

Hominoids from Berg Aukas, Middle Miocene, Namibia – Revision of dental measurements

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Abstract :- Revised measurements of hominoid teeth from Berg Aukas, Namibia, indicate that the two species previously reported from the site were of similar body size, raising the possibility that there might be only a single species present. However comparisons of dental morphology confirm the hypothesis of two species, *Otavipithecus namibiensis* and cf *Kenyapithecus* sp. closer in dimensions to *K. africanus* than to *K. wickeri*.

Key words :- Late Middle Miocene, Hominoidea, Africa, Measurements, Dentition

To cite this paper :- Mocke, H., Pickford, M., Senut, B. & Gommery, D. 2023. Hominoids from Berg Aukas, Middle Miocene, Namibia - Revision of dental measurements. *Communications of the Geological Survey of Namibia*, **26**, 34-38.

Introduction

The sample of late Middle Miocene hominoids from Namibia was recently augmented by the description of several dentognathic and postcranial specimens collected at Berg Aukas during the 1960's (Mocke *et al.* 2022). In that study, the material was interpreted to belong to a genus close to *Kenyapithecus*, because the morphology of the cheek teeth is closer to the situation in

Kenyapithecus wickeri Leakey, 1962, from Kenya, than it was to the type material of *Otavipithecus namibiensis* Conroy *et al.* 1992

Restudy of all the Berg Aukas fossils in 2022 led to the realisation that the published measurements were taken in slightly different ways from the usual method. We herein publish revised measurements of the dental remains (Table 1).

Material and Methods

The fossils are curated at the Earth Science Museum, Geological Survey of Namibia, Windhoek, under the register numbers GSN BA 11'21, mandible and GSN BA 12'21, upper molar.

The mesio-distal length and bucco-lingual breadth of the fossil teeth were measured using metal sliding calipers to the nearest tenth of a mm.

Results

The new measurements of all the Berg Aukas hominoid teeth indicate that the recently described material (Mocke *et al.* 2022) agrees in metric details with the previously described hypodigm of *Otavipithecus namibiensis* (Conroy *et al.* 1992) (Table 1, Fig. 6). As a result, the length/breadth ratios of the teeth are slightly different from what was previously

published, and now accord more closely in length/breadth proportions to the original hypodigm of *Otavipithecus namibiensis*. However, the morphology of the teeth indicate that there are indeed two taxa of hominoids in the Berg Aukas sample, *Otavipithecus namibiensis* and a *Kenyapithecus*-like form (Figs 1-4).

Comparison of the upper molar from Berg Aukas (GSN BA 12'21) with East African hominoids, reveals similarities to the species

Kenyapithecus africanus (Le Gros Clark & Leakey, 1950) (Fig. 5).

Table 1. Measurements (in mm) of the teeth of cf *Kenyapithecus* sp. (GSN BA 11'21 and GSN BA 12'21) and *Otaviapithecus namibiensis* from Berg Aukas, Namibia. (MDL – mesio-distal length, BLB – bucco-lingual breadth). In italics are the previously published measurements of the material.

Tooth	MDL	BLB	MDL/BLB	<i>Published MDL</i>	<i>Published BLB</i>	<i>Published MDL/BLB</i>
GSN BA 11'21 rt m/1	8.5	7.4	1.15	<i>9</i>	<i>7</i>	<i>1.28</i>
GSN BA 11'21 rt m/2	9.2	8.6	1.07	<i>9</i>	<i>9</i>	<i>1.00</i>
GSN BA 11'21 rt m/3	10.7	8.8	1.21	<i>10</i>	<i>9</i>	<i>0.90</i>
GSN BA 12'21 rt upper molar	8.7	10.8	0.82	<i>9.0</i>	<i>11.0</i>	<i>0.81</i>
Holotype <i>O. namibiensis</i> rt m/1	8.5	7.6	1.18			
Holotype <i>O. namibiensis</i> rt m/2	10.0	9.2	1.08			
Holotype <i>O. namibiensis</i> rt m/3	9.6	7.8	1.23			

