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School-Based Intervention for Children with
Developmental Coordination Disorder or Suspected
Developmental Coordination Disorder

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- [Callista] Today's course is titled School-Based Intervention for Children with Developmental Coordination Disorder or Suspected Developmental Coordination Disorder. And we are pleased to have with us today Dr. Melinda Mueller and Dr. Lisa Dannemiller. Dr. Melinda Mueller received her masters in physical therapy and her transitional doctorate from the University of Colorado Health Science Center. Dr. Mueller became a board certified clinical specialist in pediatric physical therapy in 2013. In addition to practicing school-based physical therapy for a large district located in the Denver metro area, she is committed to improving the practice of physical therapy services. Dr. Mueller is an ABTA level two credentialed clinical instructor and serves as a mentor for the physical therapy residency program and is a volunteer clinical faculty at the University of Colorado.

Dr. Mueller is currently part of a team writing a clinical practice guideline for the Developmental Coordination Disorder and has contributed commentary on the topic to the ABTA Journal. She is the co-founder of the Colorado Inter-district School-Based Physical Therapy Group and serves as an advisor to the Colorado Department of Education. Dr. Lisa Dannemiller is an assistant professor in the physical therapy program at the University of Colorado and a pediatric certified specialist. Her career includes 28 years of full time pediatric clinical work, a doctorate in science from Rocky Mountain University of the Health Professions in 2005 and a pediatric specialist recertification in 2011. She's also been full time teaching since 2008. Dr. Dannemiller currently practices in the Developmental Pediatrics Infant Clinic at Children's Hospital in Colorado, and Dr. Dannemiller has been a presenter and facilitator at several education sessions at the Academy of Pediatric Physical Therapy's annual conference as well as CSM. She has participated in two educational summits sponsored by the Academy of Pediatric Physical Therapy. Dr. Dannemiller has teaching, research, and scholarship interests in the areas of education, admissions practices, pediatric health and wellness, and Developmental Coordination Disorder as well as autism, so we are

so pleased to have the both of you here with us today presenting on DCD. And at this time I'm gonna turn the microphone over to you Lisa.

- [Lisa] Great, thank you very much Callista, I have to give you a lot of credit for pronouncing my name many times. So thank you very much for that introduction. Melinda and I are here and we're very very excited to present to the group about school-based intervention for children with Developmental Coordination Disorder or those suspected of DCD. We'll use the DCD term through most of our presentation here today. The objectives that we're going to cover today are that we hope you leave this session with an understanding of the four DSM-5 criteria used to diagnose children with Developmental Coordination Disorder. DSM-5 is the Diagnostic and Statistical Manual of psychological disorders and that is where the diagnosis of DCD lies. We also hope to describe the current evidence for physical therapy management of children with DCD, specifically focused on those who are in the school environment, so we're gonna focus on examination and intervention in the school environment after introduction.

We're also going to identify some of the unique challenges or we should probably say opportunities that you have for working with children with DCD in the school environment. So our timeline today is that we're gonna provide an introduction, and then we're gonna review in a fair amount of depth the criteria for the diagnosis of DCD because we feel strongly that physical therapists should be part of that process of contributing information for diagnosis. We're then gonna spend quite a bit of time on examination and intervention strategies in the school setting, then we'll talk about those unique opportunities in the school setting mostly through a case that Melinda is going to present. And we'll end with probably about 10 minutes of time that we could have for your questions. We want to let you know that we will take questions at the end, that's probably the best way for us to handle that, so go ahead and make sure as Callista said that you're writing down your questions as they arise. We also want you to

know that we're gonna have many times during this presentation where we will go out to do some screen sharing for some documents that aren't really able to be easily viewed on a PowerPoint slide, so you can expect that as well. We're gonna talk to you about, our disclaimer is that Melinda and I are both working and we're nearly at our completion of writing a clinical practice guideline on DCD. And so we are not actually presenting to you the exact outcomes of our work. That will be presented this February at the combined sections meeting and so we're really sharing with you a lot of the details of what we have learned, but the clinical practice guideline will be presented at the combined section meetings of the APTA.

So we're gonna start with that first objective of really spending time looking at this DSM-5 criteria for the diagnosis of DCD. It's really important that everyone knows that a diagnosis, a medical diagnosis of DCD is made by a physician, a psychologist, or a psychiatrist. We as physical therapists cannot make a medical diagnosis of DCD just as we can't make medical diagnoses of many other conditions.

However, we feel strongly that the physical therapy contribution may be a little bit more, what should I say, a little bit more important for this diagnosis because there is in the medical community a fair lack of understanding of this diagnosis, so we may be doing some education about the criteria for DCD as we gather information working with a particular child. So the first criteria is that children who may receive this diagnosis have, they have learning and execution of motor skills that is below their age level when they're compared to other children at their age. And we're also considering whether or not this child has had opportunity for skilled learning of these and other tasks. So for example, if a child were six years old and had been in a, in perhaps foster care or in a, let's say orphanage and didn't have opportunities for movement, then we might not be looking at them in the same way as other children who have had that same opportunity for movement. So we have to have some way that we're documenting that they're below age level. So that's what Melinda will spend some time

on how we actually document that. The second criterion, and it's important to remember that all four of these criterion have to be met, so it's not just one or a few of these four, but all four of them. So the second one is that the motor difficulties that they present with have to interfere with their activities of daily living, their academic productivity, perhaps their vocational type activities, leisure, and play. So not only do they have motor skills that are below their age level, but they also have to interfere with their daily life. So my hope is that as you're thinking about these criterion, you're thinking about children who you may have seen who have coordination difficulties that are to a greater degree than other children who may have mild deficits. So perhaps those children who may be last to be chosen for a team, or those children who really stand out as having difficulty in any of their activities like being in their PE classes or playground kind of skills.

So keep that vision in your mind of those children that you've either worked with or seen or perhaps you were one of those children. So the third criteria for DCD is that the onset has to be in the early developmental period. That means there's no exact timeframe for that criteria, but it means that in early years in early childhood, not something that's diagnosed when an individual is in their teens or late elementary years having not had anything come up before that. So it's really the family that says that my child seems to have had difficulties from the time that they were toddlers and then into high schoolers and beyond, so it's something that continues. The fourth is that the motor difficulties are not better explained by some kind of an intellectual delay, a significant visual impairment or other neurological conditions that we may see. So that means that it is not those children who perhaps have cerebral palsy or Down Syndrome, other medical type conditions. Doesn't mean that those children may not have a comorbid condition of DCD, but it means that that's not describing the type of difficulties that we're looking at with Developmental Coordination Disorder. So in the literature we find a lot of other terms when Melinda and I and our team have looked at literature, we've seen a lot of the literature, particularly from the past, would talk about

children with Clumsy Child Syndrome. There is a lot of literature about developmental dyspraxia. But essentially what we have learned is that the international community has now chosen to use the term Developmental Coordination Disorder rather than focusing on the older term developmental dyspraxia. It's also important to know that there are a lot of children with DCD that you will probably see if you have been in the schools. And so the current statistic is that five to six percent of school age children have DCD, that may be an underestimate according to Harris et al, but it is something that we need to definitely watch for in our classrooms.

So for example a classroom of 33 children may have at least two children with probable DCD in that classroom. So certainly an area that we need to consider and really be on the lookout for. So what's a little bit hard is that in the literature we see that there are a lot of co-occurring conditions with Developmental Coordination Disorder. However, what we don't see is a lot of clear distinction in terms of different examination or intervention strategies for children with these different co-occurring conditions. So what we'll be presenting today is mostly information that has to do with the literature that focuses on children with DCD or those who have probable DCD. The co-occurring conditions that are the most common are children that have ADD, Attention Deficit Disorder, or ADHD, Attention Deficit Hyperactivity Disorder. So many many children approximately 50% have this co-occurring condition.

In addition, many children have specific learning disabilities, some disabilities with reading, some disabilities with writing or handwriting. We are not going to focus on handwriting today because it is not within the scope of practice for many physical therapists in terms of our education. Some of you may have, and particularly some occupational therapists who might be part of this presentation may have more experience than many physical therapists do in that realm. But because that's not our expertise, we won't be addressing that specifically today. Some children also have speech and language disorders, dyspraxic speech as well. Many children also have

Autism Spectrum Disorder. It used to be in the DSM-4 that children could not have a dual diagnosis of Autism Spectrum Disorder and DCD, but within the DSM-5 that is possible now to have those two diagnoses. Some children also have some psychological disorders as well and so those are oftentimes seen as children age a little bit. Some of the characteristics that you may commonly see is as we mentioned this gross motor skill delay, they have to have delays beyond their peers. They also will have the ADL limitations and because of these types of challenges children may also have some difficulties in this school setting. You'll also see that because of these challenges and because children may not be able to participate as well there may be some social implications we'll talk about a little bit more, and some resulting communication issues as well.

