

Ludwig van Beethoven: genius, disease, and masterpieces

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Introduction

Ludwig van Beethoven is one of the greatest musicians in the history of art. It has been postulated that his deafness had an important influence on his artistic production because it strengthened his will power, challenged his talent and positively reinforced his mental perception of sound.

This article, will review Beethoven's biography emphasizing his vast production, and will discuss the different disease entities that could explain his symptoms.

His life

Originally the family of Ludwig van Beethoven was from Flanders, his Dutch surname means "beetroot garden". Due to a family feud his grandfather traveled with his children to Germany, so he was born in Bonn on the 10 December 1770.

His childhood was painful, miserable and sad because of his father's physical abuse and their poor economic situation. His mother, Magdalena Keverich, died in 1787 victim of a hemoptysis secondary to tuberculosis. Only two of his seven siblings reached adulthood and undoubtedly that contributed to his sullen character.

Music was the profession the Beethoven family passed on from parents to children.

He started his musical education at the age of five, directed by his father, Hans Beethoven, who was a singer (tenor). Later on young Ludwig completed his education with the best teachers of his native capital, Bonn.

Beethoven's father, brutal, drunk and selfish, tried to profit from his son's talent, and with merciless discipline made Ludwig work relentlessly night and day on his piano.

His work

His most outstanding works were conceived when he was almost completely deaf, which is a sign of his introversion. He was amazingly prolific: He wrote 279 pieces, among which we find new symphonies, an opera, a large amount of chamber music (quartets, trios, etc.), concertos, overtures, some songs, choir pieces and 32 piano and violin sonatas which, just like the symphonies have not been outperformed. In the *Pathetic symphony*, he exteriorized the tragedy and sadness of his life, while in the *Pastoral symphony*, he poured out the memories of the wind blowing in the trees, the birds singing, the murmur of the streams, the murmurs of the falls, the singing and the music of the shepherds.

Beethoven had great admirers. Possibly his **favorite** was the Countess Giuletta Guicciardi, one of his saddest love affairs, called by him, in a famous letter: *Immortal Lover*, and to whom he dedicated a piano sonata and to which the German musicographer and critic Ludwig Rellstab gave the name *Moonlight Sonata*. This **sonata** transmits sorrow, sadness and testimony to an irrepressible disenchanted pain, written when he found out about her wedding to Count Wenceslao von Gallemborg. When he was old, despite being reduced to utter poverty, he pretended not to need anything was generous, helping his friends who were worse off than him, more than once. Severely ill he finally died on March 1827.

His deafness

Beethoven's deafness started when he was approximately 26 years old. His auditory deficiency increased to the point where he could not hear his own music. Due to his deafness he secluded himself in his house; became gloomy; running away from friends and fans, because he considered his deafness a disgrace for a musician. He changed doctors many times in search of relief. Among them was Erhard van Swieten, a renowned doctor of Marie Therese, the well-known Empress of Austria. His first symphony was dedicated to him. Due to his deafness he did not have any regular employment in his profession. His deafness turned him into a misanthrope, gloomy and distrustful person. On one occasion he got angry at the prince Lobkowitz, one of his patrons, to whom he had dedicated his third and fifth symphonies. Sometimes, Beethoven treated his disciples, even women, in an atrocious way. When he got angry he tore his sheets of music apart and threw them on the floor. Francisco Grillparzer, an Austrian poet and playwright, wrote: "When he bursts out in anger, he transforms himself into a beast; it is scary to watch".

Beethoven's anger outbursts, which he regretted later, were disproportionate to the reasons for them, later he gave giving excuses to the people he offended.

His left ear was compromised first, with initial symptoms such as, tinnitus and high-tone hearing loss which was associated with poor discrimination. The symptoms were intermittent and later became permanent. The Bonn museum displays the different ear trumpets he used as amplifiers. The piano manufacturer of the Imperial Court designed a piano with more powerful tones for him. Beethoven used a wooden rod between his teeth which went to a resonance box of the piano and this, with what can be inferred from his accounts, suggest he suffered from conductive hearing loss.

Autopsy Findings

In 1827, the autopsy revealed the following regarding his auditory system: The Eustachian tube and the facial nerves were much thickened. In addition, the acoustic nerves were wrinkled and without a medulla. The left nerve was much thinner than the right one. The white substance in the fourth ventricle, in the region of the fourth ventricle also was much denser in consistency and more vascular than in other nerves which arose from it. The petrous bones were removed as well as the ossicles.

