Research Update | July 2025

CONQUER CHIARI
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Testing the Neanderthal Theory of Chiari

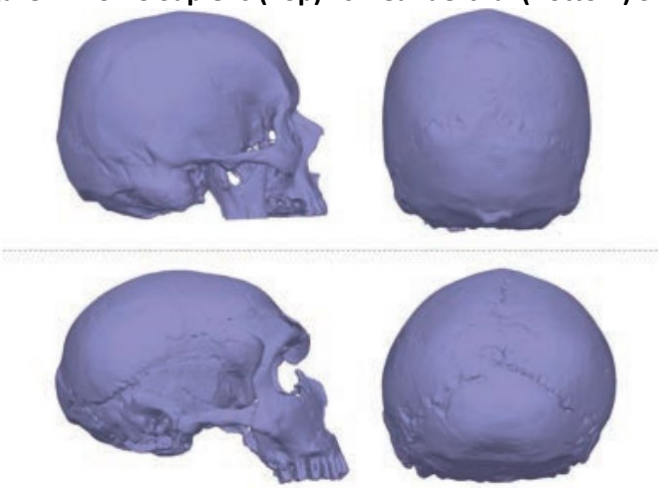
In 2013 an interesting theory emerged that speculated that the skull shape differences seen in Chiari cases were due to Neanderthal DNA. While at the time there was no direct evidence to support this idea, scientists commonly use skull base geometry to identify the hominid species that newly discovered fossils belong to, so the idea made logical sense (Figure 1). In addition, new genetic studies around that time revealed that modern humans of European descent can have as much as 2% Neanderthal DNA, so the idea was also timely.

Fast forward to today and a recent study out of the UK has provided the first real evidence that there may actually be something to this novel idea. The researchers wanted to directly test the theory, so they used CT imaging and 3D shape analysis to compare the skulls of 46 living adults with Chiari I, 57 living adults without Chiari I, and the fossils of three different hominid species, including homo neanderthalis. First, they compared the modern humans with and without Chiari and found results similar to previous morphometric studies, namely that people with Chiari tend to have reduced occipital height and smaller foramen magnums (the opening at the bottom of the skull).

But next, they compared each group of modern humans with the three different extinct species and found that the people with Chiari were closer to the Neanderthal skull shape, while the people without Chiari were closer in shape to the other two hominid species.

While this study is interesting, just because Chiari skulls share some similarities with Neanderthals doesn't mean that Neanderthal genes are responsible. It's also important to keep in mind that tonsillar herniation of 5mm or more can be found in 1% or more of adults and even more in children, yet the vast majority of these people will never experience symptoms, so it is likely there is more to the Chiari story than just skull shape.

Figure 1: Homo Sapiens (Top) vs Neanderthal (Bottom) Skull Shapes



Source: A test of the Archaic Homo Introgression Hypothesis for the Chiari malformation type I. Plomp K, Lewis D, Buck L, Bukhari S, Rae T, Gnanalingham K, Collard M. Evol Med Public Health. 2025 Jun 27;13(1):154-166. doi: 10.1093/emph/eoaf009. eCollection 2025. PMID: 40666821

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Conquer Chiari is a 501(c)(3) public charity dedicated to improving the experiences and outcomes of Chiari patients through education, awareness and research.