You're listening to Moving Ahead, The Physical Therapy Podcast by Washington University Program in Physical Therapy. In this episode, Dr. Greg Holtzman, Division Director of Clinical Practice and Professor of Physical Therapy at Washington University's Program in Physical Therapy, talks to Vanessa Lanier, Assistant Professor of Physical Therapy at Washington University's Program in Physical Therapy about her nontraditional career path and her part in a recent study from the Van Dillen Lab, published in JAMA on the treatment of individuals with chronic low back pain. They also discussed her unique opportunity to be part of a research study that allowed her to assume clinical and research related roles.

Greg: Hello, my name is Dr. Gregory Holtzman and I'm the Division Director of the Clinical Practice at Washington University Program in Physical Therapy. I'm pleased to be joined here today with Dr. Vanessa Lanier, also Assistant Professor at the Program in Physical Therapy at Washington University. Just happy to have her with us and talk a little about some of the things that she's doing for both clinical practice research and education, which is really exciting. So welcome, Vanessa.

Vanessa: Glad to be here.

Greg: Thank you. To start with Vanessa, I think your background is really, really interesting 'cause it didn't necessarily start out in physical therapy. So can you just tell us a little bit about your background and you know, not only sort of how and why you decided to pursue PT, but some of your prior work in your previous career.

Vanessa: Yeah, so I actually started out an undergraduate I was an Earth and Planetary Sciences major. And so, you know, I kind of joke that I got into physical therapy because I like to hike, but it's not quite true. So, when I was an undergraduate, I really did start to have a love for research and actually as part of my undergraduate training, we traveled to Spain and we went to the Rio Tinto River and we actually tested equipment that was going to be used on one of the Mars Rovers. So, it's a pretty exciting introduction to research for an undergraduate and then when I graduated from my undergraduate experience, I actually joined the NASA Planetary data system. And what we did was we archived data from NASA planetary missions and we also created tools for people to be able to access that data. So, I think that you know interfacing between like people and research and helping to help people understand research has always been something that is really interesting to me and I think that desire to work more with people is sort of what fueled me to seek out physical therapy. And I kind of joke that I like to hike, but I have always been a very active person and I've you know, enjoyed those types of things so I went from you know, this undergraduate degree in Earth and Planetary Sciences, not definitely the traditional path to go into physical therapy, but after a couple years of working I applied to physical therapy school and you know my love of research did not stop once I started to pursue this new career. But you know, now, the research that I was involved in or I have been involved in is really directly, you know, helping people so it's not just about disseminating what's known to people, but my research actually has a direct bearing on improving people's quality of life, so it's just been a really exciting, I guess, journey.

Greg: Great no, that's so exciting to hear. It's always fun to kind of learn more about what brings somebody into the profession. I can certainly appreciate some of the interest that you have and how it relates to the profession of physical therapy. Obviously when you graduated physical therapy school initially your focus was more on clinical care. Can you talk a little bit about some of your expertise in clinical care? And kind of what you, what your passion is for working with patients?

Vanessa: Yeah, so from a clinical perspective, you know I've always been actually really interested in helping people with really chronic conditions, so you know, physical therapy is a very broad field, and even within the realm of musculoskeletal pain problems, which is really what my primary focus is. You know there's a lot of diversity of you know patients that you could see within that field. And so, you know, people who really are having trouble you know doing everyday daily activities and people who have had a long you know duration of symptoms that really interferes with their quality of life. That's always been the population that I've been most interested in working with and trying to help, and so I think that you know, just because of that interest I've sort of also leaning toward helping people with spine problems. That's really been an interest of mine, you know, and unfortunately a lot of people who do have spinal pain conditions, those are often chronic conditions, and so it's just been an area that fits well with my initial interest, and then it's kind of changed over time to focus a little bit more on that population.

Greg: Great, and so I think learning that would probably give us our listeners some indication as to some of the research that you've been able to pursue, so you've worked really closely here lately with Dr. Linda Van Dillen to work on and complete a clinical trial related to the treatment of chronic low back pain. Can you just tell us a little bit more about the primary aims of that study and your specific involvement both as a clinician and as an investigator?

