So things like supine, to sideline, to

sitting. Things like sitting without support. So it's especially sensitive in the first three months following stroke. So this is the measure for all those folks that say, well my patient's very low functioning. Really, there's not an outcome measure that's appropriate for me to use. This outcome measure is appropriate. This really can help capture those lower functioning folks. So if you're working in acute care, or you're working maybe in an inpatient rehab where you're getting folks at a pretty low level, this could be the measure that you utilize. This will definitely capture some objective data about those lower functioning folks. So really nice to have, and to know. Now, I'm gonna jump outside the EDGE documents because while we're talking about stroke, I think it's important to talk about Pusher Syndrome.

I'm sure some of you have worked with patients who have Contraversive Pushing, or what we most often refer to as Pusher Syndrome. This is an issue with orientation and space. If we think back to those components of balance that we outlined earlier, that framework that we looked at, one of them had to do with orientation in space, and my ability to maintain verticality. And so when a person has contraversive pushing, they have a problem with being able to maintain vertical. They have a problem with their perception of verticality.

And oftentimes people just use, maybe use the Berg, or whatever balance outcome measure they typically use, they'll use with these folks that have pushing behavior. And that's certainly appropriate, but I want you all to know that there's actually some outcome measures specific to pushing, that more capture sort of their balance and postural control issues that they have related specifically to controversial pushing. So maybe in addition to doing whatever outcome measures appropriate for balance for that patient with stroke, you might also want to layer on top of that an outcome measure specific for contraversive pushing. So I've provided for you here, there's three that are currently available in the literature. The clinical scale for contraversive pushing, the modified scale for contraversive pushing, and the Burke Lateropulsion Scale. And

the reason why there's an asterisk by the Burke Lateropulsion Scale is because it is the scale that, based on the most recent evidence, it's the scale that's most sensitive to change. And so it's the one that's most recommended, kind of across all of your patients with contraversive pushing. So I wanted to make sure that I provided that. I think this can be a nice additional outcome measure to whatever outcome measure you choose to utilize from your toolbox. So no one's talking about kind of stroke, and outcome measures related to balance and stroke and specific to contraversive pushing. And so after the stroke EDGE came to be, and they did their work and they published their work, even before they publish their work, actually, there were other task forces that were commissioned to work on all the other neurological diagnoses. And so as you see we're gonna move forward talking about all of the other most common neurological diagnoses.

And so work has been done here to sort of replicate what was done in the stroke EDGE. So they all looked at, again filtering, looking first at the literature what outcome measures were utilized? Then filtering them by the scales that were created in the stroke EDGE, and then creating again some sort of classification to help guide your selection. And again in MS they chose to look at acute versus inpatient and outpatient. And now you might notice right off the bat when you look at this slide there's a few more measures here. That seems to be that they chose quite a few measures. The measures that I highlighted for stroke, there were fewer of them, I think that probably has to do with sort of the level of complexity, and the variability that we see in folks with MS, which maybe isn't quite so standard in our patients with stroke. And I also should say that the measures that I'm going over for each category are the ones that they highly recommended, or recommended. They also have a list of other measures that you might want to do, but they tried to help narrow down things by giving us what they most highly recommended for, and recommended for these patients. So if you look at the acute care setting, you'll see some familiarity there with the Berg Starting off, it's gonna be repeated a lot. And then they talk about the Timed Up and Go, but

they specifically talk about the Timed Up and Go with cognitive and manual. And we'll talk about what those two sort of additional factors are. They mentioned the ABC, which we've already talked about. The Dynamic Gait Index, which I've already alluded to, we'll go into. They talk about the functional reach, and the trunk impairment scale as all being appropriate for folks with MS at the acute care level. In the inpatient and outpatient setting, they recommend the Berg, the Dizziness Handicap Inventory, the TUG, again the cognitive and the manual, the ABC, the Four Square Tests which we've not talked about, functional reach, and the trunk impairment scale. And then I also gave you a resource here, a paper that was published along with the EDGE documents, or I guess at the same time. And this was in the International Journal of Multiple Sclerosis Care in 2015, by Cohen et al. This is a really good resource, with some nice case examples that utilizes the EDGE work that was done for MS, utilizes how it goes through and talks about how to select these measures based on patient cases.

So if MS is a population area that you work in, you might want to look at that paper as well, because it gives some nice guidance for how to use this information. But let's talk through these measures that are not familiar to us yet. So I think everybody knows the Timed Up and Go. It's probably one of the most widely used measures ever for balance, the person rises from the chair, they walk 10 feet, they turn around, they return to the chair, and they sit. This was created, initially intended for folks with older adults. But there's been a ton of work done, and all kinds of diagnoses. In general for older adults, you're looking at 13.5 to be the cutoff, if they require more than 13.5 seconds, they're a fall risk. 14 seconds is what's accepted as the fall risk in stroke. But again they all kind of fall right that level. There are other values though for other diagnoses. So if you're interested in another diagnoses, you just sort of look out for that information, and I'll tell you later where we can find that. But essentially, we can all kind of agree on if they're greater than 14 seconds, there's probably a fall risk there. So that's the TUG, pretty standard, and we all know how to do that. But more recently

what they've done is they've layered on a dual task to the TUG, because we know dual task is important. In real life I rarely ever do one thing in isolation. I have some cognitive thing that's going on in the background, or I'm doing two physical tasks at once while I'm trying to maintain my balance. And so their idea was, well let's look at a cognitive task with the TUG, and let's look at a manual task, or what some people call is a physical task with the TUG. And so for the TUG cognitive, you're gonna add a cognitive task for the TUG. They're gonna do the TUG just like we just talked about, rise from the chair, walk 10 feet, turn around, come back, sit down. But for the cognitive they're gonna do all that while they're also doing a cognitive task. The literature says counting backwards by seven?

But most people, there's a lot of variability in how that's done. Counting backwards by seven is really hard from 100. I can get to 93, and then I'm kind of done. So you'll see variation of that, counting backwards by three is probably a more commonly chosen task to have them do. But you're giving them a cognitive task that they're doing out loud while they're completing that 10 foot walk and turn. You can also give them the TUG manual. This is where you add a physical task. So the most accepted one, and the one that's talked about in the literature is having them walk while holding a cup filled with water. So even for my patients with stroke, I can have them with their unaffected or less affected hand, walk while carrying a cup filled with water.

