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## The brute that never was, life and death of Neanderthal man

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### Abstract

The scientific views upon life and death of *Homo neanderthalensis*, the closest species to *Homo sapiens* ever lived, changed continuously through time. Once considered a form of brutish, unintelligent and savage hominin, Neanderthals are now rightfully seen as a highly social, clever and ecologically plastic species, whose behavior must have been much closer to modern humans than we thought before. Extensive gene exchange between the two species and convincing evidence of imitation by Neanderthals of *H. sapiens* practices and technologies bolster this view, suggesting the interactions between the two were possibly untroubled. This casts serious doubts on the conventional opinion that *H. sapiens* could have violently exterminated Neanderthals. In contrast, the much stronger than ever evidence that Neanderthals were not a cold-loving species, and an increased awareness of the effect of climate change on extinction in hominins, reinforce the idea that *H. sapiens* did not cause their demise.

**Keyword:** *Homo neanderthalensis*, *Homo sapiens*, Cave art, Paleolithic intentional burials, climate change

### Riassunto

Le opinioni scientifiche sulla vita e la morte dell'*Homo neanderthalensis*, la specie più vicina all'*Homo sapiens* mai vissuta, sono cambiate continuamente nel tempo. Una volta considerati una forma di ominini brutale, poco intelligente e selvaggio, i

Neanderthal sono ora giustamente visti come una specie altamente sociale, intelligente ed ecologicamente plastica, il cui comportamento deve essere stato molto più vicino agli esseri umani moderni di quanto pensassimo prima. L'ampio scambio genico tra le due specie e le prove convincenti dell'imitazione da parte dei Neanderthal delle pratiche e delle tecnologie di *H. sapiens* rafforzano questa visione, suggerendo che le interazioni tra le due erano forse senza problemi. Ciò solleva seri dubbi sull'opinione convenzionale che *H. sapiens* avrebbe potuto sterminare violentemente i Neanderthal. Al contrario, le prove molto più forti che mai che i Neanderthal non fossero una specie amante del freddo e una maggiore consapevolezza dell'effetto del cambiamento climatico sull'estinzione degli ominini, rafforzano l'idea che *H. sapiens* non ha causato la loro scomparsa.

**Parole chiave:** *Homo neanderthalensis*, *Homo sapiens*, arte rupestre, sepolture intenzionali paleolitiche, cambiamento climatico

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Neanderthals, *Homo neanderthalensis*, were the closest among our relatives. Contrary to the conventional history of most other members of the genus *Homo*, Neanderthals lived away from the African continent, residing in the cooler lands of northern Old World, where the species first findings were surprisingly unearthed back in the XIXth century.

Early descriptions of Neanderthals provided a misguided rendering of the species, closer to a violent caveman brandishing a club than to us, and thus unceremoniously evading any recognition that they were, in fact, nothing less than the second most intelligent species on Earth. This rough treatment of our cousins probably went hand in hand with the sappy

feeling aroused at thinking they were, after all, humans. The anatomist Herman Schaaffausen, in his first ever description of Neanderthal remains in 1857 had to feel this sentiment when he stigmatized the findings as belonging to a "barbarous and savage race". Thomas Huxley was not any more light-hearted at regarding the skull found in Neander valley as "the most pithecoïd [i.e. ape-like] of known human skulls". The German pathologist Rudolph Virchow even went one step further, dismissing the idea that Neanderthals were on our bloodline altogether, and dubbing the remains as belonged to an unfortunate, heavily pathological old *Homo sapiens* individual (Rosen 1977). These denials recall to mind

Queen Victoria's mixed sense of disgust and kinship at visiting London zoo in 1842, when she asked to move a female orangutan away from her sight uttering the infamous "frightful, and painfully, and disagreeably human" words. Similarly familiar sound the repeated attempts to demote the finding of an extraordinarily small-brained dwarf species of *Homo* on Flores islands as a legitimate, recent member of our kind (Hershkovitz et al., 2007; Obendorf et al., 2008). In a curious twist of fate, *Homo floresiensis* was regarded as a pathological member of our own species, an idea that Virchow would have appreciated. Today paleoanthropologists look at a much brighter side of Neanderthals. The species is now recognized as highly social, intelligent, plastic and endowed with exquisitely human cognitive characteristics, from healthcare practices delivered to the sick to art production (Spikins et al., 2018).

