

## **Electroencephalography in eating disorders**

Ignacio Jáuregui-Lobera<sup>1,2</sup>  
<sup>1</sup>Behavioral Sciences Institute, <sup>2</sup>Pablo de Olavide University, Seville, Spain  
Correspondence: Ignacio Jáuregui-Lobera  
Virgen del Monte 31, Seville 41011, Spain  
Tel +34 95 428 0789  
Fax +34 95 427 8167  
Email [ignacio-ja@telefonica.net](mailto:ignacio-ja@telefonica.net)

**Abstract:** Clinical applications of electroencephalography (EEG) are used with different objectives, EEG being a noninvasive and painless procedure. In respect of eating disorders, in the 1950s a new line of study about the neurological bases of anorexia nervosa was started and has since been developed. The purpose of this review is to update the existing literature data on the main findings in respect of EEG in eating disorders by means of a search conducted in PubMed.

Despite the fact that weight gain tends to normalize some brain dysfunctions assessed by means of EEG, the specific effect of gaining weight remains controversial. Different studies have reported that cortical dysfunctions can be found in patients with anorexia nervosa even after weight gain, whereas others have reported a normalization of EEG in respect of the initial reduced alpha/increased beta power in those patients with refeeding. Findings of studies that have analyzed the possible relationship between eating disorders and depression, based on sleep EEG disturbances, do not support the idea of eating disorders as a variant of depression or affective disorders. Some EEG findings are very consistent with previous neuroimaging results on patients with anorexia nervosa, reporting neural disturbances in response to stimuli that are relevant to the pathology (eg, stimuli like food exposure, different emotional situations, or body images).

**Keywords:** *electroencephalography, event-related potentials, sleep, depression, refeeding, weight gain*

### **Introduction**

Electroencephalography (EEG) is the recording of electrical activity along the scalp produced by the firing of neurons within the brain,<sup>1</sup> reflecting the synchronized and desynchronized oscillations of the overall cortical activity in the brain.<sup>2</sup> Brain patterns form wave shapes that are commonly sinusoidal, and the brain state of the individual may make certain frequencies more dominant. Brain waves have been categorized into four basic groups (delta: 0.5–4 Hz; theta: 4–8 Hz; alpha: 8–13 Hz; beta: .13 Hz).<sup>3</sup> With regard to the study of cognitive processes, the most useful application of EEG recording is the event-related potentials (ERP) technique. Mental processes (eg, perception, selective attention, language processing) occur in milliseconds; thus, whereas neuroimaging techniques

localize regions of activation during mental tasks, some EEG applications can define the time course of these activations. In addition, quantitative EEG can better determine spatial structures and localize areas with brain activity or abnormality.<sup>3</sup> EEG is an image technique that, among others, is included in the group of so-called electrobiological measurements like electrocardiography, electromyography, and magnetoencephalography. In addition to these measurements, another way to explore the human body is to apply other imaging techniques based on other physical principles.

*Electroencephalography in eating disorders (PDF Download Available)*. Available from: [https://www.researchgate.net/publication/221776045\\_Electroencephalography\\_in\\_eating\\_disorders](https://www.researchgate.net/publication/221776045_Electroencephalography_in_eating_disorders) [accessed Apr 22 2018].