Retouching Tools from Osseous Raw Materials in the Starčevo Culture

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Abstract: Tools from osseous materials were used for a variety of tasks during prehistoric times – for processing organic materials such as leather, hide, plant fibres; but they may have been also used for the manufacture of flint tools, as percussors, hammers, retouching tools, or anvils. These are relatively easily identifiable through characteristic use wear traces and numerous examples of them were noted on sites throughout Europe, covering the span from the Middle Palaeolithic to the Late Neolithic / Chalcolithic. These tools are important not only in reconstructing the chaine opératoire for flint tools, but also for linking together different industries into general technology studies. In this paper, tools connected with flint manufacture identified so far in the Starčevo culture bone industry will be presented. These were mainly used as retouching tools or pressure flakers, and all of them were made from antler. They cover the span from ad hoc, expedient, to the carefully shaped tools.

Key words: antler, bone industry, technology, tools, Neolithic, Starčevo culture

Introduction

It is a common practice in analyses of archaeological materials to group artefacts into industries.\textsuperscript{1} Although such an approach is very useful, the analyses should not end with a single industry, but a multiple technology analysis is needed.\textsuperscript{2} Sometimes different technologies share the same craftpersons, workshops, methods for obtaining raw materials, etc. Their interconnection and overlapping – flint blades and burins used for bone crafting, bone artefacts used in flint artefact production, etc. – can be both interesting and instructive for analyses of the organization of craft production.

However, the tools used in flint knapping, be they of antler, bone or stone, are not always treated in detail, although the analysis of these tools can provide both a new way of reconstructing prehistoric flint-knapping techniques and a way of testing hypotheses concerning the nature of the artefacts produced.\textsuperscript{3}

Generally, we can define retouchers as objects made from bone, antler or tooth, used in their natural form or modified, that have one or several zones with small punctiform pits and/or parallel linear marks on the distal end on their surface, that were used to strike stones in order

\textsuperscript{1} Industry is defined as a set of artefacts characterized by a particular technology, technological style or morphology, and drawn from a number of different, but contextually related, assemblages – Jameson 1999, 307.

\textsuperscript{2} cf. Lemonnier 1992.

\textsuperscript{3} Chase 1991, 443.
to transform them into retouched tools. Use wear traces may also include deep grooves and incisions, generally perpendicular or slightly diagonal to the main axis of the object, but large damages may also occur on bone surface; they are dense and overlapping, thus creating smaller, limited surfaces of damage on the bones.

Retouchers could have been used in percussion flaking, which is the removal of a flake or chip by striking the objective piece with a hammer or percussor. Usually the percussor or hammer is a cobble or pebble, but they may also be made of bone, antler, or wood. Sometimes a percussor is used in a manner so that contact is not made between the objective piece and the percussor, in which case the percussor is used to strike a punch that is placed on the surface of the objective piece. This technique is called indirect percussion. Another technique is pressure flaking, i.e. the removal of a flake or chip by applying pressure to the objective piece without striking. This is usually done by placing the tip of an antler tine or sharpened bone on the objective piece and pushing it down and in on the point of applied force. The antler tine or bone used in this way is called a pressure flaker.

Although the basic function of these tools is generally clear, the more precise cause of marks on them (i.e. by pressure or percussion), has been less frequently discussed. It is interesting that among the diverse prehistoric osseous artefacts, those used for flint production were among the first objects to attract special attention, and also the earliest experiments related to the bone industry were focused on the interpretation of their use.

The identification and interpretation of marks on bones was a topic of numerous studies, and focus was especially placed on identifying the marks caused by non-human agents of bone modification, similar to those caused by retouching. Also, several experimental studies were made.

The emergence of such tools might be found in the latest phases of Acheulean, but the earliest retouchers are usually connected with the Middle Palaeolithic. Up to day, they were also identified throughout prehistoric Europe in the Upper Palaeolithic, Epipalaeolithic, Mesolithic, and the Neolithic period, as well as on different sites outside Europe.

