

Exploitation of carnivores for clothing: evidence of carnivore skinning from the Palaeolithic of Europe

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Zusammenfassung

Ausbeutung von Karnivoren für Kleidung: Belege für das Häuten von Karnivoren aus dem Paläolithikum in Europa

Die Entwicklung von Kleidung ist ein entscheidender Faktor beim Verständnis der menschlichen Expansion in kältere Regionen, aber aufgrund der Vergänglichkeit des Materials ist sie in der Archäologie immer noch ein viel diskutiertes Thema. Es wird oft angenommen, dass die ersten, einfachen Formen der Kleidung umhangartige Kleidungsstücke aus Tierhäuten waren. Um herauszufinden, welche Tierarten die Homininen für die Herstellung ihrer ersten Kleidungsstücke ausgewählt haben, können wir Schnittpuren an bestimmten Stellen des Skeletts untersuchen, die auf das Häuten von Tieren hinweisen. Verglichen mit der relativen Seltenheit von Karnivoren in einem natürlichen Ökosystem ist das Vorhandensein von Häutungsspuren bei dieser Tiergruppe im Vergleich zu Pflanzenfressern relativ hoch, was für eine Bevorzugung von Karnivorenhäuten durch (Vor-)Neandertaler und frühe moderne Menschen spricht. Die Erklärungen für die Häutung von Karnivoren reichen von funktionalen (Haardichte, isolierende Eigenschaften) bis hin zu sozialen oder sogar rituellen Gründen, die die Idee der Prestigejagd und der Signalwirkung des Tragens von Karnivorenfellen umfassen. Frühe Belege für die Häutung von Karnivoren aus dem Alt- und Mittelpaläolithikum finden sich vor allem bei großen Arten wie (Höhlen-)Bären und Großkatzen. Ab dem Jungpaläolithikum scheint es eine Verschiebung hin zu mittelgroßen und kleinen Arten, einschließlich Caniden und Musteliden, zu geben, was mit den verfeinerten Schneidewerkzeugen wie Nadeln zusammenhängen könnte.

Schlagwörter Enthäutung, Fell, Paläolithikum, Jagd, große Karnivoren

Introduction

One of the major obstacles for hominins to overcome in north-western Europe, even during interglacial conditions, was maintaining their body temperature. Evidence of occupation during different climatic conditions – similar to or colder than today – implies that hominins were able to cope with wind chill, low temperatures, reduced daylight hours, and snow cover (Hosfield 2016). Cultural solutions, such as clothing, are often assumed to be the answer to these

Summary

The development of clothing is a critical step in understanding human expansion into colder regions, but due to the perishable nature of the material, it is still a widely debated topic in archaeology. It is often assumed that the first simple forms of clothing consisted of cape-like garments made from animal skins. To gain insight into the animal species that hominins selected to produce the first forms of clothing, we can study cut marks on specific locations of the skeleton that indicate skinning. Compared to the relative rarity of carnivores in a natural ecosystem, the presence of skinning marks on this animal group in comparison to herbivores is relatively high, arguing for a preference for carnivore skins by (pre-)Neanderthals and early modern humans. Explanations for why carnivores are selected for skinning range from functional (hair density, insulating properties) to social or even ritual reasons, fuelling the idea of prestige hunting and the signalling quality of wearing carnivore pelts. Early evidence for carnivore skinning from the Lower and Middle Palaeolithic is primarily found on large species such as (cave) bears and big cats. From the Upper Palaeolithic onwards, there seems to be a shift towards mid-sized and small-sized species, including canids and mustelids, which could be related to the availability of more refined tailoring tools such as needles.

Keywords Skinning, fur, Palaeolithic, hunting, large carnivores

challenges, although direct evidence of clothing is very rarely found due to the perishable nature of the materials garments were made from (Nowell/Skala 2024). It is often assumed that the first simple forms of clothing consisted of cape-like garments made from animal skins (Gilligan 2010; Collard et al. 2016). Several indirect lines of evidence, for example, the occurrence of tools related to hide working and tailoring or the emergence of clothing lice (Toups et al. 2011), are used to predict the timing and development of different types of clothing. One of the early examples of flint



Fig. 1 Cave bear metatarsal bone with skinning marks from the Lower Palaeolithic site of Schöningen, Helmstedt District.

