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ABSTRACTS

The use of UV and near-IR photography in human osteology studies.

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The objective of this study is to obtain the unseen data of the VIS (visible spectrum 380-750nm) normally used in human bone photography. A collection of about ten skulls came from excavations carried out in the soviet era in Georgia and hardened with Shellac (a natural bio-adhesive) were used for IR photography (near infrared between 750 and 1000nm), and three tooth samples from different origins, without Shellac, were used for photography with UV (Ultraviolet A, 315-400 nm). After its technical modification, the Sony C3 camera was adapted for full-spectrum photography (200-1000nm). An 850nm IR filter was used for the IR experiment, since this wavelength can pass through the Shellac layer and show the surface of the bone. The Lumix G3 camera was also adapted for full spectrum and a UV-Bandpass filter was used for UV photography, with a 365nm light to detect details in the bone that are not visible in VIS. The results were excellent, with the IR method, the surface of the bone looked clean of Shellac as if it had not existed, and it was easier to read the details hidden by the Shellac. Dental caries was observed more clearly as well. Regarding the UV method, microcracks were observed in teeth, fillings and all non-tooth material. The details surpass dental radiology in detecting microcracks. This method will provide more details if used in the histological analysis of cremated bones.

Atypical burial of an adult female from the modern (17th-19th century) Santa Maria Dos Anjos Churchyard (Valença, Portugal).

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In 2009, an excavation at the Santa Maria dos Anjos churchyard in Valença (17th-19th centuries), Portugal, uncovered 28 individuals (10 females; 6 males, 2 unknown sex, and 10 non-adults, with age at death ranging from 6 months old to 59 years old). Among these was a well-preserved female skeleton, aged 50-59 years, buried in an unusual, seated position, leg extended, with her head resting on her right shoulder. This study aims to explore whether the set of lesions found on her skeleton influenced this burial posture. The skeleton was macroscopically analysed and exhibited several traumatic lesions: a depressed fracture on the right frontal bone (2cm wide), a medial clavicular fracture, a Colles's fracture on the right radius, a subtrochanteric fracture of the right femur, and a transverse fracture of the right patella, all completely healed. Additionally, the vertebral column showed a Schmorl's node on the 9th thoracic vertebra and a compressed fracture in the vertebral body of the 4th lumbar vertebra. Besides those lesions, the individual presented several severe degenerative changes along the elbows, hands, and feet. All injuries suggest a significant long-term survival and imply access to care, indicative of a high socioeconomic status. The cumulative impact of these injuries likely resulted in reduced mobility, potentially rendering the individual bedridden. It is hypothesized that she may have died in this immobile position, and to avoid breaking rigor mortis, she was buried as found. This case highlights the significant interplay between severe trauma, the provision of care, and burial practices.

Caring for the sick, the poor and pilgrims at the Hôpital du Saint-Esprit in Dijon (Côte d'Or, France): paleopathological inferences.

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In 1204, Duke Eudes III of Burgundy established the Hôpital du Saint-Esprit outside the medieval city walls of Dijon (Côte d'Or). From its inception, Dijon's Hôpital du Saint-Esprit was designed to provide care for the poor (both sick and healthy), abandoned children, and the indigent. Following construction work, a series of archaeological excavations focused on the hospital cemetery. 142 burials were discovered, spanning five centuries of cemetery occupation. However, radiocarbon analyses show that most of the osteological material dates from the 16th-17th to the early 18th centuries. In total, 112 adult individuals (24 male, 25 female, and 63 unknown sex) and 53 immature individuals were excavated. To assess recruitment in this hospital and compare it with historical data, a macroscopic exhaustive paleopathological examination was carried out. It reveals that 80% of the subjects exhibit lesions, despite the moderate state of preservation. In the case of immature individuals, nonspecific signs predominate. Among adults, the presence of indicators of chronic infectious or inflammatory illnesses is noteworthy. Disabling pathologies and rare paleopathological conditions (e.g., an adult female, US 187, with probable multiple osteochondromas) were also identified. Conversely, few traces of medical-surgical procedures were detected. Historical records suggest that hospitals associated with

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the Ordre hospitalier du Saint-Esprit welcomed a diverse array of individuals afflicted with various diseases, as well as healthy individuals (travelers, pilgrims, women in childbirth, orphans, etc.). Our paleopathological analysis corroborates this pattern for Dijon's Hôpital du Saint-Esprit during the modern period. However, additional paleomicrobiological analyses are planned to better identify the diseases present in this structure.

A case of sapho syndrome from Southern France (Avenue Kennedy, Martigues, Bouches-du-rhône).

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In 2013, an archaeological survey on Avenue Kennedy in Martigues (southeast France, 45 km from Marseille) uncovered a section of the 19th-century "Ferrière cemetery" extension. Poorly documented in historical archives, the enlargement of this cemetery followed the multiple cholera epidemics that affected the town of Martigues (for example, in 1835 and 1854). A total of 9 perfectly parallel trenches oriented East-West were discovered. So far, 51 primary coffin burials have been excavated, mostly associated with adult skeletons (apart from 1 sub-adult and 1 fetus). The macroscopic paleopathological examination of those subjects focused on bone-by-bone observations of the specimens, leading to the differential diagnosis of a rare pathological condition. Notably, KEN-SP 011 (male, >60 years) displayed singular osteitis of the medial end of the clavicle and sternum associated with multiple inflammatory reactions, fusion, and ankylosis of the lumbar vertebrae. For a more in-depth diagnosis and to establish the link between these lesions, X-rays and a CT scan were performed. The presence of hyperostosis and sclerosis involving the manubrium, ligament ossification, and syndesmophytes was confirmed. This combination of lesions could suggest SAPHO syndrome (Synovitis–Acne–Pustulosis–Hyperostosis–Osteitis Syndrome), a rare chronic inflammatory disease of unknown pathogenesis. KEN-SP 011 could be the first paleopathological case of SAPHO identified in France, thus broadening the geographical and chronological scope of our understanding not only of this pathology but also of inflammatory arthropathies. Other analyses, notably paleomicrobiological, would support and confirm the diagnosis.

Nasopalatine duct cysts in archaeological assemblages.

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Nasopalatine duct cysts (NPDCs), or incisive canal cysts, present as round, ovoid or heart-shaped lytic lesions in the midline of the anterior maxilla, exceeding 6mm in diameter. They arise from fetal epithelial precursors of the nasopalatine duct, typically manifesting between age 40 and 60 years. With approximately 1% frequency in modern populations, they are more common in males than females. While often asymptomatic, NPDCs may cause inflammation, drainage of pus or mucus, and pain leading to surgical removal. Because NPDCs cause substantial enlargement of the incisive foramen, they are observable macroscopically in archaeological maxillae. Despite this visibility, NPDCs have not been reported widely in the paleopathology literature. We aim to draw attention to this condition, which we have identified in an array of samples across space and time. These examples are drawn from a Kerma period (2500-1100 BCE) sample (1/40 adults) from the al-Qinifab area of northern Sudan; a medieval (c. 7th-8th centuries CE) sample from Mograt Island, northern Sudan (1/10 adults); a Late Antique/medieval (c. 600-1500 CE) sample (1/50 adults examined to date) from Polis, Cyprus; and 18th-19th-century Oxford, UK (1/237 adults). These results suggest a potentially higher frequency (2.0-10%) of NPDC in antiquity. Because NPDCs are underreported and may affect the individual adversely, there is a need to recognize these cysts through observation of enlarged incisive foramina in archaeological samples. We provide criteria for differential diagnosis and encourage others to report occurrences of this condition in archaeological samples to permit a better understanding of NPDCs in paleopathology.

Sunshine in a Bottle: Investigating the relationship between breastmilk consumption and vitamin D deficiency through histomorphological and stable isotope analysis.

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Infants are more susceptible to stress due to their underdeveloped immune system. Dental Enamel Hypoplasia (DEH) and Interglobular Dentin (ID) are dental pathological markers that indicate physiological and metabolic stress, such as reduced breastmilk consumption and vitamin D deficiency. Vitamin D has a key role in regulating the homeostasis of bone and teeth mineral components and its deficiency may result in abnormalities like ID. Recent studies have revealed a correlation between low breastmilk proportions and DEH events. While extensive research has delved into ID and DEH among ancient individuals, the appearance and causation of these conditions during infancy remain unexplored. To investigate this hypothesis, 26 ancient individuals, who exhibited DEH, originating from the city of Thessaloniki (323 BCE – 16th century CE) were examined. Permanent canines were analysed histologically, recording the severity of the ID and DEH and estimating the age of occurrence. The breastmilk intake of the individuals was estimated using carbon and nitrogen isotope ratios from first permanent molars in a Bayesian mixing modelling approach using the MixSIAR package. Our results reveal that all the individuals with DEH also exhibited ID, while the isotopic results show that the breastmilk proportions were below 40% of their diet. Our study focuses on the potential development of ID and DEH due to stress related to breastfeeding or triggered by vitamin D deficiency.

Life goes on: a story of disability and care at the Germanic edge of the Roman Empire.

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Disability is a unique experience shaped by the context-specific modalities of support provided to the subject. This research aims to present a case of partial recovery after a life-threatening accident to explore long-term health consequences, dynamics of adaptation, and community behavior regarding physical impairment and care in the Roman Lower Germanic Limes. The study of a female skeleton (Sk.271) from the late antique cemetery of Bonn-Irmintrudisstraβe (North Rhine-Westphalia, Germany; 4th CE) revealed several healed fractures, affecting the left ischiopubic ramus, left femur, and the rib cage. The Bioarchaeological Index of Care was applied to explore the level of assistance the individual needed to cope with her acquired conditions. Stable isotope ratios of δ13C and δ15N were measured on bone collagen to infer nutritional levels. The recognized traumata likely correspond to a single life-threatening accident. The comminuted fractures caused significant deformation and bone length reduction, resulting in permanent disability. The Index of Care suggested that community assistance was necessary as immediate aid, during rehabilitation, and probably as long-term support. Beyond the functional impact on mobility, possible nerve, genital, and organ misfunctions may have required multi-level accommodations in the individual's daily life and restructuring her self-perception and social role. The high-quality objects included in Sk.271's

funerary equipment might acknowledge her social status, suggesting she was well-integrated into her community. Although the actual person's experience can only be speculated upon, this study approaches individual aspects of a story of survivorship, life adaptation, and identity reconversion within the framework of disability in Roman Bonn.

A comparison between social status and dorsal pubic pitting (DPP) presence in three Dutch post-mediaeval collections.

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Dorsal pubic pitting (DPP) is a lesion characterized by pits and depressions on the dorsal surface of female pubic bones, which is commonly linked to pregnancy and childbirth. However, DPP has also been observed in male individuals, raising questions on its aetiology. In this study we test two hypotheses. First, that differences in socioeconomic status and life experiences may have an impact on the incidence of DPP in both males and females. Second, we explore the potential link between number of pregnancies/deliveries and social status. For this purpose, we macroscopically assessed the frequency and severity of DPPs by measuring the width, length, and depth of the lesions with a digital calliper. For this study, we selected three post-medieval Dutch populations (c. 1650-1850 CE), known from historical sources to represent a wider social spectrum with both high and low classes. Our overall sample is constituted of 87 female (Arnhem = 45; Zwolle = 13; Eindhoven = 19) and 55 male individuals (Arnhem = 21; Zwolle = 14; Eindhoven = 20). Results of statistical analysis show no significant difference in the incidence of DPP in the female and male samples examined, nor in the three populations overall ($X2 = 1{,}748$, $p = 0{,}282$). This may suggest that socioeconomic status has neither an impact in the frequency of DPP overall nor in the number of pregnancies per woman. Future research on wider and better-preserved samples, also associated with archival documentation, may provide more detailed results.

Dwarfism in a female individual from 18th-century Vienna, Austria.

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In 2019, the skeletal human remains of 365 patients from Vienna's first women's hospital, the Hospital of the Elisabethians, founded in 1715, were excavated before construction. Archaeological and historical records date the burials to 1715-1784. Patient records attest that the women treated by the Elisabethians largely drew from Vienna's poor and lower-class citizens. While research on the entire group is still ongoing within a historic-bioarchaeological project, this presentation reports the macroscopic and metric results of the assessment of one young adult female (IND 108) featuring considerable proportionate short stature, asymmetric bowing of the lower limbs as well as extensive dental pathologies including antemortem tooth loss, periapical lesions and dental crowding. Supported by the detection of interglobular dentine through dental histology associated with vitamin D-deficiency, the array of pathological changes is most likely consistent with a diagnosis of hypophosphatemic rickets. This group of diseases is most commonly of congenital origin in which abnormal bone mineralisation is due to insufficient levels of phosphorus caused by inadequate processing of phosphate in the kidneys. In contrast to the majority of burials, the female dwarf was neither afforded a coffin nor other grave goods. In life, the woman would have suffered from bone and muscle pain in addition to the visible physical impairment associated with the bowing and length differences in the lower legs. A healed nasal fracture as well as advanced osteoarthrosis in the spine and ribs provide further glimpses into the lived experience of an individual at the bottom of 18th-century society.

A quantitative approach to record skeletal manifestations of leprosy and its application.

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Research interest in 'leprosy' has greatly increased in recent decades within both historical and bioarchaeological fields. Multiple researchers now discuss the skeletally visible lesions that leprosy can produce, either as the main topic of publication or to describe specific collections/individuals. This increased availability of leprosy-related osteoarchaeological data theoretically allows the study of the sociocultural and biomedical impact of this disease on past populations and individuals, including changes through time and space. Interstudy comparisons are, however, impeded by terminological and diagnostic differences within the field. Moreover, well-written qualitative descriptions per individual are often not published due to word or supplementary-file limits within journals. This paper proposes a quantitative scoring method for leprosy-related lesions, including the five sub-lesions of 'rhinomaxillary syndrome' (based on Moller-Christensen in 1978), severity classes for periosteal bone formation on limbs, and changes to hand and foot bones. The method was applied to describe 559 human remains from 19 sites across England, spanning the early to late medieval period, and is used to assess the true prevalence of individual lesions specifically and, in this case, to obtain different levels of diagnostic certainty. This method is not intended to be a formula where the sum of scores is indicative of a specific diagnosis, but rather to provide a coded, detailed shorthand that can replace qualitative descriptions in limited-word publications, and thereby improve interstudy comparisons and aid statistical analysis. It is hoped that this method can facilitate more complex diachronic and socially grounded research.

A palaeopathological assessment of the late medieval population of Nieuwpoort, Belgium.

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A large late medieval cemetery was discovered at Nieuwpoort, Belgium, during construction in 2011. Following an archaeological survey, 549 graves were excavated during 2015. Archaeological findings suggested that the cemetery came into existence during the 14th to 16th centuries, before the city was invaded by Spain. The church adjacent to the cemetery was largely damaged during the 14th century and was never rebuilt. Instead, a protective fortress was built on the grounds, and the cemetery was forgotten. This study aims to provide a demographic and palaeopathological overview of the individuals excavated. To date, 200 non-adult and 135 adult skeletons have been assessed. Unexpectedly, the prevalence of children aged 6 months to 14 years (n = 150; 75.0%), surpasses the number of infants/neonates (n = 18; 9.0%) and adolescents (n = 32; 16%) observed in the sample. Most adult individuals (62 males, 52 females and 21 unknown) were aged between 30 and 60 years, which is comparable to other late medieval European populations. *Cribra orbitalia* was frequently seen in adults (n = 16; 11.9%) and children (n = 36; 18.0%). Rickets (n = 2; 1.0%) and osteomalacia (n = 2; 1.5%) were also encountered. Other conditions observed included localized infections (n = 5; 3.7%) and antemortem trauma (n = 6; 4.4%) in adults, as well as porotic hyperostosis in non-adults (n = 5; 2.5%). The absence of non-specific signs of disease in most individuals suggests that the population was not overwhelmed by chronic disease, but more likely succumbed to acute infection.

Initial evaluations of co-occurrence of rickets, scurvy and anemia in six Dutch and Canadian 1650–1854 CE communities.

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We present the first results from individuals who died between birth and 15 years, assessed for all three conditions. Thirty-seven individuals out of 282 were randomly selected. Our sample comprised individuals from two Quebecois collections (Saint-Antoine n = 8/59; Pointe-aux-Trembles n = 11/44) and four Dutch collections (Arnhem n = 9/52; Eindhoven n = 3/46; Alkmaar n = 5/55; and Zwolle n = 1/26). Anemia assessment was based on evaluating micro-CT frontal bone reconstructions, rickets using a combination of micro-CT data and core microscopic lesions and scurvy macroscopic evaluation of the Ortner criteria. Utilizing diagnostic terminology based on the Istanbul protocol, less than half of the individuals (16/37, 43%) showed no evidence of these conditions at death or exhibited non-specific features simply consistent with these conditions. There was evidence for one condition at the diagnostic certainty level of 'diagnostic of' or 'highly consistent with/typical of' in 10 individuals, with 10 having two conditions and one having all three. The preliminary findings underscore the feasibility of identifying disease co-occurrence for all three conditions considered. Subsequent research will further refine these results and establish connections with detailed serial stable isotope investigations.

Early childhood caries in 14th-17th century Alytus, Lithuania.

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Early childhood caries (ECC), often referred to as 'baby bottle caries' or 'nursing bottle caries', is characterized by specific patterns of enamel decay primarily observed on the deciduous anterior teeth of children. These patterns are closely linked to dietary quality, particularly during the transition from breastfeeding to the introduction of solid foods. While contemporary dental research extensively explores this topic, such studies are rarely undertaken in paleopathology. Therefore, we aimed to examine the prevalence of circular carious lesions in a sample from the Late Medieval/Early Modern period (14th-17th century CE) from Alytus, southern Lithuania. Additionally, we employed stable isotope (carbon and nitrogen) analysis of incremental dentine from permanent first molars to assess breastfeeding and weaning patterns in six affected individuals. Among the 331 non-adult individuals studied, twenty (6%) showed evidence of deciduous carious lesions. More than half of these individuals displayed other pathological conditions such as *cribra orbitalia* and scurvy, indicating nutritional deficiencies in children aged between 1.5 and 5.5 years. Stable isotope analysis indicated elevated nitrogen values, ranging from 10.10‰ to 14.09‰, suggestive of breastfeeding practices, although the impact of physiological stress on these individuals must also be considered. These findings imply that the transition to solid food was a precarious period for children, as their nutrition was not balanced, potentially compromising their immune systems and making them more susceptible to disease and mortality. A larger sample size will enable us to further explore the issue in the future, underscoring the potential for additional bioarchaeological investigations.

The price of progress: The impact of rapid urbanisation on health during the English Industrial Revolution.

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The Industrial Revolution represented one of the greatest economic, social, and biological transitions in the history of humanity. Intrinsic to this period of economic change were population increase, the migration of workers and the rapid expansion of villages and small towns into large towns and cities with densely packed housing. Registration of births, deaths and marriages was recorded for the whole of England and Wales by the General Register Office (GRO) from 1837 onwards. We compared age-at- and cause-of-death for 335,055 individuals from the first annual report of the Registrar General for 1837-8 (GRO). This revealed stark contrasts in life expectancy and disease experience in rural and urban areas, with GRO regions comprising newly expanded urban centers with a large rural hinterland ('mixed' regions) having the worst health outcomes. While infectious diseases were rife in towns and cities, more deaths attributed to TB were reported in rural areas, indicating that while migration to urban areas was a risk to health, urban to rural migration by those with long-term conditions might have permitted family support during chronic illness. Developing on this published work, a more granular analysis has revealed that London (one of two urban regions) fared well compared to Birmingham and the mixed districts, especially in terms of life expectancy. This paper highlights the role death registration documents can have in exploring the bioarchaeology of historic periods, offering a point of comparison to skeletal data, and filling in the gaps of skeletal palaeopathology.

Diet, Agriculture and Oral Health: A Comparative Study of Dental Caries across Three collections in Neolithic China.

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This study explores the intricate relationship between dental caries and the transition to agriculture, particularly examining the impact of different subsistence strategies on oral health in Neolithic China (~5500–3700 BP). A total of 2885 teeth from 149 adults across three collections were analysed: hunter-gatherers from Niuheliang in northeastern China (478 teeth, 30 individuals), millet farmers from Qingtai in the Central Plains (1769 teeth, 83 individuals), and rice farmers from Gaoshan in the southwestern region (638 teeth, 36 individuals). Caries was recorded by sex, age, tooth location and severity, with corrections made for antemortem tooth loss. Results revealed a strong link between subsistence strategies and caries prevalence. Hunter-gatherers exhibited the lowest prevalence (26.67% of individuals, 3.35% of teeth), followed by rice farmers (36.11% of individuals, 4.86% of teeth), with millet farmers showing the highest prevalence (75.90% of individuals, 14.02% of teeth). This gradient suggested a significant association between intensive millet farming and increased caries, while rice farming appeared less detrimental to dental health. Additionally, caries rates increased with age, but sex difference was not significant across sites. These findings provide insights into the nuanced impact of agricultural practices on health, suggesting complex interactions among diet, lifestyle, and oral health, beyond simplistic narratives of declining dental health due to agriculture. Nonetheless, the present investigation of caries in archaeological populations may have overlooked other factors affecting dental health. Future research could benefit from broader geographic and temporal comparisons and incorporate diverse evidence to deepen the understanding of diet-health dynamics during agricultural transitions.

Health and Disease at the Dawn of European Expansion: paleopathological analysis of the population buried at the colonial settlement of San Marcial de Rubicón, Lanzarote (15th Century).

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The archaeological site of San Marcial de Rubicón, located in Lanzarote (Canary Islands), is pivotal in understanding the early stages of European colonial expansion in the Atlantic. Established in 1402 by the Norman-Poitevin expedition led by Jean de Bethencourt and Gadifer de la Salle, this site marks the first stable European settlement in the region. Our research aims to explore the health and disease patterns of a marginal population within this settlement through the analysis of 1205 bones and 212 teeth from 10 individuals interred in the cemetery. We employed radiographic analysis, osteological examination, and paleopathological methods to assess physical activity stress, nutritional status, and disease presence. Our findings reveal a demographically diverse population of neonates, children, youths, women, and a single adult male likely affected by Paget's disease. Indicators of high physical stress, such as entheseal changes in the upper limbs, along with nutritional deficiencies evidenced by dental enamel hypoplasias and periodontitis, were prevalent. Additionally, periostitis and trauma, including a 20-23-year-old female with two blunt-force injuries to the skull, suggest violent encounters. This study offers crucial bioarchaeological evidence of early European colonial impacts on health. The marginalization, physical labor, and nutritional stress faced by this community provide insights into the harsh realities of life during the early colonization of the Atlantic islands. By integrating osteoarchaeological data with its historical context, this research contributes to our understanding of health dynamics in colonial frontier settings and underscores the importance of San Marcial de Rubicón in the broader narrative of European expansion.