The fossil record of Neanderthals includes several individuals fraught with injuries or bone fractures they managed to survive with the help of their peers. The healthcare practices concerned not only injured individuals but also those with long-term, non-communicable diseases. An adult male aged between 25 and 40, found at La Chapelle-Aux-Saints (France), was suffering from chronic periodontal disease, extensive tooth loss, severe osteoarthritis in lower cervical and upper thoracic vertebrae, moderate to severe degeneration of lower thoracic vertebrae, osteoarthritis in both shoulder joints, and a rib fracture in the mid-thoracic region, at the time of his death. Survival with so many different severe

conditions must have required direct support during health crisis, hygiene maintenance, manipulation and feeding to an extent to "ensure that he was not left behind when the group moved camp" (Spikins et al., 2018). The skeleton of a male individual aged around forty found at La Ferrassie (France), shows minor periodontal pathology, with abscesses of the left mandible and resorption, minor osteoarthritic changes to the lower spine and right elbow joint, a healed fracture of the great trochanter of the right femur, and the presence of active systemic disease at the time of his death. Like the La Chapelle-Aux-Saints individual, this man must have received continuous assistance for years. In terms of healthcare and personal hygiene, the presence of interproximal grooves in the teeth supports the use of toothpicks, as suggested by Spikins et al. (2018). Also, a poplar present in a dental calculus of a Neanderthal from El Sidrón in Spain, with a dental abscess demonstrates the likely use of painkillers in the form of salicylic acid (Weyrich et al., 2017).

As argued by Spikins et al. (2018), "strong bonds provide a social buffer against individual shortfalls in resources, health or capacity to raise young and provide a distinct evolutionary advantage"; also, "for Neanderthals food sharing, hunting, childcare and healthcare are likely to have been inseparable elements of social relationships based on strong social bonds and willingness to take risks and give up time or resources to improve others' survival". In this sense, the El Sidrón assemblage represents a perfect example of

group-living in Neanderthals, with no less than thirteen different individuals, including seven adults, three adolescents, two juveniles and one infant, living together.

What emerges from the fossil record is that Neanderthals indubitably lived physically challenging lives but that was not too different from what modern hunter-gatherers are used to. What appears to be proven beyond doubt, is that Neanderthals' infant corpses received a lot of attention from the elders. Peculiar examples of this are found at La Ferrassie, in which two newborns were founded buried in oval depressions (Heim 1982), or the bodies founded at Sima de las Palomas (Spain), where a young Neanderthal woman and a child were possibly deposited, rather than casually found, with flexed knees and elbows, and the hands raised up beside the face (Walker et al., 2012). Additional evidence of similar burials was yielded at Vindija and Krapina (Croatia), Mezmaiskaya (Russia), Teshnik-Tash (Uzbekistan), Amud, Le Moustier and Roc de Marsal (France) and Dederiyeh (Siria, reviewed in Spikins et al., 2014). Peculiarly, flint scrapers at La Ferrassie, goat horns at Teshnik-Tash (Uzbekistan) and a red deer maxilla in Amud Cave (France) could have been intentionally associated to the burial. Of course, kids were paid great attention well before death by Neanderthals, as suggested by flints knapped by unexpert individuals at the Grotte du Renne at Arcy-sur-Cure (France; Bodu 1990), or the artistic artifact (a protofigurine representing a face) probably made as a toy for the kids at La Roche-Cotard (France; Marquet & Lorblanchet 2003). The reality and extent of

Neanderthalian art is hotly debated. At Gorham's cave (Gibraltar) one of the cave walls is adorned with a criss-cross engraving showing geometric regularity, akin a similar finding at Blombos cave (South Africa) made by *H. sapiens* (Simón Vallejo et al., 2018). Even more impressive, and undeniably Neanderthalian, are the 'sculptures' of Bruniquel in France, two huge circles made with stalagmites bottoms. What is fascinating about Bruniquel is that Neanderthals appear to have selected pieces of stalagmites that had similar lengths, suggesting they cared the aesthetics of the final product (Jaubert et al., 2016). Pike et al. (2012) dated a stencil present in El Castillo cave in Spain, the famous Panel de las manos to find that the stencil of a hand could have an age of 40 ka, meaning it is mostly compatible with Neanderthals. Yet, debate about the age estimate of the radiometric method adopted by the authors is mounting (White et al., 2019). At Shanidar Cave in Iraq, one of the individuals was found in what appear as an intentional burial, surrounded by pollen of different flowering plants, suggesting flowers adorned the corpse of this individual as a burial ritual (Pomeroy et al., 2020).

