

Bone microscopy: guiding knowledge from history to forensic medicine

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Calcified tissues are well known microscopically, but the diagnostic potential of bone micro-anatomy is still underestimated. The shape and size of osteons or of lamellar bone are unique and fundamental for determining the species of origin of human remains, and for understanding age, disease, and trauma; thus micro-anatomy is crucial to many disciplines, from archaeology to forensic medicine. This presentation aims at illustrating and reviewing all such applications. The first question arising when studying skeletal remains is: "is it human?". Macroscopic analysis alone can sometimes be insufficient in understanding if they belong to a human or to another animal; in such cases, the microscopic characteristics can be the only instrument capable of providing a reply, by evaluating the presence of osteons, their pattern and distribution, as well as the their metrical parameters [1]. Secondly, bone tissue formation as well as the constant bone remodeling process result in a strong correlation between the age of an individual and both the tissue pattern and the number of osteons per unit area in a bone cross-section, parameters on which most of the histological age-estimating methods are based. These methods are particularly important in distinguishing subadults from adults, and, among the latter, in estimating age where other methods result unsatisfactory [2]. Bone histology can also be diagnostic in the research for pathological diseases and traumatic events, especially with concern to the moment in which a trauma occurred [2]. Finally, the type and degree of microscopic damage can give some insight into the environmental surroundings in which the bone was, and a taphonomic profile useful for the verification of taphonomic events and clues on the post mortem interval of the sample [3]. All these contributions demonstrate that even just a small piece of bone, in fact a microscopic part of it, is fundamental and can sometimes be the only instrument for the correct interpretation of the story that human remains can tell.

References

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Keywords

Bone histology; microscopy; anthropology.