Endostructural features of Neandertal and modern human permanent canines: 3D enamel proportion is not taxonomically powerful than nonmetric traits

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Résumé

Teeth are useful to discuss taxonomic distinction, notably between Neandertals and modern humans. Investigations on 2D enamel thickness and more recently, on 3D enamel thickness revealed that Neandertal permanent canines and molars have thinnest enamel than modern Humans. As generally observed in biometric analyses, the range of variation of Neandertals overlap a part of that of modern humans, thus limiting the taxonomic assignment of certain teeth. Here we propose the investigation of permanent canines of Neandertals (n=25) and recent modern humans (n=24) by means of 3D enamel thickness. We take a particular look at the overlapping area of variation ranges of Neandertals and recent modern humans and compare our result with those obtain previously with restrict geographical origin (Buti et al., 2017). Neandertals individuals in this study are dated between MIS 7 and 3, and recent modern humans sample include large geographical origin (Pygmies, Europeans, Amerindians, Australians, Inuits). Secondarily, nonmetric traits at enamel dentine junction (EDJ) are recorded, which comes in support especially for no discriminating canines with volumetric parameters.

Results for lower canines show Neandertal have a 3D average (3DAET) and 3D relative enamel thickness (3DRET) lower than recent modern humans (p=0.02 and p=0.005). Despite a significant difference for 3DAET, 7/13 Neandertals fall in the variation range of modern humans and 2/12 modern humans are out of Neandertal variation range. For 3DRET, 5/13 Neandertals fall in the variation range of modern humans and 8/12 modern humans are out of Neandertal variation range. For non-discriminating canines, the presence of a distal accessory crest, a faint shovel-shape and a flat aspect of the lingual middle part at the EDJ characterized Neandertal canines. Concerning upper canines, Neandertal have a 3DRET lower than modern humans (p=0.02). However, 7/12 Neandertals fall in the variation range of modern humans and 1/11 recent modern humans are out of the variation range of Neandertals. For non-discriminating canines, the presence of a distal accessory crest, a moderate shovel-shape and a developed *tuberculum dentale* at the EDJ characterized Neandertal canines.

Our study confirms that statistically, Neandertal canine enamel is thinner than that of recent modern humans. However, this study shows no significant difference of the 3DAET for upper canines between Neandertals and recent modern humans, probably due to a larger geographical and genetic origin of our modern human sample compared to previous studies.

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For no discriminating canines with volumetric parameters, nonmetric traits at the EDJ are useful for distinguishing Neandertals to recent modern humans. Finally, 3D enamel proportion is not taxonomically powerful than nonmetric traits. This implicates for more efficient to investigate Neandertal and modern human teeth with multiple methods.

Mots-Clés: 3D AET, 3D RET, enamel dentine junction