So again we wanted to highlight that incidence of five to six percent of the children that are in schools may have DCD. So here are some of those functional consequences of having so much difficulty with motor planning, with motor skills, are that the children may choose to not be as active, they may not feel as successful. And so poor fitness may be a consequence of having DCD. And as a result also obesity may be a problem as well. What we see is that children may have decreased physical activity in general, and so they may choose to not participate in sports if they are not going to be successful, if they may be called out by their peers about not being able to play as successfully for a team. And so they might be better off doing individual type sports so things like horseback riding or golf or swimming or things that may not require participation to achieve a particular goal with a whole team. So some of these children also have poor self-esteem and self-worth. I should mention I just realized when I'm referring to children, we are going to focus on children today although we want you to know that individuals with DCD still have DCD as they progress into their teenage years and into adulthood. So some of these problems may continue, things like poor self-esteem and self-worth. Children may also have some emotional and behavioral problems, so you can imagine in school if a child isn't able to be successful in their

classroom at the speed or the quality of their peers, they might act out, they might, on the playground stand out as the child who's not participating as well with their peers. And so they might also therefore, a lot of school activities involve a lot of motor planning and sequencing and have some difficulties with academic achievement as well. So all of these children are highly at risk for being bullied, I should say. That I think this is probably one of the big reasons that our team was interested in looking at DCD and really thinking about gosh, can we intervene in a way that allows children to be more successful from an early age and hopefully not be therefore at risk as much as their peers with being bullied.

So I think that's something that we all address. I think yesterday was the international day of bullying prevention, so there's an international attention to this problem with bullying as well. So I'm going to give you guys an opportunity to maybe feel what it's like to have DCD. So I'm purposefully using a series of words in a sequence that you have to follow and do and following that sequence may also be difficult for some of us, so I'm gonna take you step by step through an activity that I want you to do while you're sitting at your computer. So sit up straight, go ahead, put both arms stretched out straight in front of you. Have your palms facing each other. Now take your wrists and cross them over each other so your right goes over your left or your left goes over your right, either one. So you should have your arms crossed at your wrists with both palms facing out.

Now keep your arms extended, but wrap your hands around so that your palms are touching each other. Now clasp your fingers together so that you have a tight fist out at the end of your extended arms. Now bend your elbows and bring your hands towards your chest your wrists and hands will naturally go down and then turn them up so that your hands are right in front of your face, right in front of your eyes, clasped hands in front of you. I hope you all had a great experience doing that, but you're not done, so keep your hands clasped in front of you like that. Now I'm gonna ask you to move your

left ring finger up and down. You may hear Melinda laughing in the background because she's having trouble doing it. Now move your right index finger up and down. A little challenging? Now maybe you'll have more luck moving your left pinky up and down. So I love this activity, I hope you all had the same amount of challenge that we did. What I love about the activity is that it really draws your attention to what the learning experience may be for a child with Developmental Coordination Disorder. If you think about what you just did, you had to really focus your attention, you had to really cognitively plan each of those movements to so much of a greater degree than most individuals do in their daily life with their motor activities. And so if you think about the challenge that that presents for an individual child with Developmental Coordination Disorder.

I hope that your experience allows you to empathize a little bit with their experience and how things may take longer, things may take more planning, things may not be done as smoothly as you and I do them most of the time. Great, so we're gonna move on to a little bit about, I think I have a slide in here about what the CPG is, I had mentioned that we're going to present at CSM. But basically what we are going to present there is this whole collection of action statements that are developed from a systematic review, and our hope is that when we, are able to implement this, that we actually see that there is less variability in the care of children with DCD, so I think that's what's most important to us is that we're hoping to have the care be more optimized for the patient and that we're gonna reduce unnecessary variability. So just a review of the DSM-5 diagnostic criteria, those are kind of more simple ways to refer to them and ways that you may remember them, that students first have to have a performance deficit.

They have to have participation in their playground play and ADL deficits. They have to have an early onset and no other exclusionary type conditions to have this diagnosis. I'm going to cover a couple of those exclusionary diagnoses in a little more detail

because you will actually see these if you do a history and systems review with the children. And I know in the schools that this is definitely different than in a clinic setting, so it may be a quicker screening to make sure that if you have a referral of a child with DCD or a child with coordination problems that you're looking to see that there may not be any other reasons for their coordination problems. So we're looking at things like do they have a loss of motor skills, that's not typical of children with DCD, we usually see that they just have slower development and different quality. Do they have any neurological signs and symptoms? Do they have abnormal muscle tone, do you see a Gower's sign that would make you suspect that there was muscular dystrophy? Are there any signs and symptoms of trauma? Could they have had a head injury? Could they have any acute changes in cognitive function are not typical of DCD nor is any acute change in vision.

So some of those exclusionary conditions are those that I alluded to, cerebral palsy, congenital kinds of syndromes, any other kind of genetic disorders, musculoskeletal disorders, neurodegenerative disorders, traumatic brain injuries or significant visual impairments. So those are the types of things that we're really looking for to rule out. So what I would like to mention here, I'll just go on to the next slide about the delay in gross and fine motor skills in the early developmental period, I did mention that we don't have an exact time from for that. But definitely as children are typically developing through their preschool and early childhood years is when families and physicians and other providers may notice differences in children.

So as a school therapist, I know that you may or may not have too much interaction with physicians around getting an exact diagnosis of Developmental Coordination Disorder. However, if it's important for you and for the family to do that, then you would be able to take information that you have for these particular criteria, all four of these criteria and have a conversation with the physician, perhaps provide some educational information to the physician if they're unfamiliar with DCD. But you don't absolutely

have to have a diagnosis of DCD to be a recipient of physical therapy services in the school. So that is a decision that you will make as a provider, whether or not you pursue diagnosis or whether you treat these children in the schools as a physical therapist for their limitations that interfere with their access to their school environment. So that's something that you will decide with the family perhaps and providing information to the family as you go. So that's the summary of the criteria related to their medical components. And what I'm gonna do here now is switch over to Melinda Mueller who is a quintessential provider of physical therapy in the schools through Cherry Creek schools in Colorado, and I will let her go on with a little bit more of the specifics around the criteria through examination and then through intervention. So it's been nice to talk to you, I will come back on towards the end when we get to questions, but Melinda has a lot of content to cover here, so we're gonna make a quick switch in our headsets.

- [Melinda] Okay, so now it's Melinda Mueller on, and we're gonna start, this is where some of the back and forth is gonna go, so just so you know, we'll go back and forth between the PowerPoint and some just screen sharing, which I think are just great visuals for you all. So we'll start off with meeting criteria B, so that's the one that says basically if we just sum it up, it's participation in ADL deficits. And this is where the child's motor difficulty significantly interfere with their ability to perform ADLs and they interfere with academic productivity. The prevocational, vocational task, leisure, and play. So there are some good test measures out there to help you look at these particular areas. And so the first one is the DCDQ, which is a parent questionnaire and it's called the Developmental Coordination Disorder Questionnaire. It's updated in 2007, the manual itself was updated in 2012, but the actual updated questionnaire was 2007. It is free, that's the best part about this one. And it's for children five to 15 years old. So before I go to it, I just want to quickly look at, I just wanted, for a school setting, let's just talk about that for a minute. So when we're thinking ADLs, well what things are we looking at in schools for ADLs? How about buttoning and zipping up your coat?

That can be a problem for some of the children. Organizing their supplies, their desk, is their desk messy, what's happening there? Their backpack, can they hang up their backpack, can they get their supplies out of their backpack? And then academic performance, handwriting, is that an issue, and that's very common with children with DCD is that they struggle with handwriting. And then leisure and play activities is that decrease interest in physical activity, they struggle to learn new motor activities, so playground issues. Maybe kids are playing a new game that they invented which happens all the time with some ball and they're doing this and that child is just struggling to participate.

And you also find these children sometimes just walking around the playground not even accessing the equipment. So sorry, that was a little aside in there, but it just kind of helps sum up what we're looking for in that criteria, be just that decrease in participation and ADL deficits. So now let's jump forward and look at that DCDQ. I'm gonna share a screen with you, and this'll be my first time doing it here, but I hopefully get this. Oops, let's go to this one and here is a screenshot of the DCDQ. And this is something that you can download from CanChild, we do have it in our references, I think it's there on the slide as well. And you can see they, when you send home a questionnaire like this for parents, 'cause remember, this is a parent questionnaire, it calls it a coordination questionnaire. And so the parent would fill it all out, great, and then it comes back to you, and then you're gonna take what these scores are here and then you're gonna enter them into this score sheet.

