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The Spaced Retrieval Technique: A How To For OTs Recorded May 14, 2020

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- [Fawn] Today's course is The Spaced Retrieval Technique, A How-To for OTs. Our presenter today is Megan Malone. She is a speech language pathologist working as a clinical faculty member at Kent State University's Department of Speech Pathology and Audiology as a clinician and consultant in home health care. She previously worked for nine years as a senior research associate and lead trainer at Meyers Research Institute in Cleveland, Ohio, where she oversaw federally privately funded grants focused on implementing interventions with older adults with dementia. She is the co-author of the book "Here's How to Treat Dementia", and has spoken numerous times at the annual conventions of the American Speech and Hearing Association, Gerontological Society of America, American society on aging and Alzheimer's Association along with several state Speech and Hearing conventions. She has published articles in the Journal of Communication Disorders, Alzheimer's Care quarterly, The Gerontologist and Dementia. Welcome, Megan.

- [Megan] Much, hello everyone. Thank you all for joining me today. I'm so thrilled to be here. I always love working with OTs, so I thank you for allowing an SLP to share this information with you today. OTs are some of the most creative and inspiring people I know. So, being able to share with you a tool you can add to your, already, innovative toolkit is a great honor for me. Today's presentation on the spaced retrieval technique is one that is very near and dear to my heart. I began using the technique as a graduate student in one of my clinical placements and I was lucky enough to be included in the early research of this technique as well. I still find it to be one of the most use methods that I use with my clients and patients and I also teach this to my graduate SLP students in my position as a faculty member at Kent State. So, I'm again really thankful that you're all here today. Please feel free to ask questions as I go, I will try to answer those, as I'm speaking or we will save some of those for the end if the time allows. All right, so let's get started. Here are our learning outcomes for today. Hopefully, by the end of this course, you're going to be able to describe the space retrieval technique and the evidence to support its use in rehabilitation contexts. We'd also like you to be able to provide two examples of goals that can be addressed using this technique in

occupational therapy, and describe the process of how space retrieval is implemented in a therapy session. Here are my disclosures so you can take a quick look at that and then some acknowledgments. I always like to put out before I get started that the work I'm sharing is the result of the tireless work and innovations of many individuals. As Fawn mentioned, I spent a lot of time at the Meyers Research Institute early in my career, which was part of Menorah Park Center for Senior Living in Cleveland, Ohio, and that's where a lot of this space retrieval research really began. So, I'm happy to acknowledge them and all their contributions to this wonderful work. Also done some close work with the state of New York and their Department of Aging. They used this technique in a number of studies within the state. Hearthstone Alzheimer's care, Northern Speech Services, the National Institute on Aging and the Retirement Research Foundation, were also great supporters of the work I'm gonna be sharing today.

Okay, so I thought what we would do is we get started to just kinda get a foundation of kinda our thought process here and just talk a little bit about dementia and memory so we can have a good understanding of how the space retrieval technique works, and how it can be used for you, to use with your patients with cognitive impairments. As we know, dementia is not a specific disease. It's a descriptive term for a collection of symptoms that can be caused by a number of disorders that affect the brain. So, that can be anything from a traumatic brain injury to a stroke, to Alzheimer's disease, anything like that. So, we're talking about the symptoms when we're talking about dementia. According to the Alzheimer's Association, Alzheimer's disease accounts for 60 to 80% of cases of dementia and vascular dementia occurs after a stroke, as we know, is the second most common type of dementia. Okay, so, a little bit about what research tells us related to dementia. We know it's that loss of mental functions involving thinking, memory, and reasoning, also language, and that's impacting a person's ability to live their daily life. So, we can see those symptoms coming up in areas such as language disturbances, so we might see people having a lot of word finding problems, it may also pop up in the form of some challenging behaviors. So,

asking the same question over and over again, wandering, things like that. Difficulties with activities of daily living. So, a topic near and dear to the OTs heart, right, so people having trouble with sequencing for dressing, personal grooming, things like that, and then we may see changes in personalities. So, some disengagement, lack of initiation, maybe some aggressive behaviors that can also occur. Okay. We know that memory is dependent on organizing information. So, we have to attend to information before we can learn it and then encode it and we know memory is critical to our ability to acquire language, develop high level thinking and effectively make decisions. So, you know, a lot of times our patients have maybe a little bit of a narrow idea of kinda what memory entails and that's just like, "Well, I just can't remember certain things that I know how to do, or I used to know," We know that there's a number of systems that are in place that impact how memory works and so, we may have to work on different aspects of memory in order for that retention to happen.

So, when we kinda think about memory stages, we're looking at, you know, that attention to the information, then encoding it to make it meaningful, storing it and then being able to retrieve it and these are interactive processes. The ability of one of these processes affects the quality of another, so we know that good encoding can make for good retrieval later. And I always compare this to kinda when you were really studying for exams, when you were in school, how you might have to make, you know, mnemonics to remember certain things or recite lists over and over again, try to make it meaningful to yourself, in order to remember it better, that's going to assist with that retrieval. So, again, we wanna think about with our patients that we wanna make things meaningful, and make sure that that encoding stage and their attention to that information is good, so that retrieval can be strong later. Deficit in one of these stages can lead to a deficit in another. Alright, just a couple of memory definitions to share with all of you. As we know, working memory and short term memory refers to the ability to use information as it's being processed. So, that might be something like remembering a phone number, repeating it a few times and then going ahead and dialing the number and then typically that information isn't necessarily encoded and

retained it's usually something that's just used in that moment. We can see things working memory and short term memory primarily being affected first with Alzheimer's disease and other dementias. We also have long term memory. So, we know that long term memory is where information from short term memory is stored and retained permanently. This includes the ideas of declarative and procedural memory and I'm gonna get into a little bit more about detail there because this is kinda the key element to the space retrieval technique. How we can utilize long term memory and those preserved skills in order to help people retain information for a longer period of time. So, procedural memory is relatively spared through the progression of dementia. That's another reason why this is so key to this technique, because we wanna be able to use something with people as, you know, the disease perhaps progresses, something that's going to be still intact, that we can definitely use as a springboard to help people remember things for as long as possible. Long term memory can be affected by dementia in both storing information and retrieving it. But the research shows that it's a little more spared than what we're seeing happened to working memory short term memory with diagnosis of dementia.

