

Sparks over Saturn: A Revision on Francisco de Goya's (1746–1828) Disorders

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Abstract

In 2012, the official curator of the Prado Museum, Gudrun Maurer, revealed a letter which showed that the famous painter Francisco Joseph de Goya y Lucientes (1746–1828) took electrotherapy sessions with a “Glass Disc Machine” (a Ramsden machine) to cure his deafness. The 1793 “illness of Goya” seems still to be an enigma. We will briefly review the use of electrotherapy circa 1800 and make a revision, with DSM-based criteria, of the diseases and mental disorders (Bipolar II, PTSD) that could have affected Goya during his life, especially syphilis, malaria, typhus, and a lifelong heavy metal poisoning.

Keywords: Goya; electrotherapy; bipolar; depression; lead; neurosyphilis

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Structure

Materials and Methods

A search was conducted in articles in PubMed and Google Scholar on previous hypothesis about Goya's illnesses, his deafness, and possible interactions. Theories were checked for specific symptoms like the ones described by his friends, doctors, and the painter himself. We have used only the highest credible institutional, scientific, university, and museum sources.

Introduction

In 1777, Dr. Maudyt records one of the first cases of electricity applied to medicine. The case describes a person who had a stroke and suffered a left-sided hemiplegia, rendering his members cold and faint. The treatment was conducted in baths with triboelectricity currents and Leyden bottles' discharges to force mobility response. After 10 months, Maudyt reports an improvement in the mobility, blood circulation, and strength (Rozier, 1781).

Triboelectricity became a topic in Medicine books. In 1835, the existing electricity treatments were reviewed (Guerard, 1835). For the physician who wanted to use electricity, a simple friction machine was recommended, together with a set of Leyden bottles. The protocols were electric baths and spark discharges. The usual goal of the treatments was restoration of secretions and blood circulation. We have to note that depression and deafness were included as potential indications of the treatment. The effect of polarity is described (phosphene color and mouth taste), but there is no other significant advice regarding application or treatment effectiveness.

The author suggests more rigorous studies, with a call to certify which illnesses might be the true object of the therapies. We must underline the fact that deafness was one of the prevalent diseases without cure at that time.

In September 1794, a letter was written by an official from the Court of King Charles IV of Spain. The letter was addressed to F. Chavaneau, director of the Royal Laboratory, saying that the Court was

going to cover the costs of the glass disc that had been broken by Goya, provided the machine stayed at the Laboratory after being fixed (Maurer, 2012). From this letter, we can note the following facts: that Goya was using an electrotherapy treatment for his deafness until 1793, and that he broke the disc. The machine was restored, but we don't know whether Goya used it ever again.

Even though there were other models at that time, the machine described could have been a Ramsden machine. Chavaneau describes a standard friction machine as one with a rotating glass disc and skin

or leather pads (Chavaneau, 1790, pp. 191–194). We have traced several Ramsden models in Spain, most of them being built later than 1800. These devices can deliver thousands of volts at a very low intensity.

The protocol is described in Maurer's article and Varela's Otology review (Varela, 2005). One of the electrodes was placed in the ear with a salty solution, the other in the contra lateral ear or the arm. The current was set when the disc was turned, creating a positive accumulation in the disc and a continuous electric discharge through the collectors.



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2



3

- 1 Small Ramsden Machine, the type probably used by Goya.
- 2 A detail of the collector, near the glass disc.
- 3 In the last image, a student handles a Leyden bottle facing it to an electrode.

All Images kindly authorized by Colegio Inmaculada , Gijon, Spain.

Detail photo by Javier Valdes Gomez, Colegio Inmaculada.

Figures 1–3. Ramsden machine, circa 1800.

Goya's Disease or Goya's Diseases

The main hypothesis of many authors and biographers of Goya is that he suffered a strange disease in 1793 that completely changed his vision of the world and turned him into an artist of the insane and obscure (Vallejo-Nagera, 1982).

However, Goya suffered from more than one disease. As Felisati and Sperati (2010) say, Goya suffered diseases which had a high prevalence in the 19th century. Goya was probably affected by syphilis before 1780 and was diagnosed in 1825 of a *Tabes Dorsalis* due to urinary problems (Gómez León, 2007). This was a neurological consequence of years of suffering the disease. He also suffered from malaria (1786), lead intoxication (1792; Canellas, 1981) and typhoid fever (1819; Gómez

León, 2011), and finally died from a stroke (1828) at the age of 82.

The famous 1793 "Goya illness" (which started with a two-month lead colic crisis) provoked a debilitating state in which sudden vertigo, tinnitus and deafness, and paralysis, occurred in a brief period of time (probably weeks; Canellas, 1981). The interaction of lead toxicity, two months before, a possible use of mercurial medication, and a crisis of encephalitis due to secondary syphilis could explain the episode. Gordon is one of the authors who support the thesis of Goya's having syphilis (Gordon, 2009).

Lead and Mental Disorders in the Present Time

Lead is known to affect cell and neuron metabolism. The effects might include impairment in rods activity, impairing vision, hearing problems, and brain

hypertension. The effects of lead poisoning have also been studied in cognitive and EEG domains. Studies commonly reflect the relationship between lead blood content and a lesser IQ.

