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Did Australopithecines and Homo taxa suffered from alveolar bone loss, which may have affected masticatory functions?

Content

The primitiveness of the craniate and masticatory craniofacial apparatus and the evolution of the multifunctional capacity of all amniotes' clades has been controlled by several yet ancestral common genes to finally sculpt a true thecodont attachment apparatus with cementum, periodontal ligament fibres inserting into the alveolar bone. The evolution of the masticatory apparatus with its supportive periodontal structures has been Nature's complex yet highly successful evolutionary challenges to provide proper functional and mechanical support during mastication, deglutition, copulation as well as numerous other physiological functions of life not least the extraordinary power of the human smile. *Australopithecus africanus*, *A. robustus* and *Homo gnathic* remains (7, 5 and 6) were additionally examined by micro-focus X-ray computer tomography housed at NECSA. Scans were performed at 140 kV and 70 μ A, and at 160 kV and 70 μ A, respectively. The latter scans allowed for a spatial resolution of 34 μ m. The reconstruction process transformed the 2D projection images into a 3D virtual volume. In systematic observations of the fossilized gnathic remains of early hominine of Southern Africa, we observed alveolar bone loss affecting *Australopithecus africanus* and *A. robustus* as well as *Homo* species. Alveolar bone loss with the inferred indication of acute and chronic periodontitis is the first recognized disease in hominid evolution. There is however, a transition of morphological events from the Australopithecines taxa to the emerging *Homo* species, such as *Homo habilis* and *Homo erectus* unearthed in the Cradle of Mankind, Blauwbank Valley, Swartkrans and Sterkfontein, South Africa. *Homo* species show the evidence of alveolar bone loss with the emergence of a vertical component of attachment loss with crateriform inter-radicular osseous lesions, as found in extant *Homo*, defining chronic periodontitis in *Homo sapiens*. Vertical components of bone loss were not seen in both *A. africanus* and *A. robustus* taxa raising the question of what would be the evolutionary significance of alveolar bone loss in early *Homo* species.

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