

## TRANSCRIPT 1001

### How Pain Works

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[00:00:09] This, it contains elements of technical presentations that I've done. And I've tried to make it introduce the technical experience, the technical terms in a way that all of us can understand it. So I did run it by **my husband this morning**. And he's said this really, it he said, "Finally, what you're talking about **makes sense!** I know you keep on saying it's in the brain, but now I understand why you mean it's real and it's in the brain." So I hope that this has a lot of impact. And so please slow me down and tell me, I've got to keep Sharna on my screen because she told me that she would pull her hair if I was **talking too quickly**. So you all are welcome to pull your own hair too, if I'm talking too quickly as well. So I'll look at everybody's heads.

[00:00:44] So we were told to talk about a personal story. My husband said this is boring, but I think it's interesting. So here's a visual to go with it. Graduated in medical school in 2008 where I learned all about pain. I learned about how pain is a **marker of tissue injury**, and how to dose opiates, and how that pain is a **fifth vital sign**. And I wanted that, it's an emergency that

we want to get people on medicine, so they don't experience the sensation. That we weren't good doctors unless we were able to make people not experience pain.

[00:01:10] This is what I went out to thinking. Started **my residency 2008. 2012**, I was in residency, had my first baby. And this is 2012. My, my second baby, I was studying for my board exams, studying for my board exams. Felt like I knew everything, felt like I was ready to practice. I was. Ready to go into the world and save everybody. There was **not going to be a problem that I wouldn't be able to solve.**

[00:01:31] So started practicing in New Hampshire, and this is us in cold New Hampshire. Now this little baby is this little baby there. And the other guy was two and a half at this picture. And now he's this size. I **realized that I was failing.**

[00:01:42] I really felt like I didn't, I never felt like there was a problem that I couldn't solve here, but here I really felt like my patients kept on coming in. And the more they came in, the more I felt like I'm going to get on top of this; I'm going to **make them not suffer.** I'm going to dose their opiates. I'm also going to find out what exactly is happening.

[00:01:59] If a nerve is damaged, I'm going to find the person who can cut out that nerve, or I'm going to find out what's the tissue damage that's causing this pain (because there has to be tissue damage that's causing that pain). But my **patients kept on getting sicker**, and sicker, and sicker. And I started to feel more and more like a failure.

[00:02:14] I **was failing** these people that kept on coming in to me. I thought I could save the world. I'd worked so hard. I'd gone through medical school. I'd worked really hard through residency. I was, I thought there was nothing that I couldn't figure out, but then realizing that I just, I couldn't do it.

[00:02:30] 2019, I attended the Oregon Pain Summit and finally things started to make sense. I started to learn that **pain is not a marker of tissue injury,**

and I started to learn how **pain is constructed in the brain**. Started to learn that despite markers of tissue injury or without tissue injury, every pain experience is real. I learned to **start listening** to my patients. I learned to start understanding more of their experience.

[00:02:52] And this is me in **2021. I'm still learning**. I still don't have all the answers. But I feel like I'm closer to where I wanted to be back in 2008. So, thanks to Sharna.

[00:03:03] So let me talk about the topic that I, that I wanted to introduce you all to. So when I was talking to the OPSA board folks on Saturday, I was thinking about how could I best summarize the things that I've been thinking about that really I've been **trying to explain this to all** my friends and family for years.

[00:03:24] How do I explain it in a way that makes as much sense to them as it did, to me in the Oregon Pain Summit. Now the Oregon Pain Summit **was two days** of lots of intense information. How do I do this **in a shorter period** of time? So, when I met with Rolly, Cyndee and Sandy, they said it'd be nice to talk about:

- **What happens when I stub my toe?**
- Then also taking that to the next level. **How does pain become chronic?**
- And then **how does knowing about pain science help?**

[00:03:47] So I feel like I'm preaching to the choir here. This is all those things that you all know when you've been talking about, but I just wanted to give my perspective on this. So, we'll **start off with** what happened when I stub my toe.

