A HOMINID METATARSAL FROM DMANISI (EASTERN GEORGIA)

ABSTRACT: Anatomical description is presented for the hominin metatarsal III recovered from the Layer IV of Dmanisi (Eastern Georgia) in the 1977 field season. The specimen is illustrated and its measurements are given. It is concluded that it should be attributed to the same species as the Dmanisi mandible from the Layer V (Homo ex gr. erectus).

KEY WORDS: Dmanisi Metatarsal III – Homo erectus – Lower Pleistocene – Villanyan-Biharian

INTRODUCTION

The biostratigraphy and dating of Dmanisi

Dmanisi (Eastern Georgia) is the most ancient fossil hominid site yet found in western Eurasia. The Dmanisi hominid was accompanied by a faunal assemblage as well as by simple stone tools. As it has been reported previously by ourselves as well as by others, the Dmanisi skeletal and cultural remains date to the Lower Pleistocene. Chronometric dating of the lava flows directly underlying the fossil bearing deposits indicates an age of some 1.85 Myr (for detailed descriptions of the site, its dating, geology, recovered fauna and human remains see: Dzopanidze et al. 1991, Gabunia et al. 1992, 1996, Gabunia 1992, Gabunia, Vekua 1993, 1995a,b, Vekua 1995, Brauer, Schults 1996, Gabunia et al. in print).

The Dmanisi mandible represents a somewhat isolated morphological type of Homo erectus: given its advanced traits and particularly the dental morphology it appears to be a forerunner of both the late Homo erectus and the early archaic Homo sapiens (Gabunia 1992, Gabunia, Vekua 1993, 1995a,b, Vekua 1995).

The geological age of the Dmanisi fauna corresponds to an early phase of the Upper Villanyan (Upper Villanyan or Lower Biharian, transition MN 17 to MN 18). Up to now the following species have been identified: Erix sp., Natrix sp., Coluber najadum, Coluber rohmermertensi, Elaphe sp., Testudo cf. graeca, Struthio dmanisensis, Ochotona cf. lagrel, Hypolagus brachygnathus, Apodemus dominans, Kowalskia sp., Cricetus sp., Mimomys ex gr. reidi, Mimomys cf. pisoceanicus, Parametoponietes cf. obelidensis, Gerbillus sp., Marmota sp., Canis etruscus, Ursus etruscus, Martes sp., Megantereon megantereon, Homotherium crassidens, Panthera gombazgoensis, Pachycrocuta perrieri, Archidiskodon meridionalis, Equus stenonis, Dicerorhinus etruscus etruscus, Gazella borbonica, Soergelia sp., Dmanisbos georgicus, Cervus perrieri, Eucladocerus aff. senezensis, Cervidae cf. Arvernoceros, Dama nestii, Palaeanthropus sp., Homo erectus.

The faunal and paleobotanical evidence as well as the depositional nature of the site indicate that hominid occupation took place in a mosaic environment of the open steppe and gallery forests along the valleys. Excavations conducted in Dmanisi in 1997 by the Centre for Archaeological Research, Georgia Academy of Sciences, and the Romisch-Germanisches Zentralmuseum uncovered numerous vertebrate remains as well as an incomplete hominin metapodum. The hominin metapodum was found in sq. 64/59 of Layer IV, where we also found a mandible of Canis etruscus, a lower M3 and a radius of Archidiskodon meridionalis, an Equus stenonis metatarsal, a fragment of an antler and other
A Hominid Metatarsal from Dmanisi (Eastern Georgia)

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absence of the ventral facet on the medial surface of the proximal end, for example, distinguishes the Dmanisi specimen from MTT. II of modern humans who usually possess this feature, albeit expressed to varying degree. Unfortunately, we know little about the development of this feature in fossil hominids. It is thus possible that its absence in the Dmanisi specimen reflects just one extreme in the variation range.

A complete reduction in the medial ventral facet is observed on the MTT. III of Homo habilis (Susman, Stern 1982), although it cannot be ascertained that its absence in OH 5 is characteristic for this taxon. This facet is also absent in ER 803 from Koobi Fora (Harriss, Isaac 1976) assigned to Early H. erectus = 20 or H. ergaster. Its absence on this specimen, however, may be due to the damage to this end of the bone (Day, Leakey 1974). An examination of the medial surface of this bone suggests that, if the ventral facet was present, its form was likely very reduced in size and more like a thin stripe at the plantar edge of the proximal articular surface (Day, Leakey 1974). It should be noted that the Dmanisi MTT. III also lacks the tubercle used for inter-bones ligament attachment which is seen in ER 803. This feature is congruent with the total reduction of the ventral facet in the specimen. This trait may indicate that MTT. II and III were conjoined less firmly than MTT. III and IV. This conclusion is supported by the fact that the Dmanisi MTT. III has less well-developed facets used to articulate it with MTT. IV.

