Reconstructing the paleoecology of Taung, South Africa from low magnification of dental microwear features in fossil primates

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ABSTRACT

Taung, South Africa yielded the first Pliocene Hominini fossil, Australopithecus africanus, recovered from a lime quarry in 1924. To identify whether the habitat of the site differed from present-day conditions, dietary preferences of fossil papionins from Taung, including Parapapio antiquus (n = 8), Papio izodi (n = 12), and indeterminate specimens (n = 10) were examined under low magnification to discern patterns of dental microwear. The comparative fossil sample from Sterkfontein Member 4 includes Parapapio broomi (n = 10) and Parapapio jonesi (n = 5). Extant Papio ursinus (n = 20), a savanna-dwelling baboon from South Africa, provides a modern analogue. Six dental use-wear scars on the paracone of the second molar (M\textsuperscript{2}) were recorded and the data analyzed using ANOVA with Tukey’s test to detect whether group differences were present for each feature; linear regression identified significant covariation of microwear features. Principal components analysis and discriminant function analysis were utilized to identify species-specific dietary signals. Extant Papio ursinus is separated from the extinct taxa solely by a relatively greater number of fine scratches with respect to the other microwear features. Papio izodi overlaps primarily with extant Papio and secondarily with Parapapio, which forms a more discrete grouping that includes Parapapio antiquus from Taung. A wetter, more closed environment is suggested for Taung and Sterkfontein Member 4 compared to the habitat of present-day central South Africa.