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Typological and Technological Study of Prehistoric Implements in Animal Hard Tissues

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A B S T R A C T

Several series of prehistoric implements in animal hard tissues, either from ancient and recent excavations, were studied by the typological and technological points of views. Their morpho-typological description was in many cases associated to microscopic study of surface modifications, often allowing identification of traces related to manufacture. This technological information in some cases could be integrated by the observations of use-wear, thus providing functional indications. Implements came from sites of different antiquity and different geographic areas (from Liguria to Calabria). Implements considered by the research program included tools, pendants and other ornamental objects, as well as unfinished implements and manufacture left-overs often identified during revision of faunal remains. Middle Paleolithic bone fragments bearing traces of non-alimentary anthropic actions were limited to the so-called »retouchers«. However, during Upper Paleolithic, implements in animal hard tissues were relatively frequent in most Italian sites, even if those industries were not so rich, elaborated and typologically differentiated as in other European areas.

Key words: *Paleolithic, animal hard tissue, implements, typology, retouchers*

Middle and Upper Paleolithic Bone Retouchers
(G. Malerba, G. Giacobini)

The surface of some diaphysal fragments bears marks, which cannot be related to butchery actions. They are deep and short, V-shaped in cross section, transversal or oblique to the major axis of the bone fragment and concentrated in

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closely clustered groups. Scanning electron microscope observations show that their morphological characteristics correspond to those of marks experimentally produced by using the bone fragment in retouching the edge of a flint flake. Numerous retouchers of this kind were produced by Mousterian and Upper Paleolithic levels. Material from French (La Quina) and Italian sites (such as the S. Bernardino, Fumane and Tagliente) (Figure 1), as well as experimental retouchers, were studied[1,2].

Implements from the Mesolithic Site of Mondeval de Sora (Belluno)

(C. Cilli, G. Giacobini, A. Guerreschi)

The funerary items of the Mesolithic burial of Mondeval de Sora (Italian Dolomites, North-Eastern Italy)[3] comprise 61 pieces, including flint artifacts and masses composed of resin residues and the following objects in animal hard tissues:

– two bone awls of red deer and elk located on the sternum and between the knees;
– one group of artifacts located on the left side of the skeleton (close to the elbow) including nine bone and antler artifacts (four blunted red deer antlers), a point made from a red deer tibia diaphysis, an awl made from red deer antler with five longitudinal grooves, a harpoon with alternate tangs made from red deer antler, a large articular fragment of a red deer left scapula showing traces of use wear on the inside of the glenoid cavity and a thoracic red deer vertebra with use wear traces in the vertebral foramen;
– another group (located closed to the left femur) including a blunted boar canine;

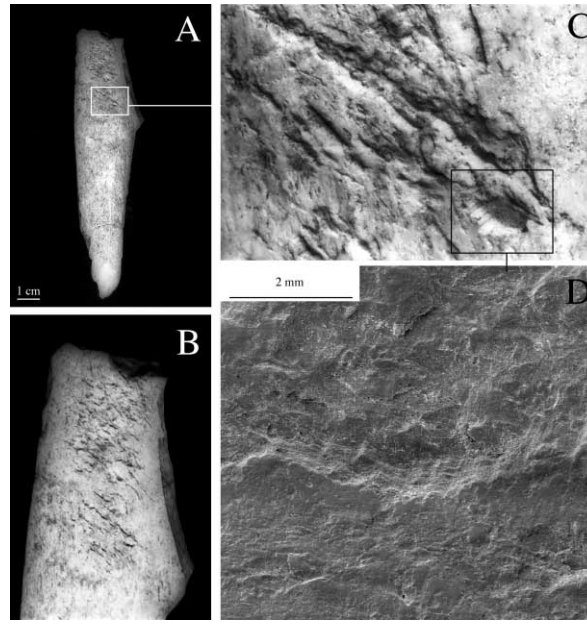

Fig. 1. A, B: Bone retoucher from Riparo Tagliente (Upper Paleolithic levels). C: Close up of the area covered with impressions produced by the impact on the lithic instrument. D: SEM image of an impression mark.

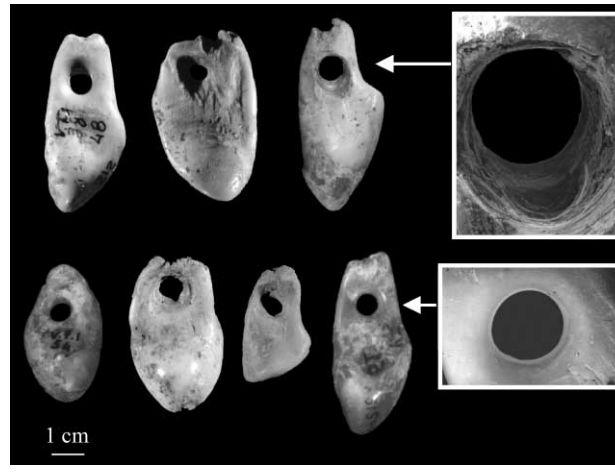

Fig. 2. Pierced atrophic red deer canines from the Mesolithic site of Mondeval de Sora. One of them (top right) shows, close to the hole, traces of a previous unfinished perforation. The regularity of traces, visible at the SEM, suggests use of a bow-drill. On another specimen (bottom right), the edge of the hole appears polished by wear (suspension) and traces of perforation are almost completely obliterated.

