

READING DISEASE IN BONE: BIOARCHAEOLOGICAL AND MOLECULAR PERSPECTIVES ON SKELETAL PATHOLOGY IN A HUMAN SKELETON FROM SIDE (TURKIYE)

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Background: Tuberculosis has profoundly shaped human history, but skeletal diagnosis alone is often limited by non-specific lesions and preservation issues. Biomolecular methods therefore provide valuable complementary evidence for detecting tuberculosis in archaeological human remains.

Objective: This study investigates pathological changes observed in a human skeleton excavated from the ancient city of Side (Antalya, Türkiye) and dated to the Byzantine period using an integrative bioarchaeological approach combining palaeopathological assessment and ancient DNA (aDNA) analysis.

Materials and methods: The individual exhibited vertebral porotic lesions and was buried outside the main necropolis, an unusual funerary context that may reflect disease-related social responses, marginalization, or concerns about contagion. DNA was extracted from skeletal remains using the QIAamp DNA Investigator Kit and the presence of amplifiable human DNA was verified by PCR and qPCR. Shotgun sequencing libraries were then prepared and sequenced on an Illumina platform. In parallel, 16S rRNA amplicon sequencing and SILVA-based taxonomic assignment were employed to screen for the presence of pathogen DNA.

Results: Both shotgun and 16S metagenomic analyses revealed sequences affiliated with the *Mycobacterium tuberculosis* complex. Post-mortem damage patterns confirmed the authenticity of the ancient DNA signal. By integrating osteological and molecular evidence, this study strengthens the diagnosis of tuberculosis and demonstrates the importance of interdisciplinary approaches in biological anthropology.

Conclusion: The findings contribute to a better understanding of the biological and social impacts of infectious diseases in past human populations and highlight the potential of ancient DNA research to refine palaeopathological interpretations within their archaeological context.

Keywords: Bioarchaeology; Paleopathology; Ancient DNA (aDNA); Tuberculosis; Infectious diseases.