Now the parent does not see this score sheet at all. And you come up with this nice score at the end, you're gonna score all their control during movement, their fine motor, handwriting task, and then general coordination. And then let's say that this child was like eight years old and they score 23. Well then you're gonna look on here and it says indication of DCD or suspect of DCD. Just a reminder, you cannot make a diagnosis of DCD from this questionnaire alone, this is just one piece of the puzzle. This is giving

you criteria B. I'm gonna go back to the PowerPoint. And it's supposed to magically appear back where I left off, which I really like that, it just happens. So you guys don't know what's happening on the other end, but somebody does that part for me, which just makes me so happy. All right, so another test that you can do to try to meet criteria B is called the Movement Assessment Battery for Children Checklist, or the MABC-2 checklist. This one, what's great about it is that it is for teachers, parents, or therapists. And this is when I say what's great about that is because you get what they're doing at school, this is how the teacher, if you wanted the teacher to do it you can see how the child's performance is going at school in self-care skills, classroom skills, ball skills, and recreational skills. Also just as a reminder, this test actually costs quite a bit of money, it's part of a whole kit. It's called the MABC-2 kit which we'll talk about, but it is expensive.

So for schools that can be a problem. I'm gonna go to sharing screen again and show you a picture of that particular checklist. So here's the MABC-2 checklist. If you haven't seen it before. Or questionnaire, sorry. Actually it's a question checklist, sorry, Lisa and I are talking back and forth, you don't hear that. Anyway, it has three sections, there's section A that looks at predictable environment such as here's an example of one, the classroom skills. Forms letters using a pencil or a pen. Also the second section, section B, looks at movement in dynamic or unpredictable environment such as ball skills, they can hit or strike a moving ball using the bat.

Then there's a third section which is not part of the score at all, and that is called non-motor factors that might affect movement. And I like this that it considers these areas just as something to put in the back of your head when you talk about, is the child distractable, are they impulsive, are they anxious? So I'm gonna go back to the top of this, you're gonna see your screen fly, and once you get your scores, you have section A and section B, then you get this total score and the MABC loves using the traffic light system, it does it in the MABC2 test and also in this particular checklist or

questionnaire. And so if you get a green light that means yeah, there's no difficulties of motor and you can move on. If you score in the amber zone then that would mean that there is a risk for motor difficulties. And then the red zone would be that yeah, there's a probable risk for motor difficulties with this child. This particular questionnaire does not use the word DCD in it, it actually says motor difficulties. However it was designed to be used for children with DCD. All right, so I'm gonna stop sharing the screen and move back to the PowerPoint. Oops, there. And onto the next slide. So let's say also in the schools you can't afford the MABC, and what if the questionnaire isn't coming back from the parents? Now what do you need to do? Well you do have other options. You can do what probably most of us do a lot in this school is that we go and we ask the teachers. Say hey, how the student is doing. We might call the parent, ask the parent questions about what does your child like to do after school, what kind of activities do they participate in? How is it going in the morning when they get ready? How well, can they get dressed and be ready for school on time? How are they doing with getting their lunch box ready to go, just questions like that that you can ask the parent.

You can also ask the student hey, how are you doing? How are things going at school? How's recess, how's PE? I wanted to share with you a couple of checklists that I use in the school district that I hand to the teachers so that, we can, a couple of checklists that I share, which I like to use for the teachers, 'cause I don't always have time to just stop and ask them a bunch of questions. So again I'm gonna share my screen, and this one is called a, we just call it a physical therapy teacher checklist. And you can see it's very short. There's a few little check marks that they can make on it and then my favorite part about this particular checklist is that it has the level of concern, and then that gives the teacher another chance to think about that. Are you a little concerned, are you moderately, or are you extremely concerned? And those ones that come back extremely concerned, they're a big red flag for me. I'm like ah, I definitely need to continue to look into this. And then there's also, called a functional checklist that you

can look to see how children are participating across their school environment. This is just a simple one that we use in Cherry Creek. And you can just go through, make quick little check marks on each of their access areas. You can write about the quality of that movement, and that will give you a good idea of how their motor performance is affecting their ADL participation or participation in general across multiple school environments. All right, and now go back, I'm really sorry all this switching, but I really do like some of the stuff I'm sharing with you, I think it gives you a good idea of the test and measures and then just general checklists that we're using.

And now onto the DSM-5 criteria A, which we have just shortened that definition to say motor performance deficits. So one thing to think about with motor performance deficits is that we're not really saying, this is gonna confuse you a little bit, but they might be a little delayed in motor development per se but it's more the delay is in the acquisition of motor skills, and so let me give you an example of this before I get into the tests and measures. Let's say a child can jump. What does that jumping look like? Can they, if you set out five targets, each target may be five inches apart. Can that child jump, continuously landing on each target and hit that target? Or does the child, they jump and they jump and the next thing you know they're tripping over themselves and falling, can they just not hit the target when they're jumping, they over jump it, under jump it, what is that quality of movement and how well are they coordinating that ability to jump?

So the MABC does a great job looking at motor performance. It's an expensive test again, it is the test that was the most recommended in a clinical practice guideline for DCD put out by a group in Europe. And it does come up most often in all the literature of the test that's being used. So let me just kind of go through the test a little bit, we have some creative ways that maybe you can meet criteria A if your district can't afford a test like this. But the MABC-2 is norm referenced, it's for children three to 16 years old, it takes about 20 to 40 minutes to administer it and it has three domains. Manual

dexterity, aiming and catching, and balance. So let me go back and share a screen with you. And here is a front cover of the MABC. And you can see here are some of the components that it looks like, and this particular, it has different booklets depending on the age band of the child, so this is for seven to 10 years old. And when they were looking at manual dexterity, this particular one, and this is the other thing I like about this, this is pretty quick. I mean look at this, there's only, here we have four, five, six, eight items, and so that makes it pretty easy. And so manual dexterity, placing pegs is one of them, threading lace, drawing the trail, and aiming and catching is how well they're catching with two hands or throwing a bean bag and then balance. How well they're balancing on a, it's a balance board actually, it's quite difficult. Walking heel to toe, or hopping on mats, and then you get a score.

And the score for this, so right over here, here's the raw score, you get a standardized score and then from there, a standardized score is converted into a percentile score. On this particular test, if you score below the fifth percentile, it's considered that you have significant difficulties in motor performance and then if it's between the fifth and 15th, it's at risk for motor difficulties. And this particular manual does recommend that the child have intervention or be monitored closely if that's the outcome of this test measure. And then anything 16 and above you say hey, you're good to go, we don't think you have any motor difficulties at this point.

All right, and now I'm gonna switch back. Okay, and the next slide, we'll move on to that, is the BOT which is the Motor Assessment Battery for Children, it's in its second, sorry this was a, let me skip that one. So here comes the BOT, it's the, it's also in its second edition, it's norm referenced for the US population, four to 21 year olds. It takes a much longer period of time to take it, it's 45 to 60 minutes compared to the MABC-2 which was 20-40 minutes. It does have four domains, fine manual control, manual coordination, body coordination, strength, and agility. And again, this is an expensive test to buy. I'm gonna go back again, share screen, I must sound like a broken record.

And up pops the BOT. This, so again, here's just the scoring sheet that you end up with where you look at each of those four categories, and you come up here with the standard score. And this score then looks at, if the standard score falls 40 or below or greater than one standard deviation below the mean, then the child is considered to have motor difficulties. The one thing I took another picture of is the short form which cuts the test in half, and it has also been used a lot in the literature to use the short form instead of the full. I read an article, I'm spacing the name, but it actually said that they were equivalent in the results that you get. So if you do have access to this test, you could do the short form and maybe get the results that you want that way. All right.

So still on criteria A, let's say we don't have the money to pay for the MABC-2, we don't have the money to pay for the BOT-2, that's not unusual across school districts. So there's other things that you can do, you can look at the child's fundamental motor skills and this would be basically doing an observational movement analysis on the quality of those skills and their ability to do these skills. When you think fundamental motor skills you are thinking about local motor skills, balance, and ball skills, and local motor skills being defined more as running, jumping, hopping, skipping, galloping, those types of things.

Balance skills, having to do with single leg stance activities and ball skills having to do with throwing, kicking, and striking. Another way that you can look at a child's motor performance is again through those ecological checklists with movement analysis. So I showed you a checklist earlier that had a bunch of participation areas in a school. And you could definitely look at a child and say well how are they getting on and off the floor? Well you could either say yes they can get off the floor, not they can't get off the floor, or you can take it a step further and say what does that look like? Are they using a bear crawl to get up off the floor, do they use a half-way stand to get off the floor, what does that look like? Ability to participate in age appropriate games on the playground, what's happening on the playground? Do you see them playing with the

other kids or do you see them walking around in gravel, I had mentioned that before, or maybe they just sit around a lot, or do they get going in a game of tag and they're having a lot of fun doing that, and the next thing you know they're sitting on the ground or maybe they're leaning against the equipment and they're just taking a lot more rests than the other kids do. Posture during sitting activities, you'd want to look at that, are they slumping over the desk, are they sitting on the floor, and the next thing you know they're lying all over the floor? And then their ability to participate in PE and sometimes you can figure that out, as you well know, if you ask the child so how's PE going and they answer sometimes with children like this, they'll say I hate it, I don't like it. I'm gonna share my screen again because I wanted to show you a couple of other checklists. I think we might be getting down to the last share screens if any of you are getting tired of the back and forth.

