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Pecha Kucha Presentation Session 4, Thursday 3:50-4:10 pm

Postcanine EDJ morphology in *Homo habilis* and its implications for the evolution of early *Homo*

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A large portion of the *Homo habilis* hypodigm consists of dental remains, including the key specimens from Olduvai Gorge in Tanzania. The type specimen of the species, OH 7, includes the mandible with a nearly complete tooth row, and specimens such as OH 13 and OH 16 preserve mandibular and maxillary tooth rows. Teeth are useful in studying hominin systematics, and the outer enamel surface (OES) morphology of the *H. habilis* dentition has been studied extensively. Relatively few features of the postcanine dentition are considered distinctive in *H. habilis*, but the mandibular premolars and molars are frequently described as being buccolingually narrow [1]. Based on new microCT scans we investigate the enamel-dentine junction (EDJ) morphology of *H. habilis* postcanine teeth from Olduvai Gorge, early *Homo* specimens from Koobi Fora (Kenya), *Australopithecus afarensis*, *A. africanus*, *Homo erectus s.l.*, and later *Homo* (modern humans, Neanderthals, and middle-Pleistocene *Homo*). We use geometric morphometrics to quantify EDJ shape of every postcanine tooth position for these taxa.

We find that for a number of *H. habilis* specimens, the postcanine dental morphology is very primitive. Type specimen OH 7, as well as OH 24 and several Koobi Fora specimens (KNM-ER 1802, KNM-ER 1813), show an EDJ morphology that is largely within the range of variation for *Australopithecus* and retain several primitive features. However, there are a number of features of the postcanine EDJ morphology that reliably distinguish later *Homo* from *Australopithecus*, including an increase in the height of the dentine body (defined as the distance between the cervix and marginal ridges) in all tooth positions, reduction of the talon or talonid in the premolars, and reduction in the distal aspect of the crown of the upper molars. Our findings are consistent with previous work emphasizing the generalized postcanine dentition of *H. habilis* [1]. Contrary to previous work [1,2], our EDJ shape analyses do not suggest that *H. habilis* is characterized by buccolingually narrow mandibular molars and premolars, in line with observations on the outer enamel surface [3]. However, there are some aspects of the postcanine dentition that we find to be more distinctive; for example, the maxillary third molars of *H. habilis* are distinguished from those of *Australopithecus* by the presence of a further mesially placed metacone and a mesiodistally shorter crown.

We also find variation within the *H. habilis* hypodigm. While Bed I Olduvai specimens such as OH 7 and OH 24 show a largely primitive morphology, some Bed II specimens show a more derived morphology. This is most notable in OH 16, which displays a suite of derived features, particularly in the mandibular and maxillary premolars, which show a tall dentine body and a reduced talon/talonid region; in these respects the specimen is more derived than the early African *H. erectus* sample. OH 13 is the youngest specimen assigned to *H. habilis*, and although it shows some derived aspects of postcanine morphology, other key features are more similar to Bed I specimens such as OH 7, which is consistent with the mandibular dental arcade shape [4].

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