So what we're looking for here is, we're scoring each one of those, the TUG baseline, the TUG cognitive, the TUG manual. And then we're looking for what's the difference between those scores. How much does adding on that cognitive piece decrease, or rather increase their time? Or how much does adding on that physical piece increase their time? So here we're looking at, again, dual tasking. We're looking at that cognitive component of balance that has to do with attention and learning. And so we're looking at how much do these two things degrade their overall performance. If in fact I see, and so you might be saying well that's neat information, but how do I use that? If I see

that my patience speed goes way, it gets way poorer, like their time that it takes them to complete the test goes way up when I'm having them do a cognitive task, that's an area I know I need to work on. And it may also be an area I want to caution them on for right now, so maybe you need to avoid cognitive dual tasking while you're walking and moving about the house, or moving about the community. That may be something I sort of restrict for them, a little bit if I can.

But I also need to know that I need, that's an area for me to work on. This is a perfect example of how the measure directs us right into our treatment. That's gonna be the thing I'm gonna work on with treatment is adding in a cognitive task, or a manual task, or both based on the results of this. We're looking at the change between sort of their baseline and these two dual task additions here. So that's the TUG, and the TUG cog, and TUG manual. Then we have the Dynamic Gait Index, which I kind of alluded to earlier. The Dynamic Gait Index and the FGA both just look at like a 20 foot walk. You just need about 20 feet of space. And you're gonna have the patient walk and do some various activities while they're walking that require them to modify their balance to external demands.

So it's stepping over things, stepping around things, turning their head in various directions while they're walking. So for the DGI you have only eight items, and less than a 19 is gonna indicate a fall risk. You got a max score of 24, and less than 19 is gonna indicate a fall risk. So again this is much more high, sort of on the dynamic end of balance. FGA really kind of being highest that we've talked about so far, DGI kind of falling underneath that, TUG kind of probably falling underneath that, and then Berg kind of, Berg and TUG being closer to the bottom end in terms of dynamics there. Then we have the functional reach. Functional reach created quite a long time ago. And this occurs in standing, you have the patient stand, and then you have them reach forward as far as they can and you measure the change in their position with that reach. The standard instructions say stand with their hand outstretched, and I'm gonna Start

wherever their fingertip is, and that's my zero. And then they're going to reach forward as far as they can without moving their feet, and I'm gonna remeasure. I'm gonna measure the change in distance that occurs there. Now this gets thrown off, this throws people off, because they're like my can't raise their arms, or use their arms. Doesn't really matter the arms is the standardized position that you measure from. I can also measure from the tip of the acromion. I can look right at the shoulder. Because I'm not looking at anything related to arm function here, I'm looking at how far can they move, what's the maximum excursion they can make of their center of mass?

So when you think about it that way, you realize, hey the arm is really not a critical thing here. They were just using the arm as a tool that they can easily see, and sort of measure the change in. But I could measure from the acromion as well. So the first sort of iteration of the functional reach was just forward. It was how far can you reach forward from a fixed position? We really looked for people to get greater than seven inches, below seven inches would indicate a fall risk. Typically folks are gonna get greater than 10, but seven was considered the fall risk. You can repeat the functional reach in all directions. So you can do forward, to the right, to the left, and to the back, to behind.

You can also do what's called the modified functional reach, which means that you repeat this but you do it in sitting. So for some of our lower functioning patients that can't do a standing functional reach, they may be able to do a seated functional reach. And that may be a good place to start for some of our really low functioning folks, it's a very acute care friendly measure. Really only need a tape measure to be able to do this. There's fancy little tools that you can have stuck on the wall in your clinic, where as they reach forward they actually slide a little thing along a ruler, and that's great. But I could also just have somebody hold up a tape measure, and I can look at it while they're moving. And that gives me the same information. So functional reach being a good, again, more on the static end of the scale though kind of measure. Now it's

interesting, the trunk impairment scale was listed here in the MS group, but it was really created specific to stroke but they've done research with it in MS, and so that's why they used it here. It's a measure of static and dynamic sitting balance and coordination of trunk movement. So it's very similar to the PASS which we talked about on the stroke slide, it's very similar to that. They're looking at more static components of balance and postural control, and the ability to make really basic translational or transitional movements like supine to sideline, coming to sitting, those kinds of things, but they included it here as a recommended measure under MS. They also included a couple other measures, the dizziness handicap inventory. This is a 25 item self report, so I'm gonna ask the patient to self report about their dizziness. But it's a guided self report. They're going to be telling me, they sort of are gonna grade themselves about how dizzy various activities are gonna make them, so I'll give you some examples. Does looking up increase your problem? And they're told to either answer always, sometimes, or no for each one of these.

Because of your problem do you feel frustrated? Do quick movements of your head increase your problem? Does walking down a sidewalk increase your problem? So it's giving them a list of various activities, and it's asking them if these activities increase their dizziness. And so for the data in MS you're looking at wanting less than a 59 there. This is something that can be utilized really in all patient populations that experience any type of dizziness, this isn't a specific balance measure. But it's a nice self report that's telling me how maybe some of their issues are impacting their overall level of handicap. So this is a nice self report measure. Most of the time you'll see this used in patients with some sort of vestibular diagnosis. But, because vestibular problems are common in folks with MS, it was included in the MS recommendations. They also recommend, sorry, the Four Square Test. I love the Four Square Test. I use this for a lot of patients. It didn't make the highly recommended list for stroke, but I do use this in my patients with stroke. Super simple, you just lay down two straight canes on the floor into a cross pattern, like what's demonstrated here. You're gonna have the

patient Start in the one square, and then they're gonna move to two, and then three, and then four. So they're gonna sidestep to two, step backwards to three, sidestep the other direction to four, and then they're gonna reverse that and come backwards. Sidestep to three, forward to two, sidestep to four, I mean to one, sorry. So just repeating that pattern. This is a great balance test that gets at lower extremity movement, gets at overall balance during stepping. Again, not really a lot of translation of the body over a great deal of space, but adds more complexity maybe than some of the items of the Berg. So it's sort of a middle of the road sort of dynamic balance test, like that a lot.

