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# Dental Microwear and Diet: the Role of Geographic and Cultural Contexts in Human Evolution

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► **To cite this version:**

Pierre-François Puech. Dental Microwear and Diet: the Role of Geographic and Cultural Contexts in Human Evolution. Human Evolution Past, Present & Future – Anthropological, Medical & Nutritional Considerations, May 2013, London, United Kingdom. hal-01116468

**HAL Id: hal-01116468**

**<https://hal.science/hal-01116468>**

Submitted on 13 Feb 2015

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# Dental Microwear and Diet: the Role of Geographic and Cultural Contexts in Human Evolution: abstract and presentation.

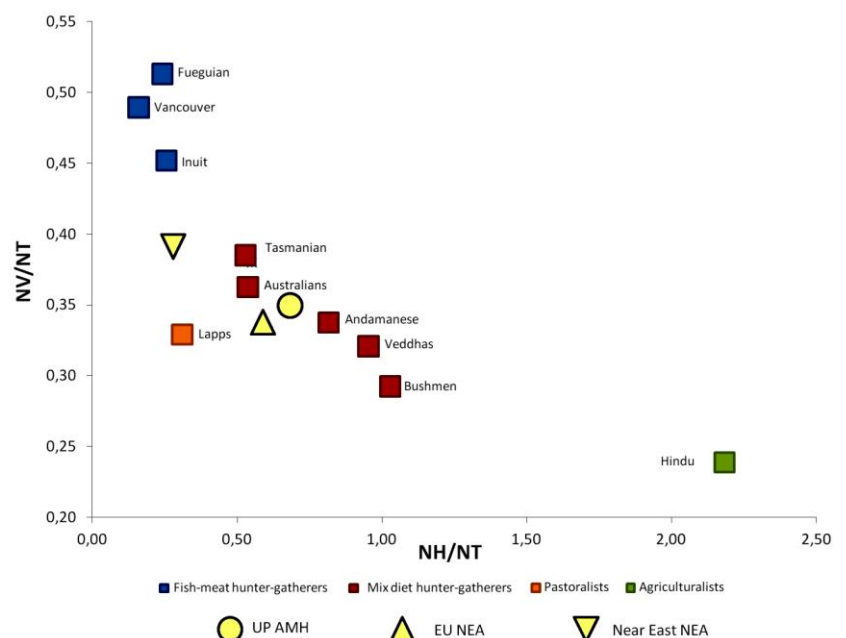
Presented at “Human Evolution Past, Present and Future” conference centre of The Royal Marsden, London 10<sup>th</sup> May 2013. Special reference is made to consider how Man’s evolution has possibly been influenced by a period of adaptation to an aquatic environment. [Nutrition human evolution life science Dental microwear](#)

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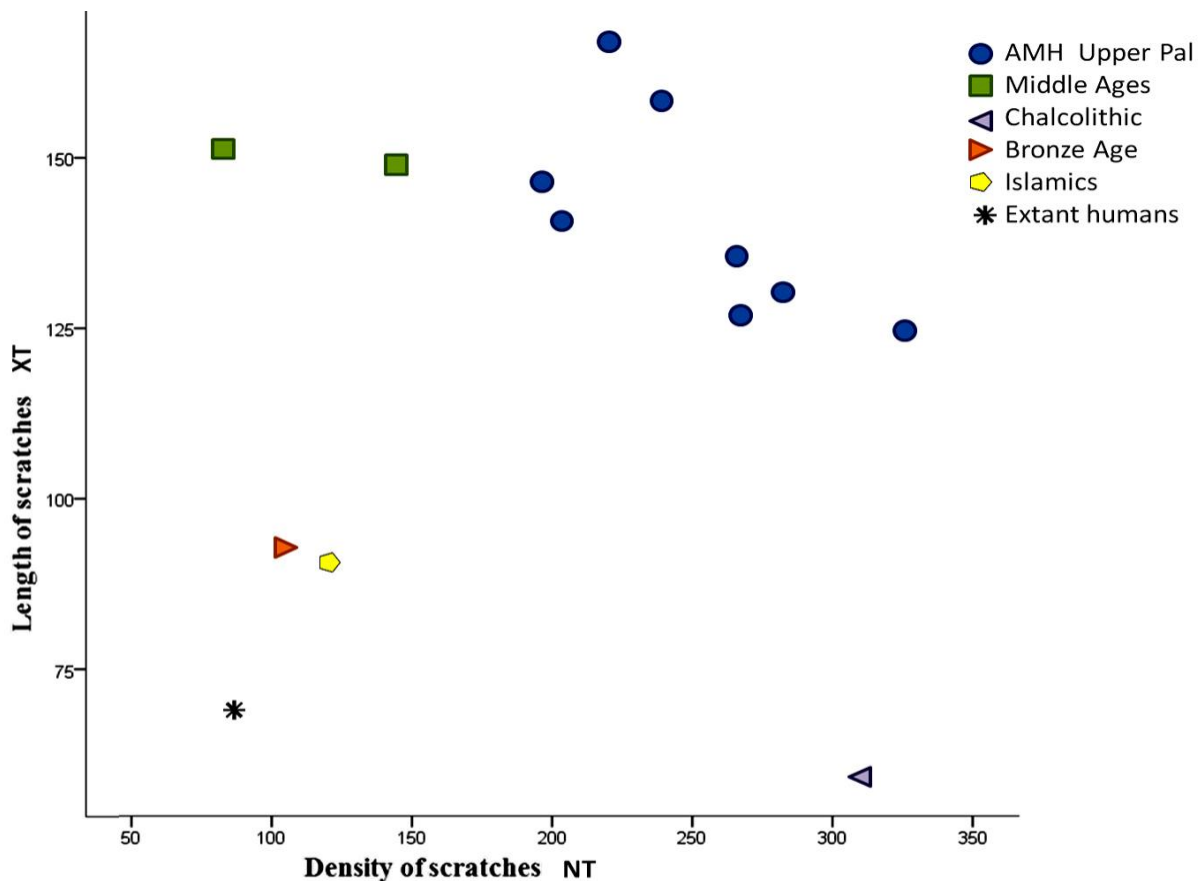
This specific anthropological research identifies the functions of teeth by closely examining their surface damage characteristics. We have observed the dental micro wear striation on a variety of populations, that range from being almost carnivorous to largely vegetarian, to improve our knowledge of Prehistoric man diet. The method interprets the food movements in mouth by the form of striae present on the buccal enamel of the back teeth. The micro striae vary in number, length and orientation, we consider 4 orientations: horizontal (H), vertical (V), back oblique in a mesio-distal direction, MD, and forward oblique in a disto-mesial direction, DM. Moreover standard deviation of lengths (S) is also recorded for all orientations. The comparative examination on a large quantity of human remains, from the European Pleistocene to modern hunter-gatherers, show variability that can be explained eco-geographically as well as culturally, allowing the reconstruction of a grid or an atlas of major eating patterns reflecting different dietary traditions worldwide. Fossil remains from the Paleolithic



