

# Beethoven's Hearing Loss

A thorough reasoning of what likely caused Ludwig van Beethoven to lose his hearing.

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We simply cannot be sure about what caused famed composer Ludwig van Beethoven's hearing loss. It seems unlikely anyone can (or will ever) definitively determine the details. But in this article, based on what we do know, we propose the most likely diagnosis.

## Beethoven's Early Life

Ludwig van Beethoven was born December 16, 1770. His father was Johann, a talented singer/musician. Beethoven lived in Bonn, Germany. His first publication was at age 12, and by age 14 he was a working musician. He went to Vienna to study with Mozart in 1787, but he was only there for a short period of time. Unfortunately, Beethoven's mother became quite ill, so he had to return to Bonn. After she died, Johann died from alcoholism in 1792, leaving Beethoven to take charge of his two younger orphaned siblings.

By 1802, Beethoven had released his first symphony and become a highly sought-after composer, musician, and performer. His brother Karl became his business manager, and the two of them had a difficult and strained relationship, to the point that they even fought physically.

It appears that the onset of hearing loss was a significant source of the anxiety and stress which plagued Beethoven throughout much of his life. Difficulties in all manner of personal and financial relationships; political, professional, and personal stress tormented him. It has been documented that Beethoven even considered suicide. By 1817 it was reported that he was "stone



A wax figure of Ludwig van Beethoven at Madame Tussauds. People have been debating the cause or causes of the famed composer's hearing loss for centuries.

deaf" (whatever that means). Ludwig van Beethoven died March 26, 1827, at age 57.<sup>1</sup>

Reports of Beethoven's hearing loss progression offer some clues as to a possible cause, but seem to leave more questions than answers.

Wolf reported in 2001, "Beethoven began to lose his hearing at age 28. By age 44, his hearing loss was complete, most likely caused by compression of the eighth cranial nerve associated with Paget's disease of bone..."<sup>2</sup> Beethoven may have had Paget's disease, but as Monsell reported in 2004, typical Paget's presentations involve underlying loss of bone mineral density in the cochlear capsule.<sup>3</sup> This would be unlikely to compress the eighth nerve, but may account for some high-frequency sensorineural hearing loss (SNHL)

and the air-bone gap (a middle-ear problem).

Monsell also reported the diameter (i.e., thickness) of the internal auditory canal (within which the auditory nerve traverses) has no statistically significant relationship to hearing thresholds, based on 68 temporal bones of people with Paget's disease. Hamed and Fayad noted in 2009 that otosclerosis and Paget's disease are bony disorders which may impact the otic capsule, yet finding both in the same patient is rare, although still possible.<sup>4</sup>

## Quantifying Beethoven's Level of Hearing Loss

We (DLB and DF) are each licensed audiologists, and to be frank, phrases like "his hearing loss was complete" or he was "stone deaf" have almost no meaning, as these terms relay no factual, objective, or audiometric information.

For example, "complete hearing loss" might indicate that Beethoven could not hear any (?), most (?), or all (?) conversational speech. However, not hearing conversational speech may indicate a moderate or severe hearing loss, which frankly, is a long way from "deaf" or "complete hearing loss."

"Complete hearing loss" might allow that



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Beethoven could hear someone yelling in his ear from 12-18 inches away (90-100 dB or so). Of note, a very loud symphony orchestra (fff, fortississimo) including brass, strings, percussion (and more) can reach 110+ dB at or near the conductor! If Beethoven had a 60-, 70- or 80-dB hearing loss, it is possible he could not hear spoken words, but might have heard the symphony orchestra through air and bone conduction (more on this below).

However, without an objective working definition of “his hearing loss was complete” we have precious little information as to the type and degree of hearing loss. Nonetheless, it seems likely Beethoven had at least a moderate (typically defined as 41-70 dB HL) or worse hearing loss.

This is not to trivialize Beethoven’s hearing loss, but to better understand it.

In traditional audiology and otolaryngology, the term “deaf” has an actual definition and indicates hearing loss of 91 dB HL or greater. However, people who cannot “hear most speech” might have a hearing loss of 60 dB HL or greater.

Can we retroactively quantify Beethoven’s hearing loss?

Probably not.

Most of what we know about hearing and hearing loss has emerged since the late 1800s. For example, the first sound recording and reproduction was probably (although debatable!) the work of Thomas Edison in 1877. Further, the first or second audiometer was not available until some 50 years after Beethoven’s death. In 1879, David Edward Hughes, or perhaps Alexander Graham Bell, respectively, created or patented an audiometer. And so back in the 1820s, there were simply no standards for loudness or spectral quantification.

## Potential Etiologies

In the film from 1994 titled “Immortal Beloved” the speculation is that Beethoven’s hearing loss may have been syphilis-based, or due to head or brain trauma, or perhaps was related to frequent falls or perhaps paternal physical abuse (see above; Beethoven’s father died of alcoholism and was perhaps violent).

