

# Tracing back a modern dental disease: a severe case of Molar Incisor Hypomineralisation (MIH) in an Imperial Roman Child (Isola Sacra, 1<sup>st</sup>-3<sup>rd</sup> century AD)

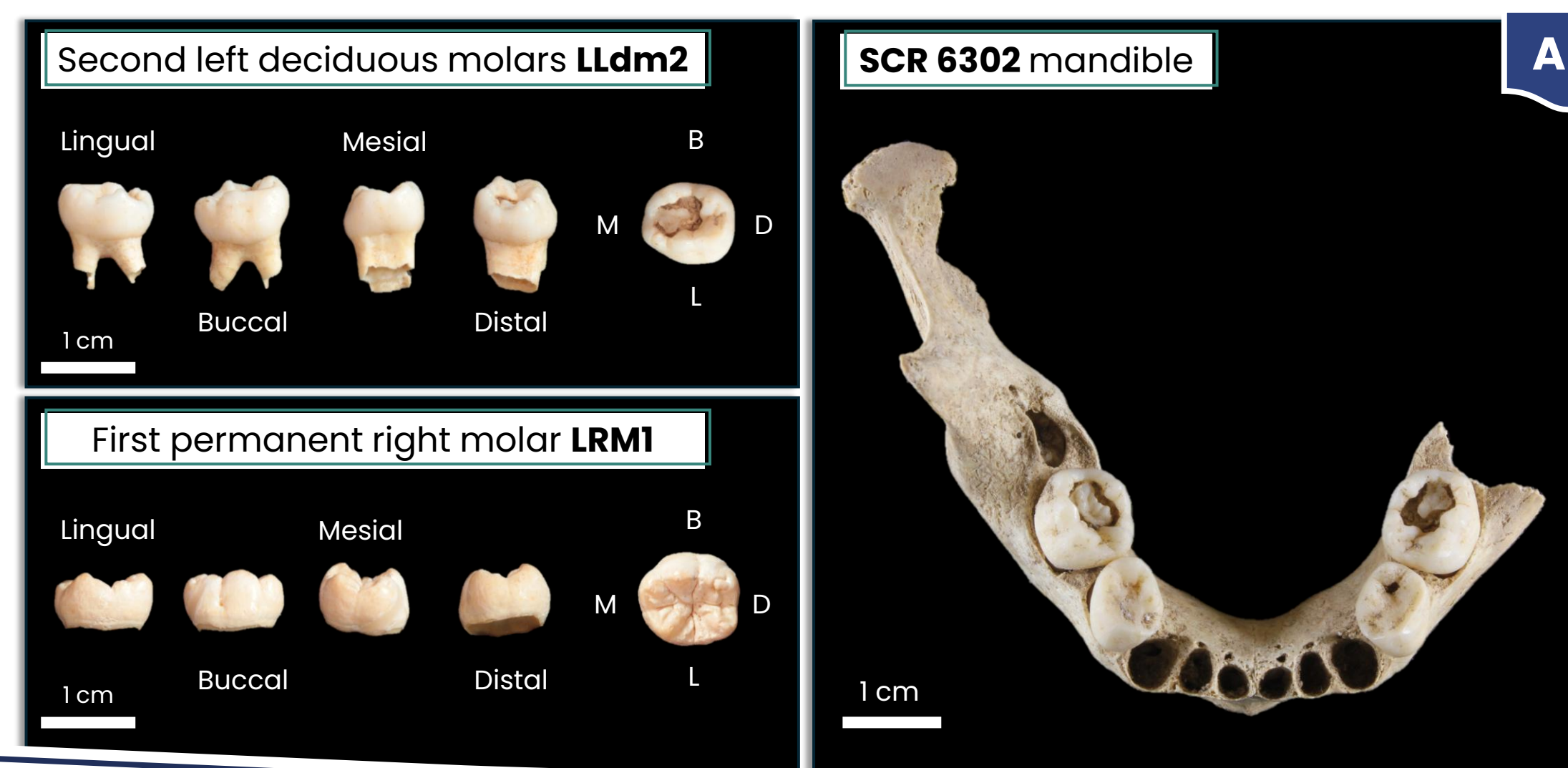
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## Introduction

Molar-Incisor Hypomineralization (MIH) is a pathological condition involving a qualitative alteration in the mineralization process of dental enamel [1]. While some studies have reported possible cases of MIH in ancient populations [2], its wide variety of phenotypes and complex clinical features pose challenges to a definitive diagnosis, especially in the milder cases [3].

