

## TRANSCRIPT 1021

### Linking Trauma to Pain

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[00:00:00] Good evening everybody, and thanks so much for being in and for the invitation to be a part of this group, at least for an evening, and perhaps in some other ways as well. I'm excited, I, in part because this is a little bit of a different format, we get to **tell a little bit** of our own personal stories as well here.

[00:00:25] My name is Dr. Jonathan Belinsky and I get to **hang out** with you for at least the next half hour or so talking a bit about my experiences and also what I've learned from the available science about trauma and pain and how they might be related.

[00:00:39] As always, we academics like to remind everybody whether or not we have financial conflicts of interest. I have **no relevant financial disclosures** for this topic. I do get to work for OHSU, where I'm a professor and the director of public psychiatry. I also work with a couple of statewide projects like the Oregon Psychiatric Access Line about Adults and the Oregon Echo Network and the Oregon Psychiatric Physicians Association. And I serve on a few nonprofit boards.

[00:01:04] I have shamelessly used lots of graphics from Unsplash in accordance with their policies. And as far as I know, everything that I'm showing you is available to be shared. I would like to take a moment to say a **huge thank you** to one of my mentors in the area of trauma and in just being a good human being, Dr. Maggie Bennington Davis, who currently works at Health Share of Oregon. If you ever get to hear a talk from her about trauma, definitely attend that. She's been doing work in this area her entire career.

[00:01:34] Here's what I hope we learn over the next half hours. I hope that everybody leaves this evening with three examples of the **link between trauma and pain**, at least three effects of trauma on brain development, and three ways to be helpful to those with a history of trauma and chronic pain.

[00:01:50] I will warn you, I'm going to **fly a little bit fast**, so if I do that, if I'm going too fast, please don't let me. The downside is we psychiatrists spend a lot of time listening in our work every day. And you've done something very dangerous this evening. You've given me a microphone and an audience, and I am perfectly capable of talking completely nonstop, almost without breathing about this. So, feel free to let me know if I'm getting carried away.

[00:02:16] Here, by the way, is how we'll get there this evening. We're going to just review a bunch of information and then talk about how to apply it. But first **my story** about trauma and pain. I'm gonna go all the way back to my teens and twenties to start this where I was of course involved in high school, in college, and my personal favorite sports were mountain biking and rock climbing and uh, softball. And I spent my summers working on the waterfront in summer camp.

[00:02:43] And a really interesting thing happened when I was 16 years old. I was up in British Columbia, in Hope, British Columbia taking off on a **mountain biking trip** with a couple of friends of mine, and we got away from the place where we'd spent the night we were bombing down a gravel road. We weren't even in the difficult stuff yet. And I hit a pocket of loose gravel and endoed, and came down, and I got scrapes on my shoulder blades, on my hips, on my knees, on my elbows, on my hands. Every point of contact that could get some skin taken off was taken off. And what **didn't particularly hurt** or bother me, it was a little bit annoying, and I decided probably I shouldn't finish the ride. And I went back and spent a long time getting cleaned up and things like that.

[00:03:30] Fast forward about four years, four years. I'm now in my twenties. I'm in college. I'm bombing down a hill, a dirt path, not a gravel road this time, bombing down a dirt single track on my mountain bike. And I endoed, which means I caught the front

wheel, and I popped up in the air, and I started to flip through the air. And even **before I hit the ground**, it hurt.

[00:03:57] **Nothing had happened** to me yet. It was about to. Nothing had happened to me yet, and it started hurting.

[00:04:05] That same summer. I was **water skiing** and did not cross the wake wisely. And with the sensitive ski I was using, shifting your weight forward is like putting on the brakes. So essentially as I came across the wake behind the boat, whipping across the wake at somewhere near 50 miles an hour, I stepped on the brakes and of course that planted the front end of the ski and I dove into the water. It pulled me out of the ski. The ski then came shooting across the water and hit me right smack in the mouth as I'm diving into the water. **Shattered two of my teeth**, broken clean off, put a bunch of cracks in the rest of my teeth. Didn't hurt at all, aside from the thunk of the original. Whoa, something just rang my bell.

[00:04:48] And those incidents got me thinking about why is it that **some things hurt and other things don't**. Getting whalloped with a ski traveling, at near 50 miles an hour in the face ought to hurt. It didn't. Having pain before you crash your bike is just strange.