The level of modification of these tools differs from period to period and region to region; most Mousterien retouchers were not formal tools, but expedient, ad hoc used pieces of bone.

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6 cf. Andreofsky 2005, 12 ff., see also illustrations in Siret 1925.
7 cf. Karavanić & Šokec 2003; however, for experimentation concerning raw material used see Mallye et al. 2012.
8 Martin 1906, 1908; Siret 1925.
9 e.g., Chase 1991; Capaldo & Blumenschine 1994; Giacobini & Patou-Mathis 2002; Schwab 2002, 2003; see also Vercoutre et al. 2007.
11 e.g., Karavanić & Šokec 2003; Mozota Holgueras 2007, 2009; Mallye et al. 2012.
12 Blasco et al. 2013.
14 e.g., Malerba & Giacobini 2002; Schwab 2002, 2003; Gudelis 2009, 114 ff.
15 e.g., Gudelis 2009, 199 ff.
16 e.g., Bačkalov 1979; Jiljic 2001; Vitezović 2011b.
17 e.g., Schibler 2013.
18 e.g., in the Natufian culture – Stordeur 1988, 31-47.
later ones are usually more formal tools. Raw materials used also cover a wide range – pieces of long bones from large ungulates were mainly used, but also phalanges, carnivore teeth, antler, etc., may occur.

The presence of these artefacts was also important for the discussions on the Neanderthal behaviour, and most papers focused specifically on this tool type deal with Middle and Upper Palaeolithic examples, while those from later periods are less known.

Retouching tools in the Starčevo culture

Artefacts identified as being used as retouchers / pressing tools were discovered at seven Starčevo culture sites – at the eponymous site of Starčevo-Grad, at Donja Branjevina and Ludaš-Budžak, situated in Vojvodina, in the Pannonian plain, and at Anište-Bresnica, Grivac, Divostin and Drenovac, situated in the region of Pomoravlje, in central Serbia.

Starčevo-Grad. At the eponymous site, Starčevo-Grad in southern Banat, two such tools were discovered – first one is made from a small red deer antler tine, it has a blunt tip and its’ use wear traces consist of deep, dense notches and incisions. At the base, it has a deep groove, that could have been used for attaching the tool (fig. 1). The second artefact was made from a roe deer antler, a beam with a crown and one tine, completely covered by deep, parallel incisions and grooves from use (fig. 2).

Donja Branjevina. In the rich bone industry from this site, three retouching tools were also identified, all made from red deer antler tines. Two of them have at their distal ends their natural tine tip transformed into a small circular surface (approx. 5 mm in diameter), blunt and worn out from use (fig. 3). One of them was especially carefully made (fig. 4). – traces of cutting are visible at the proximal end, and most of its outer surface was smoothed – natural roughness of antler was removed by scraping. Traces of use, visible at both tools at their distal parts, consist from short deep burrows, grooves and incisions, perpendicular in respect to the tool’s axis, partially overlapping.

Third tool was made from a tip of a smaller tine (fig. 5). The basal part was carefully cut and the spongy tissue is partially carved out. Two perforations (4-5 mm in diameter) are visible, one entirely preserved, and the other one broken, with an unfinished third perforation. The active end is partially fragmented, but it most likely also had the shape of small elliptical or circular surface. Deep dense lines, incisions and grooves, perpendicular to the tool’s axis, are visible at the distal end.

The entire artefact was carefully made – aside from the above mentioned perforations, the natural roughness of the antler was also smoothed. Perforations were probably made so that the artefact could be carried attached to the belt or for some similar reason (broken perforation is the result of use), therefore, this item was not only a practical one, but it may have had a representative role as well.

Ludaš Budžak. One retouching tool was discovered that was made from an antler tine tip (fig. 6). The basal part was cut off with an axe, and the entire surface is covered by dense use

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19 e.g., Schibler 2013.
Fig. 1: a, b) Red deer antler retouching tool with a groove on the base, from Starčevo, c) detail of use wear traces.