So here is a way of looking at some fundamental motor skills, it's another checklist that we use sometimes in Cherry Creek, and it just is asking a lot of questions about what they can do, what they can't do. Some of them are more the developmental side of it all, like as far as like jumping 24 inches, jumping 26 or 30, but then you can write comments down about that and that comment section is also for the quality of the movement. What does it look like when they jump? Do they land hard? And here's the balance skills on the same sheet we have transitional movements like I was talking about in the classroom, especially when you think about a little kindie, can they play and squat or are they falling down on their bottom all the time and losing their balance? Are they tripping all over things in the classroom?

And then here are fall skills and stairs, I love looking at the stairs, what do stairs look like for these children as they're walking up and down them? Are they still marking time, placing two feet per step, or are they alternating down the stairs? Do they have to hold onto the rail, can they do it without holding onto the rail? Do they go slower, do they stop on each step? I think you get where I'm going with that. Another thing on the

playground, I can collect a lot of information just to see how they change surfaces and what happens when there's a barrier. So for example, let's say those little concrete barriers, the child does fine, everybody's running, here's the barrier, they stop. Then they either put their hands down to step over or they just stop so they can gather themselves to step over. Same thing with changing between grass to concrete or gravel. They might stop or slow down when they change a surface just to gather themselves so they don't lose their balance. All right, and then I'm gonna show you another one, and I'm also gonna give a plug to, I don't know if any of you have used this before but this Your Therapy Source Incorporated. This is a great place to go to get checklists, and they're very cheap. So even if your school isn't gonna pay for them, who cares, they're like three bucks, and they'll even tell you you can edit them, so they give you the Word version.

And you can keep using them over and over and over again, so it is a really great place to pick up some checklists of different types of things, and they have so much stuff on their website. But anyways, here's a great great one I just decided to use for you, but here's like participation in classroom, functionality in classrooms, functionality in the school. And this obviously isn't just for DCD, it can be for any child of any diagnosis. I like that it has this whole part on life skills, you can get an idea on how they're washing and drying their hands in school, what does it look like just taking care of some self-care tasks? And then some playground activities as well.

So again, there it is, Your Therapy Source Incorporated. I may have given them a reference too in the back. Okay, let me go back to the PowerPoint. Okay, very good. So moving along, let's go to examination of body structures and functions. So let me just kind of put that all together, what we just did right? We just went through all four criteria, going through criteria A, B, C, and D. And in reverse order actually. So actually D and C, Lisa went through that, and that's just basically, did it occur during the early developmental period and then the other being like are there any exclusionary

diagnoses or red flags? Then we looked at does the child's motor performance significantly affect their ADLs? And then finally we looked at, in more detail, their actual motor performance. So we have added another section that we feel is important. It does not contribute to criteria A or B, well directly as far as definition goes, let's put it that way. So but through, there's some really great systematic reviews out there to look at this body, structure, and function, combined with motor performance. So let me just first talk about examination of body structure and function and it comes up a lot in the literature too. So one of it is, the children with DCD is basically we know that they have poor motor performance. And secondly they also have poor physical activity outcomes and participation in those activities. And then they seem to perform significantly lower in most fitness components.

And an article by Rivilis actually started that poor motor competence is believed to play a role in poor outcomes in the components of physical fitness and physical activity outcomes. However, it is not known whether physical fitness is primary or secondary in children with DCD. So throughout the intervention articles, they mention these components of physical fitness a lot and they want to see if the interventions are having an effect on physical fitness components. And they do by the way, but we'll get into that. So different ways in the school, how can we examine structures of body function, or body structure in functions?

And we do this already I think, I imagine a lot of you will be like, well I do that all the time. So yeah, like the 30 second walk test where you're looking at muscular strength and basically their walking ability, how well. And you can then say well can they keep up with their peers in walking from one area of the building to another? Because that gives you a nice little norm reference where they fall. Then there's cardiorespiratory fitness, you can do that through a six minute walk test, which is a really nice test to do. And again it'll give you an idea of where they are. There's also 20 meter shuttle runs, sometimes that's done in gym and they also call it the pacer test. And then many PE

teachers do that at the beginning of the year. I a lot of times go in and check in with the PE teacher and ask about that type of thing with the child. And then there's balance where you can do a pediatric reach test, and of course there's also just looking at single leg stands, you can look at that. If you actually did, if you could do the MABC, you're gonna know where they fell in the balance section that kind of give you a good idea too. And of course there's APTA fact sheets that list the whole thing, I think it's three or four pages of assessment tools, and it is categorized by ICF. And I'm pretty certain the fact sheets are available to everybody whether you are a, yeah, an APTA member or not. I think you can just go Google it, find it, but I think we also gave you the link on the reference site as well. Okay, oh we do? Okay. Do we have it pulled up? Oh, let me see if I have it pulled up, I'm gonna share it, I wasn't convinced we did, but okay. Oh yeah, right here. So here's all the different body structure and function that you can use. I mean it's just a list, and a list, and a list, and then they have them categorized by activity level, the different testing measures that you can use for that. And also by participation level. And then here's someone with personal and contextual factors.

This is a great list, a lot of people worked hard to put that together, so it's a great tool. Okay, and outcome measures related to participation. So we do have to talk about outcome measures, right? As also, as before we go into interventions, let's talk about what outcome measures we're gonna use to measure those, and then we'll go back and do a case study that hopefully will tie some of this together. So outcome measures related to participation, there's the COPM which is the Canadian Occupational Performance Measure. There's also the PEGS, the Perceived Efficacy and Goal Setting Program. These two actually go hand in hand, they cover the age group where the other one doesn't. The COPM, I think is from eight to 21 maybe and the PEGS is from five to nine years old for that. It might even be four, not sure. But anyways it's a great, they both, well the PEGS use that card system to help small children look at what they feel their good at and what they may need to work on and what they're interested in

and helps with setting goals and they're related to participation. And then there's the CAPE and PAC, and for anybody who is familiar with those, they're for activities outside the school setting. They tend to use them a lot in our district for high school in the transition program. And then the goal attainment scale, we put this one on here because it's such a great tool to use when you're wanting to try to measure just levels of participation, and a way to just in general monitor progress. If it also helps, I think it can be motivating to children that are able to be involved in the process of goal setting and what steps they need to take. So let me show you for anybody that's not familiar with that.

So here's an example of a GAS goal, so this is related to how you can just use it as an outcome measure. But you basically, everything is an increment. So you have the first level, like say jump roping, that's at the ICF activity level. And then the current level or the baseline is a negative two, so they're not able to skip. They can jump one time is the next one, so they're just in increments. They can jump five times in a row, they can jump 10 times in a row. And so forth, and then you can also do one that was maybe for participation, playing at recess. And right there, the baseline was maybe they don't access any of the equipment, they just don't play on any of it, and so the goal can be accessing one piece, then two piece, and then all the stable playground equipment and then maybe doing much more than expected which would be a plus two. It would be they play on all stable equipment with one pieces of moveable equipment.

So once you get all the, at the end of when you're trying to do some progress monitoring, you score where they are at that time, you add it all up, and then it goes in this cute little formula and you get a T score, and that T score tells you whether that progress that they made, whether it was significant or not. And then just as a side, you also realize that outcome, when you're talking about outcome measures and how you're gonna measure progress, any of the exams that you did earlier that I introduced to you earlier also could be used as an outcome measure. The MABC-2 can be used

as an outcome measure. Gosh, the six minute walk test, 30 second walk test, any of those can. So you can get as complicated as you want, but I do feel that we do all this stuff for participation, what is the child able to do as a result of your intervention that improves their experience at school, either their access, or their ability to interact with their peers. So that's where the GAS goal can be a nice thing. But you can also, we use something called a scoring tool, and we put areas of access. So let's just say for this child that has DCD, let's just use classroom and playground. So classroom I may have on there the child getting on and off the floor so that they can do that more efficiently, especially if I'm thinking a Kindergartner and they're getting up and down from the floor all day and maybe they're struggling in that area a little bit. I could work on that as part of a classroom access skill.

I can also work on playground, on accessing the equipment, practicing playing on the equipment. And then I could even add one more as a building skill and use it as a stair goal in there. So that's another way, and you would have just like you do a rubric. You give them a score based on their level of achievement in that area. So let's move on to this, let's talk about intervention, what does intervention look like? So let's say this child comes out and they're like yeah, it looks like they might have DCD, so what are we gonna do about it? Well we're either gonna seek a diagnosis, talk to the parent about it, but that's gonna come a little bit later in the school setting 'cause we're gonna have that conversation probably at an IEP. But either way that would be a decision between parents and you know, maybe your recommendation of maybe seeking that diagnosis, but either way you know that this child presents as if they had DCD, they don't have any red flags, you're seeing that they are really lacking coordination in a lot of their motor skills, so you want to go ahead and intervene at this point. Best practice now as far as what our systematic reviews are telling us and maybe our CPG, I'm not sure, I'm not really supposed to about that too much right now. But task oriented interventions, these are probably some of the best interventions to use. And task oriented interventions are motor activities or programs to improve the acquisition and

execution of a specific functional task. So the types of task oriented interventions are Motor Skills Training, Neuromuscular Task Training, the Cognitive Orientation to Daily Occupational Performance, and then Motor Imagery. Just give me one second. Okay, so let's start with task oriented training for Motor Skill Training and Neuromuscular Task Training. And we're gonna present these two together because they are so similar that I'm not sure to be honest with you if I can recognize a difference between the two types of interventions.

