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A retouched bone shaft from the Late Mousterian at Fumane cave (Italy). Technological, experimental and micro-wear analysis

Diaphyse osseuse retouchée issue du Moustérien final de la grotte de Fumane (Italie). Analyse technologique, expérimentale et tracéologique

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ABSTRACT

This paper describes a retouched bone shaft found in a Late Mousterian layer at Fumane Cave, northern Italy. The interpretation of the anthropic nature of the retouch is based on the identification of specific morpho-technological markers through experimentation. An integrated taphonomic and technological analysis was applied to the archaeological artifact. The evidence suggests that the bone shaft modifications involved the use of direct percussion through a transfer of technical knowledge from flint knapping. However, this does not necessarily imply that this technique was used in the absence of a more effective one. Similar cases of the use of bone as raw material for tool manufacturing are documented in the Lower Palaeolithic, and might have been related to the lack of appropriate lithic raw material, although this is not the case for Fumane cave.

Mots clés :
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Outil en os
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RÉSUMÉ

Cet article présente un outil en os retouché trouvé dans le niveau Moustérien final de la grotte de Fumane dans le Nord de l'Italie. L'interprétation de la nature anthropique des retouches est basée sur l'identification de marqueurs morpho-techniques spécifiques qui ont été mis en évidence lors d'expérimentations. Ces analyses taphonomiques et technologiques ont été appliquées à l'artefact archéologique. Les résultats indiquent que la modification de l'outil en os nécessite l'utilisation de la percussion directe par un transfert de connaissances techniques du débitage du silex. Toutefois, cela n'implique pas nécessairement que cette technique a été utilisée en l'absence d'une autre plus efficace. Bien que des cas similaires de l'utilisation d'os comme matière première pour la fabrication d'outils documentés dans le Paléolithique inférieur aient pu être reliés à un manque de matière première lithique appropriée, cela n'est pas le cas pour la grotte de Fumane.

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1. Introduction

Difficulties in identifying retouch technology applied on bones in Lower and Middle Palaeolithic are due to different taphonomic agents, which acted on faunal remains. In general, the level of bone modification is low, as are the intentional breakage patterns that may partially overlap those produced by carnivores (Brain, 1981; Chase and Nowell, 1998; d'Errico and Villa, 1997; d'Errico et al., 1998; Domínguez-Rodrigo et al., 2009; Galán et al., 2009; Koby, 1943; Villa, 1991; Villa and d'Errico, 2001). While, there is little evidence for the use of retouch or more formal techniques (e.g, splitting, scraping, polishing) with respect to the enormous bulk of raw material available, such as bone, antler or ivory, the use of unmodified bone flakes as hammers for stone flake retouching is widely documented (Jéquier et al., 2012; Mozota Holgueras, 2009; Valensi, 1996).

An overview of the ancient bone technology reveals that the earliest deliberate modification of bones by retouch dates to MIS9 at Gran Dolina and Bolomor Cave (Spain) and at Qesem cave (Israel) (Blasco et al., 2013; Rosell et al., 2011). Bifaces, choppers, scrapers and denticulates made on bone flakes from large herbivores, such as bovids, horses, deer and proboscideans were also found in several Lower Acheulean sites in central Italy (Anzidei, 2001; Anzidei et al., 1989; Biddittu and Celletti, 2001; Cassoli et al., 1982; Saccà, 2012; Segre Naldini et al., 2009; Villa et al., 1999), Germany (Bilzingsleben – Mania and Mania, 2005) and Hungary (Vertesszöllös – Dobosi, 2001). Acheulean bone tools are dimensionally and morphologically comparable to lithic implements, with invasive and bifacial detachments, regularly positioned on the side. Outside Europe, retouch technology is ephemeral for the MSA in Africa, although it is considered amongst the repertoire of techniques for bone modification associated to modern human behaviour (Henshilwood et al., 2001; McBrearty and Brooks, 2000). The earliest example is provided from Blombos Cave, South Africa, ca. 75–77 ka BP, where a fresh bovid long bone was modified into an end-scraper and used (d'Errico and Henshilwood, 2007).