Fig. 2: a) Roe deer antler retouching tool, from Starčevo, b, c) detail of use wear traces.

Fig. 3: Retouching tool from Donja Branjevina.
Fig. 4: Retouching tool from Donja Branjevina.

Fig. 5: a, b) Retouching tool from Donja Branjevina with perforations on the base, c) detail of the perforations, d) detail of use wear traces.

Fig. 6: a) Retouching tool from Ludaš-Buđak, b, c) details of use wear.

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wear traces. In the distal portion of the tool several zones exist where grooves and diagonal incisions overlap. The very end itself was modified into a circular surface, also with dense lines and incisions.

Anište Bresnica. One retouching tool was discovered that was made from a red deer antler tine (fig. 7). The basal part was cut off with an axe, and the distal surface was smoothed by scraping with a fine flint tool. The distal end is in the shape of a small circular surface, and the entire distal portion of the tool is covered with deep, dense incisions and grooves.

Grivac. Two retouching tools were identified (fig. 8), both made from small tine fragments of red deer antlers. The natural tip was modified into a more or less regular circular surface – in specimen Grv 067 the groove was made and then the tip was removed, and at Grv 024 two flakes were removed from two sides. Apart from damage on the tip, entire distal ends are covered with incisions and grooves. One of the tools was found in the unit related to the pit-dwelling, perhaps abandoned on the place where it was used.

Fig. 7: a, b) Retouching tool from Anište-Brenica, c) detail of use wear traces, d) details of manufacture and use wear traces, e) detail of traces of manufacture.
Divostin. At the site of Divostin a rich antler industry was discovered, and it included four retouching tools, all made from red deer antlers. Three of them were made from tines; the natural tip was shaped into a small circular surface on two specimen; the third one has a damaged tip, but the natural tip was also modified by cutting. Traces of use are very intense on all specimens, and consist of dense, deep incisions and grooves.

The fourth artefact is a hammer, from a modified base of a shed red deer antler (fig. 9). The natural base was used as hammer working surface, and the beam was thinned to be used a handle, so the entire artefact is mushroom-shaped. The natural base of the antler was also modified (or perhaps repaired) by removing small flakes, and it was used as hammering surface. The other end is not preserved. After the tool broke and became unusable, the handle was secondarily used for flint artefacts – dense, deep, short incisions and furrows are visible on its surface.

Fig. 8: a) Retouching tool from Grivac, b) detail of a working tip, c) detail of use wear traces, d) detail of the traces of manufacture.
Two smaller antler tines were used as retouchers. The first one with traces of whittling at its base, has its entire mesial and distal part covered with dense, somewhat irregular, short incisions. The natural tip was modified into a circular blunt surface, also damaged from use. On the other retoucheur numerous incisions and grooves from use may also be noted.

**Discussion**

All these retouching tools were made from antlers. Except for one roe deer antler tool from Starčevo, all other artefacts were made from red deer antler segments. Tine tips were preferred, although other parts may be found as well. In most cases, they were made the same way as smaller punching tools.\(^{27}\) Firstly, the tines were cut from the antler; usually a groove was made first so as to make the severing easier (generally, the groove was made with a flint tool and

\(^{27}\) cf. Vitezović 2011a, 308 ff.
abrasive fibre), and the antler was later cut off by an axe or broken off by flexion. The natural tip of the tine is shaped into a smaller circular or elliptical surface (cf. fig. 8b), usually less than 1 cm in diameter, made either by grooving (using the same technique as in detaching the tines from the antler) or, simply, flakes were cut off or even snapped off from one or two sides.