However, these potential etiologies were explored and discounted in 1827 by Karl Rokitsansky (1804-1878) as he apparently performed (or participated in) the autopsy on Beethoven.<sup>5</sup>

Stevens, Jacobsen, and Crofts concluded in 2013 that Beethoven’s hearing loss was more likely due to the consumption of wine tainted with lead, and they more-or-less ruled out otosclerosis.<sup>6</sup> Although the presence of an osteosclerotic foci at autopsy would likely have been informative, its absence (given a lack of binocular surgical microscopes, electro-microscopy, CT, or MRI) doesn’t necessarily rule out otosclerosis, stapes fixation, or other middle ear conductive issues.

Stevens et al<sup>6</sup> noted Beethoven’s “deafness” was not due to syphilis and they reported the finding of “shrunken cochlear nerves,” again implicating Paget’s disease, the diagnosis posited by Monsell.<sup>3</sup>

## What About Otosclerosis?

Otosclerosis occurs when bone remodeling occurs in the middle ear attenuating the ability of sound to traverse the middle ear, most often due to stapes fixation resulting in a classic “air-bone gap” such that the air-conduction pathway is impacted increasingly and significantly over time, while bone conduction hearing most often remains intact.

In most cases of otosclerosis, a type A tympanogram results as the tympanic membrane remains mobile and is not impacted by otosclerosis, the “Carhart Notch” is observed (such that air and bone thresholds “meet” at 2000 Hz), and a mild to severe bilateral hearing impairment may result. Currently, some 3 million Americans have otosclerosis. It most often starts to manifest in years 25-45, and in females is often first noticed after childbirth. People with otosclerosis may notice balance, tinnitus, vertigo, and other inner-ear associated anomalies.

## The Case for Beethoven Having Otosclerosis

Again, we don’t know whether or not Beethoven had otosclerosis.

Nonetheless, the stories of Beethoven’s increasing hearing loss and his ability to compose and conduct despite what appears to be significant hearing loss may lead one to conclude that he had significant otosclerosis.

We have no data to support this, but theoretically; if Beethoven had led a life in which he was exposed to too much wine, as well as ototoxic chemicals such as lead in cups and plates and more, and various physical ailments such as Paget’s disease, in addition to syphilis, these factors may

have negatively impacted his outer hair cells and cochlea and exacerbated a significant sensorineural hearing loss. Let’s guess that maybe these factors combined and gave him a 40 dB SNHL. Of course, it may have been more or less, but we’ll guess 40 dB. Then, if you were to add a 35 dB air-bone gap, i.e., an additional conductive hearing loss from otosclerosis, this might yield a 75 dBHL hearing loss.

If this was the case, Beethoven would very likely be able to hear through bone conduction while playing piano, and while standing on a wooden (or other) platform conducting, although he would not be able to hear normal or loud air-conducted (typical) voices.

Maybe it was otosclerosis and a poor genetics profile and lots of environmental influences (i.e., bad choices)?

There is an adage repeated in medical, audiology, and other professional doctoral programs: “When you hear hooves, think horses, not zebras.” That is, consider the most likely sources first.

Certainly, Beethoven may have ingested lead via his wine and/or wine goblet, he may have had syphilis, he may have had Paget’s disease, and perhaps he had all, some, or none of these problems.

However, with 200 years of analysis, and without benefit of audiometric results or truly any other objective data, we hear hooves and we’re proposing otosclerosis as the single most likely diagnosis. ▀

## References

1. Classical Music, BBC Music Magazine. A Beethoven timeline: 20 key dates from the life of one of music’s most iconic figures. August 14, 2024. Available at: <https://www.classical-music.com/articles/20-key-dates-in-beethovens-life-a-timeline>
2. Wolf P. Creativity and chronic disease. Ludwig van Beethoven (1770-1827). *West J Med.* 2001;175(5):298. doi:10.1136/ewjm.175.5.298. PMID: 11694466; PMCID: PMC1071597.
3. Monsell EM. The mechanism of hearing loss in Paget’s disease of bone. *Laryngoscope.* 2004;114(4):598-606. doi: 10.1097/00005537-200404000-00002. PMID: 15064610; PMCID: PMC3813977.
4. Hamed AA, Fayad JN. Presence of otosclerosis and Paget lesions in the same temporal bone. *Otol Neurotol.* 2009;30(8):1232-3. doi: 10.1097/MAO.0b013e3181be643f. PMID: 19779387; PMCID: PMC2805274.
5. Santora E. Karl Freiherr von Rokitsansky (1804–1878). Embryo Project Encyclopedia (2019-08-12). ISSN: 1940-5030 <https://hdl.handle.net/10776/13119>. Available at: <https://embryo.asu.edu/pages/karl-freiherr-von-rokitsansky-1804-1878>.
6. Stevens MH, Jacobsen T, Crofts AK. Lead and the deafness of Ludwig van Beethoven. *Laryngoscope.* 2013;123(11):2854-8. doi: 10.1002/lary.24120. Epub 2013 May 17. PMID: 23686526.