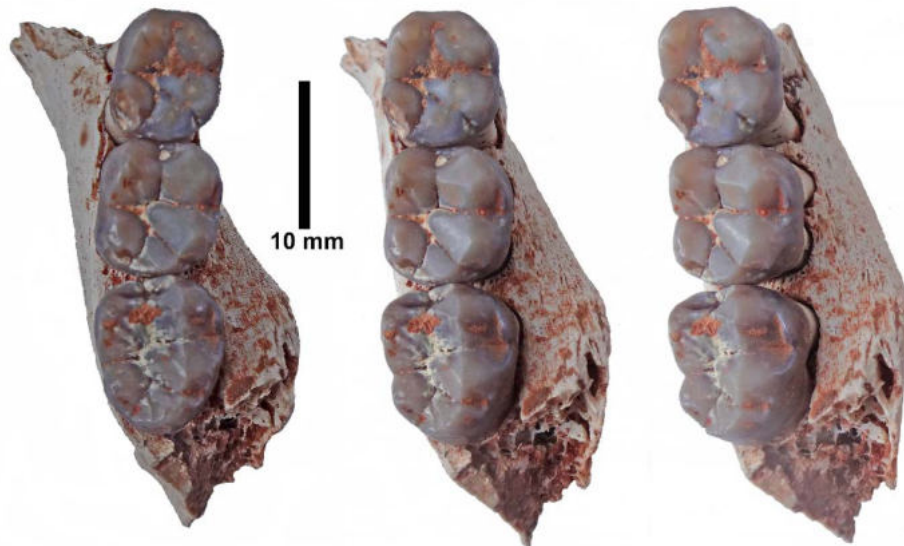


Figure 1. Stereo occlusal views of GSN BA 11'21, right mandible of cf *Kenyapithecus* sp. from the late Middle Miocene of Berg Aukas, Namibia.

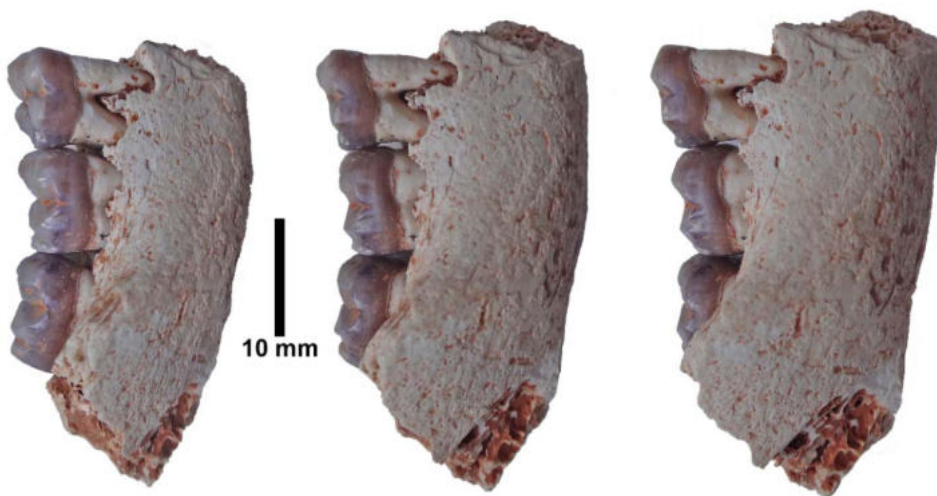


Figure 2. Stereo buccal views of GSN BA 11'21, right mandible of cf *Kenyapithecus* sp. from the late Middle Miocene of Berg Aukas, Namibia.