Underlying disease

Even though, it is not clear yet which was the disease that caused Beethoven's deafness, *Otosclerosis* is the disease which would most probably explain the composer's hearing deterioration. This entity can start in the young adult, it is bilateral, it can start early in one ear, it takes the pattern of sensory hearing loss, the capacity of catching high pitch sounds is lost initially and then follows an inability to distinguish words (*...I can barely hear a person when they speak but when they shout I can't even hear a sound ...*), it is often accompanied by tinnitus, and is not associated with other entities. Severe otosclerosis can be associated with atrophy of the VIII nerve. Fifty percent of the cases are inherited, which does not seem the case with Beethoven. Other alternative diseases that could explain Beethoven's deafness would be:

-Chronic otitis media: It is unlikely that Beethoven suffered from this chronic infection since its cardinal symptoms are earache, purulent discharge and tympanic perforation. None of these findings were recognized by his doctors, or mentioned in his accounts or detected in autopsy.

Autoimmune neuritis: This entity can be linked to other **autoimmune** illnesses. In Beethoven's

case, one of them can be inflammatory bowel disease. -

Ménière's disease: The symptoms are hearing loss with dizziness that come in the form of vertigo and, very noticeable pain. These are absent in all Beethoven's accounts. -

Syphilis: It has always been suspected that Beethoven suffered from this disease. His lifestyle, its **prevalence** in his time, and especially the development of his hearing loss made this diagnosis the most popular one. Lead was discovered in his remains. It was detected accidentally when looking for mercury, and mercury is an old, well known treatment for syphilis. That syphilis could be congenital was initially ruled out because of the absence of other typical physical traits (saddle nose, Hutchinson teeth etc.). Its acquired form can be excluded due to the absence of tabes dorsalis, macular rash, and dementia. Inflammatory changes were not found in the auditory artery as it is in the case of syphilis.

-Paget's disease: This entity causes bone deformities mainly in skull bones, pelvis, and shins. Paget's disease can manifest itself as hypoacusia due to the bone proliferation of the petrous bone. In descriptions and pictures of Beethoven's physical habitus he appears to have an extremely long trunk disproportionate to his lower members. His forehead also seems to be prominent in paintings, sculptures, illustrations and plastic reconstructive mask. Beethoven's bones were subjected to X rays analysis looking for **Pagetic** traits with no positive results. Finally, Paget's disease, very rarely manifests itself before age of 40 year.

-Tuberculosis: Apparently, Ludwig's mother and his brother Kart died of tuberculosis. Since it is a contagious infectious disease, we could postulate that the composer had contracted the disease in his early life. The chronic abdominal pain and the lesion of the VIII nerve seen in intestinal or peritoneal tuberculosis could be linked to tuberculous meningitis. However, it is almost impossible to suffer from one of these diseases without dying.

Other less possible conditions

Finally, the following entities could explain some of Beethoven's symptoms such as the joint, intestinal, renal and psychological ones:

-Rheumatic disease: Beethoven suffered from joint pain. As mentioned before, one possible explanation could be, seronegative arthritis secondary to inflammatory bowel disease, sarcoidosis, primary gout or secondary to lead poisoning, arthritis or lupus.

- **Systemic lupus erythematosus:** Some of Beethoven's lesions could be due to conditions like lupus. In 1823 the composer was affected by eye pain that could be attributed to uveitis. Joint pain appears in the list of Beethoven's health problems. Nevertheless, the absence of such signs such as alopecia, pleuropericardic disease, renal failure, photosensitivity, etc, leaves this diagnosis in serious question. The abdominal pain could be linked to peritoneal serositis. Deafness and liver disease are extremely rare in lupus. Finally, lupus is nine times more frequent in women.

- **Inflammatory bowel disease:** There is no doubt that Ludwig van Beethoven suffered abdominal pain and **diarrhea**, from his youth to his death. The idea that he suffered a systemic illness such as inflammatory bowel disease is attractive because it can be accompanied by uveitis, joint pain and hepatic conditions such as primary biliary cirrhosis or primary sclerosing **cholangitis**. However, the absence of such prominent signs as bleeding in the digestive tract and frequent episodes of fever question this hypothesis. The autopsy did not reveal any intestinal lesions such as are found in Crohn's disease or ulcerous colitis: intestinal strictures, adhesions, ulcerations or **fistulas**. In those times diarrhea frequently was due to **dysentery**, which can trigger secondary systemic immunologic processes such as uveitis, arthritis and sacroilitis. However, this condition can not explain either his deafness or his liver disease.

- **Alcoholism:** Beethoven was an alcoholic. The master, consumed enough wine for a sufficiently long period to damage his liver (according to the DSM IV he would fit the alcoholic dependence criteria, not abuse). Such damage could lead to cirrhosis. This has been certified by several findings. His doctor's accounts: On the 5th of December, 1826 Dr Andreas Wawruch described a typical case of edematous ascitic syndrome: "...his feet were tremendously **edematous**, at the same time he was developing hydrops, urine secretion was decreasing, his liver appeared to be full of nodules and then he became more and more icteric".