[00:03:59] So I, I think Kevin, doesn't like to share this picture cause it's so outdated. So outdated; this was in 1600. This is **how we understood pain in 1600**. And it really hasn't changed that much for the way we're taught medical school, that there is one signal that goes off one wire and it trips off a

part of the brain. Descartes said the pineal gland. This is what we thought pain was, and this is how we're still teaching it.

[00:04:20] So much of medical sciences has evolved. And but this is the way we used to understand pain that it's just this one wire that when you touch the fire, you get this injury that goes up and sets off a signal that just turns off and on. It's **an off and on switch**.

[00:04:33] It really isn't. And I want to prove to you guys that it really isn't this way. So how do we know that it isn't? How can you do an experiment or **prove that this isn't the case**? So let's talk about some experiments that kind of prove that this isn't the case. So this picture is wrong.

[00:04:52] So the **danger signal**. So talking about point 'A' right here. So the danger signals that, that get activated when there is tissue damage, become active when the skin reaches **105 degrees** Fahrenheit. It was supposed to be Fahrenheit here. I changed this, all. This was originally in Celsius, but my husband said it's not going to make sense unless I change it.

[00:05:11] This experiment was done, where you take a lot of people and you take a heat probe, and you put this heat on the skin, and you wait **until the person says, "Ouch."**

[00:05:20] Turn it up, turn it up, turn it up, turn it up. And you wait until they say ouch, but then you also have probes in their skin to see when those fibers are active.

[00:05:27] So you have a **probe on their skin** to see when the fibers are active. And then you're also asking them, does it hurt? Does it hurt? So they can see from the readings that the fibers start to become active at 105.8 degrees Fahrenheit. But the **person doesn't say ouch until 111 degrees** Fahrenheit. So the signal is coming in from the outside, but no one's saying ouch until it reaches 111 degrees Fahrenheit. So it's not that just the signal that it just turns off and on.

[00:05:54] All right. I maybe haven't convinced you. Let me give you another experiment. So let's take a sharp pin. This **sharp pin** wasn't actually pushed, didn't break the skin, but a sharp pin was pushed into the skin. You have one sharp pin that's hot; one sharp pin is room temperature. So you take the room temperature pin, and you put it on the skin, and it fires the C fibers, those major **signal fibers start to fire really slowly**. Beep, beep, beep.

[00:06:20] And then if it gets **really hot, it fires really fast**. Beep, beep, beep, beep, beep, beep, beep, beep. But **people can't differentiate** the two. So it's not how fast they're going. It's not like it's Morse code where it's just this is a signal, we're going to get the signal up to this part of the, it's not just that one signal. There's so much more to do than that.

[00:06:36] All right. I've got two more experiments. So you take warm stimulus. Remember we talked about the stimulus was 111 degrees Fahrenheit. When the **person said "Ouch,"** so 113 degrees Fahrenheit. Do you take **113 degrees** Fahrenheit stimulus? And you put it to something one millimeter wide. So one millimeter is about a third of this three millimeter.

[00:06:56] So just to give you guys a sense of how big **one millimeter** is, it's described as a pricking pain. At **four millimeters** wide, so this size right here, it's stinging. At **20 millimeters** wide. So even so all, probably this whole fingertip, it's a pleasant strong warmth. So it's not the number of the dangerous signals that are firing. It **doesn't match** what people are experiencing.

[00:07:18] One last experiment. So you take a **15, second painfully hot or pinching** stimulus. You pinch, pinch, pinch, pinch, pinch, pinch, pinch. Those **signals are going crazy** for their **first 15 seconds**. Those fibers are just sending all this information out, but then **they stop after 15 seconds**. You keep on applying this painful stimulus. The person keeps on experiencing the sensation. So it doesn't really match what's happening. These signals are doing something and people are experiencing something different. So that picture does not make sense. So **what is really happening?**

[00:07:52] So I'm going to just show you guys some **pictures**. So this is what we look at for a **nociceptor**. This is the signal that, that are **just hanging out in the skin**. They just start to look for danger, these danger signals. So it's not like directly, you get injured and you feel this, it doesn't directly trip this off.

