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Putting dental calculus under the microscope

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1. Dental calculus, the small unsuspecting substance stuck to your teeth, is about the most massively useful thing an archaeologist can have. You can find DNA from a variety of plants, animals, bacteria, and the human host; larger molecules and small remnants of past meals; and use it to discover clues about oral and systemic health.
2. We still have a lot to learn about what happens with dietary microremains after they enter our mouth. Once we start exploring this, we will know more about how granules become trapped in dental calculus and why we can find them in archaeological remains.
3. Validation of methods and results from archaeological remains is not possible using archaeological remains only. Future studies need to include modern populations and oral biofilm models.
4. Calcifying oral biofilm models are a good proxy for naturally occurring dental calculus, but they will never be able to mimic the full complexity of the natural oral cavity.
5. Advances in dietary research on dental calculus will be led by the adoption of scientific methods and experimentation from a variety of disciplines and close collaboration with experts; it will not come about by an obsession with finding the ‘oldest’ example of [insert dietary or non-dietary practice here].
6. Once we understand fundamental mechanisms of how dietary markers become trapped inside dental calculus, we will have a much clearer understanding of the limitations and will be able to make much bolder interpretations in the future.
7. The ethical considerations of studying archaeological dental calculus need to be better defined. Dental calculus may be considered an ectopic growth, but it very much contains intimate pieces of a once-living person.
8. We should be more child-like in our approach to calculus research (and science in general). Keep asking ‘why’ until we reach a point where we don’t know the answer.
9. A study can be novel without being impactful, and a study can be impactful without being novel.
10. Gatekeepers and those resistant to changing traditional systems of scientific output and “impact” metrics are hindering scientific progress and knowledge accumulation. Those who are perpetuating the system are complicit. Out-dated reward systems are preventing the widespread adoption of open practices and disproportionately impacting early career researchers and researchers/institutes with limited access to funding.
11. Academia, in its current state, is not a system that fosters good, collaborative, and rigorous science. It rewards competition, not cooperation. It rewards quantity, not quality. And it rewards a narrow vision of research output with opaque metrics encouraging a misleading sense of impact.
12. A dissertation is an inadequate medium to judge the journey taken by a PhD student.