Around the same time to improve his breathing he was subjected to several abdominal paracentesis removing up to 10 liters. On occasions, the puncture area became infected causing erysipelas. Other findings that support a finding of cirrhosis are the presence of petechiae revealing coagulation defects characteristic of advanced liver disease.

In his autopsy, the liver was half its normal size, and had the consistency of leather, a greenish blue **color** and was full of nodules. Also the spleen was double its normal size and presented signs of congestion suggesting portal hypertension.

Chronic pancreatitis

Frequently the pancreas is affected by alcohol. Chronic pancreatitis is characterized by frequent bouts of abdominal pain that is, intense and difficult to treat, malabsorption syndrome and associated diabetes.

Accounts of the musician's health mention abdominal pain, and frequent **diarrhea**. However, these symptoms seem to have been more frequent in his youth, in which case his alcohol intake and its duration would have been insufficient as to cause alcoholic pancreatitis. Finally the autopsy revealed a firm and sclerotic pancreas, indicating a degree of damage that made it virtually impossible to make any clinical correlation. The report did not describe the distinctive microscopic findings of chronic pancreatitis such as the presence of cysts and ductular dilatation. Alcoholism is associated to other systemic phenomena such as **peripheral** neuropathy, changes in **behavior**, hallucinations, social alienation, anorexia, nausea, vomiting, abdominal pain, parotid enlargement, etc. Several of these signs and symptoms were present in the later years of the musician's life. Bear in mind that the musician's family, his father and grandmother were also alcoholics.

-Sarcoidosis : Some authors have proposed that this disease explains the diverse symptoms and affections from which he suffered. This illness has a systemic character and it acquires different shapes and stages. Its etiology is unknown. It affects people from a young adult age onwards, frequently it appears with pulmonary (hilar), ocular and cutaneous adenopathies. Rarely, it compromises the liver, spleen, heart, digestive system and central and peripheral nervous system. It is distributed worldwide, but predominantly among the Scandinavians, Japanese, Irish and Africans. It is more frequent among women. Among the illnesses from which Beethoven could have suffered we find hepatic, neurological, cutaneous, digestive, and **splenic** manifestations. Although all these organs were involved their main characteristics were not compatible with this disease: Thus, sarcoidosis does not cause cirrhosis, which he certainly had. The digestive lesion of sarcoidosis does not manifest with pain or **diarrhea**. Sarcoidosis causes uveitis, an eye lesion from which the composer may have suffered. Finally, some of the most frequent symptoms characteristics of sarcoidosis, such as fever, nocturnal sweating, cough and dyspnea are missing. However, sarcoidosis does cause psychiatric, digestive and nephrolithiasis conditions, all of which are included in Beethoven's list of symptoms.

-Renal disease: His post-mortem examination revealed that his kidneys had calcified necrotic papillae. Necrotizing papillitis can occur in patients with rheumatic diseases, angiopathies,

chronic or acute, diabetes and nephropathy caused by anti-inflammatory analgesics and sarcoidosis. Beethoven, frequently suffered from headaches and rheumatic and abdominal pain. Salicylate precursors could have led to renal damage. However, necrotizing papillitis is frequently found in autopsies of patients who die of any critical state. His autopsy also showed calcifications that could represent isolated lithiasic disease, hypercalcemia caused by sarcoidosis, or tuberculosis, although these entities are unlikely.

-Lead Intoxication (Saturnism): The director and composer Ferdinand von Hiller took a sample of 160 to 582 of Beethoven's hairs at his deathbed and later these were donated by Alfredo Guevara (member of the American Beethoven Society) for his study in 1995. The results of this modern analysis, made doctors believe that the composer had been intoxicated or poisoned by lead. This investigation was carried out by the forensics expert William Walsh at the Investigation Center in Illinois (Argon National Laboratory). This fragment of his skull (property of the Californian businessman Paul Kauffman). This fragment was subjected to authenticity through a DNA test, confirmed its origin. Studies performed on the bone fragment also confirmed a clear lead overload. The hair samples are 7-15 cm long, thus representing the growth during the last 6-12 months of his life. Dr Walsh estimated that the concentration of metal in Beethoven's hair and bones is 100 times higher than the value considered as normal (60 parts per million). As to the origin of the metal it may be due to contamination of the waters where Beethoven bathed to obtain its healing properties, or lead salts contained in the wine he drank or in the cups he used.