There's not a lot of, I found one intervention article that in the past nine years now that used NTT and many many many use Motor Skills Training. But anyways, they both are based on theories of motor control and motor learning, and they both focus on goal attainment through active participation and task demands that are progressively increased. And those, when you think about task oriented interventions, they need to do all those things. They need to focus on goal attainment, they need to be active, the child needs to actively participate in them, and the task demands need to be progressively increased.

As you do your progress monitoring, you would increase, right? So here's another example to try to make what is a task oriented intervention, 'cause all I'm giving you right now is a definition. So let's take stairs. The child needs to learn how to negotiate stairs better. If you're practicing stairs and you just keep practicing and it's an intervention to improve stair negotiation, then that's task oriented intervention. Now let's say you're going and you're gonna practice some stairs that day but you're doing it because you want the child to improve in leg strength or maybe appropriate perceptive awareness, or who knows how you're using the stairs. In schools we get quite creative and stairs become a good treatment modality for us. So that becomes more of the body function and structure, or a process oriented intervention if you're gonna use stairs to improve leg strength only if that's you're only goal with that. I just kind of want to take time just to look at one more note that I made to myself, make

sure I covered that the way I wanted to for you guys. Yeah, okay so then moving on to the next one, next slide here. The other type of task oriented intervention, and it's a really cool approach, it's a Cognitive Orientation to Daily Occupation Performance called CO-OP. If you want to learn even more about this intervention is probably well described on CanChild. They do a great job describing what this is about, they even have some really great videos too. The thing is about it though, you really do have to go get additional training before you can use it. So you need to find yourself some continuing education around that. But either way, I'll tell you a little bit about it. There's a four step self-instructional problem solving strategy, that's how it describes itself.

And this method uses Goal-Plan-Do-Check as its main formula. So this is what it looks like, we'll use jump roping as an example. So the goal is I want to learn to jump rope. The plan, that's how am I gonna do that, well, maybe I have to learn to jump in place. I have to learn to turn the rope, and then I also have to learn to jump in place and turn the rope at the same time. The next portion of that is Do, well that's exactly what it says, Do, you've got to go practice. Lots of repetition, the more you practice it, the better you're gonna get, you must practice. And then the check is how am I doing? So that would go back, let's look at where you're at, oh hey, I can jump in place now. Okay good, what's the next step? And then you continue to progress, keyword there, progress the activity. Then the final one is Motor Imagery, this is, okay, you'll see in articles, there's a few of them that will say that this is a new intervention. Well not really, it's not a new intervention per se because athletes all over the US use it and across the world, let's put it that way. It's been used a lot in neuro rehab. It's been used across multiple populations. But it's just now being looked at in the DCD population, and Wilson has a great article if you're interested in this type of intervention to describe it. But it has six components. And so you do need a child who can participate in this cognitively with you, so again, the selection of the intervention that you're gonna use is going to also be able, also is determined by what the child is able to do. So it has, visual imagery exercises, relaxation and mental preparation, visual modeling of

fundamental motor skills, mental rehearsal skills from an external perspective, and from an internal perspective. And then overt practice with repetition of the skill and mental rehearsal between the skill. And I think a lot of us do that last step a lot, I think we have a child, they're practicing, they want to learn something, and we will just be, okay now stop, let's think about what just happened, what do you need to do? And so we might use a component of that, but I think we use a component of all those task oriented interventions in our current intervention practice. That's just my opinion by the way. Let's move on to interventions at the level of body function and structure.

So remember, with this particular presentation, we are presenting on what we found in DCD literature, that all of you, I should say that most of you probably have access to, and there's some great systematic reviews out there right now, especially YU 2018 is one of my most favorite ones, because this one really puts together a lot of the pieces for where we are right now with intervention and where we need to go. So let's just quickly talk about interventions at the level of body function and structure. And the reason I'm also prefacing this is I'm just not sure the slide makes as much sense as I wanted it to. So if we're going to do straight up interventions looking for impairments, you have core stability training.

And there's quite a few studies that did look at that. And one of them in particular, they just did core stability with a physio ball to see if that would increase motor performance and core stability and balance. Well guess what, it did not increase the balance, just as a heads up there. That physio ball did increase motor performance, but they didn't have an increase in balance, and the other group of that same study, they did core stability exercises combined with task oriented training. Guess what? Those kids actually improved in balance, and I think that's because, and the author says this, is because there was a dynamic component to the training of the other group, which therefore you got to see an improvement in balance. And they used the SOT to determine if the children improved in balance or not. And then we can look at balance

training all together, there's multiple ways to do that, studies have lots of ways that they worked on it. Some use these functional movement trainings that focused on the stability of the task. Others use sports activities that they use to try to improve balance, so a lot of different ways to do balance training. I'm sure all of you in the audience can think of multiple ways that you can do balance training. And then cardiorespiratory training. The study that did a straight up on this was, they actually used interval training, and these children, it was a very intense program, and they did it all based on running. Basically interval training on the track, they did distance running, I mean it was a crazy program. Very intense, but they did obviously have great results. So let's talk about intervention all together and what you found, 'cause I can present that, and in their study, they looked at motor performance by the way, this was the primary thing that the systematic review looked at is how well did they improve in motor performance.

And the best was when they combined, when the studies combined task oriented interventions with impairment level interventions. That seems to have the greatest outcome and the greatest effect size. Good, and still had a good effect size by the way, is you just use task oriented approach alone and you didn't focus at all on impairments, the results are still good and you did see an improvement in motor performance.

And then not recommended, and this has been backed up by several systematic reviews through the last probably five to eight years that impairment level only interventions do not work to improve motor performance. And we should probably stick to task oriented combined with impairment level is now what they're saying, and that's pretty new. It's the first article that we had seen that in was used, that actually pulled that data. Okay so, so now we have also evidence on intervention, and this is like whether we do group versus individual. And the, okay, see where I'm at. I'm just double checking where I'm at. So group versus individual, so that's like whether the

group size was four to six to one ratio and then individual obviously one on one, and that was found to be equally effective. The effect size was the same for both, mode of performance was the same for both, so that was a good finding especially in schools when you're looking to combine small groups. One study, and I'm not gonna remember the name though, did mention that children are below that fifth percentile when you're thinking about the MABC, individual sessions are probably best versus the children that score between that fifth and 15th. And then the large group we did have, there was one study that found that it caused increased anxiety and decreased enjoyment for children with DCD. So that's significant to know that it just becomes too large and then when you start thinking about PE classes and the child's being introduced to a new skill and how overwhelming that might feel to them. And that's a good point to keep in the back of your head when you're thinking about indirect services or consultation services in a school district and who might be the players that you want to talk to to help these children with their motor skills in situations like that, and PE is probably where it's gonna come up the most. All right, intensity. This was a surprising result, not really I don't think, but kind of. But it felt like a lot for us when they found that an increased practice schedule with increased repetition is the best way to see improvements in mode of performance, so the recommendation was four to five times a week.

Frequency, this is key, I thought this was good, was more important than the amount of time, so it would be number of times you practice was more important than the amount of time, and then the use of direct home programs and supplemental were all okay as part of that practice time by the way. And interventions that were nine weeks or longer seem to be the most effective for children with DCD or decreased coordination by the way. So there's lots of ways you can do that in school right, because many times we have a pair of professionals working in the school and if that child has one you can set up activity programs around the particular skill. You can also set up home programs just like little practice sheets that they can go home to do, but now you know that the

frequency is more important than the amount of time, give them one or two things that they're working on to practice, not a whole list, because we know they just need to practice maybe one or two things more. And then, and then talking with parents then, you can also talk about supplemental activities like activities outside of the school that the children may benefit from based on what their goals are for participation or what we need to do to improve access. So our role as a school based therapist for these children in particular is improving functional motor performance as gross and fine motor, right?

So we can increase participation in school activities with their peers, increase participation in physical activities at school and in the community. Also collaborating with school teens and significant adults. Education of diagnosis and strategies to improve participation. And in this particular case when I talk about strategies to improve participation, I am referring to physical activity outside the school as well as accessing different areas, especially like the PE and playground areas. Those tend to be the ones that are most difficult for our children. For OT though, it might be the classroom, especially since you're involved with handwriting. And then we also have a role as a PT in the school is to recommend and provide resources for community activities. This could be individual versus group activities and motor versus non-motor activities.