Vanessa: Yes. So, Greg, as I'm sure you know, low back pain is the most prevalent type of chronic pain, and it's also the most common cause of disability in the US. So, you know, obviously, there's a lot of interest in improving the management of chronic low back pain, and so we know that, and I'm sure our listeners know, that exercise is a very effective treatment for low back pain, which is a good thing as a physical therapist that we have something to offer. But over time, studies that have looked at different types of exercise-based treatments for low back pain haven't really identified a big difference between the treatments and hasn't really identified which treatment is going to be the most beneficial for people with low back pain. And unfortunately, that's especially true when it comes to long-term outcomes. So, you know the effects of these interventions are, you know, typically there's not very much difference between the two types of interventions and then the largest effects are in the short-term. And of course, when you're talking about a chronic condition, you're probably actually more concerned about the long-term outcomes than you are about the short-term outcomes.

So obviously there have been many, many people that are trying to help solve this problem, and with Dr. Van Dillen we started to really be interested in the primary reasons that people with low back pain seek care, which is difficulty performing their everyday daily activities. So, you know, obviously people have pain and then that pain can also interfere with their ability to perform activities, and they will actually not be able to perform them as much, right? And so, given that the primary problem is with functional activities, it seems like that is really the place to target our intervention. And then we also, through Dr. Van Dillen’s research, she has a long history of research, she's identified that people with chronic low back pain actually moved differently than people without chronic low back pain during those exact functional activities that they have difficulty with. So, kind of the logical treatment would be to try to change the way that people are moving during their daily functional activities so that they can perform them better and then without pain. So that's where this idea of motor skill training came up, and motor skill training is basically just using motor learning principles to help train people to do something differently. And in this case, you know, obviously we're interested in functional activities, so, and we know a lot you know about motor learning from the research and typically this type of intervention has been used successfully in people with neurological conditions, but it hasn't really been applied to people with chronic musculoskeletal pain conditions.

So, the study that we most recently completed which was actually published in the in JAMA Neurology, compared motor skill training. So, training people to do their functional activities differently using motor learning principles and this training is person specific. So, geared to exactly how that person moves to strength and flexibility exercise, which is probably one of the most common treatments that we, as physical therapists, use for individuals with chronic low back pain. So, we gave each group six weeks of this, either motor skill training or strength and flexibility exercise, and then we followed those people for 12 months following treatment to see you know how the treatment affected their function, both immediately and across the course of 12 months.

Greg: Great, I think it's really exciting to hear kind of the premise behind some of this research, you know as a clinician myself, I've had the opportunity to kind of work with you in some similar capacity for this type of approach. Can you just share a little bit more about what an actual visit would be like with one of these patients in the study. In other words, what type of things might you be doing with the patient? How might you address some of those functional activities just so we can understand? Kind of what one of those visits might look like.

Vanessa: Of course, so each of these visits would be an hour in length, and so the person would come in, and I would know already what their person specific problem was so, their movement diagnosis. So, this person might, you know, have too much lumbar flexion and rotation during their daily activities, and so we know that that's the movement that we're trying to change, so we're trying to get them to do less lumbar flexion and rotation during daily activities. And then the person will actually identify the specific functional activities that they are having trouble with, so it's not as though every single person has to practice the same thing. It's very much tailored to exactly what that person needs to do, so we had some people who needed to simply lift, you know, books from a low shelf all the way up to like someone who might be like a butcher lifting a really heavy piece of meat, and so you know the visit would start with having the person... educating them about their movement problem and the goal of our therapy, which is to change the way that they're moving and then we would actually practice the specific activities that we're giving them trouble. And during this practice we would use what we know about motor learning. So, there's some principles that we would use to help drive the person learning how to do it really versus me just simply telling them what to do. So, some examples of that might be that I would engage the person in problem solving because obviously I'm not going to be there with them when they go home. Luckily for them, they probably wouldn't want me there telling them what to do all day, and then I help them solve the motor problem. We would give them feedback, but we would try to if it was needed, but then we would try to remove that feedback as soon as possible and try to get the person to attend to their own internal feedback. So again, the goal is this person is independent in problem solving when they come up with a problematic activity that they're using their internal sensory systems to tell them whether they're moving in the way and that we would not like them to move, or in the way that they should be moving. And then we would progress the activities to make them more difficult over time.

