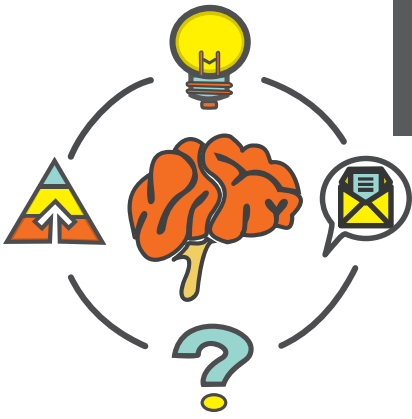


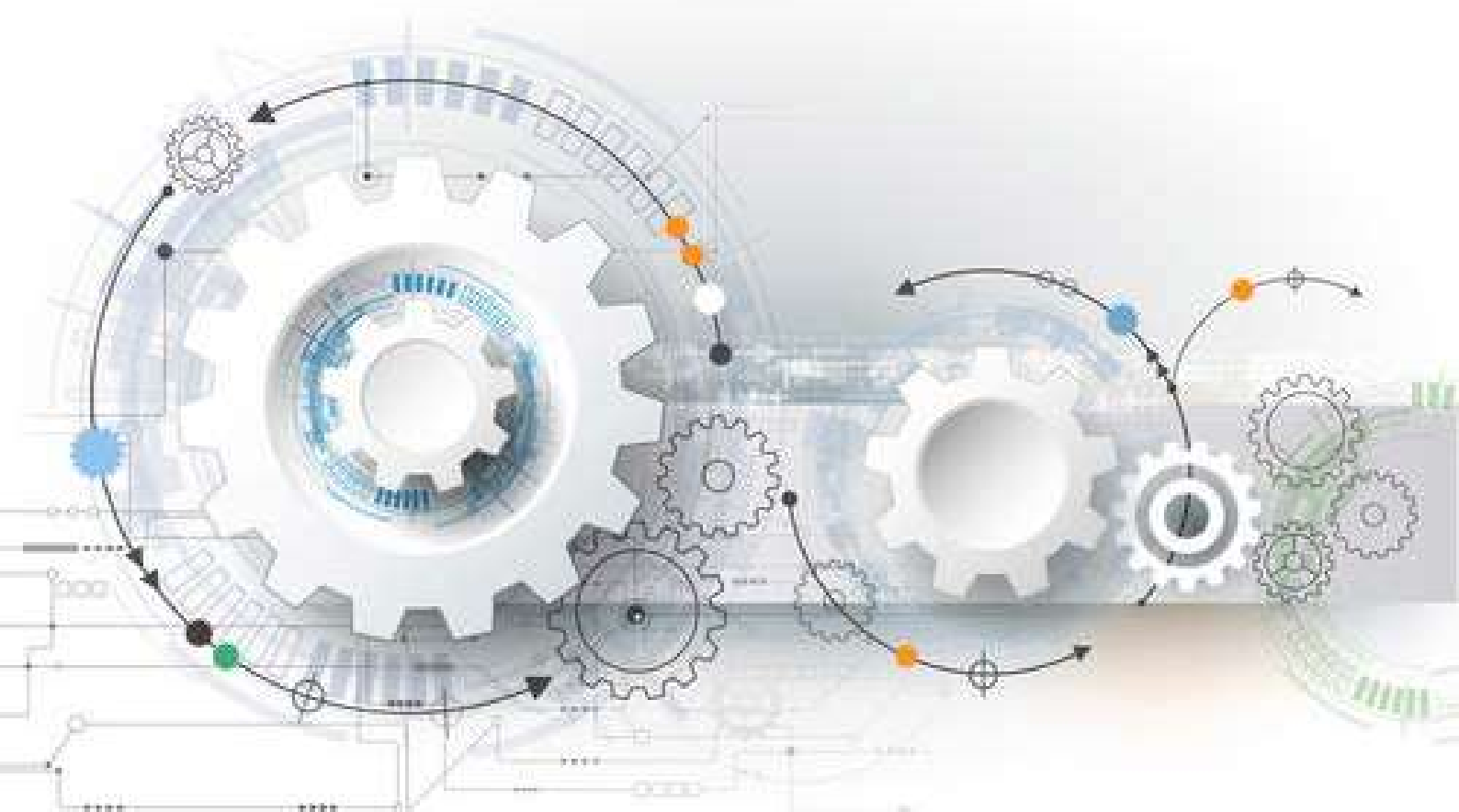
# RECOVERY strategies

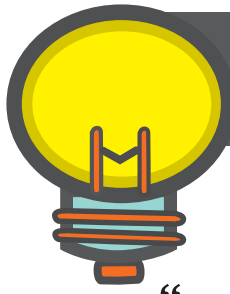
## - Section I: Pain Principles -



### What's Inside?

1. The point of understanding pain
2. Pain defined
3. Pain is an alarm
4. The process of pain
5. Nociception: our surveillance system
6. The spinal cord: our switchboard
7. The brain: the family meeting
8. Pain is meant to motivate an action
9. Learning pain: painful memories form
10. Sensitization: more pain more gain
11. Habituation: turning pain down
12. Cortical Reorganization





## The Point of understanding pain

**“why are you telling me all this stuff?”**



A number of themes will repeat themselves through this book. But one theme that resonates for many is that you can control your pain, manage your own injury and even get out of pain with your own skills and with some guided help from a therapist. Education and knowledge are the first step in problem solving your own pain predicament.

Pain is without a doubt weird. It is never as simple as being some gauge of how damaged your body is. Rather, it is influenced by a number of things in your life...your body being just one of them.

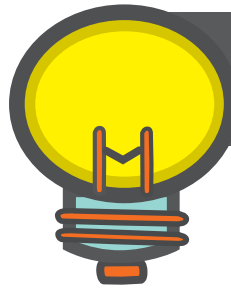
What we've learned through the years is that understanding pain and learning about injuries can help you do the things that help with recovery. Some of those things might be counterintuitive and not make sense unless you fully understand what pain is. For example, many people might think that pain means you need to stop doing everything in your life and if you keep persisting you could harm yourself. There are rare cases where this is true but often rest and avoidance is the opposite of what is needed. When you have pain or injury it might actually be best to get moving again, start exercising or resume your hobbies.

