

BUSTA 1)

1. Quali sono le informazioni ottenibili da un dente con le attuali tecniche analitiche avanzate.
2. Spiegare le differenze fra microscopia ottica e confocale, e come utilizzarle in campo istologico.
3. Quali sono gli organi del dipartimento?

Enamel extension rates (EERs), the rates at which ameloblasts differentiate, determine how fast tooth crowns grow in height. Studies of fossil primate (including hominin) enamel microstructure usually focus on species differences in enamel formation time, but they have also begun to address species-level variation in enamel extension rates. To improve our ability to compare EERs among primate species, a better understanding how EERs vary within species is necessary. Using a large and diverse modern human histological sample, we find that initial EERs and patterns of EER change along the enamel-dentine junction (EDJ) vary in relation to EDJ length. We also find that enamel formation time varies in relation to EDJ length, but that it does so independently of initial EERs. These results suggest that EDJ length variation within a species sample can affect interspecific comparisons not only of EERs but also of enamel formation times. Additionally, these results lend within-species support to the hypothesis, based on comparisons among hominin species, that EERs and crown formation times can vary independently (Dean, 2009). In a second approach, we analyzed EER changes specifically in the lateral enamel of two modern human population samples as these changes relate to the distribution of perikymata. As surface manifestations of internal enamel growth increments, perikymata provide a valuable source of information about enamel growth in fossils. We find that EER declines in the lateral enamel are associated with an increase in perikymata density from first to last-formed lateral enamel. Moreover, variation in the extent of EER decline among individuals is associated with variation in the distribution of perikymata along their enamel surfaces. These latter findings suggest that the distribution of perikymata on the enamel surface provides information about rates of EER decline in lateral enamel, at least in modern humans.

BUSTA 2)

1. Cosa sono le linee accentuate visibili nello smalto e che informazioni possono dare sull'individuo.
2. Esporre come si studiano e si descrivono i granuli di amido al microscopio, indicando le metodologie e le tecniche microscopiche utilizzate.
3. Quali sono i compiti delle Facoltà?

Understanding the growth patterns and developmental trajectories of teeth during early life stages provides valuable insights into the ontogeny of individuals, particularly in archaeological populations where such information is scarce. This study focuses on first deciduous molars, specifically investigating crown formation times and daily secretion rates, through histological analysis. A total of 34 teeth from the Early Medieval necropolises of Casalmoro and Guidizzolo (Mantua, Lombardy, northern Italy) were analysed assessing growth parameters and identifying possible differences between sites and between sexes, which are determined through proteomic analysis. Furthermore, a robust linear regression model relating prism length and secretion time was built to estimate growth rates also in teeth in which the finest incremental markings are not visible. The daily secretion rates (DSR) in inner enamel showed a high homogeneity between dental arches, sexes and the two sites. Values fall within the known range reported in the literature for the same tooth class in archaeological populations. However, a difference in DSR was observed when compared with modern sample published values. Crown formation times and age at crown completion differ between dental arches, with maxillary first molars initiating their matrix apposition earlier than mandibular molars as formerly reported. However, no significant differences were highlighted in association with sex. This study expands our

understanding of the growth and development of the first deciduous molars in a medieval population, providing valuable insights into growth trajectories specific to the dental arch. These findings highlight the need for extensive investigations using similar methodologies to attain more accurate and comprehensive information about the developmental patterns of first deciduous molars. Additionally, proteomic analysis improves the capability to conduct sex-specific histological assessments of immature individuals, thanks to this method's application in determining their sex.

BUSTA 3)

1. Quali informazioni posso dare gli inclusi del tartaro sulla storia di vita individuale.
2. Istologia dentale: descrivere la procedura di preparazione di sezioni sottili per tessuti mineralizzati.
3. Tra chi è eletto il Rettore?

Dental calculus is recognised as a secondary aetiological factor in periodontal disease, and being a prominent plaque retentive factor, it is routinely removed by the dental team to maintain oral health. Conversely, dental calculus can potentially be useful in forensic studies by supplying data that may be helpful in the identification of human remains and assist in determining the cause of death. During the last few decades, dental calculus has been increasingly recognised as an informative tool to understand ancient diet and health. As an archaeological deposit, it may contain non-dietary debris which permits the exploration of human behaviour and activities. While optical and scanning electron microscopy were the original analytical methods utilised to study microparticles entrapped within the calcified matrix, more recently, molecular approaches, including ancient DNA (aDNA) and protein analyses, have been applied. Oral bacteria, a major component of calculus, is the primary target of these aDNA studies. Such analyses can detect changes in the oral microbiota, including those that have reflected the shift from agriculture to industrialisation, as well as identifying markers for various systemic diseases.

BUSTA 4)

1. Quali tecniche possono essere utilizzate per indagare il tartaro dentale e quali informazioni si possono ottenere
2. Come si definisce una linea intradiana e come si distingue da striatura trasversale nello smalto dentale umano
3. Chi sono i componenti del Consiglio di Amministrazione?

The Pacific islands and Island Southeast Asia have experienced multiple waves of human migrations, providing a case study for exploring the potential of ancient microbiomes to study human migration. We perform a metagenomic study of archaeological dental calculus from 102 individuals, originating from 10 Pacific islands and 1 island in Island Southeast Asia spanning ~3000 years. Oral microbiome DNA preservation in calculus is far higher than that of human DNA in archaeological bone, and comparable to that of calculus from temperate regions. Oral microbial community composition is minimally driven by time period and geography in Pacific and Island Southeast Asia calculus, but is found to be distinctive compared to calculus from Europe, Africa, and Asia. Phylogenies of individual bacterial species in Pacific and Island Southeast Asia calculus reflect geography. Archaeological dental calculus shows good preservation in tropical regions and the potential to yield information about past human migrations, complementing studies of the human genome.

BUSTA 5)

1. Come si distingue la porzione di smalto prenatale da quella postnatale. Quali denti utilizzeresti per ottenere questa informazione?
2. Descrivere protocollo di campionamento del tartaro ed estrazione degli inclusi per successiva analisi microscopica.
3. Che cosa è il Senato Accademico?

The Neonatal Line (NNL) of the tooth serves as a unique identifier, allowing us to distinguish whether a child survived birth. This line is essential for assessing the age at death of infants from [skeletal remains](#) found in archaeological contexts. Our primary objective is to accurately determine the age of infant intramural inhumations from the Iberian Iron Age (8th-1st centuries BC) by analyzing histological sections of [tooth germs](#). Due to their fragility and high susceptibility to taphonomic factors, these samples are challenging to handle. By accurately assessing their age, we aim to classify individuals into various stages of [infant mortality](#), which will help reconstruct infant mortality patterns in these populations. We analyze unerupted and still-forming crown [deciduous teeth](#) from 45 infant burials. By calculating Crown Formation Time (CFT) and identifying the NNL, we determine both gestational and [chronological ages](#). We further validate the reliability of NNL identification through [Synchrotron](#) X-ray Fluorescence (SXRF) [elemental analysis](#) (Ca, Zn, Cu) on two contemporary and two archaeological samples. Our histological study reveals the chronological age of 38 infants from Iberian settlements, ranging from the 30th week of [gestation](#) to the 2nd postnatal month. The [age distribution](#) shows an attritional mortality pattern, with nearly half experiencing [perinatal mortality](#), including [preterm births](#). These findings support the hypothesis that mortality was primarily attributed to natural causes. Our research enhances the understanding of infant life history events in prehistory by combining histological analysis of [tooth NNL](#) and CFT, highlighting the technique's potential and limitations.

F.to La Commissione