[00:08:08] This can be tripped off by any injury. And you have all these **chemicals that get released** that cause these danger signals to start to be activated. So this is what looks like. This is what it looks like, the danger signals start to look like. So when this danger signal gets tripped off, it releases a lot of substances outside.

[00:08:25] So right underneath the skin, a lot of substances outside of the skin **that help the skin heal**. So cause it has things that promote bone healing. It has things that make the blood vessels become bigger to let all the healing ingredients get to the part of the body that needs to be healed. So thinking about how important this **danger signal** is for **healing**. So when the, when this initially happens, when you have an injury, this dangerous signal needs to fire in order for the body to heal itself. So thinking about how important that is, that it needs to fire in order for the body to start healing itself.

[00:08:59] So then what happens is that this signal goes all the way to this spinal cord. And there's going to be a lot more information that gets transmitted, but it's going to meet another nerve. That's going to **send information up to the brain** before it even gets processed as anything.

[00:09:13] Those signals, that, the strength of that signal is going to change. The more you fire it, the more important this signal is, the more, the stronger this sensation gets. So this might never change. But if someone injures themselves, and this **spinal cord** may change in such a way that it remembers that injury and will be much more sensitive to anything that happens in that part of the body in the future.

[00:09:36] So you have this **protection system** that starts to get turned up based on any injury that you've had before in the past. And the same thing happens in the skin too, that any injury that you've had in the past. It can

remember it. So all these **injuries that you've had in the past**, there's a potential for the central nervous system for these nerves to remember this injury.

[00:09:54] Now keep in mind that I'm talking about the nerves. It's not the tissue that's causing the pain. It's the nerves that are causing these signals to be sent up to the brain. This is the most important part. So you get these **signals** up to the brain. It's **not pain yet**. You have these, this danger signal being sent up to the brain and these danger signals meet up of this part of this brain. This part of the brain is called the **thalamus**. And so what this part of this thalamus does is it receives all of the signals from outside, from the, from throughout the body. All the signals are being received here.

[00:10:24] What's really important is that this **thalamus sits right next to the hippocampus**. And the hippocampus is where all of your **memories** are stored. So think about all the memories of any sensations that you've had before are stored here. And remember, this is really similar to what's happening in this spinal cord, too, that you have all those memories that are stored there too.

[00:10:43] This side sits right next to the **amygdala**, which can fire often off which mediates our fear. This is where our **fight or flight responses**, the faster this is firing, the more fight or flight we need to get out of here. This whole part of the brain is called the **limbic system**. This is all the emotional part of the brain. So all pain needs to be processed through here. So all pain, regardless of the cause has an emotional component.

[00:11:04] I want to also draw your attention to this, that the more **painful memories** that you have, the more, this dangerous signal's going to start firing. The more the thalamus is going to be sensitive to everything that's happening. So thinking about the set point of things that have happened to people. They're all stored in here and this amazing protection system becomes more sensitive because it has to be. Just thinking about how we've evolved, how every single organism evolves to protect itself. You can see that in the anatomical relationship here.

[00:11:32] But I also want to call into, to let you guys to talk about when we saw that first picture, that Descartes drew, that it was just that one part of the brain that they thought was causing pain. There are actually **multiple parts of the brain** that have to be involved to create a pain experience.

[00:11:48] So I want you to think about any activity that you're doing right now. So it's a matter of, oh, maybe even thinking about putting these headphones on. So you got, you want to put these headphones on, you have to know where's your head, how long and short are your muscle fibers in order to open up this, where are your ears? Do you need to open this first? Where do you put your head? All of these things have to happen to put this pair of headphones on. That's takes **so much complexity**, but you're not thinking about that.

[00:12:14] Same thing with the pain experience, you get all of these sensations that are coming up through the thalamus. It's **checked against your memories**. Does this ever happen to you before? Am I really scared? Am I in a horrible spot right now? Am I really stressed out? Did this happen to anyone else I've known before? What do I think about this? Where's my emotional state right now?

