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Oreopithecus bambolii is still an "enigmatic anthropoid"

CLÉMENT ZANOLLI1, DAVID M. ALBA2, M. CHISTOPHER DEAN3, JOSEP FORTUNY2,4, ROBERTO MACCHIARELLI5,6 and LORENZO ROOK7.

1UMR 5288 CNRS, Université Toulouse III Paul Sabatier, France, 2Institut Català de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona, Spain, 3Department of Cell and Developmental Biology, University College of London, UK, 4Centre de Recherches en Paléobiodiversité et Paléoenvironnements, Muséum National d'Histoire Naturelle, Paris, France, 5UMR 7194 CNRS, Muséum National d'Histoire Naturelle, Paris, France, 6Unité de Formation Géosciences, Université de Poitiers, France, 7Dipartimento di Scienze della Terra, Università di Firenze, Italy.

Oreopithecus bambolii lived in the Tusco-Sardinian archipelago between c. 8.3 and 6.7 Ma. Its evolution in an insular context was likely responsible for the development of a number of peculiar cranio-dental features which render the assessment of its phylogenetic relationships quite problematic compared to other late Miocene Eurasian catarrhines. Even if its dentition shows a blend of hominoid, cercopithecoid-like and unique features (such as the development of a molar centroconid), Oreopithecus is regarded by several researchers as a derived member of the dryopithecine subfamily.

By using high resolution X-ray microtomography, we detailed the inner structural morphology of three Oreopithecus lower permanent molar crowns (the M1 FS1996#Fi98, the M2 FS1996#Fi99 and the M3 FS1996#Fi97) from the Sardinian site of Fiume Santo and compared their 3D enamel thickness (ET) topographic distribution and enamel-dentine junction (EDJ) morphology with those from representatives of some European fossil anthropoids (pliopithecoid taxa belonging to Pliopithecus and the hominoids Dryopithecus and Ouranopithecus), extant hominoids (Homo, Pan, Gorilla, Pongo, Hylobates), and Papio.

In Oreopithecus, the pattern of ET topographic distribution, where the thickest tissue is found along the mesiodistal axis of the crown, is unique among the taxa considered in this study. The results of the 3D geometric morphometric analysis (GMA) discriminate the relatively high dentine horns and EDJ conformation of Oreopithecus from the typical cercopithecoid condition, on the one hand, and from the fossil and extant hominoid patterns (including in Dryopithecus). Oreopithecus also differs from the pliopithecoid condition, except for the M1 IPS41955 that closely resembles the former.

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