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Experimental replication shows knives manufactured from frozen human feces do not work

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ABSTRACT

The ethnographic account of an Inuit man manufacturing a knife from his own frozen feces to butcher and disarticulate a dog has permeated both the academic literature and popular culture. To evaluate the validity of this claim, we tested the basis of that account via experimental archaeology. Our experiments assessed the functionality of knives made from human feces in controlled conditions that provided optimal conditions for success. However, they were not functional. While much research has shown foragers to be technologically resourceful, innovative, and savvy, we suggest that this ethnographic account should no longer be used to support that narrative.

1. Introduction

In his book, *Shadows in the Sun*, Davis (1998: 20) recounts what is now arguably one of the most popular ethnographic accounts of all time:

> "There is a well known account of an old Inuit man who refused to move into a settlement. Over the objections of his family, he made plans to stay on the ice. To stop him, they took away all of his tools. So in the midst of a winter gale, he stepped out of their igloo, defecated, and honed the feces into a frozen blade, which he sharpened with a spray of saliva. With the knife he killed a dog. Using its rib cage as a sled and its hide to harness another dog, he disappeared into the darkness."

Since publication, this story has been told and re-told in documentaries, books, and across internet websites and message boards (Davis, 2007, 2010; Gregg et al., 2000; Kokoris, 2012; Taete, 2015). Davis states that the original source of the tale was Olayuk Narqitarvik (Davis, 2003, 2009). It was allegedly Olayuk's grandfather in the 1950s who refused to go to the settlements and thus fashioned a knife from his own feces to facilitate his escape by skinning and disarticulating a dog. Davis has admitted that the story could be "apocryphal", and that initially he thought the Inuit who told him this story was "pulling his leg" (Davis, 2009: 207, 2014: 15). Yet, as support for the credibility of the story, Davis cites the auto-biographical account of Peter Freuchen, the Danish arctic explorer (Hodge and Davis, 2012). Freuchen (1953) describes how he dug himself a pit to sleep in and woke up trapped by snow. Every effort to get out that he tried failed. Finally, he recalled seeing dog's excrement frozen solid as a rock. So, Freuchen defecated in his hand, shaped it into a chisel, and waited for it to freeze solid. He then used the implement to free himself from the snow: "I moved my bowels and from the excrement I managed to fashion a chisel-like instrument which I left to freeze… At last I decided to try my chisel and it worked" (Freuchen, 1953: 179).

While tools manufactured from human feces are not unprecedented in the human technological record (Chen et al., 2018; Mayor, 2009; Persson and Hågeru, 2018; Tran-Thi et al., 2017), we do not believe that Freuchen's account can serve as support for the Inuit account for two reasons. First, while we do not have any reason to suspect that Freuchen was prevaricating, to our knowledge there is no verifiable evidence beyond Freuchen himself that this event occurred. Second, a chisel is a very different tool than a knife. The mechanics of use are distinct, and the worked substrates in the Inuit and Freuchen cases are different. The Inuit case features the cutting and slicing motions on tissue, muscle, and tendon; the Freuchen case presents the pounding and chipping of snow.

Given the current ambiguity surrounding Davis' (1998) account of an Inuit using his own frozen feces as a knife, we conducted an experiment to test whether such a knife can function. Rather than conduct an "actualistic" butchery experiment, we designed a more controlled test that involved the simple slicing of materials necessary to skin and disarticulate dog: hide, muscle, and tendons. We reasoned that if knives manufactured from human feces cannot cut hide, muscle, and tendons in a simple, controlled setting, then the notion that such knives could be

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used to butcher an entire animal would also not be supported. However, if such knives could cut through these materials, then future tests could systematically increase the complexity of the experiments for additional support (Mesoudi, 2011).

2. Materials and methods

In order to procure the necessary raw materials for knife production, one of us (M.I.E.) went on a diet with high protein and fatty acids, which is consistent with an arctic diet, for eight days (Binford, 2012; Fumagalli et al., 2015) (Table S1). The Inuit do not only eat meat from maritime and terrestrial animals (Arendt, 2010; Zutter, 2009), and there were three instances during the eight-day diet that M.I.E. ate fruit, vegetables, or carbohydrates (Table S1).