Okay, so here's a nice, little, you know, how we wanna say it? It's a little visual here to help us kind of understand a little bit more about how long term memory works and this is by the work of Doctor Larry Squire. He's an innovator, researcher, in the area of memories, someone who I would definitely recommend looking into his work. But basically what this model says, and it's one I very much use with my patients and their families when trying to understand dementia a little bit and kinda why we're seeing changes in certain types of memory and those kinds of things, is that, you know, long term memory can really be divided into the ideas of declarative memory, and procedural memory. So, declarative memory is the portion of long term memory that holds information such as facts and events. So, that could be people's names, it could be where you were earlier in the day or something that happened to you, you know, in the recent past, it could be also your knowledge of the world. So, being able to kind of understand and remember certain facts that maybe you've learned over the years. So,

it could be something like knowing that the capital of France is Paris, maybe that is something that you learned early on in life and have been able to retain throughout your lifetime. And then the final piece of declarative memory is the idea of vocabulary or language. So, being able to know, you know, what something is, being able to label it, being able to express that in verbal output. So, all of these things, you know, can be relatively spared through dementia, but we can see a lot of our patients maybe struggle with these aspects. Maybe they can't recall their loved ones name or they can't remember what they had for breakfast. They might struggle with remembering the name of something and so, sometimes what we see is we're able to pull that information out of that person's memory by using some cueing that might be something like phonemic cues, like the first sound Have a word or a name, or being able to use a semantic cue, like a slight definition or clue, if you will, of what that information is. And a lot of times our patients will be able to recall information with that little nudge but it's still a little bit difficult. I always kinda compare this to a file cabinet where the drawers a little bit stuck. We can get to that information and the files that's in that drawer, but sometimes we have to give it a little bit of a push.

On the flip side of that procedural memory is one that, as I was saying earlier, is one that we find to be relatively spared throughout the process of something like dementia and what procedural memory entails is our memory for things like skills and habits, so that could be how to feed ourselves how to tie our shoe or get dressed. It could be driving, something like that, something that's been repetitively practiced over a whole lifetime. This could also be reading, and reading is one of those skills that we see relatively spared as well. People can retain the ability to read far into the course of dementia. That doesn't mean that they necessarily comprehend everything that's being read. But they can still utilize the processes that are needed to decode and read information and so, that's one reason why we use a lot of verbal or visual compensatory strategies with this population, because it's something that we can use as a relative strength. So, in procedural memory, we have that memory for skills and habits, we also have the idea of simple classical conditioning and if you kinda think

back to maybe a psychology course you took back in the day, that's just that idea of kind of stimulus response, right? A certain stimulus can elicit a certain response and so, that's one aspect of the space retrieval technique that really allows people to recall information well, is that we can use a simple question or a command and teach a certain response and so, then with practice, that becomes something that becomes more automatic for the person to recall. The idea of priming is also stored in procedural memory. As we know, that's just kinda the idea of practice makes perfect. The more exposures a person has to a piece of information or something they need to learn, the better they're going to learn it and so, that's why there's a lot of repetition involved when we're working with patients with dementia or other cognitive impairments and one of the reasons that repetition works is because it's something that's stored in procedural memory, which we know to be relatively spared through the disease progression.

So, spaced retrieval is something that takes advantage of this procedural memory system, we can take advantage of the fact that we can use repetition, we can set up a certain stimulus and response in the forms of questions and responses or questions and actions to help a person be able to recall information well, and those skills and habits then become something that becomes a little bit more permanent and more easily retained. So, this is long term memory kind of in a nutshell and a lot of times, like I said, I'll use this with my patients and families to kind of describe why we see those splinter splintered skills in persons with dementia. So, you know, they might ask a question like, "I don't understand why my mom can't remember my name. "But she's still able to remember how to play the piano." and so, you know, this is a good way to describe that, it's well, you know, the name would be something under facts, which is in this declarative memory system, which we know to be a little bit more impaired with persons with dementia. Whereas something like playing the piano might be a procedure or a habit that this person has practiced throughout their lifetime and it's almost become an unconscious automatic thing that they can do. They don't have to really think about it, it's a little bit more effortless, and so, we can see that retention

happen there. I also use this as a description for staff members in facilities as a good way to kind of understand why patients can always seem to find their seat in the dining room. Maybe after they've been there for a few weeks, they can know exactly where they sit, they go straight to that seat, and if someone else is sitting in that seat, they're gonna let them know, right? And that's because it's repetition, the priming has happened, they've gone to that seat multiple times, many times throughout a day. So, it's become something that they've been regularly exposed to and it's turned into a skill or habit that when they enter that space, their feet just kind of know where to go, they head right to that chair. And so, that's why we can see kind of learning happen with this population, because they can and do learn new procedures, if we present the information in such a way that's meaningful and give them lots of repetition and practice with that information.

Okay, so hopefully that gives you a little bit more understanding of kinda how long term memory works and this will give us a good foundation in understanding the space retrieval technique a little bit more. As we know, there's a lot of mistaken beliefs out there about dementia. There's many people out there who still believe people with dementia cannot learn to remember information, that the best way to care for them is just to make them comfortable, accept those idiosyncrasies that they may have, and just be patience and yeah, some of those things are true. We wanna make sure that we kind of are more accepting and patient with people when they're dealing with this level of cognitive impairment, but we also wanna be hopeful and we wanna really focus on strengths and the idea that people cannot learn with dementia is just flat out wrong. There's a lot of evidence out there that supports the idea that learning can indeed happen with persons with dementia, that it, again, just depends on how that information is presented and how frequently they're able to use that information. And, again, reason being is because we can see something like the procedural memory system be something that is retained. Again, that example of maybe the dining room in a facility setting might be a nice one to share with staff members who may kinda have this idea that, "Well, there's not much we can do, "they're never gonna remember it

anyway." Well, they learned where they sit for meals, and that was new information that they did not know prior to moving into a facility setting. So, that really shows that that learning can happen. Our goal, as therapists, is always to kind of circumvent deficits, right? We're always looking for strengths, figuring out how to get around the weaknesses, and building off the strengths that we know are present. So, we know persons with dementia have a lot of weaknesses going on, they have some issues going on with their learning in their memory, but a number of strengths exist as well and those strengths can include things like the ability to learn procedures and that ability to read that I mentioned, which again, we see kind of retained because it's a skill or habit that's been practiced throughout life, and is supported by that procedural memory system. Research has shown that the learning of information and its retention depends heavily on how it's presented and that's with anything, as we said, there has to be meaning behind anything that we learn in order for us to wanna remember it. So, all of you are taking this course here today, hopefully, because you have the interest in knowing more about this technique and how you can use it.