[00:05:09] Well long story short, I decided to go off to medical school in part because very curious about the human body. And I also wanted to be helpful to people on a very practical level. And I started medical school in 1998, and the **world of pain changed** in my first year of medical school because in 1999, as I'm finishing off the first year of Medical School, the Veterans Health Administration decided that they would include pain as a fifth vital sign. The rest of America followed over the next couple of years, and suddenly I'm learning to ask all of my patients, on a scale of one to 10, how much pain are you in? And then focusing the clinical visit on trying to alleviate that pain, usually with medications.

[00:05:48] By being here tonight, you know that as a **national strategy, that did not work** well for us. An awful lot of people ran into problems with medications and we didn't do a great job of actually helping people get their lives back and be functional.

[00:06:01] And I began to learn this, especially when I started my intern year in internal medicine. I went to southeast Ohio, and a really interesting thing that happened in southeast Ohio. Over the previous couple of years before I got there **pain medicine specialists** moved into town, which was really great and supposed to be really helpful. And then within a couple of years of pain specialists moving into town, heroin returned to the Miami River Valley for the first time in decades. And why did heroin come back?

Simple and easy. People were dependent on opioids, and there was suddenly a market for it.

[00:06:34] And so I'm **working in the ER**, for instance, during my intern year, and I'm having people coming in with a respiratory rate of three because they've overdosed. And I'm treating people and I'm sending them into terrible withdrawals, and I'm sending them back to their pain medicine specialists, and I'm doing all sorts of things and none of it feels very satisfying. I feel like I'm keeping people alive. I don't feel like I'm helping them.

[00:06:53] I made a switch because I found out that what I really cared about, for me at least, what really helped me want to get out of bed and show up to work in the morning, wasn't so much the medical wizardry and all of the cool technology that we had, and all the ways that I was able to save somebody's life. But it was really how do people make sense of what's going on for them? Why do they make the choices that they make? **Why do we do what we do?** And why do we wind up where we wind up? And how can we as a healthcare community partner with people to help them get their lives back, not just keep them alive?

[00:07:25] So that led me into psychiatry. I moved down to New Mexico where I did a psychiatry residency, and all of a sudden I got to learn a lot about trauma. By the way, one final footnote, I moved to Oregon after my psychiatry residency back in 2006 uh, which was just right at the time that Oregon passed laws that decided that all healthcare providers needed to do a special six hours of continuing education in the **treatment of chronic pain**.

[00:07:50] So as soon as I got here, I did my six hours so that I could get my license. And I learned that I needed to aggressively treat people's pain **with medications** so that it wouldn't develop into chronic pain. And what happened after Oregon did that? Opioid addiction rates got higher, in our state, anyway.

[00:08:08] I will leave it to somebody else to tell us whether pain control in our state actually got better. But that led me down a **journey of curiosity**. And that journey of curiosity, I would like to take you along with me on that during the rest of our time together.

[00:08:25] First question. What do you see when you **look at this picture**? This, by the way, is the most famous version of this is by a comedian. Back in about 1915. I found earlier versions of this on postcards floating around Paris in the late 1800s, famously called *My Wife and My Mother-in-law*.

[00:08:39] I'm guessing when you first looked at this picture, you saw either an **old woman or a young woman**. For those of you who don't see both of them, I think if I use my pointer here if you're, if you wanna see the young woman, she's looking away from us. Here's her eyelash. Here's her nose. She has a beautiful cheek and jawline. She's wearing a fashionable choker. Do you **see the young woman** now?

[00:08:58] For those of you who only saw the young woman, the old woman is now looking a little bit more left out of the screen. Here's her left eye. This is her right eye. You can tell that she's kind of tired. She has a sort of a much larger nose. Her lips have sunken in a little bit, and here's her chin down here. Do you **see the older woman now**?

[00:09:18] I'm guessing if you're looking at this, now that you see both, your brain snaps back and forth between the two. But it's **really hard to see both** at the same time.

[00:09:26] Let's try this again. What do you see in this one? I'm guessing you see a beaver or a muskrat or a **cute little rodent** with an adorable little that's a, maybe a bow tie on his tail, or that's a butterfly in the background. It's a little hard for me to tell, but do you see the cute rodent? Alright, this is a similarly colored picture. But what do you see on this one?

