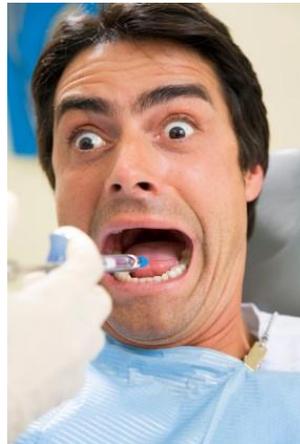


Pain: It's NOT In Your Head

For many a particular activity and pain go hand in hand. Like a trip to the dentist always brings about those feelings of anxiety and fear associated with the impending intervention. And whilst you are just booked in for a routine appointment you still have the same level of apprehension as the last time you saw the dentist when he pulled several teeth out. Why do these feelings return even though you know that it's just a routine check-up?



Whilst there is plentiful research into pain and our perceptions of pain, the factors that influence and how it presents, I still feel we know only a small amount of information regarding pain science. Even within the medical domain, a domain we see and treat pain daily, I feel we often neglect most aspects of pain science during both assessment and rehabilitation strategies. In doing so we are missing the boat and as result our intended interventions prove suboptimal and this could account for why many people develop chronic pain and live their lives with pain and discomfort. First up, it's important to get to grasp with what pain is.....

What is Pain?

If you looked at the dictionary definition of pain it reads like this.....

“physical suffering or distress, as due to injury or illness” or

“a distressing sensation in a particular part of the body” or

“ a mental or emotional suffering or torment.”

Labelling pain is difficult. How you or me might rate the same pain would most probably differ. In the world of medicine, we often use pain scales to allow those we work with in pain to score their current symptoms. Whilst these might be useful to help clinicians provide a baseline and gauge patient progression through treatment and rehabilitation interventions trying to classify pain is a minefield. Pain isn't something that is easily labelled. Pain is exclusively subjective and as previously stated will differ widely from patient to patient. Therefore, trying to pigeon hole someone symptoms to a scale is very difficult.



Pain is an experience and pain is a perception. This experience might be the result of actual tissue injury (e.g. result of inflammatory process which excites pain receptors) or could be the perception of potential symptoms (e.g. fear of potential injury/pain). Going back to the dentist example, this could explain why some of us fear certain experiences. Regardless of the impending intervention a trip for the dentist for some will always be an unpleasant experience as they perceive potential harm. But why?

Past Experiences and Perception

Central to perceived pain in both the present and future relates back to our past experiences.

This provides an explanation as to why certain experiences continue to be unpleasant, like that trip to the dentist.

In a study by a group German researchers (1) they found how preconceived notions of pain specifically affected a patient's experience of pain. They found that past experiences with needle pricks, combined with information received before having an injection, greatly influenced each individual's pain experience.

In the experiment, participants watched various video clips whilst receiving painful or painless electrical stimuli to their hand. The video clips included shots of a needle pricking a hand, a Q-tip touching a hand, and a hand standing alone. The screen showing these clips was placed above the participants own hand; therefore, giving the participants the experience that the video image was their own hand.



During the experiment the participant's felt varying degrees of pain. This isn't surprising given we perceive and rate pain individually. What was interesting however that was the clips showing needles pricking the hand, elicited pain levels far more intense and unpleasant than the Q-tip touching the hand and the hand standing alone. These individuals are relating

back to previous experiences. The brain will remember the last time the body received a needle prick and the associated negative thoughts and emotions that accompanied it.

The increased pain scores observed in the study also matched to increases in autonomic nervous system activity. Those perceiving more pain (those exposed to the needle images) showed increased pupil dilation responses, indicating heightened nervous system activity, the body's fight or flight response.

The study also found that the participant's expectations affected each participant's pain response. Before the experiment started, the participants were told that either the needles or the Q-tips were more related to painful electrical stimulation than non-painful electric stimulation. As a result, the images shown to participant's that highlighted pain (i.e. images related to needles), proved to produce higher levels of self-reported pain than clips less associated with pain. This proves that the participant's expectations or perception of a particular painful experience directly influences the intensity of the pain participants felt during the trial.

So it would seem clear that past experiences influence perception which plays an important role in pain provocation.

So What Is Causing Pain?

Basic pain science tells us that pain is the brain's way of telling us something is wrong. Pain can be the direct outcome of tissue damage, if you cut your finger, it hurts. However, pain is not always a good indicator of tissue damage. Pain can be the result of the brain telling us we are under threat when the brain perceives possible tissue damage. The brain may perceive a threat even when there is none. In the same way it may ignore a threat even when the threat is very real. Think of the stories you may have heard about an injured soldier in battle, who is able to keep fighting despite catastrophic injuries and at that time felt no pain. Or the sport star that discovers he has broken his ankle long after the game has finished, having played the majority of the game with this injury. In both these situations, there is clearly tissue damage, but how the brain perceives, or doesn't perceive pain results in no pain being felt at that particular time point.



Past pain experiences, anxiety and emotion, which may run independently from the diagnosis, will all influence our perception of pain. There is no straightforward relationship between tissue damage and pain. Therefore, trying to classify pain and trying to control pain given the complexities of its origin (tissue damage and/or perception) is very difficult.

Does the brain get it wrong? I believe it doesn't. But is in fact doing something very clever, using all the information it receives to make a decision on how to protect (pain) or not protect (no pain) the system at that particular time point. In the case of the soldier above the brain is able to override pain coming from his catastrophic injuries to allow him to continue to fight, as it might be a matter of life or death.

Chronic Pain Patterns

Those individuals that have persistent or chronic pain are inevitably going to have altered pain control mechanisms via both the central and peripheral nervous systems. With chronic pain the nervous system becomes increasingly sensitised. This means the relationship between pain and actual tissue injury becomes weaker and also less predictable. It could be said for these individual's pain is not actually a symptom of another disorder; pain is the disorder. This definitely doesn't mean that the pain isn't real. We need to remember that all pain is created by the brain. Pain equally is not weakness leaving the body as many lead us to believe. Pain production is part of the body's highly complex protective mechanism. The body craves homeostasis. The brain uses every piece of information at its disposal to keep us functioning as close to neutral as possible. Pain is a way of telling us something is wrong, but pain messages can be dampened depending upon the needs of the body at that particular time point.

The brain and pain science is a highly complex relationship still in its infancy. The more knowledge we attain about this relationship the more we will be able to learn about pain provocation and pain management. Until then we need to make efforts to acknowledge pain, both actual tissue damage and perceptions of actual or potential tissue damage. Failure to do so will likely make our interventions less effective and for many lead to the continued presence of daily pain and increased apprehension of certain future activities.

Pain is just an output the brain. This doesn't mean that it originates in the brain. Past experiences and our individual perceptions of pain contribute to what we feel.

So just remember, pain is NOT in your head.

Thanks for reading

Andy Barker

1 Pain study: Viewing a needle pricking a hand that you perceive as yours enhances unpleasantness of pain," by M. Höfle, M. Hauck, A.K. Engel, and D. Senkowski in PAIN, Volume 153, Issue 5 (May 2012).

Dentist image by hubpages (online); Needle image by doctorshangout (online); Pain image by Steven Depolo (online); Soldier image by Pinterest (online)