Re-creating and Rethinking Pot Polish: The Taphonomic Implications of Cooking Fauna

Kelsey A. Gruntorad and Chrissina C. Burke

Faunal Analysis Laboratory
Northern Arizona University – Department of Anthropology

Abstract

Archaeologically, the term pot polish refers to wear on skeletal elements resulting from cooking in a ceramic vessel. The active mixing, stirring, and rubbing of the materials within and against the vessel's abrasive interior leads to polished fragmented bones. Unfortunately, limited experiments have been conducted on this topic. Despite natural taphonomic processes producing similar polishing modifications, archaeologists confusingly use cultural and natural attributes interchangeably. Given this lack of knowledge, investigations challenged if pot polish is in fact created in the manner described. Using experimental archaeology, this research tests whether cooking skeletal remains does in fact result in polishing. This research further demonstrates the extent to which pot polish is human produced and identifiable macroscopically. Not only do the outcomes of these experiments contribute to future studies exploring taphonomy, but this project presents an opportunity to discuss shifting traditionally assumed archaeological narratives through zooarchaeological and experimental methods.

Background

Animal remains are one of the most common materials recovered from archaeological sites. Behaviors associated with hunting, processing, and cultural values placed on those animals are reflected on those preserved remains. In the American Southwest, behaviors such as simmering or boiling plant and animal materials is common among cooking practices as it allows greater economic utility for consumption (Church and Lyman 2003; Morin and Soulier 2017). One of the ways zooarchaeologists examine these practices is through the identification and interpretation of taphonomic effects to bone, such as cut marks, breakage patterns, or polishing. One taphonomic agent that affects bone is pottery. Pottery is thought to create “pot polish” on bone specimens, a beveled and smoothed abrasive surface, and few experiments clarify this phenomenon. Although one would think pot polish would appear in more zooarchaeological literature discussing faunal remains in relation to cooking practices, the term is almost always tied to a narrative of cannibalism. Moreover, taphonomic effects found on faunal remains produced from food processing activities are thought to be found on cannibalized human remains as well. To better understand how pot polish is produced and the implications it holds, I incorporate three interdisciplinary perspectives: zooarchaeology, experimental archaeology, and decolonizing theory. Decolonizing theory, most notably, provides a lens through which to not only interpret these findings but also challenge the status quo. These three perspectives therefore guide this research.

Question

What is the relationship between how people created pot polish in the past and how zooarchaeologists understand and use the term today?

Pot Polish

First identified and defined by archaeologist White (1992), pot polish is the smoothing and rounding of broken tips and fractured edges of splintered bone, typically long bones, after they've rubbed against the abrasive interior surface of a ceramic vessel (Figure 1-3). The motion of boiling water and stirring emphasizes the contact between the pottery and bone. Other characteristics observed and used to describe pot polish also include a sheen or glossy appearance and a yellow discoloration. Sediment abrasion and other contact friction produces the same effect but whether there are differences in microscopic surface alterations is undetermined.

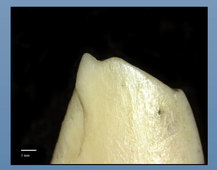

Figure 1 (left): Broken bone splinter tip. Figure 2 (right, top) and Figure 3 (right, bottom): Broken bone tip and edges. All exhibiting pot polish.

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Pottery as a Taphonomic Agent

Taphonomy describes the laws of burial in which a once living organism after death transfers from the biosphere to the lithosphere, preventing or biasing preservation (Efremov 1940). Different natural and cultural agents are the mechanisms for distributing and modifying human or animal remains. Taphonomic effects can occur naturally (e.g. weathering, root etching, carnivore gnawing) or culturally (e.g. cutmarks, chopmarks, pot polish). Therefore, investigating taphonomy permits zooarchaeologists to understand how faunal assemblages transpire. Commonly, foods are cooked in utilitarian pottery. Utilitarian meaning non-special or daily use ceramics (Rice 1987). Indicators that certain pottery was used for cooking include a squat and rounded shape, unrestricted openings, undecorated, and soot existing on the exterior (Rice 1987). For the purpose of this research, it's important to realize pottery can act as an agent which generates taphonomic effects on skeletal remains. The coarse, quartz sand and/or sherd temper used in utilitarian pottery to reduce thermal stress also creates that abrasive surface in which bone rubs against when cooking, ultimately resulting in pot polish.

Methods and Materials

Experimental materials and procedure follow closely to White's (1992) (Table 1). Three different samples were generated and tested to account for environmental conditions which may have affected the degree pot polish occurs. Two samples were defleshed before boiling while the third sample kept its flesh before boiling. Before performing the experiments, the skeletal remains were butchered using stone tools and fragmented into pot size pieces. The pottery used for the experiments was a modern variation of Tusayan and Little Colorado whiteware created by Michael Yeatts. A campfire was used, and the water reached a boiling temperature before placing the skeletal remains into the pot. The remains were stirred with a tree branch every 15 minutes for one minute. After 3 hours, it was set aside to cool before cleaning and analyzing the bone specimens.