Learning about pain helps change how you think about your problem and can help you start planning out your own personal recovery strategies.

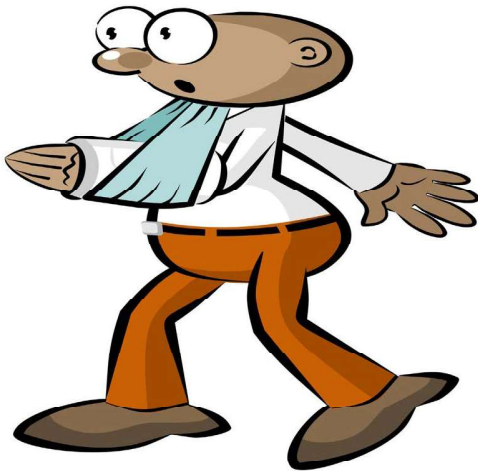
This book (along with many others referenced at the end) teaches you a little bit about pain but ideally it gives you the knowledge to start doing things about your pain.

**“learning about pain can help promote  
healthy behaviours”**





## Pain Defined



“An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”.

What does this mean?

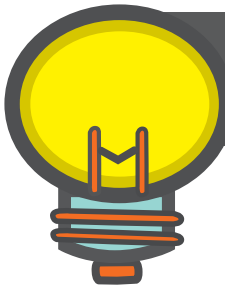
This definition gives us some hope.

The biggest thing you should see is that pain doesn't necessarily mean there is damage. Thus you can have pain with damage, no pain with lots of damage and lots of pain with minimal damage. The definition below is slightly expanded to show that pain is influenced by a lot more than just body tissue. It is affected by and influences other areas of your life. Emotions, sensations, cognitions (beliefs about pain) and social aspects (social withdrawal is common with pain) are involved with persisting pain. **We call this the Bio - Psycho - Social model of pain.** Meaning all areas of your life can influence pain. This is kind of a great thing because it means you have a lot of options to treat your pain. In the recovery strategies of this book you will perform a self-audit to find out what factors might be related to your pain and maybe find some factors that you can change to help with your pain and your recovery.