(AMH and NEA) show a similar microwear pattern between them (AMH NH/NT=0.67; NV/NT=0.36; NEA from Europe NH/NT=0.69; NV/NT= 0.30). More similar hunter-gatherers groups include those from Tasmania (NH/NT=0.55; NV/NT=0.38) and Australia (NH/NT=0.56; NV/NT=0.36), which traditionally are described as mixed diets groups including a significant amount of vegetables in their diet. Interestingly, European fossils (both AMH and neandertals) are close to each other being the Near East individuals more distinct, especially for the horizontal scratches proportion (NH/NT= 0.25; NV/NT=0.39). The values obtained point to a mixed diet in the fossil groups but a more carnivorous pattern on the Near East.



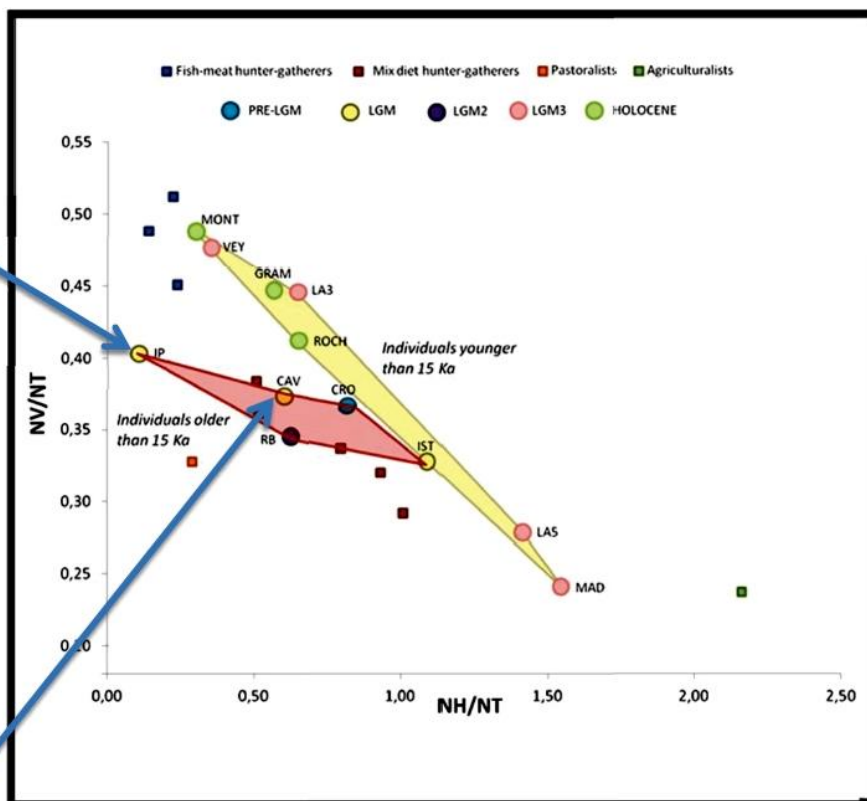
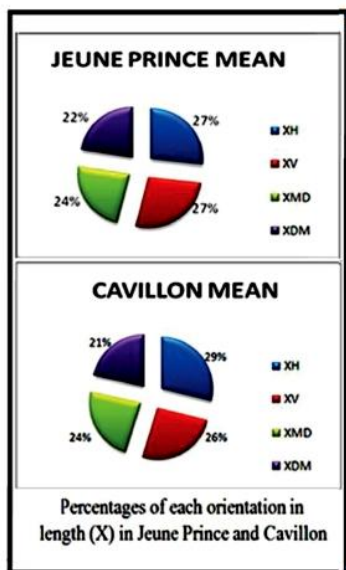
The Density (NT) and Length (XT) of scratches of Upper Paleolithic modern humans (represented by blue dots), that are compared with Christian and Islamic Middle Ages individuals, Bronze Age and Chalcolithic as well as extant humans. Main characteristic of Upper Paleolithic hunter-gatherer groups is related to a higher density of scratches, so therefore, a diet more abrasive in prehistoric groups is assessed.