Some people will just tape on their floor across like this. And that's fine. The thing about the canes is that the person has to clearly, cleanly step over, or they kick the cane. And so that's why there was, that actually have a physical object that they have to step over. But you certainly can tape this on your floor for some practice. But the actual test does say that you have to have something laying on the floor. So those are the measures that were most recommended for MS, and you can see that some of those repeat from stroke, some of those were new. In terms of spinal cord injury, if you look at the EDGE documents that were created there, they're balance measures were many fewer, and much more simple.

And that's probably because if you're looking at somebody that has a more significant, or a more complete SCI, then balance, their balance may be relatively poor. Certainly I would say that any of the balance measures that we've talked about would be appropriate for the patient who has a very incomplete spinal cord injury and is working on higher level mobility skills, return to walking, and those other balance measures could be appropriate as well. But these were they're recommended based on the timeframes of acute, subacute, and chronic. They broke it down a little bit more, but they recommended the same balance measures across them. The TUG and the Berg, which we've already talked about. They also recommended, make recommendations

and outcome measures based on their ASIA classification, so their American Spinal Cord Injury classification. If it's an A or a B, so A being a complete injury, and B being a motor complete injury, they didn't recommend any balance measures. Because again they felt like the patient's balance was going to be very impaired and not really measurable. For patients that were an incomplete injury, either a C, or a D, and those are just varying degrees of incompleteness, they recommended the TUG or the Berg. So not a lot of detail there in the spinal cord injury recommendations. And we're gonna get to some newer measures here, different measures we haven't talked about, as we talk about TBI. So in acute care they really didn't have any that were in their highly recommended category. But if you look in their recommended box, they talked about the Balanced Error Scoring System, which is an important measure in traumatic brain injury. We'll talk about that in a moment. They talked about the Community Mobility and Balance Scale, another measure we've not talked about.

And they talked about the High Level Mobility Assessment, or the HiMAT. And we'll talk about this one as well. In terms of what they recommended for inpatient and outpatient, you can see there's a lot of repetition there, the HiMAT, they also added the Berg. They talked about the Community Balance Mobility Scale the best, and they also talked about the Dizziness Handicap Inventory. And this makes a lot of sense because patients who have a traumatic brain injury oftentimes have, can have a pretty significant vestibular issue. And so getting that Dizziness Handicap Inventory is gonna be part of that assessment as they're trying to determine if there's some vestibular issues here that need further investigation. But looking at just sort of the the pure balance stuff that we've not talked about, let's first talk about the BESS, the Balance Error Scoring System. This is a really important measure, I said, in traumatic brain injury. This looks at static postural stability. So it's not a super dynamic test, but this is used very exclusively in concussion and mild traumatic brain injury. And this is oftentimes used as one of the measures that they look at in terms of return to sport. So in order to determine that an athlete is okay for return to sport after concussion, there's

been some really in depth guidelines that have been created within the past decade, this has been a hot topic within the last decade, concussion and return to sport. And in terms of looking at a performance based balance measure, the BESS is usually the one that's chosen. And so there's six conditions here, the patient, and this is again, easy to conduct anywhere in your clinic, easy to conduct on the sidelines at a sporting event even. There's gonna be six conditions. They're gonna stand with their feet together, eyes open, and eyes closed, on foam.

They're gonna do single leg stance, eyes open, eyes closed. And they're gonna do tandem, eyes open, eyes closed. And you're looking at can they stand there for, I think it's 30 seconds, and you're looking for the number, I'm sorry 20 seconds, and you're looking for the number of errors that they have. They're holding their arms across their chest. So you're looking for the number of errors, how many times they come out of position, if they touch down their foot, those kinds of things. If you look at the guidelines there's very specific scoring for this based on what's considered an error. But this is often used as part of a battery of tests for return to sport, and just sort of the overall guiding intervention in our patients with concussion and mild traumatic brain injury.

The Community Mobility Balance Scale, this is considered a high level balance and mobility task, and it looks at tasks that are really common in community environment. So the patient has to be able to do this without an assistive device, just only need about a 10 meter space. You're having them do things like unilateral stance, tandem walking, hopping, crouch walking, looking while walking, carrying items. Again it takes them through some very functional, very practical kinds of things that they would need to do in a community environment. So a higher level higher dynamic-ness to the test, very functional. And then finally the HiMAT is a high level motor performance test, mostly focusing on balance things. And it looks at very high functioning balance skills, things like walking, running, jumping, climbing stairs, bounding, skipping, those kinds

things. So we've kind of progressed almost, I didn't mean it this way, but we've kind of progressed from some really basic measures to, in this section we're talking about some higher level measures. Now these are important, you might say why do I need a balance measure that looks at running and jumping? Well, oftentimes in our patients, especially our patients with TBI, but some of our other diagnoses as well, we will have a patient who has a very good recovery. But they're still not able to return to sports. They're still not maybe able to return to their job, which requires a high degree of balance. And we need a way of assessing that, being able to determine are they safe to return to those skills?

And also justifying why they need continued therapy when they're essentially able to walk about under normal circumstances with a modified independent, or a complete independence FIM score. So these help us justify therapy for folks who have higher needs for balance, and who have some of those really high level issues, impairments that we've been able to look at. So if we move on to Parkinson's disease, and I think this is gonna be our last diagnostic category that we look at. You can see here, they have kind of a long list. And they didn't really break it down into, they sort of, instead of having acute versus inpatient outpatient, or something like that, they do talk about it based on the Hoehn Yahr staging.

