Introduction and Guest Background

So many parts of our brain are kind of already kind of so active to make sure that, you know, my brain remembers where I have kept the keys. You know, I'm preparing for the movement of putting the hand in my bag and taking something out.

And then I have to, you know, talk to my family on the phone. So in nutshell, I think cognition and movement kind of go hand in hand. And the way I think of PT's as, you know, think of PT's as PT's are your brain, helping your brain-body connection.

So when I'm thinking and talking to a physician like you, I hope that, you know, when we are thinking about physical therapy, it's not just about pain, muscle, and movement.

I think physicians need to understand that physical therapists are also helping in, you know, rewiring of the brain. This is Doctor Talks. Real talk from real doctors on the issues that matter to you most.

Welcome to the Too Curious, MD podcast. Today, we are excited to have a very good friend, colleague, really inspiring person I've known for many years, including her family, Dr.

Nooper. She is a licensed physical therapist and a neuroscientist who has been advancing neurorehabilitation. She is also a professor at Department of Physical Therapy at California State University and Fresno, and she's a Director of Rehabilitation Technologies and Outcome Research at the Central California Sports Science Institute.

Big titles that she carries. With a lot of grace, Dr. Hajala's work bridges clinical practice and also research, and that's an important component to what she really believes in.

At Fresno State, she teaches future DBTs, which are doctors of physical therapy, about neurological evaluation and management of conditions like stroke and Parkinson's disease.

Her research at the Gait Balance and Education Research Center focuses on improving gait and balance in individuals with mild traumatic injury, stroke, and Parkinson's.

And she really has been able to implement translational neuroscience and novel technology She earned her bachelor's in physiotherapy in India, followed by a PhD in rehabilitation with a neuroscience emphasis at the University of Minnesota and a prestigious postdoctoral fellowship at the Rehabilitation Institute of Chicago, now known as the Ability Lab, where she explored brain stimulation techniques such as TMS, She's also a certified LSVT big therapist, and you have to tell me more about that, Luper.

Dr. Hajira is currently researching neuro gaming applications for individuals with concussion, including veterans and athletes, and I'm very, very interested to hear about that.

She champions interprofessional collaboration and is pursuing a post-professional DBT and remains an active clinical license in both California and Washington state.

Outside of the academia and clinic, I know that Nobird loves music. She's got a beautiful voice, sings beautifully, loves food, loves outdoor adventures with her husband and her two children.

So welcome to our podcast where we ask those unasked questions. We are two curious MDs. We are really curious about the sciences of medicine, narrative story, and mental health, and really working at psychedelic spaces, which is those unconscious subconscious spaces and healing using holistic approaches.

So welcome to our podcast. Thank you, Dota Amit. I really appreciate the opportunity and it's my privilege and honor to be on your podcast, The Two Curious MDs.

Thank you. I am again very curious about your journey, not just in where you are right now, but really what brought you to this focus specifically to rehabilitation in your role as an educator and as a practitioner.

Yeah, I think that's a very, I would say, deep question, a meaningful question to me. And I say that with all humility because this month is the month that my mom passed away in 2021 when the COVID happened.

And whatever you see of me is what she has helped me become. And I was kind of raised by a very, I would say, strong woman. But my dad was more ambitious, so he inculcated more ambition into me.

But my mom was somebody who was very courageous, someone who would try to look past the problems and, you know, challenges with a very courageous mind and heart.

So my journey started from a very middle-class background. with the sense that my parents were always about helping others. And I think that kind of in some way got instilled in me.

And when I came to the point where I was trying to choose a profession, I wanted to be in a profession where I could kind of impart more hope, you know, connect with people on a very personal basis in the sense that I can help them heal in a better sense.

So I think, you know, that has been my journey, you know, about my academic background. I've been kind of gold medalist in India. And then, you know, when whenever I would come home, I would, you know, every time there was my parents used to tell me that, you know, everything comes with a purpose.

And, you know, it's all about kind of digging deeper and soul searching to find what is next in you. So I think that's what I'm trying to do. I'm trying to find what is my next challenge?

What is my next call? And that's where I'm here today. Beautiful. And yes, for the audience, being a gold medalist in India is not an easy task. It is something that many people strive for and few people achieve.

And I understand that that itself puts you in a different category, right, of somebody who's really ambitious, but also strives for something bigger and better ways of thinking.

I think you're well deserved that skill. I also want to ask you more about your work right now as a professor, as an educator, and the interventions you provide in neuromodulation for the nervous system.

Tell me, tell the audience a little bit about that. Well, I think I would like to kind of take you back to my background as a physical therapist. So I wear many hats.

As you described, I'm a licensed physical therapist in the state of California and Washington, but then I'm also a professor at Fresno State. I'm a neuroscientist by training.