The Bottom Line: **Pain is not just about Damage**

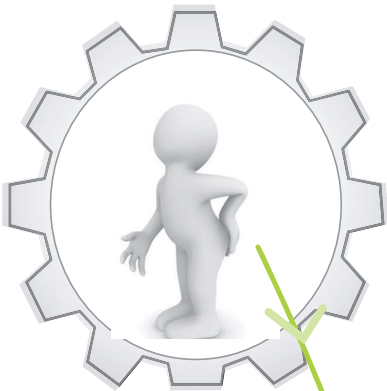
**Pain is a distressing experience associated with actual or perceived tissue damage with sensory, emotional, cognitive and social components**



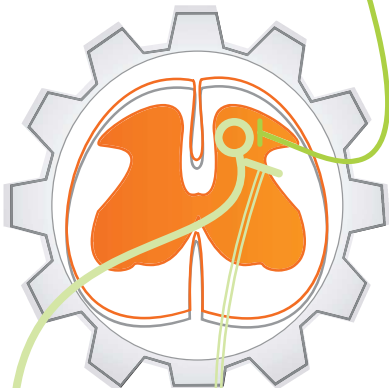


# The process of pain (sometimes)

## Nociception



## Spinal Cord Processing



“how dangerous  
is this really”?

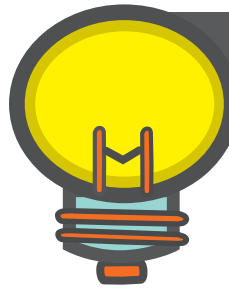
## Pain Emerges



Nociception (unpleasant) stimuli can activate sensors called nociceptors. These sensors send these **potential danger** signals from the body to the spinal cord via nerves. They are signals from nerves in tissues that mean there is the **POTENTIAL** for tissue damage and perhaps you might want to do something about it.

Those nociceptors send that signal to the spinal cord for further processing. You can think of the spinal cord as a switch board operator who can decide to send the signal on up to the brain or can even decide to leave that nociceptive signal at the spinal cord. Meaning the brain doesn't get the message that there is potential danger. Its like the Boss telling her secretary that she doesn't want to be interrupted during a meeting or she kwnows who is calling and knows from past experience that the message is not important so "Please hold all calls". The spinal cord works like this assistant and can work to turn up the signal or turn it down.

Let's say the signal gets sent on up to the brain/boss. Here is where the magic happens. You get to make a subconscious decision of how important that information is. You essentially ask "Is there really a threat here?". If you think there is a threat then pain will likely emerge. **But none of this occurs consciously.** What we've learned is that pain is multidimensional. Meaning a huge number of things go into to making that decision. Nociception is just one part.

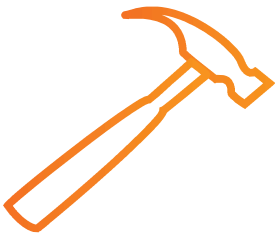


# Nociception

## Our alert surveillance system



We have sensors throughout our body that give us a lot of information. Like most information we get, some of it is useful but we always have to make a decision about what that information means. In our body we have nociceptors. Nociceptors respond to physical, chemical or temperature stressors. And sometimes nociception can lead to pain...which is a good thing. When you sit down your butt nociceptors will yell at your brain sometimes to get you to move. You might move around a little and there will be no more yelling. There wasn't any damage its just that the nociceptors got irritated. If you put your hand near a fire your temperature nociceptors might decide to say something. They will send out a signal and maybe you will move or have some pain. You don't have to have damage here.



**Nociception is a good thing.** But it has to be interpreted. It does not necessarily lead to pain. And like many alarm systems it is better for the nociceptors to be more sensitive than less sensitive. They can send a signal to the brain and you get to make a sub-conscious decision if that nociceptive signal is worth producing pain.



Nociceptors are like the Look-out on a ship. They report when they see something. They don't always care if its a massive ship or some small dingy. The look-out just says that there is a light off in the distance and sends that information on to someone else. Some higher up then makes a decision about what to do. That captain's response will be influenced by where the ship is, what their orders are from the government and what has been happening in the past. **Just like pain!**

## “tissue irritation or nociception is probably unavoidable but it doesn't have to hurt”

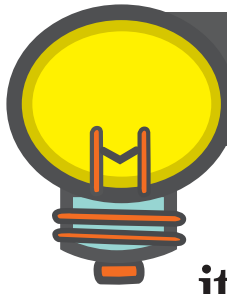
### Changing Nociception?

