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► **To cite this version:**

Victoria Poltze, Julie Arnaud, Florent Détroit. Post-natal mandibular growth patterns in Neanderthal and Homo sapiens. *Bulletins et Mémoires de la Société d'anthropologie de Paris*, 2023, 35 ((s)), 10.4000/bmsap.11377 . hal-04128889

HAL Id: hal-04128889

<https://hal.science/hal-04128889>

Submitted on 5 Jul 2024

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Post-natal mandibular growth patterns in Neanderthal and *Homo sapiens* through a geometric morphometrics approach

*Motifs de croissance mandibulaire post-natale de Néanderthal et Homo sapiens
à travers une approche de morphométrie géométrique*

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Édition électronique

URL : <https://journals.openedition.org/bmsap/11377>

DOI : [10.4000/bmsap.11377](https://doi.org/10.4000/bmsap.11377)

ISSN : 1777-5469

Éditeur

Société d'Anthropologie de Paris

Référence électronique

Victoria Poltze, Julie Arnaud et Florent Détroit, « Post-natal mandibular growth patterns in Neanderthal and *Homo sapiens* through a geometric morphometrics approach », *Bulletins et mémoires de la Société d'Anthropologie de Paris* [En ligne], 35(S) | 2023, mis en ligne le 14 janvier 2023, consulté le 26 décembre 2023. URL : <http://journals.openedition.org/bmsap/11377> ; DOI : <https://doi.org/10.4000/bmsap.11377>

Ce document a été généré automatiquement le 26 décembre 2023.



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- 1 Research in hominid growth and development studies serves to understand species specific evolutionary patterns and phylogenetic relationships between species. A particular focus is put on the investigation of the emergence of modern patterns of growth and development. Neanderthals, due to their morphological and phylogenetic proximity with modern humans are often used in these comparative studies. Research questions have focused on the moment in developmental time when ontogenetical differences between the two species emerge as well as on the evolution of growth patterns between the two species, with the main question being whether and at what point in time they are parallel or divergent. In this study, we propose to test the different hypotheses regarding Neanderthal and *H. sapiens* growth velocity using the mandible as a proxy. In the specific, we want to see whether morphological differences between the two species arise during post-natal growth or whether growth and developmental patterns follow parallel pathways. For that, we use a geometric morphometric method evaluating overall mandible shape on a large reference collection of Neanderthal and *H. sapiens* mandibles of all dental age stages. Results shows that apomorphies are present in early dental stages (e.g. chin) which allow to distinguish the species. However, we observed that the antero-posterior elongation and augmentation in height follows parallel growth patterns in both species. Interestingly, during the eruption of the first permanent molar, modern humans show a specific morphology which could be related to a growth spurt, not observed in the Neanderthals from our reference collection. In general, this preliminary study has

highlighted how mandibles of both Neanderthals and modern humans have the same velocity of maturation and follow an age-related gradient of overall growth.

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JULIE ARNAUD

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