So brain always fascinated me, you know, how, as you can realize, Dr. Ahmed, It's very complex, but it's very intriguing. It's very interesting. It's very malleable.

It's something that reacts and acts to stimuli.

Personal Journey Into Rehabilitation

And that was something when I was, I think I remember back in 2005, when I landed to pursue my PhD in University of Minnesota, we were just starting to talk about neuroplasticity.

And that kind of opened up a lot of, I would say, my neurons were just firing all the time. I was just so intrigued

about, because before that, we used to think we are born with a certain set of cells, and those are the neurons that you have, and nothing changes.

But now we were talking about, based on the animal experiments, the experiments done in rat or neuroplasticity. And I'm talking about the year 2000, like I said, 2004, 2005, about neuroplasticity.

And that kind of led me to think that there is so much you can do. You can do so much as a neuroscientist. Not only that, you can do so much that I can bring to physical therapy and rehab.

And that's why I made sure that I drew an emphasis in neuroscience, because now I was learning about, for example, the study suggests in research that if you perform movement, it kind of helps with something called as BDNF, which is brain-derived neurotrophic factor.

And there I am as a grad student learning about BDNF and about this protein and kind of learning how it can sustain or encompass neuroplasticity from increases synaptogenesis, doing things about different various ways of neuroplasticity in the brain, So that kind of made, that was kind of my calling to kind of pursue further.

And that's when I went for my postdoctoral fellowship in kind of neurorehabitation again at Northwestern Medical, which is, you know, Shirley Ryan Ability Lab now, in which I was actually providing transcranial magnetic stimulation in people with incomplete spinal cord injury and trying to kind of see how we can rewire the system.

So that is what I'm trying to take from what I have learned in my training is, you know, what are the ways in which you can rewire the nervous system?

And the way I think of movement is movement in some way is a neurobiological reset. As a physical therapist, I want to perform movement on my patient and I want them to know that when you perform movement, you're not just working on your joints and muscles, you're actually working on the brain.

So that's why I tell everyone, everyone has a heart and everyone has a brain. So what can you do to kind of elevate and heal that? So that's what I actually also teach my students, because sometimes you would realize as a practitioner when you're meeting a stroke patient and you're performing a movement, you may not see the changes right away.

But what are you changing in the long term? How can you make the body more resilient? How can you make these patients actually be comfortable with their own body image?

I'm sure, you know, at your facility, you're trying to kind of do that with trauma patients, and you're trying to do that with other patients who have issues with some of the chemical changes that's happening in the brain.

So I feel, you know, I'm very much of a proponent of interprofessional collaborations, and that's why I am so glad that you and me are talking about this topic today.

Yeah. And it's fascinating. You mentioned BDNF and you mentioned the neuroplastic effect of movement, right? We at our center talk about ketamine. We talk about TMS.

aspects of that effect of BDNF, ketamine-increasing BDNF activity after infusion, and then transcranial magnetic stimulation also having that increase in stimulation, which also enhances that regenerative growth in a proper way, that synchronization of activity in the brain.

And we're speaking from a very general point of view. Can you explain to our audience what exactly is transcranial magnetic stimulation? How does it help in modulating that specific effect that stroke or Parkinson's or cognitive changes or traumatic brain injury has?

Yeah. So I think if I were to put it in a very simple words, think of it as like a coffee to the brain. The way I think of it is transcranial magnetic stimulation.

When you think of it, you can think of a stimulus as from a bottom up approach or a top down approach. So transcranial magnetic stimulation is actually going over the neurons and they're trying to kind of go and increase what you call as, I mean, in some way we say it's MEP or magnetic evoked potential, but in certain ways what you're thinking is you're trying to increase the receptability of those neurons.

You're trying to see how can they respond to the stimulus that they are getting in a more optimal way. So think of like a coffee shot, which is kind of going directly into the area that is responsible for the movement, whether it is like you, for example, when I was used to provide magnetic stimulation, we were trying to stimulate tibialis anterior, which was in the front muscle in your leg.

And we were kind of using that, you know, coil shape, dome shape, you know. Device. Device on top. But for example, if you want to stimulate the hand, then you have something that's a very circular, simple one that you kind of go on the opposite side of the brain.

So for your viewers, I think the way I describe it is that's something that can increase and optimize the potential of the neurons. So every neurons have their spiking capacity.

And how can you kind of increase that, increase the amplitude of movement?

Neuroplasticity and Movement in Physical Therapy

It was so interesting that even the imagery of something can increase the movement. So when I used to try and find a spot, a hotspot on the brain for my patients, I would first ask them to imagine that they're actually raising their foot.

And it was so interesting that even before they start the movement, just the preparation of the movement would allow me to kind of see those motor evoked potentials.