Bones on Display: Excavating Human Remains from a Five-decade-old Abandoned Museum Installation.

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Following structural renovations, the University of the Philippines Asian Center sought the assistance of UP School of Archaeology in extracting the skeletal remains that were part of the AC's permanent exhibition entitled “Likas ng Kabihasnan”. Highly fragmented and commingled remains of at least six individuals were collected and examined from four dioramic displays, with the added challenge of incomplete records and no known provenance for any of the remains. The assemblage contained a mix of well-preserved and highly fragmented material, with some bones impacted by gluing attempts, breakage, and burning (post-excavation). Following an inventory of the collected skeletal materials, taphonomic analysis aided by experimental archaeological methods, including heat exposure to simulate burning, was employed to understand and explain the preservation state of the bones. Without proper investigation, some of these marks may be mistaken for pseudo-pathological lesions, a distinction necessary to underscore in osteoarchaeological analyses. Beyond an application of experimental archaeology on bone material, this paper sought to understand what a decades-old exhibition can tell us about conceptualizing, curating, and conserving human remains. Here, it is argued that, especially in the case of skeletal materials, museums, schools, and other private institutions are enjoined to ensure their exhibitions are not only about showcasing for educational purposes but also about preserving the integrity of these skeletal materials as material culture and more especially as human beings. This also serves as a call for exhibits to evaluate the state of their installations and assess if these have been adjusted appropriately and ethically accordingly.

Reconstructing the frequency of traumatic episodes in the Early Medieval population of San Lorenzo di Quingentole (Mantua, Italy).

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Investigating traumatic episodes proves to be a useful tool for evaluating the lifestyle of a population within the historical-geographical context, allowing for the reconstruction of cultural dynamics within a community. We analysed 83 individuals belonging to the adolescent portion (12-18 years old) and the adult age group to estimate the prevalence of traumatic evidence in the community of S. Lorenzo di Quingentole, living between the 7th and 11th centuries. The osteological material was examined macroscopically, reconstructing the biological profile and evaluating the identity and the degree of the injury according to selected methodologies. Within the sample, only 5 individuals show signs attributable to traumatic episodes, mainly in the form of accidental fractures of the upper limbs (Colles fracture) and in traumatic signs on the left parietal bone. It appears highly probable that the population buried in the early medieval cemetery was mostly exposed to traumas of an accidental nature or minor blunt force trauma. Episodes of interpersonal violence or warfare were unlikely scenarios for the community of Quingentole. This aspect is significant considering the many belligerent events that mark the Early Medieval period, especially in Northern Italy. The reconstruction of the lifestyle and health status of the San Lorenzo sample allows for comparison and equivalence with similar contexts in the northern Italy area, which seem to share historical dynamics. However, the sites investigated for paleodemographic and palaeopathological purposes are still limited, so it is necessary to increase the study of comparable contexts.

A comparative study of chronic maxillary sinusitis and otitis media among two ancient Italian populations from pre-Roman to Late Antique Periods (5th century BCE-6th century CE).

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This study aimed to investigate how changes in population density influenced the respiratory health of ancient Italian populations. Using established palaeopathological criteria, we macroscopically examined the presence of chronic maxillary sinusitis (CMS) and otitis media (OM) within two skeletal assemblages: Alezio/Vaste-Fondo Melliche (urban, 5th-3rd century BCE, $n = 32$), and Vaste-Fondo Giuliano (rural, 4th-6th century CE, $n = 37$). These populations were ideal for our analysis because, despite their chronological differences, archaeological evidence suggests they were largely comparable in terms of diet, occupation, and climate. The main distinction was population density, which was significantly higher in Alezio/Vaste-Fondo Melliche compared to Vaste-Fondo Giuliano. For the purpose of our analysis, only adult individuals (i.e., older than 20 years) were included in this study. CMS was observed more frequently in Vaste-Fondo Giuliano compared to Alezio/Vaste-Fondo Melliche, whereas OM was more prevalent in Alezio/Vaste-Fondo Melliche. However, the statistical differences between these conditions were not significant (CMS: $X2 = 0.010$, $p = 0.920$; OM: $X2 = 2.424$, $p = 0.119$). Our results suggest that differences in population density may not have impacted respiratory health in the past as

significantly as previously thought. However, further research into respiratory disease patterns within these groups (e.g., among non-adults) could still yield valuable insights into the health challenges our ancestors encountered. The present work is the first in Italy to systematically investigate respiratory disease and to compare the data between chronologically different sites from the Ancient era, thereby offering pivotal groundwork for future investigations into the health of ancient Mediterranean populations.

A study into the Impact of Tobacco Consumption on the Respiratory Health of two Dutch Skeletal Samples (1600–1829 CE).

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For years, both archaeologists and historians have examined how tobacco quickly transformed from an exotic plant introduced to Europe in the 16th century to a widely used commodity. However, despite clinicians now widely recognizing its harmful effects, the historical impact of tobacco on human health remains largely underexplored. To partly address this gap, we investigated the influence of tobacco consumption on respiratory health by examining the presence of respiratory disease (i.e., chronic maxillary sinusitis, otitis media, and pulmonary inflammation) in two Dutch skeletal collections dating to 1600-1829 CE (Arnhem, N = 62; and Vlissingen, N = 64). Tobacco use status was determined for each individual using dental evidence for consumption (i.e., pipe notches and dental lingual staining). While all pathological conditions studied were prevalent in these populations (8.4-50.0%), no significant correlations were observed between respiratory disease and evidence of tobacco consumption (p-values: 0.183-0.708). We argue that additional factors, including secondhand tobacco smoke, indoor air pollution, and increasing urbanization, may have significantly impacted respiratory health during this historical period. Furthermore, limitations in identifying tobacco consumers posed by macroscopic analysis may have impacted our results (i.e., only orally consumed tobacco could be detected; edentulous individuals could not be analysed). Future biomolecular insights into both tobacco consumption and respiratory disease may help address such limitations. Our study is one of the initial attempts to systematically investigate the relationship between tobacco and disease in historical Europe, and as such holds important implications for a more comprehensive exploration of tobacco's broader health impacts in past and present populations.

A possible case of anemia in an adolescent from the Meroitic cemetery of Amir Abdallah (Abri, Sudan).

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Anemia refers to a group of conditions in which the oxygen supply to the tissues is below physiological needs. The study of anemia in past populations has been conditioned by the lack of agreement on specific skeletal signs of anemia, although recent progress is being made on qualitative and quantitative bases in the possibility of a differential diagnosis. We present a skeleton with an estimated age-at-death of 17 years and undetermined sex. This case presents a clear delay in bone maturation (absence of fusion in the ischiopubic ramus, active fusion in triradiate cartilage, epiphysis of the olecranon and proximal radius), and in growth (<-3 standard deviations in long bones, compared to a healthy reference). As signs of interest potentially related to anemia, it presents bilateral *cribra orbitalia*, bilateral *cribra femoralis*, porosity in the sternum, porosity in the vertebral bodies, and enlargement of the nutrient foramina in metatarsals and phalanges of the hand and foot. Additionally, the skeleton presents a type B defect of the atlas and complete spina bifida of the sacrum. The findings are discussed within the framework of the current debate on anemia, and in the context of signs linked to anemia in the Nile Valley and in the Mediterranean area.

Two archaeological cases of hyoid variants.

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The hyoid bone has been studied for sex and age estimation in biological anthropology and in forensic anthropology, due to its potential association with trauma inflicted on the throat and neck. The variants of the hyoid have only been studied in clinical anatomy. We present two archaeological cases of variants of the hyoid assessed macroscopically and with microCT. The first case is an adult male (estimated age of 45.6; 51.4; 75.35 years with pubic symphysis, auricular surface and acetabulum, respectively) skeleton from the medieval site of San Pedro de Montes (Leon, Northern Spain), who presents a unilateral curvature of the left greater horn, which might resemble an antemortem fracture. The second case is an adult male (estimated age of 35.2; 37.86; 34.5 years with pubic symphysis, auricular surface and acetabulum respectively) skeleton from the Nubian Meroitic site of Amir Abdallah (Abri, Northen Sudan), who presents a variant of the greater horns that includes an articulated connection between the greater horn and the superior ossified horn of the thyroid cartilage via an ossified triticeal cartilage (current frequency for both, 0.4%). Both variants can be explained by ossification of embryological cartilaginous components. These cases are valuable since their identification could avoid misdiagnosing trauma.

A possible case of secondary hypertrophic osteoarthropathy from the 13th–16th century Knights Templar's church of Rašaška - Račeša (Croatia).

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Differential diagnosis of pathologies in ancient skeletal remains often relies on the comparison with modern manifestations of identified diseases. The diagnosis of an ancient pathological condition just through macroscopic observation could thus be more challenging if a disease is nowadays eradicated or always treated before it could reach a severe stage and produce significant bone changes. We herein describe the lesions on the skeleton of a 35-45-year-old male from the Knights Templar's church in Rašaška, Croatia (13th-16th century CE), providing a differential diagnosis based on macroscopic and radiographic (X-ray and CT scan) analyses. The skeleton features abnormal bony proliferation on every long bone, with an extreme thickening of the shaft and intense periosteal reactions, almost doubling the diameter of the bone compared to an average one of similar length. Pathologies taken into consideration for the differential diagnosis are, among others, Camurati–Engelmann disease, osteomyelitis, Gaucher's disease, varicosities and Paget disease. The differential diagnosis suggests a possible case of hypertrophic osteoarthropathy. This pathology, often secondary to a pulmonary disease, could have been caused in this individual by lung damage due to abnormally shaped ribs. However, the lack of similar cases in the scientific literature, simultaneous periosteal reactions of some bones suggesting an overlapping infection, and the impossibility of comparing these extreme reactions to modern cases that are treated at an earlier stage, make the diagnosis difficult and open to revision. Further research could elucidate the aetiology of this pathology through the isolation and analysis of genetic markers of diseases.

Bilateral Injuries: two examples and some thoughts about interpretation.

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Case reports of bilateral injuries that show a high degree of symmetry are uncommon, both in the clinical literature and in paleopathology. Two examples are presented: a Hopewellian male with multiple healed fractures including ribs and femurs, that suggest a survived fall, and a Mississippian young woman with highly symmetrical well-healed metaphyseal fractures of the distal humeri. This second case can be assigned to late adolescence because the fractures resulted in early fusion of the epiphyses, anterior displacement, and altered, highly symmetrical remodeling of the olecranon and coracoid fossae. In both cases, the clinical literature suggests highly patterned activity—for example, broad jumping and wrestling–as scenarios explaining these observations. Many paleopathologists check for asymmetry in identifying well-healed fractures. Both cases suggest caution in using asymmetry as a criterion for healed injury.

A comprehensive literature review of *pectus excavatum* and *pectus carinatum* in the archaeological record.
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Pectus Excavatum (PE) and Pectus Carinatum (PC) are common congenital defects of the sternum that today are treatable through surgery. Despite the prevalence, their representation in the palaeopathological and historical record is scarce. In severe cases, in which the sternal body is very depressed, the condition can interfere with cardiorespiratory functions, while in mild forms, they can be considered asymptomatic. This presentation is based on a systematic literature review that aims to synthesise the archaeological data. Google Scholar and Pubmed were used to scan the bioarchaeological literature for keywords such as '*Pectus excavatum*', '*Pectus carinatum*' and related terms in English, German, Italian, French and Spanish to bring new light on these conditions in antiquity. Fifty osteological cases of PE/PC were identified in the literature between 1990 and 2023 coming from archaeological contexts in all continents except Australia and North America. While the cases spanned chronologically from 3000 BCE to the early 19th century CE, most of them were from the European medieval period. Contrary to the clinical literature on PE/PC that identified males as more frequently affected, females (24/50) were more affected than males (21/50). With PE, this divide was 8/25 for males and 15/25 females. At the same time, PC was 13/25 for males and 9/25 females. Finally, poor preservation of the sternum in archaeological contexts may explain the scarcity of reports and sex-based variation observed in antiquity.

Living conditions in the Archaic period: A contextualized osteoarchaeological approach of thirteen burials from Thebes, Greece.
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This study aims to understand the variation in living conditions of a human skeletal population outside of Attica during the Archaic period (800-479 BCE) by examining age, sex, non-specific physiological stress markers, activity markers, and dental pathological lesions according to Buikstra and Ubelaker's guidelines and through the framework of the Osteological Paradox. The research intends to contribute to the growing body of bioarchaeological scholarship on Archaic human remains from Greece by conducting a macroscopic osteoarchaeological analysis of 10 inhumation burials and 3 cremation burials from the northeastern cemetery of Thebes, Boeotia. The study identified 2 children, 2 adolescents, 3 young adults, 5 middle adults, 1 old adult, 3 adults aged 20+ years, and 1 unknown. The sex assessment resulted in 2 females, 2 probable females, 1 ambiguous, 1 probable male, 3 males, and 2 unknown. Multiple cases of osteoarthritis (n = 9), disc disease (n = 5), entheseal changes (n = 6), *cribra orbitalia* (n = 2), porotic hyperostosis (n = 6), periostitis (n = 5), and enamel hypoplasia (n = 3) were found in the assemblage, indicating physical activity and episodes of physiological stress. Caries (n = 5) suggests a carbohydrate-rich diet. No correlation between sex or age and pathological lesions was found, so we conclude that there was no higher morbidity for any one sex or age category in the sample population. This is the first macroscopic osteoarchaeological study of this material. However, the skeletal material is poorly preserved due to disturbance by later burials. Future research can study the cremation burials from Thebes to generate a better understanding of life experiences and demography.

An early 20th-century case of lower lip cancer related to pipe smoking from the Morgagni Museum (Padua, Italy).
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The Morgagni Museum of Human Anatomy of the University of Padua (Italy), founded in the 1860s, hosts more than 1300 pathological specimens mainly from the late 18th century to the mid-20th century. Among these specimens, there is a unique case of massive lower lip cancer in a 38-year-old male who died in 1915. The autopsy also presented pulmonary adhesion with a grey hepatization of the upper right lung, a partially tiger heart, an enlarged spleen and a fatty liver. Both the head and part of the right lung are still preserved in the collection of the Morgagni Museum. The historical analysis of the autopsy intertwines with pertinent literature encompassing cultural and medical contexts, supplemented by recent data. A non-invasive analysis of the specimen was conducted, revealing a distinctive pipe notch on the left upper first molar (LM1), significantly worn due to potential continuous pipe usage. The development of a substantial fungating lower lip mass suggests that the scarring tissue grew around the holding position of the pipe, indicating persistent use during the development of pathology. This study explores the correlation between pipe smoking and the development of oral pathologies, using comprehensive examinations of the specimens and a review of historical autopsy reports and medical literature. This case study contributes to providing comprehensive insights into the impact of cultural practices by demonstrating how historical habits, such as pipe smoking, can lead to specific pathological developments, thereby enhancing our understanding of the interplay between lifestyle and disease across different historical periods.

An 'index of oro-dental disease': a holistic method for understanding the impacts of different risk factors on oral health in archaeological populations.
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Understanding the impacts of risk factors on oral health in archaeological populations has always been accompanied by issues of preservation and comparability between multiple different oro-dental diseases. Influenced by clinical approaches, we produced a formula that can be applied to combined true prevalence data for caries, periapical lesions, periodontal disease, and antemortem tooth loss, with double weighting given to the latter. This produces a composite 'Index of Oro-dental Disease' (IOD) score per individual, which also accounts for missing data. We applied this formula to oro-dental disease datasets from modern clinical (n = 6206) and 'mock' archaeological (clinical data with missing values inserted) British populations, and datasets from two post-medieval British archaeological populations (Barton-upon-Humber; St James's Gardens Burial Ground; n = 353). Patterns in mean IOD values

within different variable groups were consistent across all data sets. IOD scores significantly increased with age and were also higher in tobacco-consumer groups. This demonstrates that the IOD method may be a useful approach for understanding the impact of different risk factors on oral health in the past, whilst also accounting for missing data and increasing comparability between groups/individuals. This method can be applied retrospectively to already collected true prevalence data and can be adapted to allow for differences in original data collection. This method has only been applied to two archaeological populations and under/over-inflation of mean scores may occur in smaller sample sizes. Thus, application of the method still needs to be tested on a greater range of population groups and different risk factors for oro-dental disease.

A bioarchaeological exploration of maternal-infant diet, health, and social status in London, England (1789–1853 CE).

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Nutrition in the first 1000 days of life is fundamental for short- and long-term health and survival. Historical literature has identified socioeconomic status as a significant causative factor in poor health, morbidity, and mortality during the industrial period in England. However, the effect of social status on the maternal-infant nexus of diet and health is less clear, and bioarchaeological analysis offers the only means to directly observe this sensitive relationship. This study explored the interplay between socioeconomic status, infant feeding practices, maternal diet, and health in industrial London. Young non-adults (20 weeks gestation to 3.5 years postpartum) from the industrial cemetery of St. James Gardens, London ($n = 207$) were analysed. The short duration of cemetery use (1789-1853 CE) and defined social stratification (pauper, working and middle-class burials), allows for the consideration of broad patterns of diet and nutritional stress, in addition to individual life histories. Dental enamel hypoplasia, metabolic disease (scurvy and rickets), and caries were recorded using macroscopic and radiographic standards, providing evidence for the impact of nutritional deficiencies in young non-adults and mothers. Additionally, all fully intact long bones were measured, and growth profiles created. A high prevalence of scurvy in infant (0-1 years) individuals (18.9%, $n = 10$) and evidence of growth disruption, could be indicative of poor maternal diet and health, or early weaning practices. Maternal nutritional stress is evident through intra-uterine growth disruption and perinatal scurvy (6.3%, $n = 4$) observed in individuals from the pauper and working-class burial grounds.

Ethical engagement and Indigenous perspectives in biological anthropological research of Greenlandic Inuit remains: Uncovering past tendencies for future insight.

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In recent years, biological anthropology has aimed to confront and decolonize the harmful legacies of its practices, addressing the social injustice inflicted by earlier scholars on Indigenous and other marginalized groups, as well as their descendants. This study examines unethical historical practices in biological anthropology and its subdisciplines, such as paleopathology, that have impacted Greenlandic Inuit communities. Using a review of past disciplinary efforts, the study explores how these practices have perpetuated social injustice and encourages ethical engagement. This research underscores the importance of collaboration with Inuit descendant communities, thereby promoting respectful research practices that acknowledge the culture and rights of Inuit communities. Furthermore, it reveals the complexity of ethical reform in anthropological research involving Greenlandic Inuit remains and shows how future research should aim to develop and implement Indigenous perspectives across the field, potentially transforming how biological anthropology engages with both Indigenous remains and communities.

A case of suspected treponematosis from the Merovingian cemetery of Burmerange (Schengen-Luxembourg).

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The origins of treponemal diseases remain a topic of extensive debate, and instances of syphilis definitively traceable to pre-Columbian times are limited. Within the framework of results derived from anthropological and paleopathological examinations of sixteen individuals interred in the Merovingian cemetery of Burmerange (Luxembourg), a potential case of treponematosis has been discerned in the cranial remains of an adult female. This observation was conducted through macroscopic examination. The skull displays seven cavitations on the external table of the frontal bone, characterized by irregular margins and variable dimensions, ranging from 3 mm × 2 mm to 2 cm × 8 mm. The most extensive loss of bone substance consists of two merged cavitations, exhibiting a profound circular depression. Cribriformity on the healed bone surface of the cavitations suggests the presence of destructive processes coupled with reparative phenomena. Differential diagnosis methods, comparing bone characteristics against known patterns of disease, to identify the most likely cause, were employed, resulting in the exclusion of osteomyelitis, tuberculosis, and malignant neoplasms. While cranial involvement is infrequent in Yaws and endemic syphilis, it cannot be entirely discounted in a potential diagnosis of treponematosis. Conversely, venereal syphilis often manifests erosive and reparative changes on the skull, similar to those observed in this case, particularly in its early stages. Despite the known cases of uncertain dating, in this instance, the type of necropolis and the grave goods unequivocally establish the dating as medieval (circa 7th century CE). Future investigations, including the study of ancient DNA, could validate this hypothesis.

Attritional and catastrophic mortality in medieval Britain: A demographic analysis of burials pre-dating and attributed to the Black Death.

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Palaeoepidemiologists have previously sought to understand how the Black Death of 1348-52 AD affected the population of medieval Britain by comparing the demography of plague burials to "attritional" burials. However, previous studies have been limited by only including one comparative site, or by including "attritional" cemeteries that span the Black Death and therefore may contain plague victims. This study evaluates the demography of the Hereford Cathedral Black Death mass graves alongside three early medieval cemeteries that predate the Black Death. Age-at-death was estimated for adults via transition analysis: 73 individuals from the Hereford Cathedral mass graves, 111 from the Black Gate cemetery (8-12th century), 87 from the Church of St Dochdwy cemetery (late 7-13th century), and 119 from Wharram Percy (9th century −1348 CE). Demographic profiles were generated using model life tables, and mortality analysis was conducted via Kolmogorov-Smirnov tests. No significant variation existed between the age-at-death profiles for each of the pre-Black Death cemeteries. The age-at-death profiles of the plague burials and the aggregated "pre-Black Death" sample were significantly different (Kolmogorov-Smirnov $D = 0.278$, $p = 0.000$), with individuals aged 15-34 being over-represented within the plague burials. This suggests that an over-representation of young adults is indicative of Black Death mortality. Notably, this study also describes age-at-death profiles for "attritional" early medieval British cemeteries. The sample size and poor preservation of the Hereford sample do limit interpretation, but these results do complement previous studies. Future research should examine the demography of "attritional" cemeteries that may include plague burials.

