

Frontal lobe syndrome

Frontal lobe syndrome, in general, refers to a clinical syndrome resulting from damage, and impaired function of the **prefrontal cortex**, which is a large association area of the frontal lobe.

The areas involved may include the anterior cingulate, the lateral prefrontal cortex, the orbitofrontal cortex, and the frontal poles.

Frontal lobe syndrome is a broad term used to describe the damage of higher functioning processes of the brain such as motivation, planning, social behavior, and language/speech production.

Etiology

Although the etiology may range from trauma to neurodegenerative disease, regardless of the cause frontal lobe syndrome poses a difficult and complicated condition for physicians.

Symptoms

Harlow first described this collection of symptoms as “frontal lobe syndrome” after his research on the famous Phineas Gage who suffered a dramatic change in behavior as a result of trauma. Thus, an abnormality in the frontal lobe could dramatically change not only processing but **personality** and goal-oriented directed behavior. Prior research has sought to identify the major areas where lesions may occur to cause the behavioral changes in frontal lobe disorders. Ventromedial Orbitofrontal Cortex Commonly known to cause “**frontal lobe personality**”, lesions in the orbitofrontal areas classically cause dramatic changes in behavior leading to impulsivity and a lack of judgment. Lesions are usually found in Brodmann’s Areas 10, 11, 12, and 47 is associated with a loss of inhibition, emotional lability, and inability to function appropriately in social interactions. The most popular case involving a lesion in this area is the case of Phineas Gage who had major behavioral changes after his trauma.

However, in a study by Tranel and Damasio et al., a variety of other etiologies such as stroke and neoplasms may cause “frontal lobe personality.”

Anterior Cingulate and Dorsolateral Syndromes Lesions in the areas around Brodmann areas 9 and 46 may cause deficits within working memory, rule-learning, planning, attention, and motivation.

Recent studies have reinforced that DLPFC is critical for working memory function and in particular for monitoring and manipulating the content of working memory. DLPFC may also affect attention as several cases have documented patients complaining of attentional deficits after brain trauma.

There are also psychiatric implications due to injury to DPFMC. Previous studies have researched how lesions in the DLPFC may cause “pseudo-depressive” syndrome associated with DLPFC associated with a loss of initiative, decreased motivation, reduced verbal output, and behavioral slowness (abulia). Other processing issues include rule learning, task switching, planning/ problem solving, and novelty detection and exogenous attention.

The anterior cingulate cortex is important for the motivation behind attention, but may also be involved in a variety of psychiatric disorders such as depression, post-traumatic stress disorder (PTSD), and obsessive-compulsive disorder (OCD).

A new area of research within the dorsolateral frontal cortices revolves around “intuition.” The frontal lobes can communicate with the [limbic system](#) and association cortex. In turn, this emotional influence associated with abstract decision to create more efficient or “intuitive” decision in a short span of time ¹⁾.

The [signs](#) and [symptoms](#) of [frontal lobe](#) disorder can be indicated by [Dysexecutive syndrome](#) which consists of a number of symptoms which tend to occur together.

Broadly speaking, these symptoms fall into three main categories; cognitive (movement and speech), emotional or behavioural. Although many of these symptoms regularly co-occur, it is common to encounter patients who have several, but not all of these symptoms. This is one reason why some researchers are beginning to argue that dysexecutive syndrome is not the best term to describe these various symptoms. The fact that many of the dysexecutive syndrome symptoms can occur alone has led some researchers to suggest that the symptoms should not be labelled as a “syndrome” as such. Some of the latest imaging research on frontal cortex areas suggests that executive functions may be more discrete than was previously thought.

Signs/symptoms can be divided as follows: Movement

Tremor

Apraxia

Dystonia

Gait disorder

Clumsiness

Emotional

Difficulty in inhibiting emotions, anger, excitement.

Depression

Difficulty in understanding others' points of view.

Behavioural

Utilization behaviour

Perseveration behaviour

Social inhibition

Compulsive eating

Language signs

Aphasia

Expressive aphasia

Neuropsychological testing of patients in the course of their recovery from brain injury enables analysis of cognitive deficiencies and/or emotional changes. The principle study objective was to define organic and/or reactive personality changes and the course of these changes in the function of the time span following brain artery aneurysm surgery in both female and male patients. The study was carried out at the Clinical Department of Neurosurgery, Zagreb University Hospital Center in Zagreb. The data refer to the period from 1989 to 2012 collected in two time intervals, i.e. 11 months and 12-48 months following brain artery aneurysm surgery. Of 72 patients included in the study, there were 28 male and 44 female patients. Neuropsychological testing consisted of clinical interview, clinical assessment of frontal lobe syndrome, Cornell personality questionnaire and Emotional Profile Index. Study results showed evidence of frontal lobe syndrome in 32% of patients on first testing and significant recovery on retesting, when only 17% of patients presented with frontal lobe syndrome. The reactive personality changes found in both testing intervals indicated increased neuroticism. In the first testing period, asthenic syndrome occurred most often, followed by conversion and aggressive-antisocial syndromes, while in the second testing interval asthenic syndrome was most pronounced and conversion and antisocial syndromes showed the same level of expression. The results also showed higher depressive and disorganizing states, which were even more pronounced in the second testing interval. As regards sex differences, the inclination toward cardiovascular somatization and destructiveness was more expressed in females than in males, showing a tendency of aggravation with increasing the time span following surgery. It may be concluded that the study has contributed to better understanding of organic and/or reactive personality changes in patients undergoing brain artery aneurysm surgery ²⁾.

¹⁾

Pirau L, Lui F. Frontal Lobe Syndrome. 2018 Oct 30. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2018 Jan-. Available from <http://www.ncbi.nlm.nih.gov/books/NBK532981/> PubMed PMID: 30422576.

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Pačić-Turk L, Šulentić T, Meštrović AH, Paladino J, Mrak G. PERSONALITY CHANGES FOLLOWING BRAIN ARTERY ANEURYSM SURGERY. Acta Clin Croat. 2016 Dec;55(4):565-78. PubMed PMID: 29117647.

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