Nociception can be avoided sometimes although it isn't necessary to avoid it to stay out of pain. You can avoid nociception by avoiding any of the things that trigger nociception (heat, mechanical pressure or chemical inflammation).



Initially, after an injury, it is good thing to rest and not aggravate the injury. This is a case where nociception is important and is probably well related to pain. There is a time and place where we try to avoid nociception and pain. But as pain persists that relationship between nociception and pain becomes less strong. You can start to have more pain with less nociception. Or more pain with the same amount of nociception. You can even have pain with no nociception. What we aim to do is to tolerate that normal nociception rather than thinking we always have to avoid it. But more on that soon.

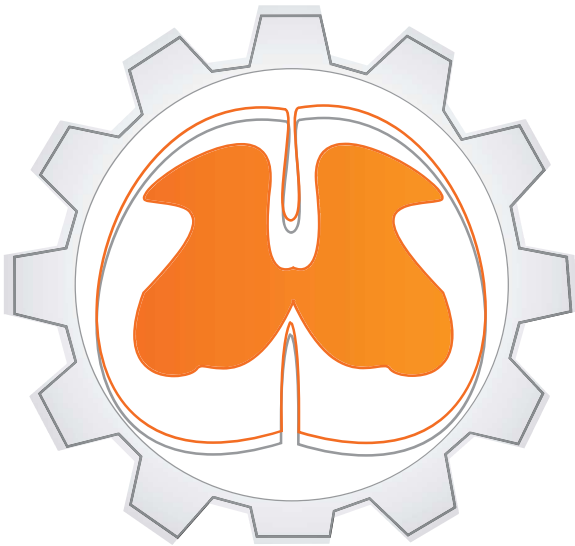




## The Spinal Cord Our switchboard

it can go up or it can go down. you make the call

“I’m a spinal cord”



Nociceptors send their potential warning signals to the spinal cord. At the spinal cord we are able to process this signal. The spinal cord can act like an amplifier where it turns the signal up and then sends it on to the brain or the signal can be turned down and less signal gets sent to the brain.

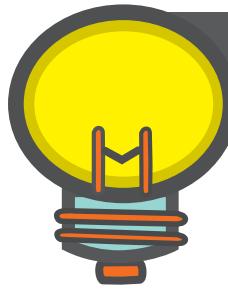
If we stay with the look-out analogy on the ship it is similar to the look-out telling the first mate that there is a light off of the port side. The first mate makes a decision to send this on to the Captain who then might decide to ignore that light or maybe do something to the ship. Sometimes the first mate can make a decision - do I tell the captain about the light or do we just decide to ignore it. This decision will depend on a lot of factors. If the Captain previously told the first mate that there might be some issues with Pirates in the area you bet that the first mate will send that information to the Captain and the Situation Room. If the first mate is nervous, ignored something in the past and got in trouble, that first mate will probably be sending on more information.

Nociception works the same way. Based on descending (instructions from the brain) inhibition (turning down) or facilitation (turning up) from the brain the spinal cord can alter its sensitivity and alter how much signal gets sent up to the brain.

## Processing Nociception - Hold All Calls and Getting Wires Crossed

You can also look at the spinal cord as akin to the switchboard operator or executive assistant. There is some leeway in what calls get sent on through to the boss depending on the instructions from the boss. But, the switchboard operator can make some mistakes. Wires can get crossed. When the boss has decided that all calls are really important the switchboard operator can get a little excited and start confusing calls about nociception with calls that just have to do with something less important. The switchboard operator (the spinal cord) can now confuse signals that normally tell us about things like pressure or touch on a joint with nociception or potential danger. So now, instead of just feeling pressure the spinal cord sends up nociception signals to the brain. This is how we sometimes feel pain when something would normally be felt as just pressure. Not cool but that's how we work. We get better at thinking we need protection and we get better at having pain.





## The Brain The situation room

### “how dangerous is this really”?

The brain ultimately makes a decision about what to do with nociception. But like most decisions it doesn't arrive at this decision based on one factor. This is why pain is so much more than nociception. Nociception is just a potential warning signal. It is the same as the lookout yelling that there is light off the starboard side. The brain is like the Captain of the ship and Captains often have a whole situation room to advise them. The Captain will make a decision about that light based on her past experience, where the ship is, what has happened previously and from insight from other officers. The brain works the same way. Expectations, past experiences, beliefs, attitude and emotions can all influence how much or whether you have pain. This is why for the same information (e.g. same nociception) you can have vastly different pain responses.