So that was so interesting that I was reading then about applications of it in depression. And now I see that I have a clinic right in Sacramento that can provide that for the patients.

Yeah. It is a combined approach. It does require kind of that way of looking at something in a different way. I think a problem in a different way. I mean, I'm a physician.

You're a PhD. We're talking about collaborative thinking, right? And what brings that to the healing space. And a lot of times when we work in the different silos, and this happens in medicine, right?

We work on our different silos. I would refer to a physical therapist not knowing really what's going to be you know, what's going to be the effect. And when you, and this may be going a little bit off topic, but I really want to hear about how do you approach a patient when they first refer to you?

How do you decide, you know, what treatment options they would need? What would be the best approach for them? And then assessing that over time. Yeah, I think that's a very pertinent question you're asking.

I think the first thing that comes to my mind is evidence-informed care. I want to make sure that my patients are getting the best of the best outcome, so to speak, from the time that they spend with me, right?

So in terms of your question of, you know, how do I decide what is the best approach to take? And I think I would go back to what are their goals? You know, I think everyone's goal when they walk into physical therapy clinic or meet a physical therapist or being referred by a doctor is very different.

An example that I can give you is I may meet a stroke patient and I would say, you know, Mr. Smith, what would you like to achieve from getting physical therapy?

And he may be kind of limping and maybe hemipyretic and may not be able to walk, but all he wants to do initially is

to be able to eat. So his upper extremity movement is more important to me than me just thinking from the gait and balance perspective.

So again, kind of going back to What are my patient goals and how can I align their time with me in a more optimized manner? And that's why I think I'm also leaning more and more towards technology.

I think I want to see the augmentation of what we do along with technology. An example I would give you is initially, you know, when my patients would count, so I kind of currently am focusing on Parkinson's patients.

I do research in Parkinson's. I have gotten a grant from California State University Chancellor's Office to perform Parkinson's disease-based interventions for patients with Parkinson's in underserved communities.

And I'm trying to kind of use immersive virtual reality to help these patients. I'm trying to find which is effective. Is the standard physical therapy more effective or an immersive VR-based intervention can be more effective?

So yeah, so I think what I'm coming to a conclusion is I think if we want the optimized care, we need to work in hand-in-hand with technology and see how we can leverage that.

What can we do to optimize that? So I think the first thing comes is assessment. And what I'm learning is not just in-person, inside clinic assessment.

I think more of what my patient does at home is also of value to me. So I am kind of learning more about variables. I'm learning more about, for example, application-based.

For example, some of my patients have tried what I call is a gait app in which they can just take their phone, they can take the measure, and they can get the assessment right in their home where they're actually going to go back.

So I don't want assessments to be just initially valid when you do midterm evaluation and the final discharge. I feel the continuity or the care at the continuum is of more importance to me, and that's what I'm learning.

So when my patient comes and they say, yes, I have worked twice a week, I need to know if they've really worked twice a week at home, or are they just saying it to appease me?

So with this, some of these applications and apps that allows me to see whether they have engaged with the app, how much of physical therapy have they done.

And so I think that's where I'm moving towards, that the science should move or the treatment should move towards learning the patient's habits and what they're doing at home.

or wherever they are, you know, whether they're in their skilled nursing facility or whether they are, you know, other places. But very much so, you know, and that's why I feel that there is time.

I mean, yes, we are very divided on AI, but I also feel that we can use AI to our advantage if we understand the ethics and we understand the nuances of, you know, what is good for my patient.

So I think assessment is the key. And I think my short answer to your question is assessment in continuity and not just assessment in, you know, in chocks and blocks of just one or twice or thrice.

Yeah. You know, it's data-oriented, data-driven, but also really realistic, right? You want to be addressing both the patient's outcome experience and their goals, as well as their results.

You want to be able to track that and monitor that. It is so vital. It does require patients to also possibly kind of be in that partnership with you.

And I wonder, because I see the same thing on the other spectrum, other side of that, is the emotional and

physical, you know, emotional impact of a condition can have that leads to depression, that comes from a background of trauma, that leads to a lot of anxiety, especially as we talk about the aging population.

How does physical therapy and the neurorehabilitation interventions that you provide affect mental health outcome? Is this something that you track or is this something that you assess for in your assessment?

Yes, I do actually. I've started doing what we call it as two questions to kind of assess, for example, the geriatric depression scale. Or I'm very much interested when a Parkinson's client come.

Transcranial Magnetic Stimulation and Neuromodulation

For example, in my research study, we are doing cognitive assessment and we are doing motor outcome assessments because we need to understand that movement and cognition go hand in hand.

And to your question, you know, we also sometimes do MOCA and MMSE. And these are some, you know, first line cognition based assessments that you can do, which are very easy to administer, but give you, you know, a lot of information and data on how the patient is doing and if you are making any changes.

