

The Evolution of Man through Cranial and Dental Remains: A Literature Review

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Abstract : Darwin's insightful anthropological theory on the evolution drove mankind's understanding of our existence in the natural world. Scientists consider analysis of dental and craniofacial remains to be pivotal in uncovering facts about our evolutionary journey. The resilient mineral content of enamel and dentine allow cranial and dental remains to be preserved for millions of years, making it an excellent resource not only in anthropology but other fields of research including forensic dentistry. This literature review aims to chronologically approach each ancestral species, reviewing Australopithecus, Paranthropus, Homo Habilis, Homo Rudolfensis, Homo Erectus, Homo Neanderthalis, and finally Homo Sapiens. Studies included in the review assess the features of cranio-dental remains that are of evolutionary importance, such as microstructure, microwear, morphology, and jaw biomechanics. The article discusses the plethora of analysis techniques employed to study dental remains including carbon dating, dental topography, confocal imaging, DPI scanning and light microscopy, in addition to microwear study and analysis of features such as coronal and root morphology, mandibular corpus shape, craniofacial anatomy and microstructure. Furthermore, results from these studies provide insight into the diet, lifestyle and consequently, ecological surroundings of each species. We can correlate dental fossil evidence with wider theories on pivotal global events, to help us contextualize each species in space and time. Examples include dietary adaptation during the period of global cooling converting the landscape of Africa from forest to grassland. Global migration 'out of Africa' can be demonstrated by enamel thickness variation, cranial vault variation over time demonstrates accommodation to larger brain sizes, and dental wear patterns can place the commencement of lithic technology in history. Conclusions from this literature review show that dental evidence plays a major role in painting a phenotypic and all rounded picture of species of the Homo genus, in particular, analysis of coronal morphology through carbon dating and dental wear analysis. With regards to analysis technique, whilst studies require larger sample sizes, this could be unrealistic since there are limitations in ability to retrieve fossil data. We cannot deny the reliability of carbon dating; however, there is certainly scope for the use of more recent techniques, and further evidence of their success is required.

Keywords : cranio-facial, dental remains, evolution, hominids

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