

Section 1

The Purpose of Pain

KEY MESSAGES:

- Pain is one of the protective mechanisms of your body.
- The pain alarm system is complex, adaptable and always changing.
- Typically, the system responds when there is damage to the body and when something potentially dangerous is happening to the body.
- The pain alarm system does not work very much like simple alarm systems.



Figure 1.1: Paper cut
Pain is not simple. How can a little paper cut hurt so much? It's not just because your fingers are really sensitive.

How would you answer the question:

“Why do you experience pain?”

It seems really obvious.

“Pain tells you when you are injured!”

“Pain warns you when there is something wrong or something damaging happening in your body!”

It may seem surprising, but these statements do not completely describe why we feel pain. For example, you might remember a time in your life when the pain you were feeling didn't match the severity of your injury. Sometimes big injuries don't hurt much at all, and sometimes little injuries can hurt a lot. Think of a paper cut.

Science tells us that why and how people experience pain is much more complex than we expect. It also tells us that pain is more complex than we have been taught. On the other hand, science tells us that understanding pain and what it's really about will help you in your recovery.

Your body has many ways to protect you. Sneezing, muscle spasms and reflexes are all protective actions of your body. Pain protects you too. Pain is a protective mechanism.

We all have a pain alarm system. It is an extremely complex alarm, so before we discuss how it works, let's consider a simple alarm system. Most of us have seen a motion detector, which people use to help keep their house safe at night or when they are away. These detectors are made up of a sensor that detects movement, wires that send an electrical message to a light switch and a light bulb. In your body there are sensors that detect the things from which you need to be protected. There are nerves that send electrical messages from your sensors and instead of the messages going to a light bulb, you have a brain.

In the 1600's, scientists thought there was a pain centre in the brain in which a type of bell would ring when the pain nerves were tugged by something that was damaging your body. As you might guess, modern science has disproved this belief. However, even until the early 1900's the belief

that a pain centre existed in your brain was common. Even today, people have the idea that there is a damage meter in the brain. This would make some sense, but it is not true. Modern science tells us that your brain can do so much more than ring a bell or turn on a light.

One of the jobs of the brain is to analyze information coming in. When danger signals get to the brain, it needs to decide what is going on and how to protect you. It's a little like having a computer attached to your motion detector; your brain can tell the difference between leaves blowing by, you walking out to your car, your neighbours walking up to your house, or armed bandits. If a home motion detector could do that, you could sell it for a lot of money. Not only would it be able to decide whether the light needed to be turned on, it could also decide if the light was the most appropriate response. Maybe you



Figure 1.2: What happens when we twist our ankle?
Pain is one of your body's protective responses. Your body has the ability to choose any way it can to protect you.

need the SWAT team to run out (for the burglar) or the front door to lock and the lights to switch off (for the unwanted neighbours) instead of a light turning on! This sort of decision making is what the brain does for you.

What is great is that your brain, unlike the simple motion detector, has many options for how to respond. When the brain decides that there is danger, it can protect you in many ways.

If there is something dangerous happening to your body, what does your brain do to protect you? If you answered “PAIN” you are correct. Pain would help protect you. Pain usually makes you stop what you are doing, move away from the danger and sometimes even go lie down. All these responses would protect you from a lot of dangerous things. How about muscle tension? If your muscles spasm or stay tight, that would stop you from moving too. Or maybe your nervous system might make your muscles weak. Have you ever banged your knee really hard? Not only does it hurt, but your leg muscles also feel weak. If the muscles are too weak for you to walk, that protects your knee too.

There are other protective systems in your body that work in similar ways. Think about what happens when you eat or drink something dangerous. When your body decides

it is dangerous, your protective system responds and you start to feel sick, stop eating or drinking and probably lie down. If your system decides this is really dangerous, your systems will create a bigger response (vomiting) to protect you. Pain responses are similar to this in many ways.

Imagine a time in your life when you twisted your ankle or had your thumb or finger pulled back too far. You may have felt pain. Why? Your pain alarm system was trying to protect you. Either it was warning you that if you kept moving you would cause damage, or trying to get you to stop using that part of your body so that it would have a chance to heal.

What if that same ankle was twisted many times? Your pain alarm system is so smart, it might start to protect you. For example, it might make you tense up as soon as you got near rough ground. On the other hand, if you decided that spraining your ankle wasn't a big problem, your system might start to protect you less. In other words, you might have less and less pain the more times you sprain your ankle.

If you are getting the idea that your pain alarm system is nowhere near as simple as a motion detector, you are right. Now you have an idea of what it is not. In the next sections you will learn more about how it actually works.

Summary

The purpose of pain, just like muscle spasms, sneezing or vomiting, is to protect you. The pain alarm system – unlike most alarm systems we imagine – is able to adapt and learn. It is a complex and sophisticated system that responds when your brain decides something is really dangerous and that you need to respond.