The brain doesn't just produce pain just like the Captain won't just sound an alarm. The Captain will do other things as well. There are a bunch of decisions to make and all are meant to help protect. Pain can occur but so can muscle tightness, releasing of different chemicals or a stress reaction. If the brain/captain is concerned with the information from the lookout the captain can ask the lookout to be hypervigilant and tell the spinal cord/first mate to keep sending more information up and order the engine room to increase speed and for Tiller operator to turn the ship. But fortunately, the captain can also suggest that while that information is a little bit important it is not too important. Its not worthy of freaking out and creating a lot of pain. Here the captain can send **descending inhibition of nociception**. Essentially, telling the first mate "don't worry about those lights. We understand what they are and there is no need to protect the ship with any evasive action".

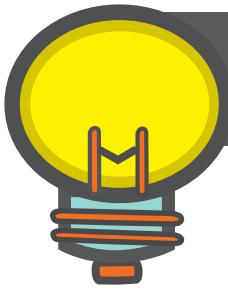
**What can happen with persistent pain is that the Captain and the whole crew stays on high alert.**

They might have passed through the Pirate infested waters where caution and vigilance (and pain) were necessary but now there are no more Pirates. But, we still have the fear of Pirates so the ship stays on alert. Its sensitive and pain is created to keep protecting the ship even though that protection is no longer needed or can be detrimental.

### The perceived need for Protection (“Danger in Me”)

In the great self help book "The Protectometer" David Butler and Lorimer Moseley refer to things called DIMs and SIMs. A DIM means "Danger in Me" and a SIM means "Safety in Me". If you feel that something in your life is a DIM and these DIMs out weigh your SIMs then you are likely to have pain. The idea is that anything in your life that contributes to you feeling like you need protection (e.g. the DIMs) will contribute to you having pain. Performing a self audit of the things that contribute to your sensitivity (your DIMs) can be important part of recovery. See Section IV: Recovery Strategies for more on that.





## Pain is meant to Motivate an action

**The point of pain is to get you to do something.** Ideally, to protect yourself. Pain is an alarm and alarms are designed to create action.

Pain is the same thing.

With many acute injuries the pain alarm is great and helpful. It stops you from walking on a broken leg. But the problem with many alarms is that they keep going off long after they are useful.

The long term pain alarm is not a very good alarm. Meaning it is disconnected from the initial problem. Alarms don't tell us how much smoke there is nor do they tell us if there is even a fire. A smoke alarm can even go off when there is no smoke. Our pain alarm can work the same way. The fire can have been put out but the alarm is still going off.

And when we have pain for a long time we can even increase the sensitivity of the alarm.

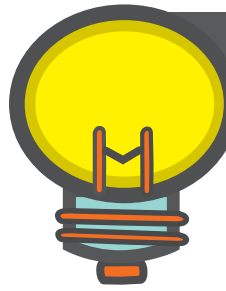


### Things to consider:

1. What does an alarm tell us?
2. Does the strength of an alarm tell you how much damage there is?
3. Do alarms often go off without there being damage or fire or even a problem?
4. Can alarm that keeps going off end up being a problem in and of itself?
5. Can you change the sensitivity of an alarm?
6. If you understand why an alarm is going off can you sometimes choose to put less value on it and do other things?







## Learning pain painful habits and memories

# “just like a habit pain can become triggered”

**Pain is multidimensional** and as it persists it becomes much more about other triggers of sensitivity than about damage or nociception from the tissue.

When pain persists it is almost as if we get “better” at producing pain. We can become more sensitive and activities, movements or environments that we could previously tolerate are now triggers for pain. This is not an unusual thing and we see this in many areas of our lives:

*Have you ever experienced a smell that suddenly triggered a memory or an emotion?*

*Have you walked into a location that you haven't been in a long time and you suddenly remember an event long forgotten.*

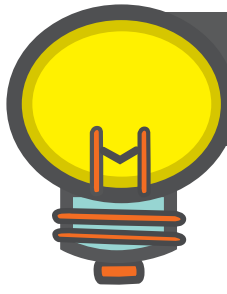
*Do you remember when smoking was outlawed in bars and restaurants? Owners were worried about drink sales because smoking was “coupled” with drinking. They facilitated each other.*

**Humans are creatures of habit and pain can work in a similar way.**

**It is like we “learn” to be better at pain.** Learning and memories work by “linking” them with other things. You know how you can remember the lyrics to a song by singing it with the melody. Well, those lyrics got linked with the melody and it is easier to remember. Same with pain.