The traits noted above also distinguish the Dmanisi specimen from MTT. III of the Shanidar Neanderthal (Trinkska 1983), as well as from a number of other later hominids. Our study of anatomically modern MTT. III from old cemeteries in Eastern Georgia (collections of the Miskheva Expedition, Georgia Academy of Sciences), and other remains preserved at the Department of Anatomy, Tbilisi State University (No. 20519, No. 2669, etc.), as well as the collections of the Institute of Experimental Morphology, Academy of Sciences of Georgia, show a ubiquitous presence of both medial facets on the proximal ends of MTT. III (absent in only one out of 19 cases). In addition, the studied modern human MTT. III all show, at the same time, a more pronounced (compared with the Dmanisi specimen) rough surface separating these facets and serving as the attachment surface of the inter-bones ligaments.

The Dmanisi metatarsal has some further specific traits which, however, also do not distinguish it from those of other members of the genus Homo. These include its relatively small size, greater massiveness, as well as the pronounced development of the ventral tubercle on the proximal end. Given the length of the broken Dmanisi specimen (54.7 mm), the length of the whole bone could not have been much greater than 65.9 mm. This estimate is based on observations in 21 anatomically modern humans.

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postcranial remains of Cerasus perrieri, a Scergelia sp. scapula, and fragments of Testudo cf. greca carapace. The same level also produced a few flakes, one nucleus, and some flaked pebbles. In total, 64/59 yielded 26 bones (including a hominid metatarsal), 21 of which have been identified to date.

THE DMANISI METATARSAL III

The new hominid bone from Dmanisi (D 2021) is a right MTT. III whose distal end is broken off on the epicodylar level (Figure 1). Given that the break is jagged and shows a part of the spongy interior, the part that broke off included the epiphysial and a segment of the diaphysis. This indicates that we are not dealing with the removal of an unused segment but with a broken metapodium that belonged to an adult individual. The remaining part of the bone is well preserved with minor damage present only on the ventro-lateral proximal end. The body of the metatarsal is slightly concave ventrally and frontally with an inclination to the left. The diaphysis is slightly flattened and medially curved (the angle of the curvature is of ca 20°). The corpus thins considerably distally, with the narrowest part found immediately before the epicodylar widening. It is oval in cross-section and latero-ventral in direction.

The dorsal surface is slightly convex and has rounded edges which are clearly visible, especially on the proximal end. In the middle part a medially oriented crest is seen. The ventral surface displays a blunted crest, which is more strungulated towards the dorsal edge, where it becomes keel-like. The lateral surface has a faint crest running towards the ventro-distal side where it joins the rounded ventral crest. The medial side of the metatarsal is slightly concave on the proximal part, a feature which disappears at mid shaft. The ridges of the dorsal and lateral sides of the bone's body most probably show attachment traces of the interosseous muscles. Their distinctivevity may serve as evidence that the bone belongs to an adult individual.

The cuneiform III articular surface is nearly flat, with a very faint ventro-dorsal concavity. It is moderately high and triangular in shape. The ventral edge of the surface is narrowed and features a rather steep medial dip. Its plantar surface is directed medio-distally.

The dorsal relief of the proximal end is well visible in a faint central convexity bounded on both sides by prominent tuberosities. The medial surface of this end has a very clear dorsal facet (facet length = 5.9 mm; width = 6.9 mm). The surface lacks a ventral facet. Its place is taken by a faint fossa which distally borders a well-developed ventral tubercle that, likely, served for the attachment of interosseous ligaments between the cuneiform III and MTT. III. The lateral side of the proximal end has a rectangular dorsal facet (length = 7.9 mm, width = 8.3 mm). Since this end of the bone is damaged, we can say little about the ventral facet. However, a deep fossa - extending both ventrally and distally - abuts the dorsal facet ventrally, and it may therefore be presumed that the ventral facet was also either absent or only slightly developed.

MEASUREMENTS

The total length (though parts are missing) of the MTT. III is of 54.7 mm. The width at midshaft is 7.3 mm and 8.2 mm transversally. The width of the proximal end is 18.5 mm, transversally - 13.1 mm and the width at the epicodyles is of ca 6.5 mm. The transversal width at the latter point is ca 9.5 mm, and the angle of the bone's body bending is approximately 20°

COMPARISONS AND COMMENTS

The Dmanisi MTT. III is quite similar to those of anatomically modern humans. At the same time, it also differs from them in some features. The significance of these differences is difficult to gauge, however. The total
REFERENCES


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