Many schools have developed like these type of resources but it's our job to point these out to the parents so that they can provide these community resources, or we can provide these community resources for their child to participate in that they would be successful in. Many parents would come to me and say Joey wants to play soccer and you're like, you're just kind of taking a step back because you know ball skills are not there, this child can't kick a ball nor can they, they can't catch one. And you're just thinking oh goodness, there must be something else. So you kind of redirect that a little bit by you know, well have you thought about maybe a tumbling class? Or how about,

going Taekwondo, or you've kind of got to give them some other things to think about instead of just jumping right away into soccer. So we'll do, hold on. Oh hold on, you all can hear me for a minute, hold on just for a second. Okay so what I'm gonna do right now, I need to take just a touch, I'm gonna take a small break while I do our case study. And Lisa's gonna summarize basically everything that she's heard me talk about and what she's talked about and then we'll do a case study here.

- [Lisa] All right everybody, this is Lisa again. So I do want to just do a quick summary for you of this content that we've covered with regard to children with DCD. So I hope you all remember the four criteria that all have to be met. You have some ideas of the different tests and measures that can be done to address those criteria, particularly around those children who have difficulties with ADLs and also around making sure that there's some documentation of the child having skills that are at a level that is less than what is expected of their peers. So , excuse me. So in addition, I just want to review, after having done the test in measures and really used our skills as physical therapists for observational movement analysis, really looking at the qualities of the children's movement in addition to their actual skill level, we can consider these interventions that Melinda so well described include both the combination of task oriented training and body structure and function interventions. So I want to do that by giving you an example of an individual that I'm familiar with, so this is not an official case study, but I want to let you know about what happens, if for example a child is not diagnosed and maybe not given the appropriate intervention over time, maybe even through the schools or through their clinics. So we have had an individual in our physical therapy program as a student who was never diagnosed with DCD yet right away in all of her activities that involved physical performance of skills, she had extreme difficulty as a physical therapy student doing these activities, particularly those for which she had to plan in the moment. And I want you to kind of think about your time in physical therapy or occupational therapy school and how often you are called upon to do those type of activities. Now this individual was very intelligent, age 24, had

never been diagnosed with any condition, although she did tell me that she had a suspect for autism as well when she was younger, but was again, never diagnosed. And very interestingly, I want you to think about this, was quite an athlete, which doesn't fit our presentation necessarily, does it? But I will tell you what the activity was that she chose, was riding around on a bike in a velodrome. So those centers that you go around and around and around and around multiple times. And so that seemed to be an individual sport, there's a lot of repetition and so something that she could be successful at.

And so the consequence of not having had a diagnosis, not having had any focus, was that this child, I'm sorry, this student, had extreme difficulties in their clinical education work within the physical therapy program. And so I want to share with you some of the motor learning strategies when we think about task oriented training, some of the motor learning strategies that we emphasize with her in our extra time with her because specificity matters. The activity that you're doing is what you want to practice over and over again. It's hard to practice those things that are unpredictable and therein lies her challenge in being a physical therapist. But if we needed to practice how to move someone from a wheelchair, we needed to practice that over and over again. So we needed the repetition.

We needed her to, and what we did was watch videos, have her watch her own videos and see where she may have had some difficulties. And then practice this idea of self-discovery as part of a motor learning strategy within the task oriented trainings. So having her watch videos of herself, having her determine where she may have had difficulty, what she might do better is part of that co-op training that Melinda described, kind of checking on what she's doing and coming up with a new idea. So having then, kind of divided her activities into parts, so doing parts practice also was a successful model for her. So I just want you to see that even as an adult, a 24, 25 year old adult, you are using some of the same strategies in terms of motor learning and task oriented

training that we would do with any child in the school system. But in this particular situation it was a little bit more critical because it involved patient care and safety. So I just wanted to kind of put that in context and see how you may be able to even learn, use some of these strategies with individuals who are older because they all apply. So I think at this point we'll switch back to Melinda and go over a case of a child who is in the school and we'll flip ahead to the next slide, but thank you.

- [Melinda] Okay, I'm thinking you guys can hear me again. So we are actually going to, I am going to go to a shared screen on this last part because I want, I kind of made a diagram so that we can go through the case study like that, I think it made more sense when I was. Okay, so let's look at this, let's make this real for us, okay? We have a student, they're starting, it's in the fall, they're starting school right now, they're in first grade, they have an IEP from a previous school. And us, being the new school, we're gonna reject the IEP due to some of the goals and the service times. This IEP also has adaptive PE on it, which in my district we do not have that as part of our school district, so we're gonna have to go ahead and do a reevaluation. As she comes into the school, the parents talk about that they are concerned with the child's playground skills, their lack of, their concern that we don't have adaptive PE, that was really bothersome for the parent.

Parents are also concerned with the child's handwriting and other fine motor skills for the classroom activities. And then the student currently is seeing private speech therapy for an articulation disorder. She also had school based speech therapy, there are no other diagnoses on this child's history except for developmental delay, and private services included PTOT as well as PTOT on the last IEP. So let's say we went ahead and permission has been received to do the reevaluations, so we're good to go. And let's go ahead and let's start with that. So this is the order I would do it. I would contact the parent again just to make sure I have a complete history and there wasn't something that I'm missing from the documentation that came over to the school. And

the types of things that I want to know from the parent are probably what are the major concerns of course. I also want to know to make sure when did your child, what kind of symptoms do they have as far as like, what are you concerned about with gross motor skills, what are you concerned about with playground skills? And try to get a timeframe too of when they started noticing these first symptoms, that type of thing. I also will do a complete review of the records that we were sent, and as you all know, in schools we don't get the complete record sometimes, we don't even have a complete medical history sometimes, and sometimes things even come up at the IEP meeting that are like oh, note that, okay.

So we all deal with the same problems. So basically what I'm trying to do is complete this mini systems review, right? Then I'm trying to clear the red flags and I'm trying to go through to make sure there's no exclusionary conditions. Then I'm gonna go take a look at the child. I'm gonna probably do a functional checklist, that's probably where I'm gonna start, I always like to observe them in their school environment, I try to catch as many settings as I can, I look at that functional checklist, and I take a lot of notes about what's going on. And so for this particular child, let's say that I'm noticing right away that wow, they're not getting up well from the floor at school, they're tripping a lot in the classroom, and as a matter of fact the teacher told me they tripped last week and hit their head on the desk.

They never quite hang up their coat or their backpack, it just never quite gets there. I'm watching the child, they have poor posture sitting at the desk, they're lying on the floor. So I'm like wow, this is definitely a kid I'm gonna want to continue to do a little bit more testing and see what happens and what else I'm getting at. So then we'll move on and we'll use, I showed you earlier that teacher's checklist, I'll probably give that to the teacher to see what they're seeing. I'll send home the DCDQ and I'm hoping since I already talked to the parent, I may have mentioned that on the phone if I thought it based on what they're saying, but if not I'll probably call the parent again and say hey,

I'm sending home this questionnaire, can you take care of that for me and get it back as soon as you can? That usually is how I get my best response. And let's look at this, and then I'm still gonna do this, now I'm gonna go back, I already looked at how well they're doing in the schools as far as in those class environments. So I'm kind of getting an idea but now I like, really want to look at those fundamental motor skills, let's see how they're doing, this child is only in first grade, let's see what's happening with those skills. And while all along I'm doing this, I'm also looking at the quality of the movement, so I'm basically doing movement analysis through this entire time that I started looking at the functional check list, to the time I'm looking at fundamental motor skills. And let's say what I see with this kiddo is more like, they're not doing well balancing on one leg, it's like less than three seconds. They can jump about 18 inches and it's a symmetrical jump, but a very hard landing, and sometimes they actually fell when they did it. They can throw a ball, but it lacks direction. They cannot catch. They can hop on each foot one to two times, they're running lacks smoothness, it just looks a little awkward, and galloping just lacks rhythm altogether. I'm not really expecting them to skip in first grade, sometimes I give children a break on that, so I'm not as concerned about that, but the child cannot skip. And then I did a 30 second walk test as well, and that came out kind of like low normal, that is normal in the normal range, but it was low.

So the teacher questionnaire comes back, the teacher is really concerned, the teacher lists some of the exact same concerns that I had had. And the tripping in the classroom they were concerned with and then the teacher always says they just cannot keep up, we are constantly trying to slow down for so and so to keep up in line, it just takes them longer, and they just can't do things like the other kids can do. That was really some of the comments. And so anyways, and then the DCDQ, when it came back scored in a 20 which says uh-oh, that's an at risk category. So as I look at all this DSM-5 criteria and see in this, they're hitting all of them. So there's no exclusionary conditions. Looks like it's early onset. Their participation, they are showing

participation, difficulties in participation and ADL deficits because when we look up here I put a problem list off to the side, they're not playing with peers on the playground or accessing the equipment. They're walking with their, they're stopping at obstacles, putting their hands down to walk over it, they're just not as efficient as their peers are. They're spending a lot of time standing around in the classroom, they're tripping over obstacles. So it's making their participation, they're having increased difficulties with it.