So to talk about cognition, I have always been interested in that. And I think the way I think of it is even for our physical therapy when I'm teaching my Doctor of Physical Therapy students, we call it, you know, adding a cognitive load to a motor task.

And why that is important is from the brain perspective, even when the movement execution happens, the movement preparation should begin. And for the movement preparation to begin, you need to start recruiting your prefrontal cortex.

You need to kind of add that cognitive piece of, you know, you and me are walking, we use our phones, we are trying to look for our car keys, and we are doing so many things in a seamless way we don't even realize this, you know.

So many parts of our brain are kind of already kind of so active to make sure that, you know, my brain remembers where I have kept the keys. You know, I'm preparing for the movement of putting the hand in my bag and taking something out.

And then I have to, you know, talk to my family on the phone. So in nutshell, I think cognition and movement kind of go hand in hand. And the way I think of PTs as, you know, think of PTs as PTs are your brain, helping your brain body connection.

So when I'm thinking and talking to a physician like you, I hope that when we are thinking about physical therapy, it's not just about pain, muscle, and movement.

I think physicians need to understand that physical therapists are also helping in rewiring of the brain. And that is very important. As I understand, for neuroplasticity, you need repetition.

You need reward. you the patient needs to have the tasks which are challenging because our brain is so smart the moment we just keep doing something repetitive something it has seen it kind of shuts off and you know the lower center starts take over like the reflexes right so you know what do you do to engage the brain and that's why i'm trying you know new technologies and immersive rehab and vr is kind of giving me that.

Like, for example, currently, I have this VR headset, which provides cognition. For example, I also treat Alzheimer's patients. So with them, I am, they are in that, you know, immersive world.

And it's so surprising, you know, sometimes we think of elderly generation and we think of elderly, they will not like it. I just had a 78-year-old Parkinson's patient, and she was having a ball with immersive VR.

She said, oh, this thing is coming at me. I need to do something like that. So I just feel that clinicians should not just stereotype patients. I think we need to try things out of what works or connects with our patients.

Because it could just be that in this particular case that I'm telling you is this patient is in a immersive world where she's going grocery shopping.

And what I do with this app is I'll have some things on the aisles. And as I've made connection with the patient, I know whether she likes jam or jellies or peanut butter or something.

And those are the items I can actually put on those shelves. I take them away and then in the immersive world, and then she has to retrace or retract those kind of things.

So it's very interesting how you can make your physical therapy session, which you think would be very mundane and boring, interesting and engaging to kind of, again, reignite those pathways.

I'm talking about prefrontal cortex to motor cortex pathway. There are some very important things that you just mentioned, which is the prefrontal cortex.

We know in depression, when we talk about FDA-approved TMS, it's really to target the dorsolateral prefrontal cortex. That's where we're stimulating with the TMS, which is the area with the prefrontal cortex, the motor planning.

It's funny how that is the center where depression tends to live, at least in most people, not everybody, but it tends to be the targeted area. I want you to kind of highlight to me what it is like for you when you see a depressed patient who is having motor issues and how do you work with depression in mind or something else that's in mind with that treatment.

Yeah, that's a very, I would say, again, interesting question that you asked because when, imagine, you know, I mean, you are seeing these patients every day in and day out.

Imagine how these patients sit, right? They are very kind of stooped. They are very kind of have low self-esteem. They are not making eye contact. They are not connected with the reality or the present.

even though they walk very slowly, you know, at least some of the patients that I have seen. And what it tells me is that these patients are losing that sense of safety with their body, right?

So I think what I feel that when physical therapy can allow to do along with the kind of therapy that you provide with ketamine is kind of making sure that they understand that when you do a movement, you're actually sending a signal to the brain and saying, hey, I'm here.

Hey, I'm safe. And hey, I can perform this. I can do this. And I think that's what a physical therapist provides. It's not just about the movement. It's also about the quality of movement or living their life optimally.

fulfilled, right?

Patient Assessment and Technology in Rehab

So I think that's where I feel that very important and I'm so glad that a clinician like you thinks about mental health to the extent that you have moved in that direction and is speaking to a physical therapist who sometimes you just refer and you don't know what a physical therapist does.

So I'm so glad that we are kind of connecting on this kind of highlighting the intersection of different, I would say, expertise can be leveraged. I think that is what, if I have to summarize in many ways of what we are kind of underlying, what we are doing here is talking about how interprofessional care with the data-informed decisions that you can make provide a very optimal environment for the patient to thrive and get better from where they started.

So because physical therapists meets the patient wherever they are in their journey. So I think that is very important that we don't lose sight of mental health for this patient.

For example, today I had a patient, this person was talking about how he starts seeing tremors. in his hand, and he's a Parkinson's patient, and how initially the physician thought that it was just essential tremors and it's not Parkinson's.

