



Figuring Out Why Patients Hurt – Examples and Metaphors

Pain is a response to a perceived threat

“Imagine that you hit your hand with a hammer. The receptors in your hand send a signal to the rest of your nervous system explaining what happened. Your nervous system then processes this information and decides whether or not it is a threat to your body. If it is, your nervous system wants you to make a change, so it gives you a sensation of pain to strongly persuade you to protect your hand. Your nervous system does this because it doesn’t have another way of communicating its concern to you. Pain is how your body tells you to change something.”

Tone

“Our muscles have something called ‘tone.’ What this refers to is how much resistance to movement you have at rest. If you have low tone, it’s like your body is a loose bag of bones that can be pushed around easily. If you have high tone, your body is rigid and it’s difficult to move. We want to have a moderate amount of tone to allow us to functionally move, but also not crumble to the ground if someone runs into us. When your nervous system perceives a threat in an area, it increases the tone of muscles in that region in order to protect you from harm. Unfortunately, our nervous systems don’t always know when to bring the tone back down when the threat is removed.”

Approaching discharge

“You seem to be improving very well. What else do you need from me before you’re done with physical therapy?”

“I don’t think there’s anything I can do for you that you can’t do for yourself. If you continue with your home exercises, you’ll continue to improve until you’re back to full function.”

Tissue sensitivity

“After spraining your ankle, swelling in the area helps with healing, but also makes your ankle sensitive, so that even light pressure can cause pain. This is good because it keeps you from using your ankle too much before it’s ready. After the inflammatory stage is over and the swelling goes down, the tissues will become less sensitive, allowing you to walk more with less pain.”



Explaining onset of pain

Water in a cup: “Picture an empty cup. Everything that could possibly be seen as threatening by your nervous system is represented as water being added to the cup. If the cup overflows, that’s when your nervous system perceives a threat, and you have pain. Things that can add water to the cup include ROM restrictions, muscle guarding, poor posture, fear of movement, memories of previous injuries, emotions tied to the pain, your perception of the pain, and more. Factors like strength and overall health represent the size of your cup. The healthier and stronger you are, the more water you can add before your nervous system perceives a threat. You didn’t have an injury that started your problem, but rather an accumulation of many pieces that eventually made the cup overflow. Physical therapy helps you remove water from the cup, as well as increase the size of the cup, to keep the water contained.”

Burrito: “Imagine you are making a burrito. Everything that could possibly be seen as threatening by your nervous system is represented by ingredients in the burrito. If you have so much in your burrito that it makes it so that you’re unable to fold your burrito, that’s when your nervous system perceives a threat, and you have pain. Things that can add ingredients to your burrito include everything we’ve already talked about. Your strength and overall health represent the size of the tortilla, so the healthier you are, the more ingredients you can add before your nervous system perceives a threat. You didn’t have an injury that started your problem, but rather an accumulation of many pieces that eventually made the burrito too big to fold. Physical therapy helps you remove ingredients from the burrito, as well as increase the size of the tortilla, which make the burrito foldable.”

Cortical smudging

“For the reasons we’ve already discussed, your nervous system is currently trying to protect your spine. When you try to move, the muscles around your spine are over-activating, which can contribute to your pain. Normally, we should have different muscles working independently for separate tasks, but right now your muscles all want to contract together to make sure you stay safe. It’s like you’re trying to pick up your shoes from the ground, but your muscles contract like you’re lifting a refrigerator. This isn’t something you can directly control, but we’ll give you specific exercises to do that will retrain your muscles to contract appropriately.”

Referral pain

“Sometimes our nervous system can’t tell where the problem is, so it picks a spot for you to feel pain where it makes the most sense.”



Spreading pain

“What would happen if your home’s alarm system went off at 2am? Your neighbors would get concerned, and would pay attention to what was happening around your house. If the alarm turns off, they will go back to bed. But if the alarm stays on for a long time, your neighbors will get worried, and may even feel like they are in danger. This threat can spread pain to those neighboring areas.”

Firing threshold

“Your pain nerves have a normal resting level and a threshold that, if crossed, will cause a threatening signal to be sent, making your nervous system perceive a threat in this area. Your nervous system will then give you a sensation of pain to make you change something. When your nervous system is sensitive, the resting level is higher, making it closer to that threshold. This means that it takes less activity than normal for your nerves to send a threatening message and cause pain. What I’m trying to do is take away anything that can be seen as threatening to help calm your nervous system down. This will allow you to have more room available for activity before having pain.”

Importance of HEP

Window: Imagine that your pain is like a closed window, and if we can get the window all the way open you won’t have pain. When I work on you and cause a positive change, it opens the window. However, all the hands-on treatment I do creates short-term improvement because your body wants to go back to the guarded position it was in. This means that if you don’t do anything, the window will slowly close until it shuts, and the pain will return in about 2-4 hours. So how do we keep the window open? We use exercises to retrain your nervous system that movement is OK, which helps to reduce the level of threat. If your nervous system does not perceive a threat to the body, the window will remain open. Your nervous system cannot be told that things are fine; it has to be shown. For this reason, the exercises are extremely important for long-term improvement, and it is vital to your recovery that you consistently do your exercises on the days you do not have PT. Each time you come in for treatment, we’ll try to open up the window a bit more, and it is your responsibility to keep it there after you leave. If we can keep the window fully open for about 3-4 days, it tends to stay that way.