Oscar Wilde once famously said that Art, all art, is quite useless. Making useless objects that take nonetheless days of work to complete, like a mask figurine made out of flint carving or moving hundreds of kilograms of solid rock in the form of stalagmites only to make circles are tasks individuals living a dire life, under unimaginably hard conditions, are only afforded to do if they are, cognitively speaking, like us. And Neanderthals were

more like us than the hand stencils or natural painkillers would suggest. Shockingly, they are within us. From 2010, it is known beyond doubt that a variable number of Neanderthals genes (depending on which human ethnic group is sampled) is present in modern-day, non-African *Homo sapiens* (Green et al., 2010). This discovery, independently confirmed by several studies, indicates that Neanderthals and humans had frequent intercourses, quite an accomplishment for a “barbarous and savage race”. And yet, these smart, adaptable individuals of our own kind, which were as good as to produce tar heating birch bark to attach points on spears (Roebroeks & Soressi 2016), use painkillers (Weyrich et al., 2017), change diet upon necessity, spanning from hunting to fishing and seafood consumption (Zilhão et al., 2020), were among the three human species that conquered the world by means of culture (Mondanaro et al., 2020) and whose brains were exceedingly large and asymmetric just like ours (Melchionna et al., 2020), did not manage to survive to the present day.

In the past, scientists were used to think Neanderthals fell victim to the rampant peopling of Europe by *H. sapiens*. This view constitutes an almost textbook example of competitive exclusion, with a superior competitor displacing the underdog. This old-fashioned idea, however, failed to pass reality check. On the one hand, gene flow between the two species suggests most encounters were not conflictual. The competitive exclusion idea probably rests on the undeclared assumption that we humans *must* have been the culprit, although there is

not a single archaeological evidence of aggressive confrontation (e.g. Neanderthal skulls bearing unhealed wounds left by *H. sapiens* stone tools, Neanderthal bones butchered by *H. sapiens*). On the other hand, the most likely alternative to competition for explaining the extinction of Neanderthals, that is climate change, was habitually underplayed. Neanderthals were traditionally regarded as adapted to the cold. Their short limb extremities and large narial openings were thought to preserve heat loss and humidity (Holliday 1997; Steegmann et al., 2002). However, more recent studies have questioned the adaptive significance of these traits (Lacruz et al., 2019), and neither them, nor Neanderthals' advanced cognitive skills, made them capable to survive through the last glaciation (Rae et al., 2011; Benito et al., 2017; Melchionna et al., 2018). The observation that the presumed to be cold-adapted Neanderthals could not make it to the last glacial maximum makes climate change a serious candidate as the extinction driver. Melchionna et al. (2018) inferred climatic niches of *H. neanderthalensis* and *H. sapiens* through Species Distribution Modelling (SDM), taking in consideration a time span that comprises the occurrences of both species that lived for a certain time (60 - 36 ka) in the same area. Their main targets were to understand whether the ‘cold-loving’ assumption about Neanderthals is correct, and if there were some superimpositions in the niches of the two species. They found that, although there was a clear overlap between the two human species, the habitable habitat patches for Neanderthals

crumbled in small and isolated areas just prior to its extinction, pushing the species into an extinction vortex. Indeed, climate change, rather than competition, seems to have been the main extinction driver for extinction in other *Homo* species as well (Raia et al., 2020).

After 400 kilo years of revered existence, *H. neanderthalensis* found its last stand in Europe some 40 ka (Higham et al., 2014), but its legacy, and even its genes, still live and thrive today, deep in our minds and bodies.

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## Author contributions

All authors have contributed equally.

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