And this patient took a step further. He said, I went on and kind of looked into some of the symptoms of Parkinson's because he had a history in his family of Parkinson's, and he realized that he was having some of the Parkinson's.

symptoms, so to speak, that he didn't take much effect to it and then he came, for example, three years later and he had more vigorous symptoms, for example, slowness of movement and paucity of movement.

Why I'm telling this is that diagnosis is so important because we know that, especially for people with Parkinson's, It is the depletion of dopamine that is happening, you know, dopaminergic neurons are dying.

Unfortunately, the people that I see, 30% of the dopaminergic neurons have already become dead, right? So what can you do to catch something, a disease like Parkinson's?

And just to give you a perspective of the scale of this, one million Americans have Parkinson's. And 60,000 of those patients, we see 60,000 new patients with Parkinson's every year.

So we know that by 2040, this is going to become a double the amount. So what are we doing in terms of catching and diagnosing the disease faster, making sure that, and the research suggests, that movement actually can slow the disease progression.

You know, so that's why I think it's very important that we don't take, for example, the symptoms that we see for granted and maybe give them a better advice on making sure that they can do something and catch them things faster.

Because now we know that you can use movement to help, you know. in some way. Think of it like a neurobiological reset, again, I would say, in terms of movement.

I mean, you see, when you go to the gym, you do exercise, you feel better, you talk to your friends better, you kind of feel that you have it in a better mood, so to speak.

So again, kind of, I would say, think of BDNF as your fertilizer to the brain and see how you can do that and move better. That's exactly the word I use.

I say BDNF is like sprinkling fertilizer on the brain. In fact, When I first went into medicine, I was working, I wasn't even in medicine, I was in engineering and I was doing some lab research and, or working on mice and working on the hippocampus.

We were talking about 30 years ago, we were talking about the hippocampus, gabinergic, you know, acetic cholineric receptors in the brain you were talking about.

And I was, my, my job was to prepare the cell media, you know, for those, and I used to go in and, you know, I mean, get the brain and dissect out the hippocampus and then plate that those cells dish and then grow those cells.

And literally I had to sprinkle BDNF onto the, onto the growth plate, you know, to grow it was a growth factor is, you know, it's a sprinkling going, Oh my God, this is going to.

And it did. That's exactly what it is. I mean, in very simple terms. Yeah. And it's fascinating because what I'm also hearing from you is, yes, diagnosis, early diagnosis, maintaining physical body motor health, right?

How important that is to mental health. The correlation is possibly the strongest correlation we have to mental health. have your motor skills, you know, you can maintain your motor skills.

You don't have a fall. You don't risk the, you know, the mental effect of that fall has on the brain. We know that that slows things down. There is anxiety, depression, and trauma that occur because of injury that occurs.

And then that spirals into more motor disability, more problems with mental health. I mean, it just cycles. And Parkinson, you know, yes, it's a challenging diagnosis for clinicians.

I think it's something that we overlook, I think, in conventional spaces, and it's something we don't really query about because we're afraid to. And I think part of that is because what are the treatment options?

You know, give a patient a diagnosis of something like Parkinson's. It's almost like you're giving them a death sentence. You know, you tell me, this is how you're going to die.

That's what she's told me actually, one of the patients that I went home and I cried and then I didn't know what to do for some time. Yeah, and it's a scary diagnosis, but to offer hope.

to say to a patient, and this is even, I'm learning from what you're saying, that there is hope, there is neuromodulation, there is change that can occur even when the diagnosis is not made as early as it could have been.

What are you seeing there in your experience, in your research? How is that assessed and evaluated? So can you reframe your question to understand what you're looking at?

So I'm asking about what in your work and research has affected or shown this effect to be possible, where you talk about neuromodulation, you talk about these technological approaches.

How do you assess that and how do you see that? I would say, for example, that now we know more about the gut and brain connection, and most of the patients who will come when we are taking history, they'll start talking about having symptoms, for example, constipation, you know, sleep related issues.

The patient talks about, I mean, start having, you know, loss of sense of smell. And, you know, some of these patients will talk about how their REM sleep changed over the period of time.

Mental Health, Cognition, and Movement

I mean, they didn't know the REM part of it, but they do tell you about that they are not good sleepers. And this actually starts even much before the symptoms, so to speak, you know, the motor symptoms appear, for example, in Parkinson's.

So I feel that, you know, the applications of AI probably, I think, we'll start seeing more of those, I would say, early detection. so to speak, with Parkinson's, I feel that in terms of neuromodulation, in terms of seeing how you can change the brain with type of stimulus that you provide, I know that when I actually have a published research in neuroplasticity, and it was like 35 sessions of physical therapy in a complete spinal cord injury, provides rewiring in the brain.