And then I decided you know what, with all of this, because my school district, we do have one, I'm gonna do the MABC-2, I want to see how they're coming out, I have a pretty good idea what's gonna happen with this. So I go all the way through the MABC-2 and they score in the second percentile in this particular examination. So I'm pretty confident I'm looking at somebody with probably DCD and I can't diagnose that. So I'll bring this up in the IEP meeting and I may even call the parent before the IEP meeting just to kind of discuss what I'm thinking and what maybe next steps might be.

So I'm gonna go down to this next section and this is kind of now we're dealing with the IEP, because we could do all this stuff and we make our problem list out and this child has, again off to the right here you can see playground, classroom, and building seem to be the three things that I'm most concerned about as far as access areas. And these, if you can look at the other things below there, more of those activity limitations. I can also extrapolate from this information just kind of taking a step back if I want to look at balance skills and even the strength of this child or even endurance. So I am considering those even though I didn't do specific tests for them. On the MABC-2, it does have that balance section, so I feel like I covered that. And then as far as looking at, I am kind of concerned about this child's strength just because they're placing two feet on each step. And are they doing this because there's a weakness or are they doing this because of perceptive awareness, or are they doing this because it's a balance issue? But I think we probably have a little bit of both, especially with their

poor posture, they're lying on the floor at recess, or sorry, at classroom, and just the way that they're handling recess in general by not accessing equipment. It may be a little bit of a strength issue there too. So moving on with that, I think I went through, we did the MABC-2 and now let's go to the IEP meeting. And I want to try to make this real for all of us, and so we know in the IEP meeting we have the strengths and needs, and that's the part we just went through with the entire evaluation process that we did. And with this particular kid, I mean what I did for them was two days of evaluation.

That's a good 45 minutes one day and 45 minutes another by looking at all the things that I looked at, which is a very comprehensive evaluation and I'm not sure what kind of timeframes you have in your schools. You may have to, you know, bring that back a little bit, but for a child like this, I just feel like I need to do actually that long of an evaluation process so I can be sure what I'm looking at. So I want to move on to this, I want to move on to service time because I think this is where it's gonna hit home with many school based PTs. And depending on what your district actually allows for, what kind of staff you have in your school district, is a contract or do you work for the school district, or what type of students do they allow for you to see.

And that is the reality of the situation, right? So one of the, the service time is gonna depend on your school district, right? Another thing if you're in Colorado, it's supposed to be a team's decision and it's needs based. I can tell you that not all schools in Colorado follow that. They still use other types of tests such as they'll use the standardized test and look at where did they fall. And then other school districts will use something that's called a CERT tool. And I'm not sure who in the audience is aware of those or use those, but it's Consideration of Educationally Relevant Therapy and they score children based on what they can do in a school environment and how much assistance that they need. And I can tell you a child like this will probably come up as a consult kid. They will not come out if you're using that tool, and those tools, it depends on the validation of them or whatever, but many schools stick with them. And

this child would be a consult kid. In my school district we are needs based, we would see a child like this directly, and we would see them every week for about 15 to 20 minutes each week to help them improve their access on the playground, especially NPE. And for younger children we do seek children that are delayed in motor skills just for the purpose of improved participation with their peers. That's, we just, our district believes that that's the best way to go and so that's what we do. So, and if you're percentile based, like what did they score on the standardized test, well you do have the MABC2 and they did score below the fifth percentile. And I think for a lot of districts it's below the seventh percentile.

So you could use that as a way to qualify a student on an IEP for physical therapy services if that's what you have to prove. So, then move on to accommodations and goals, and I'm gonna go back up to the page that has a problem list, 'cause I think we can kind of talk through that a little bit. Accommodations can be based on a lot of what you have right here when you look at that problem as well. You probably would want accommodation in there about needs increased time to learn new motor skill tasks, right? Then maybe they need increased time to transition through the school building. Those might be the two that stick out to me the most as far as accommodations for the student, especially that increased time for learning new tasks and increased time to transition.

There might be a modification that goes in there for PE and as physical therapists we cannot modify curriculum, but we can make recommendations to have that curriculum modified for physical education so that they don't get a poor score based on their ability to perform certain motor skills. So, and then that also ties into, where you, if you're in a district that you're only gonna be able to be a consultant to this child. It ties into, I'm just making sure I'm okay, okay, it ties into, okay, playground, maybe you're going to get together with the TAs and you're gonna say all right, let's encourage so and so to play on this piece of equipment today and you go out there and get them to

learn to go down the slide and you might talk to the TAs about how they help the child, encourage the child, you may even kind of get a different group of peers together that like to be helpers and get them going on doing some sort of a game like that. In the classroom, again, you're gonna go in there and you're gonna look at how the child is sitting at their desk, and you're gonna do this whether you're direct service or consult service, by the way. But you would go in there, you might add, make sure the desk is the right size, make sure the chair is the right size, do they need a special chair that would help them sit better in the classroom? What about the floor, should you use a cube chair, do you need to use back check chair, do you need to kind of think about other ways to help improve their posture and help them tolerate a sitting position for a longer period of time?

Building, you might offer suggestions to the teacher even though that might be something they're complaining about, but can we walk slower in the line? When we get to the stairs, can we move a little slower down the stairs, or just go from corner to corner and wait for everybody to catch up? Don't always put, let's call him Joey, don't put Joey at the end of the line, put Joey at the end of the line so that he doesn't feel bad that everybody is just waiting for him. Those are just little suggestions that you can give to the teacher. PE, we can go in there and talk to the PE instructor. Now in our district, because we don't have adaptive PE, our PE instructors are getting very good at modifying tasks.

Oh my goodness, they're doing such a better job with it. But I still go in there and have the conversation about Joey's gonna need increased time, set aside time or break the skill down a little bit more. And many of them, there's always not just one child in the classes struggling with a motor skill, there's usually several. And so the PE teacher will take time to maybe given them a couple more steps in the instruction, put them together may help them learn a task a little differently, anything like that. And then sometimes there's extra TAs in the classroom and you can spend time educating them

as well. You would also, sorry this is a lot of information on just consult alone before you even get to intervention. But also talking to the parent, you're gonna want to talk to the parent about Joey and about different activities he can be involved in and offer resources and be an open door to that parent so they know they can come to you and ask questions and how they can help them. I'm always like, keep it fun, no matter what you do, it should be more about fun than it is about performance. So, in no matter what you're doing, it's always about fun and just completing it. You went on a bike ride today, I don't care if it's even around the block, oh that was so much fun, look what we just did as a family, that was great.

And so you keep it in that perspective. I also want to share with you a, yeah let's leave that up, I also want to share with you a CanChild resource. And so I have to give credit to two of the people that have actually developed this. It says, Recognizing and Referring Children with DCD, the Role of the Physiotherapist. And this is written by Cheryl Missiuna, is that how you say her name, and Lisa Rivard. Cheryl is an OT and Lisa is a PT. And one of my favorite parts about it is if you're kind of stuck about what you need to do in the consult role, is they have this program called MATCH, M-A-T-C-H. And the M is modifying the task, the A is altering your expectations, T, teaching strategies, C, change the environment, and H, help by understanding. And they have this on this site for all the grade levels.

Yeah, all the grade levels. And I just wanted to, oh, are we ready, do I have to leave? I have to talk about one more thing. Okay, one more thing, so let's talk about the goals, say hey, that's sweet, I'm in a district, I get to see this child direct, I'm super excited because I know I can make an impact. So my goals, I think I kind of like, I kind of skimmed over them in the first place. It's gonna look like this, I'm gonna focus on playground skills, I'm gonna focus on some classroom skills and that includes not only helping them get on and off the floor better, but also their posture in the classroom. So I might have some interventions in there, more of those process oriented or body

structure and function interventions, however you want to define those to help improve posture. And then I'm also gonna look at building access as well, and I'm gonna look at balance, again for body function and structure, I'm probably gonna do some balance work on there, and one of my favorite activities is we like to play a bean bag game. A child puts a bean bag on their foot and they dump it in a bucket. So they're working on single leg stance activities without even realizing that they're standing on one foot because they're spending so much time thinking about dumping a bean bag into a bucket. Another one that I like to do when I'm working on balance to get them to narrow their base of support and be a little more comfortable with that is I do use a balance beam. But they hold jingle bells and their whole time walking across they have to keep the jingle bells quiet.

And so the child ends up focusing so much on keeping the bells quiet that they kind of forget about that they're walking over a narrow little barrier there. And you can do those outside on the playground too, 'cause they have lots of little narrow barriers out there that you can practice. But my primary focus will be on a task oriented approach to work with this child. So we are gonna directly practice on the playground. When the other children are not out there, we're gonna go practice on the thing that they want to do most, and we'll spend a lot of time getting them pretty independent in doing that. And then encourage them to do that with all the kids outside, but they typically start doing that on their own when they start feeling confident in it.

