READ ME File for **“Dataset for: Synchrotron radiation-based X-ray tomography reveals sexual dimorphism in cementum incrementation”**

Dataset DOI: https://doi.org/10.5258/SOTON/D1467

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This dataset supports the publication:

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TITLE: Synchrotron radiation-based X-ray tomography reveals sexual dimorphism in cementum incrementation

JOURNAL: Proceedings of the Royal Society: Interface

Abstract of the paper:

Cementum is a mineralised dental tissue common to all mammals that grows throughout life, following a seasonally appositional rhythm. Each year, one thick translucent increment and one thin opaque increment is deposited, offering a near-complete record of an animal’s life history. Male and female mammals exhibit significant differences in oral health, due to the contrasting effects of female versus male sex hormones. Oestrogen and progesterone have a range of negative effects on oral health, that extends to the periodontium and cementum growth interface. Here, we use synchrotron radiation-based X-ray tomography to image the cementum of a sample of rhesus macaque (*Macaca mulatta*) teeth from individuals of known life history. We found that females have increments with significantly greater tortuosity and less organized cementum structure when compared to male increments. We quantified structural differences by measuring the greyscale ‘texture’ of cementum and comparing results using principal components analysis. Adult females and males occupy discrete regions of texture space with no overlap. Females with known pregnancy records also have significantly different cementum when compared with non-breeding and juvenile females. We conclude that cementum exhibits significant sexual dimorphism, reflecting differences in growth between females and males due to their differing oral environments.

This dataset contains:

\*8 bit straightened (folder)

Folder containing example 8-bit .tiff files of isolated and straightened cementum synchrotron data created for each specimen.

\*Appendix1.m

Matlab script for measuring 3D texture metrics.

\*Appendix2.m

Matlab script for applying a steerable gaussian filter to cementum data.

\*Appendix3.m

Matlab script for isolating the outermost five cementum increments in straightened data.

\*Appendix4.m

Matlab script for measuring tortuosity of cementum increment models.

Date of data collection: 2016-2019

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