And that was something to me in terms of, so I think what I'm also What you're thinking about is about insurance payers. When you start thinking about it and you say, oh no, you can only get 12 sessions of physical therapy because that's what insurance would provide.

But what are you thinking about a chronic disease management perspective? You know, where should like, how can you draw the line and tell a Parkinson's patient or even a Parkinson's for a diabetic patients who is, you know, kind of working on again, a chronic disease management on how that kind of reimbursement happens.

So I feel that some kind of a shift has to happen, whether it's value-based care or whether it is in the realm of how we look at outcomes. Again, could be a very different way of looking at disease progression.

Because some of my patients, for example, they look for… other avenues, like for example, some of the patients do the rock study boxing, or you know, they kind of some of the patients do cardio, you know, aerobic training.

And I feel that again, if I'm thinking about mental health, I feel aerobic training has a lot to kind of offer. And I think the patients to think about, you know, what can you do when you oxygenate?

for example, the nervous system, right? So, I mean, you are a better person to kind of tell us what can happen in terms of the chemistry and the biochemistry of the brain.

But there is so much into, again, in medicine and science to offer, and I just feel that we can leverage some of the technology and then, you know, with the dash of technology, but more of the human touch.

I think at the end of the day, no matter how much I talk about technology, I am of the belief that, you know, a human touch, a human interaction is very much needed for someone to feel that, you know, I'm okay, somebody's out there kind of looking out for me.

If I meet a doctor like you, I feel half better because you have that effect on people. So I don't think the AI, for example, can take that away. What AI can help us do is, can I detect something earlier so that I can provide better outcomes for this patient?

You're speaking such a beautiful language of healing. I think addressing all components of what makes somebody have a chronic disease, the effect of access, the effect of their gut, the effect of their sleep, who they're connected with, what is their normal metabolic health like.

When we talk about health, we've gotten that health begins from the cells. all the way up into even the holistic, right? Even to things that we, spirituality, you know, emotional health, things that we don't have a real direct kind of correlation of science to, but it is scientific.

And not to take that away, the story of somebody's illness is so important to their outcome as well as how they see themselves. And when you see patients, you see them as human right you see their their condition and you can see them the struggle that they may be having with insurance and being told that they're this is what it is and that's all that yet and how challenging that must be to be able to have to work in that in that process i think i'm lucky because i'm working in a very in patients are coming to us because of their complexity and their last resource right our patients are When they pay out of pocket, it's such a hard, it's very difficult for a lot of people to have that, you know, that kind of treatment.

And we know we need to address this long term as well. And so what does that look like? But with the insurance, as you mentioned, you know, I know that is a limitation that I'm sure you feel in your care that you're giving, that you know that this is going to take longer and yet you're only unlimited by this number of visits that are allowable by insurance.

What do you feel needs to change in healthcare? What would be your vision? I think my vision for healthcare is definitely outcome based. And the way I see in healthcare is more like a less time documenting things.

I mean, use AI for that, but kind of more time interacting with the patient. I think as a clinician, any day I would want to spend more time knowing what my patient's history is.

Like for example, even knowing, you know, systemic changes that are happening that is contributing to something neurological, right? So I think the healthcare, the way I envision it, it should be more about, at the core, we are humans.

I mean, yes, we get bogged down with technicalities. We get bogged down with sudden changes. AI definitely is a

very game-changing entity that we have at the moment.

But I think how do we hone things? How do we address things in a way, keeping at the center our patients? Even for my students, I want them to embrace technology, but have that human connection at the end of it, because that's what is lasting.

Again, I think because I love neuroscience so much, I would think of long-term potentiation. What are some of the things that you can do today that can have a lasting impact?

because again, and you cannot be with the patient all the time, there would be some end to it. What are some of the long-term learnings can we impart on about patients?

So I think we have to think of long-term And from that perspective, I would say the healthcare needs to become more human. I feel we are losing that connection and we need to kind of come and find what is the ethos of what we want to do and want to achieve.

And I think people need to kind of start thinking about, yes, this is what I connect with, this is what I believe in, and this is how I'm going to impart it because that's a human sitting across the table.

So we have to kind of go past all the, I would say, the noise and the signal should be of hope. It's true. I mean, you spoke a little bit about what it must feel like for patients to go to a doctor who can't see them, right?

And that is the shortage and that's the shortfall of healthcare right now because we're so time limited and conventional healing could be so much better if we were able to disconnect our devices, disconnect this documentation that takes us away from the patient bedside, be able to sit with the patient, hold their hand and say, it's going to be okay.

And I can tell you, doing this now with patients and adult patients included, which is another topic of discussion that I have about, you know, the psyche, right, as it develops and loses skills and gains skills and loses skills.