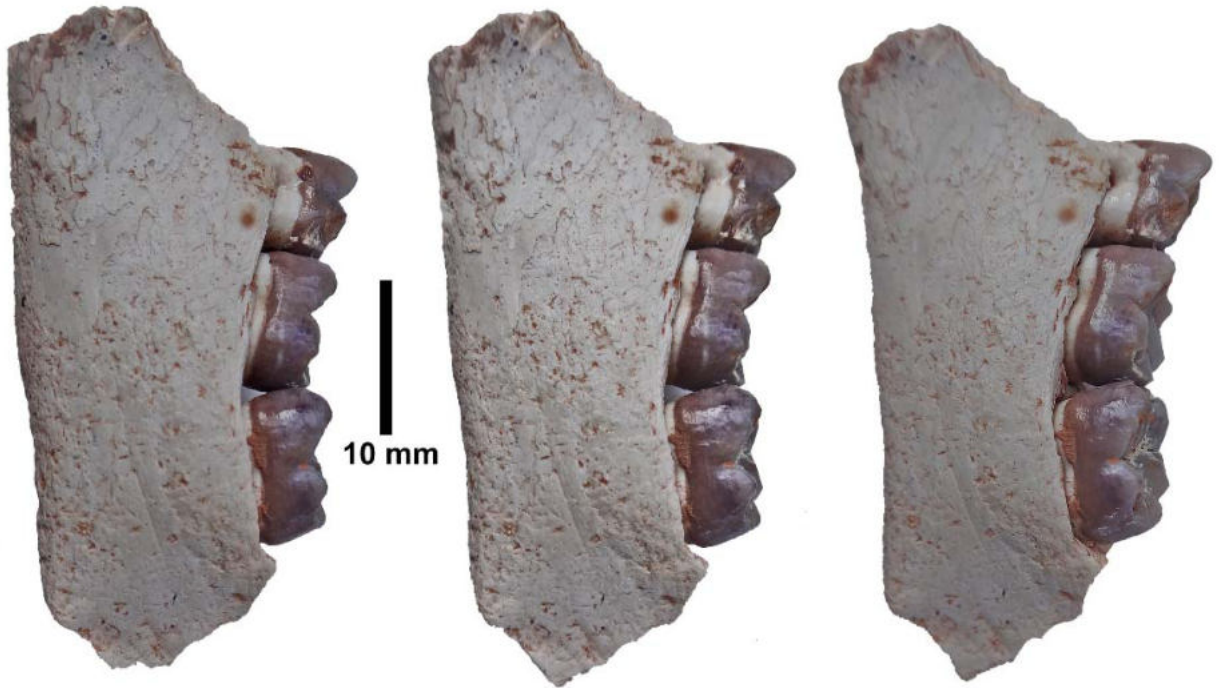


Figure 3. Stereo lingual views of GSN BA 11'21, right mandible of cf *Kenyapithecus* sp. from the late Middle Miocene of Berg Aukas, Namibia.

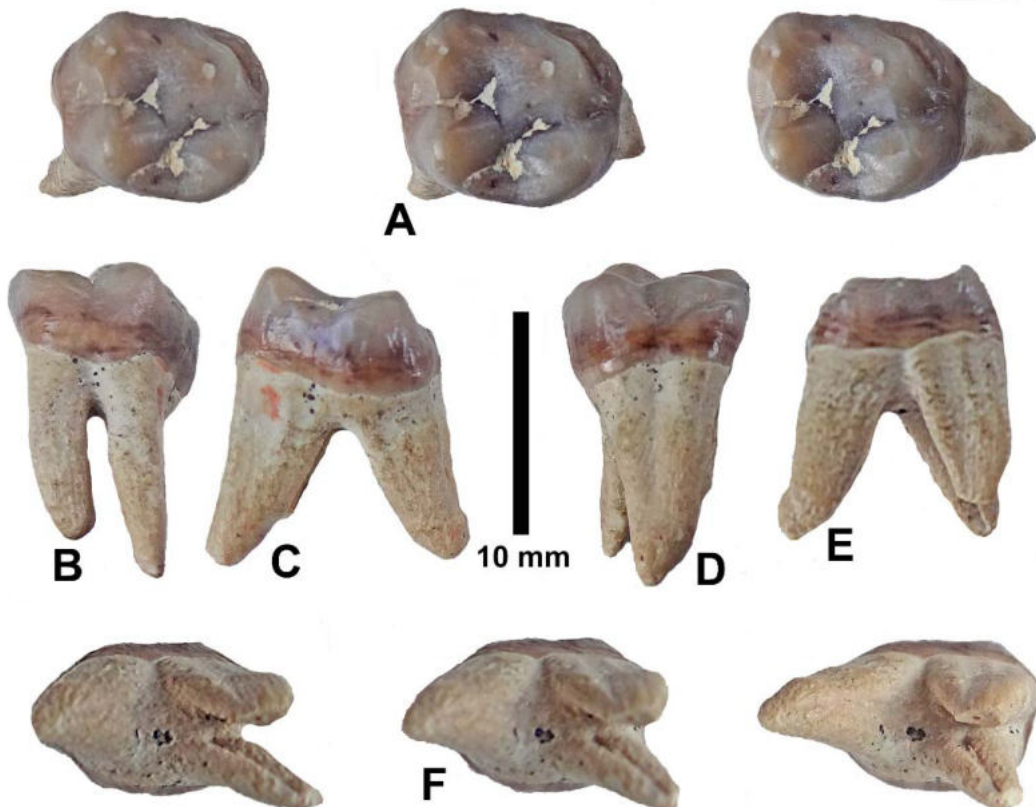


Figure 4. GSN BA 12'21, right upper molar of cf *Kenyapithecus* sp. from the late Middle Miocene of Berg Aukas, Namibia. A) stereo occlusal views, B) buccal view, C) distal view, D) lingual view, E) mesial view, F) stereo radicular view.

