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

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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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