So, the idea would hopefully be that because of that you're paying attention to the information, you're gonna look back at that handout later, and it's gonna be something that has meaning to you, in order to be able to apply it. We have to really look at that idea for our patients too. Not only what we want them to learn as a result of what we see in assessment or maybe what families are expressing, or a facility staff member is suggesting that we work on. But what's important to that patient? What's in it for them? And we can kinda think of things from that angle, it can really make that information more meaningful to them, which again, puts them in a better position to recall it. We always wanna be aware of the weaknesses, but we always wanna focus on strengths and I find that going from that perspective really helps my practice in general. You know, it may be that we're dealing with patients who have, you know, a high level of issues going on, lots of deficits, but, you know, if we can still always seek out to find what abilities remain and look at things through that lens, it's gonna be a much more positive experience for the patient and for us. So, when we think about

behavioral interventions for dementia, which is something that spaced retrieval would fall under these can be either direct or indirect. So, a direct intervention, behavioral intervention for dementia would be something like when an OT or another professional intervenes directly with individuals or a group using an intervention. So, in this case, if you were using spaced retrieval in your sessions with a client or a patient, that would be an example of a direct intervention, a direct application of space retrieval. Whereas an indirect intervention would be when you as an OT or other professionals, train caregivers in an intervention, modify the environment or develop activities to maximize function.

So, space retrieval kinda falls under both of those categories, because you as an OT can use this technique with your patients directly in sessions, or you could be training caregivers, other staff members, family in how to use it, so then they continue to generalize this even after therapy is over. So, without further ado, let's get into kinda the nitty gritty of what the spaced retrieval technique is. So, spaced retrieval is a technique used to help persons with cognitive impairment, recall important information over progressively longer intervals of time. So, that's the spaced in the spaced retrieval. We're spacing out the interval of time that we want the person to be able to recall information and giving them practice at those longer intervals, so we can shape the recall of that information and hopefully get it to retain in long term memory. It was actually first used to address face-name learning in non-impaired individuals. Back in the late 70s, some researchers in the United Kingdom, were using this technique with university students and trying to see if they could recall the names of people in pictures that they provided to them and seeing if spacing out the retrieval of that information over progressively longer intervals of time, help them retain the names better than just using something like lots of repetition or rehearsal, which tends to be a lot of the ways that we think that we would remember things better. And what they found in those studies is that the students who are non-impaired actually remembered the names of the people in the pictures much better using this spaced retrieval technique. And so, then, over the years, that's been adapted to be applied in rehabilitation context and so,

as you can see, on the third bullet here, it's been used in a lot of studies used with Alzheimer's patients, patients with traumatic brain injury, Parkinson's disease, dementia related to HIV. So, there's a lot of great evidence out there about the use of this technique and, you know, the body of research goes back a number of years now, we're talking from the late 70s to now, that's a strong body of evidence that this technique can be used with many different populations successfully. Spaced retrieval is an effective tool that therapists can use to help clients reach their goals and rehab therapy and it's something that we can use that's billable and reimbursable, which we know is super important in a lot of the contexts that we work. It takes advantage of that procedural memory system, and it's really success oriented.

So, we're really looking for people to experience success when using this technique and that's another reason why I really like it, because it's just a great positive way of working with clients and allows them to feel more positively about themselves. When, typically, when they're having memory issues, people are very hard on themselves, you know, feel really bad about some of the abilities that they're losing and so, this is a way to kind of turn that around a little bit, which is really wonderful to be a part of. The goal is to enable individuals to remember information for long periods. So, we might start off, as you're gonna see in some future slides, with just people retaining information for a few seconds or a few minutes. But we wanna start to push that time out as we're working with a client so they're able to remember things for days, weeks, months, even years at a time, so they can achieve long term treatment goals. A lot of the research I've seen is that, you know, we could see people retaining information for six plus months at least, even longer and of course, that's dependent on the level of impairment, what other diagnoses they may have in play, those kinds of things. But the retention is there. So, we're not just saying, "Oh, great, "they can remember it for 30 seconds. "Where's that gonna get us?" We're seeing people really be able to remember information for clinically significant periods of time. What happens is therapists teach clients strategies that compensate for memory impairment, we use procedural memory and we use things like reading and repetitive priming, to be able to

help people retain this information. So, we do use things like external aids to compensate as well and so, that kinda falls into the category of really just written cues, if possible. Sometimes we've used auditory cues to help people who maybe have visual impairment. So, there's a lot of ways that we can kind of bulk up some of these supports that occur with using this technique, and we'll get into those as we go here today. All right, so, what does this all look like? Basically, what's gonna happen is you're gonna begin with a prompt question for a target behavior, and you're gonna teach the client to recall the correct answer. So, this is going back to That stimulus response idea that simple classical conditioning that we see preserved in long term memory, procedural memory.

So, we're gonna start with a prompt of something that we wanna work on and then we're gonna try to teach a particular answer or response, or even an action can fall into this too. When the patient is able to retrieve information successfully, we increase the time that they're going to practice that next answer. Okay, gonna show you what this all looks like as we go here. If the patient has trouble remembering an answer, they're told the correct response and asked to repeat it and so, this is a key piece of the technique here. I'll go ahead and bring my arrow down and show it to you a little bit clearer. Right here, this errorless learning idea. Errorless learning is the minimization of error responses during the presentation of target stimuli. It doesn't mean that people aren't going to make errors. But what we're trying to do is if they do make an error, we're gonna replace that error with giving them the correct response or the action that we're seeking them to do and then asking the question again or giving them the prompt again, and then giving them the opportunity to immediately respond and so, that's something that we typically don't do too much. I know in my own practice, sometimes, you know, I might correct somebody, tell them the correct answer and then move on. But what's key about this technique is if an error is made, we immediately give the the client or patient the correct response we're seeking, give them a chance to repeat that, and then give them more opportunities to practice and so, that's a really key aspect of this that allows for that more success oriented approach

that we're talking about. And then what happens is if the patient then makes a mistake with an error here, we would go back to the time interval where they were last successful, so we're always gonna go back to where they were successful, and then only increase time if they're able to correctly respond and so, that's kinda the nuts and bolts of what this technique looks like. Let's take a look at an example here. So, let's say that we had a goal that the client will independently recall the location of it daily schedule to complete their ADLs improve attendance and participation in meals and engage with peers.