Two adult individuals with cemento-osseous dysplasia (COD) in

the mandible from Budyonnovsk, Bronze Age (2500–2300 BCE) in the Northern Caucasus.

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Fibro-osseous processes are frequent, often benign, changes of the facial area of the skull. Their differential diagnosis includes fibrous dysplasia, several types of osseous dysplasia, and ossifying fibroma. Although their soft tissue component is mainly missing, by their localization within the skull and their distinct types of osseous changes (lytic lesions filled with woven bone and sometimes with cementum), they can also be diagnosed in skeletons from archaeological contexts. A 30-40-year-old female individual from a Middle Bronze Age burial mound in the Northern Caucasus/Russia dating to 2500–2300 BCE, showed a periapical lesion encompassing the alveoli of the four lower incisors with circumscribed replacement of compact bone by less well-organized bone trabeculae and additional cementum-like structures. The lesion was investigated using digital microscopy, plain radiology, and plain and polarizing microscopy, as well as computed tomography. The localization, combined with the presence of cementum, suggests a cemento-osseous dysplasia (COD). In the same burial mound, a 22-25-year-old male has already been diagnosed with a cemento-osseous dysplasia. However, while this lesion only affected a mandibular canine, fitting best to focal COD affecting single teeth, the described case represents the typical periapical COD. Although these conditions are relatively rare, recent studies showed a familial accumulation of cases. The presence of these lesions in two individuals within the same burial mound might suggest a biological relationship between them. These cases prove that discreet bony changes like osseous dysplasia can also be detected in archaeological skeletons.

Unveiling ancient chronic calcific arterial disease: radiological and histological insights from two Sicilian natural mummies of the 18th-19th centuries.

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The issue of atherosclerosis in antiquity has sparked significant debate, as it remains one of the most prevalent diseases in Western populations nowadays. This paper investigates two mummies preserved in the Santa Maria della Grazia church of Comiso (Sicily) with evidence of atherosclerosis. The chapel contains 50 male mummies dressed in Capuchin attire dated to the 18th-19th centuries. The mummification process occurred naturally, aided by microclimatic conditions and procedures that facilitated the draining of the fluids. We studied two mummies, a friar who died in 1742 at the approximate age of fifty and a farmer, aged around thirty, who probably died in the early 19th century. Autopsy revealed severe calcification of the distal portion of the abdominal aorta, iliac and femoral arteries. Samples were obtained through pre-existing fissures in the bodies and underwent radiological, histological, and immunohistochemical examination. The analyses confirmed a severe atherosclerosis with calcified plaques. These cases are of considerable relevance for the exceptional macroscopic and histological preservation of the vessels, which is rare in paleopathology; furthermore, the presence of atherosclerosis in non-elderly adults in this historical period, when the patterns of the diet and lifestyle were different from today, contributes to demonstrating that this disease is not only related to modernity. The mummies are no longer accessible, so it is impossible to obtain additional samples. Future paleonutritional and molecular investigations on the samples already collected could elucidate whether in these two individuals the pathology was solely related to dietary habits or was influenced by genetic predisposition.

Estimating impaired Activities of Daily Living through Degenerative Joint Disease to identify disability in a skeletal sample.

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Degenerative joint disease (DJD) is often used as an indicator of age, yet these changes also reflect the living experience of individuals as they progress through life. This study set out to assess the impact of DJD in a sample of modern southern African skeletal remains and the subsequent effects on their Activities of Daily Living (ADLs). A novel scoring system was created, translating DJD into ADL limitation – by quantifying DJD severity and frequency in specific joints and relating it to limitations in completing respective ADLs. A sample of 150 individuals between 35 and 90 years was assessed for signs of DJD in all major joint regions. Results indicated that the shoulder often (43%) presented with the most severe DJD score across the sample. For the axial skeleton, severity scores were much more variable; however, the lumbar vertebra was most affected with 81% showing signs of DJD. Generally, females presented with higher severity scores for DJD across all appendicular joints, whereas males presented with a higher severity frequency of DJD lumbar vertebra (34%). This study indicated moderate impacts in transferring (53%), walking (51%), and eating (41%) ADLs for all individuals. Females presented with significantly higher ADLs for all activities except posture changes. Differences between socio-economic status (SES) groups were also noticed, with the lower SES group showing increased levels of impairment across most of the ADLs. This study highlights the value of understanding trends in joint pathology and its resulting activity limitations within past and present populations.

Auditory ossicle changes as an indicator of chronic otitis media in medieval central Italy (Tuscany, 10th-12th century CE).

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Chronic otitis media (COM) is an inflammatory condition affecting the bony structures of the middle ear, including the auditory ossicles. This study aims to evaluate the presence of COM within the osteoarchaeological sample from Pava, a medieval rural site in central Italy (Tuscany, 10th-12th centuries CE). A total of 224 ossicles were extracted from 20 non-adults and 99 adults using dental instruments; the ossicles were cleaned with water and air-dried before visual inspection using a stereomicroscope. The results revealed that 32.8% of the individuals exhibited pathological alterations, with 25.0% of non-adults and 34.3% of adults affected, and a higher prevalence of COM was found among males (39.6%) compared to females (28.3%). Pitting was the most common lesion (76.9%), with the incus being the most affected ossicle (67.3%). In comparison to data from other medieval sites in north-eastern Europe, the lower prevalence of COM in the Pava sample could be attributed to the temperate climate of central Italy and the possible limited exposure of rural communities to risk factors such as indoor air pollution and overcrowding living conditions. This study contributes to COM assessment in ancient human remains by providing descriptions and scoring criteria of further lesion-types in auditory ossicles (e.g., new bone formation, bone resorption, bone remodeling) linked to this condition. Research limitations include the inability to examine all auditory

ossicles per individual, as well as the limited number of non-adults. Further examination from various contexts across Italy could offer insights into the prevalence of COM from a diachronic perspective.

Exploring porous skeletal lesions and variations in the elemental concentration using pXRF: insights from a non-adult sample from Lisbon, Portugal (18th-19th century).

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Etiologies and interpretations of porous skeletal lesions (PSLs) are still debated in paleopathology. Previous studies suggest that variations of P, Ca, Sr, S and Fe concentrations in bone, measurable by pXRF, may contribute to this discussion. Thus, the main goal of this research is to investigate whether the concentrations of these elements differ between individuals with/without *cribra cranii*, *orbitalia*, *humeralis*, and *femoralis*. One hundred non-adult individuals aged 0-11 years were selected from the archaeological site Convent of São Domingos, Lisbon, Portugal (18th-19th century). Possible contamination was excluded by comparing the concentrations of elements in bone and soil and the assessment of Ca/P ratios. *Cribra* were recorded as present/absent with low intra- and inter-observer errors. Multivariate analysis revealed that low levels of Fe and higher levels of S increase the odds of expressing *cribra orbitalia* (OR = 1.76; CI = 0.97–3.20) and *cribra femoralis* (OR = 1.42; CI = 0.73–2.74); while higher levels of P, Ca, and Sr increased the odds of having *cribra femoralis* (OR = 2.30; CI = 1.23–4.29). Despite the known link between low Fe, *cribra*, and iron-deficiency-anemia, the complexity of PSL suggests considerations beyond simple nutritional deficiencies, including cultural feeding practices in non-adults, articulated with megaloblastic and/or chronic disease anemias. Since older individuals presented significantly higher levels of P, Ca, and Sr—aligning with physiological processes of skeletal growth—it is possible that differences found in elemental concentration for *cribra femoralis* are more related to an age effect than with the expression of *cribra* itself. Although more elemental studies are needed, these results broaden *cribra* interpretation.

Investigating social and health inequality in historical populations of Amsterdam.

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Disease indicators in skeletal remains reveal essential aspects of past lives. We studied groups representing different socioeconomic layers of 17th-19th century Amsterdam society to examine the effects of social marginalization on health and disease. The collections examined include young girls from Amsterdam orphanages, nuns, and adults and children from wealthier social groups. We conducted a macroscopic analysis of common skeletal diseases for a comprehensive palaeopathological study. We found a high prevalence of *cribra orbitalia*, pitting and linear enamel hypoplasia, but also some instances of rarer conditions, such as cancer, carcinoma, gallstone and antemortem trauma cases, in groups of lower socioeconomic status. These elevated pathology rates may correspond to nutritional deficiencies and disease in the early stages of life, arising from poverty, poor living conditions, and social inequality. While these results may appear expected, vulnerable and historically marginalized populations of Amsterdam have rarely been the focus of palaeopathological investigation. In some cases, the lack of interest in these groups is mirrored by a lack of previous research on their remains and the extremely sparse documentation of the excavation process. This study is the first in a more extended project aiming to (re-)analyze collections under long-term curation and will include microscopic and biomolecular analyses of past diseases in these social groups in the future. This project aims to expand our knowledge of social and health inequality in past populations of Amsterdam and support new narratives in palaeopathology.

On the backs of the working class & poor – Scoliosis in the 18th-century patient cemetery of Vienna's first women's hospital.

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In 2018-19, archaeological excavations uncovered the cemetery of the first Viennese women's hospital of the Elisabethians, which was built in 1715 and used until 1784. The excavations brought to light the well-preserved, articulated skeletons of 356 individuals, who, according to historical records, largely belonged to Vienna's lower social class. During the excavations, it was already apparent that several individuals suffered from advanced scoliosis. The study of these individuals and the quantitative recording of the skeletal changes as well as the exploration of the physical and social consequences their spinal deformations entailed is a topic explored by an ongoing dissertation on living conditions, health and medical care for lower-class women, and which is being carried out as part of an interdisciplinary research project. For the quantitative analyses of scoliosis, a mount was built to photogrammetrically record the vertebrae in an anatomical, upright position and subsequently measure the Cobb angle using dewarped images in QGis. Preliminary findings show that 20 out of 56 individuals (35,7%) with a preserved spine examined to date suffered from at least a mild form of scoliosis, and almost three-quarters of these (14 individuals) also showed a deformation of the thoracic cage. Since the skeletal sample represents a subpopulation of working-class women, the high frequency is likely due to the harsh working conditions the women suffered from early childhood and their overall poor living conditions as members of the lower class in 18th-century Vienna.

Fibro-osseous processes of the facial skeleton: Surface evaluation using scanning electron microscopy.

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Small fibro-osseous processes are frequently found in the craniofacial skeleton in archaeological remains, but also in living people, regardless of geographic location or time period. These small (<10mm in diameter), roundish lesions are characterized by a replacement of compact by woven bone and are mainly located around the nasal cavity and paranasal sinuses. While the origin of these fibro-osseous processes is still a matter of debate, this study focuses on features of their bony activity. Using scanning electron microscopy (Leica LEO 430), we examined 14 lesions for the presence of osteoclastic resorption holes (Howship lacunae) and the structure of their trabecular filling. The 14 lesions (nasal cavity n = 8, maxilla n = 3, frontal bone n = 2, hard palate n = 1) were of 12 adult individuals (20-60 years of age) from Neolithic Turkey (n = 3) and Bronze Age Russia (n = 9). Four lesions show Howship lacunae, four have no Howship lacunae, and in six lesions, poor preservation prohibits any statement. Trabecular formation is dense and more organized in six lesions, less organized in six lesions, and could not be evaluated in two samples. All four lesions with Howship lacunae show less organized trabeculae. Despite the limiting sample size and preservation, the combination of Howship lacunae and poor trabeculae

organization seems to be more indicative of an active process. Dense and remodeled trabeculae suggest a maturated state of these lesions. Although the lesions do not differ in their macroscopic appearance, microscopically they present different grades of maturation, which is also known from fibro-osseous lesions of tooth-bearing areas.

Debating ancient health: one worm at a time, based on finds from the Early Modern Period Chełm in Poland.

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For this project, 230 graves (minimum number of individuals - 268; 170 adults, 98 subadults) and soil samples from 66 sacra from Chełm, Poland, dated to the Early Modern Period, were analysed. Assessment of skeletal stress markers (stature, *cribra orbitalia*, porotic hyperostosis, linear enamel hypoplasia) and paleoparasitological studies were conducted. The project aimed to analyze differences between the osteological and paleoparasitological data within a historical context. Results were compared to determine if there are associations between findings. The main hypothesis was that the results would show generally bad health. Soil samples were analysed with the Rehydration-Homogenization-Microsieving protocol, while bones were studied with the modified Global History of Health Project protocol. Data were available for 43 individuals (32 adults, 11 subadults): 24 showed CO, 4 PH, and 23 LEH lesions. Paleoparasitological results showed polyparasitism in most of the examined individuals (38). Intestinal parasites, e.g., whipworm (247 eggs), roundworm (148), and flukes (23) were identified. The statistical model (H1 deviance = 150.075, AIC = 156.075, df = 112, $p = 0.024$) showed an association, e.g., between parasite presence and PH ($p = 0.013$). The project represents the first large-scale paleoparasitological analysis in Poland. It allows to reconstruct lives in small towns during a well-documented period, addressing topics seldom discussed in sources. The project's limitations include not examining the entire site for parasites and a limited number of children studied. As the project reaches its midpoint, it will be enhanced with additional paleoparasitological results.

A proteomic view on malaria-infected and -uninfected red blood cells: identifying potential biomarkers for paleopathology.

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The causative agent of malaria tropica, Plasmodium falciparum (Pf), is responsible for the majority of malaria-related deaths in the world. The erythrocytic schizogony of the parasite within the red blood cells (RBC) of the human host can lead to a severe outcome due to parasite-driven RBC remodeling and progeny production. We were curious which parasite proteins are produced within the RBC during that time, how their abundance changes and if host RBC proteins are affected as well. We aimed to identify parasite and RBC proteins that could be used as markers to detect the presence of different Pf developmental stages in a paleopathological setting. Therefore, we examined parasite and host cell protein changes throughout the erythrocytic schizogony via mass spectrometry of the tightly synchronized Pf laboratory strain 3D7-infected as well as uninfected RBC that were kept in a 48h-in vitro culture. Samples of uninfected and infected RBC were analysed at well-defined time points during the parasites' ring, trophozoite and schizont stages. We found that 584 identified RBC proteins did not change significantly, either in the infected or in the uninfected culture. We identified 337 different proteins of the parasite. 53 of the parasite proteins changed significantly throughout the erythrocytic schizogony. Their predicted location was the nucleus and the cytoplasm of the parasite with putative functions in DNA maintenance, replication and protein synthesis. Although we used a contemporary Pf strain in our study, we hope our findings support the identification of the parasite within ancient human remains in future paleopathological studies.

Lost too soon: The infant skeletal remains from the W.D. Trotter Anatomy Museum, New Zealand.

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Foetal and infant anatomical historical skeletal remains can pose specific ethical dilemmas. An investigation of the social and historical contexts and acquisition practices of historical remains are integral to ethically engaging with these collections. The W.D. Trotter Anatomy Museum at the University of Otago in New Zealand, founded in the 19th century, houses more than 2000 models and anatomical 'specimens', with many skeletal remains missing provenance information. This research aimed to provide an inventory of the foetal and infant skeletal remains and identify, through archival analysis, the social context of their acquisition. An osteological analysis was carried out to assess the minimum number of individuals (MNI), estimate age-at-death, and any evidence for pathology and dissection. There was an MNI of 32 individuals ranging in age from 15 weeks in utero to 3 months postnatal, with most around full-term. Some individuals have evidence for developmental pathology, birth trauma (use of forceps), and/or post-mortem dissection. It is likely that these remains were retained as developmental teaching 'specimens' and examples of pathology. Archival research indicated a high proportion (7/18) of these babies who had records available were 'illegitimate', and a high proportion were born to low socio-economic families. Many of these babies were also born at maternity hospitals where women without support were forced to give birth. These archival findings, coupled with the historical legal rights afforded to physicians to the custody of bodies (under the Anatomy Act 1875) suggest structural inequality played a role in the acquisition of these infants' remains.

Silver as alternative treatment in 19th-century Europe: the cases of argyria of Edinburgh, Padua, and Dublin.

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In the 19th century, silver was sometimes used as an alternative treatment for syphilis and other diseases due to perceived benefits based in astrology. However, prolonged silver intake could lead to argyria, a rare and irreversible condition where chronic absorption of silver bypasses the body's renal and hepatic excretory capacities. This results in deposition of silver granules in the skin, mucosae, and internal organs, causing permanent grey to bluish-black staining. To demonstrate the consequence of these alternative practices in Europe, we examine three cases spanning from late-19th to early 20th century from three pathology museums: a kidney from Surgeons' Hall in Edinburgh (Scotland), a mummified head from Morgagni Museum of Human Anatomy in Padua (Italy), and a watercolour portrait of a patient from Old Anatomy Museum at Trinity College Dublin (Ireland) labelled as from a patient with argyria. Recent studies confirmed that prolonged intake of silver is

not toxic at low levels. Modern analyses (histology, ESEM, EDS) of the Padua case demonstrated a high amount of Ag in every skin layer. A comparison between the historical sources in these three cases, modern analysis and current medical literature highlights how patient reliance on perceived benefits is common in argyria cases. This study aims to provide a historical-medical review of pre-20th-century argyria cases and examine the consequences of past silver abuse. In the 21st century, there is a rising demand for silver in alternative therapeutics claiming to treat infection and disease, underscoring the importance of understanding the medical implications of silver use.

Study of *Cribra Orbitalia* and *Cribra Femora* through Portable X-ray Fluorescence Spectrometry (pXRF).

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Porous bone lesions of the eye orbits (*cribra orbitalia*, CO) and the anterior side of the femoral neck (*cribra femora*, CF) have often been associated with red bone marrow expansion due to anaemia, in particular iron-deficiency anaemia. Subsequently, the condition has often been used as a proxy to study health and diet in ancient populations. We hypothesized that the association between chronic iron-deficiency anaemia and porous bone lesion formation would be reflected as lower iron levels in the bones of affected individuals. To this end, we examined the remains of 92 skeletons of adults (male = 25; female = 18) and subadults (n = 49) from the Middenbeemster and Arnhem excavations and estimated the frequency of CO and CF in these Dutch post-medieval (16th-19th century) populations. Using pXRF, elemental concentrations of femora were measured. At both sites, a downward trend in relative frequency of CF can be observed as age-at-death increases (84,61% of sub-adults and 13.63%). The pXRF-analysis showed that individuals with CF do not have significantly lower concentrations of iron, nor any other metal in their femora ($p > 0.05$ for each element). The results seem to support a recently postulated theory which claims that these porous lesions are not pathological but developmental in nature and therefore cannot be used as a stress marker. A caveat is that the use of pXRF to measure elemental bone concentration is a relatively new method in osteoarchaeology with an urgent need for standardization of protocols. The study was limited in sample size and should be validated on a larger population.

The search for a partisan leader Vladas Montvydas-Žemaitis. The process and its difficulties in Varniai, Lithuania.

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During the Soviet occupation of Lithuania, numerous citizens participated in the resistance movement (1944-1953). Many of them lost their lives, and their remains were buried disrespectfully. The experience of working on specific cases such as Vladas Montvydas, which involved his family members and community, has highlighted several ethical challenges associated with the search for human remains of forensic significance. The following issues have been identified: (1) the remains are generally hidden next to or within cemeteries, thereby other burials can get inadvertently disturbed during the operations; (2) while it is important to have an anthropologist present during the excavation process, archaeological research in Lithuania does not necessarily require them to be on-site; (3) without an anthropologist (or due to time restrictions), recent remains that are not related to the searched individual and are not of forensic significance can accidently be brought to the laboratory; (4) the presence of random visitors unrelated to the archaeology team and their behavior on site can also be problematic. This paper will present the details of the research process and the benefits of collaboration between specialists, as well as offer suggestions for similar scenarios. Although the search and recovery of anti-Soviet resistance fighters is relevant for multiple reasons, the identification and return of individuals to their families are the most significant parts. However, it is equally important to ensure that human remains unrelated to the search are not disturbed and are treated with utmost respect.

A differential diagnosis analysis on a case of mandibular osteomyelitis from the Late Helladic III cemetery of Kallithea-Laganidia, Achaea, Greece (ca. 1400–1050 BCE).

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Osteoarchaeological studies from the Bronze Age Aegean (BAA) have been steadily increasing during the last decades. However, palaeopathological approaches are limited, hindered by large-scale commingling and fragmentation of the remains, typically present in such contexts. This presentation examines a left mandibular body with extensive pathological alterations, from a commingled pit deposit (preliminary MNI = 10) from the Late Helladic III (ca. 1400-1050 BCE) cemetery of Kallithea-Laganidia, Achaea, Greece, to provide differential diagnoses. The fragment was analysed macroscopically, with visual pairing applied, to identify additional elements potentially belonging to the same individual (e.g., maxillary fragment with similar lesions). Significant, localised bone enlargement was present, along with extensive porosity and a cloaca on the medial aspect of the cortical bone surface. A post-mortem breakage in the lateral aspect revealed a combination of trabecular bone destruction and irregular masses of sclerotic bone. Fragmentation and commingling prevented the attribution of this element to a specific individual and/or a potentially broader pathological pattern. However, a review of archaeological and clinical literature allowed the identification of potential differential diagnoses, compared and presented on a basis of likelihood: (a) non-specific infection leading to osteomyelitis (with or without secondary fracture), (b) primary (odontogenic?) bone cancer with secondary infection, (c) ossifying fibroma, and (d) facial trauma with secondary infection. This case study discusses a rare occurrence for the BAA standards and stresses the potential of a differential diagnosis approach in this context. Future radiographic and pathogen analysis will hopefully increase our understanding of the observed pathological case.

An early 20th-century case of noma infection following typhoid fever from the Morgagni Museum (Padua, Italy).