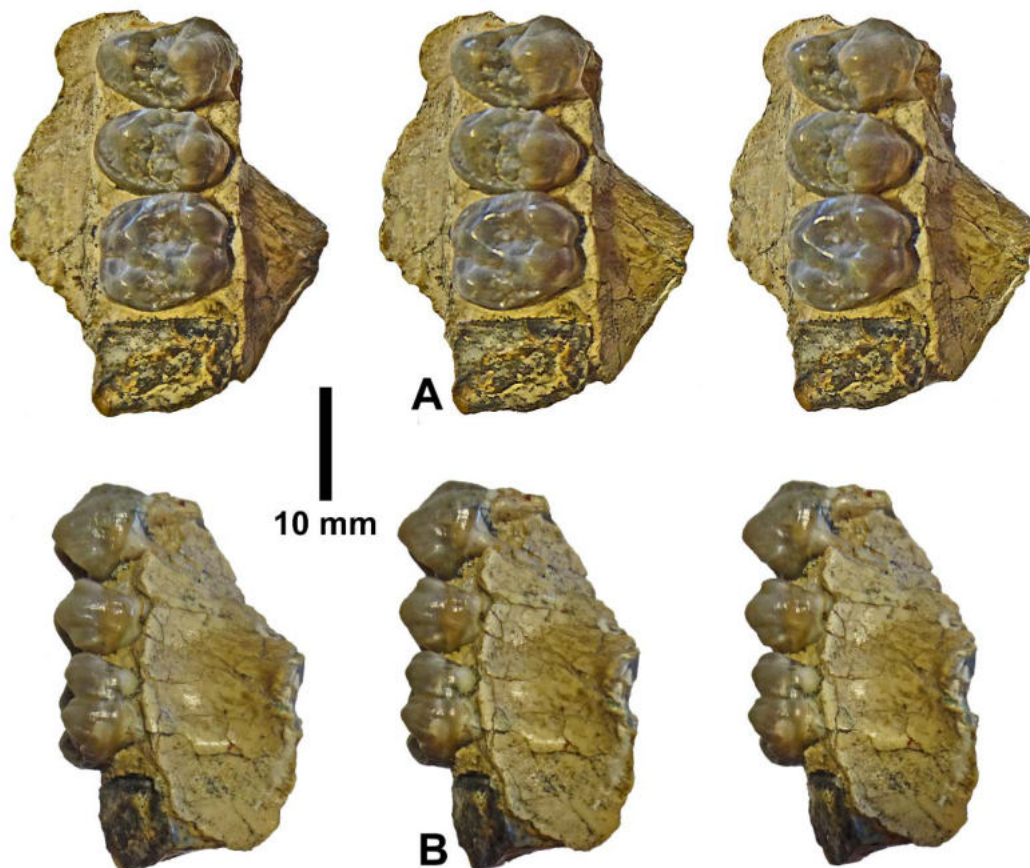


Figure 5. NHMUK M 16649, holotype maxilla with P3/-M1/ and roots of M2/ of *Kenyapithecus africanus* from the Middle Miocene of Kenya, probably Maboko. A) stereo occlusal views, B) stereo lateral views.