So, let's say that we wanna know how to put a schedule together of things that they needed to complete, or where they needed to be certain times of the day, we might attach something like a visual schedule to their walker, that's kinda what you're seeing here and then teach them to find that schedule and use it. So, the prompt question that I might use would be, "Where should you look to find your daily schedule?" And the response would be, "To look at my walker." Okay, so that could be a very simple way to kinda set this up and then as we go, this is kinda how this would look in therapy. So, I might sit down with the client and say, "Okay, we're gonna work on remembering "where you need to be every day, "since it can be kinda tough "to kinda keep track of your schedule. Let's take a look at what I wrote down, and so, I might have that index card in front of me, look it over with the client, make sure they can read it, the print is big enough, it makes sense for what they think they're doing during the day and then attach it to a place on their Walker where they can easily see it. So, again, involving the patient in every step of the way, so that I'm making sure the information that I want them to learn is something that's meaningful to them. I'm thinking about what's easiest for them to access on their walker, "Does it look good here? "Or should we move it down over here?" Making sure that you're there involved, and then I might say, "Okay, I'm gonna be asking you a question "and then I want you to tell me the answer. "So, here's our question, where should you look "to find your daily schedule? "And I'd like you to tell me, 'Look at my Walker'." So, "Where should you look to find your daily schedule?" They say, "Look at my Walker" and so, that's a correct response and what

we call zero seconds or immediate recall, I give them the question, the response, I immediately asked them to tell me what I just said. So, that's just seeing if that attention is there, so we can then kinda work on encoding it and making it retrievable. Then what I'm gonna do is space out the retrieval of that information. So, now, you can see here, I just increase the time a little bit, just little baby steps here at the beginning. So, we went from immediate recall to 10 seconds later, I would say probably prompt question, which is, "Where should you look "to find your daily schedule?" They say, "Look at my Walker," I say, "That's great." Let's touch that schedule, making sure that I'm kind of pairing that verbal response with a motor movement, as we know, that can help to increase retention of information. So, I wanna make sure that they can find it and then what I'm gonna do is say, "Great. "All right, now we're gonna move on up." So, now maybe I wait 30 seconds before I ask again.

So, again, just pushing out the time a little bit, went from 10 seconds and ask the question, now I doubled it to 20 seconds later, then I'm gonna go ahead and ask here, "Where do you look to find your daily schedule?" client answers, "My Walker," great. Now, I would increase to a minute. Now, let's say I ask the question here at one minute and the clients like, "Not sure." What I would do there is immediately give them the correct response and say, "Well, actually, when I ask you, "where should you look to find your daily schedule, "I'd like you to say, 'Look at my walker'. "So, let's try it. "where should you look to find your daily schedule?" They say, "Look at my walker." That's that errorless learning piece, they missed it, I give them the correct answer in response, they give it back to me and then I return to the last interval where they were successful, which is 30 seconds. Okay, so, we can see here again, you're just bouncing around. If they get it correct, you're gonna gradually increase time. If you see an increase or an incorrect response, you go back to the last time interval where the patient demonstrated success, which in this case was 30 seconds. 30 seconds later, I'd ask the question, they give the correct response, then I would increase back to a minute. Okay, so then the client would continue the session, and we would just continue to increase time. So, maybe after a minute, I go to two minutes, then maybe

four minutes, eight minutes, 16 minutes. So, you're just gradually increasing and doubling time. A lot of times that's kinda the way that we look at it is kinda doubling the time intervals, but that doesn't mean you have to stick to that. If you're finding a patient, you know, is able to retain at four minute or not able to retain it four minutes, but is able to retain it two minutes, then I might go ahead and stick a three minute interval in there, just as that kind of intervening time to push out that retrieval. And so, that's kind of how the sessions goes and as those time intervals increase, you could start working on some other therapy goals you might be working on, you can just have some general conversation during these early time intervals and then just go ahead and kind of superimpose the spaced retrieval question into the other things you're working on in your treatment. Let's keep going here. Kind of illustrate this a little bit further.

So, that's kinda the nutshell of what it can look like. But you know, a lot of times people initially ask, "Well, how do you know, if a patient's right "for this method or not?" and the truth is, there's an actual really easy screening measure that you can use. This is one that we use in a lot of the initial research with this technique, and it's one that I still use to this day, and is one that is available in a lot of the treatment books that you see related to spaced retrieval. But I wanted to give you kind of a little snapshot of what it looks like so you can easily implement it and decide if some of your patients would be good candidates for this technique. It's a really easy process. Basically all it's doing is testing a client or a patient's responses to correctly recall a target name over three different time intervals. So, we're just looking at them being able to remember a name, kind of a immediate recall, maybe 10 seconds later and then 15 to 20 seconds after that. The client has three trials at each time interval to recall that target name in order to pass the screen and it's something that can easily be folded into an initial evaluation, maybe an admission interview, that kind of thing. So, this is a quick little snapshot of what the screen looks like and I realized that it's probably not the easiest to see. But I want you to know that you can just use this in kind of any way shape or form that makes sense for you. It doesn't have to follow necessarily all the

specifics of what is written here in terms of the verbiage but you can kinda just keep in mind a general idea of how this is implemented, and then you can use it anyway you want. What we were doing in the initial research was using just a stock photo of a woman and we were having patients recall that her name was Peggy Bailey.

So, right here at the beginning of the screen, you can see today we're gonna practice learning how to remember things better. We're gonna start by practicing remembering the name of this person. Show the picture, and say her name is Peggy Bailey and then the prompt question would be, "What is her name?" If the patient's able to say Peggy Bailey at immediate recall, you would go ahead and click here, or make an X and say, "Okay, they got it correct at trial one." I'm gonna go down here and say, "That's right, I'm glad that you remembered," and now I'm gonna increase to 10 seconds.

