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DISCRIMINATION OF EARLY HOMININS USING LOWER MOLAR CUSP AREAS IN THE PRESENCE OF ACCESSORY CUSPS

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Abstract

Comparisons of tooth cusp relationships allow anthropologists to make detailed assessments of hominin variability and assist with fossil identification. The method to measure cusp base areas assumes that diagnostic cusp relationships used for fossil identification are consistent in the presence of accessory cusps. However, scholars have hypothesized that the presence of accessory cusps alter the diagnostic cusp relationships of the upper molar. This research investigated whether accessory cusps affect the lower molar cusp relationships used to discriminate between early hominin taxa. Lower molars of individuals representing *A. anamensis, A. afarensis, A. africanus, A. sediba, P. robustus, P. bosei, H. habilis-rudolfensis, H. erectus, H. species, K. platyops* were included in this study. Teeth were separated by taxa and number of cusps. Teeth with accessory cusps were used to generate two sets of data: 1) cusp 1-7 were measured independently and 2) Cusp 6 and Cusp 7 were equally divided amongst the adjacent primary cusps. Unpaired t-tests and analysis of variance (ANOVA) determined whether the cusp relationships in molars with accessory cusp significantly differed from those with only five cusps. Principal component analyses visually compared the relative cusp areas of the M1, M2, and M3 with apportioned cusps to the cusp relationships observed in five-cusped molars.

Overall, the results show that accessory cusps do influence the mandibular molar cusp relationships. The cusp relationships that distinguish between taxa in molars without accessory cusps were difficult to observe. However, diagnostic cusp relationships of the mandibular molars, (see Wood et al. 1983) were clearly expressed in teeth with accessory cusps and distinguished *Australopithecus* and early *Homo* from *Paranthropus*. This trend is most marked in the M1 and becomes is less clear toward the back of the molar tooth row.