Stumblling onto the Truth –
From the Gate Control Theory to Pain Science

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[00:00:10] I'm an occupational therapist from Eugene. I **graduated from USC in 1978** with a master's degree.

[00:00:18] Just in case you are not familiar with **occupational therapy**, the basic concept is that there are four occupations to our daily lives: work, play, rest, and sleep. **Work** includes unpaid activities that have monetary value. For example, cooking a meal is work. **Play** is what we do for fun. **Sleep** is sleep. **Rest** is activities that promote a sense of peace and calm. Occupational therapy patient goals relate to these four occupations. Most of my career focused on two occupations work and rest.

[00:01:00] Around 1983, Sacred Heart Medical Center was selected by the State of Oregon to serve as a regional rehabilitation program for people who had been injured on the job. It was known as the **Injured Workers Program** IWP for short. It was an all-day four-week outpatient multidisciplinary program. We had a psychologist, rehab medicine doctors, vocational counselors, and three types of therapists, occupational, physical, and recreational. IWP's overall goal was for our patients to have the self-management skills, strength, and endurance to return to their regular jobs. Truck driving and millwork were the most common jobs.

[00:01:49] I was ready to try something new, and I took the opportunity to work in the injured workers program. As an occupational therapist, **my primary role** was to collaborate with my patient to identify their really challenging job tasks. Then we would

think of a way to simulate these job tasks. We'd start at an easy level and gradually increase their physical capacities. I think I visited just about every type of mill there is in Oregon so that I could more accurately simulate my patient's job tasks.

An older understanding of pain: gate theory

[00:02:27] Occupational therapists, in IWP also provided biofeedback relaxation training. Our approach to treating chronic pain was based on Melzack and Wall's 1965 **gate control theory.** These two scientists connected the physiological and psychological experience of pain. They proposed that pain signals travel from the affected body part via the peripheral nerves up to the central nervous system, the brain. Melzack and Wall visualized a gate in the spinal cord. **The gate could be opened and it could be closed.**

[00:03:06] The gate would **open to increase pain** when the person overdid it physically, when they were anxious or angry or stressed out, depressed, focused on their pain or any combination of these experiences. The gate would **close and decrease pain**, when the person relaxed, when they had healthy habits, when they used modalities like heat and massage, when they focused on positive attitudes.

[00:03:35] IWP staff **expected our patients to close the gate** between their brain and spinal cord and reduce their pain by the combination of relaxation training, gradually increasing activity and exercise levels, psychological treatment, and focusing on the hope of return work. When Oxycontin was being promoted for people with chronic pain, our doctors did occasionally prescribe it for patients.

[00:04:06] The Injured Workers Program was eliminated in 2001. Luckily Sacred Hearts, director of employee health and safety had dreamed up and gotten approval for an occupational therapy position. It turned into a really fun job. In effect. I became an **in-house consultant** for the application of ergonomic principles to manual materials handling jobs, patient care jobs, and office jobs.

[00:04:34] I did job analyses and I **assisted with return to work of injured staff**. Keep in mind that I was a representative of their employer. I did not have access to medical records. I did not do formal patient evaluations. And my injured coworker was my primary source of information. What I noticed over and over again was the pain and fear were often the barriers to the injured hospital workers return to regular work.

[00:05:05] At some point in the late 2000 Teens, I **stumbled onto the YouTube video** *Understanding Pain in Less Than Five Minutes and What To Do About it*. The video

seemed really hopeful. I began to watch the video with injured staff and discuss it. This was especially with people who seemed to be really limited by their pain.

[00:05:26] The video's presentation of multiple factors contributing to pain was already familiar to me. And I could easily discuss that with injured workers. But I realize now that the frame of reference behind the understanding pain video was **not the old familiar gate control theory**. The video's frame of reference was actually new and different.

[00:05:52] I still thought acute pain was very different from chronic pain. I didn't really grasp the news. The pain scientists had found that **pain is constructed in the brain** and not in the injured body part. When I think over my patient care experiences, it's clear that both my IWP patients and my injured **coworkers** were afraid of overdoing it. They worried about increasing their pain level. They **worried about causing bodily harm**.

[00:06:27] Although I hadn't yet learned to see pain as a protector. One focus of my occupational therapy practice was increasing injured workers' **sense of safety and security** during my injured worker program. The security and safety came from simulating key job tasks in the clinic, and gradually increasing their level of physical demand to match the workers' real life jobs.

[00:06:56] During my employee health and safety days, the **doctor's return to work release** served as a guide to safety and security. The work release usually specified the amount of weight and force the injured worker could lift, carry, push, or pull. It might also set specific restrictions for walking, reaching, standing, and sitting.

