

ABSTRACT

Recent studies of the dental remains from Malapa, a fossil-bearing karstic cave-site located in the Cradle of Humankind (Berger *et al.*, 2010), have demonstrated the presence of dental calculus and associated plant material in the form of phytoliths, preserved on the teeth of *Australopithecus sediba* (MH1) (Henry *et al.*, 2012). This discovery raised the probability that dental calculus and plant microremains may also be present on hominin material from other cave sites in southern Africa, where fossils are preserved under similar conditions. The aim of this study was to establish the presence of dental calculus and associated microfossils on the teeth of other southern African Plio-Pleistocene early hominins. The dental collection of the Plio-Pleistocene age hominin site of Sterkfontein was examined. Where fossils were observed with adherent material, several analyses were performed to determine whether this material was calculus or not. Where possible, comparisons with the texture of the sediment matrix surrounding the fossil were conducted. Small quantities of this material were removed and observed microscopically to determine if it included food particulates and microfossils. In these cases, we also looked for microfossils in the surrounding matrix as a control. Phytoliths were recovered from all tooth sample material tested. The establishment of phytoliths in the dental calculus is direct evidence that these two structures existed simultaneously, as the formation of calculus can only take place in the presence of saliva. A large number of phytolith morphotypes further indicated that *A.africanus* had an adaptable and diverse diet, and that monocotyledons and dicotyledons appear to have made up a considerable part of their diet. The results from this study will benefit future analyses, by not only providing new protocols for establishing the presence of dental calculus, but also for promoting better preservation of dental calculus in the future. Further, future studies may be able to obtain direct evidence of consumed food that can directly be associated with individual hominins' feeding behaviours. This could result in significant clues to the diet and

ecology of not only individual hominins, but populations, species and comparisons of diet and behaviour between species and genera.