# Neandertal Dental Morphology: Implications for modern human origins

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## Abstract

Research on Neandertal dentitions has been limited primarily to simple dental metrics, dental proportions and a few dental traits that seem to distinguish these from anatomically modern *Homo sapiens* (e.g., derived incisor morphology and taurodont molars). Consequently, Neandertal postcanine dental morphology has been generally assumed to be much like our own. This research examines this assumption through a systematic and comparative study of Neandertal postcanine dental morphology. Results are interpreted in light of two competing models for modern human origins: Multiregional Evolution (MRE) and Recent African Origin (RAO).

Postcanine dental data were collected using the well-standardized methodology of the Arizona State University dental anthropology system. Additional dental traits were added by the author. Samples include individuals representing *Homo erectus*, archaic *Homo sapiens*, Neandertals, early anatomically modern *Homo sapiens*, Upper Paleolithic Europeans and seven recent human geographic populations. Univariate and multivariate statistical analyses, together with cladistic analysis, were used to make quantified assessments of Neandertal affinities.

The results are inconsistent with predictions of the Multiregional Evolution hypothesis as it concerns Europe: phenetic analyses indicate that contemporary and Upper Paleolithic Europeans are among the groups *least similar* to Neandertals, and that there is no evidence of gradual evolution toward the modern human dental condition in Europe. In addition, Neandertals were found to exhibit a number of dental traits whose frequencies and combination of occurrence should be considered uniquely derived in their lineage. The results of the cladistic analysis are inconsistent with the phylogenetic hypothesis that Neandertals and amHs share a recent common ancestor that is unique to them. Instead, the data are consistent with a hypothesis that archaic *Homo sapiens* and Neandertals share a more recent common ancestor with each other then either does with anatomically modern *Homo sapiens*. Finally, the complete lack of derived Neandertal dental traits in Upper Paleolithic Europeans is difficult to reconcile with hypotheses of intensive gene flow between Neandertals and Upper Paleolithic Europeans.

The fact that Upper Paleolithic Europeans and early amHs are phenetically similar, together with the fact that Upper Paleolithic Europeans are less similar to recent Europeans than to some other recent groups, likely indicates that the modern European dental pattern was acquired relatively recently.

Finally, the overall phenetic similarity and evidence for dental synapomorphies between Neandertals and European archaic *Homo sapiens* conform to the hypothesis that European archaic *Homo sapiens* is best interpreted as an early representative of the Neandertal lineage.