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Putting dental calculus under the microscope

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Putting Dental Calculus Under the Microscope

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Jan Bartholdy

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Table of contents

Preface	1
Acknowledgements	5
Open Science Statement	7
1 Introduction	9
1.1 Dental calculus in archaeology	11
1.2 What is dental calculus?	15
1.3 The study of dental calculus	17
1.4 The challenges of studying dental calculus	20
1.5 Aims	23
1.6 Thesis outline and structure	24
References cited	26
2 Background	37
2.1 Oral biofilms	38
2.1.1 Dental plaque	39
2.1.2 Dental calculus	45
2.2 Oral biofilm models	48
References cited	52
3 Article 1	61
3.1 Introduction	62
3.2 Materials and methods	65
3.2.1 Biofilm growth	65

iv *table of contents*

3.2.2	Metagenomics	68
3.2.3	FTIR	72
3.2.4	Statistics	74
3.3	Results	74
3.3.1	Metagenomic analysis	74
3.3.2	Samples show an increased mineralisation over the course of the experiment	85
3.3.3	Model calculus has a similar mineral composition to natural calculus	86
3.3.4	Samples show similar crystallinity and order to reference calculus	86
3.4	Discussion	89
3.4.1	Microbiome	89
3.4.2	Mineralisation	90
3.4.3	Replicability	91
3.4.4	Limitations	92
3.4.5	Future work	93
3.5	Conclusions	94
3.6	References cited	94
4	Article 2	105
4.1	Introduction	106
4.2	Materials and Methods	108
4.2.1	Biofilm formation	108
4.2.2	Amylase activity detection	110
4.2.3	Treatment solutions	111
4.2.4	Extraction method	111
4.2.5	Statistical analysis	112
4.3	Results	112
4.3.1	No amylase activity detected in the model	114
4.3.2	Treatment type had minimal effect on biofilm growth	114
4.3.3	Starch counts	114
4.4	Discussion	119
4.5	Conclusion	124
	References cited	125
5	Article 3	135
5.1	Introduction	136
5.2	Materials	137

5.3	Methods	138
5.3.1	Skeletal analysis	138
5.3.2	Calculus sampling	141
5.3.3	UHPLC-MS/MS	141
5.3.4	Statistical analysis	142
5.4	Results	143
5.4.1	Correlations between detected alkaloids and diseases	145
5.5	Discussion	148
5.6	Conclusion	156
	References cited	157
6	Discussion	167
6.1	The dental calculus model	169
6.1.1	Model application	172
6.1.2	Model limitations	173
6.1.3	Further model validation	175
6.1.4	Potential biofilm model applications in archaeology	176
6.2	Dental calculus in archaeology and future challenges	178
6.2.1	Incorporation pathways	179
6.2.2	Identification of fragmented remains	181
6.2.3	Contamination and lab processing	183
6.2.4	Deliberate and efficient sampling and analysis	187
6.3	Thoughts on the future	190
6.4	Concluding remarks	194
	References cited	196
	Supplementary Information	211
	Summary	213
	Samenvatting	217
	Curriculum Vitae	221

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List of Figures

1.1	Plot of the number of articles per year in bioarchaeology and clinical dentistry with the term 'dental calculus' in the title.	12
1.2	Word cloud of most common dental terms in articles. Figure is from Pilloud & Fancher (2019), Figure 1.	14
2.1	A simplified overview of biofilm formation stages. Created with BioRender.com.	40
2.2	General structure of a bacterial cell. Common features of gram-negative bacteria on the left, and common features of gram-positive bacteria on the right. Created with BioRender.com. . . .	42
3.1	Overview of the protocol for biofilm growth. The samples for metagenomic analysis were grown in a separate experimental plate than the FTIR samples under the same experimental conditions. Biofilm (B) and calculus (C) samples were used for FTIR spectroscopy, and saliva (S), artificial saliva (M), and calculus samples were used for metagenomic analysis.	66
3.2	Plot of Shannon Index, Pielou Evenness Index, and number of species across experiment samples grouped by sampling time. inoc = samples from days 0-5; treatm = samples from days 6-23; model = model calculus samples from day 24.	75
3.3	sPCA on species-level counts and oxygen tolerance in samples from this study only. Figure shows the main sPCA plot (A), species loadings on PC2 (B), and species loadings on PC1 (C).	77

