



## **CORRELATIONS BETWEEN CHRONIC PAIN AND BRAIN STRUCTURE**

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Chronic pain is a major health crisis and is considered the second major cause of disability in the world. People with chronic pain that lasts 6 months or longer usually experience other symptoms as well, including depression. While the causes of chronic pain are often unknown, it has been shown that people who have chronic pain exhibit brain structure differences compared to those who do not. While chronic pain can have a significant effect on brain structure, it is unknown whether different dimensions of pain affect different areas of the brain. The effects of chronic pain on the brain have not yet been quantified for separate dimensions. Our aim was to determine how different dimensions of chronic pain affect the brain individually and evaluate possible overlap.

The dimensions we tested were sensory pain, affective pain, and depression. We used MRI scans from participants experiencing chronic lower back pain. The relative levels of each pain dimension that the participants were experiencing were determined via the McGill Pain Questionnaire and the Center for Epidemiologic Studies Depression Scale. The FreeSurfer based program qdec was used to find areas of the brain where the cortical thickness was affected by each dimension. There were many statistically significant clusters found for each dimension ( $p < 0.005$ ). Some of the clusters showed up in the same area for multiple dimensions of chronic pain, but some were unique to one dimension. This shows that sensory pain, affective pain and depression all affect the brain differently. This is an important finding, because having a better understanding of how different dimensions of chronic pain affect the brain can aid in finding more personalized treatment for those experiencing it.