So, again, with every correct response, you just increase a little bit of time and then I might say something like, "Good, I'm gonna give you more chances "to practice as I'm working with you today. "Let's try it again. "What is her name?" The patient gets it correctly, then we go ahead and mark that this is the correct trial and then we would increase again, to a little bit longer, so 15 to 20 seconds later. "Great You're doing well remembering her name "for longer periods of time, and that's the idea. "I'd like you to always remember her name. "I'll be practicing this with you during therapy "by asking you often. "So, what is her name?" If the clients able to remember that at 15 to 20 seconds, then you go ahead and click that, x that, and then they pass the screen. So, you know, you could do this very easily with a stock photo of your own, you could come up with, you know, you could use Peggy Bailey or you could use another name or you could just do this with your own name if you want to just kinda work with the patient and just say, "Well, today, I thought it'd be fun "if we could practice remembering my name, "since we're gonna be working together for a bit. "So, when I asked you what my name is, "I'd like you to say, 'Megan Malone'," maybe I'd make sure that my name tag is flipped over so they don't have any kinda visual cues to assist here, we just wanna see if they can retain information, any new information using this

method so over those progressively longer intervals of time. And then, you know, if patients make a mistake, so let's say we got up to here, the 20 second time interval, and they weren't able to remember the name, I would do exactly what I would do in a therapy session. I'd say, "Well, actually, her name is Peggy Bailey. "What is her name?" patient responds with Peggy Bailey and then I'd return to the last 10 rule where they got it correct, which would be, in this case, 10 seconds, so then I'd wait 10 seconds and ask again, if they got it correct there, then I would bounce back up to 20 seconds and then if they get it correct there, then they would pass the screen. So, you're just going to, you know, if any errors are made, you're going to go ahead and, you know, implement that errorless learning piece, which would be giving the correct response, asking the question again, having them respond and then returning to that last successful time interval.

So, it's a really simple thing to do, if patients have trouble with this, it doesn't mean that they're not a good candidate, it just means maybe you wanna try to get the information inputted in a different way. So, I have done the screen where if the patient's not verbally recalling the information well, I might write down the name that I'm looking for them to remember on like an index card or something like that, have them read it, and then in between the time intervals, just flipping that card over, so they're not doing any rehearsal of the name and then when I asked them the question, I want them to turn the card over and read it. So, then I'm asking them to perform an action and reading the response versus just verbally recalling the name. So, that's another way that you could do that with patients, if you feel like they might struggle with retaining verbal information, maybe they have a pretty significant hearing impairment, that might be something that you could do, pairing that verbal response with that motor action and then you're able to see that they can indeed learn new information that way and, you know, maybe you're gonna be able to teach them to actually do some physical responses to commands or questions versus some of that verbal responses that some questions might be. So, that's an example of kinda how the screen would work and again, this is something you can easily implement into an

evaluation. In terms of patients who typically do better with this, a lot of the research kinda says that persons who have scored on something like the MMSE, the Mocha or the Slums, if those are cognitive screens that you use, and they score below a seven on those, they typically don't seem to be the best candidates for use of this technique, but It's not a be all end all, I always say go ahead and do the screening, it takes a couple of seconds, and can tell you if people can remember this information or remember new information in this way and then that can give you some great, you know, directions to go with your therapy. If they can't do as well with it just because they scored low on a screen then, you know, then that's one thing, but I really do feel like you wanna give everybody a chance and if this can be a tool you can use, why not just go ahead and give it a try, since it's so easy to implement. Okay, so that's a little bit about the screen and who might be good candidates for this treatment. Let's talk a little bit about goals.

So, prompt question and answer examples. These are just a couple of easy things. I mean, really, you're only limited to your imagination in terms of what you could use this technique with. So, it could be something like working on disorientation goals. So, where do you live? Maybe someone's moved into a new facility, and you want them to recall that, maybe they're using a lot of repetitive question asking, wanting to know where they are, that might A good thing to do. Maybe what their room number is, again, if they moved in somewhere new, it might be good for them to learn their room number, sometimes I'll do instead of the room number I might do having them look for certain landmarks. So, you know, "How do you find your room? "Oh, I look for the big red ribbon on the door," you know, if they have a wreath on their door, something that they can find and easily see, then that might be a little bit more meaningful than a room number, which tends to not have a lot of meaning to people unless, you know, it's been a long time since they've shared a room with someone. So, or you could be doing something like, you know, "What is your address?" so that could be something for someone who's living at home. And then repetitive question asking. So, that could be dependent on the type of question the person is asking over and over again. Like we

said, it could be that they're having trouble retaining the name of a facility, they might wanna know what time meals are served or when their loved one is coming to visit. So, you might be able to teach some things like that, using this technique. Let's see, we have a question. "Can this be used with anyone "who has a cognitive impairment? "So, adults clients with severe depression, cancer?" Yes. So, the bottom line is, is this technique can be kind of used with lots of different populations and that memory is memory, the basic structures of how memory works is constant in all of us and so, how it is impaired may differ, but in terms of kind of what's available to all of us in terms of long term memory, and being able to be responsive to this type of cueing is something that can be applicable to many different disorders.

So, I'd highly encourage you not, you know, limiting yourself to just a dementia diagnosis. As you can see from those early slides, we talked about it being used with TBI, even HIV, so and things like depression could, now, again, we know depression could be memory impairment related, that could be something that could be reversible. But we wanna make sure that, you know, we give people the help they need in the moments that they need it. So, I think this would definitely be applicable to any population that you're working with. And I've heard lots of people also say that they use this even with their loved ones who may not have impairments. So, having their loved one remember when to take the garbage out or their child to remember when their homework is due or something like that, again, memory structures are, you know, gonna be universal across human beings and so, you know, you don't have to have an impairment to use this technique successfully. So, have that husband learn when the anniversary is. Alright, so here's a couple of goals and prompt questions that might be applicable to all of you related to, you know, occupational therapy. So, maybe for energy conservation types of goals, you could do a question like, "What should you do before you begin a task? "Gather everything that I need." Maybe questions related to medications. "So, how do you remember which medicines you take? "Oh, I look at my list," or use of adaptive equipment and question could be, "How should you reach "for items safely up? "I use my Reacher." So, even some simple things like that could be

applicable to using this technique, you could start with having them remember some of this information and then you could even use the technique for them to remember how to use those things. Another question, "What has been your experience using SR "with clients with significant visual impairment?" So, excellent question. So, definitely, I've had a lot of patients who've had visual impairments and I've seen this use successfully with them, I may not be able to use necessarily all the visual cues that I might with other patients, but I may be able to alter the size or the print size that I use non visual things and that might help. Again, as you all know, working with low vision clients all the time, things like high contrast, so maybe white background with black print, using more of an Arial font, something that's a little bit easier to read without the fancy curlicues and so forth, could help, maybe using more of a bolder font or just a nice pressure on a sharpie marker to make things a little bit easier to use. Adjusting lighting could assist with use of some of those visuals and sometimes the visuals, we can fade over Time to if the patient starts to be able to remember the information, just through sheer repetition of seeing it and using it. That may happen. I've also use kinda auditory things.