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Noma (*cancrum oris*) is a gangrenous disease causing severe facial tissue destruction and high mortality, predominantly affecting young children living in unsanitary conditions and extreme poverty. The exact aetiology of Noma is unknown; it is linked to malnutrition, a compromised immune system, and potentially triggered by an unidentified bacterial factor. This study aims to investigate the pathological and bacteriological aspects of a Noma case dating back to 1902 from the Morgagni Museum of Human Anatomy at the University of Padua (Italy), to enhance our understanding of its aetiology and pathogenesis. We conducted a comprehensive review of historical autopsy reports, medical literature, and past bacteriological analyses. Additionally, a non-invasive analysis of the specimen was performed to identify any associated pathogens and examine the tissue structure. Historical bacteriological analysis revealed the presence of Typhus bacilli in the specimen, suggesting a correlation between typhoid infection and Noma. This connection, though rarely reported recently, aligns with current studies indicating an association with other infectious diseases. The analysis also connected the Noma case to two other specimens—a mesenteric lymphatic ganglion and a spleen—belonging to the same individual, providing further insight into the systemic nature of the disease. The

pathogenesis of Noma remains to be fully understood. The findings support the hypothesis that infectious diseases like typhoid may play a role in the development of Noma. This study underscores the importance of historical collections in modern pathological research, providing valuable insights into the disease's aetiology and pathogenesis, potentially leading to better treatment and prevention strategies.

A case of manubrial porosity from a single tomb from the Mycenaean settlement of Chalandritsa, Greece (Bronze Age: 13th -12th century BCE): differential diagnosis for a "neglected" skeletal element.

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The importance of the sternum as an element of manifestation of pathological conditions has not been sufficiently described in the literature. Due to its location in the thoracic cavity, sternal porosity has been associated with anemia, tuberculosis, and other pulmonary or heart diseases. This study presents a case of manubrial porosity discovered in one of the best-preserved skeletons recovered from burials in the Mycenaean settlement of Chalandritsa, more specifically from tomb 11. The remains, which belonged to a 40-year-old male individual, were prepared, restored, and examined macroscopically. The paleopathological findings were analysed according to the existing literature. The posterior surface of the manubrium presented arachnoid lesions. Similar lesions, though in a smaller magnitude were observed bilaterally on the inferior side of the acromion of the scapula. Moreover, a healed Parry fracture was found on the distal end of the left ulna. The results suggest that the porosity is a sign of increased vascularity, indicating chronic inflammation. These findings can be explained by a bacterial infection on the locus of the fracture that spread through the circulatory system. The absence of typical anemia or tuberculosis manifestations in places such as the vertebral column and the skull strengthens this potential diagnosis. This case study addresses a poorly researched bone element regarding its diagnostic value and suggests an infectious pattern. However, a macroscopic assessment always has limitations. Thus, further investigation is needed with CT and micro-CT scans to evaluate density changes and the architecture of the trabecular bone to verify the above hypothesis.

***Cribra orbitalia* and osteoperiostitis correlate with socioeconomic indices in Late Medieval - Early Modern Vilnius.**

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We aimed to evaluate the effects of socioeconomic and cultural factors on *cribra orbitalia* and osteoperiostitis prevalence in a large sample from the 13th to 18th centuries CE. Vilnius. Vilnius is a multicultural city that experienced early urbanization (13th-15th centuries), prosperity (16th century CE), decline and gradual recovery (17th-18th century). The database consisted of more than 2000 individuals with known archaeological contexts, assigned to the Catholic, Orthodox and Protestant denominations, to social elites and to ordinary citizens, and with biological profiles (age, sex and pathologies). *Cribra orbitalia* was classified as either porotic, cribrotic or trabecular. Osteoperiostitis is classified as localized (only tibia and/or fibula involved) or widespread (more than tibia). Kaplan-Meier survival curves and Cox proportional hazards models were used to estimate survival by sex, age at death, denomination, time period, and social status or their combination. We found that for *cribra orbitalia* incidence, sex had no significant effect. The incidence decreases with age: lower social status, early urbanizers and Orthodox individuals with *cribra* had significantly lower survival. These findings correlate with earlier C13/N15 studies suggesting lower protein intake of Vilnius early urban dwellers, lower status individuals and those of the Orthodox denomination. The prevalence of osteoperiostitis showed a cumulative effect with age, no sex or confessional differences, an increase towards the 18th century, and marked social differences with ordinary citizens significantly more affected. However, the uneven preservation of the materials studied and the uneven representation of confessions in different periods are limitations of the study.

Dental versus skeletal age discrepancy in subadults: A preliminary study from the ancient Saqqara Necropolis, Egypt.

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Age at death of subadult remains can be estimated via dental and skeletal methods. Observations of the exceptionally well-preserved subadult remains from the ancient Egyptian cemetery at Saqqara, located immediately west of the step pyramid complex of Pharaoh Djoser, demonstrated a discrepancy between age estimates derived from dental versus skeletal methods. Some authors have suggested that dental development is less affected by environmental stressors than is skeletal growth, making it the best indicator of chronological age at death in subadult human remains. Here, we explore the issues of (a) the observed discrepancy in dental and skeletal age estimations in a sample of subadult skeletons dating primarily to the Greco-Roman Period (c.332BCE–c.400CE), and (b) the influence of environmental stressors and stress-related pathologies on dental/skeletal development and skeletal growth. We examined 38 non-commingled subadults aged $\leq$13 years at the time of death, whose completeness allowed for both dental and skeletal age estimations using current standards. The presence of macroscopically observable stress-related pathological lesions or trauma was recorded for each individual in the study sample. All skeletal age indicators, except for the clavicle, were statistically significantly different from dental age ($p < 0.05$). The general trend was for skeletal indicators to underestimate age compared with the dentition. Analysis of age estimates in individuals with or without observable stress-related pathologies suggests that these types of pathologies are associated with delayed fusion relative to dental development but not delayed longitudinal growth. These results are discussed in the wider context of growth, development, and method applicability.

Differential diagnosis of remarkable unilateral upper limb anomalies: case study from medieval-early modern Europe.

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The aim of our study was to present an unusual case of severe unilateral upper limb anomalies and to explore their potential aetiology. These skeletal remains have been recovered among over 4000 individuals from the 13th to 18th century CE, buried in and around a collegiate church of St. Mary Magdalene in the city center of Poznan, western Poland, Europe. The individual was 90% complete. Sex was assessed to be female through the morphology of the pelvis and skull. Age at death was estimated with Transition Analysis 2 as 30-45 years. The main pathological changes were found in the left shoulder girdle and left upper limb

in the form of substantial deformation, mainly in the joint areas, with significant size reduction. The most severe changes involve the humerus, with an altered proximal head, bifurcated distal epiphysis, lack of radial articulation area, and overall shortening by one-third relative to the right humerus. The ulna and radius are slender and have deformed epiphyses, while their distal two-thirds seem normal. The clavicle shows an abnormal acromial facet, and the scapula has a small and slightly convex glenoid fossa. The right scapula and humerus appear generally normal in terms of their anatomy, but show poorly developed muscle attachment sites and signs of joint disuse. Our preliminary diagnosis involves brachial plexus injury, potentially resulting from breech birth. Differential diagnosis includes sepsis, peripheral nerve palsy, and rare congenital diseases. Our study, through incorporating a biosocial approach, enhances understanding of human health and behavior in the past.

Examining climatic events, diseases, and ritual practices within pre-Columbian civilizations through a bioarchaeological perspective.

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Paleoclimatic investigations of regions previously inhabited by pre-Columbian civilizations, such as the Yucatan Peninsula, have revealed exposure to extreme climatic conditions, including droughts and floods. Research indicates that these phenomena are closely associated with the Little Ice Age and meteorological events such as El Niño, which primarily originate in the tropical areas of the Pacific Ocean and usually occur every two to seven years. Droughts could lead to crop failures, food shortages, and consequently malnutrition with a serious health impact on the population. These adverse conditions may have prompted societies to adopt extreme measures to mitigate the effects. This study aims to provide literature evidence that suggests similar occurrences in pre-Columbian societies such as the Maya and Aztec, who experienced prolonged periods of severe drought, and the Inca, who faced both drought and significant flooding events. According to at least ten studies, archaeological sites including Cara Blanca Pool, Midnight Terror Cave, Tula, Chichen Itza, Tlatelolco, Misti and Llullaillaco volcanoes, and Huanchaquito have yielded excavation findings comprising numerous ceramic artefacts and the remains of 355 individuals in total. Some of these remains exhibit distinctive death marks, indicating that the data align with the corresponding paleoclimatic evidence. In all these societies, extreme ritualistic practices appear to have been employed as attempts to "negotiate" climatic conditions with the deities they believed in. These findings allow the hypothesis of a connection between extreme climatic events and the ritualistic practices observed, thereby enhancing our understanding of the response of a society under threat.

The prevalence of cancer-like lesions at the Middle Anglo-Saxon cemetery at Cookham, Windsor, England (590–910 CE). Implications for site interpretation.

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This presentation aims to advance our understanding of cancer and attitudes towards physical impairment in early medieval England through the analysis of individuals buried at a middle to late Saxon monastery at Cookham, Windsor (590-910 CE). Four types of burial have been identified: single burials, stacked and/or intercut burials, a linear 'mass' grave to the west of the cemetery, and disarticulated bone assemblages. These disarticulated remains represent both grave markers above inhumations, and perhaps 'ancestors' reburied on consecrated ground during the conversion to Christianity. To date, 35 inhumations have been examined (32 adults, 3 non-adults). Eleven (31.4%) have pathological conditions (e.g., active new bone formation, unilateral profuse dental calculus, trauma, Perthe's disease, femoral atrophy) and 4 of the 35 (11.4%) display bone tumours. This prevalence is higher than what is expected in a general population (1.2%) and similar to prevalence rates in pathological collections of individuals who died with cancer (17.5%). The archaeological and palaeopathological evidence is combined to explore the hypothesis that this early monastery functioned as a treatment centre for a wider community, and considers the use of English monasteries before their height in the later medieval period and downfall during the Reformation. Currently, the sample size is small, but further excavations will elucidate whether the excavated area of the cemetery was being reserved for the physically impaired, skewing our interpretation of the site, or whether more individuals suffering from severe pathological conditions are present.

Developmental defects in the adult human vertebral column: prevalence by biological sex and co-occurrence.

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Development defects result from errors during embryonic development. Except for spina bifida occulta (SBO), axial skeleton development defects are poorly documented in paleopathology. This research aims to study developmental defects in vertebral columns and their co-occurrence. Individuals (N = 345, 168 females/177 males, ages-at-death: 21-79 years-old) from the Coimbra Identified Skeletal Collection (19th-20th century) were macroscopically examined. Intra and interobserver errors (n = 20) revealed good concordance. No cases of notochord (sagittal or coronal cleft vertebra, diastematomyelia), neural tube defects (sacral agenesis), or hemivertebra were identified. Paraxial mesoderm defects were present in 49% (169/345) of the individuals (79 females/90 males), without statistically significant differences. In descending order, the following defects were reported: sacral SBO (19.1%, 23 females/43 males), sacrocaudal border shifting (14.5%, 20 females/30 males), lumbosacral border shifting (11.9%, 17 females/24 males), hypoplasia/aplasia of the neural arch complex (7.5%, 12 females/14 males), numerical errors in segmentation (7.3%, 13 females/12 males), block vertebrae (1.7%, 4 females/2 males), spondylolysis (1.7%, 2 females/4 males), centrum hypoplasia (0.9%, 3 females). Co-occurrence of defects happened in 14.8% of the individuals. The most common associations are: border shifting with neural arch complex defects, shifting defects in more than one transition zone, and border shifting defects with sacral SBO. Transition zones -occipitocervical (1.5%), thoracolumbar (4.8%), lumbosacral (12%), and sacrococcygeal (14.6%) -were the regions affected by developmental defects. The completeness of these spines provided a better understanding of the distribution of these defects. Its aetiologies are unknown, but low prevalence could indicate a lack of major nutritional issues and low consanguinity.

Exploring health challenges: A possible case of congenital syphilis in 18th-19th century Pointe-aux-Trembles, Québec.

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Venereal syphilis was a common disease across Europe throughout the 16th to 20th centuries, yet little palaeopathology research has addressed its presence in historical Canadian communities. When syphilis is transmitted from mother to fetus in utero, it causes congenital syphilis, which commonly results in neonatal mortality and significant morbidity if the infant survives. This case study evaluates the presence of congenital syphilis in a child from the 18th-19th century Pointe-aux-Trembles, a rural community near Montréal, Québec. The dentition and skeletal remains were observed macroscopically and scanned via

computed tomography for lesions associated with congenital syphilis, and potential stress episodes were investigated using stable carbon and nitrogen isotope analysis of incremental dentine samples. Conditions such as rickets, scurvy, anemia, and osteomyelitis were also considered. Osteological analyses found several skeletal and dental lesions, including planar hypoplasia on the deciduous dentition and Fournier's/mulberry molar morphology on the permanent first molar. Isotopic analysis and enamel hypoplasia formation suggest the individual experienced physiological or nutritional stress between birth and ~15.5 months of age. This evidence is consistent with congenital syphilis; however, a definitive diagnosis is challenging due to the absence of the cranium and other diagnostic permanent teeth. This poster is the first to combine paleopathology and paleodietary analyses to report on congenital syphilis in 18th-19th-century rural Montréal and suggests additional evaluation of syphilis among other adults and non-adults is warranted.

A rare case of inguinoscrotal hernia in a 14th-century Italian church mummy (Tuscany, Central Italy).

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In 2022, a bioarcheological study on an Italian church mummy dating back to the late 14th century was conducted to reconstruct the biological profile and cause of death of a prominent late religious figure of medieval Tuscany. Due to ethical and religious reasons, his identity cannot be disclosed. The macroscopic examination of the body was complemented by X-ray, CT scan, and histological analysis, while the biological profile was reconstructed using traditional anthropological methods. The body underwent a process of natural mummification, resulting in a fairly well-preserved state, and it belonged to a man over 60 years old. Radiological investigations revealed calcifications in the pleura and lungs, suggesting chronic pulmonary inflammation or infection, which histological analysis determined to be active at the time of death, and complicated by anthracosis. The most interesting and uncommon paleopathological condition was a disproportionately enlarged right scrotal sac compared to the left, diagnosed as an inguinoscrotal hernia. This condition involves the protrusion of abdominal organs through a weakened area in the inguinal abdominal muscle fascia. In this case, the protrusion extended into the scrotum, where a CT scan and histology revealed the presence of an intestinal diverticulum inside the right scrotum, increasing the risk of visceral injuries. Additionally, it is plausible that this pathology led to an ischemic crisis, ultimately causing the death of this prominent religious figure. This case is of particular importance not only due to the rarity of the pathology but also for the difficulty in finding similar well-preserved evidence in ancient remains.

Understanding the relationship between linear enamel hypoplasia and Harris lines in indentured Chinese mine labourers recovered from a historical gold mine in the Witwatersrand, South Africa.

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Linear enamel hypoplasia (LEH) is a well-documented indicator of physiological stress during dental development, whereas Harris lines (HL) have been interpreted either as markers of growth-disrupting disease/malnutrition or as normal growth spurt patterns. Between 1904 and 1910, Chinese indentured labourers were imported to South Africa to relieve gold mine labour shortages. Earlier work identified a high prevalence of LEH in 36 individuals from the historic Witwatersrand Deep Mine. This study tested whether LEH and HL co-occur in these remains. Ages of formation for each LEH and HL were calculated and statistically correlated. Both lesions showed parallel trends from ages 3–5 years (increase), a slight decline from 5 to 7 years, and a second rise from 7 to 9 years. After age 11, the patterns diverged: LEH declined sharply, while HL continued to rise, peaking around puberty. These results suggest a dual aetiology for HL: (1) post-weaning physiological stress and subsequent malnutrition/disease, and (2) normal appositional bone growth during pubertal growth spurts. The study demonstrates that skeletal tissue records stress in a manner analogous to dental tissue, providing new insight into the formation of Harris lines.

Vrolik disease at the Morgagni Museum (Padua, Italy): a case of idiopathic osteopsathyrosis following a potential congenital extrapulmonary tuberculosis infection.

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The Morgagni Museum of Human Anatomy at the University of Padua (Italy) in the 1860s, hosts over 1300 pathological specimens primarily from the late 18th century to the mid-20th century. Among these specimens there is a case labelled as "Vrolik disease", dating back to 1920. The case involved an 11-month-old child with idiopathic osteopsathyrosis, marked by extreme bone fragility and numerous fractures. Autopsy performed after the death of the individual revealed chronic interstitial hypophysitis, suggesting a pivotal role of the pituitary gland in bone dystrophy. The analysis also highlighted adrenal medullary atrophy with central hematoma, thymic involution, and testicular interstitial cell hypoplasia, alongside acute hydrocephalus and pulmonary complications. It was hypothesized that a tubercular infection during gestation could have been a potential trigger for bone dystrophy, given also the mother's poor health status during pregnancy. Idiopathic osteopsathyrosis still poses a significant challenge in paediatric medicine due to its complex aetiology and clinical manifestations. Through biocultural and palaeopathological analysis of both historical sources and the physical specimen hosted at the Morgagni Museum, this study aims to unravel the pathogenesis of a rare paediatric disorder. The case study provides new insights into modern cases and underscores the importance of historical anatomo-pathological collections in contemporary pathological studies. This case demonstrates the intricate interplay between endocrine dysregulation and skeletal metabolism, shedding light on potential therapeutic targets for this disease.

The 3300-year-old *Yersinia pestis* genome of an ancient Egyptian mummified individual.

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Yersinia pestis, the causative agent of plague, ravaged humankind with three historically documented pandemics. Paleogenetic analysis of human skeletons additionally shows the presence of *Y. pestis* in prehistory as early as the Neolithic period. These findings, however, have so far been geographically limited to Eurasia. Here, we report the presence of *Y. pestis* DNA in an ancient Egyptian mummy (Suppl. 05066) of an adult male from the collection of the Museo Egizio in Turin, Italy. The individual, who was anthropogenically mummified, was radiocarbon-dated from the end of the Second Intermediate Period to the beginning of the New Kingdom (3290 ± 45 years BP; 1686-1449 cal. BCE), yet its exact provenance within Egypt is unknown. Bone tissue and intestinal content derived from the mummy were first subjected to a shotgun

metagenomics approach. Thereby, we detected *Y. pestis* DNA in both samples indicating broad tissue tropism of the pathogen during an already advanced state of disease progression. The samples have been further processed using a targeted enrichment approach that resulted in low-coverage genome-wide data of both the human host and the *Y. pestis* pathogen. This is the first reported prehistoric *Y. pestis* genome outside Eurasia, providing molecular evidence for the presence of plague in ancient Egypt, although we cannot infer how widespread the disease was during this time. The obtained genomic data is further analysed to assign the ancient strain to the currently known *Y. pestis* diversity, to study virulence-associated genes, and to characterize its possible modes of transmission and pathology.

Redefining treponemal history through pre-Columbian genomes from Brazil.

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Treponemal spirochetes are globally re-emergent pathogens, known for their serious implications for human health throughout history. The missing archaeogenetic confirmation of the pathological evidence has long obscured the origins of the treponemal diseases, such as the emergence of syphilis, which has at times been ascribed to Columbus's expedition to America in the late 15th century, and at times to a global persistence of treponemes across prehistory. In a novel study, aimed at illuminating the spread and divergence of treponemes, we present genomic evidence of a pre-Columbian treponematosis from South America, dating back nearly 2000 years: four Treponema cases from human remains from the sambaqui (shellmound) excavation site Jabuticabeira II on the south coast of Brazil, where treponematoses had been previously morphologically identified. Pathogen genome reconstruction revealed the causative agent to closely resemble modern strains that cause bejel, a disease mainly found in the hot and arid regions of the world today. These findings at a humid coastal site demonstrate the adaptive capacity of treponemal subspecies, and support a potentially wider geographical distribution of endemic treponematoses in the past. One particularly high-coverage genome (33.6X) was retrieved from the samples, allowing an in-depth analysis of the recombination events across the *T. pallidum* family and improved molecular clock dating estimates with Beast program, including both ancient and modern lineages. Together, these results suggest a pre-Columbian divergence time for all *T. pallidum* subspecies present today and showcase the remarkable potential of archaeogenetics in resolving open questions surrounding the evolution and elusive origins of treponemes.

Paleoperspectives on red blood cell Physiology: Piezo1 Genetic Variants.

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Recent paleogenetic studies show that anatomically modern humans interbred with Neanderthals (N), with selective pressures later eliminating the N variant of many alleles, including that of the ion channel Piezo1. The 'Piezo1 Genetic Variants' project studies red blood cell (RBC) mechanosensitivity of extant and extinct Piezo1 variants. Today, specific Piezo1 variants are linked to hereditary xerocytosis (HX) and partial malaria resistance. We aim to understand how genetic gain- or loss-of-function Piezo1 variants have helped humans adapt to environmental pressures throughout evolution. To address the possible impact of ancient Piezo1 variants on human survival, we first studied how HX-linked Piezo1 alleles in modern humans affect RBC physiology by measuring cellular stability, deformability, and oxygen-carrying capacity. We found that Piezo1 hyperactivity significantly alters tissue oxygen delivery. The archaic Piezo1 variant sequence was obtained from published Neanderthal genomes, and we confirmed it through comparative studies with Piezo1 variants of modern apes. Using computational modeling, we demonstrated that the archaic Piezo1 variant alters protein folding, potentially impacting protein function. To study the physiological properties of the archaic Piezo1 variant, we are currently employing CRISPR/Cas9 to express it in human RBCs. We developed an ex vivo hematopoiesis platform where genetically altered human pluripotent stem cells will be converted into mature NRBCs carrying the archaic Piezo1 allele. Afterward, we will test the oxygen-transporting capacity of these RBCs and estimate the overall impact of changes in oxygen delivery on human physiology and adaptive evolution.

Exploring a Calcified Tissue from the 19th-century Carmo burial site (Porto, Portugal): Differential Diagnosis Using Nano-CT Imaging.