So for those of you who work with Parkinson's disease, or the common way to stage a patient with Parkinson's, is by what's called the Hoehn Yahr scale. And so they need to talk about which of these is used based on that, so you can look at the document for more detail there. But you can see here there's a lot of measures, and again I think that sort of reflects the variability in Parkinson's disease. So some of these are gonna be familiar, and a couple of these are gonna be new for us to talk about. So they use the BESS Test, and the Mini BESS Test. And some of you may be familiar with these, and you may be wondering why we haven't talked about them already. I think some of the earlier EDGE groups, EDGE task force that created these found that the BESS test, A

was pretty new when some of these were coming out. But the other thing is is the BESS test is a little bit lengthy, and so that's one of the reasons why some people are hesitant to to use it, and why it's not been included probably in some of these guides. But we'll talk about it in detail in just a second. They talk about the DGI, the FGA, the TUG, the ABC scale. We've all talked about that. The four square step test, that certainly makes sense in patients with Parkinson's to talk about functional reach. This is the first diagnostic group that's mentioned the Tinetti Mobility Test, or the POMA, which some of you may be familiar with. It's not really been mentioned up to this point, and we'll talk about why in a moment. They also list the Berg, Walking While Talking Test, that's also one that gets at sort of dual tasking, we've not talked about that yet, and the 360 degree turn.

So this introduces some new measures for us to kind of discuss how they're done. The BESS Test and the Mini BESS Test are probably the newest, some of the newest balance outcome measures that have come about within just really the last I don't know, decade or 15 years or so. The full version of the BESS Test is 36 items. But what is really nice about the BESS Test, remember we talked about balance being multifactorial. It really looks at all the factors that make up balance and postural control, and kind of helps us assess in which of these areas are they having the most problem? So it looks at things like anticipatory, reactive postural control, sensory orientation, dynamic gait.

So it really looks at kind of all the things that are on that framework, whereas if we think about some of the outcome measures we've talked about thus far, they may not cover all the components of balance in one test. The downside of the BESS Test is that it's long, it's 36 items. So because it is very comprehensive and it covers anticipatory, and reactive, and it talks about sensory, and because it covers all of those mechanisms and has the person stand on foam, eyes open and eyes closed, and on firm, it has a TUG within this test. So you would actually do a TUG within this test. Because of all the

items that it looks at, it's relatively lengthy and can be a bit of a challenge in terms of time. There is a Mini BESS, it's 14 items. They both have good strong psychometric properties. So it's a good test, and that may be something that you want to look at, especially if your patient has some significant balance issues and you're really trying to tease out what exactly do I need to be addressing, you're kind of struggling with that. Maybe look at the BESS or the Mini BESS. But again, the group that researched all this for people with Parkinson's felt like it was very appropriate for folks with Parkinson's disease.

The Tinetti Mobility Test, or the POMA, the Performance Oriented Mobility Assessment. Some of you, this may be a test that you use. And you may be wondering, if it is a test that you use, you may be wondering why we've not talked about it till now. It really didn't shake out as being a highly recommended measure for all the diagnostic categories that we've talked about thus far. One of the reasons being is that it's a little bit lengthy, it can take a little bit of time as well. But it was created for older adults, and there hasn't been a lot of research outside of the category of older adults. There is some, but there's not a lot.

And so I think that's one of the reasons why it was included here in Parkinson's disease, which tends to be a disease of older adults, and not maybe included in some of the other categories. But again, it's a nice measure that looks at both gait and balance, and attempts to establish a fall risk. But again attended for those older adult folks. Walking While Talking Test is a dual task measure of divided attention, it looks at sort of how do we do when we have motor and cognitive sort of interaction. It's really simple, they walk 20 feet and return, they walk while reciting the alphabet, and they can complete the walk while reciting alternate letters of the alphabet. So you're looking at how much time does it add for them to do this cognitive task, either something simple like just reciting the alphabet, or something more complicated by reciting alternate letters of the alphabet. You're looking for what's the difference between that

base 20 foot walk and those those two cognitive tasks. And again this is gonna give us some idea of that cognitive component of balance and postural control. And then lastly the 360 degree turn is just what it says there, it's an example of dynamic balance. They're gonna complete a circle, or a turn just right there in space, I mean in place.

They're not walking forward or anything. You just ask them to turn in a complete circle, and you're timing how long it takes and how many steps they take. So you can imagine a person with Parkinson's disease might take a fair number of steps, whereas you and I would only take two or three, four to turn in a full circle. So you're looking at the number of steps, as well as the time that it takes. And so that would definitely be a very useful measure, especially in our patients with Parkinson's disease. But I can also see that being very useful in our patients with stroke as well. So I've gone through all of the diagnostic categories that are covered in the stroke EDGE, except for vestibular, and there is vestibular information that's available there. I felt like vestibular is kind of beyond the scope of this course.

You have balance issues, and you have vestibular issues, and they're certainly very linked. But to talk about balance measures related to vestibular, or to talk about measures related to vestibular disorders would be really lengthy. So I'm giving you this resource. If you're seeing folks with vestibular issues, but you're still not clear on what specific outcome measures you should use, go to this link and that's a great resource for you there to look at in terms of your folks with vestibular issues. And keep in mind that many times all the diagnoses that we've just talked about, may have some related vestibular problem, especially our folks with traumatic brain injury and MS. Those folks are gonna oftentimes have some vestibular issues, so you want to make sure you're looking at that as well, and combining those vestibular measures with your balance measures. So really recently, in 2018, Moore et al published in the Journal of Neurologic Physical Therapy this article about balance outcome measures, and it was an article that was looking at creating a clinical practice guideline related to outcome

measures, and selecting the best measure. So they looked at all the outcome measures for balanced gait, transfers, patient selected goals. And they sort of tried to boil that down into some recommendations, they call this a core set of outcome measures for adults with neurologic conditions undergoing rehabilitation, that's a long title there. But I went through this to just look specifically for you guys, what do they say about the balance measures? And so really their recommendations for balance came down to really three measures, the Berg Balance Scale, to look at changes in dynamic and, static and dynamic sitting and balanced. Looking at the activities of balance confidence scale, so that was that self report measure of balance confidence. And using the functional gait index, which is again a dynamic balance measure looking specifically at balance while walking. So these were their core set for balance in patients with neurological diagnosis.