So, a lot of times like those fun photo, you know, like a picture frame that you can record on. Or you could use maybe like a switch, like a recordable device that you can kind of, the patient can hit the button to recall information, you could teach them to do that and then that can be a way for them to remember. So, those are some different things that you might be able to do. Great question from Heather here. "Do you ever find the clients "become irritated with repetitive questions?" Yes, indeed. I've had lots of clients say to me, "Oh, my God, are you asking me that question again?" Yes, and so, you know, what I do there is I just kinda always, preemptively say, "I'm gonna be asking you this a lot "and it might get a little irritating, "but it's a way "that we're gonna help you remember the information. "So, just bear with me," and, you know, most of the time they'll be pretty pretty open to that. Sometimes I'll explain depending on their level of comprehension and so forth that, "Yeah, this is a way that it's been found in research "that can help people remember things a little better." So, we got to practice

it a lot at first, in order for that to be something that sticks and most people are pretty open to that, especially if it's something that they really wanna remember and if we can make the case for why it's important for them to remember, you know, "We don't wanna have a fall again. "So, I wanna make sure that you remember to, you know, "push off from the arms of the chair before you stand," things like that. So, then they're like, "Okay, I don't wanna fall, "fine, I'm in it, I'll listen, "you can ask me that a million times if you want." So, I always repeat pretty frequently at the start of sessions and maybe even throughout the sessions, that it's, you know, there's gonna be a lot of repetition of me asking the question, but eventually that'll start to become a little less as they're being able to remember it. Great question. All right, so, let's say we get through that first session and you know, maybe we were working with that client who was remembering their schedule on their Walker and they're, you know, being able to retain it pretty well, you know, what would we do after that first session? So, basically, what you would do is write down the longest interval they were able to recall the information and then, let's say I'm gonna say him see him a day or two later, I would come in and that first trial, the first thing I'm gonna do with them after we kinda sit down or do our thing is to ask the question.

So, "Where should you find your daily schedule?" and then if they're able to remember that information, that shows me that they're able to retain it for much longer than that eight minutes they did in that first session, but now maybe over 24 hours and so, in that case, I don't need to reduce down to smaller intervals. I can go ahead and leave that question alone for a bit and so, you know, what the research says is that, you know, you don't have to necessarily work on that prompt and response practice throughout that next session if they get it correct at that first trial. I always say it's good to kinda pepper that question in there maybe not as stringently with time intervals as you did in the first one, but maybe Just make sure that retention is there and so, I might you know, as the session goes on, I might ask again, "Now, how do you find it?" or, "where do you find your daily schedule?" and seeing if it's sticking or not. But basically, what you're gonna do is always start subsequent sessions by asking the

prompt question and seeing if they can remember it. Because again, that that retention is much longer than what they probably experienced in the session. So, just to get a little bit more detail there, like we said, if the client can recall the correct information, so that could be the answer to the prompt question or even associated behavior. So, it might be, I want them to remember, I look at my schedule or on my Walker, but then I want them to touch that card, so I know that they know what they're looking for. Then you can kind of seize training for that session, but I tend to pepper in a few other questions, or asking that same question a little bit throughout the rest of the session just to make sure. However, if they can't recall it, let's say we go in, you know, two days later, I asked the question, the client can't remember it, then we're gonna do exactly what we would do in a session. I would give them the correct response, "Actually, you look at your Walker. "Where do you look to find your daily schedule?" asking the question again, having them answer. They say, "My Walker," I say, "Great," I look back, I'm like, "Well, they got to do eight minutes last session. "So, that's where I'm gonna start this session." So, I would then set a timer for eight minutes, and then wait eight minutes, and then ask the question again, so giving them credit for what they were able to accomplish in that first session, but then giving them that practice. If they missed it at eight minutes, then I would probably reduce back down to four minutes, et cetera.

So, reducing time, if they missed the question, increasing time if they get it correct. Okay. All right. Let's see, we have a question here for third world countries. Where not all are educated, those who can't read or write, how do we use spaced retrieval when they're also unable to verbally recall? Well, that could be difficult. I think, like we said, you would maybe think about what would be some ways that they could remember, maybe you would use a picture or just an action in general, you know, maybe it's not be, you know, having them read something or write something down, it would just be, "Okay, How should you stand from your chair?" and then having them put both of their hands on the sides of the chair and then push off and so, then that's the response that you're looking for. So, it doesn't always have to be something verbal, or them writing

something or reading something, it could just be that action. I've had lots of non verbal patients who, you know, could not give a verbal response. But I would look for them to then show me the action and teach them the action. So, that might be a way that you could get that information in. Great question. All right, so here's our subsequent session example. So, again, at the start of any session, following that initial training on a prompt question or response, the clinician should allow the client to demonstrate recall the information by asking that prompt. So, let's say our client has some left sided weakness, maybe you want them to work on putting a shirt on or getting dressed, maybe you have kinda a dressing chart that you're using for them so they can remember kinda how to, you know, put on the shirt correctly and easily in light of their impairment. So, maybe the prompt question could be "How should you put on a shirt?" "Use my dressing chart," could be the answer.

And so, again, what I would wanna do if the response is correct, they get it right, I'd want to then see them in that next session, reinforce that action, complete it, and then I might discontinue training for that remainder of that session, but maybe spot check retention throughout just to make sure they've got it. If they get it incorrect, I would say something like, "Actually use your dressing chart," and then show that to them. "Let's try it again. "How should you put on a shirt?" and then the client responds, "I use my dressing chart." "Good, let's look at your chart "and then let's keep practicing," and then I would return to the last successful time interval in the prior session. Okay. All right, let's see. Good question here. "Do you ever coordinate with other professionals "to create a prompt so that you can increase repetition "through interactions with OT, PT, SLP, Nursing?" Yes, all the time. I'm always looking for what's gonna be the best way to ask this question to get the patient to retain the information. So, you could definitely coordinate with other disciplines. I would just say that, you know, if you're gonna be working on it in your sessions, billing for it, that you kind of maybe do a lot of that training yourself, kinda decide between the disciplines who's gonna be addressing it. So, then, you're not kinda seeing that cross, you know, treatment going on, or billing for goals. So, I would work with them on maybe, "what do you guys think "would be

the best way?" "What would be a good response here? "All right I'm gonna be working on that in my sessions," and then as the patient is getting more proficient in that recall, then you can be sharing it with those other disciplines, nursing family, so then they can implement it when those situations arise. Okay. Let's see. "Do you ever phrase responses to mimic a social story?" Well, that's an interesting question. I like that. You could definitely do something like that if the patient can handle it. It would just be about what they're able to respond with a routine. So, the length of the response may come into play. But, you know, I will say trial and error goes into a lot of what we do here and I would love to hear if you try that and you kind of having a response be related to a social story, something that they could recall that would be meaningful for them in that way. You could also maybe use a social story as a way to maybe introduce the need for the prompt.