Hill: Imagine that you are trying to push a ball up a hill. If you can get the ball to the top, your pain will go away. When I work on you it helps to get the ball rolling. After that, we use specific retraining exercises to keep the ball moving. Doing your home exercise program is how you keep the ball rolling until the next time you come in, at which time I will give you another push to increase the momentum of the ball. If you do not do your exercises at home, the ball will stall, or may even roll back down the hill. It is your responsibility to keep the ball rolling



between visits. It's important to realize that everyone's hill is different. Yours may be taller or shorter than someone else's who appears to have the same problem. Yours may have dips or areas of greater incline, and may have rocks in the way so that we need to change course to get around them, but eventually we can push the ball to the top.

Alignment concerns

"Your alignment doesn't have to be perfect to not have pain. However, while you are having pain, malalignment can be something that increases the threat level that the body is perceiving, so I'm going to work on it to take stress off of your low back (or whatever system hurts). This can help to properly retrain your movement patterns, and show your nervous system that things are ok. Once you're no longer in pain, I'm not too concerned about how your alignment is."

Patient has thought virus from doctor

"Doctors have a difficult job. Since they only have a limited amount of time with their patients, they tend to use terms people are familiar with. Their job is to make sure you're medically stable, and then they send you to the appropriate person to fill in the blanks. Your doctor sent you here because I can do that."

Muscle guarding/inhibition

"When your nervous system perceives a threat around a joint, it will tell all the muscles that cross that joint to get tight so that the joint is protected. A muscle that is guarding like this is not actually working correctly; therefore, motion at this joint can feel weak. Once we get the muscles to stop guarding, you'll feel much stronger."

Set-backs

"You're the owner of a company, and one of your employees makes a huge mistake. You're able to correct the problem, so everything is back to normal now. How long would it take for you to completely trust that employee again? It's the same for your body. Your nervous system needs a little time before it completely trusts this area again, but eventually it will be fine."

Surgery is a controlled traumatic injury

"Your body cannot tell the difference between a surgery that is meant to help you and an injury. All it knows is that something happened that disturbed the tissues, making your brain concerned about this area. When your brain perceives a threat, you experience pain. If we can optimize the mobility and strength of this area, we can reduce the threat, which will reduce the pain."



Other ways to explain pain

Ship: Imagine a ship is sailing on the open sea. The ship is your body, the crew members represent areas of your nervous system in your arms/legs/peripheral trunk, the first mate is your spinal cord, the captain is the cortex (higher levels) of your brain, and the captain's advisors are other areas that influence pain. You have pain when the captain believes the ship is in danger – at which point he or she will decide to change course. When sailing on rough waters, the increased threat puts the crew on high alert (seen as muscle guarding), and they are quicker to relay information to the first mate, who will then relay it to the captain, if he or she believes it is necessary. If they continue to sail on rough waters, the first mate will become quicker to relay information to the captain, and the advisors will be more forceful when helping the captain make decisions intended to protect the ship. Normally, pain will stop once the ship removes itself from harm's way. However, pain will persist if the ship reaches calm waters, but everyone aboard remains on high alert. Physical therapy helps to convince the sailors that the storm is over, allowing them to relax.

Company: Imagine that your body is a company. Different areas of your body are regional managers, your spinal cord is the vice president, the cortex of your brain is the president, and other areas that influence pain are the board of directors. If there is a problem with one regional manager, the vice president will take note of it, and will inform the president. The president will then discuss the problem with the board of directors, and create an action plan to protect the company. This plan can include pain and muscle guarding to help protect the problem area. Pain can continue even after the problem is solved because the president needs to be convinced that the regional manager won't make another mistake. It takes time to rebuild trust, but eventually the company returns to business as usual.



Good things to remember

- Continued pain = continued perceived threat = continued protection (guarding)
- Limbic lobe = self-preservation and emotional regulation center
- “Pain is stressful. Stress is painful.”
- **Gait Theory:** Proprioceptive signals can inhibit action potentials in the spinothalamic tract, leading to reduced threat. Faster signals are considered more important to the cortex.
- **Descending analgesic system:** When we have pain, our nervous systems are able to release opioids that we naturally produce, which are able to reduce the intensity of the threatening signal the brain receives, leading to reduced pain.
- Don’t forget to treat the nerves themselves, and explain to your patient why you’re treating the nerve.
- **Pain threshold:**
 - **Joint dysfunction + muscle tone + weakness (whether true weakness or inhibition) + perception (fear, memory, emotion, rational thinking) + tissue damage/inflammation = threat or no threat**
 - Think of it as the line your brain draws in the sand; if the combination of these inputs crosses that line, your brain will start to care, and it will give you pain to make you change something. Where the brain draws the line depends on the sensitivity of the nervous system: the more sensitive it is, the less the brain will tolerate of these issues.



- Staying in one position for longer than your brain perceives as normal may be seen as threatening and result in pain.
- A combined treatment of manual therapy, specific exercise training, and neuroscience education is superior for reducing pain and disability than any of these components by themselves.
- Stimulation of nociceptors activates the immune response, bringing inflammatory cells to the area.
- Inflammation causes hyperalgesia through release of various chemicals from inflammatory cells.
- Hurt does not equal harm.
- Get to end-range during exercise to have the greatest retraining effect.
- Things don't have to look pretty to work well.
- Highlight what is going well, too, not just what is wrong.
- The art of our profession includes maximizing placebo and minimizing nocebo
- When lacking pain improvement, highlight functional gains to keep people invested in the process and trusting the system.
- Pain education should be early and often.

Good questions to ask

"What do you think is causing your pain?"

"What would you like to get out of physical therapy?"

"How do you think physical therapy works?"

"How long do you think these improvements will last if you do nothing?"

"How do you see yourself without pain?"

*Other "what" and "how" questions – avoid "why" questions