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Tracking *Oreopithecus* evolutionary history: evidence from the enamel-dentine junction morphology

Clément Zanolli¹, David M. Alba², David Begun³, Florian Bouchet², Loïc Costeur⁴, M. Christopher Dean^{5,6}, Josep Fortuny², Jay Kelley^{7,8}, Adeline Le Cabec^{1,9}, Wataru Morita¹⁰, Masato Nakatsukasa¹¹, Lorenzo Rook¹², Alessandro Urciuoli^{2,13,14}

¹ Univ. Bordeaux, CNRS, MCC, PACEA, UMR 5199, F-33600 Pessac, France

² Institut Català de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona, Edifici ICTA-ICP, c/ Columnes s/n, Campus de la UAB, 08193 Cerdanyola del Vallès, Barcelona, Spain

³ Department of Anthropology, University of Toronto, Toronto, ONT M5S 3G3, Canada

⁴ Naturhistorisches Museum Basel, 4001 Basel, Switzerland

⁵ Department of Earth Sciences, Natural History Museum, London, UK

⁶ Department of Cell and Developmental Biology, University College London, London, UK

⁷ Institute of Human Origins, and School of Human Evolution and Social Change, Arizona State University, Tempe, AZ, 85287, USA

⁸ Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA

⁹ Department of Human Evolution, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

¹⁰ Department of Anthropology, National Museum of Nature and Science, Ibaraki, Japan

¹¹ Laboratory of Physical Anthropology, Department of Zoology, Graduate School of Science, Kyoto University, Kyoto, Japan

¹² Dipartimento di Scienze Della Terra, Università Degli Studi di Firenze, Via La Pira 4, 50121 Firenze, Italy

¹³ Universitat Autònoma de Barcelona, Campus de la UAB, 08193 Cerdanyola del Vallès, Barcelona, Spain

¹⁴ Division of Palaeoanthropology, Senckenberg Research Institute and Natural History Museum Frankfurt, Frankfurt am Main, Germany

Although most of the anatomy of the Late Miocene catarrhine *Oreopithecus bambolii* is well known, its phylogenetic relationships are still debated. The dentition of *Oreopithecus* has been interpreted as showing a blend of hominoid and cercopithecoid-like features. Even though cusp height recalls that of some Cercopithecidae, *Oreopithecus* molars do not show a bilophodont pattern and the presence of a centroconid, as well as the peculiar crest pattern distinguish them from most Miocene hominoids. *Oreopithecus* also shows slow dentine daily rates at the enamel-dentine junction (EDJ) but fast root extension rates, as in *Anapithecus* teeth. *Oreopithecus* is now regarded as either representing a derived dryopithecine or a stem hominoid, possibly related to nyanzapithecines. Here we evaluate both hypotheses, and also examine an alternative hypothesis that it is related to pliopithecoids based on the EDJ shape. The EDJ has been demonstrated to be a reliable proxy for tracking evolutionary history in primates. We ran surface deformation-based geometric morphometrics of the EDJ of five lower molars of *Oreopithecus*, compared with dryopithecines (*Dryopithecus fontani*, *Anoiapithecus brevirostris*, '*Sivapithecus*' *occidentalis* species inquirenda, *Hispanopithecus laietanus*, *Hispanopithecus crusafonti*, *Rudapithecus hungaricus*), a nyanzapithecine (*Nyanzapithecus pickfordi*), pliopithecoids

(*Barberapithecus huerzeleri*, *Anapithecus hernyaki*, *Pliopithecus antiquus*, *Pliopithecus canmatensis*), and extant great apes. For each molar position, *Oreopithecus* systematically groups closer to pliopithecoids than to any of the hominoid taxa included here. Conversely, *N. pickfordi* molar EDJ shape resembles that of dryopithecines and differs in dentine horn positions and overall shape from those of *Oreopithecus*. While the phylogeny of *Oreopithecus* remains uncertain, from a dental point of view it is unlikely that it is closely related to dryopithecines or, based on our limited sample, nyanzapithecines.

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