So, why they need to remember it, that could be a great way to do it. Maybe if you have that visually written for them, you go over it with them that can kinda set the stage for why you're doing the practice, which might help with their buy in, which I think would be excellent. So, those can be some great ways to kinda set that good stage. So, I feel like that could be a really great thing to do. Another question. "Can responses focus on more than one item?" "For example, total hip precautions, those kinds of things?" So, great question. Yeah, you could definitely have them recall more than one thing. It just depends on kinda what you feel like they can handle and I think you're gonna find that out pretty quickly with a lot of your patients. You'll kind of know what their level of ability is and then you'll think to yourself, "Okay, should I kind of, "you know, parse this out in pieces, "or can I have them remember all of this information?" A lot of times what I might have them do is direct them to a visual. "So, what are your hip precautions?" "Or how do you remember your hip precautions?" And then they have to look at the, you know, a chart that you give them or, you know, a written list or something like that, or, "What are your most important hip precautions," you know, if there's certain things that they typically don't tend to recall, or really put them at risk, I might start with those. So, you can work on more than one thing for sure. I always find

though, that you just wanna make sure that if you're using spaced retrieval for multiple types of goals, that they aren't too similar. So, I might work on kind of, you know, the name of a loved one, with a certain verbal response. That would be, you know, what that person's name is and then also use space retrieval to work on some type of action I want them to recall. Like, maybe for me as an SLP, or even all of you as OTs if you're working on swallowing, maybe add work on their loved ones name and also work on them being able to remember to tuck their chin before they swallow, things like that.

Okay. All right, I'm gonna keep on moving forward. I see your questions over there. I just wanna make sure we get all this in before our time is up. When is a space retrieval goal considered mastered? Typically with the research what our rule of thumb was if a client can recall information to a prompt question or perform a targeted strategy at the beginning of three consecutive sessions, then the goal can be considered mastered. So, if you see you kinda do training in one session with them, then over the course of the next three sessions, they're consistently recalling that information or the action that you want them to remember, at that initial trial, then you're probably seeing some good retention happen there and you can consider it mastered. But I really feel like, and I'll stress this, it's important to make sure that the client is consistently performing a targeted strategy before you discharge it. So, we know, sometimes, you know, people can answer a question correctly, but they're not following through with the desired action. So, we wanna make sure that that's in place. So, if I was Working with the patient trying to recall where their room was. We were working on them having remember where our landmark is or what the landmark is for them to find their room. I would wanna make sure that we practice that in treatment but also that we go back toward where their room is. I ask them the question and can they indeed go find that red ribbon on their door? I wanna see that they're consistently doing that. That staff is kind of seeing them consistently do that before I considered it something mastered. Okay? Training is gonna be In terms of the type of client, so it depends On the level of impairments, you know, other things that are going on how many sessions you're seeing them for and the frequency of those sessions. So, if you're seeing them five

days a week, it's likely that they're going to show some great, you know, success more early than you would if you were seeing a client only twice a week or something like that. Also the number of goals being addressed, how many different things that you're kind of working on. Basically what the research says is that you know, the clients enrolled in more frequent treatment are gonna like attain their goals more quickly, which we just know is pretty obvious, but you know, it's gonna vary. I, like I said, I always wanna see that that retention is happening that they're following through before I go ahead and discharge something and it may take a little time. I will say that, you know, there are times where I've had to tweak the prompt question or the response based on the client. Maybe I've had two sessions where they're just really not getting it and then I might have to say to myself, "Well, is the question too long?"

Remember, that working memory Memory usually only holds about seven pieces of information right? So, seven to nine pieces. So, we don't want that question to be something that they maybe don't attend to and then they can't remember the response. I might have to tweak the length of the question, the concreteness of that question. I've had patients who maybe I wanted them to remember where, you know, that they needed to Take their cane with them before they left the room, I'm saying, "What do you need when you walk?" I want them to say cane, they are not getting it and then I finally remember to ask them, "What would you call this?" and they're like, "That's a walking stick." So, my bad, I should have actually asked them from the beginning, "What do you call this?" So, I'm using a meaningful response to them so you may have to play with this a little bit. Don't get too discouraged if a client doesn't do well initially, you may have to play with it a little bit and that's completely okay. There's a lot of things that go into learning and retention and so, if we have to play with how we make that information more meaningful and for them to be able to really attend to it then go ahead and do that. Okay, the goal possibilities are endless, goals aren't written any differently with using this technique than they are for anything else, so you would use, maybe, you know, the SMART goal guidelines, making sure, you know, again, that they're measurable and attainable and time limited and things like that. This

is a great link here from CMS about a mapping therapy goals according to the ICF model, so I encourage you to take a quick look at that if you wanna know more information on some good goal writing techniques, but a functional goal equals a space retrieval goal. So, if you're already working on great things with your client that are functional, which I'm sure you are, you might be able to use this technique to help them reach those goals. In terms of how goals are attained and the measurement of them, you could do it anyway that makes sense. So, you could do it by a percentage or number of trials. So, in this case, you know, patient will recall and demonstrate energy conservation techniques to decrease fatigue 80% of opportunities during a given activity. So, you wanna see if they're able to actually apply the techniques you're using that, you're teaching them, during a task, or maybe you're gonna go ahead with this three sessions, you know, a number of sessions. So, patient will recall and demonstrate the strategy of properly using a grab bar to transfer to shower at the initial trial of three consecutive sessions using spaced retrieval. So, however you wanna set it up, is gonna make the most sense for your clients. This is just a tool in the toolkit, right? Just a method that is gonna help you work on those goals and help clients attain those goals so you don't write them any differently, it's just kinda the way you're going about it is changing a little bit. It's a modality or an approach.