And you can kind of see there. If we think about this, that kind of makes sense. The first one, the balance, the Berg Balance Scale again is dynamic, but sort of on the low end of dynamic. They utilize the ABC, which is a nice self report measure of balance confidence. And then the FGA being a much higher on the sort of dynamic scale in terms of if we look at things in a continuum of easiest to hardest. The other thing I want to mention about this paper, really lengthy paper but some really great information. But if you look at their abstract, I found it really interesting.

The very last line of their abstract says physical therapists should discuss the outcome measure results with patients, and collaboratively decide how the results should inform the plan of care. So we've been talking about really technical things, about how you conduct the tests, when do you conduct the tests, what's good, what's not good about the test, cutoff measures, and all that kind of stuff, but they really summed up. They really get to the heart of the matter there at the end of their abstract that we should be informing the patient, or discussing the outcome measure with the patient, not just the results, but also are we looking at the measures. But that these should then

collaboratively decide how this should inform the plan of care. And so again, just trying to point us back to that patient centeredness all through this process. Oftentimes we sort of think measures are more about us. It's the outcome measures I'm using. But we need to make sure that we're patient centered in those as well, and that we're collaborating with the patient to have these outcome measures inform our plan of care. Now there's a couple of measures that aren't utilized anywhere, or aren't talked about anywhere in these EDGE documents. And I want to throw them in here because I think they're important, and good measures. The Function in Sitting Test, or the FIST. This was created to be a bedside evaluation of sitting balance, so really looking at those folks in acute settings. It looks at sensorimotor, proactive, reactive, and steady state balance, it's just 14 items.

And this was done specifically, this was created specifically for patients with stroke. Could certainly use these in other diagnoses. But this is easily accomplished right at the bedside, with sort of the lowest functioning of patients. The reason why it probably wasn't considered in the EDGE documents is it's a relatively new measure. And it had only just been created when the EDGE documents were coming out, and so they had not done all the psychomotor testing on it at that point. Since that time it's been found to be very psychometrically sound, so I would definitely include this in my toolbox. I apologize I didn't put a reference on here for you.

But if you want to look for this further, you can just google Function in Sitting Test. But the author of this, creator of this outcome measure, the last name is Gorman, G-O-R-M-A-N, first initial S. So if you just Google Gorman S and the FIST you'll get this, it'll take you to a website for Samuel Merritt College, or Samuel Merritt University. That's where it was created, and you can find there great resources on how to do the test. They show you videos of therapists conducting the test, gives you the actual test you can download, and all the information about it there. The other test that I think that's important, that we can't not talk about when we talk about balance is the L-Test.

So for those of you who maybe work with patients with amputation, you may have seen the L-Test. The L-Test is an extension of the TUG. The patient, very much like the TUG, rises from the chair. They walk three meters, or 10 feet. And then they're gonna turn 90 degrees, and they're gonna walk an additional seven meters, turn around, and come back and retrace that L. So why is this important for patients with amputation? Well a person with an amputation has a unilateral weakness, a unilateral problem. The TUG doesn't specify which way to turn.

The TUG itself just says walk, turn around on the mark, and come back, doesn't say turn right or turn left. So a person with a unilateral weakness is gonna turn the direction that's strongest for them to turn, usually towards their strong side, or their unaffected side. So the L-Test is gonna force them to turn each direction. So you're gonna capture sort of their capacity to make turns in both directions, and that's really very important in a person that has a prosthetic limb. Also could be really important in patients with stroke. I utilize this in patients with stroke. It's not really been studied in the literature, although there's a little interest in doing that.

But this would be a nice test to use to make sure that you capture what's happening with your patient when they turn both right and left. And again if you want to look at more information about this you could just Google L-Test. But the author of this test, the last name is, I don't know if it's death or deeth, but it's D-E-A-T-H-E. That was the author, and it was published initially in 2005 so you can look at a little bit more information there. The L-Test is really nice test to do though. Both of those are really nice tests to do. Want to talk just a second about psychosocial assessment, and why things like the ABC are important. So balance is really, it's very interlinked, interwoven with their social support, behavioral and cognitive function. We've already talked about the links between cognitive function and imbalance. And it's really linked to fear of falling. So a third of those who have fallen, will develop fear of falling. You don't have to have fallen in order to be fearful about it. People who haven't fallen still can have a very

high fear of falling, and in those people who have fear of falling who have significant fear of falling, they tend to be more sedentary, they've therefore become working de-condition, they increase in frailty, and therefore they're at an increased risk of future falls. So you can see we sort of have a vicious cycle going here. And so really important to be able to assess this fear of falling, this low balance confidence, or sort of their self efficacy around balance. In fact, not only is there just sort of this vicious cycle that can occur whereby low confidence, high fear could actually sort of perpetuate more falls.

But fear of falling is actually a predictor of falling. So again we see fear of falling in those who have fallen as well as those who've not. But there was a study that was published just in 2016, that showed that balanced confidence was the best predictor of falling, followed by fear of falling avoidance behavior, and then the TUG. So what predicted best if a person was gonna fall, was their ABC score, second best was their fear of falling avoidance behavior quotient, or the FFABQ. And third was their TUG score. So these psychological factors seem to be more valuable, or at least as valuable, in predicting future falls as these performance based measures.

So what's really important is, if I have a patient that I'm assessing for balance issues, I want to make sure that I'm combining that with some type of measure that gets at their self perceived, or their self report issues. So using the ABC, or the FFABQ can be really great ways to augment our performance base and may, in fact, be better predictors of falls than just those performance based measures by themselves. So an important thing to remember to do that. I always try to just remind myself, if I'm doing a TUG, or I'm doing a Berg, or if I'm doing whatever, that's sort of the sister thing that should go with that, just a thing that's paired with it automatically is an ABC. I tend to use the ABC more than the FFABQ. But want one or the other of those, no need to do both, but one of the other of those. So we want to make sure we're including that in our balance assessment. Want to take just a minute to talk about some other measures

related more to orthopedic issues in sports. Again, there's more out there besides this. But these are the two most commonly used. The Y Balance Test, and the Star Excursion Test. And the Y Balance Test is actually a tool that's commercially available, you could create this and measure it without the tool, but there's a commercially available tool. I gave you the information there, Move to Perform out of Illinois there. And it's what you see there on the left. And so on the left the person is actually standing on this little platform in the center, and then they're reaching their left foot forward to move to slide that little, looks like a block of wood, kind of is a block of wood, and they're sliding that as far forward as they can without losing their balance.

