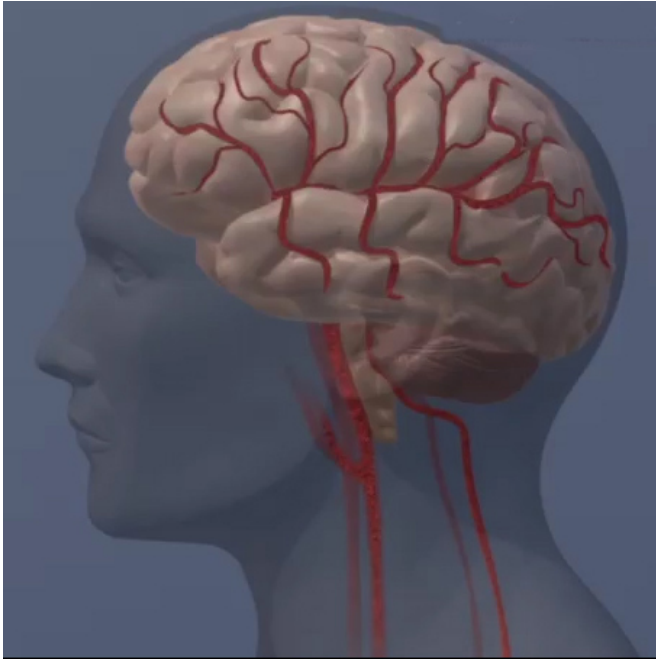


# Brain changes linked to physical, mental health in functional neurological disorder

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An imaging study by Massachusetts General Hospital (MGH) investigators has identified differences in key brain structures of individuals whose physical or mental health has been most seriously impaired by a common but poorly understood condition called functional neurological disorder (FND). In their report published online in the *Journal of Neurology, Neurosurgery and Psychiatry*, the research team describes reductions in the size of a portion of the insula in FND patients with the most severe physical symptoms and relative volume increases in the amygdala among those most affected by mental health symptoms.

"The brain regions implicated in this structural neuroimaging study are areas involved in the integration of emotion processing, sensory-motor and cognitive functions, which may help us understand why patients with functional

neurological disorder exhibit such a mix of symptoms," says David Perez, MD, MMSc, of the MGH Departments of Neurology and Psychiatry, lead and corresponding author of the report. "While this is a treatable condition, many patients remain symptomatic for years, and the prognosis varies from patient to patient. Advancing our understanding the pathophysiology of FND is the first step in beginning to develop better treatments."

One of the most common conditions bringing patients to neurologists, FND involves a constellation of neurologic symptoms - including weakness, tremors, walking difficulties, convulsions, pain and fatigue - not explained by traditional neurologic diagnoses. This condition has also been called conversion disorder, reflecting one theory that patients were converting emotional distress into physical symptoms, but Perez notes that this now appears to be an oversimplified view of a complex neuropsychiatric condition. The research team hopes that advancing the neurobiological understanding of FND will increase awareness and decrease the stigma - including skepticism about the reality of patients' symptoms - often associated with this condition.

Previous functional MRI studies have suggested that a group of brain structures forming part of what is called the salience network - which are involved in detecting important bodily and environmental stimuli, as well as integrating emotional, cognitive and sensory-motor experiences - showed increased activity in FND patients during a variety of behavioral and emotion-processing tasks. The current study is one of the first to examine structural relationships between components of the salience network and the physical and mental [health](#) of patients with FND.

The researchers compared whole-brain structural MRI scans of 26 FND patients with those of 27 healthy control participants, looking for associations between the size of salience-network structures

and participants' reports of their physical health, mental health and symptoms of anxiety and depression. While there were no whole-brain structural differences between FND patients and healthy controls, patients reporting the greatest levels of physical impairment were found to have decreased volume in the left anterior insula, while those reporting the greatest [mental health](#) impairments and highest anxiety levels had increased volume within the amygdala.

"The association among FND patients between the severity of impairments in physical functioning and reduced left anterior insular volume is intriguing, given that the anterior insula has been implicated in self- and emotional awareness," says Perez, who is a dual trained neurologist-psychiatrist and an assistant professor of Neurology at Harvard Medical School.

He adds, "Little attention has been given to FND to date, which is striking given its prevalence and the health care expenses driven by patients suffering with FND. I hope that advancing the neurobiological understanding of FND will help decrease the stigma often associated with this condition and increase public awareness of the unmet needs of this patient population."

**More information:** David L Perez et al, Corticolimbic structural alterations linked to health status and trait anxiety in functional neurological disorder, *Journal of Neurology, Neurosurgery & Psychiatry* (2017). [DOI: 10.1136/jnnp-2017-316359](https://doi.org/10.1136/jnnp-2017-316359)

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