– seven perforated red deer atrophic canines located under the left scapula and on the sternum.

The study of the surface modifications of these implements was carried out at the scanning electron microscope (SEM)[4]. It allowed identification of marks related to both the manufacture and use of these objects[5].

Technological observations were made on the perforated deer canines (Figure 2). Two perforation techniques were identified: by free hand rotation of a lithic perforator and by use of a bow-drill. Two specimens show the edge of the hole polished by wear (suspension).

The harpoon (Figure 3) is one of best examples of Italian Mesolithic harpoons. Traces of scraping are visible on most of the surface. They correspond to accurate finishing of this particularly fine piece of manufacture.

The very rich bone artifacts from this burial offer important possibilities for the study of burial rituals and technology of bone manufacture by the Mesolithic populations of this geographical area.

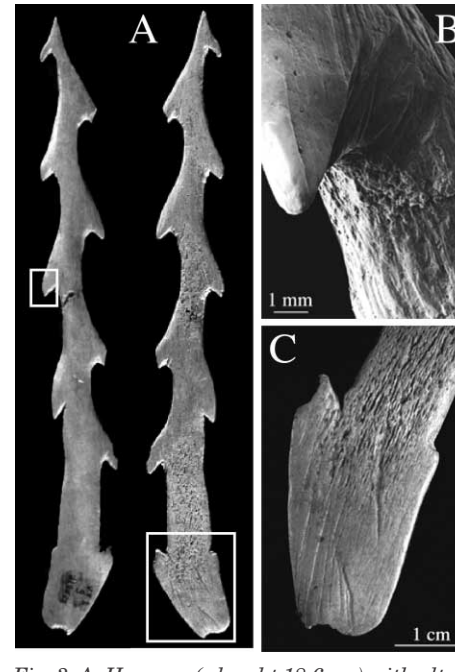

Fig. 3. A: Harpoon (r lenght 18.6 cm) with alternate tangs made out of red deer antler. Traces of scraping are visible on most of the surface. B: SEM detail of a tang. C: Detail of the bottom of the harpoon showing traces of scraping.

Ornamental Ivory Objects
(G. Malerba, G. Giacobini)

A general work project is in progress concerning artifacts made out of ivory from Italian Upper Paleolithic sites. Ivory objects are exceptional. In fact, mammoth remains never were unambiguously identified in Italian sites of Upper Paleolithic age.

Four ivory claviform pendants were present among the abundant grave goods of the burial of the so called »Young Prince« (Gravettian or Ancient Epigravettian layers) of the Arene Candide cave (Finale Ligure). At least 3 of them were obtained from mammoth tusks[6].

Thirteen ivory objects were found associated to two Upper Paleolithic burials (burial II and III) from the Barma Grande (Balzi Rossi, Ventimiglia). They are represented by 9 claviform pendants and 4 buttons formerly defined as »double-olive pendants«[7].

Ivory claviform pendants from both sites (Figure 4), even if different in size, show a very homogeneous shape and decoration with sets of parallel grooves, produced by the repeated action of a lithic implement.

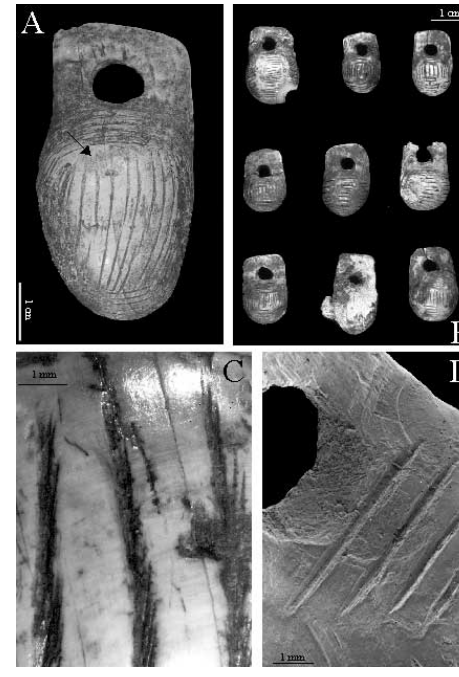

Fig. 4. Ivory pendands from the Upper Paleolithic levels of Arene Candide cave (A) and Barma Grande (B). C: Close up of grooves present on the convex surface of pendant A; D: SEM image (close up pendant indicated by arrow in B) showing hole and grooves.