So, you know, you could think about like within the context of a sport you might progress, you know, from a simple you know type of drill to something that was more sport specific.

The same thing with the functional activity. You might progress from lifting something that was light from like a you know high height, and then you might progress to lifting something lower but you're not just progressing them, just simply to make it harder. You know we have physical therapists definitely know how to do that I think our patients would attest to that. But you're doing it within the context of what that person actually needs to do.

Greg: Well, that's really great to hear a description I think for a couple reasons. One, because you're really engaging the patient in terms of what's important to them and understanding their goals, what movements might be more functional for them and important for them to be able to perform on a daily basis and then two the way you're basically promoting that independent performance, you know working on some of these activities to help them, not only while you're seeing them, but hopefully long thereafter. So that's really great. So, based on that, what can you tell us about some of the results of this study? What were some of your primary findings.

Vanessa: Yes. So, this is actually, I think, the really exciting part and why I get so excited about talking about this study anytime anyone will let me. So, what we found was that motor skill training this new type of treatment where the people were doing getting training in their daily activities was more effective than the traditional strength and flexibility exercises. So, the people who received the motor skill training intervention they got almost twice as much better as the people who received the strength and flexibility exercise intervention. And when we followed them out to 12 months following treatment, they actually maintained that improvement. So, it's a really exciting finding because we treated them for only 6 visits and we were able to see like about a 60% improvement in their function from the beginning of the trial until after the treatment. We were, yeah, it was really exciting to see.

Greg: No, that's really exciting because you think about this idea of again dosage and the number of visits that somebody has to come to physical therapy for and to understand that through 6 visits each of one hour length, you're seeing results that are one immediate and two long lasting. You know, those are definitely exciting results, and so I thank you for sharing those results. Just curious, you know, kind of thinking about the results of this study, I guess in your opinion, how do you think these findings of this particular study could or should impact the practice of physical therapy, specifically related to the treatment of an individual of low back pain? 'Cause I think obviously we need to kind of, think about the scope of this study 'cause it did relate specifically to chronic low back pain. So, within that context, how do you think it could affect the practice of physical therapy related to those individuals?

Vanessa: I mean, I, I think it pretty clearly suggests that motor skill training should really be a priority treatment for people with chronic low back pain because you know in only these 6 visits, we were able to see this very large improvement in function, much larger than kind of our standard of care and an improvement that then persisted for 12 months after treatment. And then we're talking about, you know, a chronic condition, so most people in our study had had low back pain for about 7 years prior to enrolling in the trial. And they had actually a moderate level of disability, so 7 years of low back pain, moderate level of disability, and then within you know, 6 weekly one-hour sessions they're getting a 60% improvement in their functional activities. That's a pretty large improvement, and I think something that should really be considered.

And then another aspect that we didn't chat about before, but I think is really important I think gaining a lot of interest in physical therapy is the concept of adherence. So, you know you could think about adherence as how much the person sticks to you know what they're instructed to do. So, in terms of medication adherence, it's easy you know you could just measure the number of pills the person takes, and it's pretty clear that you know if you don't take your medication. If you don't take your pills, then you're probably not going to get any effect of that medication. So, you know, similarly, with physical therapy, if you don't do the exercises or if you don't implement the changes to your functional activities then you're probably not going to get an effect of the intervention. And so, people become much more interested in this over time because we know that adherence to exercise is actually typically very low in the long term, and so the other finding from the study was that the adherence to changing daily activities to the motor skill training component was actually quite high during the treatment and then was actually quite high for a full 12 months following the treatment, so it really seems like something that people can do and can continue do. And because it's within the context of their daily activities, I think it offers a really effective tool for self-management of what we really know is a really chronic condition, so yeah, so I think it should be really a priority treatment for us to investigate further and implement in people with low back pain.