[00:12:31] The **prefrontal cortex** is the CEO of the brain, basically **deciding what to pay attention to**, what not to pay attention to, trying to thinking about how you're going to plan the rest of your day, the rest of your life. How is this going to impact my work? My physical activities? What else do I have to do for the rest of the day? Where am I feeling in my body? Did my parent experience this before? What does this mean to me as an organism? Then these parts of the brain can also communicate with the thalamus hippocampus, the amygdala, can **turn down these sensations** as well. I've experienced this before. This is not a big deal. I know it's my nerves it's causing this. I know it's going to get better. You can turn down these sensations.

[00:13:06] So all of this **processing** needs to happen in order for us to experience pain. All of this processing needs for us to do anything.



[00:13:13] Our **brain does so many incredible** things and it does it so quickly. So you think about a song that you listen to over and over again, you listen to the first note, you're going to hear the whole song again, in your head. Similarly, with chronic pain, you hear that first note of something, it's going to set this all the more you connect all of these experiences together, the easier it is to fire.

[00:13:32] So the **more you do it**, the better you get at it. You know how to ride a bike. You don't even think about riding a bike. You know how to drink coffee. You know how to eat a bowl of cereal. All of these things, you do it so frequently. You don't even have to think about it. You start putting the spoon up to your mouth, you open your mouth right away.

[00:13:48] **Same thing with the pain experience.** I twist my back a certain way. Oh no this exact same sensation is what happened before when my back started to really hurt and that meant that I couldn't work anymore. All of this is going to happen without you even knowing it. It happens fast.

[00:14:00] I put these headphones on without thinking about all of those things that I told you about. This pain experience can be regenerated quickly in the brain **without even thinking** about it because these get so closely wired together.

[00:14:10] So thinking about **how does pain stick?** So we talked about the brain can get really good at this. So there are really important neuroscience concepts. The really important neuroscience concept is **salience**. So if a sensation or an action is salient to an organism, it's going to stick. If it has evolutionary, **if it has a role to protect the organism, it's going to stick.**

[00:14:34] It's important. This is what we need to do. We need to protect ourselves. So this is a, this is the **pain catastrophization loop**. This has been proven over and over again in terms of how pain would become chronic.

[00:14:47] So you have an initial injury, you twist, you pick, lift up something heavy, you strain your back. It really hurts. Oh, no, I know when people strain

their back, they lose their jobs. I'm going to go to the doctor and the doctor's going to tell me what's going on. **Doctor told me** that, oh, if I, if my back keeps on hurting, I need to come back in because that might mean I may never be able to work again. Oh no. Every time my back hurts, it's going to, it's going to keep on, means that I'm hurting myself. Okay. Maybe I should just stop to go anywhere. I'm going to skip. I'm going to not go to work today. So my back is really hurting and every time it hurts, I know that I'm damaging myself. I'm just going to stay home.

[00:15:20] The more you stay home. I'm just terrible. I can't believe that I can't even go to work. This is awful. The pain starts to get worse. I'm just so miserable. The pain starts to get worse. Oh no. The pain is worsening. This means I'm not going to be able to feed my family. What's going to happen? **Start to become really sensitive.**

[00:15:37] I need to pay really close attention to my back. Cause every time I know that signals come that I feel that, that sensation. I know that I'm **hurting myself more**. I'm going to pay really close attention to. Start to feel it more and more, and this becomes really relevant. You can see how this can lead to significant disability.

[00:15:52] On the converse, hey, I'm having some pain. Backs get better. That's okay. I hurt myself. I know the nerves is doing this. I know this **doesn't mean that I'm damaged**. It means that I'm not broken. My, but this pain is amazing. It just shows me that my body's doing what it needs to do to heal. I'm going to experience it. I'm **going to keep on moving**. I know my body knows what it's doing. We'll start to get better. So this impact is huge. Basically talking, thinking about this is not something that people do on their own. This is something that some people's brains are more wired to do than other people's brains.