[00:09:49] Most people tell me when they look at this picture that they see a **donkey**. . I don't know if that's what that looks like to you. But those of you who read German are in on this joke because it turns out that it's the exact same picture. Those two German words both mean upside down

[00:10:11] The point here is, in the words of Dr. Wayne Dyer, "When you **change the way** you look at things, the things you look at change." And that's what I'm hoping to do here tonight, is to change the way that we look at things.

[00:10:24] Let's look at some numbers. First I just wanna observe a couple of things about chronic pain in the United States of America. For instance, if you are older than 20, more than half of people older than 20 in the United States of America have reported pain in the last year, that lasted more than three months. If I bump up to 65, more than half reported pain that has lasted for more than 12 months. **Chronic pain is a big problem** here in the United States of America.

[00:10:52] If I want to look, instead of at pain, I want to **look at trauma**. I'll just remind all of us that the classic trauma disorder called Post-Traumatic Stress Disorder happens to about 6% of us over our lifetimes, about twice as often in women as it is in men.

[00:11:06] If I go just to a year it's a little bit less than 5% but still twice as common in women as in men. But notice that there's not really a big difference between those of us who have been exposed to **trauma and get PTSD**. And those of us who have been exposed to trauma, but do not get PTSD. So PTSD is not simply caused by exposure to trauma. There's something about us that makes us more vulnerable. If you want to decrease your risk, be Asian or Pacific Islander. Be educated, be wealthy, live in an urban area, and live with someone else. That, statistically speaking in our country, gives you the best chance of not developing PTSD.

[00:11:44] If I move to the primary care setting, now I'm starting to move trauma and pain a little bit closer together. I will just note that PTSD is pretty common in primary care patients. And also that people who have been traumatized visit their primary care providers four times more often. If someone **happens to be a survivor** of childhood sexual assault, and you do chart reviews, they're much more likely to have physical complaints, pain disorders, and general medical diagnoses as a whole. In other words, they have a longer medical problem list.

[00:12:16] And then of course, into our world, back in early 2020, came this beautiful - **thistle-y looking little virus** that sent our world a little bit sideways for a while. And you can see that almost overnight, the incidence of anxiety and depression in the United States of America jumped about fourfold just in the first few months of the pandemic.

[00:12:35] And that translates to PTSD for some people, to trauma for some people. During the COVID 19 pandemic, you were more **likely to develop PTSD** if you had lower income, if you had to quarantine for a long time, if you were exposed often to COVID or were around people who had COVID, if you were hospitalized for COVID, or simply if you were a healthcare worker, your risk of developing PTSD during the pandemic was much higher.

[00:13:02] I'm going to shift again back to chronic pain but to hold on to PTSD now and look at the **intersection of PTSD and chronic pain**. This is a study of about 5,000 folks who were either identical or fraternal twins and the researchers were trying to figure out what the genetic risk of developing PTSD is and what the genetic risk of developing chronic pain is.

[00:13:25] And what they found is that your genes account for about 43% of your risk for PTSD and about 34% of your risk of developing some kind of pain condition. Everything else is environment. Notice, **environment** plays a much bigger role in your risk of developing both PTSD and pain compared to your genes.

[00:13:45] But more importantly from the study, if you look at the blue and yellow boxes that I've highlighted here, if you have PTSD, that's the blue column, your risk of developing a **pain disorder** is at least double for all of these different pain conditions. And for things like tension headaches or chronic fatigue syndrome, that risk is about six times as great that you'll develop one of those if you have PTSD compared to if you do not have PTSD.

[00:14:12] The only pain condition that they checked that there was no difference between people who had PTSD and didn't have PTSD was **prostatitis**, and that one held steady across. But for every other kind of pain condition they looked at, your risk is much higher if you have PTSD than if you don't.

[00:14:30] The truth is that post-traumatic stress disorder and chronic non-cancer pain, often overlap. They share the **same symptoms**: anxiety, hyper arousal, avoidance of things that make it worse, emotional unsteadiness, and elevated focus on your body. And, they result in the same kinds of things over the course of one's life. People become hypervigilant. They watch out for things that can make their symptoms worse. They pay attention more to things that make their symptoms worse. Their bodies get more physiologically reactive, and they are wired to magnify pain.