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An adult individual of indeterminate sex was excavated from the burial site of the Third Order of Our Lady of Carmo in Porto (Portugal), used from 1801 to 1869. The individual belongs to a large assemblage (circa 490 individuals, including adults and subadults) excavated from 2006 to 2007, currently under analysis. An ovoid-shaped mass ($27 \times 26 \times 18$mm) was curated with the sacrum by excavators; its precise in-situ location was not recorded. Differential diagnosis was conducted based on macroscopic examination, SKYSCANTM 2214 multiscale X-ray nano-CT-imaging, and X-ray-diffraction. The smooth external appearance is characterised by folds and sulci with some vascularisation evident; nano-CT revealed dense calcification throughout, arranged in a lobular structure with some hollow spaces. X-ray diffraction confirmed the crystalline structure to be consistent with hydroxyapatite. Drawing on palaeopathological and clinical literature, the differential diagnosis considered 12 possible aetiologies resulting in the following most likely diagnosis: calcified (uterine) leiomyoma, calcified amputated ovary and calcified fibroadenoma. Clinical diagnosis of calcifications strongly utilises relations to soft tissue anatomy, which are unavailable in skeletal remains. This limitation is compounded by the precise in situ location not being recorded. Nonetheless, the results demonstrate the utility of the diagnostic approach presented to narrow down the differential diagnosis. The study expands palaeopathological knowledge of the frequency and structure of calcifications, contributes palaeoradiographic imaging to the literature, and highlights the importance of careful field recording. Future research on other masses recovered in situ with individuals from the same site will enable comparison and holistic interpretation of health in the community.

Virtual paleopathological assessment of cranial trauma in an Old Kingdom mummified individual from Asyut, Egypt.

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In 2017, as part of the Torino Mummy Project, the collection of human remains at the Egyptian Museum in Turin (Italy) was subjected to CT-scanning within a collaborative interdisciplinary project involving Eurac Research, the Egyptian Museum and the Horus group. However, logistical constraints and the fragile condition of the remains prevented a full-body scan of a mummified individual (Suppl. 14396) from the Old Kingdom (3872 ± 24 BP; 2461-2214 cal. BCE, 95%). However, the well-preserved and mostly skeletonized cranium of this individual was CT-scanned due to macroscopically evident trauma that required detailed documentation for further paleopathological investigation. This study focuses on the paleopathological analysis using a Virtual Anthropological approach (computed tomography unit, Toshiba Aquilion PRIME). The mature, approximately 50-60 years old female individual exhibits diagnostic evidence of blunt force trauma on the right parietal bone. The trauma is healed, suggesting survival after an ante mortem possibly traumatic event on the right parietal bone. This research contributes to reconstructing the osteobiography of this individual, which is part of the permanent collection of the Egyptian Museum, and sheds light on interpersonal violence, medical practices, and survival rates in the pre-antibiotic era.

Antemortem Cranial Trauma is Culturally Specific, Patterned and Gendered: Case Study from the Ancestral Pueblo of the American Southwest (CE 900–1300).

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Phil Walker's landmark study in 1997 demonstrated the usefulness of detailed analysis of antemortem trauma to vault, face and jaw. The data revealed the culturally-specific ways that interpersonal violence was expressed. This study extends that research with an analysis of cranial trauma at 6 culturally distinctive sites in the American Southwest (CE 900-1300). Cranial trauma was assessed by age, sex, and cultural context. The expectation that primarily males were both the perpetuators and victims of violence was not supported. Female frequencies of healed head wounds ranged from 60% to 10% across the 6 sites. For males, the range was 50% to 23%. Male and female rates of head wounds are tethered in different ways and co-occur in different frequencies. This suggests a much more complex role of gendered violence than has been considered. Nonlethal violence due to warfare and raiding was likely only the tip of the iceberg, with other forms of gendered violence taking place concurrently. While the sample sizes were small (ranging from 23 to 60 adults per site), using the mortuary context, archaeological reconstructions, and the presence/absence of fortifications provided multiple indicators of gendered and culturally-specific forms of violence. This study supports a complex patterning of male-female violence that blurs the notion that violence mostly affected males and that females were less engaged in violent interactions. Placement of head wounds suggests females were both perpetrators and victims of violence in some cases. Future research needs to expand the definitions and culturally-specific expressions of violence in small-scale societies.

The presence of scurvy in Medieval (9th-10th centuries) Barcelona, Spain: Investigations at the necropolis of the Antics Jutjats Municipals.

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Scurvy is a disease that affected past populations, influencing their survival. This disease has been little studied in the Spanish archaeological record. Here we present a study focused on the Antics Jutjats Municipals (9th-10th CE) archaeological site in Barcelona (Spain), located outside the city walls. 115 individuals constitute the sample. 71 died during growth and development (0-24.99 years) and 44 were adults (25-50 years) with broadly equal numbers of males and females. Individuals were macroscopically assessed using Ortner's core lesions for scurvy alongside other conditions. Diagnostic terminology following the Istanbul protocol was adopted to describe scurvy's diagnostic certainty level. Evidence for scurvy was found in five individuals at the "Diagnostic of" or "Highly consistent/typical" of level of certainty (one adult, 25-33 years, and four children, 1.5-7years). A further seven individuals were allocated to the "Consistent with" level of diagnostic certainty (three adults and four children); these individuals had lesions consistent with scurvy, but there were many other possible causes. Sub-periosteal new bone formation was widespread in the individuals examined and work is ongoing to better understand other potential conditions experienced by those buried at the site. Given information on natural resources available at the time these individuals lived the occurrence of scurvy is surprising. However, Barcelona is known to have experienced a period of particular political instability during the 9th century CE. In 801, the city was captured by Frankish troops following several months of siege. It is possible that some of those buried were directly affected by these events.

A possible case of Echinococcosis granulosus infection with cyst formation in a historic mine worker from the Koffiefontein Diamond Mine, South Africa.

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South Africa has a rich mining history, starting with the discovery of diamonds in Kimberley in 1867. Corporate-controlled diamond mines sprang up, one of which was the Koffyfontein Mines Ltd., established in 1893. As with most mines, the labour force was made up of black migrant labourers sourced from across southern Africa. These individuals were subjected to harsh working and living conditions, with disease, malnutrition, and injuries a common occurrence. During excavations undertaken at the Koffiefontein Petra Diamond Mine in 2023, one individual was found with an in situ ossified mass in the right thoracic cavity. A three-dimensional surface model of the mass was made using structure-from-motion before it was retrieved to enable analysis. Preliminary analysis of the mass indicates an elliptical-shaped, hollow structure with thin walls measuring approximately 8 by 6 cm in length and width. The ossified mass was situated between the 9th and 12th thoracic vertebrae and lying on top of the 9th and 10th right ribs. No bone involvement was observed indicating an isolated ossified mass. Preliminary findings indicate that the mass could be a calcified hydatic cyst associated with an Echinococcosis granulosus or tapeworm infection. Historical records indicate that most mine labourers lived in extremely unsanitary conditions, with many mine workers at the Koffiefontein mine dying of a typhoid epidemic that occurred in 1896. Evidence of already contaminated water resources and deplorable living conditions, in addition to the interaction with zoonotic carriers such as horses, may therefore have made Echinococcosis granulosus infection quite plausible.

Skeletal evidence for metabolic and respiratory diseases among non-adults from two Early Medieval sites in Central Germany.

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Skeletal indicators of physiological stress among non-adult individuals are important markers of a community's biological well-being. Developing skeletons react more readily to physiological insults, and adverse conditions during early life can negatively impact adult health. To assess variability in such stressors in Early Medieval Germany, this study compares the prevalence of skeletal lesions commonly associated with metabolic disease and infection among non-adults (0-19.9 years) from two Merovingian cemeteries in Thuringia: Groβvargula ($n = 20$; observable individuals vary by condition from 11 to 15) and Sondershausen-Bebra ($n = 11$). Recorded lesions include cribrous cranial lesions (CCL) of the orbits (*cribra orbitalia*: CO) and cranial vault (*cribra cranii*: CC), new bone formation on pleural rib surfaces (PRL) indicative of respiratory disease, and hemorrhagic bone deposits suggestive of Vitamin C-deficiency (scurvy). All lesions were assessed macroscopically and microscopically. Results show a high frequency of scurvy at Groβvargula and Sondershausen-Bebra (73%; 70%), while CO and CC are more prevalent in Groβvargula (69%; 64%) than in Sondershausen-Bebra (22% and 20%). PRL occurs in 67% of non-adults in Groβvargula but only in 11% of Sondershausen-Bebra non-adults. Inter-site differences in CCL and PRL are statistically significant ($p = 0.03$; $p = 0.05$). In Groβvargula, 83% of PRL are associated with CCL, supporting recent research showing a relationship between respiratory infections and CO. These findings demonstrate inter-site homogeneity in Vitamin C-shortages, while risks for respiratory disease, possibly accounting for PRL and CCL, differ markedly. One major Limitation is the small sample size. Future research will incorporate additional samples and further explore inter-site variation in morbidity among Merovingian communities.

Bioarchaeology of Care: A case study of antemortem skeletal trauma for a pre-colonial southern African hunter-gatherer/herder.

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Physical trauma has significant ramifications on a person's way of life depending on social structure and access to support. Understanding trauma for past people with a Bioarchaeology of Care (BoC) framework is valuable to assess the impact of trauma on mobility, functionality, and social integration of individuals. The Holocene Later Stone Age (LSA) (last 10,000 years) is a significant period in southern Africa and was dominated by hunter-gatherers and herders. A BoC framework was used to assess a case of antemortem trauma in a pre-colonial hunter-gather/herder individual (UCT36, radiocarbon dated to 420 ± 30 BP) from the Northern Cape, South Africa. Using macroscopic examination, photographic documentation, and radiographic analysis, an osteobiography was constructed showing the person was male, aged 35-49 years at death. The individual has a malaligned, healed oblique fracture to the proximal third of the femoral diaphysis. The malalignment caused shortening and medial rotation ($\sim 90^{\circ}$) of the distal femur. Due to the risk of complications and impairment, this individual required care, particularly in the healing early stages post-injury. The degree of healing indicates a level of care provision and assistance to this individual ensuring their survival and ability to maintain a role within the community. This study contributes to a deeper understanding of the way of life for southern African hunter-gatherers and herders highlighting the importance of care and social support in mitigating the effects of trauma during the LSA. Further research is recommended to explore healthcare systems and expand the understanding of trauma in this population.

Understanding the role of intersectional identities in shaping life narratives from the Quaker burial ground of Hemingford Grey at St Ives (17th and 18th century, UK).

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Bones are an intricate biological history record, influenced by environmental factors and societal disparities that can dictate physical health and life outcomes. Intersectionality, pinpointing significant intersections between identities such as gender, class, and disability, offers more profound insight into social contexts. Quakers' osteobiographies will be explored using this approach. Seventeen skeletons in single earth-cut burials and fourteen individuals from a charnel from a Quaker non-conformist burial ground are assessed. Analysis revealed a diverse group of adults ($n = 25$) and non-adults ($n = 6$). Several adults show degenerative joint disease and muscular stress ($n = 8$ individuals from single-pits and $n = 3$ MNI from charnel). A high rate of lesions related to systemic infection (e.g., tuberculosis or brucellosis) was also recorded ($n = 7$ individuals from single-pits and $n = 3$ MNI from charnel). Metabolic disease in adults indicates a harsh childhood. In addition, two males had severe scoliosis, and one old adult female had knee ankylosis with bilateral amputation of both feet above the ankles. Similarities and differences are evident compared to those buried in other Quaker burial sites (e.g., Coach Lane). Though skeletal evidence of diseases linked to poor nutrition, sanitation, and overcrowding was common in the lower classes in urban areas, conditions were not exclusively experienced in large industrial cities. Intersectionality will explore members of the emerging and developing Society of Friends from Hemingford Grey who left the mainstream religion, exposing themselves to potential social exclusion. Parish records indicate locals were buried there, suggesting possible familial connections. Biomolecular analyses will offer further insights into this post-medieval Cambridgeshire population.

Pathological cranial alterations in a Bronze Age sample from Southern Italy (1700–1350 BCE).

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Various pathologies can leave specific modifications on the skull, impacting both its internal and external surfaces. In this study, 23 skulls from the Trinitapoli hypogeum (Puglia, Southern Italy), a large collective funerary complex dating back to the Middle Bronze Age (1700 - 1350 BCE), were examined with the aim of evaluating the relationship among cranial alterations and inflammatory, degenerative, and infectious diseases. Due to the commingling of skeletal remains deposited together, it was not possible to attribute other anatomical districts to each skull; therefore, traditional anthropological methodologies for determining sex and age were applied only to the skull. The paleopathological investigation focused on identifying the following bone modifications: porous skeletal lesions (PSL), periosteal new bone formation (PNB), endocranial digital and granular impressions (APDI and GI), serpens endocrania symmetrica (SES), and endocranial abnormal blood vessel impressions (ABVI). The results revealed high frequencies of these alterations within the Trinitapoli sample. The most frequently observed lesions were PSL (86% of individuals), occipital and frontal ABVIs (83% and 75%, respectively), frontal and parietal APDIs (46% and 54%, respectively), GIs in the parietal and occipital bones (42% and 40%, respectively), and SES in the occipital bone (60%). In at least six cases, the differential diagnosis suggested the presence of meningeal tuberculosis, consistent with previous findings of Pott's disease in two individuals from the hypogeum. Despite the study's limitation of analyzing a small number of isolated skulls, it contributes to a better

understanding of the health status of the individuals at the Trinitapoli Bronze Age site.

Intestinal parasite infection and sanitation in medieval Leiden, the Netherlands (CE 1250–1600).

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The aim of this study is to investigate sanitation and intestinal parasites in medieval Leiden (The Netherlands). Fourteen sediment samples from six cesspits dating CE 1250 – 1600 were analysed for intestinal parasites, archaeobotanical and zooarchaeological remains, and results interpreted using information from textual evidence relating to the households where the cesspits were located. Using light microscopy and ELISA we identified whipworm (*Trichuris trichiura*), roundworm (*Ascaris lumbricoides*), fish tapeworm (*Dibothriocephalus sp.*), cf. *Echinostoma sp.*, cf. *Fasciola hepatica*, *Dicrocoelium sp.* and the protozoa *Giardia duodenalis*, which causes severe diarrhoea. Parasites spread by ineffective sanitation dominated, while species contracted by eating raw fresh water fish were also present. Fasciola and Dicrocoelium eggs likely indicate the consumption of the internal organs of infected herbivores, and not true human infection. While the archaeobotanical and zooarchaeological cesspit evidence varied between the different professions of the Leiden households (ranging from poor or medium status users to wealthy brewers), the range of parasites present was very similar across all households. This would suggest either that all residents of the area were infected by similar parasites, or that if the wealthy and their servants used the same toilets then this could mask any true differences that did exist.

Setting up the Groningen Human Osteoarchaeology Lab: materials, processes, and ethics.

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The Human Osteoarchaeology Laboratory at the University of Groningen, the Netherlands, has been established and developed over the last three years. This poster presents the materials (namely, a reference and teaching collection of archaeological human remains and casts), equipment, and processes required for the establishment of such a lab. It will also deal with some of the practical and ethical considerations and the challenges faced, such as finding space and funding. In establishing a reference and teaching collection, palaeopathology is a key consideration to be able to properly educate students in this field, as well as for making the collection a valuable resource for researchers. In terms of ethical considerations, one of the core justifications for keeping human remains in a university teaching collection is that it is essential for students to be able to handle a large number of skeletons. These should be from a range of different contexts, displaying as large a variety of pathological conditions and normal morphological variations as possible, and in differing states of preservation. In this way, students can be properly equipped with the skills to conduct osteological analyses independently in the pursuit of scientific research and knowledge, thus becoming the researchers of the future. There are limitations on what human remains it is possible to obtain for the lab, which currently consists of skeletons from the three northern provinces of the Netherlands, but we continue to research what remains exist from these provinces and grow our collection with the aforementioned goals in mind.

A microbiological approach for the correct display of historic mummified remains in Militello Rosmarino (ca 18th-19th centuries, CE, Messina, Italy).

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Human mummies are an important resource to paleopathology as they provide evidence of past disease in both hard and soft tissue. When displayed in museums, crypts, or churches, these remains pose a challenge regarding their long-term preservation and possible deterioration over time. Therefore, this pilot study aims to assess the status of an assemblage of spontaneously mummified dignitaries from Sicily, located in the recently-opened crypt of the mother church of Militello Rosmarino (ca 18th-19th centuries, CE). Within the framework of the Sicily Mummy Project, we used the skin's microbial community as an indicator of the conditions of both the remains and the environment in which they are stored. Samples were collected from the surface of 6 of 41 individuals based on their accessibility and overall preservation. Fifty-four isolates consisting of fungi and bacteria were obtained. Microorganisms were identified through cultivation, morphological features, biochemical tests, RISA, 16S rDNA, and ITS1-5.8S-ITS2 rDNA sequencing. Any potential biodegradation was assessed through cellulase and protease activities. Results have revealed that the mummies had been inaccessible for a long time, covered in dust, and colonized by diverse cultivable fungi and bacteria with cellulolytic or proteolytic characteristics. The study showed that, despite their prevalent environmental origin, the identified microorganisms could lead to both biodeterioration of the mummified remains and health implications among susceptible living individuals (e.g., visitors). The need for appropriate cleaning and conservation interventions of the remains and constant monitoring of the environmental parameters is called upon to preserve this remarkable evidence of past funerary practices.

Investigating the relationship between childhood mortality, paleopathology, and diet: Preliminary results from stable isotope analysis of incremental dentine from the 19th-century Maagdenhuis orphanage in Amsterdam.

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The early modern Netherlands were characterized by the industrial revolution, increased urbanization and high mortality, especially for the working class. This caused many children to end up in orphanages, where the living conditions were generally very poor. While there is archival data concerning the Maagdenhuis orphanage, little is known about the individual life histories of these orphans. We analysed first molars of six orphans with varying pathologies from the Maagdenhuis cemetery to understand their diet, breastfeeding and weaning patterns (BWPs), and to investigate possible nutritional stress. Stable isotope values were obtained from incremental dentine samples, enabling dietary reconstruction at high temporal resolution. Five out of six orphans showed a decrease in δ15N between the first and second sample, indicating intake of breastmilk but with a quick decrease in early infancy. Overall elevated δ15N values (averaging at 12.6‰) also indicate nutritional stress among the infants and/or their mothers. These results suggest that the orphans were malnourished and that five out of six might have been weaned before the age of one. This pattern clearly contrasts with the results of previous studies of the contemporaneous rural town of Middenbeemster, where evidence for breastfeeding is meager, indicating that BWPs may have been highly variable during this time period. The current study could be improved by increasing the sample size while retaining the incremental sampling strategy because of its high degree of detail. Similar studies on different populations in the 19th-century Netherlands could increase our knowledge of

breastfeeding practices on a larger scale.

Puzzling lesions: Exploring variability in differential diagnosis for treponemal disease in two late medieval case studies from Kampen, the Netherlands (1381- ca. 1611 CE).

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Known as "the Great Imitator", syphilis can be challenging to identify in human skeletal remains, as a wide variety of lesions, often non-diagnostic, and a limited skeletal expression severely impact the disease's archaeological detectability. Additionally, individual studies often employ different diagnostic criteria, which can lead to inconsistent recognition of treponemal disease. Although a number of recent papers have established the use of more standardised frameworks to identify diseases like scurvy and rickets to increase international comparability and replicability, this remains to be done for treponemal disease. In order to more accurately diagnose treponemal infections in past populations, this poster aims to discuss the skeletal lesions present in two probable cases of treponematosis in human skeletal remains. Two case studies from a late medieval infirmary site in Kampen (1381 - ca. 1611 CE), the Netherlands, are presented to illustrate the variation in the skeletal manifestation of probable treponemal infection. The skeletal remains were assessed following the more standardised approach developed by Harper et al. (2011), on the basis of Hackett (1976) and Powell and Cook (2005). By comparing skeletal lesions of these individuals with consistent descriptive terminology used in paleopathological literature, this poster will discuss how different diagnostic interpretations may arise, depending on which lesions are deemed pathognomonic for or highly suggestive of treponemal infection. Consequently, this poster argues that standardisation of differential diagnostic criteria is necessary to provide consistency in identifying treponematosis in skeletal remains, ultimately contributing to a more complete understanding of the past presence of the disease.

An Early Neolithic "family" with severe joint dysplasia and stunted growth from Central Germany.

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An archaeological excavation in Schönstedt, a village in northwestern Thuringia (Central Germany), unearthed a burial site with 15 crouched inhumations (three adult males, six adult females, one indetermined adult, five nonadults). The artefacts suggest an Early Neolithic (LBK) association. The anthropological investigation, including macromorphological, microscopic, and radiological methods, identified a severe pathological condition in at least four of these skeletons. The poor preservation of the joint surfaces of four individuals prohibited a secure diagnosis, while seven showed no changes. The severe destruction with deep, well-circumscribed lesions of multiple joint surfaces repeating similarly, albeit different in expression, in four of the 15 individuals, suggests a biological relationship among them, sharing the same genetic disease. In the same four cases, shortening and deformation of the humeri were observed. A possible diagnosis could be autosomal dominant multiple epiphyseal dysplasia (MED). However, a characteristic feature of this disease are shortened phalanges, which are not present in the affected skeletons. It is uncertain whether this is due to a possible change of characteristic features of this disease within the last 7000 years, or limited preservation. Alternatively, other differential diagnoses are possible. DNA analyses are pending and might confirm the original diagnosis. There is only one known individual with MED, which dates to the third millennium BCE Old Kingdom of Egypt. If indeed confirmed as MED, the oldest known cases worldwide, these individuals would add to the research on ancient rare diseases, raising awareness of these conditions.

Health status of individuals buried at the 6th-8th century CE children's cemetery at Sipar, Istria, NW Croatia.

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The site of Sipar (Late Antique/Early Medieval Sapparis/Siparis) is located on a small peninsula north of Umag in Istria, NW Croatia. Several field campaigns revealed the presence of a settlement in the western part of the peninsula that existed between the 5th and the 9th centuries CE. Within the perimeter of the settlement the presence of a small children's cemetery (16 inhumation burials in total), dated between the 6th and the 8th century CE, was registered. This paper aims to reconstruct the health status of the individuals buried at the cemetery by using conventional macroscopic methods, but also to present preliminary results of ancient DNA analysis. The peculiarity of this skeletal assemblage lies in the fact that all studied burials contained exclusively subadult skeletons of individuals under the age of 18 months. Most of the burials contained the remains of a single individual with only two containing two skeletons totalling 18 individuals. A large majority of the skeletons (13/18 or 72.2%) show pathological changes associated with early childhood physiological stress (*cribra orbitalia*), metabolic diseases such as rickets and scurvy, and possibly disorders like meningitis. The paleogenomic analysis indicates that most of these individuals don't have local, but wider, probably eastern Mediterranean ancestry. The comparison of this site with similar Late Antique/Early Medieval assemblages from the Mediterranean and continental Europe will provide a better understanding on how the major, long-term changes in political, social and cultural systems during this period affected the health status of children.