Intentionally Perforated Teeth
(A. Broglio, C. Cilli, G. Giacobini, A. Guerreschi, G. Villa)

Perforated teeth are ornamental and symbolic objects frequently found in prehistoric (Upper Paleolithic and younger) deposits. In most cases, they are represented by cervid atrophic canines, clearly used as pendants and often associated to burials. Owing to their frequency, they represent a suitable material for studying the development of the techniques of perforation. They are usually well preserved and allow microscopic observation of the walls of the perforation. Material studied by this point of view came from North Italian Upper Paleolithic (Grimaldi caves, Tagliente and Villabruna rock-shelters, Broion cave) and Mesolithic (Mondeval de Sora rock-shelter) sites. Experimentally perforated red deer canines were examined as comparison material. Experimental perforations were obtained either by hand rotation of a flint borer and by use of a bow-drill. SEM observation of the perforation walls allowed identification of striae produced by the rotation of the borer[8,9]. Their arrangement and regularity demonstrated to be related to the piercing technique.

Material from Tagliente was particularly interesting, since it included specimens representing different stages of the

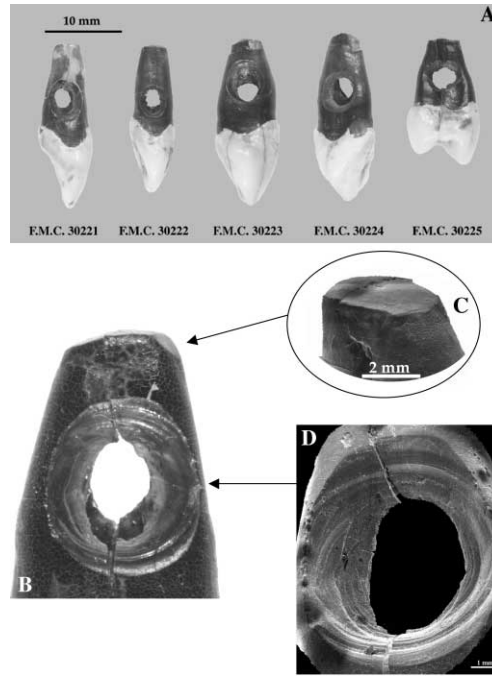

Fig. 5. A: Perforated human upper anterior teeth from the Neolithic site of Fimon-Molino Casarotto. B: Close-up of the root of specimen 30223. C, D: SEM details of the same tooth (artificially abraded root apex and perforation wall showing concentric thin parallel striations).

perforation process (e.g., production by scraping of an excavation to guide the rotating flint borer at the beginning of its action)[10]. Comparison with experimental material demonstrated that all examined perforations could be attributed, in the case of Upper Paleolithic specimens, to free-hand rotation of the borer. In the case of the Mesolithic specimens from Mondeval (Figure 2), at least one tooth suggested use of a bow-drill[5].

Exceptional examples of artificially perforated human teeth were also studied. They were represented by a series of 5 permanent upper anterior teeth (Figure 5A) found in the Middle Neolithic site of Fimon-Molino Casarotto (Berici Hills, Vicenza)[11].

Dental roots appeared perforated mesio-distally close to the neck and showed an artificially abraded apex. SEM observation provided indications about the mechanism of production of perforations and apex abrasion. The morphology of the circular concentric striations clearly visible on the perforation wall is typical of the rotating action of a lithic tool (Figure 5B, C,D). The marked regularity of the concentric striations present on the perforation wall could suggest use of a drill (for discussion and further details, see[12,13]). These pierced teeth showed a slight wear on the apical side of the hole edges, suggesting a short hanging period.