And then the therapist is gonna take a measure of that, how far did they move that. And then they're going to take their left, and they're gonna, if you see back to the left of them and behind, you see the same sort of thing. They're gonna put their left foot on that block of wood, and move it as far left and behind as they can, measure that, then they'll stand on just their right foot, and they'll move that block to the right out as far as they can. And you're taking measures of that. And this is used pretty commonly, and it's looking really at just three directions. So anterior, posterior lateral, and posterior medial.

And you're gonna sum those, and then repeat it for the other leg. Versus the Star Excursion Test, is gonna look at really very similar types of motion. But it's gonna break it down into more directions. So the Star Test is gonna look at, as you can see there you have one, two, three, four, five, six, seven, eight different sort of directional movements that you're doing there. So forward backward, lateral medial, and then that anterior posterior, or posterior lateral, posterior medial, so it's looking in all directions. So a little bit more detailed, but you can imagine for either one of these measures you really have to have good strength, good flexibility in the lower extremity, good proprioception. So this is really getting at a lot of the factors, or a lot of the components of balance in this test. And you can look at the details for how you score

this. For all of these you're going to take measurements of their excursion of that foot, and then there's some other ways that you average and sum that are a little bit more complicated to talk about here. But you can look those up, those are available all online. The directions are there for you. But you'll see this used in a lot of folks that have more of a musculoskeletal injury, more in athletic training types of issues. Now I wanted to spend just a little bit talking about some common mistakes. I feel like all of you are like yeah, Berg Balance Assessment, know how to do that. TUG, know how to do that. But what I see in the clinic, in experienced therapists as well as new therapists, just kind of some common mistakes that we all make. So first of all, and this occurs a lot in new therapists, and entry level students. They conduct all of these tests while holding on to the patient.

And if you're holding on to the patient, if you're providing them contact guard, holding on to their gait belts, putting your hand on them, you are skewing the test, you're changing the test. So, if we're assisting the patient, or providing contact guard, and if we can allow the patient to go without that, we need to go without that. I really want this to be under the patient's power, with my close supervision, potentially, but under the patient's power. If I have my hand on the patient, holding on to the gait belt, or providing some degree of assist, I need to document that, and I need to know that that's skewing the test.

Because even just my hand on the gait belt might change their degree of confidence, might give them just a little bit of input. So we really want to make sure that when we're assessing this all the normative values that we've talked about, all the cut offs that we've talked about, those were all conducted on patients who did this without assists. They had close supervision, but they did not have physical assist or contact guard. And so it's important to keep that in mind. Now, some people say so you don't ever do any parts of any of these, as long as they require a hand on them? No, sometimes I do. Sometimes, especially for the Berg, which kind of progresses from easy items to harder

items, they may be able to do the easy items without any assists. And so I'm just gonna document anything that I applied any assists. But my goal is gonna be able to, is to do without providing the patient any sort of assist. And then not attending to the details of the test. So for example, you have to read the test, and really pay attention to it because oftentimes we like, oh yeah I know how to do that, I've been doing it for years. And then we read the test and were like, oh I was doing that wrong. So for example, in the Timed Up and Go it says specifically to use a chair with arms, so if the patient wants to push off the arms of the chair, they can do that. Some people say, don't push up from the chair. Well that's not really the directions for the tests. The tests say rise from the chair, from a chair that has arms actually. And it doesn't specify whether or not to use the arms, or not to use the arms. So it allows the patient to be able to do that.

There are other tests, one that we haven't talked about today, the Five Time Sit to Stand Test. The Five Time Sit to Stand Test, you can't use your arms. So you want to make sure that you know those details. You want to know when to Start the test. So in the TUG, for example, you say go and then the patient starts, you don't start the timer when the patient rises from the chair. Because if I say go, and it takes them a few seconds to get up from the chair, I want to have captured that time. That's part of the reason why we're doing this.

So for the Timed Up and Go specifically, you say go, Start the timer as you say go, and then however long it takes the patient to rise is part of the test. We want to make sure we know what the start and stop times are. For the TUG the stop time is when their bottom touches the chair. So we want to be really detail oriented about that, want to make sure that we measure the distances it says. If they're supposed to go 20 feet, if they're supposed to go 10 feet, we want to make sure that we measure that. And what I would suggest, if you work in an outpatient clinic or an inpatient rehab, I would suggest that you have some places pre-marked in your setting. So most places will

have a TUG space. So they have a dot on the floor, and another dot on the floor, and those are two feet away. I mean 10, 10 feet away, sorry. And you put the chair on one dot, and they walk around the dot ahead of them kind of thing. When we have those places marked, those distances marked, it tends to make the test easier to conduct and people are more likely to do it. So we can sort of aid the utilization by having those spaces available. Don't be a distraction to the patient. Don't talk to the patient while this is happening. You want to give them the instructions very clearly, very concisely. I want you to rise from the chair, walk to the mark, turn around, and come back, and sit down.

And then I'm not gonna talk to them while they're doing it. I don't want to be a distraction. We don't want to inflate the score or the grade. We're nice people, we like to be nice positive people. And so like oh wow, maybe they actually did okay on that. Maybe they didn't lose their balance as they were doing head turns in the Dynamic Gait Index. Oh maybe, I don't know, I want to give them the benefit of the doubt, no don't give him the benefit of the doubt. Always give them the lower score if there's any question.