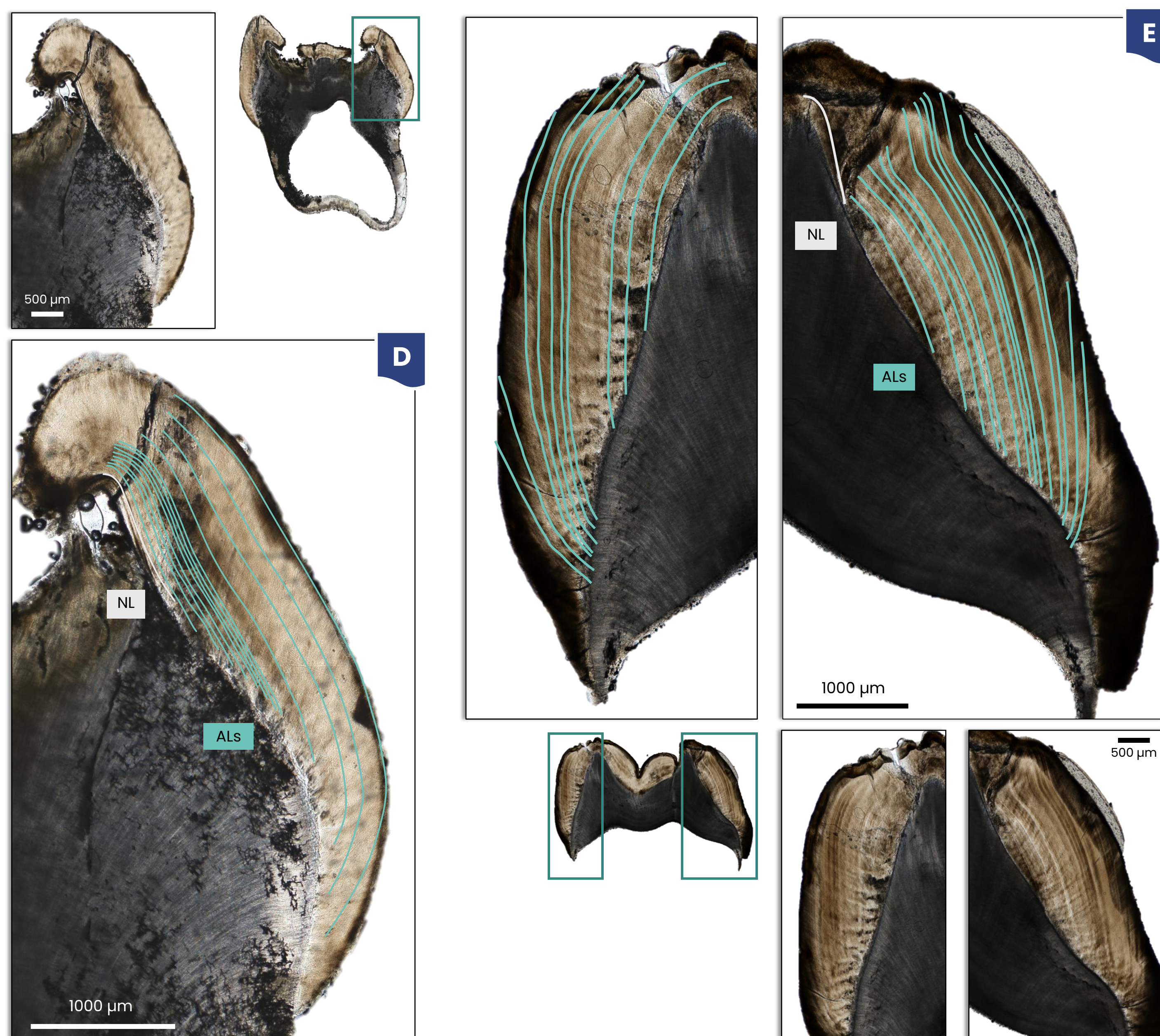
This study presents the so far oldest known case of severe MIH identified in the mandibular dental remains of a Roman child from Isola Sacra (*Portus Urbis Romae*, 1<sup>st</sup>-3<sup>rd</sup> century CE) (Figs A) by integrating clinical, X-rays imaging (XRM) and histomorphometric analysis [4].