Greg: Well, that's again, really, really exciting. And congratulations to you and Dr. Van Dillen for the publication in JAMA. That's, it's really I think a testament to the nature of the study and the quality of the results that led to that publication. Thinking about things a little bit more, though, on a broader level, particularly with regards to again, kind of your sort of role as a physical therapist you've now had, I think what would be a really unique opportunity to be a part of a research study that allow you to both assume clinical and research-oriented roles, and I think that gives you an interesting perspective on the process by which clinical practice can drive research and how research can impact patient practice. Can you just tell us a little bit more specifically about your perspective of this interaction and how it relates maybe to the study this specific study but then a little bit more broadly to the profession as a whole?

Vanessa: Yeah, I think that's a really, really great question and maybe tying back to the beginning of this chat that we've had. You know why I think that research and physical therapy has interested me perhaps a lot more than my initial love of Earth and Planetary sciences. So, you know, I think as a clinician and you know you're in the clinic every day you're working with people, you're seeing you know what are the difficulties that they're having. You know you're obviously reading the research and seeing what's been identified as problems for people, but you're also having this really hands on really real time experience with people to see you know what they're having difficulty with. And so, you know, with this study, obviously at the before the trial even started, we had to design methods to apply basically, it was a really novel intervention in people with musculoskeletal pain. And so, I worked closely with Dr. Van Dillen, as well as a group of people to help determine you know how we could implement what we know about motor learning with patients in a clinical environment. And so, I think as a clinician I had a very unique perspective as to you know, what do these patients look like when they're coming in. What do I think they could do within a particular session? And so, I think I had a lot more kind of practical insight into how we would deliver this intervention. And then, you know, once the and then I actually was one of the therapists that provided treatment within the trial.

So, I got to learn a lot of new skills for how to implement this type of intervention effectively in people with low back pain. And then once we found out that it was so effective, I was able to then quickly, you know, implement this in treating my patients with low back pain.

So that was really exciting. And then I think the part that is unique as a clinician, is that so you know, let's find you know one of the main issues. I think that we have in being evidence-based practitioners is that you know there's research that's done and then the findings are published. And then you know, it takes a long time sometimes before those findings are actually implemented in clinical practice and can actually help patients and help us as providers to be able to provide effective interventions. And so, some people describe that as the gap between like what we know and what we do. OK, so I think that being a clinician who's involved in research, I can take the findings immediately and put them into clinical practice. And then I can help to identify what are the barriers to implementing this in a clinical practice environment because, you know, as if someone is involved in research and doesn't have any clinical experience, they may not have the same insights into the reasons why we may not be able to implement this, and I think you know that can be an important gap to fill, and it's not that practitioners don't want to implement research findings. You know, we all want to do the best that we can to help our patients in evidence-based ways, but sometimes there may actually be issues that come up when you try to take something that happens in a lab and put it into clinical practice. And so that's something I'm actually very interested in, and I think a unique perspective that you have when you are a clinician and a researcher.

Greg: You know, I think that's just such a great perspective for you to be able to go right back to the clinic try to implement these things for those things that work really well. You can kind of continue to apply those and use those in the clinic and for those things that might not. You can kind of bring it back to the table to sort of talk about in terms of how you might frame future studies to try to figure out how it could be better implemented in the clinic, so that's really great to hear that perspective.

Now, in your particular role at Washington University Program in Physical Therapy, you know clearly you understand the hallmark of the program itself is the integration across different missions. For both clinical and research like we've already talked about, but there's also the educational mission that we tried to fulfill at the Program in Physical Therapy, so I'm curious again, sort of thinking about bridging this gap between research and clinical practice now, can you talk a little bit about how you might kind of bridge the gap between research clinical practice and education? And talk about how this specific study and maybe the results of this study have impacted your role in education and how you've incorporated it. Or have you? How you've been able to incorporate concepts, learned from this study into some of the teaching that we do for the doctorate of physical therapy student.