The Traces of Life Beyond Death: Exploring an Intriguing Early La Tène Period Burial and a Life Marked by Illness and Injury.

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The Traisen valley south of the Danube river in Lower Austria is an outstanding archaeological area for the Iron Age in Austria and of special interest for the project "CATA - Celts Across The Alps" funded by the Austrian Science Fund (Project P 36086-G). This interdisciplinary, international research project focuses on inhumations and cremations of three Early La Tène period populations from this area (Franzhausen, Gemeinlebarn, Walpersdorf), in comparison with three contemporary populations from Northern Italy (Marzabotto, Casalecchio, Carzaghetto). During detailed archaeological and anthropological investigations, graves 165 and 166 of Walpersdorf generated particular interest. The cremated bones of an adult individual (probable male) were placed in an urn (grave 165) next to the inhumation (grave 166) of an adult person (morphological sex unspecified) in a common square burial garden. This rare find situation of both graves is further enriched by the discovery of a new type of an early La Tène belt hook ("type Walpersdorf") in the urn burial 165 and by the exceptional traumatic

and pathological changes of the individual from burial 166. This individual shows a healed skull impression fracture with signs of wound care, endocranial lesions (abnormal blood vessel impressions and periosteal appositions), healed traumatic injuries of several ribs with extensive new bone formation, extensive periosteal reactions on the long bones, and also several perimortem cranial and possible postcranial injuries, which indicate a difficult and marked life and death.

Osteobiography of two medieval individuals from St. John the Baptist Hospital in Arbroath: a review of differential diagnostic methodology.

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This study is a detailed osteobiography for two never-before-analysed skeletons recovered in 1952 from the Hospital of St. John the Baptist in Arbroath, founded by monks in the 13th century. A detailed bio-profile was conducted, and an inter- and intra-observer error test was undertaken to assess the diagnostic effectiveness and feasibility of the traditional diagnostic method. This study compares traditional descriptive methods with a modified diagnostic method combining description and photographs. The bio-profile revealed them both to be female, one being 18-21 years old, while the other is 27-66 years old, and both have multiple signs attributable to various pathologies. The inter- and intra-observer error test shows that traditional diagnostics are more difficult to apply, requiring substantial knowledge to use than the modified diagnostics, using more detailed descriptions and pictures of lesions facilitating the method's use. The research provides valuable information on health and living conditions of past populations, and the improved ability to diagnose pathologies in both recent and historic remains can assist medico-legal and archaeological investigations and facilitate identification of deceased missing persons. The assessment is limited to two individuals but gives insight into the effectiveness of traditional diagnostic methodology and a possible modification to improve diagnostics. Further research can be done on the effectiveness of diagnostic methods currently in use, by observing the bone histologically to find lesions before they become macroscopic, observing how different bones react to the same pathology and an extensive inter- and intra-observer error test to determine the diagnostic ability of the method.

How often do we see non-odontogenic cysts in the ancient world?

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Clinically, non-odontogenic cysts (NOC) are rare. Among them, nasopalatine duct cysts (NPDCs) and nasoalveolar cysts have a global prevalence of 0.7 to 7.0%. NPDCs are characterised by enlarged incisive foramina, while nasoalveolar cysts lead to cupping of the underlying maxillae. Initially asymptomatic, symptoms later include discomfort, susceptibility to additional infection, facial asymmetry and tooth displacement. Despite NOC prevalence in clinical research, they have seldom been described in ancient human populations. We assessed dental pathology in 369 southern African hunter-gatherer/herders dating from 500 to 11,700 years ago. Infectious lesions in the maxillofacial region affected at least 24% of the sample, and we identified two females with NOC in the form of NPDC and possible bilateral nasoalveolar cysts, which were never reported in this sample. These findings suggest that NOC prevalence is not accurately represented in southern Africa and in extension, ancient human history. If prevalence can be assessed in past populations, global comparisons of NOC frequency may be possible to ascertain, along with aetiology and symptomatic impacts on a person. The infrequent mention of NOC in palaeopathological literature highlights the need for developing criteria through archaeological assessments, as these cysts may be underreported in bioarchaeology due to clinically ambiguous terminology and a lack of awareness of their presence. The two cases from southern Africa add to the growing body of evidence on the effect of cysts in the maxillofacial region and raise questions about cyst impacts on individual health, secondary condition susceptibility, and the potential risks cystic lesions pose to life.

Diagnosing Disease: a pilot study of proteomic identification of infectious pathology.

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Respiratory infections are a major cause of childhood morbidity and mortality. This study macroscopically analysed 65 nonadult individuals from early modern Aalst to assess respiratory illness in this population. 27 nonadults had relevant lesions. One ca. 11-year-old showed skeletal signs of tuberculosis. This child was sampled for proteomic analysis to estimate sex and test whether pathogen peptides of tuberculosis could be identified. The goal was to establish whether proteomics could aid in diagnosing disease, especially in nonadults in this population, in whom nonspecific stress marker prevalence was high and diagnostic resolution low. Eight samples were analysed; six bone samples from lesion locations and normal-looking bone on ribs and vertebrae, as well as a dentine sample and an enamel sample for sexing. Sex was determined through amelogenin Y (the Y-chromosome exclusive version of amelogenin, using the unique peptide stretch IALVLTPLK). No signs of *Mycobacterium tuberculosis* were identified in any of the osseous samples. This implies that factors are at play that inhibit direct proteomic diagnosis. Most likely, a combination of general preservation, protein degradation, and available proteomic databases which are not geared towards archaeological samples, is at the root. Thus, this pilot project highlighted the need for baseline data on the peptide composition of archaeological bone and prompted the (ongoing) creation of an archaeological bone proteome atlas. This and more future research are necessary to rigorously test whether proteomics offer a valid approach to diagnosing disease.

Detecting childhood tuberculosis in skeletal samples.

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Modern epidemiological studies of tuberculosis (TB) suggest that a great proportion (15 - 40%) of those affected worldwide are children. The progression of untreated TB in children differs from adults as children more likely will die quickly, either before or in early-stage, bone involvement, due to immaturity of the immune response. Studying TB rates from skeletal samples will therefore particularly underestimate rates in children, but it is, however important to consider the proportion of affected children in paleoepidemiological studies to gain insights into the true impact of TB in the past. The present study, therefore explores potential differences in frequency rates of TB bony indicators and the patterns of bone involvement in subadult and adult skeletons with the aim of improving existing TB bone diagnostic tools that enable estimates of more reliable rates of childhood TB in skeletal samples. Eleven bone indicators associated with TB diagnosis are recorded in 966 adult and 334 subadult skeletons from the Danish town Ribe, dated within the time period 1050-1800 AD. Five indicators are considered child-specific and six have been associated with TB in adults in recent studies. The five child-specific indicators are found with low frequencies in both adults (1.9 - 7.9%) and subadults (0.0 - 3.9%). Furthermore, subadults, when affected, primarily have bone indicators that are elsewhere associated with adult TB. The results indicate that when including subadult skeletons in paleoepidemiological studies of TB, potentially affected children can best be detected using existing osteologic diagnostic tools developed for adults.

Tinea Capitis as a Confounding Pathology in the Diagnosis of

Antemortem Cranial Depression Fractures.

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Antemortem cranial depression fractures (ACDFs) are known to have no exclusive diagnostic criteria, meaning they can be confused with other pathologies like dermoid cysts or caries sicca. This research focuses on a single individual from the A22 charnel house at Bab adh-Dhra' (3100-2400 BCE, Jordan) and shows that tinea capitis, or a fungal infection of the scalp, should be added to this list. This individual has a healed lesion on the posterior cranium (occipital and posterior parietals) with several areas of lysis and a large, concentric deposition of bone. A differential diagnosis using paleopathological and clinical literature was conducted and found that despite appearing similar to an ACDF, the most likely cause of this lesion was tinea capitis. This finding is significant as it shows fungal infections can mimic the appearance of ACDFs. The absence of tinea capitis from the literature as a potential pathology to be confused with ACDFs is not surprising, as it is most often found in the Near East, a region historically understudied in bioarchaeology and paleopathology. This research is limited as we cannot be entirely certain that a fungal infection caused the lesion we observed on this individual. Differential diagnosis provides us with the most likely cause, but does not guarantee absolute certainty. Future paleopathological research should expand on current understandings of pathologies that can cause depressions in the cranial bone that can appear similar to ACDFs. This is particularly important as it will prevent the over-classification of traumatic injury and violence in the past.

Cranial trepanation from Etruscan Populonia (4th-3rd century BCE, Central Italy).

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Trepanation is considered one of the most ancient surgical practices, consisting of the perforation of the cranial vault. This research describes a case of skull trepanation from the Etruscan necropolis of Baratti-Populonia (4th-3rd century BCE, central Italy), a large Etruscan city whose fame and wealth stemmed from mining resources, especially those linked to ironworking. The necropolis housed tombs belonging to a low social class community likely employed in working activities related to the port of Populonia. The skull was found in a secondary deposition with few scattered and mixed bones from at least three individuals; therefore, it was not possible to associate it with any post-cranial bones. The sex and age at death of the individual were assessed using traditional anthropological methods. The perforation of the cranial vault was examined by means of a stereomicroscope (10-60x), computed tomography, and X-ray. The lesion affects a young male and is localized on the left squama of the frontal bone; the perforation is elliptic in shape and measures 20×15 mm, with bevelled and smooth edges indicating the long-term survival of the individual. The observed features were interpreted as the result of a trepanation likely performed using the scraping technique. The absence of other pathologies on the skull and the absence of post-cranial bones prevented assessment of the reason for surgical intervention. However, this case attests to the application of advanced medical knowledge in Etruscan Populonia, suggesting the presence of individuals with expertise in surgical techniques within the community.

Differential diagnosis of periosteal new bone lesions: Case study exploring infantile cortical hyperostosis in a young child from post-Medieval England.

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Caffey Disease (Infantile Cortical Hyperostosis) is a genetic condition affecting approximately 3/1000 live births worldwide and is relatively well known within the clinical literature. However, it has been rarely described in palaeopathological or archaeological investigations, with only a very few case studies known. This is likely due to the non-specificity of the periosteal new bone symptoms and because this disease is self-limiting (and non-fatal), resolving spontaneously in childhood with no long-term lesions left evident on the skeleton, although recurrence is possible. The condition is characterised clinically with swelling of the long bones and the mandible, profuse periosteal reaction, and irritability in infants affected. Here, we present a case of Caffey Disease in a 12-18-month-old male child from the site of Chichester, England (post-Medieval). The results of macroscopic examination, CT scans, genetic testing and the outcome of clinical consultation and case discussions with paediatric specialists at Great Ormond Street Hospital (GOSH) are presented, which are highly suggestive of a diagnosis of Caffey Disease. We will provide a detailed discussion regarding why this disease may be underdiagnosed in the palaeopathological literature, with comparisons to other conditions with similar presentations. Through these comparisons, we present a differential diagnosis pathway, using modern approaches derived from the clinical literature, that can be used by other researchers to aid in making more informed diagnoses. Periosteal new bone presents challenges when diagnosing disease in children, and without clear diagnostic criteria for the identification of specific conditions, many occurrences of this disorder, amongst others, will be missed.

Probable Case of Secondary Hypertrophic Osteoarthropathy (HOA) from the Mediaeval Cemetery of S:t Hans, Visby, Gotland.

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Hypertrophic osteoarthropathy (HOA) is an archaeologically rare condition characterised by bilateral symmetrical periosteal new bone formation (PNBF) primarily in the appendicular skeleton. Lesions tend to have a monolayered, fibrous form in early phases, and later a multilayered more lamellar form. Primary HOA is an autosomal dominant disorder characterised by periostosis, digital clubbing, thickening of the skin of the face and scalp, seborrhea, and hyperhidrosis. Secondary HOA may arise as a secondary consequence of a variety of diseases including pulmonary (most commonly cancers), cardiac, gastrointestinal, neurologic, infectious, vascular, and other diseases. A handful of cases are reported in the palaeopathological literature. In this study, a male (SH-03; DNR 7498/89) aged 25 to 35 years, excavated from the medieval cemetery of the church of S:t Hans, Visby (1100-1530 CE), displayed gross pathological abnormalities. Following macroscopic analysis and low-power digital microscopy, the individual presented bilateral symmetrical PNBF across much of the appendicular skeleton, with the greatest occurrence in the lower limb. Differential diagnosis included melorheostosis, hypervitaminosis A, fluorosis, thyroid acropachy, endosteal hyperostosis, tuberculosis, scurvy, leprosy, and primary and secondary HOA. The bilateral symmetric nature of the lesions, limited axial involvement and resorption, absence of lytic lesions, as well as the texture, disposition and morphology of the periosteal reactions suggest secondary HOA as a probable diagnosis, possibly consequential to TB. This paper discusses the diagnosis and contextualises the individual in terms of both the primary (proximal) disease underlying secondary HOA, as well as the social and healthcare environment present in Visby during his lifetime.

Periodontal health in pre-Roman Italy: a combined macroscopic and proteomics evaluation.

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Periodontitis, a chronic inflammatory condition causing damage to the supporting dental tissues, informs us about past oral health in palaeopathology. Dysbiotic host-oral microbiome interactions, including poor hygiene, diseases, and genetics, are known factors. However, the role of diet has been largely overlooked until recent clinical studies highlighted carbohydrate-rich diets as pro-inflammatory. In this study, we evaluated periodontal diseases by assessing the quality of interdental septa in a sample of 63 individuals from pre-Roman Italy who lived between the 7th and 4th centuries BCE, a period characterized by agricultural intensification and cereal production. Our macroscopic approach was complemented by proteomic analysis of dental calculus from a subsample of 33 individuals. Results revealed 23.0% of septa (N = 1890) were affected by periodontitis with males significantly more affected than females. Moreover, periodontitis increased with age in both sexes. Proteomic analysis identified the presence of periodontal pathogens of *Porphyromonas gingivalis* and *Treponema denticola* (i.e., the 'red complex') in 39.4% of the individuals (13/33). While plaque accumulation triggers periodontitis, our interpretation emphasizes the role of nutrition in disease susceptibility. Carbohydrate-rich foods, such as grains, adhere to the oral cavity and nourish bacteria, exacerbating periodontal diseases. Consequently, reliance on staple crops and poor dietary diversity may have been a primary factor contributing to the proliferation of oral microbiome-related bacteria. This aligns with previous results of bone collagen stable isotope analysis, which indicated a C3 plant-based diet with limited animal protein intake. Methodological limitations hinder comparisons with modern surveys or osteoarchaeological studies due to periodontitis recording inconsistencies.

The new unidentified skeletal collection of amputated limbs in the Azores (Portugal) and its paleopathological relevance.

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Chirurgical amputation is a risky life-saving medical procedure that often impacts the mobility and quality of life of patients. Given the scarcity of skeletal remains from amputated body parts for paleopathological research, this study aims to provide novel insights into this topic. In the Azores archipelago the anatomical specimens resulting from amputation were buried in local cemeteries until 2015. After 2015 the legislation changed and the cremation of amputated body parts is mandatory. Our study base comprises the skeletal remains derived from 13 amputated lower limbs, which were exhumed from the Municipal Cemetery of Angra do Heroísmo, at Terceira Island, between 2023 and 2024. These unclaimed skeletal remains were donated for scientific research and are currently stored at "Casa da Roda" in Praia da Vitória, where the First Identified Skeletal Collection of the Azores is also curated. Biographical information for these remains is unavailable, except for burial dates (between 2010 and 2015). Bones under analysis were inventoried, cleaned, and subjected to detailed macroscopic observation. All specimens pertain to adult individuals. Eleven limbs were amputated above the knee and two below (mid-tibia). Pathological bone changes were observed in nine individuals, including periosteal new bone, osteolytic lesions, fractures and osteoarthritis. These cases are discussed regarding the possible underlying clinical conditions leading to amputation, including vascular diseases, infections, diabetic ulcers, cancers and traumatisms. Since no other similar collection is known, the Azorean collection of amputated limbs holds potential for valuable contributions to paleopathology and to iatrogenic bone changes.

Bullfighting and interpersonal violence-related traumatic events in Terceira Island: a case study from the First Identified Skeletal Collection of The Azores (CEI/Açores).

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Terceira island bullfights by rope are secular events integrated in the regional seasonal festivities. This tradition involves running several bulls down a street while they are held with a rope by several men, ensuring the bulls stay within defined limits. Participants can either watch from a safe place or actively engage by running or evading the charging bull, a risky endeavor that can result in injury or death. Among the last are a group known as capinhas, who closely provoke and maneuver the bull with a cape for public entertainment. In 2010, a 38-year-old male capinha died in a bullfight. In the following 13 years after his burial in Angra do Heroísmo cemetery, no claims were made on his remains by family members. Consequently, the skeletal remains were exhumed, cleaned, and integrated into the First Identified Skeletal Collection of the Azores (CEI/Açores) for scientific research purposes. During the exhumation, an individual who knew the deceased described that he had suffered several specific injuries during his life, including those from bullfighting and at least one from an interpersonal altercation involving a hammer to the head. To verify the accuracy of this testimony, a macroscopic analysis of the skeleton was conducted, searching for signs of traumatic lesions. Antemortem traumatic lesions were observed in the ribs, left tibia and fibula, right foot phalanges and skull, all consistent with the provided information. Additionally, full antemortem tooth loss was noted. The singularity of this case study makes it particularly interesting for the field of paleopathology.

One in a thousand: A challenging palaeopathological diagnosis of a lumbar vertebra found amongst commingled remains from Carmo (Porto, Portugal).

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This research describes and discusses bone changes observed in a disarticulated adult lumbar vertebra, recovered in one of the multiple assemblages of commingled remains identified in the hospital cemetery of the Third Order of Our Lady of Carmo, which operated between 1801 and 1869. Bone lesions are described in detail through macroscopic

observation and multiscale X-ray nano-CT. The lower surface and lateral aspects of the vertebral body show multiple destructive foci with well-defined contours, including a "cavity" that measures approximately 2.5 cm in diameter. The formation of osteophytes, especially on the left side, along with new bone is also observable. The changes are compatible with a probable case of vertebral tuberculosis. Malignant tumours were ruled out through the differential diagnosis, one cannot completely exclude pyogenic vertebral osteomyelitis, as it may cause similar erosive foci. This case clearly demonstrates that disarticulated human remains originating from secondary deposition should not be excluded from palaeopathological studies. They can provide important information about the health status of populations. The inability of analysing the distribution pattern of lesions throughout the skeleton was the biggest limitation to a more accurate diagnosis. Future research, contextualising and complementing the palaeopathological findings and commingled remains analysis with metagenomic analysis and historical data, will offer a comprehensive view of the epidemiological profile of 19th-century Porto, including pathogen/disease prevalence.

Foot fractures in commingled bones from a Bronze - Iron Age (c. 2nd – 1st mill. BCE) multiple burial in Fujairah, United Arab Emirates.

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Fractured bones provide various information about people's way of life, e.g., social behavior, or occupational hazards. In paleopathological contexts, hand and foot fractures are often underrepresented, although they, too, add information about an individual's daily life. Dibba 76, an intact and undisturbed collective tomb from the Bronze/Iron Age (c. 2nd – 1st mill. BCE), is a unique site for south-east Arabia used for around 1000 years, containing hundreds of individuals and numerous burial types. In 2019, part of the burial (approximately 1.8×17m) was excavated, revealing mainly commingled human remains but some partially in-situ burials. The preservation of the bones varies from well-preserved to quite fragmentary. The commingled foot bones were evaluated for the presence of fractures, counted by bone element. 286 tarsal and 183 metatarsal bones, 177 proximal, 59 intermediate, 61 distal and 20 indeterminate phalanges could be evaluated. All joint facets were checked for small fracture lines, misalignment, gaps, or impressions on the surface. Fractures of the shafts were recorded when a fracture line, discontinuity of the shaft or shape changes were present. The highest frequency of fractures by bone element was in the proximal phalanges ($n = 10/177$), followed by the intermediate phalanges ($n = 2/59$). All fractures were well healed. Compared to another Bronze Age pastoralist population from the North Caucasus with a relatively high frequency of well-healed foot fractures, the population from Fujairah was less prone to accidental fractures, indicating high adaptability to their environment and mobile lifestyle.

Congenital anomalies in an individual from central Argentina (late Holocene)

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In the study of ancient populations, congenital disorders can be used as indicators of population dynamics and cultural practices, such as inbreeding. However, they are rarely reported in the bioarchaeological literature. Thus, this work aims to present the case of a male, middle adult individual from Los Mates –a late Holocene site in Córdoba province, Argentina– that shows two elongated apertures in the subscapular fossa of the left scapula, as well as a bifurcated neural arch in a lumbar vertebra. The individual has an 80% of skeletal preservation, and the observed lesions were recorded macroscopically. After a differential diagnosis, both conditions were related to a congenital origin, more specifically to a developmental delay that results in incomplete ossification. Paleopathological analysis also reported the presence of lamellar bone and an osteolytic process in the right ulna, which suggests an infectious process. All paleopathological indicators were analysed in an integrated, osteobiographical approach in order to evaluate the consequences of those anomalies in the daily life of the individual. Specifically, the congenital anomalies might not have involved severe consequences in the general lifestyle. These results were also related to previous local research that mainly identified congenital disorders in the axial skeleton (cranium and vertebral column). Finally, they were contrasted with data from genetic studies that suggest a high gene flow, which in turn seems to contradict the hypothesis of isolation or inbreeding stated by several authors when explaining the presence of these kinds of bone anomalies.

Human Remains from Finnish Shipwrecks (17th century Mulan, Borstö or St. Mikael (1747 CE), and St. Nikolai (1790 CE).