[00:07:21] I had weighed most pieces of equipment on the nursing units, and I measured the push pull force needed to move rolling equipment around the hospital. So I could confidently tell injured staff, **which job tasks were safely within their doctor's light duty** work release. For example, if a certified nursing assistant was released to 10 pounds, intermittent reach above shoulder height and no bending or twisting, I could assure that CNA that they were safe doing the following job tasks: greet and direct visitors, stock small supplies, collect meal, trays and small patient care machines, assist patients with grooming and feeding, answer call lights and prepare rooms for newly admitted patients, including moving the overbed table.

[00:08:15] Another thing I did to build up an injured **worker's sense of safety** and security as they performed their physically active jobs was teaching them what I call positions of strength. These are movement patterns based on biomechanical and ergonomic research. I would meet Sacred Heart injured workers at their job site, and we would practice these movement patterns.

A newer understanding of pain

[00:08:39] It's ironic that I started to learn about the newer understanding of pain. Right when my job was being eliminated. It started in March, 2019 at GOSH, the Governor's Occupational Safety and Health conference. There, I had the opportunity to hear a presentation by an **OSHU psychologist, Catriona Buist**? I hope I pronounced your name, right?

[00:09:04] It was called *Changing the Conversation about Pain by Addressing Five Domains of Best Practice Pain Care.* Then in October, 2019, at the annual conference of the Occupational Therapy Association of Oregon, I experienced a **double whammy**. I heard a talk by Kevin Cuccaro about the new understanding of pain and I was introduced to Sharna Prasad, the first physical therapist I ever met at an occupational therapy conference. She told me about the January 2020 second Oregon Pain Summit, and I signed up right away. Since then I have taken classes from Dr. Cuccaro and read books by Lorimar Moseley.

My pain experience

[00:09:49] Preparing for this presentation led me to remember my own worst experience with pain. It was a right **frozen shoulder**. My car had a stick shift. So I had to take the bus to work. I was really angry about the hassle, the pain, and the inconvenience. My physical therapist treated me with modalities and range of motion exercises. I did not do all of my theraband and range of motion, home exercises, but my pain went away and I was glad to drive my car again.

[00:10:25] **Why didn't this experience all drag out?** Was it because I trusted that my PT and my doctor knew what they were doing? Was it because they were sure of how long it would take me to get better, and I believed them? Was it because my PT had a very soothing manner? With my **new understanding of how pain works**, I'd say that it was everything put together, cognition, emotion, and sensation.

Positions of strength increase a sense of safety

[00:10:55] Now what's next for my occupational therapy career in pain science. I **hope to teach positions of strength** in community settings, possibly Parks and Recreation departments, senior housing, community groups, and even one to one as the opportunity arises. Positions-of-strength, aren't directly related to pain science, but

concepts such as safety, protection and brain body connections can be woven into the benefits of moving through positions and strength.

[00:11:30] I'd like to show, share the positions of strength with you now in a **slide show**. So you wish me luck setting it up.

[00:11:39] Okay. Although positions of strength are **natural movement patterns**, many people don't consistently take advantage of them. And they're especially helpful if you deal with fatigue or pain on a day to day basis. And, you are likely to feel a difference when you apply the positions of strength to your activities of daily living. They are based on both biomechanical research and ergonomic research.

[00:12:16] Here's a **fun experiment**. Which one of these methods of picking up the cup feels more secure, more comfortable, and more safe because it's your brain's job to protect you.

[00:12:42] Once the cup was close to me, I had it in the zone. **The zone** is a position of strength that involves your whole body. And it's the building block for every other position of strength. Here's the zone. As you can see, uh, the zone will move with you everywhere and it doesn't matter what position you're in and you are **strongest in the zone**, not just your whole body, but your hands, your arms, and you get less fatigue. And the zone moves with you as you change your body position. It's quite dynamic.

[00:13:29] **Forward hand and foot** is a way to help you to reach directly outward without going outside the zone. If you watch, it's the left hand and the left foot working together. You can also, do this. And so if you want to, you can stand up and try it out. With your right side: forward hand and foot on the right side. With the left side: forward, hand, and foot. Or with both arms together and just stepping forward. The pattern might feel awkward and unfamiliar, but it gets to be really smooth and flowing.

[00:14:11] Oftentimes though things are not located directly in front of us. And so **lead with your toe** is the position of strength to use when you have to reach off to the side. So each time you can see that my toe points in the direction I'm going, that I need to work. And because my body follows, it's a way to modify your forward, hand and foot position of strength and still reach objects located in the zone.

