

When Neanderthal's nose explain their history

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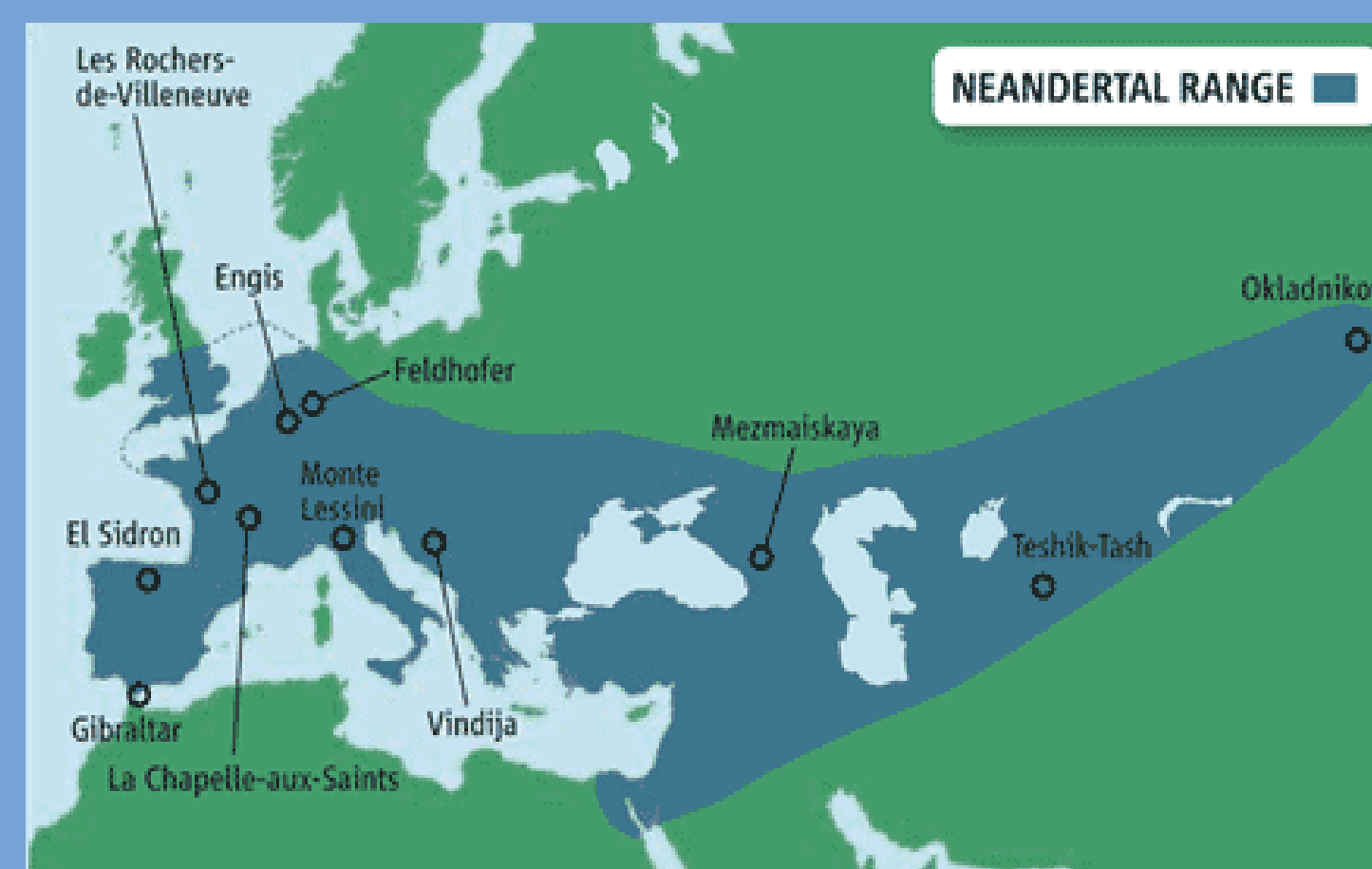


Introduction:

Neanderthals are the group of fossil humans that inhabited Western Eurasia (picture 1) from the mid Middle Pleistocene until approximately 30 thousand years ago. Their nasal and facial regions exhibit traits autapomorphics which has attracted many different functional explanations.