[00:15:06] So let's talk about how that happens. Let's talk about how trauma shapes us. Now, when I say trauma, here's what I mean. I think Bessel VanDerKolk said it best in his, by the way, he even admits this, his very hard-to-read book: *the Body Keeps the Score*. "**Traumatization** occurs when both internal and external resources are inadequate to cope with the external threat." Let me put that in English. When whatever happens to you overwhelms your ability to deal with it, that can be traumatic, which means what's traumatic for you may not be traumatic for me, and what's traumatic for me may not be traumatic for you. And what's traumatic for you today might not be as traumatic next week or next year, and so on.

[00:15:49] I'm gonna tell you about this study that broke this wide open for us in the United States of America. So come all the way back with me to **1998**, Felitti, Anda, and the rest of their team published, *The Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults*.

[00:16:04] This is most **commonly called ACEs**, and who they studied in their first couple of groups of research were folks who all had health insurance in Southern California, mostly women, mostly white, mostly over 50, and mostly college educated. These were not the people that we traditionally thought of before this time as having high rates of trauma. And what they found is that trauma is pretty universal.

[00:16:29] Now they **just asked yes or no**. Did one of these 10 things happen to you? Did any of these 10 things happen to you when you were growing up? Were you someone who experienced physical, emotional, or sexual abuse? Did you experience physical or emotional neglect? Or did you grow up in a household in which there was significant mental illness, domestic violence, substance abuse, divorce or separation, or incarceration present?

[00:16:52] And what they found is that, these were really common things. At least two thirds of those 17,000 people had **at least one adverse childhood experience**, and if you had one, you almost certainly had more than one. They tended to occur in clumps.

[00:17:09] Now, what's particularly interesting to me is the reason why they decided to ask these 10 yes or no things. They noticed that some of their patients stayed really healthy through pretty much their whole lives. And we all know those people. They take one or maybe no medications, and they're **really healthy**, and they don't have a lot of health problems. And they stay that way pretty much until they die.

[00:17:28] And then there's the rest of us who tend to develop more and more chronic health conditions as we go through life. It usually starts in our forties, and then gets worse, and we get sicker, and we tend to die a little bit earlier in life. And they wanted to figure out why that was. And they had an inkling a hunch that it might be due to things that happen to us when they're younger. And sure enough, just those **10 questions predicted** the 10 most common causes of death. In fact, those 10 things alone account for more than half of your risk of developing chronic diseases or the risk factors for them.

[00:17:59] If you had none of those, you almost certainly didn't have any of those chronic diseases or risk factors. And if you had **four or more**, you almost certainly had at least two of those diseases or the risk factors for them.

[00:18:12] When I talk about the **leading causes of death**, here were the leading causes of death for adults in the United States of America in 1999. And you can see overwhelmingly we're talking about heart disease, cancer, chronic lung problems like C O P D or emphysema, accidents, diabetes, infectious disease, and so on, all the way down to suicide. If you have an ACEs score of four or more, you're twice as likely to smoke, seven times more likely to be alcoholic, twice as likely to have heart disease, four times more likely to have emphysema or chronic bronchitis, ten times more likely to have injected street drugs.

[00:18:47] Long story short, it doesn't take a rocket shrink to realize that what happens to us when we're young has a **profound impact** on the way that our lives unfold and



increases our risk of things like traumatic brain injury, fractures, post-traumatic stress disorder, suicide, alcohol and drug abuse, and even how far we are likely to go in our educational career.

[00:19:11] There's been hundreds of studies around this since then. And I wanted to just point out a couple around pain. Turns out the things that happened to you when you're young also have a profound impact on your **likelihood of being diagnosed with chronic pain** or even disabling pain later in life. ACEs are associated with at least a 1.2-fold increase in the odds of any kind of chronic pain, chronic back pain, headache, even dysmenorrhea or pain with menses.

[00:19:39] We don't yet have all of the links in this **pyramid** solved. But in general, bad things happen to us. That changes the way we develop. That leads to impairment in the way we function, which leads us to adopt risky health behaviors to cope with that, which then in turn leads to increased disease and early death.

[00:19:57] Let's dive even just a little bit deeper. Your brain, when you are being put together in your mom's uterus, forms from the bottom up or from the inside out. It adds more and more layers. You are born with about **50 trillion brain cells**. That multiplies by 20 by the time you're six. You get another explosion of brain cells up in the front of your head during puberty. And thereafter you lose brain cells for the rest of your life. And the main reason you lose brain cells is because you're not using them. You keep the brain cells that you use and you keep the connections that you use, and you let go of the ones that you don't.