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This paper presents the first bioarchaeological study of bones lifted from shipwrecks in Finnish territorial waters. The remains are curated in the Maritime Museum of Finland. The human remains from these shipwrecks were retrieved randomly, with no systematic investigation of the wrecks to date. The aim of this primary investigation was to separate human bones from animal bones and study the demography and health of the deceased by standard macroscopic osteological and paleopathological methods, in order to evaluate the potential of these remains for future research on past seafarers. A total of three shipwreck assemblages were studied, each of which had commingled human remains ($NISP = 480$, $MNI = 9$). Other shipwrecks (Egelskär, Joskär, Svartså, Varmbådan) had only animal bones. Pathological lesions such as Schmorl's nodes were apparent in nine vertebrae from two ships, and enamel hypoplasia in two individuals, while Ante Mortem Tooth Loss, dental calculus, enthesophytes, and possible infectious disease and/or trauma were also observed. We also observed dark staining on teeth from two shipwrecks and unusual dental wear. These speak to the unhealthy habits and conditions and strenuous work onboard. The results also show that at least one juvenile was present on board all three ships, and may have had less of a chance to survive the accident. Historical records agree that juveniles were working on board such ships. These interesting and unique remains would benefit from further studies, including biomolecular analysis, to understand and document the lives of the seafarers associated with these historically documented events.

Probable sinolith in the left frontal sinus of an adult male: a multi-methodological approach.

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At Mina do Gesso (Gypsum Mine) in Tôr, Loulé (Portugal), workers from a cement factory discovered fragments of ceramics (16th-18th centuries) and human bones (MNI = 3) in 1998. This study aims to discuss the origin of a mass found within the left frontal sinus of a male cranium. The mass's calcified origin was confirmed through elemental concentration analysis (Ca = 396480 ppm) conducted using portable X-ray fluorescence (pXRF, Thermo Scientific Niton XL3t900, GOLDD+). Possible diagnoses include osteomas, malignant tumours, fungal

infection, and sinolith. The computed tomography (CT) examination revealed that the mass (dimensions: 18mm, 15.6mm, volume estimation = 1350ml) is homogeneous and radiopaque, exhibiting higher CT-HU (Hounsfield unit) than bone, consistent with the clinical description of sinoliths. Furthermore, the diagnosis of osteoma was excluded because the phosphorus concentrations in the mass and the cranium are different (61100 and 145270 ppm, respectively). In a control analysis involving a cranium with an osteoma, both exhibited identical concentrations. Strontium concentration is higher in the mass (80 ppm) than in the cranium (56.6 ppm), perhaps due to the chemical and biological affinity between Sr and Ca. The mastoid processes are asymmetric, yet CT examination did not reveal any internal changes. The aetiology of sinoliths remains unclear, but endogenous factors are likely at play, including chronic purulent secretions and impaired sinus drainage, leading to fluid concentration and mineral precipitation. Mostly asymptomatic, though some patients may experience headaches and sinusitis symptoms. Sinoliths in the frontal sinus are extremely rare in clinical practice and were not documented in the paleopathological literature by the authors.

Probable traces of metabolic diseases in two early Ottoman samples from coastal Asia Minor.

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Skeletal traces of metabolic diseases in subadults are important indicators of health status of a community. This study aims to compare their frequency in two early Ottoman (15th – 17th century CE) samples from coastal Asia Minor and tests the hypothesis that the assumed different living conditions of the groups are reflected in their state of health. The first sample comprises 97 subadults from an Islamic cemetery in the Ottoman settlement of Ayasoluk, on the western coast of Turkey. The second sample comprises 36 subadults from a cemetery in Limyra, in southern Turkey. While Ayasoluk was a rather flourishing, urban settlement, the lifestyle in Limyra was rural, perhaps seminomadic. The examination focused on possible traces of scurvy and anaemia, such as cribrous lesions, signs of marrow expansion, and new bone formations. The skeletal remains were first analysed macroscopically. X-ray examinations and light microscopy were used to improve the diagnosis. In Ayasoluk, the recorded frequency of possible scurvy reached up to 16.5% (16/97), and of anaemia 17.5% (17/97). In the skeletal remains from Limyra, possible scurvy was recorded in 44.4% (16/36), and anaemia in 50% (18/36). The statistical significance ($p = 0.05$) suggests major differences in living conditions. This investigation is among the first palaeopathological studies of metabolic diseases in Islamic cemeteries of early Ottoman Turkey. However, these results are limited by the difference in sample sizes and by the comparatively low number of individuals from Limyra. For future research, investigations of larger samples of Ottoman individuals from urban and rural backgrounds are advised.

Old age, disability, and care in the post-medieval Netherlands: The osteobiography of an elderly woman from 19th-century Zwolle.

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The elderly remain the most invisible demographic within bioarchaeology as methodological and societal biases cause their lack of identification and research focus. With studies of old adults primarily concentrating on developing accurate age-at-death methodologies rather than the concept of ageing and its variability within the skeleton, past individual ageing and subsequent disease experiences are lost. This study aims to reconstruct the life and disease trajectory of an elderly individual, focusing on quality of life, mobility, independence, and effects of (childhood) pathologies on ageing. The fairly-preserved skeleton of a 70-year-old woman from 19th-century Zwolle was analysed macroscopically. The bioarchaeological index of care and modern clinical research were used to assess the need for and accessibility of care, in-life visibility, pain experience, and co-morbidity of diagnosed pathologies. Additionally, archival data were reviewed to identify age and sex. Analysis revealed numerous conditions related to old age, such as antemortem tooth loss, gout, osteoarthritis, and Baastrup's disease. Furthermore, an unorganised bony growth was identified as a soft tissue calcification, possibly a calcified fibroid. Notably, this individual suffered from bilateral hip dysplasia, causing functional impairment throughout life and correlating with the early onset of Baastrup's disease and OA. This suggests the accelerating effect of one's existing health profile on skeletal ageing. Therefore, this osteobiography highlights the intricacy of the ageing body and heterogeneous nature of the older demographic, where the cause-and-effect relationship between ageing and disease trajectory is often indistinguishable and multicausal, thus demonstrating the need for a personalised and functional approach to old age.

Dental Diaries of the Nile Valley: Assessing Oral Pathologies Across Dynasties at Luxor's Thutmosis III Funerary Temple, Egypt.

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The study of the condition of the teeth in ancient and historical populations provides insight into their diets, health conditions, and social structures. Our presentation examines tooth wear and dental caries in two different burial sites from the Thutmosis III funerary temple at Luxor, spanning the 11th dynasty (2160-1985 BCE) and the 25th-26th dynasties (948-525 BCE), simple burials of individuals engaged in physical labour or of individuals of a middle social stratum such as priests or mid-ranking officials. Tooth wear was scored macroscopically according to a common four-point scale. A carious lesion was defined as a distinct cavity, also visible in the X-ray image, in the sense of a yes/no decision. We examined associations with burial site, age as determined by osteological data, and socioeconomic status. Our study revealed significant dental wear in both necropolises, with more pronounced wear in the 11th dynasty, suggesting differences in diet and food processing. The low caries frequency was similar in younger individuals in both periods, but significantly higher in the older population of the later dynasties: 0.25 average affected teeth in the young individuals of the 11th dynasty burials vs. 0.69 in the young individuals of the late period burials, but respectively 0.56 vs. 1.35 in the old individuals. Our study, therefore, highlights distinct patterns of oral health over time at these sites. It also emphasizes the importance of paleo-odontology in understanding the interactions between health and environmental and social factors in ancient civilizations, and provides a methodological basis for future research.

Developing a Paleo-syndemic Perspective in Bioarchaeology: The Reorganization of Northern China's Paleodemography and Environment with Special Reference to the Haminmangha Disaster Site.

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Proposed to describe ways that modern epidemics interact and mutually enhance one another within specific temporal, geographic, and social structures, the concept of syndemics has since been extended to also explore historic population health. Paleopathological studies are poised to take advantage of this framework of overlapping health conditions and biocultural structures to investigate prehistoric population health

through concepts of frailty and resilience and within the context of high-resolution archaeological data. In this study, we applied a paleo-syndemic approach to the Neolithic Haminmangha settlement (3600–3100 BCE) in Northeast China. With no cemetery identified at the site, the remains of at least 181 individuals were found in mass on the floors of semi-subterranean dwellings with no evidence of interpersonal conflicts. It has been hypothesized that the residents were killed by a deadly infectious disease. Utilizing a meta-analysis of 92 Neolithic to Iron Age (6000 BCE – 0 CE) sites from Northern China that contained the skeletal remains of 22,726 individuals along with paleoclimatic reconstructions, we use demographic measures as a proxy for underlying health along with data from macroscopic observations of non-specific stress indicators from 700 individuals. The demographic and environmental conditions of Northern China were defined by consistent population growth during climatic cooling and aridification. This contextualized synthesis illuminated that Neolithic to Bronze Age populations demonstrated flexible behavioral adaptations by intensifying millet agriculture, livestock rearing, and habitat exploration throughout time and ecosystem change. However, the marginal environment surrounding and behaviors of the Haminmangha population intensified human-nature interactions escalating vulnerability to pathogenic hazards.

A rare case of skeletal dysplasia in an adult male from the post-medieval cemetery at Nowy Dwór, North-Eastern Poland.

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Skeletal dysplasias are a group of varied, usually genetic disorders affecting bone and cartilage that lead to abnormalities in the skeleton. One such case is present in an adult male from a post-medieval (16th-18th century) cemetery in Nowy Dwór, Podlasie, North-East Poland, which was examined as a part of broader palaeodemographic research on the populations of the Polish-Lithuanian Commonwealth. The skeleton was analysed macroscopically and radiographically to identify diagnostic features of dysplasias, malformations, and other skeletal pathologies. As a result, severe bilateral shortening of both humeri with overly-developed muscle attachments, eburnation and deformities within both shoulder joints. The other bone pathologies (e.g., early degeneration of other joints), which can be connected with dysplasias, were also present as well as some presumably unrelated post-traumatic changes such as healed ulna fracture. The result can lead to several differential diagnoses including multiple epiphyseal dysplasia as the most possible based on the provided study. However, since macroscopic and radiographic analyses alone cannot be used as a substantial basis for such diagnosis, subsequent studies – particularly molecular – are necessary. With that in mind, further genomic research is planned, as well as other supplementary research including isotopic analysis of nitrogen, carbon, oxygen, sulphur, and strontium. This research will be directly tied to a broader study of investigating diet and mobility within local populations. The importance of this described unique case is not limited to palaeopathology only – as it also contributes to discussions about historic past societies of North-Eastern Europe.

Possible presence of treponemal disease among the inhabitants of Makurian Ghazali (ca. 680–1275 CE) in the Bayuda desert of Sudan.

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Numerous questions remain around encounters with treponemal disease in antiquity and associated skeletal alterations. Advances in pathogen genomics have validated *Treponema pallidum* as the causative agent of yaws, bejel, and venereal syphilis, while uncertainties remain around pinta. The macroscopic identification of localised, round osteolytic lesions with reactive areas on the anterior frontal bone of the skulls of four individuals from Makurian Ghazali (ca. 680–1275 CE) suggests the possible presence of treponemal disease in this remote community and more broadly in medieval Sudan. Located in the Bayuda desert, ca. 15 km from the Nile River, Ghazali comprises a large walled monastery, lay settlement, iron production facilities, and four cemeteries with Cemetery 2 being utilised by the monastic community, Cemetery 3 by the lay community, and Cemeteries 1 and 4 being less clear in utilization. The lesions documented include individuals interred in what has been identified as the monastic cemetery, indicating the individuals as likely having been monks and bringing forth further questions around previous inferences regarding the possible provision of healthcare at the Ghazali monastery. Little documentary evidence of treponemal disease currently exists for medieval Sudan, necessitating further consideration of this pathological condition in the context of the cultural landscape. It is hoped that future research through radiography of the individuals in question from Ghazali and trialling of pathogen DNA analyses, will help to further illuminate the nature of the lesions identified and their possible treponemal aetiology.

A case of extreme diffuse periostitis in a newborn from Poulton (UK).

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This study investigates a unique case of extreme diffuse periostitis in a skeleton recovered from the western medieval graveyard (XIII-early XVI century CE) of the archaeological site of Poulton (Cheshire, UK). Comprehensive anthropological analysis showed that the remains belonged to a newborn individual aged between 1.5 and 2 months, affected by pathological changes to several skeletal elements. Macroscopic examinations revealed the presence of a pervasive sub-periosteal bone formation and abnormal porosity on the diaphysis of both femora, tibiae, and humeri, as well as on both ilia and scapulae, on the cranium, and the vertebral arches. Although the observed pattern is consistent with congenital scurvy, the later radiological investigation was inconclusive. Differential diagnosis also considered congenital syphilis as a potential aetiology. Acknowledging the context of the graveyard's use for the burial of a relatively small farming community, the potential for a brucellosis case has been considered and dismissed as a viable diagnosis. This case underscores the complexity of diagnosing pathological conditions from archaeological contexts, particularly when radiological evidence is inconclusive, and multiple diagnoses are plausible. The study also highlights the challenges of interpreting skeletal manifestations of disease in neonatal and juvenile remains.

aDNA studies and genetic markers of disease: potential for palaeopathology.

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Many African skeletons are sampled for aDNA, with studies mostly focusing on migration patterns and relatedness. Very few include information on genetic markers of disease. This is partly because most are SNP capture studies that do not generate whole-genome sequences. Our aim is to report on genetic markers of disease from South African individuals to demonstrate their usefulness in understanding past diseases and migrations, and to create awareness of the importance of conducting full genomic sequencing. As part of a larger study, four Late Iron Age females from Kwa-Zulu Natal (590 to 370 years BP) were sampled and full sequencing performed. Their genetic affinity was predominantly with African Bantu-speakers, all with varying degrees of Khoesan admixture. Three of the four individuals carried the Duffy null allele,

protecting against *Vivax malaria*, which does not occur in southern Africa. The three individuals for whom data were available were all lactose intolerant. The APOL1 G1 allele confers moderate resistance to Trypanosoma brucei gambiense-induced sleeping sickness (also not occurring in this region) and was carried by two women. In modern populations APOL1 is associated with kidney disease and major mortality especially in African Americans, a legacy of the West African slave trade. Results from other sampled individuals are to follow soon. These markers helped to confirm the West African origin of the Bantu-speakers in southern Africa. Full genomic sequences should be generated in future studies as these may inform on the possible disease burden relating to various diseases of the past.

Correlating Dietary Patterns with Health Outcomes: A Stable Isotope Analysis of Double Burial Complexes from a Mediaeval Wallachian Cemetery.

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Archaeological investigations at Buftea, Romania, unveiled the largest medieval cemetery in Wallachia, spanning approximately four centuries and delineating two distinct burial periods: one from the 14th-15th centuries and another from the 16th-17th centuries. Interestingly, in the first period of the cemetery, there are 10 double burials present, with one also featuring a reburial. The anthropological analysis found most individuals were of indeterminate sex, with only two males and two females identified. The subadults outnumbered the adults in a ratio of 5 to 16, with children showing the highest frequency of death, followed by adolescents and young adults. The notable prevalence of non-specific markers of infectious diseases, along with the underrepresentation of adults compared to the subadults, and the unusual funerary practice of double burials could indicate both an epidemic event in this population, as well as a shortage of resources. Given the profound connection between overall health and dietary practices, stable isotope analyses were employed to investigate potential correlations between individuals exhibiting non-specific infectious markers and those deemed healthy. As such, bone collagen was extracted for carbon and nitrogen isotope analysis in order to reconstruct these 21 individuals' paleodiets showing that their diet was mainly terrestrial with C3 plants at the base of the trophic chain.

Nibbling through Nubia: An exploration of dental health and diet at Abu Fatima, Sudan (2500–1500 BCE).

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Dietary reconstructions play a prominent role in archaeological investigations of lifeways in the Bronze Age Kerma Culture of Nubia, one of Africa's earliest complex societies. As most research in this region has been centred on urban or rural environments, little is known about patterns of dental health and diet in transitional environments. The purpose of this study is to reconstruct dietary habits and examine the prevalence of dental pathology at Abu Fatima (2500-1500 BCE), a peri-urban cemetery located near the capital city, Kerma. A bio-archaeological approach combining carbon (δ13C) and nitrogen (δ15N) isotope research with the analysis of dental wear and carious lesions was employed on a sample of 23 adults (11 males, 10 females, two indeterminate; five young adults, 12 middle adults, three old adults, three indeterminate). Out of 23 sampled individuals, bone collagen suitable for isotope analysis was successfully extracted from seven individuals. For comparative analysis, data from four Nubian skeletal collections selected for their spatiotemporal comparability were included (538 individuals; Tombos, Kerma, SJE-Pharaonic and SJE-C-Group). Results for Abu Fatima indicate a caries prevalence (per tooth) of 5.2% (females: 7.1%, males: 3.1%) and excessive degrees of wear, with all individuals exhibiting attrition. Combined evidence from dental pathology and isotope research suggests a reliance on starchy foods (C3 and C4 plants), animal proteins (Nilotic fish, cattle) and abrasive food sources. These findings are consistent with comparative data from this region and contribute to our understanding of the complex interplay between dental pathology and diet in Ancient Nubia.

Respiratory health along the Lower Nubian Nile Valley: A prevalence study on chronic maxillary sinusitis between the 4th-2nd millennium BCE and its correlation with dental diseases.

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Variations in chronic maxillary sinusitis (CMS) rates between archaeological populations have been linked to climatic and cultural differences and varying rates of dental diseases. In this study, 136 adults from 16 sites in Lower Nubia spanning the A-group (3800-2900 BCE), C-group (2300-1200 BCE), and Pharaonic period (1550-1069 BCE), were examined to estimate the prevalence of CMS and dental diseases and detect any diachronic patterns. Maxillary sinuses were macroscopically analysed for bone changes following pre-defined diagnostic criteria. The presence of oroantral fistulae and other dental conditions was also recorded. Rates of CMS (87.5-100%) and odontogenic sinusitis (5.7-25%) significantly increased with time and age. Antemortem tooth loss showed a significant correlation with CMS, and, together with periapical lesions and heavy dental attrition, a significant correlation with odontogenic sinusitis and a significant diachronic increase. Results indicate that CMS and odontogenic sinusitis were extremely common in ancient Lower Nubia. Increasing simultaneously with the onset of a severe climatic deterioration, the high rates of CMS and associated dental conditions may have been induced by high concentrations of desert sand contaminating air and diet. This study is the first to investigate respiratory health in ancient Lower Nubia and sheds light on the impact of arid environments and dental health. However, lack of standardization in the diagnostic criteria may impact agreement on the presence of CMS between different observers, and, therefore, also the comparability of prevalence rates. Future research on the co-occurrence of CMS and other lesions, such as *cribra orbitalia* and porotic hyperostosis, is advised.

Socioeconomic Status and Spinal Health: A comparative analysis of spinal joint disease in children from two post-medieval (1650–1850 CE) Dutch communities.

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Despite child labor being a documented part of industrial history, little research has been conducted on the short and long-term ramifications of heavy physical labor on the skeletal health of children and young adults, particularly activity-related degenerative joint disease. This study aims to highlight the prevalence of spinal joint disease in children from two post-medieval (1650-1850 CE) Dutch populations of differing socioeconomic status. Through juxtaposing a low-status industrial community with a high-status urban population, this study highlights the effects of heavy manual labor on the manifestation of spinal joint disease in working children. This study analysed 1043 vertebrae from 53 individuals between the ages of 4 and 21 years at death from the Dutch post-medieval communities of Arnhem (N = 32) and Delft (N = 21). The vertebrae were macroscopically assessed for degenerative changes on the facet joints. The low-status, industrial population from Arnhem was found to have a significantly higher rate of lesions associated with osteoarthritis (contour changes, pitting and porosity, osteophytic growths, and/or eburnation) across all age groups than the high-status population of Delft ($\chi 2 = 15{,}934$; p<,001). In total, 37% of vertebrae recorded from Arnhem presented at least one lesion, compared to only 25% from Delft. This data highlights the prevalence of degenerative

joint disease in a working community compared to a non-working community, providing a stark contrast in the lifestyles of these communities and their short- and long-term implications for vertebral health.

Chemical analysis of a phossy jaw case from Victorian Gloucester (UK).

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This study investigates the chemical composition of the skeletal remains of individual GLC-148 from 19th-century Gloucester, the second known case of phosphorus necrosis (phossy jaw) in the literature. Hard X-ray photoelectron spectroscopy (HAXPES) is a technique used for measuring the concentration and chemical bonds of elements in very limited samples (subsurface of approximately 30-50 nm). In addition, the use of a Monochromated Ga Kα metal jet X-ray radiation and an EW-4000 electron energy analyser guarantees a reading less affected by surface contamination. Survey spectra identified the presence of calcium, phosphorus, oxygen, and carbon on GLC-148 and a reference sample from the same site. Significantly, the phossy jaw sample exhibited a noticeable presence of phosphide bonding compared to the reference sample, indicating heightened phosphorus exposure. Phosphide is clearly delineated from phosphate bonding in the P and Ca spectra with a photoelectron signal to a lower binding energy. This phossy jaw case is a good example of historical work-related pathologies and working-class conditions; for this reason, it was selected for a pilot application of X-ray photoelectron spectroscopy to highlight the importance of integrating bioarchaeological evidence with analytical techniques. HAXPES confirmed the presence of phosphide bonding and the morphological alterations of the bones, suggesting the potential application of the methodology even in less morphologically recognizable cases. The study also demonstrates how analytical methodologies can contribute to the evaluation of the health implications associated with industrialisation in historical contexts underlying the complex interaction between industrial activities and occupational health hazards during the Victorian era.

De-novo assembly and comparative analysis of an ancient *Streptococcus pyogenes* genome from an Andean pre-Columbian mummy: Insights into the evolution of a human-adapted pathogen.

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Streptococcus pyogenes, also known as Group A Streptococcus (GAS), is a human-adapted pathogen that can cause a range of clinical manifestations, including scarlet fever, skin infections, rheumatic fever, post-streptococcal glomerulonephritis and bloodstream infections. Recent studies have identified *S. pyogenes* as responsible of a series of scarlet fever outbreaks along with the surge of invasive infections. Genomic studies have suggested that new virulence variants disrupt both innate and adaptive immune host responses, making *S. pyogenes* strains more transmissible and virulent over time, with an impact on the first line of antibiotic treatment. Here, we subjected a tooth sample of a pre-Columbian Andean mummified individual linked to the Late Intermediate Period (1100 – 1450 CE), from the anthropological collection of the National Museum of Archaeology - MUNARQ in La Paz, Bolivia, to a shotgun metagenomics approach. Initial analysis of the human mitogenome placed our individual within the Native American genetic diversity. Further de-novo assembly of the metagenome allowed us to reconstruct the complete genome of the pathogen *S. pyogenes*. Using phylogenetic comparative analysis enabled us to assign the ancient genome to its closest modern infective strains. The ancient strain carries a set of virulence factors indicating a pathogenicity similar to modern *S. pyogenes*. The presence of two intact prophage regions will help us to place our ancient *S. pyogenes* strain in a broader context to understand its evolution and occurrence in different hosts and geographic regions.