## Histological analysis

Second left deciduous molars LLdm2

First permanent right molar LRM1



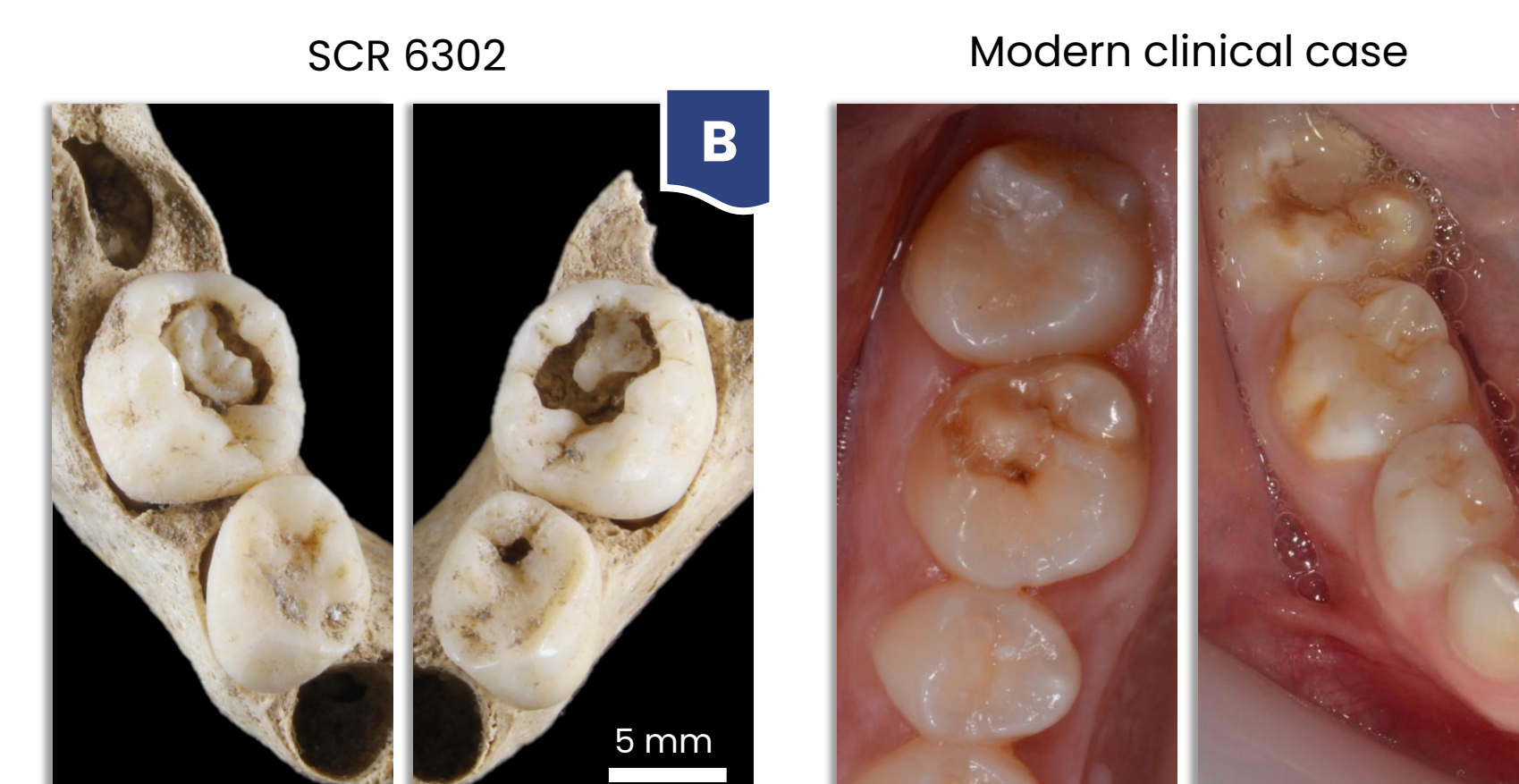
Histomorphometric analysis of MIH-affected molars (deciduous LLdm2, Fig. D; permanent LRM1, Figs E) allowed the identification of the Neonatal Line (NL, the birth marker). Several stress lines (ALs) have been identified in the enamel of both teeth, indicating a series of physiological stresses experienced by the child during early infancy [5].

Quantification of the crown formation time allowed to frame the window of MIH development between birth and the 4<sup>th</sup> month of life.



