Analysis of Dental Root Apical Morphology: A New Method for Dietary Reconstructions in Primates

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ABSTRACT

The reconstruction of paleo-diets is an important task in the study of fossil primates. Previously, paleo-diet reconstructions were performed using different methods based on extant primate models. In particular, dental microwear or isotopic analyses provided accurate reconstructions for some fossil primates. However, there is sometimes difficult or impossible to apply these methods to fossil material. Therefore, the development of new, independent methods of diet reconstructions is crucial to improve our knowledge of primates paleobiology and paleoecology. This study aims to investigate the correlation between tooth root apical morphology and diet in primates, and its potential for paleo-diet reconstructions. Dental roots are composed of two portions: the eruptive portion with a smooth and regular surface, and the apical penetrative portion which displays an irregular and corrugated surface. Here, the angle formed by these two portions (aPE), and the ratio of penetrative portion over total root length (PPI), are calculated for each mandibular tooth root. A strong correlation between these two variables and the proportion of some food types (fruits, leaves, seeds, animal matter, and vertebrates) in diet is found, allowing the use of tooth root apical morphology as a tool for dietary reconstructions in primates. The method was then applied to the fossil hominoid Khoratpithecus piriyai, from the Late Miocene of Thailand. The paleo-diet deduced from aPE and PPI is dominated by fruits (>50%), associated with animal matter (1–25%). Leaves, vertebrates and most probably seeds were excluded from the diet of Khoratpithecus, which is consistent with previous studies. Anat Rec, 00:000–000, 2012. © 2012 Wiley Periodicals, Inc.

Key words: primates; paleo-diet; tooth roots; Khoratpithecus; 3D image

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