Abb. 1 Metatarsus eines Höhlenbären mit Häutungsspuren von der Fundstätte Schöningen, Lkr. Helmstedt, aus dem Altpaläolithikum.

scrapers displaying use-wear related to hide working comes from the site of Hoxne, Suffolk County (United Kingdom), which dates to Marine Isotope Stage (MIS) 11 and is roughly 400 ka old (Keeley 1993; Gilligan 2010). Although the presence of plants with tanning properties at an archaeological site does not prove their use, there is at least one clear indication of the use of plants for tanning by Neanderthals: a residue of a tannic paste is present on both surfaces of an approximately 200 ka old flint blade from Neumark-Nord, Saalekreis District (Koller/Baumer 2010). Besides that, the plant fibre residues found on a retouched flake from Schöningen site 12 II-4 (ID 17922), Helmstedt District, could also be the relict of a plant-based tanner (Rots et al. 2015).

With the increasing number of taphonomic studies of bone surface modifications over the last decades, a growing body of evidence demonstrates that the practice of skinning is more widespread and goes back further in time than previously thought. A large number of these studies actually consist of evidence for large carnivore skinning. Lower and Middle Palaeolithic sites from the northern expansion from (pre)Neanderthals, such as Boxgrove, West Sussex (United Kingdom; Parfitt 1999), Bilzingsleben, Sömmerda District (Brasser 2017), Schöningen (Verheijen et al. 2023), and Taubach, City of Weimar (Bratlund 1999), but also from the rest of Europe (Romandini et al. 2018; Toniato et al. 2024), show that bears were, amongst others, exploited for their skins. Besides that, the exploitation of lions for their skins

is prevalent from sites such as Gran Dolina TD10.1, Province of Burgos (Spain; Blasco et al. 2010), Einhornhöhle, Göttingen District (Russo et al. 2023), and La Garma, Province of Cantabria (Spain; Cueto et al. 2016).

Skinning, fur exploitation and hunting of carnivores

If the skin of a large carnivore is exploited, it is likely that the animal was hunted rather than scavenged. Preserving the hair on the skin ensures the insulating properties of the skin. It is only possible to exploit a fully intact skin with all the hair in place when a carcass is still in a fresh state. After a few hours in warm conditions, or after a maximum of one day in colder conditions, the skin of a carnivore will start to deteriorate. This starts with hair slippage, which will eventually lead to a total loss of all hairs, making the fur unusable.

To further support the hypothesis of hunting, reconstructions of the age-at-death profiles of archaeological assemblages are used. In nature, young animals and animals with a very advanced age have a higher chance of dying from a natural cause, such as disease or predation by carnivores. Human hunter-gatherers seem to focus more on prime-aged adult individuals (Stiner 1990). If these are over-represented in an archaeological assemblage, and especially if they also show signs of butchery, it often implies that they were

hunted. In the case of bears from Lower and Middle Palaeolithic open-air sites, we see exactly this over-presentation of prime-aged animals (Verheijen et al. 2023). Moreover, a recent study demonstrated that Neanderthals were hunting cave lions as well through evidence of a hunting lesion caused by a wooden-tipped spear combined with skeletal cut marks (Russo et al. 2023).