In the European Middle Palaeolithic, retouched bone artefacts were rarely investigated for taphonomic and technological traces (Bordes, 1961; Cabrera Valdes, 1984; Vincent, 1993) and, when this was done, a number of specimens can be considered as pseudo-artefacts (d'Errico and Villa, 1997). More reliable evidence is represented by a bifacially retouched bone fragment from Vaufrey Cave (France) (Vincent, 1988), some denticulated diaphyses and a pointed tool on auroch mandible (Rosell et al., 2012) from Abric Romaní (Spain), and some trihedral picks on tibia of rhinoceros found at Gruta Nova de Columbeira (Portugal) (Barandiarán et al., 1971) dated to 87.1 ± 6.3 ka BP (Zilhão et al., 2011). To indicate that Neanderthals during the Middle Palaeolithic made use of a set of bone technologies, there are the rare tools worked by abrasion that are dated to the first half of MIS3 from Salzgitter-Lebenstedt, Germany (Gaudzinski, 1999) and the bone smoothers recovered from the Mousterian of Acheulean Tradition at Pech-de-l'Azé I and Abri Peyrony, France (Soressi et al., 2013). It follows that each single element yielding additional data about the specific Neanderthal techniques and skills is fundamental in order to evaluate the technological behaviour of this species.

To date, criteria for identifying technological retouches on bones have never been made fully explicit. The interpretation of anthropic retouched bones has mainly followed the same criteria used in stone knapping. Diagnosis and identification of anthropic retouch has mostly been based on the occurrence of invasive removals with classic attributes of percussion flaking (Saccà, 2012; Villa and Bartram, 1996). The repetition and uniformity of the blows (with percussion bulb scars) as well as the regular outline of the retouched sides have also been considered as important markers of technological retouch. In particular, the regular pattern of symmetric detachments excludes the activity of carnivores and/or butchery marks produced while fracturing bone for recovering marrow. While few modified bones have been interpreted as tools on the basis of experimental data related to the use of percussion techniques (Biberson and Aguirre, 1965; Vincent, 1988,1993), the results are not always convincing when bone assemblage formation processes are taken into consideration (Villa and Bartram, 1996). For instance, at Prolom (Stephanchuk, 1993) and Bois Roche systematic taphonomic and contextual analysis identify carnivore activity (e.g., hyena) as the main agent for pseudo-technological traces on bones or perforated artefacts (d'Errico and Villa, 1997 contra Vincent, 1993).

To facilitate the recognition of deliberately modified bones, this paper presents the results of an integrated taphonomic, technological, and functional analysis of one bone scraper recovered from the final Mousterian of Fumane Cave, northern Italy, with the aim of providing new data about early retouch technology. We believe that on methodological grounds this discussion is relevant for many other case studies worldwide where one finds old prehistoric evidence of retouch technology on bone.

2. Materials and methods

Fumane Cave (Lessini Mountains, Veneto) records the MP–UP transition with a finely layered sedimentary succession preserving several Late Mousterian levels, covered by Uluzzian and Proto-Aurignacian levels (Broglio et al., 2006; Higham et al., 2009; Peresani, 2012; Peresani et al., 2011a). The Latest Mousterian is recorded in a stratigraphic complex named A5–A6 composed of layers A5, A5 + A6, and A6. The bone scraper was found in layer A5 + A6 in the rear of the cave (square 120c), associated with dispersed charcoal fragments, flaked stones, bones, and few hearths. The chronometric refinement of the ^{14}C data sets layers A5 and A5 + A6 to 42.3–39.8 ky ^{14}C BP. The bone scraper has been subjected to taphonomic, techno and use-wear analyses, the results of which have been compared to the experimental data. Taxonomical and anatomical determinations were made after comparison with the faunal collection stored at the University of Ferrara (Laboratory of Archaeozoology and Taphonomy). Taphonomic alterations have been analysed at low and high magnification. Measurements of the specimen included length, width and thickness. For the interpretation of the traces we have referred to the available scientific literature (Blasco et al., 2008; Fischer,