**Density of enamel buccal scratches gives an account of dietary changes in societies.**

The variation observed in the AMH can be explained chronologically with Early Upper Paleolithic subjects (including the Cromagnon, Cavillon, Jeune Prince and Isturitz, and the early post Last Glacial Round du Bary) showing a pattern more similar to that of Neandertals, with lower values for both variables and less variability than can be witnessed in individuals from the Late Upper Paleolithic (including the late Last Glacial Veyrier-sous-Salève 1963, La Madeleine, Lachaud 3 and Lachaud 5, and the Holocene/proto-Holocene individuals of Gramat, Rochereil, and Baume de Montclus). Samples have been segmented in two chronological periods; younger and older from 15,000 years. It corresponds to the retreat of the ice sheets after the last glacial maximum and to the earliest evidence of pottery which provided new ways for processing and consuming foods individuals.

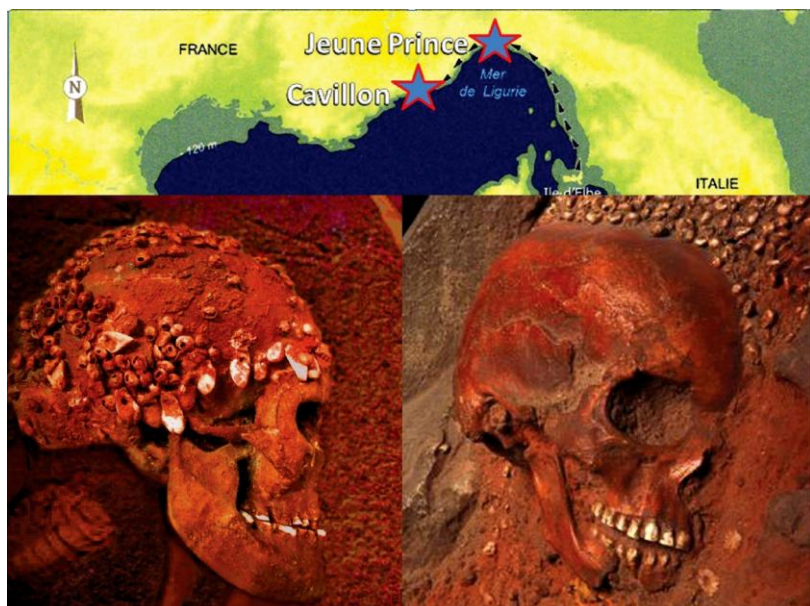
## A distinct source to precise the estimate diet



**Some fishing sites.** The AMH sample plotted at the top of the vertical scratches portion, showing a lower NH/NT value, might be indicative of an increase in aquatic food consumption, namely fish, by the proto-Neolithic European groups. Additional observations relate to the proximity of Veyrier-sous-Salève 1963 and Lachaud 3 to Gramat, Rochereil and Baume de Montclus in similar river/lake habitats with the same mode of food preparation, in spite of having an older age and thus assumed to be from a different cultural level. The former two subjects may have consumed important quantities of fish as attested by their microwear values which place them with fish eating modern hunter-gatherers or “fisher-foragers”. In the case of Veyrier-sous-Salève 1963, this hypothesis is even more probable since at that time the Geneva basin was transformed into swamps and lakes as the ices gradually melted

It is interesting to highlight the specific ‘aquatic landscapes’ shared by the fossils Le Jeune Prince and Cavillon, because of their geographic locations, on the seashore in Liguria, and also because of the cultural context: Gravettian. The microwear pattern of both these individuals is very similar in density and length for each of the four orientations (Pinilla et al., in press) that corresponds to the same type of foods characterized by the importance of maritime relative to terrestrial game evidenced in Le Prince by isotopic analysis (Pettitt et al., 2003).

Cavillon probably did ingest important quantities of sea food (i.e. mollusks, arthropods and tide pool snails) that produced the high density of striae. This interpretation would appear to make sense considering their locations and if we also consider the length of striae in its different orientations these would seem to indicate the coarse quality of food like that consumed in the medieval.



Puech P.-F., Pinilla B. 2014. *Dental Microwear and Diet as Indicators of Geographic and Cultural Contexts in Human Evolution*. Human Evolution 29 (1-3): 103-123.

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