

CEMENTOCHRONOLOGY:

About the "tree rings" in our teeth

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INTRODUCTION

Cementochronology relies on the count of pair of dark and light layers that are deposited on the acellular dental cementum (AEFC) in a circannual rhythm. The total count of the increments is added to the tooth-specific age at eruption to estimate the age of the individual.

PROS:

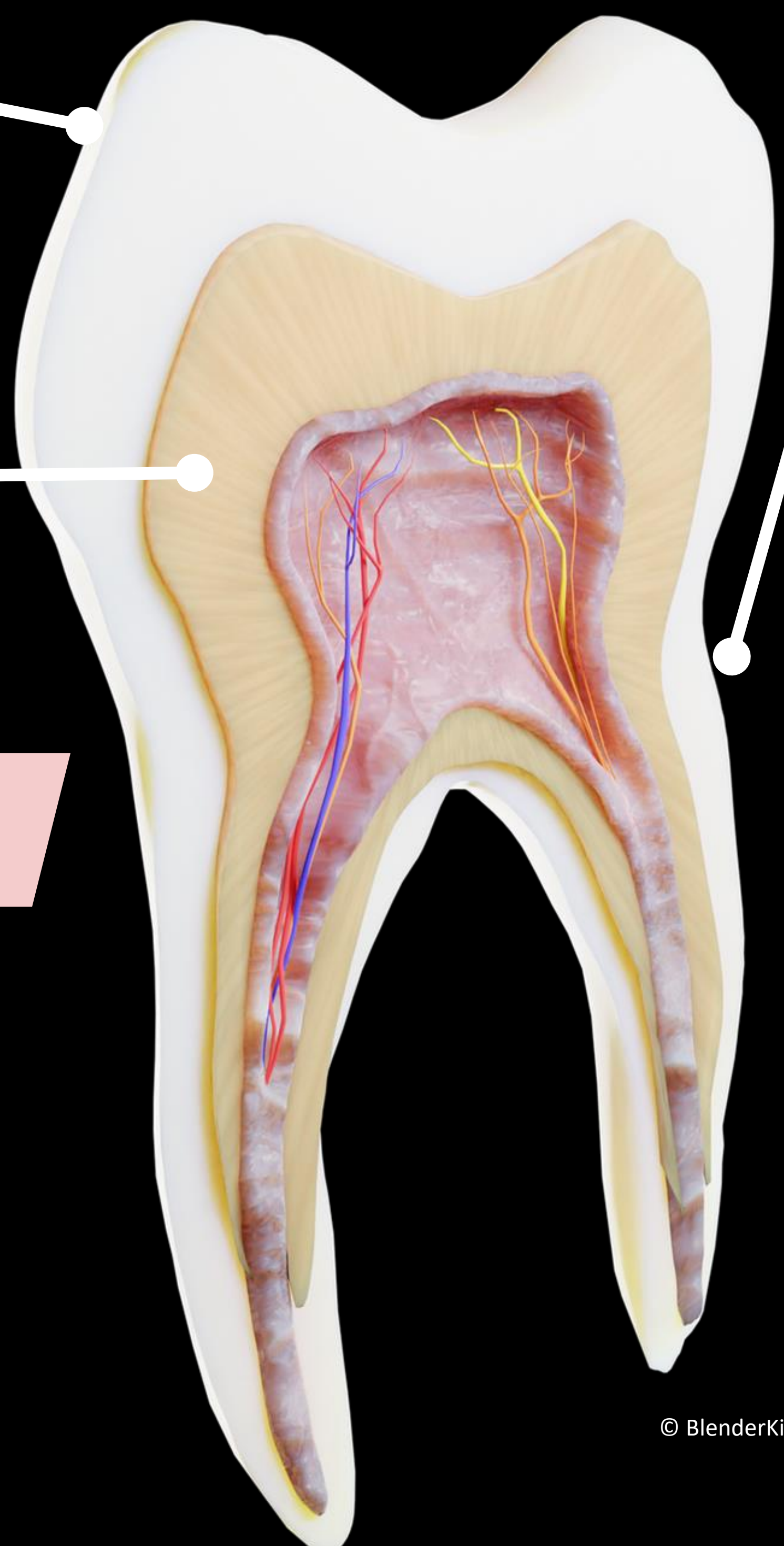
1. This technique can estimate age and season at death in adult individuals with a margin of error ± 5 years from real age^{1,2}.
2. In biological anthropology estimating age in adult individuals rely on the individual morphological changes that occur due to the aging process. Contrary to this, the AEFC increases with the same rhythm in everyone.