[00:16:24] It doesn't mean that someone has a high **pain tolerance** or a low pain tolerance. It's that the idea that this particular sensation is relevant to this organism because of all the experiences that has happened in the past. So the way that you have processed pain experiences, the way you've seen your

parents process pain experiences, what you expect from life, those **anticipations** that are just hardwired into your brain makes this loop the way it is.

[00:16:48] This is nothing that people do to themselves. This is something that happens. This is something that people are hardwired to do. This is **no one's fault**, but understanding this loop is kind of the help for the way out.

[00:17:02] So this leads to a quote that I absolutely love. This is from a pain scientist in University of Washington. So the Institute of Medicine was commissioned by the **NIH 10 years ago** to come up with a report on what is the state of pain in America? And they came up with this wonderful quote that I, I think just ties it all together.

[00:17:21] "**In fact, beliefs, anticipation and expectation are better predictors of pain and disability than any physical pathology.**" Boom! That's it. That is exactly what makes so much sense and ties this all together for me. This is why I can look at a patient, and look at two identical x-rays, and have completely different experiences.

[00:17:42] It has nothing to do with what's going on in the body. It has everything to do with beliefs, anticipation, expectation. But **what's harder to treat--an x-ray or beliefs, anticipation, expectation?** What's the low hanging fruit? This physical pathology. But that has nothing to do with it. I just showed you guys, this has nothing to do with it, but this is so hard to treat.

[00:18:06] This is where this is, but this is where the money is. And this takes a lot of listening. This takes no matter what we say as healthcare providers or friends or family members, you can't change this. This is hardwired. You can **wait for someone until they're ready to listen**, but this is really a challenging thing to change.

[00:18:27] And a lot of listening, and a lot of patience because people don't do, **people don't have these beliefs on purpose**. It has to resonate with somebody.

[00:18:34] So talking about beliefs, anticipation, expectation. I really want to drive this home that this is **not anybody's fault**. Nobody chooses to believe and have this anticipation expectation. This is what, this is what society believes. We're part of this society, and this is what we're taught.

[00:18:50] So I wanted to talk a little bit about **how pain sticks** and adverse childhood experiences.

[00:18:4\54] So to talk about how these **adverse childhood experiences** can relate to people having more protection. Again, we talked about how the brain and the hippocampus, which is the part of the brain that stores memory, and the amygdala, that part of the brain that mediates fear in their fight or flight reaction. We talked about the thalamus, how closely they're related.

[00:19:16] This **toxic stress changes the way people's brains can be wired**. So this was a study that was done in 1995, that surveyed people for 10 different types of toxic stress. And they found that the more toxic stress events the people had in their lives, the more likely they were to have significant adverse health consequences, die earlier, have high blood pressure, have chronic pain.

[00:19:39] The more people experienced it, the more they were likely to have a different experience of the world because their protection system is up naturally. So these are the **types of adverse childhood events**. Physical abuse, neglect household dysfunction. So tying this into chronic pain.

[00:19:56] So thinking about, the CDC population is the general population. So this is the likely, this is in the general population. People normally experience **forced sex**, about 5% of the time, people with fibromyalgia, 20% of them have had this experience. **Hit by parents**. This is 10% of the general population has experienced it versus in the fibromyalgia population, 40% have.

[00:20:29] And then if you look at trying to move this thing, if you look at **parents hitting each other**, this is 25%. This is about similar the general population, but looking at the difference, these are the hugely impactful

adverse childhood events that lead to chronic pain. Thinking about **youth with chronic pain** people with an ACE score of one or more, the general population is about 25% in the general. In the people, youth with chronic pain, it says the studies say 85%. I would venture to say a hundred percent in my practice, that most people with chronic pain have had significant adverse childhood events.

[00:21:01] Thinking about the **life cycle of chronic pain**. Again, this is part of how our brains get wired to develop chronic pain. In **infancy genetics** are sort of a big risk factor on people developing chronic pain. What genes that they'll up regulate or down regulate in order to create the brain that they live with. Irregular feeding and sleeping can sometimes lead to parental dysfunction. Parents' pain exposure: children and infants look to their parents for what they should be afraid of and what they shouldn't be afraid of. So if parents pain exposure, **parents are afraid of pain**. The child might be afraid of pain as well. Parents, depression, and anxiety, their reaction to pain. In childhood and adolescent, the attachment to parents. So avoidant attachment styles, which we can talk about abuse, hyperactivity, which can also lead to abuse.