viii list of figures

3.4	Log-fold changes between sample types. Circles are species enriched in the medium, triangles are enriched in model calculus, and diamonds are enriched in saliva. Lines are standard error. Plot shows the top 30 absolute log-fold changes between model calculus and saliva.	78
3.5	Shannon Index for model calculus and medium samples, as well as oral reference samples and comparative <i>in vitro</i> study.	80
3.6	Core genera within the different types of samples represented as mean relative abundances at the genus level. Other = other genera present in lower than 5% relative abundance.	81
3.7	sPCA on species-level counts from model calculus and reference samples. Figure shows (A) the main sPCA plot, (B) the species loadings from PC2, and (C) species loadings on PC1.	82
3.8	Log-fold changes between sample types. Circles are species enriched in the model calculus, triangles in modern calculus, diamonds are enriched in subgingival plaque, and squares in supragingival plaque. Plot shows the top 30 loadings (absolute value) in PC1 (A) and PC2 (B) between model calculus and other sample types, ordered by decreasing log-fold change. Bars represent standard error.	84
3.9	Select spectra from all experiment sampling days; (A) day 7, (B) day 12, (C) day 16, and (D) day 24. Absorbance bands in stretching mode around 3400 cm ⁻¹ typical of the hydroxyl group. Analysis ID for model samples is constructed as: F[day sampled].[well sampled]_[grind sample].	87
3.10	Grinding curves of our biofilm and model calculus compared to published trendlines (dashed light grey lines) for archaeological (dotted line) and modern (dashed line) enamel.	88
4.1	Overview of experiment protocol including the plate setup.	110
4.2	Microscope images of biofilm samples that were exposed to the starch solutions. Starch granules can be seen within bacterial communities and isolated. Scale bar = 20 μm.	113
4.3	Proportion of sizes of starch granules from solutions (outer ring) and treatment samples (inner ring) in separated wheat (A) and potato (B) treatments, and mixed wheat (C) and potato (D) treatments.	118

4.4 Scatter plots of (A) sample weight in mg and standardised starch count by z-score for separated treatments, and (B) sample weight in mg and standardised count of starch grains per mg calculus. . 119

5.1 Overview of sample demography. Left plot is the first batch and right plot is the replication batch with 29 of the individuals from the first batch. *eya* = early young adult (18-24 years); *lya* = late young adult (25-34 years); *ma* = middle adult (35-49 years); *old* = old adult (50+ years). *Male?* = probable male; *Female?* = probable female. 139

5.2 (A) Number of samples in which each compound was detected in the first and second batch. (B) Quantity (ng) of each compound extracted from each sample in batch 2. The plot displays the extracted quantity across the three washes and final calculus extraction (*calc*). Each coloured line represents a different calculus sample. *CBD* = cannabidiol; *CBN* = cannabinol; *THC* = tetrahydrocannabinol; *THCA-A* = tetrahydrocannabinolic acid A; *THCVA* = tetrahydrocannabivarin acid. 144

5.3 (A) Violin plot with overlaid box plots depicting the distribution of extracted quantities of each compound from batch 2 separated by state of preservation of the skeleton. (B) Extracted quantity (ng) of compound plotted against weights of the calculus samples from batch 2. *r* = Pearson correlation coefficient. 146

5.4 Plot of the polychoric correlations (*rho*). Larger circles and increased opacity indicates a stronger correlation coefficient. *OA* = osteoarthritis; *VOP* = vertebral osteophytosis; *SN* = Schmorl's nodes; *DDD* = degenerative disc disease; *CO* = cribra orbitalia; *CMS* = chronic maxillary sinusitis; *SA* = salicylic acid. 149

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List of Tables

3.1	Number of samples taken during the experiment, separated by sampling day and sample type.	69
3.2	Summary of samples used in FTIR analysis, including type of sample, sampling day, number of samples (n), and mean weight in mg.	72
4.1	Summary statistics for biofilm dry-weights (in mg) by treatment.	114
4.2	Mean starch counts from solutions, including the proportional makeup of the different sizes of granules.	115
4.3	Mean starch counts extracted from samples with standard deviation (SD), including the proportion of granule sizes of the total count.	116
4.4	The mean percentage of starches from the solutions that were incorporated into the samples.	116
4.4	The mean percentage of starches from the solutions that were incorporated into the samples.	117
5.1	Target compound including whether it was detected (TRUE) or not (FALSE) in each batch, as well as the lower limit of quantitation (LLOQ) in ng. CBD = cannabidiol; CBN = cannabinol; THC = tetrahydrocannabinol; THCA-A = tetrahydrocannabinolic acid A; THCVA = tetrahydrocannabivarin acid.	143

xii *list of tables*

5.2 Pearson correlation (r) on dichotomous skeletal lesions and compound concentrations (ng/mg) from the second batch. Correlations between pairs of dichotomous variables are removed due to incompatibility with a Pearson correlation. Moderate and strong correlations in **bold**. OA = osteoarthritis; VOP = vertebral osteophytosis; SN = Schmorl's nodes; DDD = degenerative disc disease; CO = cribra orbitalia; CMS = chronic maxillary sinusitis; SA = salicylic acid; PN = pipe notches. 147