Parkinson's Disease, Early Detection, and Hope

So what I'm really speaking to is kind of your ideas on bringing in that humanistic approach to medicine and the healing space, but also the innovation and the work that you're doing now in the Innovation Village.

Can you tell our audience a little bit about that and what that looks like? Yeah, again, I think, you know, like I said, you know, I feel that I'm seeking something and I think the universe is kind of responding to that.

So what I'm seeking is I'm seeking of how I can empower others. You know, what kind of a legacy should I be leaving so that I feel that I have done my part?

And that's why I think what I was seeking was, what does Fresno need? If a person like me who has a background in neuroscience, who's a professor, who knows the valley to some extent now that I am in Fresno for nine years, I was thinking that Fresno needs more innovation and more research.

And to that, I've started kind of working in that area of how we can bring a research center to Fresno. And for that, I have written some grants and I'm waiting for, you know, their outcomes.

But I was also talking to some collaborators and here came this opportunity where we kind of working with an industry partner who have invested in Fresno and they are going to build Innovation Village.

And what this innovation village would be, it would have residents, it would have seniors, it would have research centers, and it would make sure that we have AI technology from Taiwan, kind of, and using their model in, so to speak, in some ways in elderly care.

So my vision was to start a center for digital and technological innovation in healthcare. And that's what I'm slowly starting to see kind of taking shape.

And as this project moves forward, we are envisioning that I will be able to start a center where we'll be able to help seniors and provide them digital care through AI technologies, kind of leveraging them to improve their balance and cognition and making sure that we are actually also working with the Fresno County to see how we can serve the you know, valley people, whether it is for the diabetes care or for the seniors.

So that is my vision and I think I'm seeing some of it kind of coming to reality and I know Innovation Village will be kind of start, will start the construction.

there's already been a site kind of bought by this industry partner called Estet and we'll start seeing you know how Fresno State will be a very key partner providing their researchers and students to work on some of the research that will come out and I hope that it is world-class.

Yes, it sounds like it will be because it's ahead of its time. It really is a need that you're addressing to a largely underserved population. I imagine in the Central Valley, I worked there before as well.

It was a big hole. It seemed like it did not feel like it was part of California. It was felt like a lot of deficits, cavity, right, of healthcare. And the training grounds are there and there's definitely an emphasis on training, but then most people leave.

And so there's an evacuation of that experience and that expertise, and you're still leaving the population underserved, right? So really addressing it in a technological way where you're able to provide access and also assessment and those tools are there to really engage with that to a very needy population.

My mother also suffers from the same condition, and I'm very hopeful that these sort of technologies will be so helpful to so many. So thank you for sharing that.

I think that's an important part of the work that brings us together. You mentioned the intersections of healthcare and healing, and it's so vital for our audience to know that there are avenues for different ways of approaching this and recognizing that we should be all talking together as, you know, in the healthcare field, but patients need to have that knowledge.

And part of the reason why we do this podcast is so patients get something, some information that can, you know, and open them up to ideas that are worth spreading, right?

That's the TED Talk line, but it is spreading and innovations. So thank you for sharing your, your work, your experiences. I'm going to close with the question and it might be a personal one, but what would you say to your mom?

What would your mom, and I remember her so well, she was a kind. beautiful person who had the heart of gold and cared so much. I'm terribly, you know, she was a terrible loss during COVID.

And I'm sure that experience itself was not easy one for you. So many people, it was the impetus of what maybe you're doing now. But what would you say to her now?

What would she say to you? Yeah, I think a very emotional one. No one has asked me such a question. But first thing is, I think I would like to dedicate this podcast to her.

This month actually marks the death anniversary of my mom and I want to let her know that I'm following on her footsteps. She was a very courageous woman and someone who would offer a helping hand even when she herself may not have everything.

So I'm following her legacy. And I think the way I see this is that while I empower others, I feel that I'm giving back

to what my mom has given me. So this is paid forward model that I would like to kind of embrace and lead my kids with this legacy.

Thank you for sharing those emotional questions. I do ask those unasked questions and sometimes they're the real questions sometimes that we don't really get to ask.

And I thank you for being open to those questions that can really bring us to a space of authenticity in this work that we do for patients, what we also do for our families and for moving things forward.

Yeah. And, you know, I know that you invited me and you should be asking me questions, but I think I want to take this opportunity to thank you for, you know, thinking of me for this opportunity.

I think as a friend, as, you know, past collaborator, I feel that I feel honored. And as I was telling you before that I take so much pride in knowing Dr.

Ahmed because you are a doctor who leads with your heart and not your brain. Though you treat brain, but you know, you lead with your heart. So my question to you is, you know, where are you in your journey and what more do you have to accomplish?