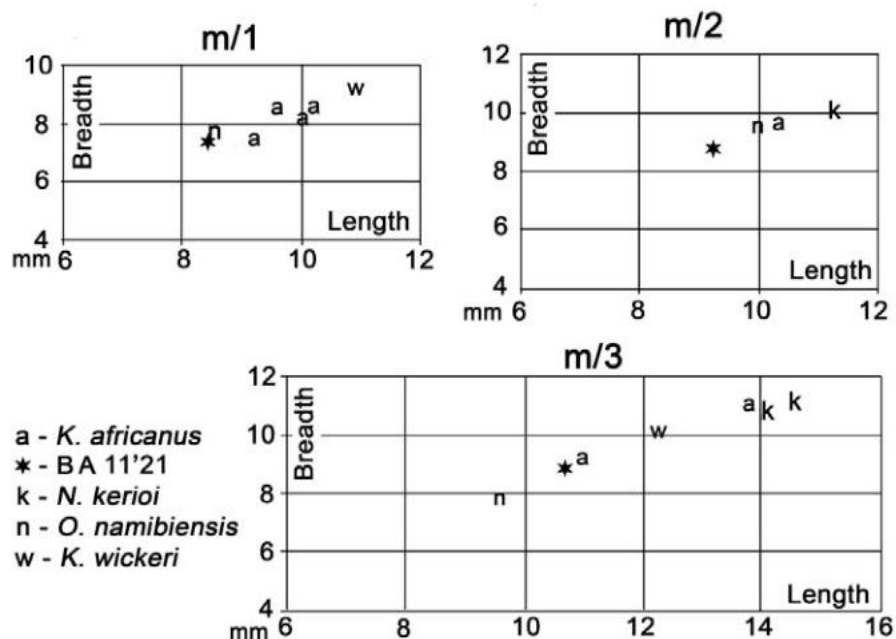


Figure 6. Bivariate metric comparisons between lower molars of cf *Kenyapithecus* sp. (GSN BA 11'21) and the holotype of *Otavipithecus namibiensis* from Berg Aukas, Namibia, and three species of Middle Miocene hominoids from Kenya. Overall, BA 11'21 is closest to *Kenyapithecus africanus* (Le Gros Clark & Leakey, 1950) (figure modified from Mocke *et al.* 2022). (Measurements of East African specimens are from Pickford, 1985; Ishida *et al.* 1999 and Kunimatsu *et al.* 2004).

Conclusion

Revised measurements and re-examination of the dental sample of hominoid fossils from Berg Aukas, Namibia (late Middle Miocene) indicate that the two species of ape-like creature that have been reported from there

were of similar body size, but that the differences in dental morphology indicate that they belong to distinct genera, as was concluded in previous studies.

Acknowledgements

We thank Mr Faan Van der Merwe for providing access to the fossils for detailed study. The National Commission on Research, Science and Technology authorised the Namibia Palaeontology Expedition to carry out research in the country. The NPE is a collaborative project undertaken by the Geological Survey of Namibia and the French

National Museum of Natural History/Sorbonne University (CR2P).

Funding was provided by the ATM project PalPrim Namibie (Paléobiodiversité des Primates du Néogène et du Quaternaire en Namibie) and by the Simone and Cimo Del Duca Foundation (Institut de France).

References

- Conroy, G., Pickford, M., Senut, B., Van Couvering, J. & Mein, P. 1992. *Otavi-pithecus namibiensis*, first Miocene hominoid from Southern Africa (Berg Aukas, Namibia). *Nature*, **356**, 144-148.
- Ishida, H., Kunimatsu, Y., Nakatsukasa, M. & Nakano, Y. 1999. New hominoid genus from the Middle Miocene of Nachola, Kenya. *Anthropological Science*, **19**, 189-191.
- Kunimatsu, Y., Ishida, H., Nakatsukasa, M., Nakano, Y., Sawada, Y. & Nakayama, K. 2004. Maxillae and associated gnathodental specimens of *Nacholapithecus kerioi*, a large-bodied hominoid from Nachola, northern Kenya. *Journal of Human Evolution*, **46**, 365-400.
- Leakey, L.S.B. 1962 (1961). A new lower Pliocene fossil primate from Kenya. *Annals and Magazine of Natural History*, **13** (4), 689-697.
- Le Gros Clark, W.E. & Leakey, L.S.B. 1950. Diagnoses of East African Miocene Hominoidea. *Proceedings of the Zoological Society of London*, **105**, 260-262.
- Mocke, H., Pickford, M., Senut, B. & Gommery, D. 2022. New information about African late Middle Miocene to latest Miocene (13-5.5 Ma) Hominoidea. *Communications of the Geological Survey of Namibia*, **24**, 33-66.
- Pickford, M. 1985. A new look at *Kenya-pithecus* based on recent collections from Western Kenya. *Journal of Human Evolution*, **14**, 113-143.