Table 1 Experimental Procedure Influenced by White (1992)

Gruntorad (2020) Thesis Experimental Design		
Taxon	Mule deer	Rabbit
Sample Size	3 forelimbs; 3 hindlimbs; 1 complete axial	3 whole carcasses
Prepared Sample	Fleshy; Defleshed, green; Defleshed, dry	Fleshy; Defleshed, green; Defleshed, dry
Butchery	Skinned and hammerstone anvil percussion	Skinned and hammerstone anvil percussion
Container	Tusayan and Little Colorado white ware variation	Tusayan and Little Colorado white ware variation
Temperature	100 °C	100 °C
Duration	3 hours	3 hours
Additions	Stirring contents every 15 minutes for 1 minute	Stirring contents every 15 minutes for 1 minute
Drying Duration	Until cool, 15 minutes	Until cool, 15 minutes
Analysis Technique	10x hand lens, digital microscope, photography	10x hand lens, digital microscope, photography
Analysis Output	Out of 348 specimens, 290 exhibited sheen, 252 with smoothing, and 261 with rounding and beveling	Out of 105 specimens, 97 exhibited sheen, 72 with smoothing, and 44 with rounding and beveling.

Results

Based on the previous pot polish research, three characteristics were expected: sheen, smoothing, and beveling and rounding. It should be noted, Sample 1 and Sample 2 were defleshed and cleaned as much as possible of any soft tissues before being boiled, similar to previous experiments (Dixon et al. 2010; White 1992). Sample 3 retained all flesh before boiling and most of it even after boiling. Overall, between all three samples, 85% of specimens exhibited sheen, 72% exhibited smoothing, and 67% exhibited beveling and rounding on broken edges. For sample 1, sheen, smoothing, and beveling were present mostly on long bones, with deer exhibiting these characteristics more frequently than on rabbit (Figure 4). Again, for sample 2, sheen, smoothing, and beveling were present mostly on deer long bones (Figure 5). Rabbit ribs were another common element which also showed all three characteristics. Although, sheen, smoothing, and beveling their presence was less prominent in appearance, and slightly a shade darker. For sample 3, all specimens in this sample retained their soft tissues even after 3 hours of boiling. Therefore, sheen, smoothing, and beveling are limited and do not occur as often (Figure 6). Beveling, specifically, is the less occurring attribute seen on bone and is almost non-existent on rabbit specimens.

Sample 1 | Sample 2 | Sample 3

Figure 4 (left): Sample 1 before and after boiling. Figure 5 (middle): Sample 2 before and after boiling. Figure 6 (right): An after photo from Sample 3. No before photos were taken because bone was covered in flesh.

A Decolonizing Discussion

The results indicate pot polish was predominately prevalent on the specimens from the samples defleshed before the experiments. As mentioned earlier pot polish is associated with a narrative of cannibalism in the Southwest (Turner and Turner 1999; White 1992). This man-eating myth, however, is argued as an extremist duality suggesting that Indigenous peoples can only be either the noble redman or the bloodthirsty savage. Furthermore, the development of a cannibalistic signature involving and emphasizing the existence of pot polish on human skeletal remains prompts fetishism (Burgchardt 2018). There are biases produced in these interpretations as demonstrated, specifically as pot polish is only occurring if flesh is removed from the bone prior to boiling. Unless experiencing famine, the evidence arguing of warfare and cannibalism explanation is not justified nor support the similar food processing strategies found on animal remains.

Conclusion

Decolonization is a means to challenge master narratives, critiquing and deconstructing practices and research, and incorporating Indigenous experiences and traditional knowledge systems (Tuhiwai Smith 2012). Decolonizing archaeology does not argue for eliminating the practice but rather advancing towards the pragmatic purpose of involving communities’ multivocal perspectives and addressing the power imbalances between groups. Research involving cannibalism fetishizes humans as exotic or primitive. The narrative persuades others to investigate such a topic and perpetuate the colonial narrative. For this reason, decolonizing methods provide the framework to deconstruct what continues to subjugate Indigenous communities, particularly those where highly funded and publicized archaeological information come from.

References Cited

Burgchardt, Lucy Ann
2018 Attitudes Toward Antiquities: Rhetorical Enchantments, Preservation Advocacy, and the American Southwest. Ph.D. Dissertation, Department of Communications, University of North Carolina at Chapel Hill, North Carolina.
Church, Robert R. and R. Lee Lyman
2003 Small fragments make small differences in efficiency when rendering grease from fractured artiodactyl bones by boiling. Journal of Archaeological Science 30(8):1077–1084.
Dixon, Kelly J., Shannon A. Novak, Gwen Robbins, Julie M. Schablitsky, G. Richard Scott, and Guy L. Tasa.
2010 “Men, Women, and Children Starving:” Archaeology of the Donner Family Camp. American Antiquity 75(3):627-656.
Efremov, J.A.
1940 Taphonomy: A New Branch of Paleontology. Pan-American Geologist 74(2):81-93.
Morin, Eugene and Marie-Cecile Soulier
2017 New Criteria for the Archaeological Identification of Bone Grease Processing. American Antiquity 82(1):96-122.
Rice, Prudence M.
1987 Pottery Analysis: A Sourcebook. The University of Chicago Press, Chicago, Illinois.
Turner II, Christy G. and Jacqeline A. Turner
1999 Man Corn: Cannibalism and Violence in the Prehistoric American Southwest. The University of Utah Press, Salt Lake City.
Tuhiwai Smith, Linda
2012 Decolonizing methodologies: research and indigenous peoples. 2nd ed. Zed Books, Palgrave Macmillian, New York.
White, Tim D.
1992 Prehistoric cannibalism at Mancos 5MTUMR-2346. Princeton University Press, New Jersey