

Sexual dimorphism in early *Homo*

Sir, – Spoor *et al.*¹ report two new hominin specimens from Ileret in East Africa, one (KNM-ER 42700) which they attribute to *Homo erectus*, and the other (KNM-ER 42703) to *H. habilis*. They conclude that the two species were evolutionarily distinct but contemporary, and that there was a high degree of sexual dimorphism in *H. erectus*. However, as in the case of comparisons between KNM-ER 42700 and the larger OH 9 (featured on the cover of *Nature* of 9 August 2007), there is a striking similarity in cranial shape of KNM-ER 1813 (a relatively small specimen attributed to *H. habilis*) and KNM-ER 3733 (a larger specimen attributed to *H. erectus*), despite differences in size.

A high probability of conspecificity is obtained when cranial measurements of KNM-ER 3733 and KNM-ER 1813 are

compared using a morphometric technique based on least-squares regression analysis, using a method described by Thackeray *et al.*,¹ in which attention is given to the standard error of the *m*-coefficient ($s.e_m$) in regression equations of the form $y = mx + c$, when measurements of pairs of specimens are compared. The question arises as to whether certain specimens attributed to *H. habilis* (including KNM-ER 42703, dated at 1.44 Myr ago) are females of a species which is also represented by some specimens that are males of *H. erectus*.

The answer to such questions lies not in trying to 'pigeon hole' hominin fossils into one or other species, but rather to assess probabilities of conspecificity in relation to a statistical definition of a species. For example, the mean log-transformed $s.e_m$ value calculated by Thackeray *et al.*¹ from comparisons of measurements of conspecific pairs of vertebrate and invertebrate taxa (–1.78, associated with a standard deviation of 0.27, for 1260 specimens) essentially provides a statistical

definition of a species, based on morphometric analysis. In terms of this definition, KNM-ER 1813 and KNM-ER 3733 have a high probability of conspecificity, because the $\log_{10} s.e_m$ value obtained from pairwise comparison of cranial measurements (including the glabella–opisthocranium, prosthion–inion, basion–bregma, and basion–nasion distances, and the posterior cranial length)³ of these two specimens is –1.72, which is not significantly different from the mean $\log_{10} s.e_m$ value of –1.78 obtained from conspecific pairs of modern taxa.

1. Spoor F. *et al.* (2007). Implications of new early *Homo* fossils from Ileret, east of Lake Turkana, Kenya. *Nature* 448, 688–691.
2. Thackeray J.F. *et al.* (1997). Probabilities of conspecificity: application of a morphometric technique to modern taxa and fossil specimens attributed to *Australopithecus* and *Homo*. *S. Afr. J. Sci.* 93, 195–196.
3. Wood B.A. (1991). *Koobi Fora Research Project*. Vol. 4. *Hominid cranial remains*. Clarendon Press, Oxford.

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