Three main evolutionary explanations have been proposed for Neanderthal cranial morphology:

- Adaptation to cold climates
- Adaptation to anterior dental loading
- Genetic drift

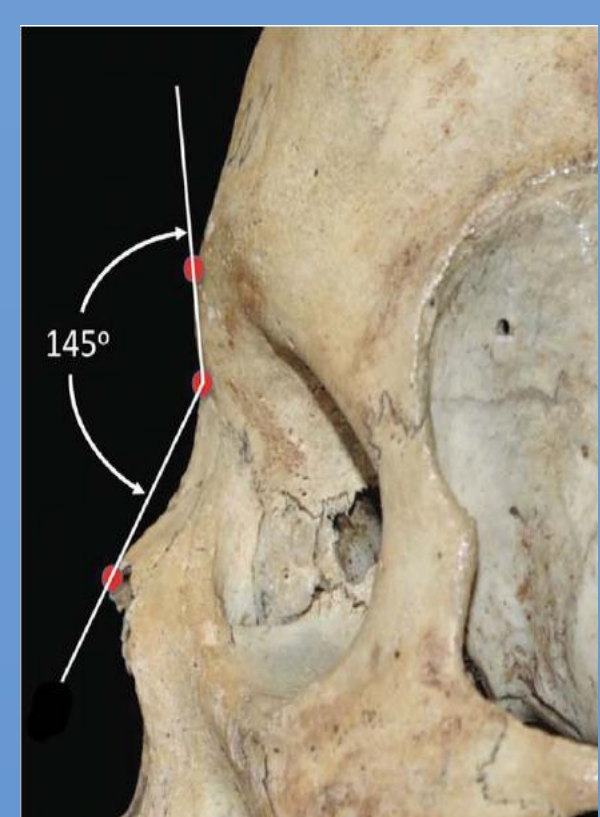


Picture 1. Distribution of Neanderthals and the main deposits

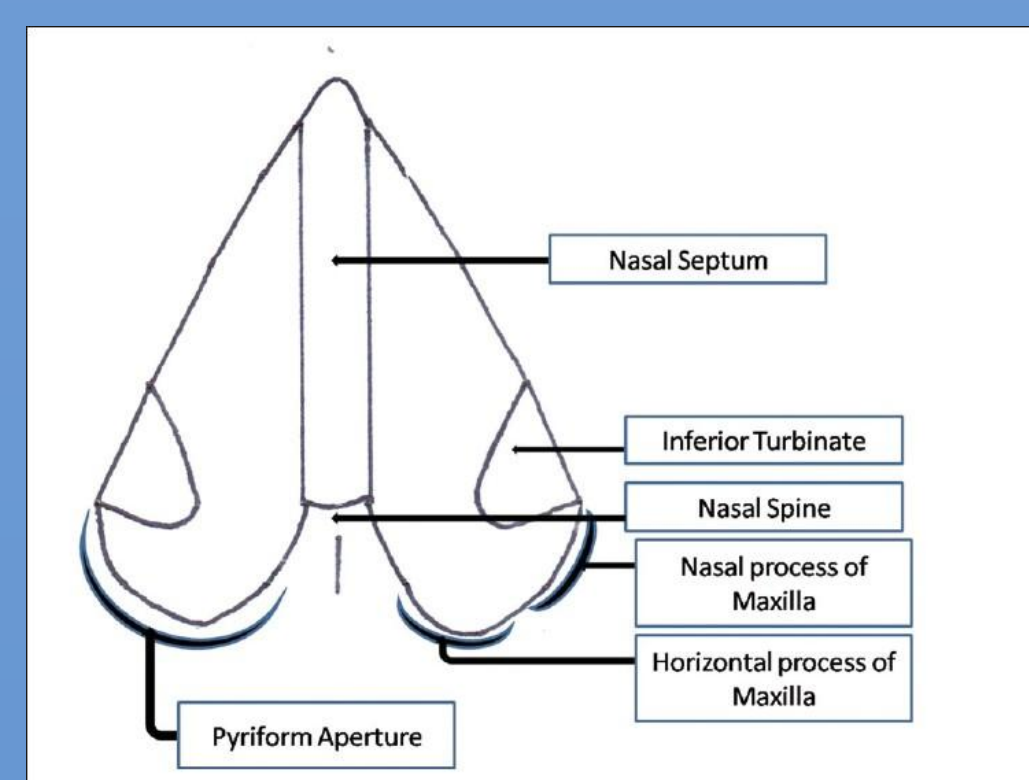
Objectives:

- Compare the nasal morphology between Neanderthals and modern humans
- Study if the Neanderthals were adapted to cold climates
- Study the anterior dental loading hypothesis
- Study if the morphologic features can be because of the genetic drift.

Nasal morphology:



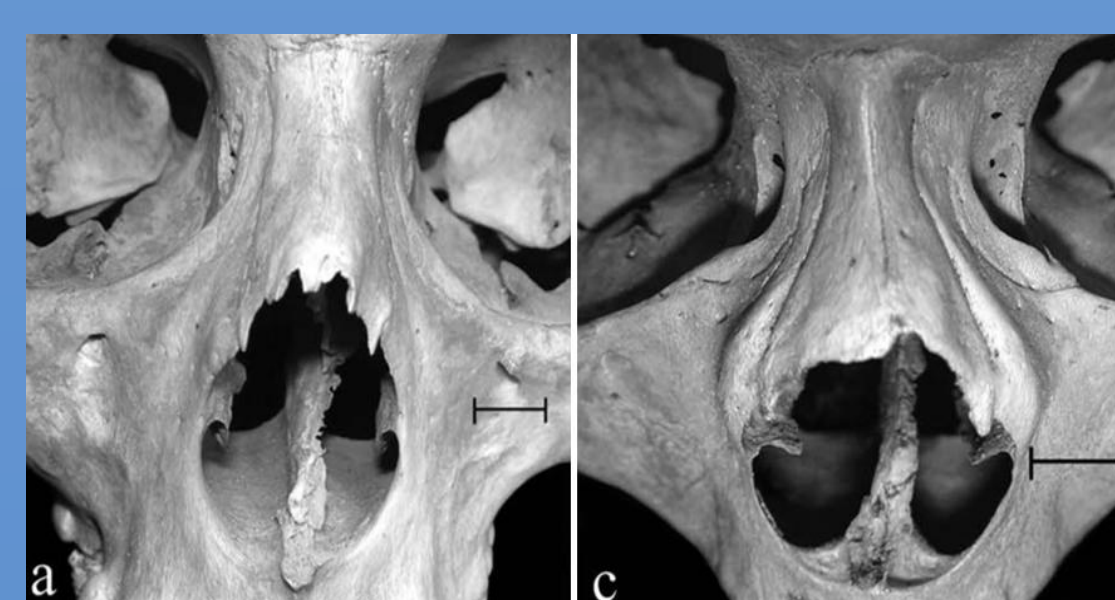
Nasofrontal angle



Piriform aperture area



Maxilar sinus volume



Nasal floor

Cold adapted hypothesis:

Narrower nasal aperture → cold conditions

Wide nasal aperture → tropical environment. Neanderthals

Two premises:

- The increase of the craniofacial pneumatisation is the result of an adaptation to low environmental temperatures
- The Neanderthals have big, extensive and even hiperneumatized sinus

Rae, Koppe and Stringer (2011):

- frontal and maxillary sinuses of Artic human are not big
- Neanderthals values enter the status of modern humans

Genetic drift hypothesis:

The genetic drift has a greater effect in smaller and more isolated populations.

1998 Maureille and Houët suggest that the level of metric variation in the isolated Neanderthals population should be low compared to a non-isolated population because the effect of genetic drift.

Anterior dental loading hypothesis:

Neanderthal's facial form would be an adaptation to dissipate the high mechanical loads produced by their behaviour.

Many Neanderthals features not only are present in adults' samples

It is not possible that these features were due to biomechanical stress

Conclusions:

Neanderthals have some different features to modern humans.

Accretion Model: Several climate conditions → isolation → genetic drift + natural selection → Neanderthal's characteristic features

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