



CHRONIC PAIN AND THE BRAIN

Pain and the brain are inexorably linked. Our brain is the hub of our nervous system, made up of 100 billion nerve cells. We count on it to process what we're experiencing and help us react. For example, touching something hot activates an immediate withdrawal reflex, thanks to the brain. However, when acute pain shifts to chronic pain, it can cause marked changes in brain activity and the way the brain works. This means that untreated or under treated pain exposes chronic pain sufferers to a lot more than just escalating levels of discomfort—it can cause damage to the brain and a person's mental abilities.

The incredible shrinking brain

Recent studies have found that the areas of the brain involved with processing acute pain are different from those that process chronic pain. In fact, multiple research studies have proven that chronic pain does not affect a singular region of the brain—it results in changes to many regions involved in critical functions and processes. For example:

- **Chronic pain shrinks the gray matter of the brain—responsible for memory and information processing—by as much as 11% a year.**

In contrast, the normal aging of the brain results in 0.5% loss of gray matter per year. It's believed that chronic pain sufferers experience this shrinkage because the nerves involved in communication are continually firing—and this constant nerve activity causes the brain to rewire itself as a form of protection.

- **People with chronic pain experience a reduction in the volume of their prefrontal cortex.**

The prefrontal cortex of the brain regulates emotions, personality expression and social behavior. Research shows that people with chronic pain have constant and excessive activity in the brain nerves, or neurons, in this area—and this causes the neurons to die prematurely. Fear, worry and anxiety tend to become more pronounced in people with chronic pain because with the loss of prefrontal cortex comes the inability to control those feelings.

- **For chronic pain sufferers, the thalamus remains open.**

The thalamus, often described as “the border of the brain,” acts as a gateway between the spinal cord and higher brain centers. When you sustain an acute injury, the thalamus opens to pass information from the

affected parts of the body to the brain. When the injury is healed, this border closes once again. However, in people with chronic pain, the thalamus remains open and every nerve signal that crosses it gets amplified, resulting in amplified pain.

- **People with chronic pain have a decrease in the volume of the hippocampus**

The hippocampus is a part of the brain that helps regulate emotional responses and is associated with spatial processing and the formation of new memories relating to facts and events. People with chronic pain show a decreased volume in this part of the brain, which can lead to increased anxiety as well as learning and memory problems.

Brain changes are reversible

While the effect of chronic pain on the brain may seem overwhelming, research suggests that the changes don't have to be permanent—they can be reversed when patients receive proper treatment. Studies show that chronic pain patients who were treated for their pain experienced an increase in brain mass to “normal” levels, an increase in their number of gray matter cells and a thalamus that repaired itself and began to operate normally. The key is to receive effective treatment for chronic pain—and to receive that treatment as early as possible to avoid brain changes in the first place.

Here at Integrative Bodywork, Jim Fazio looks at the ideology (cause) of conditions including the biopsychosocial component to chronic pain. For more information on how he can help you, he can be reached at 321-432-0775.

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