So if it's like, well I think they lost their balance a little bit, but I'm not sure, I'm gonna go ahead and score them as a loss of balance, or whatever it might be in the test because I want to make sure I'm not overestimating their balance. This is not an area where we want to overestimate. And then I think one of the biggest mistakes we make is choosing the less than best measure. We choose just any old measure, and we don't necessarily choose the best one. And we want to think about ceiling and floor affects. And I'm not sure if that's a term that's familiar to you guys, but in statistics, they're kind of a statistical term I guess, a ceiling affect means that people are gonna score full points on this really easily, versus a floor effect is gonna be that the people who really are low functioning, are just never gonna move up on this scale, those are ceiling and floor effects. So if I give somebody who walks into the clinic, let's say I have this

patient and they walk in, they don't have an assistive device, they turn around, they sit down, they get up, they're moving around pretty nicely. And I give them a Berg Balance Scale to do, they may hit the ceiling, they may score a 56 out of 56. Verses, I see that patient and I give them a higher level balanced test, like the DTI or the FGA. They may score, maybe I may actually tease out some areas where they have problems. So that's really thinking about the ceiling and floor effects there. So we want to make sure that we're choosing the most appropriate measure, that's gonna match up with that patient, and give us some room to grow that patient. So it's gonna identify some deficits and give us some space to improve.

Some other common mistakes that I think I see a lot are lack of consistency within yourself. So me as a therapist, if I'm not consistently performing these measures, I'm not consistently either choosing outcome measures, or I'm not consistently choosing, I'm not using the same measures. So we don't want use the same measure for every person. But I want to have sort of a set that I'm utilizing consistently, and that I'm performing it the same each time, that there's consistency between each time I use the Berg, or the Functional Reach, or the FGA. So we need to have some consistency. And then also consistency amongst the team.

So if I'm working in a acute care department, we need to all be consistently utilizing a set of outcome measures. We're not using the same measure for every patient, but we have this set that we're choosing from that are all good measures that we've agreed upon. And we're all consistently choosing a measure, some measure. Lack of good observation. A lot of these we're scoring based on our observation of their movement. So I want to be super observant, and I want to pick out, okay yeah they actually, as they did that head turn in the DGI they actually veered just a little bit to the right, they veered off path. I want to make sure I'm observing so I pick that up. Because that's a problem on the DGI, that scores them a little bit lower if they veer off path. So I want to make sure I'm being really good and observant in this. And not using outcome

measures that inform and motivate the patient, and we already mentioned that. You talk to your patient about the outcome measure you're using and why, and make sure that those give them information that's motivating to them. And then lack of detail in reporting these measures to a third party payer. I report how my patients do on these measures, and I add in there whether they're at a fall risk, or not at a fall risk. So if I say this patient scored a, this patient scored a 37 on the Berg. I'll put in parentheses greater, less than 45 is increased risk of fall.

So I include that formation in there. Now I will say, before I move on to good resources, there's there's one thing I forgot to put in here I wish I had, and I didn't think about it till last minute. In terms of kind of common mistakes, or just a little bit more information about interpretation. We've mostly discussed cutoff scores. Like if they score below this, they're at an increased risk for falls or something like that. They take longer than 14 seconds for the TUG, they're at an increased risk of falls. There's other statistical information that you may want to familiarize yourself with. The MIDs or the MCID, so the MID is the Minimal Important Difference, or the MCID is the Minimal Clinically Important Difference. This is the smallest change in an outcome that an individual patient would identify as being important.

And so it's what indicates a change in the patient's performance that's important to the patient. And there's a lot of statistical ways to find that. So we want to look in the literature and see if there's an established MCID for a measure, and if there is, that's probably what we're gonna use in our goal setting. I want to choose a change in a specific outcome measure that's actually gonna reflect a meaningful change. And so we can use those MCIDs. So if I look and I see that the TUG has an MCID of six seconds, then I'm gonna use that to sort of guide my goal setting, and knowing whether or not we're improving or not improving. Versus the MDC, is the Minimal Detectable Change, and that just means in terms of the measurement properties, what's the minimal change that this tool is gonna pick up on, so it's not really

necessarily looking at the meaningfulness. Many of the measures that we've talked about also have normative data that we can look at. That's not always helpful when working with patients, but that may be useful. And again most of the time we're sticking with those cutoff values related to falls, specifically when we're thinking about balance. I provided you here with some other good resources. Rehab measures, the rehab measures database, which is out of the Shirley Ryan Abilities Lab in Chicago, what used to be the Rehab Institute of Chicago. If you go to this database you can just put either a topic, or specific measure in a search bar.

And it will pull up that measure for you. It is a wealth of information about all of the cutoff values, all of the psychometric data related to each diagnosis that the measure has been studied in. So it is a great wealth of information. It can be a little bit more overwhelming than the EDGE documents, which specifically just say this is recommended at this level kind of thing. But it's a great, great resource. And the EDGE documents are actually merged with the rehabilitation measures database. So those two work together. So they're saying the same things. You're just gonna get a bigger bulk of information in that rehab measures, but a great place to quickly search for and find a tool.

The core set of outcome measures for adults with neurologic conditions, that's the article that I talked about earlier. There are clinical practice guidelines available at that link. PT now, which is I think restricted to APTA members, but that's another resource for tests and measures. If you're working specifically with older adults, the geriatric examination toolkit is a great resource for all kinds of measures related to older adults, and specifically of course, there's great balance information in there. And then Physiopedia is another resource where you can go and look for outcome measures. And many of these, and Physiopedia will have videos of someone doing the actual measure. And if you need a little bit more visual picture of how this occurs. And so those are great resources for you to look at to find out some more information. There's

others out there, and there's other resources. I just tried to pick some of what I thought were the top, and sort of most vetted kinds of things. So a couple of application questions or discussions here. I've given you just a few patients to think about. So this first patient is a 17 year old female who experienced a concussion while heading a ball in a soccer game. And so what I want to think about here is, just knowing that this is my referral I have. What might be appropriate measures? So I probably need more, definitely need more information. But what would may be some appropriate measures for this person? And you can go ahead and type in the answer, if you want to share your answer.

You don't have to, don't feel like you have to. I'm gonna talk through them. But when I first read this, I'm thinking my question is what's her level of impairment following this? But as I'm thinking about appropriate measures and she's an athlete and she's had a concussion. The BESS Test is definitely gonna pop to mind. Because as we talked about before, that's a measure that we utilize to help determine a return to play, so I'm definitely gonna think about that. I can think about the HiMat, again because that's a test that looks at a lot of high level balance skills that certainly would be necessary for a young athlete returning to play.