The lead could have come from his medicines, such as the ones used as treatment for his deafness, and the balms used by his doctor, Andreas Wabruch, to protect him after each abdominal puncture to drain ascitic liquid. The metal would act as a disinfectant. These investigators link the peaks of lead concentration found in his hairs with each procedure performed in the last months of the composer's life. The idea of lead poisoning to explain several of Beethoven's conditions is attractive. Saturnism causes conditions such as those the composer suffered from, such as abdominal colic, cephalalgea, joint pain, changes in behavior such as irritability but rarely deafness.

In short, lead poisoning seems to explain some events and it is his symptoms and it is the only theory generated with experimental data.

Irritable Bowel: This disease which is common in modern society. It characterized by abdominal pain, alternating diarrhea and constipation. Several times Beethoven mentioned his diarrhea and abdominal pain which he associated with his deafness. Chronic inflammatory bowel **syndrome**, makes it necessary to rule out celiac disease, hypo or hyper **thyroidism** (both), and parasitic infections. **The** intensity of his symptoms and their continuous state, seems to rule out be a functional state. Finally, it is well-known that personality disorders such as the master is said to have, are the cornerstone to functional disturbances of the digestive system.

His final disease and post-mortem findings:

In December 1826 Beethoven's health deteriorated due to a respiratory infection that appeared after he was exposed to cold weather during a journey with his nephew Karl and had to be attended by his physician Dr Wabruch. The genius finally recovered from this episode. From December 20 onward, abdominal fluid was removed Dr Johann Siebert performed paracentesis and drained more than 10 liters of ascitic fluid, but the procedure was complicated by a **cutaneous** infection. He had to be tapped on several more occasions. According to his brother Nikolaus ate only boiled eggs drank wine and suffered from abdominal swelling. In the last four months of his life Beethoven was bed-ridden where he received visits from his friends and admirers.

On March 20, 1827 he wrote "I'm sure I will go very soon". On March 24 Beethoven receives the last sacraments according to his Catholic faith even though his personal beliefs were somewhat unorthodox and were closer to Pantheism. That afternoon, the master fell into coma in the inseparable company of his sister in law, his brother and friend as well as an admirer Huttenbrenner. This last account describes the last moments of the composer: "He remained lying down, unconscious, from three in the afternoon until after five. Suddenly there was a flash of lightning followed by a violent thunder, and the room was filled by a blinding light. After this episode Beethoven opened his eyes, raised his right hand and quoting Caesar Augustus he said "*Plaudite, amici, comoedia finita est*" (*applaud, my friends, the comedy is finished*). Ludwig van Beethoven was leaving this world.

Beethoven was buried on March 29, 1827 in the Währing cemetery in Vienna. Following Beethoven's wishes, his body was autopsied on March 27, twenty four hours after his death. Dr Johann Wagner writes: "His body was very emaciated, especially in his arms, and covered all over with black petechiae; the

abdomen, which was unusually dropsied, was distended and stretched. Four quarts of a **grayish-brown** turbid fluid were expelled from the cavity of the abdomen.

The liver appeared shrunk to one-half its proper volume. It was of a leathery consistency and of a greenish-blue color. The spleen was more than double its proper size, dark coloured and firm. The pancreas was equally hard and firm. Both kidneys were invested by a cellular membrane an inch thick and every one of the calyces was occupied by a calcareous concretion of a wart-like shape and as large as a split pea.

Discussion

What surprises otologists the most, due to its unusual and contradictory nature, is that the more his deafness increased, the more his works improved. Beethoven started to learn music in his early infancy; therefore his knowledge was deep-rooted and profound. His hearing condition was peripheral and extra cerebral, sparing the memory cerebral centers, where the memories of sounds, are stored, memories in general, and combined images. One of the most probable diagnosis for explaining his deafness is *otosclerosis*. One of its saddest symptoms which precede or accompany deafness was tinnitus. *Tinnitus aurium*, in general is expressed by deep and monotone sounds, tenacious, constant day and night, obsessing and almost impossible to tolerate. Some people, after having been cured keep a fixed idea, which has been called memory tinnitus. Due to these symptoms people become depressed and, quick tempered as did Beethoven. After his evening meals, Beethoven suffered from *dromomania* and even in winter, at times of intense cold weather, he would go out on long aimless walks for several hours. As tinnitus increased in the calm of night it induced severe insomnia, and he tried to get tired with long night walks. Sometimes his tiredness and his need for sleep became stronger than the annoyance of the continuous buzzing: ...” *the sounds and droning of my ear make me suffer a lot*”..., he would say.

Epilogue

Beethoven’s deafness slowly took him into the isolation that nurtured his great creativity. Musicians and physicians have long speculated on the influence of illness on creativity, especially deafness. Several pathophysiological hypotheses have been put forward on how this disease could somehow increase the perception of the cortical representations of sounds.

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