CONS:

3. The technique has suffered from years of controversies and skepticism due to a lack of consistent application of the protocol and a lack of an accessible repository for raw data, which would help not only in research reproducibility, but also with standardization of the technique itself^{3,4}.

ENAMEL

DENTINE

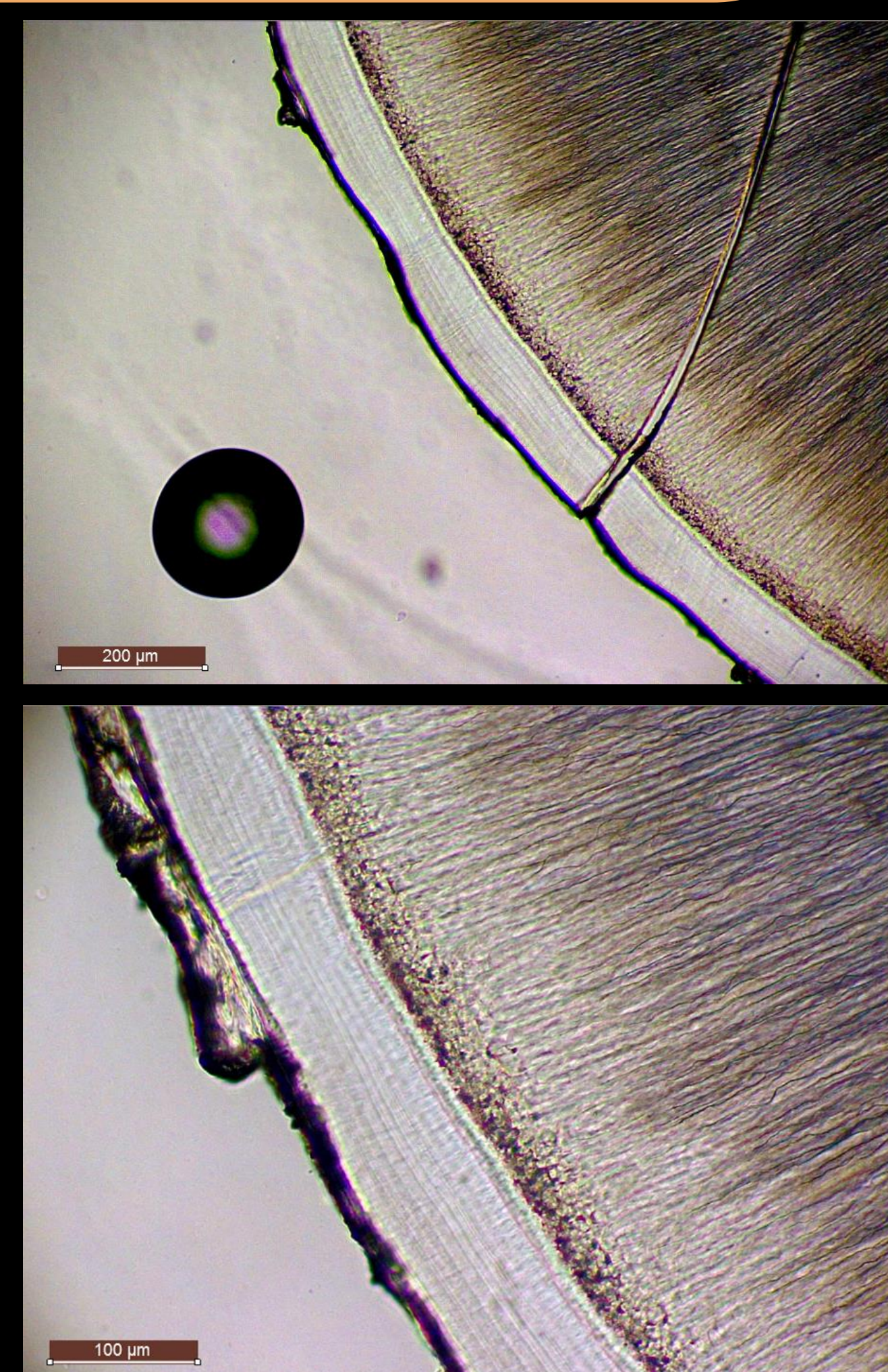
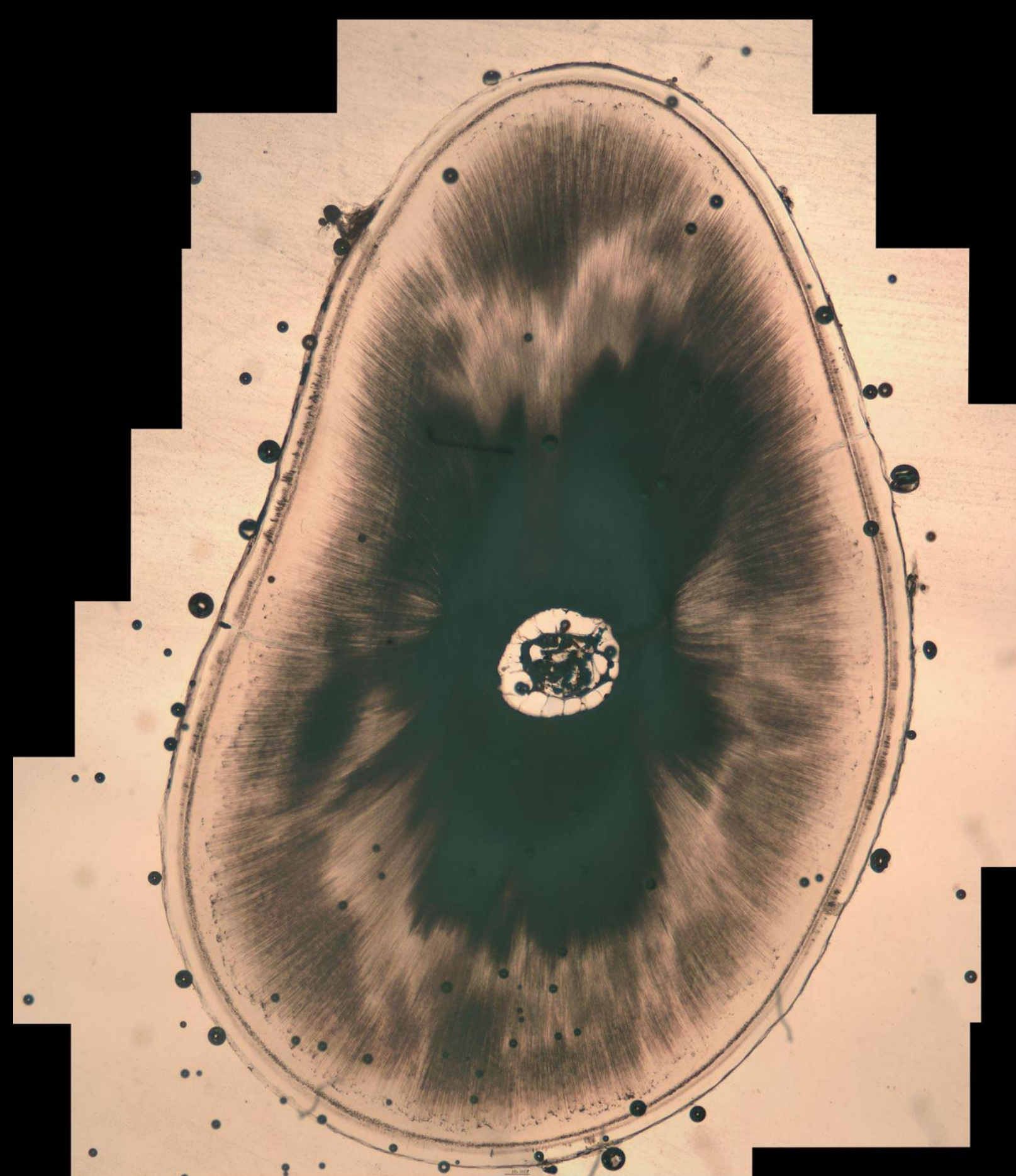