Similar to these are examples from Neolithic sites in Swiss, also made from antler (although from long, narrow splinters from beam, not from tines), with rounded working end.\textsuperscript{28}

If we arrange retouchers from Starčevo sites on an imaginary axis of manufacturing continuum\textsuperscript{29}, we may observe that they cover a wide range from minimally modified to the carefully made pieces, in which a considerable amount of time and skill have been invested. Strictly ad hoc objects are not present, but broken antler tools were sometimes secondarily used as retouchers (for example, broken hammer from Divostin, fig. 9), and most of the tools were planned, made in a uniform way, from strictly chosen raw material (exclusively antler, mainly from red deer). Some of the specimen are particularly carefully made, having their entire outer surfaces smoothed by scraping and burnishing (cf. fig. 7d, e).

The most beautiful piece is the example from Donja Branjevina (fig. 5), with a carefully cut basal part and with perforations, probably used for attaching the tool to the belt. On this particular tool traces of repair may also be observed – after the breakage of one perforation, another one was started (but not finished – perhaps the remaining perforation was sufficient or the distal end broke off and the tool became unusable).

This tool, and the example from Starčevo, were probably portable (fig. 1) – they could have been worn attached to the belt, to be at hand and ready for use. In this sense, it is very interesting to observe an analogy with a tool discovered along with the Iceman (Ötzi). Amongst other possessions, he had one implement, made of a section of a stripped lime-tree branch, which had been cut off straight at one end and appears to had been sharpened at the other end. A 6,1 cm long rod made from antler was stuck into the medullary canal at this end. The tool has a total length of 11,9 cm, whereby the spike sticks out no more than 4 mm, and this part was also hardened by firing. The tool was used for the production of flint implements; when the head of the tool grew blunt from use, it could be sharpened like a pencil and thus rendered fully functional again.\textsuperscript{30} This tool, with bark haft, is a unique find in prehistoric Europe. However, it gives good insight into the possible mode of use of these tools.

Apart from Starčevo retouchers, several finds from Swiss Neolithic sites also had perforations or notches for attaching.\textsuperscript{31}

Observed use wear traces can roughly be divided into two groups: incisions and grooves, perpendicular or diagonal to the tool’s axis (fig. 2), around the small circular working end, and zones of significant damage to the surface, consisting of dense incisions, grooves and burrows, placed at side surfaces in the distal portion (fig. 6). This suggests two possible modes of use – for percussion and pressure flaking.\textsuperscript{32} Some of the tools were used in both ways, but some have preserved just one kind of traces.

Several antler retouching tools have been identified in the Iron Gates Mesolithic – those from Kula\textsuperscript{33} and several examples from Vlasac can be interpreted as retouchers as well.\textsuperscript{34} Therefore, to a certain extent, Starčevo tools may be considered as a continuity with Mesolithic
Starčevo retouchers are relatively rare, i.e., they were present only at some sites, and never in large number; however, this may be due to sample bias (on most sites, bones were not carefully collected, or the excavations were carried out on a limited surface). So far, retouchers were not identified in the Vinča culture, so this raises an interesting question regarding technological changes in both flint and bone industries.

**Conclusion**

Retouchers represent one of the most wide-spread functional tool types from osseous raw materials, that cover a wide range of chronological and geographical distribution, as well as a wide range of raw materials, level of modification and final shape.

In the Starčevo culture, they fall into the class of planned, in most cases carefully shaped tools, and display highly uniform choice of raw material, manufacturing techniques and final form. Some of them show traces of repair, or, rarely, they were modified from another tool. For the mode of their use, it is interesting to note that some were clearly portable (the owner carried them most likely attached to the belt).

Preserved use wear traces suggest that they were used for both percussion and pressure flaking. However, their relatively low number does not allow any other generalized conclusions regarding their place within the craft production (were they commonly or only occasionally used for flint knapping, etc.). Many questions remain open, and future finds, as well as experimental work and combined analyses with flint industry, may show exactly how they were used (percussion, pressure flaking or both, whether one tool was in use for a long time or not, etc.) and on which type of flint raw material (all raw materials or just specific types of stones).

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35 Most of the techniques for antler manufacture are also a continuity of Mesolithic traditions – cf. Vitezović 2011a, 389 ff.


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