[00:21:33] **Perfectionist tendencies** are also a risk factor for pain. And mood disorders is again, parental reaction to pain. And then in adulthood, lack of social support, vivid recall of childhood trauma, occupational exposure, and development of chronic disease. So this is, these are all the, this is the **recipe** for the development of chronic pain.

[00:21:49] That does that mean that people, that me suffer from chronic pain? That's it that's the end of it? I'd like to say I know that it isn't actually, I'm not going to say that. I like to say, I know that it isn't the, I know that there is a way out. So I wanted to just talk about **Maslow's hierarchy** of needs. And I really debated whether or not to include this.

[00:22:06] Sorry. I want to get want to minimize you all. So I can't see your pictures. So Sharna, you're going to have to text me if you're pulling your hair.

[00:22:13] **Sharna:** Not yet. You're doing great.

[00:22:16] So this is Maslow's Hierarchy of Needs. So Maslow is an anthropologist. **In 1940s**. He studied some very high functioning people and tried to understand what made them self-actualized. So basically where they were not experiencing anxiety, where they were had lack of prejudice. They accepted facts. They were spontaneous. They achieved this self-actualization. He hypothesized that this **pyramid** underneath here is physiologic, safety, love, and belonging are all these **needs** that humans have. In order for them to be self-actualized.

[00:22:50] If these needs were not met, people would experience deficiency and pain. ;He hypothesized that it comes on this pyramid, that **before you can experience safety**, you need to have your breathing, food, water, sex sleep, homeostasis, excretion, all that, before you can move to the next level.

[00:23:09] There has been some debate as to how these levels feed on each other, but people agree that generally these are the needs of human beings. Thinking about **pain as being an absence of safety**, that you feel that the body's unsafe in the situation that it is in at this point. Thinking about chronic pain, is that if we are able to target the idea of breathing and you know what I was thinking about this, okay, what does that mean to breathe?

[00:23:31] I think a lot of us **hold our breath** when we're stressed out. So focusing on breathing is actually a little trickier than we think it is. **Food**. Lots of food insecurity, and also making sure that we're eating and nourishing our bodies. **Water. Sleeping**. These are all really important before we can ascend to safety.

[00:23:48] Sharna was talking about how the importance of family and friendship was also really important too, in order to achieve **safety**, but the end goal of being that we need to meet these needs. So when I talk to my residents or talk to colleagues about all right, this is really hard. How do we help people feel better?

[00:24:06] Definitely beliefs and anticipation is important, but in order to achieve safety, we can even start to address the **simple basics**. Are you

breathing? Are you taking time to make sure that you're working on your deep diaphragmatic breathing? Because a lot of times when we're stressed out, we forget to breathe.

[00:24:23] What are you eating? How stressed out do you feel when you eat? Do you feel guilty every time you have food? So do you avoid **food** because you feel there's a lot of guilt around that? Are you using food as nourishment? Are you drinking enough **water**? You're drinking more water than other beverages?

[00:24:35] Are you **sleeping** okay? Are you going to the bathroom? I tell my residents. I said, make sure you're asking all your patients, if they're sleeping and pooping. Cause once they're doing that, they're good. So thinking about how this all feeds into this is the fundamental **building block of safety**.

[00:24:49] So why does this matter? So kind of wanted to just do this experiment with you guys. And I wanted you to think about if you believe that pain is equal to tissue injury, what is your goal of the pain experience? And you guys are welcome to, to chat and put this all in. So if you believe that pain is equals tissue injury, what's the **goal in the pain experience?**

[00:25:11] You guys feel free to use the chat. What do you think the goal is?

[00:25:14] **Cyndee:** I think with tissue injury, my goal is to make it **not hurt**.

[00:25:20] Yeah, right on. Yeah. Definitely get away from it. Make it not hurt because this is in the world. If you think of **pain as protection**, how does that change that goal in your pain experience?