[00:14:56] **Lean on** is a useful position of strength when you have to pick up objects that are down low. It might remind you of forward hand and foot because it's a similar movement pattern. For objects that maybe are all the way down to the floor, you can adapt lean on by leaning on the top counter or a table or something. And then your arm and leg away from the surface are what you use. Your leg might come up to

counterbalance, and your arm of course, is picking up the object. And then as you stand up, you let the raised leg fall as you come back to standing position.

[00:15:47] **Pushing and pulling**. Oftentimes people will, jerk, reach out and jerk to start an object moving. And, instead, by working in the zone and using the position of strength called **use your weight,** you'll have more strength and you'll definitely feel more secure. Let me show you that again. What you need to notice is that it starts with step forward and a weight shift of the body for the oomph of the push or pull.

[00:16:30] We use our hands constantly. And again, bio mechanical and ergonomic research shows that it's important for them, that we work in the zone as well. So there are two, **hand and arm related positions of strength**: baseball bat grip, and pinch power.

[00:16:56] **Baseball bat grip** means that your fist isn't too tight. It's not too stretched out. You can imagine that there's a line that goes down your middle finger through the middle of your wrist and down between the two bones of your forearm. And your wrist is not cocked in any direction. And so when you're holding things, **you feel really safe and secure**.

[00:17:21] Sometimes things can't be gripped with with your closed hand. And so you have to do it with an **open hand** and just kind of compare how safe and secure you'd feel in these different movement patterns here. Using your whole hand in that baseball, that grip position should feel like you aren't gonna, spill anything in that bowl or, or anything like that, that you feel secure.

[00:17:56] Ergonomists have researched the **optimal size for handles** of power tools. And it's one inch to three inches across. So this is a tennis racket handle, and it's probably appropriate for somebody with a small to medium hand to feel like they really have a good grip for some strong hits in their game.

[00:18:26] Smaller hand movements are **pinch power,** and these muscles and joints are small. So you wanna really take advantage of whatever you can, especially with repetitive hand activities. So your activity and your pinch need to match each other. **Pincer** is the most fine; it's using needles and that kind of thing. **Palmer** is writing using pens. **Key** is obviously using a key. Pinch power also completely relates to baseball bat grip and the zone. And we'll, look at that in a minute. Key pinch, as I said, is the strongest way to hold things.

[00:19:16] And ergonomists recommend **12 millimeters across** for precision tools like pens. So there's your 12 millimeters and it's interesting. This pen that's bigger than, a lot

of pens is big enough to give you a sense of secure grip and comfortable grip as you're writing for long periods. But it's actually not quite 12 millimeters.

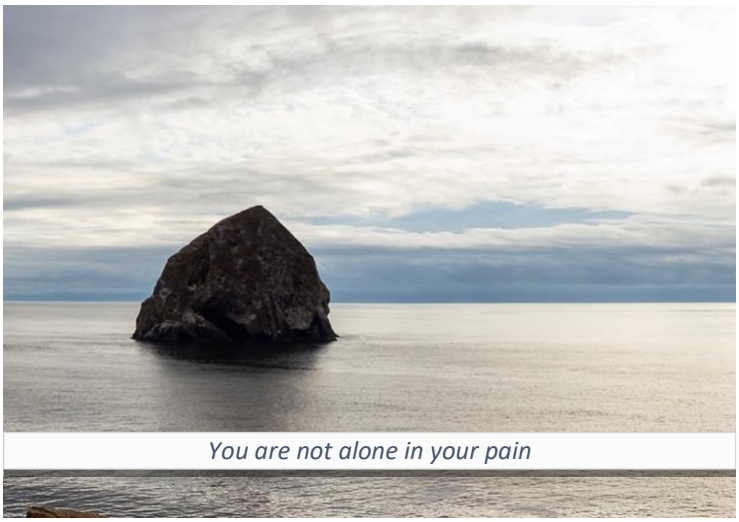
[00:19:47] Um, problems with fatigue, with arthritis, with weakness are really common. So I just put in this extra slide here showing that another option is **adaptive equipment** for challenges in activities of daily living. So the first two are key holders. This one here, you can see that perfect baseball bat grip position for this specialized knife. Pen, and pencil holders, and then jar openers. And, uh, again, these help with using more of a baseball bat type grip, so your strength is maximized as well.

[00:20:38] So, if you keep in mind that **your brain is acting as a protector** and helping you to identify the safest ways to perform your activities of daily living, you will be safe and smart. So just to repeat, all of the positions of strength, the zone, forward hand and foot, lead with your toe, lean on, use your weight, baseball back grip, pinch power, safe and smart.

[00:21:06] Hopefully you'll be able to use these tips to figure out the least strenuous and most safe and comfortable way to do your tasks in your activities of daily living. So **your brain and your body will be in tune** as you are safe and smart.

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.



You are not alone in your pain

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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