Breastfeeding and weaning patterns as a proxy for infantile and maternal health, an isotopic approach.

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Previous paleopathological studies of the early contact (ca. 1300-1550 CE) indigenous El Chorro de Maíta, Cuba, population indicated a small number of paleopathological markers. Together with the catastrophic pattern of the demographic profile, this has led researchers to conclude that most individuals had died rapidly of infectious diseases. We aim to reconstruct breastfeeding and weaning patterns (BWPs) as a proxy for infantile and maternal health, to study intra-population variation at Chorro de Maíta. We studied 37 well-preserved permanent first molars of individuals ranging from children to older adults, which were incrementally sampled using a biopsy pen and analysed for dentine carbon and nitrogen isotope analysis. The results indicate three main groups in the population: (1) individuals with normal BWPs, (2) individuals with very short BWPs, and (3) individuals without BWPs. The study of BWPs through stable isotope analysis can provide us with a better understanding of infantile and maternal health in populations that show little to no paleopathological markers. However, to accurately apply this method, it is necessary to have permanent first molars available with good (dentine) preservation and little to no occlusal wear or dental caries, as these factors can cause loss of data for the first weeks to months of life. Future studies of the Chorro de Maíta population could further investigate these three groups and assess whether they indicate different patterns regarding age at death and paleopathological markers, to gain a better understanding of the influence of breastfeeding and weaning on morbidity and mortality.

A possible case of pes planus in the convent of Friars Minor in Brussels, Belgium (13th-18th centuries CE).

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Changes to the medial arch of the foot occur frequently in modern human populations but are rarely reported in paleopathological studies. Regarding pes planus, or flatfoot, only a few studies have been conducted on dry bone, where diagnosis depends on various potential changes including lesions on joint surfaces, morphology and measurements, based partly on clinical radiographic images. This study presents a possible case from the former convent of Friars Minor in Brussels, where excavations revealed c. 100 burials (13th-18th centuries CE), of which 16 were studied using macroscopic methods. One adult burial, consisting only of lower limb bones, showed extensive pathological lesions in the right and left foot. Both feet showed severe changes in the subtalar and talo-navicular joints, including osteoarthritis and extension of joint surfaces, while the right sinus tarsi was reduced. Dorsal exostoses on several tarsal bones and the proximal left metatarsi indicate ossification of ligaments, while accessory facets on the proximal diaphysis of the 2nd, 3rd and 4th left metatarsi indicate abnormal contact. Both talar heads appear medially displaced. The changes

indicate increased stress and possible changes in the position of bones, which may suggest alterations in the architecture of the foot such as pes planus. The extensive lesions imply pain and inhibited mobility, while increased stress is also indicated by entheseal lesions on other bones. Since only few archaeological cases are known, this study offers new information to determine changes in the architecture of the foot, its occurrence in past populations and possible effects on individuals.

Detecting blood stains on skeletonized remains: a case report describing possible evidence of traumatic haemorrhage on a late medieval skeleton from Nieuwpoort, Belgium.

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The presence and accurate detection of human or animal blood (residue) on archaeological remains or artefacts is valuable in the reconstruction of ancient rituals, dietary behaviour and the diagnosis of disease. This case study presents the findings related to the skeletal remains of a young adult male from Nieuwpoort, Belgium, dating to the late medieval period. Macroscopic assessment of the fully skeletonized remains revealed several traumatic lesions in different stages of healing, as well as peculiar, localized bone discolouration on the pleural surface of a number of consecutive left lower ribs. Antemortem trauma with early signs of healing were observed on the sacrum, acetabulae and left glenoid. Cortical bone scrapings of unstained as well as stained ribs were used to perform Hemastix® and Tetrabase tests to investigate the possibility that the discolouration observed was the result of blood stains. These tests presumptively indicated the presence of blood on the affected ribs. The stains observed are suggestive of traumatic haemorrhage. Given the topographical characteristic of the discolourations, a haemothorax may be considered, although no fractures of the associated ribs were observed. It is proposed that the individual sustained extensive trauma to the trunk, which he survived for some time as is evidenced by the early signs of healing. Further tests will be performed to definitively confirm the presence of blood. This case adds to the limited literature describing the investigation of possible blood residue on human skeletal remains and highlights its value in reconstructing events surrounding the time of death.

Frontal sinusitis from Late Roman Sicily: adding palaeohistology to the picture.

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Chronic sinusitis is a persistent inflammatory status of the mucosal lining of the paranasal sinuses. Its aetiology has not been determined yet, while a combination of genetic predisposition, environmental exposure and systemic susceptibility has been suggested to cause it. A focus on its antiquity is emerging in palaeopathology. The studies have so far adopted a combination of gross morphological examination – often enhanced by endoscopes and magnifying lenses – and palaeoradiological analyses. To the best of our knowledge, histological examination of the outcomes of chronic sinusitis has not been added to the palaeopathological diagnostic picture. Thus, we present a case of chronic frontal sinusitis from Late Roman Sicily (Italy). It refers to a fragmented and not well-preserved skullcap, belonging to a mature adult male individual, radiocarbon dated to the period 418–536 CE from the late Roman necropolis of Pianotta di Calatabiano (Catania). This skull has already partly been investigated, yielding interesting results such as a rare case of frontal sinus osteoid osteoma and a very large bregmatic bone. Within the same sinus, also a standard osteoma and sinusitis represented by a conspicuous bone reaction carpeting the walls of the sinus could be observed. A sample of bone reaction was histologically analysed. For the first time, palaeohistological images of how chronic sinusitis appears in ancient human remains are offered, showing bone resorption, osteoblastic activity and periosteal reaction. Finally, the potential health impact of the combination of two benign tumours and sinusitis within the same frontal sinus on this ancient individual is detailed.

Surviving but not thriving: palaeopathological insights from a 19th-century adult individual from the 3rd Order of Our Lady of Carmo burial site (Porto, Portugal).

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This paper presents and discusses the palaeopathological profile of a well-preserved and complete possible male adult exhumed from a hospital cemetery in Porto, Portugal. These remains form part of a larger collection comprising over 800 primary burials dating back to the early and middle 19th century that is currently under analysis as part of the BeFRAIL project. A systematic and thorough macroscopic examination was carried out, complemented by the aid of low-power magnification. The findings revealed several indicators of inflammatory, traumatic and degenerative changes, including subperiosteal haematomas, a possible fracture to the nasal septum and lipping and porosity consistent with osteoarthritis. Furthermore, asymmetrical anterosuperior osteophytic bridging of the sacroiliac joints is evident, as are sacralisation and spondylolisthesis of L5. Despite the younger age of the individual, the cumulative effect of multiple conditions, some active at the time of the death, may suggest a challenging life, probably marked by some degree of impairment. This research contributes to the understanding of historical health conditions in 19th-century Portugal and offers valuable perspectives on a person's adaptability and resilience to disease. Nevertheless, inadequate on-site record keeping resulting in the absence of contextual and taphonomic information has impeded a more detailed evaluation of the individual in situ, namely at the palaeopathological level. To prevent such occurrences in subsequent research, improved documentation protocols need to be implemented. Future research on this case study will integrate both macroscopic and microscopic approaches for a more comprehensive differential diagnosis.

Kheny's Kids: nonadult social stratification in New Kingdom (15th – 11th centuries BCE) Gebel el-Silsila, Egypt.

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Differences in funerary practices and pathology prevalences can be used to gain insight into nonadult social stratification in the 15th–11th centuries BCE quarry site of Kheny, ancient Gebel el-Silsila, Egypt. A necropolis was discovered with numerous stone-cut tombs, but not all individuals were buried inside. Nine nonadults, aged between 1 month and 13 years, were buried in natural fissures or on the quarry floor. The additional funerary characteristics and prevalent pathological anomalies for each of these individuals were macroscopically assessed to detect differences in social roles. Based on the way they were buried, there were two groups of nonadults: group 1 ($n = 6$) was wrapped and had grave goods, while group 2 ($n = 3$) was buried directly on the quarry floor without burial gifts. Regardless of the group, a relatively high prevalence of *cribra orbitalia* (66.7%; 6/9) and rickets (66.7%; 6/9) was observed. A such, despite differences in social roles, the factors causing these conditions must have affected all nonadults similarly and a potentially higher status did not necessarily imply adequate diets or better living conditions. Unfortunately, comparison with the high socioeconomic status nonadults within the chamber tombs is hindered by years of grave robbing and the annual flooding of the Nile. Despite the commingling of the human remains and the absence of grave goods in these tombs, the study of these remains will be undertaken to further improve our understanding of the various levels of social stratification.

CONSENSUS: "reCOrding activity-related chaNgeS and hEalth iNdicatorS on the hUman Skeleton".

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The presentation introduces the International Research Project CONSENSUS, funded by CNRS with support from Leiden University, Ghent University, and the Royal Belgian Institute of Natural Sciences. Starting in 2023, this 5-year project targets methodological challenges in Biological Anthropology and Paleopathology, focusing on recording skeletal health indicators (SHI) and activity-related skeletal changes (ARSC). Currently, qualitative methods prevail in recording SHI and ARSC, lacking standardization and often reflecting "school of thought" preferences. The impact of these choices remains unclear, with method reproducibility rarely documented. Additionally, arbitrary decisions regarding taphonomic alterations and variable simplification further complicate comparisons. Despite the significance of SHI and ARSC, their study faces substantial methodological hurdles, leading to limited dissemination of raw data.

The team's objectives include:

1) Identifying practices among participants from France, Belgium, and the Netherlands regarding SHI and ARSC, and selecting commonly used methods.
2) Establishing reflection groups to develop methods for SHI and ARSC lacking established methodology.
3) Conducting reproducibility and repeatability tests for existing and newly created methods, with results published systematically.
4) Quantifying the influence of material preservation, methodological choices, and data processing on the obtained results.
5) Developing "guidelines" for each indicator, outlining methods, suitable data preprocessing, and data dissemination advice.

First multidisciplinary etiological study of ancient atherosclerosis: application of paleo-genetic and paleo-nutritional analysis about a 13th-century artificial Mummy in China.

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Atherosclerosis is a multi-factorial disease affected by genetic predisposition and lifestyle habits. Paleo-epidemiological studies have demonstrated that this once-presumed modern disease was common among ancient mummified individuals (R. C. Thompson, 2013 Lancet). Our subject, the Changzhou Mummy (1212-1264 CE), is the first artificial mummified body ever found in East Asia. The mummification was performed via application of mercury and mercuric sulfide through enema. The Changzhou Mummy provides us with a valuable opportunity to evaluate the two primary etiologies of atherosclerosis among populations in the Lower Yangtze region around the 13th century. To investigate his phenotypic manifestation, genomic characteristics as well as individual life history, we conducted multidisciplinary research combining the utilization of paleo-radiological, forensic, paleo-pathological, paleo-genetic and paleo-nutritional analysis. Through autopsy, two instances of yellow fatty atherosclerotic plaque were recognized on the subject's aortic wall. We subsequently generated high-coverage ($12.7609\times$) NGS sequencing genome data. Increased polygenic risk scores (PRS) for atherosclerotic cardiovascular diseases indicated the Changzhou Mummy's strong hereditary susceptibility to this condition. Dietary reconstruction through stable isotope ratios of carbon and nitrogen confirmed an elevated nitrogen stable isotope level approaching carnivore (tiger) baselines, strongly indicating regular consumption of animal proteins. Correspondingly, the phrase "三牲之养" (nourished on cattle, pig and sheep) on the epitaph pointed to frequent intake of meat during daily life. Overall, our study explores the association between ancient atherosclerosis in a case characterized by increased genetic predisposition alongside a carnivorous diet.

High Nitrogen Isotope Ratios in Newborn Collagen Due to Fetal-Placental Glycine Fractionation, Not Just Maternal or Fetal Stress.

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Combined paleopathology and stable isotope research is becoming more common but it is difficult to disentangle normal from pathologically altered isotope values. This study explores causes of elevated nitrogen isotope ratios (δ15N) in newborn collagen that may be interpreted as evidence of maternal or fetal dietary or disease stress. Data are drawn from (1) fetal, infant, and adult female collagen δ15N data from two 18th-19th century archaeological sites (Middenbeemster, Netherlands; Pointe-aux-Trembles, Canada) and (2) compound-specific individual amino acid δ15N data from sequential fingernail keratin samples of two

modern mother-infant dyads of known diet and health. Serial dentine and intra-long bone sampling of archaeological non-adults permitted tracking across the pre-to post-natal period; prenatal δ15N means were significantly higher than adult female bulk bone collagen means (t = 5.331; p=<0.01). For the modern individuals, glycine δ15N was consistently and significantly higher in fetal keratin samples (n = 5; +9.4 ± 0.49‰) than maternal samples that formed around the same time (n = 5; +7.2 ± 0.24‰) (U = 0; p=<0.01). The in vivo placental-umbilical transfer of glycine is limited so it must be produced by the fetal-placental unit. In late gestation, when glycine becomes conditionally essential, 15N enrichment occurs during nitrogen transfer from serine. Glycine comprises ~ one-third of collagen, suggesting that amino acid metabolism in the fetal-placental unit causes elevated newborn δ15N. Fetal δ15N may therefore be elevated due to normal physiological processes and should not be misinterpreted as maternal or fetal stress. This finding needs to be evaluated using additional pre-to post-natal samples from individuals of known diet and health.

Life and Death in the Times of Empire in the Southern End of the Central Andes (CE 500–1100).

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The objective of this study is to compare the life and death conditions of the inhabitants of the Atico and Tambo valleys between CE 500-1100. Both populations were located in the extreme south of the Central Coast of Peru, but were living under two different regimes, the Wari Empire (Atico) and the Tiahuanaco State (Tambo). The sample is composed of 57 individuals from Atico and 55 from Tambo (32 women, 24 men, and 56 non-adults). We analysed and documented biological sex, age-at-death, body height, and pathological bone lesions, including osteoarthritis, as well as non-specific stress indicators (criba cranii, criba orbitalia, and periosteal reactions). Intentional cranial modifications were also noted. The results indicate differences between populations. The Atico population had more antemortem and perimortem fractures (13/27, 48%), while the Tambo population had more moderate-severe osteoarthritis in the young-middle adults (N = 16/30, 52%) and more diversity in intentional cranial modeling. In conclusion, the conditions of life and death in both valleys were different, not only because of environmental factors, but mainly in the forms of social organization in the Wari Empire or the Tiahuanaco State. This project contributes to the understanding of social dynamics in the Andes based on the analysis of human bone remains, understanding the individual as part of a larger socio-political and environmental context. Future studies will include DNA and isotope analysis to characterize biological groups and migration routes, as well as contrasting the results with those published on contemporary sites.

How can dental caries illuminate the impact of environmental, cultural and agricultural shifts on the human diet from the Neolithic to Medieval periods in the Middle Nile Valley, Sudan?

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Dietary starches and sugars are the primary cause of tooth decay, thus caries prevalence can be a sensitive indicator of the impacts of dietary change. Increasing aridification and socio-cultural changes in the Middle Nile Valley from the Neolithic onwards, were accompanied by a subsistence transition from a hunter-gatherer diet to one ever more reliant on cultivated resources. With these changes, carbohydrate-rich foods would have progressively become a greater part of the human diet in this region. Therefore, it would seem reasonable to suggest that the prevalence of dental caries would rise as time progresses. However, results suggest a more complicated story. In this study, 586 individuals were analysed, dating from the Neolithic (c. 5000BCE) to the Medieval (c.1500CE). A highly detailed method of recording dental caries by each possible lesion site on individual teeth was used, allowing like-for-like comparisons across collections with varying preservation. While the findings indicate an overall increase in dental caries through time (e.g., occlusal 7.5-27%), lesions are found in different areas of the dentition in different periods and groups. Exceptions, potentially associated with cultural and environmental factors, were observed in the Neolithic and urban Medieval groups. The high level of detail inherent in the method reveals these complex patterns of caries prevalence. The results allow for a more nuanced picture of the impact of environmental and agricultural shifts on the human diet, and the state of oral 'health' over 7000 years of Nubian life in the Middle Nile Valley.

An integrated approach to stress: identifying novel approaches to assessing developmental stress.

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Most bones comprise multiple modules, which initially develop separately but form an integrated osteological unit after fusing. It was speculated that developmental stress would impact the extent to which skeletal modules integrated and affect patterns of morphological correlation. As they are formed from three distinct bones (i.e., the ilium, ischium and pubis), this hypothesis was explored in the human pelves. The skeletal remains of forty-three individuals from two English assemblages, 8th-12th century Black Gate (n = 22) and 18th-19th century South Shields (n = 21), were assessed. Assessment included macroscopic techniques, three-dimensional scanning and geometric morphometric (GM) analyses. Specifically, pelvic shape was defined through a Procrustean protocol and a novel individual index of integration was computed. Developmental stress was evaluated through linear enamel hypoplasia (LEH) presence. It was found that gross patterns in pelvic morphology were significantly impacted by site and sex; although significant sample-level integration was detected, individual indices did not predict overall shape variation. Instead, significantly higher indices were detected with a large effect size among individuals without LEH (t = 2.967, df = 26, p < 0.005, Cohen's d = 1.07). To conclude, elevated developmental stress seemingly reduces the extent to which skeletal modules can integrate morphologically. Although stress-induced disruptions to skeletal integration are relatively small, they are quantifiable through GM methods and could plausibly function as a new metric through which stress can be investigated. This assertion is made tentatively, however, and it is believed that a more thorough quantitative exploration of the signals identified (e.g., through Bayesian approaches) will help to establish the credibility of the findings.

The collections of human remains in the Natural History Museum in Vienna/Austria - A research infrastructure.

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How can a museum collection give fresh impetus for research questions in palaeopathology? The OSTE collection (national) of the NHMW contains approximately 28,000 skeletons from (pre)historic populations of Austria. The pathological-anatomical (PASW) collection has approx. 50,000 specimens (approx. 9500 of them are bones or whole skeletons) with various diagnosed diseases from hospitals. The database of the OSTE collection and 30 external research requests of the last 12 years were analysed. One clear result is that access to a focus group is highly dependent on the availability of the basic data of individuals. Further, invasive sampling, e.g., for DNA analyses (diseases, relationships), must be coordinated by the curator to limit the destruction and grant FAIR use of the data. The expertise of the curator is inevitable to introduce new parts of the collection into the scientific discourse. Our future goal as curators is to publish the basic data in a museum repository with a DOI for referencing and as an open data resource. Further, an outstanding

comparative collection for the diagnosis of diseases of the past is the PASW. Documentation of diagnosed diseases and autopsy protocols are available for every individual. The limitations for palaeopathological use are that the bone collection is only a small part of the whole collection and only organ parts showing the disease were collected. The collections of the NHMW are open to research enquiries and the curators are willing to provide the most suitable specimens for the respective research question.

Assessing the Legacy of Congenital Malformations in the Historical Collection of Vilnius University Faculty of Medicine.

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Vilnius University Faculty of Medicine, with a history dating back to the 18th century, has accumulated numerous anatomy and pathology specimens. However, inadequate preservation has led to severe deterioration of the collection. Congenital malformations represent a significant aspect of human intrauterine development, offering valuable insights into medical history, embryology, and the complexities of prenatal life. While prevalent in historical records, such anomalies are now rarely observed in contemporary medicine, largely due to advancements in perinatal healthcare and the availability of medical abortions. This study aims to assess the quantity and variety of congenital malformation specimens from the 20th century left under the auspices of Vilnius University Faculty of Medicine. Known production dates range from 1923 to 1977, and the authors of some specimens include Vilnius University professors A. Rudaitienė and R. Ptašekas. Using archival records and visual inspection, we conducted a thorough assessment of the congenital malformation specimens. A total of 54 congenital malformation specimens were identified, with the most common type being nervous system embryopathy, followed closely by urinary tract and kidney embryopathy. A detailed description and localization of the valuable historical relics fosters the development of the joint Anatomy and Pathology museum in the premises of Vilnius University Faculty of Medicine. Establishing a unified museum to preserve and display this diverse collection of congenital anomalies would provide a unique educational resource for students and researchers. All assessments were conducted with strict adherence to ethical standards to ensure the respectful handling of historical specimens.

Multidisciplinary study on the role of bone lesions in the paleopathological diagnosis of tuberculosis in ancient human remains.

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The study of tuberculosis in ancient human remains has a long tradition in paleopathology, with characteristic bone changes such as angular kyphosis initially used for diagnosis. Recent advances in the study of ancient DNA have enabled the detection of *Mycobacterium tuberculosis* DNA in mummies and skeletons, even in the presence of atypical or early skeletal changes. Pathogen genomes have been reconstructed, offering insights into tuberculosis evolution. However, these reconstructions are limited to well-preserved samples and require extensive prior molecular screening. Moreover, molecular results have rarely been used to refine the paleopathological diagnosis. Therefore, we initiated a large-scale study to examine skeletal remains from different periods for signs of tuberculosis, followed by molecular analysis. Here we present the results of skeletal series from a modern cemetery from the late 19th century in Munich, Germany, known as the Winthir collection, and the early medieval linear cemetery of Altenerding-Klettham, Germany. In both cemeteries, we identified cases with typical skeletal changes (tuberculous arthritis) as well as numerous possible early stages, including rib lesions, superficial vertebral changes, endocranial alterations and early-stage spondylodiscitis. A comparison of these results with historical records of the modern cemetery showed a significantly increased number of endocranial changes in the children suffering from tuberculosis. On the other hand, no clear correlation with other bone lesions, such as rib periostitis or vertebral body lesions, could be established. The identified cases will be subjected to molecular analysis to better understand the relationship between morphological changes and the presence of tuberculosis DNA.