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ACELLULAR CEMENTUM

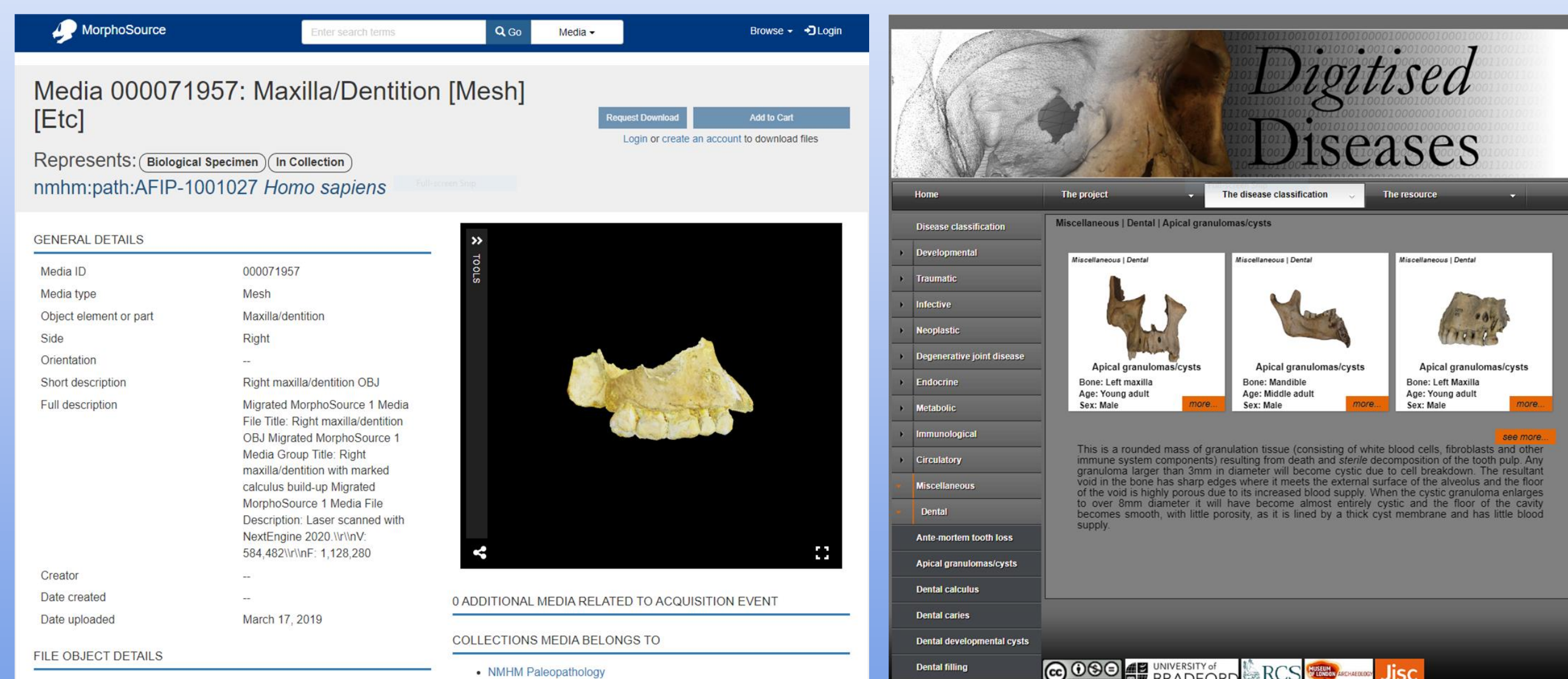
Why are we interested in this part of the dental cementum?^{5,6}

- ❖ It is found only on the first $\frac{1}{3}$ of the root.
- ❖ It **does not remodel** and **grows throughout an individual's life**.
- ❖ It can **record life events** (i.e., pregnancies) and give a hint of calcium metabolism disorders.
- ❖ It grows in alternating dark and light layers.
- ❖ Each layer forms **seasonally**, during a winter period (dark layer) and a summer period (light layer)
- ❖ The total pair of layer, the annuli, are added to tooth-specific age at eruption for age estimation.



OPEN ACCESS IN DENTAL ANTHROPOLOGY

A major effort in making biological anthropology more openly accessible has been carried out in recent years. Resources such as **MorphoSource**⁷ and **Digitised Diseases**⁸ are an example of this effort. Through these platforms, researchers and students can share digitized versions of their specimens, compare and learn from each other.



However, the same cannot be said for dental anthropology (only quickly covered in the abovementioned resources) and, even more specifically, for cementochronology.

In order to address this, part of this project will consist in:

- 1) Sharing our results for cementochronology in one of these pre-existing platforms;
- 2) Creating an **only-cementochronology database**, collecting micrographs, sample specifics and respective metadata for each sample.

A similar effort into creating open access resources for cementochronology studies will help in the affirmation of this technique as a valuable tool for age estimation by **a)** bringing researchers together and **b)** showing its scientific validity.

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