Now if I read further about this patient, and found out that she was really severely impaired, that maybe this was not a concussion, this was more of a moderate brain injury, then I might fall back into those measures that we've already talked about, the Berg or higher level, the DGI, or the FGA. But just reading just this information, I'm definitely thinking about the BESS, I'm thinking about the HiMAT, and in terms of how I would utilize outcome measures in terms of return to play, the BESS is gonna be, the BESS is going to be the best one for that. Yes, Deborah, HiMAT definitely. If we look at the next application bullet point there, we have sort of the flip end of that. We have a 75 year old male who experienced a fall resulting in a fractured wrist, so maybe they had a slip and fall kind of situation, and they have a fractured wrist. So in this patient, if

that's all I have in my referral, I'm definitely thinking about I need to do a full sort of risk assessment for this patient in terms of fall risk. And so balance is just one part of that. There's other stuff that goes into that. There's asking lots of history questions. But in terms of measures to determine, or demonstrate fall risk, what would you guys be thinking? Anybody want to type in an answer there while I'm giving you just a moment to think through that? So in terms of measures we could use for this older adult to determine, or demonstrate fall risk. We don't have any brave people that want to type in? All right Tinetti, Tinetti, TUG, Berg, Berg.

Yeah, so you're thinking about lower level measures. And that's probably, I think that's probably a good thing at this point. So when I think about if I want to determine fall risk, we know that the TUG has a good cutoff for fall risk. We know the Berg has a good cutoff for fall risk. And we also know that Tinetti was created for older adults, as were several of these, and has a good cutoff for fall risk. Now Julie said the Four Square, and I love that because you're thinking a little bit more dynamic, and you're thinking really functional. When do people fall?

They oftentimes fall in tasks where they're having to step backwards, so backing up to the toilet, opening a door which requires me to step backwards while pulling on something, even more complicated. So I love your thought about the Four Square. And I would definitely add that into that. I think there's maybe some cut off data for fall risk on the Four Square, but I can't swear it for sure. But you can find all those details at any of those resources that I just talked about. So yeah, I think any of those would be great. And again, it would sort of depend on my initial sort of observation of this patient. If he's walking in with a cane, and really seems to be struggling, I might choose more the Berg. If he's walking in without an assistive device, and doing really well, then I might think about the Berg, or I might think of more of those middle of the road, definitely a TUG is kind of always good. And then what parts of balance to target? Again an older adult having a fall, especially if they have like a slip and fall, a trip and

fall, I really want to think about those things related to reactive balance. Can they resist, can they withstand a perturbation without losing their balance? So I wanna look at those kinds of things. I want to look at those transitional movements that might disrupt balance, so those are the things that I'm thinking about focusing on. And then the last one here for application was 25 year old weekend athlete. They like to hike, they play on a kickball team, and touch football team over the weekends and evenings. And they have recurrent ankle sprains on the right. So if we think about what components of balance and postural control that need to be addressed here. This is really about strength, oh wait. I have to pause here.

Ulysses said something really important, that I totally meant to mention, and I got sidetracked. ABC Scale, absolutely on that previous patient. The person that older adult that fell, we definitely want to get an ABC or an FFABQ. You want to get something that gets at their self advocacy around balance, yeah absolutely. Great point, thank you so much. I would have hated myself later because I would have realized I left that out. But back to this 25 year old weekend athlete. If we're thinking about the components of balance and postural control that need to be addressed, this person has recurrent ankle sprains.

We're really thinking about things like flexibility, strength, proprioception, more of those biomechanical components of balance need to be addressed here. Anybody want to throw into the chat box what outcome measure might be appropriate for this person, as we're drawing to the end of our time? What kind of outcome measure might be appropriate for this person? Young, part time athlete, recurrent ankle sprains. Yeah, the Star or the Y really. The Star would be sort of the more complex challenging one for this patient. The Y would certainly be good as well. Does that mean that we can't do some of those other balance measures? Absolutely, we could do some of those ones that we talked about that were more specific to neurological conditions. But many of those this person might hit the ceiling on. Things like the FGA, DGI, those probably are

gonna hit the ceiling. Where this person's balance issues are really specific to control around the distal joint. So we can hone in on that with either that Y test, or that Star Test. Great job with those. And then the last thing, oh I said it was the last thing and it wasn't. It's just something about rating this. So again, when we think about how do we select the best measure, I think it's helpful to put things on sort of a continuum or a gradient. So you could reorder these and try to put them in the right order, but since we're at time I will tell you that if I was looking at this list and you said rate these from easiest to most challenging, I would put, out of these that are listed, the Berg of these that are listed, the easiest.

And then I would probably, oh I'm sorry, I put the PASS as the easiest. I didn't even realize what was on my list. I put the PASS, and then the Berg, and then the DGI, and then the FGA, and then the HiMATT as the most challenging. Now this is not all the measures that we talked about. This is just an example of kind of thinking about them on a scale of easiest to hardest. And that's gonna help us select the appropriate one for our patient because, we don't want to choose one that's too easy for the patient. We also don't want to choose one that's too hard for the patient. If they're scoring a zero, or a four on the measure that's not good information either. Okay, so I think that really was the last application piece. I did provide the references for you on a separate document. And we have time for questions, and I've also provided my email should you have any questions. And while I'm waiting for people to put in questions, I just would thank you for joining the course. I hope that you found it helpful, and not all new information, but hopefully it dusted off some things for you. Thanks Nadie, I appreciate that, that's very kind of you. Any questions?

- [Calista] All right well I don't see any questions in our question and answer pod. So we'll go ahead and close out today's course. But before we do again, thank you so much Jill for returning to PhysicalTherapy.com. A great course, and I'm sure all of us

learned a lot. And we're getting some comments in here saying thank you. And thank you so much Jill.

- [Jill] Yep, my pleasure. Thank you. You're all very welcome.

- [Calista] I'm gonna officially close out today's course. Have a great day everyone, and a great weekend.