Boulder Community Health
The Best Place to Get Better

PATIENT EDUCATION

Neural Pain Pathways

We used to think that all pain was due to physical injury in the body, and it was simply reflected in the brain. We now know that our brains actually generate all our internal experiences, including pain. Pain is nothing more than our brain's alarm mechanism for alerting us to danger. If our brain thinks something should hurt, then the danger-alarm mechanism in our brain will activate certain neural pathways to create the experience of pain. This experience of pain can vary from slightly annoying to excruciating, depending on how much danger the brain perceives itself to be in. We know the danger-alarm mechanism is more sensitive in people with a history of traumatic childhood or other emotional events (such as previous medical trauma). The more a person has pain, and the more severe it is, the more likely it is that the pain itself will further activate this danger-alarm mechanism. This leads to a vicious cycle of pain leading to fear leading to more pain. This is why chronic pain often gets worse with time, and often begins to involve more and more areas of the body over time. Many people with chronic pain problems are perceiving normal sensory input from certain areas of their body as dangerous, and their brain is then constructing the experience of pain.

My brain probably gets hundreds of sensory inputs per second. It decides – in a split second, and without my awareness – whether the input is dangerous or not. For instance, as I type this sentence, my brain is receiving input from my left elbow, which is resting on the table, that there is some pressure from the desk on the elbow. Even though the nerves in the elbow that sensed the pressure are working just fine, I was not consciously aware of that pressure until I typed the previous sentence. The *pressure* information was indeed being sent, via the spinal cord, to my brain. But my brain received that sensory input and made this decision: “Thank you very much, elbow, for this information about pressure on the elbow, but I’m in the middle of typing right now and I don’t need to know this, so I’m not going to allow that piece of data to reach my conscious brain right now.” However, another person with a history of trauma who has an very sensitive danger-alarm mechanism might receive that same pressure-on-the-elbow information, and their brain (again, in a split second and without their awareness) might make the following decision: “Thanks for the info elbow, let me just quickly review my personal history about pressure to various areas on my body and – HOLY CRAP!! This is potentially dangerous based on previous sensory input! I need to turn on an alarm to let John know that we are in trouble and he needs to take action!” Boom. Neural pain pathway activated.

The concept of neural pathways in the brain is one of the major new understandings in neuroscience in the last decade. The more you practice a neural pathway, the better you get at it. This can really help when you are learning to ski, swim, or ride a bike. But you really don't want your brain practicing pain. It is also important to realize that these neural pathways that develop in the brain are completely outside of our conscious awareness. When we learn to ride a bike, we do not learn to activate our right hip muscles while stretching the left hip and flexing the ankle just so. Just like bike riding, neural pathways form without conscious thought, and pain neural pathways can form without conscious thought. This can make them hard to control. But another new understanding in the last decade - and good news for people with chronic pain or other problems that have been hard to treat - is the concept of "neuroplasticity". This is our understanding that these neural pathways can be turned on and off.

If you are riding a bike on asphalt, there is no way that your brain will let you "forget" or "turn off" the complex neural pathway that keeps you balanced on the bike because your brain knows that to turn off that pathway would be dangerous. But if I were to construct a giant bike-riding room with the world's cushiest and softest padding, you could teach your brain to turn off or temporarily forget the bike-riding neural pathway. Your brain would let you fall on these pads, because it would feel safe. In the same way, your brain will not turn off the pain pathway coming from your back/abdomen/arm/neck/head/foot until you can convince your brain that there is no danger coming from this area. Right now, there is some part of your brain that continues to perceive danger from your area of pain. Your job now is to convince your brain that the sensory input it is receiving is not dangerous, and it can turn off the alarm.

For some people, just understanding that there is no actual tissue damage is enough to resolve their pain. Other people need some coaching (using specific techniques) or encouragement for their brain to really accept that 20 years of very real pain is not actually due to a problem in the back. Let me know when you are ready to pursue these ideas, because I am convinced that most people with chronic pain will be able to get rid of it by educating themselves and convincing their brain that there is nothing to fear.

Resources	
Videos to help you understand how we process pain	• A short video about how neural pain pathways can cause chronic pain: https://youtu.be/D36yy63CHq4 • A 22-minute talk about neural pain pathways by Dr. Howard Schubiner: www.unlearnyourpain.com and click on the video link • A very entertaining video about how our brain processes pain: https://www.youtube.com/watch?v=RYoGXv22G3k&t=288s • An ABC News 20/20 feature on how back pain is affected by emotions: https://www.youtube.com/watch?v=vsR4wydiIBI
Other resources	• The *Pain Psychology Center* free treatment program: http://www.tmswiki.org/forum/painrecovery/ • *Curable: A different Approach to Your Pain* website and app: https://www.curablehealth.com/ • *Unlearn Your Pain* web program & book: http://unlearnyourpain.com/ • A website created by Paul Hansma, a physicist who recovered from chronic shoulder pain using these approaches: http://activelifescientific.org/ • The Psychophysiologic Disorders Association: https://ppdassociation.org/

Books	• *They Can't Find Anything Wrong*, David Clark • *Back in Control,* David Hanscom, MD (A complex-deformity spine surgeon's take on chronic back pain.) • *The Mind Body Prescription,* or *Healing Back Pain,* John Sarno, MD. (Dr. Sarno, who died at age 94 in 2016, is considered the originator of the idea that pain is in the mind. • *Unlearn Your Pain*, Howard Schubiner • *The Way Out: A Revolutionary, Scientifically Proven Approach to Healing Chronic Pain,* Alan Gordon
Podcasts	Podcasts are a great way to "keep your head in the game", and they are usually free! These include new ideas about how the brain works to produce pain. It can be helpful for you regularly reinforce your understanding by listening to experienced providers talk about this. Two of my favorites: • *Like Mind Like Body* from curablehealth.com • *Tell Me About Your Pain* with Alan Gordon; this one is brand new, so there are not a lot of episodes yet, but it is REALLY good
Expressive writing	• This is an easy treatment that is very effective for many people, even before you fully understand neural pain pathways. • Try writing about your feelings and emotions once a day for 5-10 minutes, or even just a couple sentences. • This is not problem-solving or analysis. We are just spending a few moments attending to your thoughts and emotions. Writing is an opportunity to move towards our feelings rather than try to get away from them. • You do have to admit that you are <u>having</u> feelings and emotions, which for some people can be hard. But if you can, let yourself feel your emotions. Don't hesitate and don't worry if it is legible or grammatically correct. Just get your thoughts out onto the page. Then destroy the page. Do not keep it. • Negative emotions such as fear and anger essentially tell your danger-alarm mechanism that things are bad, and it had better stay on guard. Getting the negative self-talk and thoughts out of your subconscious and onto a page - then discarding what you wrote - can sometimes reduce the hypersensitivity in your nervous system. • This is just stream-of-consciousness writing. Feel, don't think. Just start writing, even if you aren't sure what you are feeling when you start. • And this is not meant to be a deep dive into who emotionally traumatized you as a baby. Just write about the thoughts that you find rolling around your brain. It might be "I'm worried about my upcoming doctor's appointment" or "I hope my son's meeting with his boss goes ok" or "I wonder what my mom meant on the phone last night when she said [fill in the blank]". Just getting these thoughts out on paper - and then ripping them up and throwing them away - can be very helpful to many people.