Although the hunting of large carnivores has been evident at least since the late Lower Palaeolithic, it should not be assumed that this was always to gain access to the skin. Based on our modern conception of animals, there seems to be a bias in which types of animals we see as prey for consumption and which are seen as raw materials for fur. This is especially prevalent in the distinction between herbivores and carnivores, as in modern western societies, mammalian carnivores are often not consumed anymore as a food resource. Nonetheless, historically and in non-western societies, the consumption of carnivores is more common, and archaeological evidence shows that in the past, the

consumption of carnivores was a widespread phenomenon (e.g. Blasco et al. 2010; Romandini et al. 2018; Toniato et al. 2024). A recent study demonstrates that on the Iberian Peninsula, a whole range of carnivores was consumed by hominins from the Lower until the Upper Palaeolithic (López-Páres/Cáceres 2025). This shows that having cut marks on fur-bearing animals is not necessarily a sign that these animals were hunted for their skins only, and from that perspective, the location of the cut marks on the skeleton is crucial for discerning between skinning and defleshing/disarticulation for consumption. In most cases, cut marks related to skinning are located on parts of the body where little meat and fat are present, for instance, on the external surface of the skull and around the fore- and hind paws, including circumferential cuts around lower limb bones. Cuts from skinning are usually finer than cuts made for disarticulation and are positioned differently than defleshing marks, whereas the latter are located on the areas of the body where more meat and fat are concentrated.



Fig. 2 Reconstruction of *Homo heidelbergensis*, wearing a cape-like ›simple‹ form of clothing, made from a bear skin.

Abb. 2 Rekonstruktion des *Homo heidelbergensis*, der eine umhangartige, »einfache« Kleidung aus Bärenfell trägt.

Practical versus symbolic considerations

Whether the selection of carnivores, in general, and large carnivores specifically, was a deliberate choice relating to the quality of the fur or if they were selected for symbolic reasons, is difficult to judge from an archaeological perspective. When it comes to the practicalities of skinning large carnivores, it would be much less time-consuming if a hunter ignored the skin of the paws and head and just cut the skin around the wrists and neck of the animal. In contrast, the archaeological record shows that cut marks do appear on phalanges and the skull from early on, meaning that these parts were skinned too. At the Upper Palaeolithic cave site of La Garma, nine cut-marked terminal phalanges of a cave lion were found in close association (Cueto et al. 2016). The find is interpreted as the remains of a lion skin, including the claws, that was left in the cave. Similarly, the find of a third phalanx of a cave lion with cut marks from the Einhornhöhle in Germany, dating to the Middle Palaeolithic, might be the relict of a comparable context (Russo et al. 2023). Based on the sum of archaeological contexts where remains of carnivores were found with skinning marks on the skull and the complete paws, it is not far-fetched to suggest that preserving characteristic features of the animal (paws with claws and the head) might have had symbolic meaning.

Upper Palaeolithic use of carnivore furs

Whereas evidence of carnivore skinning from the Lower and Middle Palaeolithic is primarily found on the remains of large cats and bears, from the Upper Palaeolithic onwards, early modern humans seem to exploit a larger range of carnivores, including smaller felids, canids, and

mustelids (Collard et al. 2016; López-Páres/Cáceres 2025). Two reasons for this shift can be hypothesized: perhaps the hunting techniques of AMH were more advanced compared to Middle Palaeolithic hominins, enabling them to target smaller, fast-moving prey such as mustelids, felids and canids; alternatively, it could be that small carnivores only became interesting species to hunt after techniques in garment making had developed further in order to produce the so-called complex form of clothing, after the introduction of needles (Gilligan 2010). The latter hypothesis would be a much more functional interpretation of the use of carnivores for clothing, in contrast to a more symbolic meaning as hypothesized for the skins of large carnivores where evidence suggests distinct features of the animals (claws/heads) are retained.

Conclusion

Early evidence of skinning shows that large carnivores were preferred as prey animals for obtaining high-quality furs. The insulating properties of large carnivore skins make them very suitable for producing so-called simple clothing. To obtain these furs, hominins most probably hunted rather than scavenged large carnivores. Skinning marks left on the bones from the paws and the skull indicate that these animals were fully skinned, retaining characteristic features such as the face and the paws, possibly with claws. This phenomenon is continued throughout the Upper Palaeolithic and might have had symbolic meaning, since preserving these features has no apparent practical advantages. From the Upper Palaeolithic onwards, we witness a shift towards the hunting of smaller carnivores for their fur, possibly related to the production of more complex forms of clothing items.

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Source of figures

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