Lead levels are said to be related to psychological disorders. A major United States study shows that lead even in so-called safe levels has been found to be linked to depression and, especially, panic disorder but not schizophrenia (Bouchard et al., 2009). On the other hand, lead and cadmium are elevated in bipolar patients. Zinc is elevated in the manic phase (González-Estecha et al., 2011). Goya also reportedly smoked tobacco, which increases cadmium levels.

Regarding toxic levels in adults as found in EEG, a study shows that exposure to lead fumes increase 4–6 Hz amplitude, decreasing the total amplitude of the rest of frequencies, from 6 to 16 Hz in the parietal zone, depending on the level of poisoning (Saito & Abe, 1965). Eyes-closed alpha slowing of about two Hz, which is reversible, is noted in a case of lead encephalopathy, but convulsive symptoms do not improve in adults (Simpson, Seaton, & Adams, 1964).

Chronic lead encephalopathy can lead to seizures (Rao, Vengamma, Naveen, & Naveen, 2014). In the case of Van Gogh, lead could be the reason of his mood and epileptic symptoms. Van Gogh reportedly shares with Goya (1793) the symptom of vertigo when climbing stairs (González Luque & Montejo González, 1997, p. 15).

Lead intoxication theory is based on the addition of two levels of exposure, the environmental, documented in Europe, due to use of lead glazing in food cooking earthenware (Nriagu, 1991) and the occupational. Critics of this theory say that Goya had a color mixing assistant while he was painter in the Court. The 1792 lead colic crisis is, however, a testimony of occupational poisoning, and it's the origin of the health rest permission that led to his 1793 illness. Goya's lead intoxication is supported by Niederland (1973).

Goya's Mental Disorders

Several authors have studied the case of Goya in order to understand or analyze his art and behavior. The cyclothymic behavior seems evident due to his own description of altered mood states, reflected in his correspondence (Canellas, 1991). Hyperthymic behavior, as a characteristic of his biography, has been confirmed by Dervaux, but, having in mind the problems and diseases that Goya had to face, the

author cannot confirm a bipolar disorder (Dervaux, 2007). Bipolar disorder and bipolar cycles in adulthood and senescence have been analyzed by Alonso-Fernández (1999). Fernandez-Doctor investigated the record of two possible family members (one male, one female) of Goya's mother, who were incarcerated because of dementia in Zaragoza_Asyllum, and this supports the possible existence of a familiar diathesis (Fernandez-Doctor, Seva, & Dening, 1994).

PTSD, on the other hand, could explain a period from 1800 to 1820, caused by death of family and friends, war exposure (Bouvier, 2011), famine, and financial difficulties.

Finally, Spanish psychiatrists such as Antonio Vallejo-Nagera have supported the existence of schizophrenic or schizoaffective traits in Goya (Vallejo-Nágera, 1982).

Goya seems to have experienced bipolar cycles in his life and his mood turned from hyperthymic and productive to depressed, agitated, or irritated. A cycling bipolar period could be identified in the years from 1780 to 1797, then some periods of depression and PTSD from 1802 to between 1820 and 1823, and a euthymic period from 1823 to 1828. Lack of direct and reliable sources have hindered any study on Goya's youth period.

Discussion

As we have seen, Goya suffered several illnesses which might have affected his character. If we analyze all of them (excluding infectious diseases or autoimmune diseases, which we can't confirm), we can find that most of them lead to encephalitis or similar symptoms. This happens in the case of lead intoxication, cerebral malaria (Ravin & Ravin, 1999), and syphilis. In 1819, Goya was about to die of typhus and probably suffered a prolonged, severe state of coma (Gómiz León, 2011).

On the other side, his bipolarity could explain some of his health crisis. Hypomanic behavior led him (1794) to paint during the day and concentrate on the details in the night (Canellas, 1981), which seems a bipolar trait. He painted very quickly, and probably he got exhausted because of this hard work and exposure to small amounts of heavy metals present in the paint. After some period of rest, he resumed his work again. The cycle of activity leading to depression could have been increased by the lead intoxication.

A recent scientific session (Gil-Carcedo García, 2017) on the Royal Academy of Medicine of Spain focused on the existence of a neurosyphilis (from the medical point of view) and a bipolar disorder (from the psychiatric point of view).

Conclusion

Goya received electric therapy in 1793, making it probably the first case ever recorded in Spain. Deafness and depression were two conditions for which triboelectricity was used. He likely still hoped to improve his total deafness, which didn't happen, even though he operated the machine for a long period of time, breaking the disc. Regretfully, there is no exact record of the technique or protocol used.

Goya's personality may have been affected by a bipolar disorder, specially remarkable in his adulthood, and the interactions of environmental, occupational, medications, life events, and several diseases that affected his life.

Limitations of the Study

Many authors have approached the study of Goya from different perspectives; the vision of this article has been to consider simple explanations of Goya's health and his psychological issues. The article admits the difficulties to diagnose Goya's case, where symptoms are so similar and the interactions with mental disorders many. Possible psychological disorders of Goya are also merely hypothetical since they are based only in documents and testimonials.

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