We're also gonna work on stairs and we're gonna do that by working on stairs, we'll practice stairs, we'll practice stairs anywhere we can throughout the entire school building and outside. Shoot, you even have that again on the playground. And then we will practice getting on and off the floor, it'll be a direct intervention doing that, different ways to get off, to get on and off the floor, and we may even practice things in tall kneel and high kneel to again, more of a process oriented intervention, but then also that whole, what do we need to do, we're sitting in the floor, how do we need to position

our body to even get to the level to be able to be in tall kneel to half kneel and then to stand up. So that pretty much covers this kid and then as far as outcome measures, because we have to talk about outcome measures, I will probably use, in my district we use something called a scoring tool or rubric, we talked about that where it just basically, it'll have on a section playground access, and then the activity limitations under that. Classroom access, activity limitations, building access, activity and limitations, and then there's actually a scoring tool that tells you what their score will be based on their performance. And we'll use that to monitor. I could make up a GAS poll with this, I have done that before, but it just depends on the age of the child. I do like the child to be able to participate with me a little bit about, well what do we need to do to be able to jump rope if that was something they were asking me to do. And I might break it down for them. And that's quite helpful too. That actually concludes my part, I'm gonna put Lisa back on. Yes, it's been very nice, I wish I could hear you guys talk or get that feedback. I haven't done this before where nobody says anything, it feels kind of empty. Anyways, thank you so much.

- [Lisa] I'm actually, before we click, I'm gonna do one more screen share while we have this up because I want you to see the actual CanChild website where you can do a physical therapy module that has some of the components that Melinda talked about that match approach to intervention with children with DCD, and so I want you to be able to see where you can access that. So at this point I want to just answer one question that's not up there, but one question that I get asked is kind of why is it important for children to have a diagnosis with DCD? As we talked about, it may not be critical for you to be able to have a diagnosis to be able to provide treatment for children in the school system. But I think you need to have that conversation with parents because sometimes what we see is that parents become so, I think just, they feel so validated by having a diagnosis where they understand that their child is not just clumsy or just slow or just having difficulty getting ready in the morning, all those types of things that impact a family, to be able to have a diagnosis where they can say

oh now I understand and now I may be able to get some strategies to address some of these things that have been difficult for our family I think is really important for some families. So I think if you feel like you can educate yourself enough about this diagnosis, and hopefully this is a good start for you, that I'm hoping that you can consider the fact that it may be important to some families. And so having this diagnosis of a movement disorder might be important for the family and something that you may need you initiate and address with them. So I think at this point this last reference refers to, there is a clinical practice guideline and there's actually an updated one now in 2019. There's a clinical practice guideline that's written for all people who may interact with children with DCD and so it includes all professionals, including occupational therapists and psychologist and physicians and has all the recommendations in there. The CPG that we are working on is particularly written for physical therapists because it is sponsored by the American Physical Therapy Association and the Academy of Pediatric Physical Therapy. So at this point we will entertain any questions. If I don't feel confident answering them, I will pass it over to Melinda, but we hope you enjoyed the presentation and have been able to take home some pearls with you.

- [Callista] All right, well thank you so much for the both of you, we do have a couple questions in queue, but we'll go ahead and get to those. But to remind everyone how to send those, use your question and answer pod inside the classroom here. Our first question came early on, it's asking so could you look at the jumping distance or would you look at observational movement analysis if you can't buy the MABC?

- [Lisa] Yeah, that's a really good question and I think to give Melinda's voice a little break I'll go ahead and answer that. So yes you can consider some of those tasks for which you may have some idea of what a typical child would do and then you're looking at what your particular child is doing in the test to be able to compare them to their peers. There are some things that you may have some information like the

functional reach test, we have norms for children. You could look at distance jumping when you know that some testing measures actually have some norms for that and compare the child with just a particular task, particularly if that's the task that seems to be difficult for that child. So you don't have to have the MABC-2. We were hoping that you would all be able to learn about that, that the MABC-2 is not necessary, but that your observational movement analysis, all of those components of movement that you've learned as a physical therapist are things like timing and sequencing and the range of movement that the children use, all of those things are important to consider.

- [Callista] All right and then next question is asking, did you say the direct service criteria is around the fifth to seventh percentile or lower?

- [Lisa] Let me let Melinda answer this question specifically.

- [Melinda] Hi, it's Melinda, so the direct service, that can vary from state to state, to be honest with you. But typically, typically it's below the seventh percentile, or 1.5 standard deviations on a standardized test to, if your state says they have to qualify for direct PT services. My state is that we don't qualify, it's a need base. So that's really important, but you still hear it thrown around, we prefer that they are below the seventh percentile for services in general. And I should also relate it to this, I'm talking about related services. When you are talking about the need for IEP and cognitive delay and those types of services, that's a little different on how they're gonna qualify a child on an IEP. But for related services in my state, it's need based, and for other states that they still follow that seventh percentile or 1.5 standard deviations below.

- [Callista] And the next question is are there any generic flyers with info for schools and NDs available to us?

- [Lisa] Yes I think actually on the CanChild website is where you can do some searching. They have some wonderful literature, they actually have a flyer for parents and a flyer for physicians as well. They're sometimes a little bit outdated, but I think the general information is accurate enough to share with parents and to share with physicians, so that's a great source. There's also a website called Therapy Source Inc, Therapy Source Incorporated that may have information as well that would be sharable information.

- [Callista] All right, and we have somebody asking to repeat the MATCH?

- [Lisa] The MATCH, sure, we will, I can go over the MATC criteria. It's actually really nice and it is on, if you go to the CanChild website I showed at the end, that is the particular test, or I'm sorry, the particular website, there's a flyer that has that information and also some information for parents and physicians. But MATCH means it's just kind of an acronym for what we can do and maybe even what the teacher can do in the school to help the student. So the M stands for modify the task. So all of those things that we were talking about in terms of the task perhaps being too difficult for the child, how can we modify that task? A stands for alter your expectations. I think that's really important for us, for teachers, for parents to know that this child may not perform at the level of their peers, and so how can we help them still feel successful, still feel self-worth even though they may be doing it slightly differently from their peers. T stands for teaching strategies. So teaching strategies may incorporate a lot of those motor learning principles that we just talked about, repetition, breaking down the task, all those things. C is change the environment, Melinda gave a lot of examples of that. And H is help by understanding. So educating yourself about this diagnosis and those around you.

- [Callista] All right, we have a couple more questions. One is asking did you say that kids have an increased difficulties with making friends since they have delayed motor skills and difficulty keeping up with other kids?

- [Lisa] Yes, I would say yes to both of those. Friendship may be based on not being able to be as successful in play which is one of the criteria for DCD, so yes they may have some difficulties making friends, and they may have some difficulties with their peers on the playground.

- [Callista] And this next one is a little long, so I'm gonna read it here. I have kids with an autism diagnosis that don't appear to give a good effort whether it be the activity is not meaningful or decreased focus or decreased visual focus. Do you think this could also be related to DCD, meaning that because the task is difficult for them, they don't appear to try their best. How do you approach this?

- [Lisa] Yeah that's a very good question and it actually is very common that children with autism may also have DCD. We know that children with autism may in and of themselves have some difficulties with movement and with mode of performance, but you might be required or asked to look a little bit more deeply to see if they may actually fit those criteria. So I will give a relatively short answer given our time, some of the strategies you may need might incorporate some strategies that your team would work on, so perhaps some sensory strategies to allow this child to be in a state where they're more ready to learn. So somethings like doing some deeper receptive input, those types of things with your occupational therapy peer would probably be really helpful. I would also suggest that if they have difficulty with a task then you look at the task and you figure out how can we break it down? How can we make that task just have one piece that we can work on until the child is successful? So they may, for example jump rope, need to stay in one spot for jumping to be more successful. So can you give them some kind of a reward to help with that motivation factor, to help

them be more successful by really addressing one piece at a time and then gradually putting it all together.

- [Callista] All right, one last question and then we'll wrap it up for today. you spoke a lot about kids having difficulty in PE at school, however do you feel they also have difficulty in recess and managing daily care at school?

- [Lisa] I'm gonna let Melinda take this and then it'll be our last question.

- [Melinda] Okay so yeah, yeah these kids do, they really struggle a lot at recess and many times you do see a spillover into just self-care tasks even, just buttoning their own pants getting out of the bathroom. And the kids would come out and their pants aren't buttoned or they're unzipped and you're like, oh goodness. You also see it in the classroom, their desks are just a mess, they just can't seem to organize that desk at all and things are spilling over and they somehow just can't get things where they go. So yeah, you're gonna see that difficulty in PE, you're gonna see it out there on the playground, these are gonna be the kids that might just be sitting in the gravel doing a lot of pretend play and not really moving much around that. And then of course, like what we said, yes, in self-care tasks absolutely.

- [Callista] All right, well thank you so much to the both of you and thank you everyone for attending today and being part of our virtual conference series. And I hope everyone attends tomorrow as we continue on day three, and tomorrow is on goal attainment scaling for simple and medically complex clients in the school setting. Again, thank you so much Dr. Mueller and Dr. Dannemiller for presenting for us today.

- [Melinda] Thank you.