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Is pain all in the mind?

New research shows why some people are better at coping with pain than others



Vivienne Parry

Pain is a simple enough concept to grasp. You stub your toe, shout, perhaps utter a few expletives, rub it better and it eventually fades. But neuroscientists are realising that pain is much more complex than anyone thought possible, comprising not just physical sensations, but emotional ones too. Pioneering studies are providing insights into why some people experience debilitating chronic pain long after an injury has healed, as well as why some are more prone to pain than others, and why certain people never recover from bereavement.

"Pain is much more than mere sensation. The psychological component is at least as important as the physiological processes giving rise to it," says Dr Jonathan Brooks, a scientist at the Centre for Functional Magnetic Resonance Imaging of the Brain, at Oxford University. His research centre scans the brains of people with chronic pain and compares them with those of healthy people.

While most pain goes away as an injury gets better, sometimes it remains for months or even years, long outlasting its original purpose. Chronic physical pain is debilitating and can cause disability, depression and post-traumatic stress disorder. It is also very common. A group from the University of Washington reported in the journal *Archives of Surgery* earlier this year that 63 per cent of patients who had sustained serious trauma still had injury-related pain a year later. It was most common in the 35-44 age group and in women, and least common in those with a college education.

Other chronic pain conditions include arthritis and lower back pain. In the latter, a physical source can be identified in only about 10 per cent of cases. No one really knows why some people experience chronic pain and others do not, but recent imaging studies at Northwestern University, Chicago, have found a series of abnormalities in the brains of chronic pain sufferers in which the part linked to decision-making (the prefrontal cortex) is reduced, while an area of the prefrontal cortex linked to emotion is hyperactive. What is known for certain is that the brain changes in those with chronic pain so that they experience pain differently from the way they did before.

We all have a system for suppressing pain when necessary so that we can flee attackers even when injured. Those who suffer from chronic pain appear unable to access this and cannot use distraction as a means of suppressing pain; their brains seem to amplify pain signals rather than inhibit them.

Treatment for the condition comprises both physical and psychological interventions, says Dr Michael Platt, the lead clinician for pain services at St Mary's Hospital, London, part of Imperial College Healthcare NHS Trust, where he holds weekly pain clinics. "Most physicians realise that you have to heal the mind as much as the body. For example, if you have pain, then depression is worse, and if you have depression, then pain is worse." He adds that gaining a better indication of which parts of the brain are involved in pain sensations may lead to better treatments for patients.

We all respond to pain differently

Scientists are increasingly realising that everyone responds to pain differently. "There are many physiological and psychological factors that determine how much pain you feel," says Dr Brooks. "Personality, how worried a person is, and, in the case of women, the time in the menstrual cycle, can all have an effect."

He adds that our genes can also influence our sensitivity to pain. This was first brought to the attention of scientists by the "ginger-whinger" syndrome. Anaesthetists reported that redheaded women complain of pain more than other patients, and consequently need more pain relief. Why? Not because redheads are wimps; it was later discovered that their genetic make-up makes them less sensitive to certain types of pain medication.

Neuroscience is also revealing a host of similarities between emotional and physical pain. In the same way that in some people injury can cause long-lasting chronic pain, science reveals why some will never get over heartbreak.

Professor David Alexander, the director of the Aberdeen Centre for Trauma Research, has been involved in many disasters: the 2004 tsunami; Iraq; and the recent earthquake in Pakistan. He is not surprised about the link between physical and emotional pain. "If you listen to people who are damaged emotionally, they will often translate their pain into physical similes: 'my head is bursting, my guts are aching', and so on. The parallel is very strong."

It is only in the past few years, however, that scientists have begun to investigate what is going on in the brain during an episode of emotional pain. The neuroscientist Mary Frances O'Connor, of the University of California, Los Angeles (UCLA), is one of the scientists who has propelled emotional pain up the research agenda. "We're at a very new time when we can use technologies to look at the brain and the heart." Naomi Eisenberger, one of her colleagues at UCLA, has shown which parts of the brain are active when we feel emotional pain. She devised a computer game in which participants were made to feel left out. Simultaneous brain scanning revealed that the pain of being socially rejected was processed in much the same way in the brain as physical pain, and in the same area, the anterior cingulate cortex, which is located towards the front of the brain, roughly at the height of the temples.

Eisenberger theorises as to why this should be so. Pain is often interpreted as a warning, so that you take your hand away from a hot surface. Social relationships are crucial to our survival as a species. In dangerous situations, a lone human being is in peril, whereas a group may survive. "The social attachment system piggybacked on to the physical pain system to make sure that we stay connected to close others," Eisenberger says. Being wrenched from another or rejected by a group is painful, so we learn to avoid it.

A related issue is "complicated grief", which O'Connor estimates occurs in about 10 per cent of people, who fail to adapt to bereavement over time. Her imaging work shows that this sort of grief activates neurons in the reward centre of the brain, giving addictive-like properties to memories of the lost one. There is a strong suspicion, as yet unproven, that sufferers might also be among those who experience the greatest levels of chronic physical pain. This is an area that deserves urgent research because of its terrible emotional and physical toll.

How to deal with pain

Exercise

Prolonged exercise lifts the spirits and reduces pain, as evidenced by the “runners' high”, which is driven by the naturally produced painkillers, endorphins.

Don't bottle it up

Talking about your emotions helps - one reason why women are less at risk from illness after a bereavement.

Don't self-medicate

Dulling pain with alcohol, recreational drugs or too many prescription painkillers can turn recoverable trauma into lifelong dependency or addiction.

Don't get overtired

Tiredness exacerbates pain, especially in women. Fatigue is often reported with chronic pain, though less so in men, whose higher testosterone levels make their muscles more resistant to fatigue.

Try mindfulness meditation

By concentrating on your moment-to-moment experience, you can - through repeated practice - achieve a greater sense of control and enhanced emotional wellbeing.

Case study

For the chronic pain patients who arrive at the pain management centre at St Mary's Hospital, in Paddington, West London, this clinic is their last resort.

One such patient is Ursula Madden, who lives in London with her 12-year-old son. Madden works as a radiographer at St Mary's, but her chronic pain turned her from employee to patient. She initially dismissed her painful feet as a side-effect of her busy job. But when she to lie down every night after work because of an unbearable burning sensation across the tops of her feet, she decided it was time to see her doctor.

Getting a diagnosis was not easy. It took two years, with long spells off work because she couldn't walk, and Madden became very depressed.

“None of the doctors was accepting the fact that I was in agony,” she says. Madden was eventually referred to the pain clinic where it was discovered that the pain in her feet was caused by a combination of arthritis and faulty nerves sending pain signals to the brain. The diagnosis made a big impact. “When you have something that people can't see, unlike, say, a broken arm, recognition is a very big part of it.”

The doctors at the clinic use a variety of approaches, from psychological intervention such as counselling and life coaching, to more physical treatments, such as pain killers, acupuncture and super-hot chilli pepper cream. The latter works to desensitise the nerves.

“The first time I used the cream I was jumping around with pain, but it worked brilliantly,” says Madden, who believes that attending the clinic has helped her enormously, both physically and psychologically.

While visiting her sister in Ireland recently she managed to go on a four-mile walk along the coast that she wouldn't have been able to do two years ago. “I was thinking, 'Sod the pain; I'm going to put on my boots and do it'. Yes, it was painful. But I still really enjoyed it; it was wonderful.”

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