Preface

This is not a traditional dissertation, which was a conscious choice on my part. First of all, it's not very common for a dissertation in my faculty to have a preface, which is why I have prefaced this preface with an explanation for why I need a preface. This mainly explains decisions regarding the format and style of my dissertation rather than the scientific content, which is why you won't see the phrase 'dental calculus' here. Oh, shoot...

Feel free to jump directly to Chapter 1 if you don't want to read this.

When I started my PhD research I had no intentions of shaking things up. I was going to put my head down and do my research, publish my articles in traditional journal venues, create a traditional article-based dissertation, and finish in the allotted four years. Six years later, and I accomplished... well, none of the above. Along the way I got a look behind the curtain of academic publishing. I didn't like what I saw. Not even a little bit. This was fueled by an introduction to Open Science. Science in the context of Open Science just made sense to me. This caused some delays as I dove head first into an Open Science rabbit hole. Also, covid. At first I vowed (to myself and those around me who would listen) never to publish any of my papers in Evilseer. Then, I took it a step further and vowed the same for more major publishers, including Springer and Wiley. Why do we pay publishers to take our copyright, publish our research, then pay extra so we're allowed read it? You may not be paying out of pocket, but your library is likely

2 *preface*

covering those costs with expensive subscriptions. I'm sure they would much rather use that money on more useful stuff. All this to say, you won't find any of my PhD papers in the traditional journals. I wanted to try different platforms, like preprint servers and PCI_Archaeology.

Around the beginning of my PhD research I was also introduced to R statistical software. I can no longer remember how this came about, but after many months of rage-quitting and returning to SPSS, vowing never to open R again, I started to see the value of using scripting languages (and free, open-source software) for statistical analysis. It turns out when you have a document outlining every step you made in the analysis, it's easy to reproduce; both by yourself and others. Who knew? No need for the same 'point and click' all over again. I used R Markdown for most of my output, website, presentations, articles, etc. Then I took it a step further and started writing my dissertation in R Markdown (and eventually Quarto). My dissertation was now fully reproducible, and could be rendered in different formats with little change to the documents with the actual content. One of these formats was HTML. I could turn my dissertation into a website. That was pretty cool. I could have a dynamic, outward-facing dissertation easily modified when needed. This series of events led me to publishing my dissertation online, before it was completed, as a way to show the progress to the world. Of course most of the world didn't actually care, but a few people thought it was a pretty cool idea; and, more importantly, it made the writing part enjoyable. Or at least as enjoyable as something that's not very enjoyable in the first place. It definitely motivated me to make continuous progress. The (theoretically) wide availability of my dissertation made me start thinking about accessibility. This means increasing the readability and legibility of the dissertation, not only with the formatting, but with the language used. This doesn't necessarily mean that it can be easily picked up by someone with limited knowledge of the field. Writing 'academically' is not just exclusionary to members of the public, but also to those for whom English does not come naturally. Plus, I've found it to be a tedious read, even as a native English speaker. In my experience, writing more accessibly also requires a deeper understanding of the

subject matter.

Open Science is a priority in all of my work and will be reflected in this dissertation; sometimes directly, sometimes indirectly. Admittedly this is occasionally taken to an extreme: A fully reproducible dissertation, publishing everything before it's actually done, and avoiding traditional journals. Ultimately I was just fed up with the status quo. We as researchers need to do better. Contributing to knowledge requires more than having a paper accepted in a 'prestigious' journal. We need to ask ourselves why we are doing science, and for whom we are doing it.

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Where to begin? So many people helped shape this thesis, and therefore I do not take full responsibility for the quality (or lack thereof) of this work.

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6 *acknowledgements*

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Finally, my dad. An unlimited source of support and guidance through the whole process. I couldn't have done it without you. I only wish you could have been here to see me finish it.

Open Science Statement

All materials and data, including the source code for the dissertation itself, are made available to the best of my ability. All articles in association with the dissertation are/will be Open Access.

All outputs can be found, either directly or indirectly, on the Open Science Framework (DOI: [10.17605/OSF.IO/3YX8M](https://doi.org/10.17605/OSF.IO/3YX8M)).



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