
The Digital Era meets Taphonomy

Julia Aramendi*^{†1,2}, Miguel ángel Maté-González³, Lloyd Austin Courtenay⁴, and José Yravedra^{1,2}

¹Universidad Complutense de Madrid – Espagne

²Instituto de Evolución en África (IDEA) – Espagne

³Universidad de Salamanca – Espagne

⁴Universitat Rovira i Virgili – Espagne

Résumé

In recent years, the study of taphonomic traces on bone surfaces has become fundamental for the interpretation of prehistoric carcass exploitation by hominins and carnivores. Due to the difficulties in the correct identification of certain marks, different criteria have been suggested for their description and classification.

New non-invasive techniques have been recently applied for the morphological study of marks. The methods commonly used for such analyses rely on high-cost microscopy techniques with low portability, such as the 3D digital microscope (3D DM) or laser scanning confocal microscopy (LSCM); but, recently, new algorithmic developments in the field of computer vision and photogrammetry, have achieved very high precision and resolution, offering portable and low-cost alternatives.

Anthropogenic and carnivore marks have been reconstructed and analyzed using Micro-Photogrammetry (M-PT) and a methodology based on the use of a medium/low-cost improved structured light scanner (SLS-2) yielding comparable results to those obtained using high-cost methods. High-resolution 2D and 3D models have been analyzed to best capture the morphology of long (e.g. cut marks and tooth scores) and circular (e.g. tooth pits and percussion marks) traces providing new ways of distinguishing between marks that present overlapping characteristics and are sometimes difficult to identify. The reliability of these methods has been tested using experimental samples that include cut and percussion marks generated using different raw materials and different carnivore score and pits. Ultimately, the methodology has been applied on actual archaeological and paleontological samples providing more accurate answers to current taphonomic questions concerning the hunting-scavenging debate and the identification of the agent modifying the carcasses, including the recognition of carnivore species based on the marks they leave.

The methodology exposed here offers new solutions to current taphonomic problems based on low-cost and readily available techniques, though this technology also presents some disadvantages (e.g. data collection and processing, expertise) worth further discussion.

Mots-Clés: Taphonomy, geometric morphometrics, virtual models, carnivore marks, anthropogenic marks

*Intervenant

†Auteur correspondant: juliaram@uclm.es