REFERENCES

1. MALERBA, G., G. GIACOBINI, Les retouchoirs sur éclats diaphysaires du Paléolithique moyen et supérieur de trois sites de l'Italie nord-orientale (Grotte de San Bernardino, Abri de Fumane et Abri Tagliente). In: Proceedings: XIII International Congress of Prehistoric and Protohistoric Sciences (Abaco, Forlì, 1998). — 2. MALERBA, G., G. GIACOBINI, Fiche éclats diaphysaires avec marques trasversales d'utilisation. In: PATOU-MATHIS, M. (Ed.): Industrie de l'os prèhistorique. Cahier X. Compresseurs, percuteur, retouchoirs. Os à impressions et éraillures. (Editions Société Préhistorique Française, Paris, 2002). — 3. GERHARDINGER, M. E., A. GUERRESCHI, La découverte d'une sépulture mésolithique à Mondeval de Sora. (Belluno, Italie). In: GIACOBINI, G. (Ed.): Hominidae. (Jaca Book, Milano, 1989). — 4. AIMAR, A., C. CILLI, G. MALERBA, G. GIACOBINI, L'étude au microscope électronique à balayage des surfaces osseuses. Le problème de l'identification des traces d'action anthropiques sur les objets archéologiques en matière dure animale. In: GUARINO, A. (Ed.): Proceedings: 1st International congress science and technology for the safeguard of cultural heritage in the Mediterranean basin. (CNR, Roma, 1998). — 5. CILLI, C., G. GIACOBINI, A. GUERRESCHI, Grave goods from the Mesolithic burial of Mondeval de Sora (Italian Dolomites). Typological, technological and functional observations. In: D'ERRICO, F. (Ed.): Burial implements from Upper Paleolithic and Mesothic sites. (British Archaeological Reports, in press). — 6. GIACOBINI, G., G. MALERBA, Les pendeloques en ivoire de la sepulture paléolithique du »Jeune Prince« (Grotte de Arene Candide, Finale Ligure, Italie). In: HAHN, J., M. MENU, Y. TABORIN, P. H. WALTER, F. WIDEMANN (Eds.): Le travail et l'usage de l'ivoire au Paléolithique Supérieur. (Istituto Poligrafico e Zecca dello Stato, Libreria dello Stato, Roma, 1995). — 7. MALERBA G., G. GIACOBINI, Etude micromorphologique des objets en ivoire des sépultures de la Barma Grande de Grimaldi. In: Proceedings: Balzi Rossi, 1846–1996. 150 anni di ricerche tra collezionismo e indagine scientifica, Ventimiglia, 1997. (in press). — 8. CILLI, C., G. MALERBA, G., GIACOBINI, Boll. Museo Civ. St. Nat. Verona, 24 (2000) 73. — 9. GIACOBINI, G., M. PATOU-MATHIS, Fiche rappels taphonomiques. In: PATOU-MATHIS, M. (Ed.): Industrie de l'os préhistorique. Cahier X. Compresseurs, percuteur, retouchoirs. Os à impressions et éraillures. (Editions Société Préhistorique Française, Paris, 2002). — 10. BELTRAMI, A. M., C. CILLI, G. GIACOBINI, A. GUERRESCHI, Etude technologique des dents animales perforées du Paléolithique supérieur de l'Abri Tagliente (Italie). In: Abstracts: IV International Congress of Human Palaeontology. (Sun City, South Africa, 1998). — 11. BAGOLINI, B., L. H. BARFIELD, A. BROGLIO, Riv. Sci. Preist., 28 (1973) 161. — 12. CILLI, C., G. VILLA, L. H. BARFIELD, A. BROGLIO, G. GIACOBINI, Intentionally perforated human teeth from the neolithic site of Fimon-Molino Casarotto (Berici hills, Vicenza). Scanning electron microscope studies. In: SPEDINI, G., G. DESTRO-BISOL, G. MANZI (Eds.): Attualità dell'Antropologia. Ricerca e insegnamento nel XXI secolo. (C.E.S.I., Roma, 2001). — 13. CILLI, C., G. GIACOBINI, A. GUERRESCHI, Bone artifacts from the Mesolithic burial of Mondeval de Sora (Belluno, Italy). Preliminary technological and functional observations. In: GUARINO, A. (Ed.): Proceedings. III Congress on Science and technology for the safeguard of Cultural Heritage in the Mediterranean Basin. (CNR, Roma, 2002).

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TIPOLOŠKA I TEHNOLOŠKA ANALIZA PRETPOVIJESNIH UMETAKA U ŽIVOTINJSKIM TVRDIM TKIVIMA

S A Ž E T A K

Proučavani su pretpovijesni umeci u životinjskim tvrdim tkivima sa tipološkog i tehnološkog stajališta. Njihov morfološko-tipološki opis je u mnogo slučajeva bio u skladu s mikroskopskom analizom promjena na površini uzorka, omogućujući identifikaciju tragova proizvodnje. U nekim slučajevima je tehnološka informacija mogla biti integrirana s podacima o korištenju, čime je ukazivala na upotrebu predmeta. Umeci su nađeni na lokalitetima različite starosti i zemljopisnih područja (od Ligurije do Calabrije). Umeci analizirani u radu uključuju oruđe, privjeske i druge ukrasne predmete, kao i nedovršene umetke i ostatke proizvodnje koji se često mogu naći prilikom pregleda životinjskih ostataka. Koštani fragmenti iz srednjeg paleolita sa znakovima ne-alimentarnih ljudskih aktivnosti ograničeni su na »retouchere«. Međutim, tijekom gornjeg paleolita umeci u životinjskim tvrdim tkivima su bili česti na većini lokaliteta u Italiji, čak i kada kulture nisu bile bogate, obrađene i tipološki različite kao u ostalim područjima u Europi.