**The implications for you are to create new memories and associations.** Meaning if you have associated movement with pain, or fear and worry with a movement or doing certain activities with pain then we want to do something about that association. A large part of treatment is to start exposing yourself to the things that are slightly painful, perhaps you do those things slightly differently and slowly you can habituate and perhaps form new and more positive associations with those movements or activities. Section IV will help you find those contributors and get you started on forming new and pain-free habits.





## Sensitization

More gain, more pain

“one plus one can equal four”?

A young dad comes home from a very stressful day of work. Deadlines were missed, the boss was angry, the dad has been sleeping poorly and has been a little rundown and sick. At home were his two lovely daughters, aged 9, 6 and 3. Like all kids they might fight and tease each other. Today was no different. The oldest took the youngest's doll and threatened to cut her hair off. That's when Dad stepped in and boy did he step in. "Go to your room!!!" boomed the young Dad. Scaring the oldest with his fierce and unexpected temper because Dad normally doesn't yell. But he yelled today as his anger and frustration boiled over with this little situation. Does Dad usually "freak out" when his kids misbehave like this? No, not normally. Do they often misbehave like this? Always!

Here we have a normal situation but with a massive reaction to it. We have the same "input" but a very different "output" because of a number of different factors.

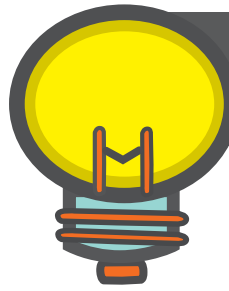
Persisting pain can be very similar. We can get better at pain over time. This is called long term potentiation or Sensitization. This sensitization can occur centrally (meaning in the brain and the spinal cord) or it can occur peripherally (meaning the nociceptors get more sensitive and fire more easily).

In a centrally sensitized state a normal input (a little bit of nociception from the body) leads to larger magnification of that nociception as that nociception gets processed through the nervous system. Just like with the Dad, we have a small normal input leading to a larger output.

This sensitization is both influenced by continuous tissue irritation (nociception) and by other factors in our life like stress, sleep, catastrophizing, fear or anxiety. More on finding those in Section IV.

People with sensitization will often have pain that moves around, spreads to other areas of the body, can be sensitive to light or foods and can feel pain where instead they should just feel pressure/touch. They also tend to flare up more readily. Some people with mild and intermittent pain will feel better with very aggressive exercise or foam rolling. This is because those activities activate a process that modulates nociception and creates endogenous analgesia (pain relief). Those with central sensitization have a much smaller or no positive response to these approaches and can even flare up with more pain. They lose the ability to modulate the irritation. Exercise is still important but we just have to do it differently. We don't do as much in one setting, we slowly progress the intensity and we accept that some flare-ups and discomfort will occur.





## Habituation Turning pain down

“one plus one can equal 1.5”

### The opposite of sensitization is habituation.

One of the amazing things about people is how we can tolerate and adapt. Habituation means that the same input over time leads to a smaller output.

We can see this very well when you get into a Hot Tub or a hot shower. Initially, it feels incredibly hot and almost unbearable. But over time we adapt and habituate and no longer feel that it is too hot. In fact, you might end up turning up the heat. This is habituation.

In terms of pain the same thing happens. We've discussed nociception being these irritation/danger receptors in the body. You can actually turn down your response to that nociception. When you see someone doing karate and kicking a hard object over and over they will report that they have no pain. What is interesting is that they still have nociception. Those danger/irritation signals are still being sent but we process and modulate them and no longer have pain. This is Habituation.

Habituation and tolerance is one of the Key Messages and Recovery Strategies of this book. It means that we can start doing the things that are important. Even doing some things that hurt a little bit. Because pain does not always mean damage. And doing meaningful activities, building a tolerance to those activities can lead to habituation and less pain.

You might still have those danger signals from your tissues but over time you slowly change your response to those signals. You might still have some pain but over time the meaning of that pain and how that pain affects you can change as well. **You can still live well with some pain.**