So, there's no changes there either in terms diagnosis category. You would use the same ICD 10 codes that would respond to the things that you're working on with your clients, that doesn't change either. So, again, this is just a method that you can use that can help your clients who have cognitive impairment. A couple of quick questions to think about in terms of making decisions. I always start with these with myself. What are the strengths of the client? Always going from the idea of strength, again, a great perspective to start with, looking at how you can kinda circumvent those deficits and build on the abilities. And then, what are those weaknesses? So, is there a physical impairment, vision, what Some things I'm gonna have to get around here? Are there any challenges behaviors being exhibited? A lot of times we'll see speech or OT being called in to assist with clients or family members who might be, you know,

demonstrating some, you know, unsafe behaviors or things like that, repetitive question asking or wandering or something like that. What are those, and then there are other ways that we could use spaced retrieval to address those. What are the prompt question and response is gonna be useful and meaningful to that client. So, again, you might have to tweak this a little bit. Don't get discouraged if it doesn't work out of the gate. I've had a lot of different ones. One I can think of too is a client, we were trying to teach, to remember to use the call button to press it if they needed help, and I kept calling it the call button and the patient told me, "I'd rather call this my taco bell" 'cause she really liked to eat Taco Bell and I said, "Hey, we'll call whatever everyone as long as you use it."

So, that's one way to go, you know, really asking the client what they would call something, make it meaningful. And then thinking about what other staff or family may be involved in the training or carry over, because as we talked about earlier, that can be a good piece of having input on what a good prompt or response might be, also and being able to provide that information, what that prompt in response is, so then they can, you know, other family or staff can use it, you know, outside of the therapy context. Interdisciplinary process, again, the more we consult with family and caregivers, the better buy in and cooperation we're gonna get down the road with generalizing this. I always think incorporating the patient family goals. It's huge it can really, again, help with that. You know, that buy in, that wanting it to learn, to thinking that it's possible that you're listening to them. So, we may have our own goals in mind and that's completely fine. We wanna address those too based on what we see in evaluation and what we feel is important for patient safety, but asking, "You know, all right, "what would be something you'd want to remember?" That can really help them to kinda be open to the therapy process and see that they have potential to learn in this way Remember because as we know These patients can start to really feel like, you know, really down about what their abilities are, and so, they may not believe you that you can help them to remember things better, but if you can kinda show them through them, learning something that means something to them and that's important.

Okay, quick case study here and then I'll try to get to your questions. Here's a 75 year old male resident of a assisted living facility, diagnoses include Parkinson, CVA, refer by the physician to get OTs through home health care. So, he's experiencing a cognitive decline, at risk for fall's, a decline in Independence and ADLs and IADLs the goal is for the patient is to remain in home and is independent as possible. So, goals that you all would be working on, would include me things like, dressing, showering, bed mobility. Managing freezing episodes when completing mobility related activities to reduce fall risk and complete have a home exercise program. So, one example of a spaced retrieval goal here could be the patient will recall and demonstrate strategies to manage those freezing episodes, during movement to reduce volume at the initial trial of three consecutive sessions using the spaced retrieval technique. So, you know, again with the freezing episodes information I got From parkinsons.org related to that.

We know that's it happens during initiation of movement can occur during multitasking or stopping or slowing pace. You know, in stressful situations or in crowds, we can see freezing happen more and, as we said, it can increase that fall risk. So, maybe You would work on that as a way to the patient to remember maybe, what are the triggers, so What could trigger you freezing or whatever The freezing triggers and then having them remember those things or it could be things they need to remember before that could happen, so before you get up from your chair. Start to march, right? Or shift your weight or sing a song or put on some music or count, any of those compensatory things that you would teach them to do in that moment, maybe you would use spaced retrieval to help them recall it. I might also think about putting some of those strategies, maybe on a visual if they could see it, maybe on their walker or something else, so then they're immediately in front of them, and then it would be about them, seeing and using that visual and recalling that information. Okay, so I'm gonna try to get to a couple of your questions here. "If a client is successful, how often do you ask again?" "Is there specific activities to avoid during time?" So, great question. So, again, you're typically, as they get an answer correct, you're going to increase time that could be

doubling the time, so say going from two minutes to four minutes and then what you would do is, you know, depending on how much time you have, if it's 30 seconds I usually start talking about the weather or what we're gonna do today or something like that and then go ahead and say, "Okay, before we get started, "let me ask you, you know, where should you look "to find your schedule?" something like that. Let's see here. "Is anything you should avoid in between the trials?" I would say anything that's going to increase rehearsal of the information. We wanna really have them be responsive to the prompt. So, then they have that response that classical conditioning idea.

So, typically you wanna avoid them. You know, if you're having to remember a family member's name, you don't wanna sit and talk about the family member for the four minutes inbetween. You wanna maybe do something else and then ask that question, so that learning is kind of clean. Let's see," Any tips on what you can do "with the clients in between intervals" Like I said, it could be anything from conversation to beginning exercise. So, maybe you decide, okay, we're gonna start, I'm gonna introduce the question and response. We're gonna do do some small talk in between and then maybe you have some, you know, fine motor exercises. You want them to Do or whatever it may be. You can start those and then just say, "Let's just stop for a second." Let me ask you really quick. "What do you do?" So, you can just start as the intervals get longer, you can start working on your other therapy goals. "How do you make sure that verbalize learning translates "into physical actions for things like hand placement "during sits transfers?" In other words, people may learn to repeats. So since I can't see it exactly, to repeat the don't transit. So, you wanna just make sure that, you know, you do just lots of practice. I can't say that enough, if you want them to remember to lock their wheelchair brakes before they stand. Every time that you ask them that question, you wanna teach them that the response should be. Let's go ahead and touch the brakes here a little bit so that you can see that they can really keep the idea of what you want them to learn, you know, in play, so, you know, I think Just pairing that verbal response with the physical as much as possible. "Do you see

clients "who can provide the correct response when question cannot organically problem solve without the prompt. So, they can tell you where the dressing chart is located but won't use it on their own shore. You may see some things like that. So, you might have to look at, again, lots of practice there. You might have to look at the placement of where that charge is you might have to, you know, have them read through the chart and practice it, again. They may not need the chart as much anymore, over time, if you start to teach them how to do it and they get lots of practice with it, it could be something that then just becomes more of an automatic habit. So, you know, you might just have to do a little bit more practice here and there. Lots of repetition In order for that retention to happen. I hope that answered all off your questions, I know it's short amount of time to kind of get in a lot of Information about this technique so I want you to know that you can read reach out to me at any time with additional questions. Happy to be here for you. Thank you so much for being here today, I really hope that this is a technique that you are either using already and got some more information on or it's one that you Maybe excited about trying out and I would love to Hear how it goes. Thank you all and I hope you all stay well and have a great rest of your day.

- [Fawn] Thank you so much Megan, for a great talk today. I learned quite a bit as did many of the participants as I can see these questions coming in. So, thank you so much everyone I hope you join us again on continued and occupationaltherapy.com Thanks, everyone.