Oh my gosh. For me, it's a coalescence of so many things that I have been wanting to do.

Healthcare Vision and Innovation Village

And I feel like I have people coming to the center, including my staff. I've grown very quickly just based on this idea. I also am doing this work in my father's name.

Really had chronic disease like diabetes and depression and really was untreated. And so, you know, where I am in my path, I'm right on track to what I always wanted and put together something that wasn't an easy task, but comes because so many people including patients, including people who I work with, who work for me, who work for the organization, who work for this belief that we can do something different, we can do something better, and we can stay in contact with the human spirit and the story.

You know that I'm passionate about narrative medicine. I want to even do more. I want to be able to. This is the reason why we do the podcast. write a book someday, really sharing to the stories that we witness, and I'm sure you do too.

There's so many stories in our experience that are untold, and I think that helps so many people when patients hear another person's story. I think it really invites them to really see themselves, but also build on an experience that gives them guidance and trust.

And I think that's missing in healthcare. So thank you for asking that question. It was also, you know, an asked question, I'm sure, from your perspective.

And we do it. Your curiosity in this is, leads to the next question, right? As we talk about the next episode, like, you know, what would be a curious question that you have for healthcare or for mental health that you would want a podcast on?

What did you thought about? I think I would like to know that. the doctor's insight of what they see in a patient that gives them the confidence that, yes, I can heal them.

Where do they gain their confidence? And yes, you can read books, you can read, but what is inside them that keeps them going? Yeah, that's a great question.

I don't know if I have the answer, but I do think that when I see a patient who shows up, the courage that it takes for them to sit there and talk about their problems and really expose themselves in that vulnerable space, with the trust

and with the honesty to speak about what it feels like for them, all I do is witness that and allow for that dialogue to occur.

And that gives me a lot of hope when I hear that, when I witness that. And it gives me, like today I had a patient who had done their research, had showed up with a notebook, had showed up with questions, and knew, had even written up what their medication list was, what they'd been through.

And I knew, I said, this patient's gonna do okay. It's going to do okay. I tell patients, it may not be the result that you imagine and it may be, but something will come through this.

And if you have that trust in the process, It will, and that's when I witnessed that. When doubt seeps in, I think doubt in any experience and patients not having that trust, I think, does affect their outcomes, right?

You know that fear is cortisol-based, and cortisol effect on the nervous system has an antagonistic effect. So if there's fear, if there's not trust, or if they're intrigued, or if they're not you know, doing their work, the outcome is not going to be as strong.

And I think we don't ask that in conventional, we're very prescriptive. We tell patients what to do. We, inviting that empowerment has to happen. And so if we can't get to empowerment, if we can't get to, we can't elicit what they want, like you described in the beginning, you know, asking them, what are they looking for?

What is their We're not going to, it's not going to be, it's not going to work. It has to come from them. Exactly. So nice. Yeah. Because, you know, I've never got to ask any doctor that kind of a question.

And I always feel, you know, they, sometimes you see so much in, obviously when you're looking at charts and patients and you have to somehow, you know, intertwine hope and you have to kind of make sure that they understand where this could lead.

So there's so much that you have to do in terms of giving the information and keeping the information and making sure you are steering them towards hope, towards healing.

So thank you for answering that. There's so much healing in hope. There's so much healing in that.

Legacy, Purpose, and Closing Reflections

desire and yes, we do have to provide realistic, you know, we don't know the future and no one should ever, you know, present it in that way because I think that really affects, I know that language of what you, how you communicate has an impact because I've heard stories after stories, like I was told I couldn't do this.

And that itself can have an impact and I think doctors and healers in general have to be careful and have to offer humility. Humility is very important in this work.

We don't know the answers and sometimes we can work together on that. Yeah. And that's what I think even from physical therapy perspective, I think what we allow them to do is for the patients, you move from the flight and fright mode to thrive mode.

You know, you want to make them believe that they can achieve. And it's important to come back tomorrow and, you know, work on it something again and again.

So I think there is this, this podcast helped me too. I feel that it's helping me kind of understand where, what I need to do. probably where I need to go.

So thank you for the opportunity. You're welcome. So we'll invite you again in a few months or maybe next year when you're at the Innovation Village and you can tell us so much more.

I would love to patients know about your, how would they be able to know about this, any contact information that you'd be able to provide. This podcast is for patients as well, as well as other providers who may want to refer to your program.

Thank you. Appreciate the opportunity. How would they be able to contact you? How would they be able to contact your center? In terms of contacting me, I think it's nhajela at csufresno.edu.

That's my email address and I'm very active on LinkedIn. So if you look up Mupur Hajela, hopefully one of them should be me. And I don't want the emails to get too flooded.

But I'm sure they can look you up at the work that you're doing at Fresno State. So thank you. Thank you. Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health.

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