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Short Communication

The Issues of Classification and Phylogenetic Position of *Australopithecus sediba*

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Williams et al. in their work 'New fossils of *Australopithecus sediba* reveal a nearly complete lower back' furnish evidence to confirm the conclusion of the founders of *A. sediba* [1] that the species is a transition from arboreal to terrestrial bipedal locomotion. It raises a number of questions regarding the classification and phylogenic position of fossils recovered from the Malapa sites in South Africa.

a) There appears to be a certain inconsistency in assigning the species and defining its place in the hierarchy of bipedal primates. [1] placed *A. sediba* in family Hominidae Gray 1825, while Williams et al. (2021) have applied the term 'hominin' and virtually assigned this species to Tribe Hominini Gray 1825 without any further explanations. The classification uses a subject-attribute form of a group name, where the genus has a subject basis, and a species has either trivial or differentiating character [2]. That said, 'the species and the genus were always the work of nature', and the genus includes a description of specific features presumably intrinsic to the initial form of a species [3]. Therefore, Raymond Dart (1925), the founder of the species *Australopithecus africanus* assumed that the species originated from the genus of a southern primate from the family Homo-Simiadae, and assigned the name *Australopithecus* to this genus, meaning 'a southern ape'. As the authors posit that *A. sediba* is a transition from arboreal to bipedal locomotion, then it is clear why the collection is referred to the *Australopithecus* genus. What is not clear, however, is why the *Australopithecus* genus has been moved from family Homo-Simiadae to family Hominidae or to Tribe Hominini, both of which can hardly be expected to include apes.

b) When exploring the phylogenetic position of the species *A. sediba*, the authors put forward four hypotheses of origin [4]. Such uncertainty may be accounted for by the lack of study of the species' diet adaptation. It is generally accepted that African bipedal primates are dichotomically divided into two diet types (for the purposes of this commentary, let us call them radicophagous and omnivorous), which is proved by the two types of craniodental architectures [5,6]. Also, the individuals are known to have two walking styles [7] and two types of femur bone architecture [8]. This is indicative of a sympatric coexistence of two genetically incompatible self-reproductive groups of bipedal primates. Checking the fossils for diet specialization might have proved instrumental in defining the phylogenetic position of *A. sediba* more precisely.

c) The authors also claim that *A. sediba* individuals featured mixed adaptation to both arboreal and terrestrial bipedal locomotion. It must be noted that the site of Malapa is located in the Bloubank stream valley around fifteen kilometers away from a famous cluster of Sterkfontein, Makapansgat, Swartkrans, and Kromdraai sites. It is in these dolomitic deposits that species *A. robustus* and *A. africanus* were recovered. Though no mosaic adaptation has been discovered in these species. Moreover, the Taung Child endocast of *A. africanus* [9] showed the significant differences in the brain architecture compared to apes, including reduction in the primary visual striate cortex (Brodmann area 17) and relative increase in the posterior parietal cortex. The brain architecture of this kind makes it almost impossible for the individuals to live in trees. It must also be said that the earliest (6.0 mya) African bipedal species *O. tugenensis* (Senut et al. 2001) had digital pulps on fingertips that increased the surface of contact with objects being manipulated, and the pollical distal phalanx that allowed additional grip on the object gripped by means of the pressure from the thumb in the opposite direction [10]. It suggests that the use of bones and sticks as instruments (referred to as 'osteodontokeratic culture' by R. Dart) was a usual practice even in those days. And starting with 2.6-2.5 mya, true stone tools made according to the "Oldowan" technology are found in the African layers [11].

In this situation, the transition of a population of arboreal primates to terrestrial bipedalism in 2 mya seems highly unlikely.

Conclusion

Therefore, it might be advisable to review the specific features of the fossils from the Malapa deposits in order to redefine the classification and phylogenetic position of these collections assigned to the species *A. sediba*. Also, a comparative analysis of these fossils with the fossils from the neighbouring deposits might prove to be useful.

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