Vanessa: I think it's a great question and I think it's one of the things that I love most about my job at the Program in Physical Therapy. And also, I think one of the major benefits for our students is that we have, you know people not just me, but others who are, you know involved in multiple different missions and then that, can you know, translate directly into the classroom. So, with my work, you know, I, you know, once we found out the results of the trial, you know we're very excited about this and wanting to share this with our students. And so, you know, very soon afterwards we started to develop some experiences for the students to actually learn how to do this particular type of training. So, I've designed several laboratory lectures and laboratory experiences for the students where they're actually learning the principles that we use within the trial and then how to implement them in people with chronic low back pain, and so that's a really exciting thing, and it's something that's brand new and I think will really serve their future patients. And then you know, obviously, education is delivered by many people, so you know it's not just training the students how to do something different, but also working with the other you know faculty that we have and the other laboratory instructors, who luckily are extremely excited to learn new things and improve their own practice to help make sure that some of these principles you know are implemented consistently across the curriculum because you know, it can be challenging if you don't get the same reinforcement throughout, and there's a lot of opportunity for us to improve how we're training people to do things differently. By using these motor learning principles, so the exciting part about for me is that you know I can take it directly into the classroom with the students. I can learn with my, you know, and share knowledge with my colleagues and then you know when I have, I actually take students in the clinic as well and when I have students working with me in the clinic, I can also help them learn how to implement this with their patients. And the other great part is, you know when you teach someone something new and when they try to implement it then of course new questions they're going to come up new insights, and so you know, I learn from the students I learned from my colleagues every time I, you know, implement something new and how people try it. It's just so it's really exciting and I think it fuels each mission you know clinical, practice, research, teaching they all kind of feel at each other and they're very interconnected, and so it's just been really exciting.

Greg: Well, that's definitely great I'm curious. Obviously, part of what goes into the teaching aspect is the actual content itself. So, thinking about how you might go about treating somebody that has chronic low back pain. But I think the other thing that we're really teaching somebody relative to what you're providing an educational program is one how we you know people can learn best and address a certain issue. Obviously, the issue or the focus on functional activities, but I'm actually more curious to kind of get your sense of feedback that you've received from students just about the process. In other words, learning how this has been, you know, a clinical question that was driven by practice, studied from a research perspective and now brought into the classroom. Have you gotten any specific feedback from students? Kind of about that specific process on how do they feel about that?

Vanessa: Yeah, it's a really good question. I think that for students seeing someone that they're working with, you know engage in this process and maybe even over the course of the 3 years that they're within physical therapy school. Seeing how, you know, what we know changes I think is just a really important lesson, because you know, I think you know many people who come to physical therapy school. I don't, I can't speak for everyone, but at least in the students I've talked to, they're really excited about helping people and learning how to become a physical therapist. And so, sometimes you know, looking at what's newest in the research or learning how to you know, read a paper or examine the evidence is it's not necessarily the thing that gets them really excited every single day because they're, you know they're early in the process and they really want to just, you know, learn how to do this this new job, but I think seeing how a clinician then we can, you know, engage in this particular process and then you know, use what's learned to really change how you're delivering care, I think, helps them to see the that's why it's important to learn how to be an evidence-based practitioner and so you know, I think a lot of students have expressed one a lot of excitement and interest in just learning about this project, but also have expressed that seeing this happen in real time sort of helps them realize why it's important to learn not only about whatever technique you know we know about right now, but also to engage with the literature after they leave school and to continue to, you know, improve their practice.

Greg: No, that's really great. And so, I guess to follow up on that do you have any advice for students or young professionals that might want to engage more, kind of in the role that you're in? Where you're doing clinical practice, you're doing research or doing education. Any advice to those students that might want to pursue those sorts of activities as they graduate and become physical therapists and themselves?

