Taphonomic insights into the Middle Pleistocene in the Iberian Peninsula. The human cranium from Gruta da Aroeira (Portugal)

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Résumé

A partial human cranium has recently been recovered from the Gruta da Aroeira site in the Almonda karst system (Torres Novas, Portugal). The site forms part of the network of galleries located in the uppermost part of the 70-m high escarpment rising above the extant spring of the Almonda river, a tributary of the Tagus River. The fossil, also known as Aroeira 3, is represented by most of the right half of the calvarium.

The cranium was recovered from the Acheulean layer (Unit 2) dated to 390-436 ka. Together with the cranium, abundant faunal remains and lithics were found, including Acheulean handaxes, along with additional bifacial tools, other types of retouched tools, cores, flakes and flake fragments. Highly fragmented faunal remains are also abundant, consisting of isolated teeth, phalanges, carpal/tarsal bones, and antler fragments of large mammals. The presence of carnivores is scarce, with just a few bear and canid skeletal remains.

This specimen is, together with the Sima de los Huesos fossils, the only Middle Pleistocene human cranium to have been recovered in the Iberian Peninsula. Taphonomic and forensic analyses on human remains are essential to understand the site formation processes and to draw inferences about the mortuary behavior of hominin species. Here, we report the first taphonomic analysis of the Aroeira 3 cranium, based on its bone surface modifications and bone breakage pattern.

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Aroeira 3 presents substantial bone loss of the left supraorbital arch and the outer cranial table of the frontal squama. Most of the fractures present features consistent with postmortem injuries of post-depositional origin. The fracture in the posterior region of the parietal bone, however, displays a different pattern, with the presence of a large cortical delamination, an oblique angle and a smooth fracture plane, features more usually present in perimortem (fresh) bone fractures. No evidence of other anthropogenic activity has been identified, which means cannibalism and secondary treatment of the corpse can be discarded, and no carnivore activity has been observed. None of the expected features of interpersonal conflict are observed in Aroeira 3, making an accident the most plausible explanation for the fracture. Finally, the bone loss in the frontal squama and the supraorbital arch could be attributed to different agencies, which means traumatic breakage cannot be totally ruled out.

**Mots-Clés:** taphonomy, cranial breakage, Aroeira, Middle Pleistocene