## Clinical assessment

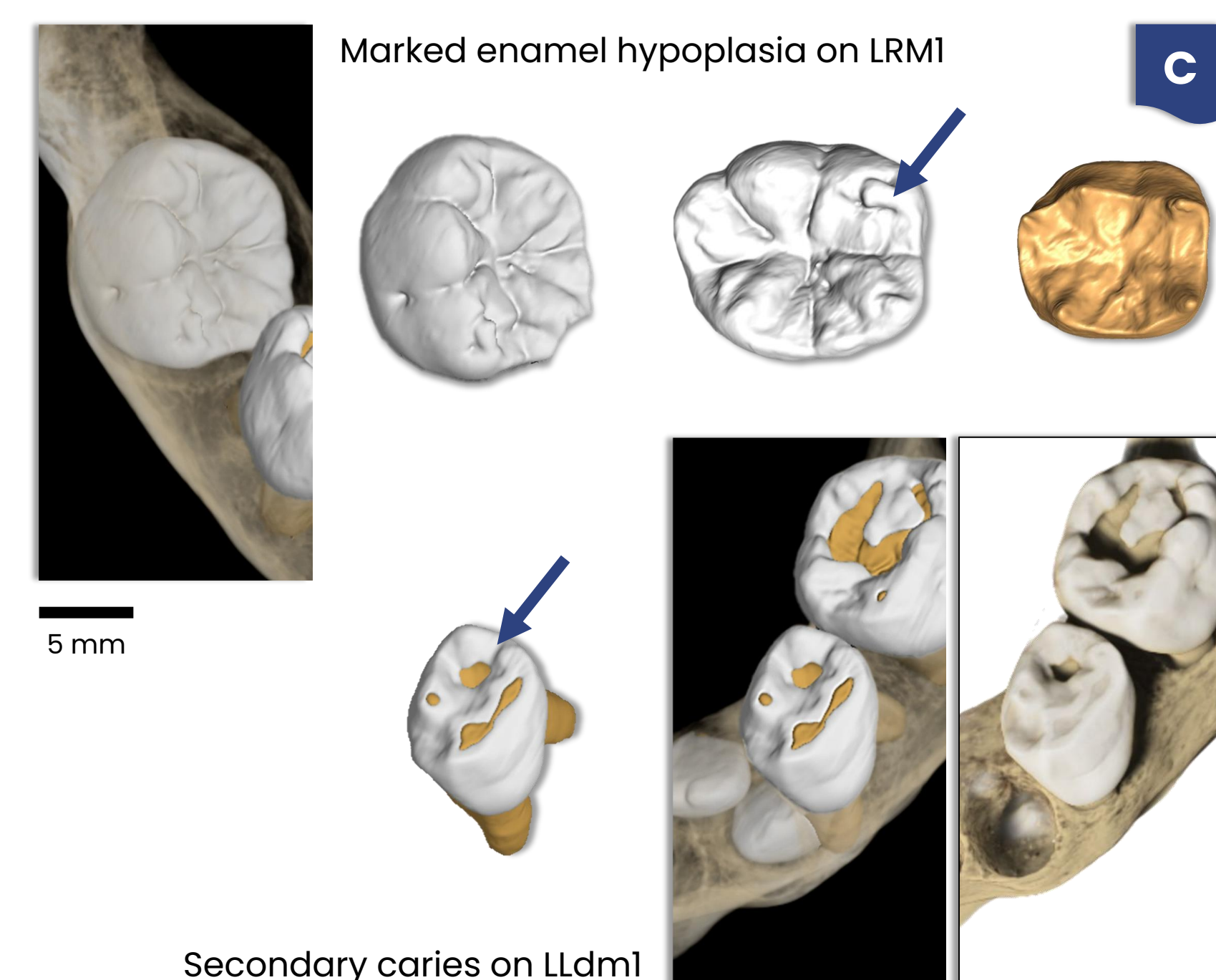
The second mandibular deciduous molars exhibit a bilateral post-eruptive enamel breakdown (PEB) on the occlusal surface (Fig. B), exposing the underlying dentine [1].



The absence of taphonomic alterations or enamel discolouration confirms the identification of the MIH phenotype.

## XRM analysis

The early stage of the pathology was confirmed by X-ray microscope (XRM) imaging analysis (Figs C).



## Conclusions

Through a multidisciplinary approach, the present study reports a confirmed case of severe MIH in an ancient population, revealing an earlier occurrence than typically reported in modern cases. Furthermore, it is suggested that the development of MIH may be driven by common or similar aetiological factors present in both past and contemporary populations, offering novel insights into the pathological processes underlying this condition.