Vanessa: Yeah, so I mean, I think that this word is probably going to be familiar to people when thinking about wanting to approach anything. But I think mentorship is really important. Dr. Van Dillen has been just an excellent mentor for me in helping me to shape some of these skills, but also just look for opportunities where I can you know, develop new skills or new experiences, and so I think you know if you're interested in moving into the research world identifying people that are doing what you want to do, and even just you know, reaching out to them. I think so many people are really generous with their time with their, you know their ideas and with helping students. You know 'cause I think so many of us are involved in educational programs and so you know, I'm always happy to meet with a student or talk with someone about you know, their interests and what might be best. But I think you know, even just looking at the people who are doing the research that you're interested in reaching out to them, telling them that you're interested in seeing what are the ways that you might be able to be involved. I think that's a really good start, and then you know there are other training programs that that help train people with clinical degrees to become you know, to have more of a research focus, and so that's another route, but I think it's very helpful to engage with the people who are doing the research because I think they will help guide you in the right direction in terms of exploring your interest and what you know what is it about this that you're really interested in, and what aspect would you like to be a part of because you know, obviously the field of physical therapy research is so broad there may be different areas or different places within that research continuum from discovery to implementation that may be the best for you and what you're really interested in and where your skills lie.

Greg: Now that's really good advice and I appreciate you kind of commenting on that, as those who might be listening. Could you know that might have these interests could pursue? Lastly, I just thought we kind of turned the focus back on you a little bit and just sort of if you could tell us about any future research plans that you might have that you can comment on, and specifically how the any future research plans you might have might have been influenced either by your clinical practice or your current research.

Vanessa: Yeah, that's a great question I'm not going to give out any top-secret ideas. Just kidding. But so, you know, I think you've heard me use the term implementation you know several times, and I think that the implementation of these findings is something that I'm really interested in. You know, I think that as a clinician who also has research experience that I have a unique understanding of that what we know and what we do gap. And so, you know we do have some interest in doing some work on asking questions that are related to the implementation of these clinical findings of these research findings into clinical practice and so that's a way in which, you know, as a clinician, I'm able to help generate some important questions because I have actually tried to implement this in my clinical practice.

I have, you know, spoken with other clinicians who have tried to implement this. I've trained other clinicians and how to do this, so that's something that I'm really excited about and you know, I think it’s just actually, such an important field and it's becoming a very kind of hot field.

I would say not just in physical therapy, but in medicine in general and then you know we're also interested in applying you know what we found in chronic low back pain and investigating this treatment and other types of musculoskeletal pain conditions where movement is a problem, right? 'cause really what we're trying to do with this particular training is change how people are moving, right? So, we're interested in exploring whether that's an effective treatment and other types of pain conditions, and so you know, obviously as a clinician, I you know I said I love the spine, but I do love treating you know any problem that needs help.

Greg: Right, right?

Vanessa: It's a physical therapy problem, of course. I would like people to get help for other problems as well, but may not be qualified to do that. So, you know I think with that experience I've helped to, we have some you know, different projects that may be coming up where I've helped to determine you know whether we think this type of treatment would be feasible you know, in that particular patient population, so it's really exciting. It's a good interchange. You know between the clinic between the research world and then, actually. Also, the educational work that I do, because like I said, you know students they have so many questions, they're really inquisitive and so oftentimes you know sometimes in teaching them what I know they ask me questions that drive me to find out more. You know, sometimes someone asks a question and I'm like I have actually no idea but that is an excellent question. And so, you know, I think that's a really nice place to be where I have all of these different experiences to draw on.

Greg: Now, well, that's definitely great. It sounds like you've got a very exciting path ahead and kind of explore different opportunities that relate to both research clinical findings, and that's sort of pulling that in back to what you do from an educational perspective. So, I appreciate all of your thoughts and perspectives today. It's been great talking with you about not only your study, but what you've done within the profession itself. And so, thank you for being here today and it was great talking to you.

Vanessa: It's been my pleasure. I'm always happy to talk about these things.

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