[00:20:34] Because your brain gets more and more complex as you grow up in childhood and adolescence. Again, it's not too much of a stretch to realize that the kind of environment your brain is in when you're growing has a profound impact on the shape of your brain. I want you to pay attention right now to just **three areas of your brain**, and we're going to look at the amygdala, this little almond-shaped structure. We're going to look at the hippocampus. And we're going to look at the prefrontal cortex up here in the front of your brain.

[00:21:02] Your amygdala is a **threat detector**. It's fully functioning when you're born and its job is to tell you thumbs up or thumbs down, this is safe, or this could kill me. This is one of the reasons babies cry so much because everything is a threat to them if they're not feeling safe. They can't really protect themselves.

[00:21:19] Your hippocampus, on the other hand, helps you with short-term **memory**, helps you begin to lay down long-term memory, and it doesn't really function very well

until you're about four months of age. By the time you get to around two years of age, it's working pretty well and so your hippocampus allows you to take stock of your surroundings and say, I feel scared, but Mom looks relaxed and happy, so I'm probably okay. Or I'm hungry, but I can see Dad's fixing my bottle, so I don't need to panic just yet. Your hippocampus can agree with your amygdala or it can suppress your amygdala.

[00:21:50] And finally there's the prefrontal cortex, that part up front. It really doesn't start forming very well until you hit puberty, and its job is to really pay attention to new things in your environment, figure out where they fit, and to take advantage of all of the memories that you've formed and the way that you think to figure out how to **make a decision** and whether to agree with your amygdala and your hippocampus or to disagree.

[00:22:11] Your amygdala works **instantly**. Your hippocampus takes a couple of beats **longer**. Your prefrontal cortex, what's the longest you ever spent making a decision? It could take years to finally decide to do something about something, right? Usually it's, a few seconds or a minute or something, but it can take a really **long time**.

[00:22:30] So for those of you who like pictures. I'm gonna go this way. **Stuff comes into** your sensory thalamus. Oh, I should have changed the transitions on this. It very quickly goes over to your amygdala and your amygdala tells you to run away, or to fight, or to freeze or to do something to stay alive. Your hippocampus on the other hand is a little bit slower. Allows you to take stock of your immediate surrounding and to either agree or disagree with your amygdala. **And finally**, your cortex can weigh in on the process as well.

[00:23:00] If you live in an environment where, when you're growing up, where things are traumatic, and you have to **use your amygdala a lot to survive**, that pathway really gets laid down. And the other pathways, not so much. Because you're not using them as much. You might be able to use them in moments when you feel really safe. But your default becomes your amygdala.

[00:23:24] And in fact, if things are really traumatic, we can see this with functional M R I. Your cortex **doesn't get as thick**. It doesn't get as robust. You don't develop as much ability to think and reason and be as adult-like as you otherwise would. And if it's really bad, we even know now that your hippocampus **doesn't develop as much**.

[00:23:42] Now most of us, are not living in our amygdala except when we're stressed we do. And when we live in **stressful periods** of time, oh, say a pandemic, we think a lot more with our amygdalas, and we find ourselves getting more and more irritable. By the

way, your brain is wired to your body to all of your organs through the vagus nerve. And what's happening in our brains influences the way **our organs** function and the ways that they develop as well. We wind up irritable. We wind up on guard. We pay attention to threats, to danger. We feel a lot of **anxiety**. We are more programmed to act and less programmed to think. The thoughts that do get through tend to be more extreme in their nature. And we begin to in short, we're overwhelmed.

[00:24:25] **Trauma overwhelms** us. It overwhelms our ability to self-regulate. And when we can't do that, we stop being able to recognize our own emotions. We may disconnect from our bodies, and we begin to express our emotional distress as physical pain or as physical symptoms. That hyperarousal, that attention to threat, becomes our baseline and results in things like allodynia, which is interpreting things that are perfectly innocent or innocuous as painful.

[00:24:55] For example, **acid reflux**. A lot of us have it, but did you know that people with PTSD are much more likely to be diagnosed with acid reflux? Did you know also that people who have PTSD have no difference in the variation of acidity in their esophagus compared to people who don't have PTSD? It's just that their brains feel that and say, wow, that might be dangerous. You gotta pay attention to this. Whereas those of us who haven't been traumatized don't pay attention to that as much.

[00:25:23] Hyperalgesia, things that are a little bit painful get really magnified, and we think this might have something to do with **migraines**.