[00:25:30] **Cyndee:** When I really hurt. I'm not thinking about protection. I'm just thinking about make it stop. How can I **make it stop?**

[00:25:39] Definitely. Absolutely. So thinking about how can I make it stop? Definitely it is really important. And it's even worse if we think of pain as tissue injury, that this is a danger, this is means that **my body is broken**. The whole goal is to make it go away.

[00:25:59] Thinking about it, maybe differently as protection is, why do I need protection at this point? Trying to explore **what else may be going on?**

[00:26:05] Or why do I need protection? It could be that that something's going on, but let me explore it from many different angles. Like why do I need protection at this point? **Thinking about a reaction** of worsening pain is, could be fear, anger, and distress. And curiosity, if it's protection and willingness to move, I don't want to move. I need to stay put

[00:26:22] There are **experiments with mice**. When you do when you put them in fearful situations that they just freeze. It seems like if it's a protection, it's okay to move because I, my protection system is up, but I'm not broken. Thoughts about the future, that my body's able to heal itself that, but if I'm broken, I'm stuck. And pain equals protection is maybe I can be hopeful about moving forward.

[00:26:43] So there is hope. The brain, while we talked about how easy it is for those once you've really done something over and over again, how the brain can keep on regenerating that same signal. As easy, as much as those signals are burned in, the **brain is amazingly plastic**, meaning that it can change shapes. Those you can change the way in which your brain is wired by paying attention to this sensation what's happening and changing the song. So what you do, you've got a song stuck in your head. Can you change the note to another? Can you change that note to a different note and constantly practicing that, which takes a lot of time. I don't know if you all had songs stuck in your head, but it takes a long time to get them out, but eventually you can.

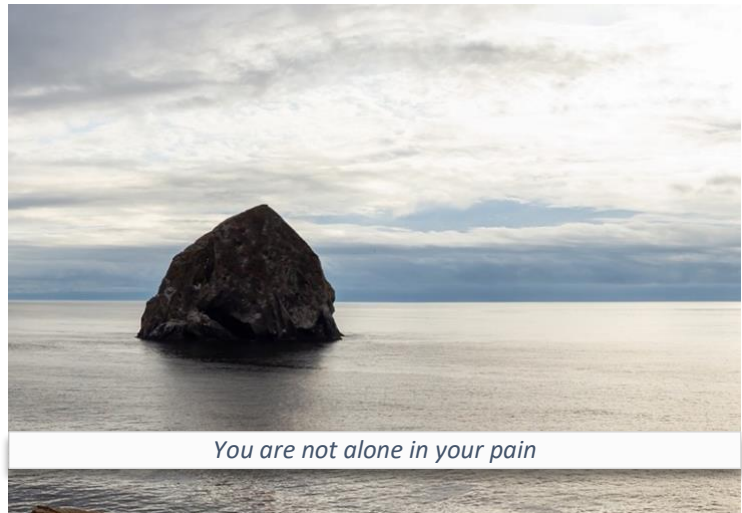
[00:27:30] So basically trying to leave you all with these are the big things that I've learned that have really changed my life. And I just basically wanted to share with you how, why I think that why I believe **all pain is pain, all pain is real**, and definitely, **all pain can change**.





# About Pain Science Life Stories

Formed in 2018, the Oregon Pain Science Alliance (the Alliance) is an all-volunteer nonprofit 501(c)3 corporation. Our members come from the health care community, their patients, and others who follow pain science research. We seek to share current information on how pain experiences are formed in the brain and influenced by biological, psychological, and/or social factors, along with practices we have found helpful and consistent with pain science concepts.



The PainScienceLifeStories.com website provides access to our video archive featuring community member's and clinician's stories describing their journey to embrace the insights of pain science research, and how their practices changed. Also included are links to other pain science explanations and practices we have found useful. We curate all archive resources with features to aid the user in finding answers to their questions.

The archive is not exclusive to stories we produce, so if you know of, or have a pain science life story, please use the contacts below to collaborate with us.

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