[00:25:31] By the way, SAMHSA says this about chronic pain. "Chronic pain often results from a process of **neurosensitization** following injury or illness in which thresholds are lowered, responses are amplified, normally, non-noxious stimuli becomes painful, and spontaneous neural discharges can occur." That sounds an awful lot like what I just said about trauma. It turns out that trauma and chronic pain are linked.

[00:25:57] But I promise you there is **hope** in all of this, and I think that hope starts when we change the basic question. Instead of when somebody has a problem, instead of asking, "What's wrong with you?" I and Bruce Perry, who gets credit for this question, think we do better when we ask, "**What's happened to you?**" Do you see the difference there? Not what's wrong with you? Instead, what's happened to you?

[00:26:24] When we ask somebody, what's happened to you? Or when we ask ourselves, what's happened to me? Instead of what's wrong with me, that allows us to **reinterpret** what's happened through the lens of exposure to trauma, to avoid overreacting, to avoid power struggles with our healthcare providers or with people who seek help from us, to

lean into what's going on with somebody, to find that area of distress, and to try to open up communication about it. That is when healing can begin to happen.

[00:26:54] Other healthy responses involve listening to people, **listening to understand** what's going on for them instead of listening for our turn to talk, to focus on building relationships, to accept our own limits, and to learn to work within those, to intentionally enjoy things every day, to notice the progress that we and other people make around us, to pay attention to our breathing, to move our bodies every day, to pay attention to basic things like making sure that we stay hydrated, making sure that we protect our sleep and making sure that we avoid substances.

[00:27:25] There are all kinds of other ways that we can intervene in traumatized brains. That's how I earn a living and that's how a lot of other people earn a living as well. And it's probably beyond the time we have tonight to talk about a lot of those. I just want you to know that there are all kinds of ways that we can help people **restore balance** in their brains and develop pathways that are underdeveloped, and be able to damp down the amygdala.

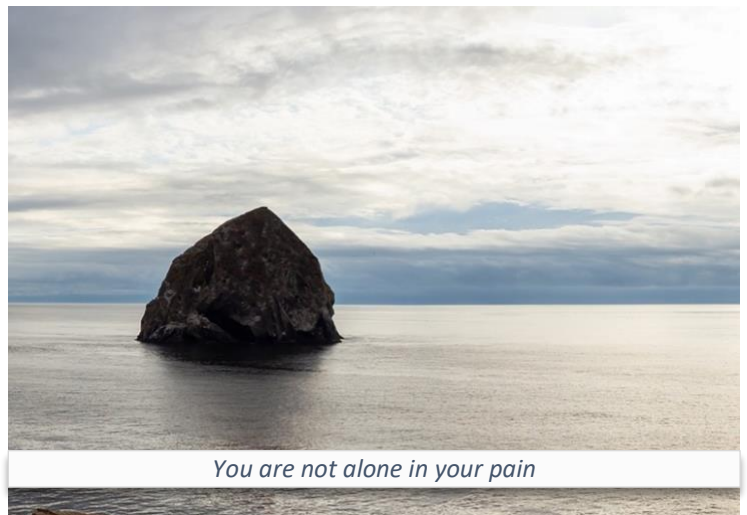
[00:27:50] The short version, as Dr. Bennington Davis would remind us, **recovery** is very likely. Our job is to create an environment in which recovery can occur. We need to believe. People live up to our expectations. We live up to the expectations we have for ourselves. So it's important to be bearers of hope.

[00:28:09] In **summary**, trauma's common. It rewires our brains and bodies. Recovery can be our expectation. Change starts wi

# 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. Through community education events, health care workers describe how pain-science-based practices have changed their interaction with and care for patients, and patients tell stories about their experience with learned pain science tools used to help master chronic pain. We can now share these collected and curated stories, and other unique features, through the Alliance “story website” launched in early fall of 2022.



## How to get involved?

Do new Pain Science insights and practices resonate with you?

We welcome anyone interested in collaborating to find or produce good stories and insights, then curating them to display on our website. Sharing in our discoveries and making them broadly available is both personally positive, and mutually satisfying.

The phone number or email address below will get you more information about us; then use the website link to the Member page for the steps to become an Alliance member, if that makes sense to you.

If you have a story using pain science tools and practices, and would like to share it with the larger community through our website, please send us an email. We would love to hear from you.

Phone: **541-224.8378**

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