Raw material collection did not begin until day four, and then proceeded regularly for the next five days (Table S1). Fecal samples were formed into knives using ceramic molds, “knife molds” (Figs. S1–S2), or molded by hand, “hand-shaped knives” (Fig. S3). All fecal samples were stored at −20 °C until the experiments began.

We procured pig hide, muscle, and tendons, and these were also stored at −20 °C until two days before the experiments began, at which point we allowed them to begin thawing at 4 °C. Minutes prior to the experiment, both the “knife mold” samples and the “hand-shaped knives” were removed from the laboratory freezer and further sharpened with a metal file (Fig. S4). The knives were then buried for several minutes in −50 °C dry ice to ensure they were sufficiently frozen before any attempt at slicing. The study was approved by the Institutional Biosafety Committee at Kent State University.

3. Results

We began our cutting experiments with the hide, reasoning that if our knives could not cut hide, then subsequent attempts with muscle and tendons would be futile.

Neither the “knife mold” samples, nor the “hand-shaped knives” could cut through hide (Figs. S5–S6). Despite the hide being cold from refrigeration, instead of slicing through it the knife-edge simply melted upon contact, leaving streaks of fecal matter (Fig. S4).

We repeated the experiment using the fecal samples of another team member (M.R.B.), whose diet was more traditionally Western (see supplementary online materials). The “hand-shaped knives” were subject to the same procedures and temperatures as the first set of knives (Figs. S7–S8). However, these knives also did not cut through the hide. For curiosity's sake, we tried to cut the subcutaneous fat on the underside of the hide. With some difficulty, only the shallowest of slices could be produced, and the knife-edge still quickly melted and deteriorated (Fig. S9).

4. Discussion

Countless ethnographic, archaeological, and experimental observations robustly support the narrative that indigenous and prehistoric people are technologically resourceful, innovative, and savvy (Derex et al., 2019; Oswalt, 1976; Thomas et al., 2017; Williams et al., 2019). It is thus unsurprising that an ethnographic account consistent with this narrative – an Inuit person extemporaneously fashioning a knife out of his own frozen feces to survive the arctic night – has been so widely and positively transmitted. Our experiments, however, tested the technological basis necessary to support that account, and our results suggest that knives manufactured from frozen human feces are not functional. Our results should be considered in light of our use of −50 °C temperatures; a metal file to sharpen the blades; and a cold, hairless hide rather than a warm, hair covered hide, the latter representative of a fresh kill. In other words, we gave our knives the best possible chance to succeed and they still could not function.

While future experiments may introduce the prospect of different diets, it is unlikely that this would have a significant impact. Our butchery occurred in a room with a temperature of approximately 10 °C, and thus future experiments might examine colder contexts. We suspect this will also fail to yield different results than those presented here, as the time between the removal of a blade from the dry ice and the slicing of meat was instantaneous. The use of saliva to sharpen a frozen fecal blade, as the original account describes (Davis, 1998), might also be examined. However, based on the work of McCall and Pelton (2010), we are skeptical that saliva will increase fecal blade efficacy. They (McCall and Pelton, 2010: 103) recently examined the possibility that, rather than flaking and chipping stone into butchery tools, humans in cold regions flaked and chipped ice. While these researchers' experiments demonstrated that ice could be fractured into butchery tools somewhat analogous in form to those made from stone, the actual use of such ice tools was ineffective. Their ice knives quickly melted when in contact with heat sources such as their hands, despite the use of gloves. Analogous to our fecal knives, the sharp ice edge also melted in contact with the various objects they tried to cut. Their results preclude the use of ice in environments near or above freezing, cutting objects above freezing, or the tool being used by a human.

Societal narratives and policies are often constructed from anthropological and scientific claims (Grayson and Meltzer, 2003). While the narrative that indigenous and prehistoric people are technologically resourceful and innovative is widely supported, these narratives suffer when an untested claim is used to support it. If one untested claim is used to support a stance – even if that stance is otherwise supported, ethical, or just – then there is no logical reason why a second untested claim cannot then be invoked. The use of untested claims then becomes the norm, and can be used to support stances that are beneficial to society, as well as those that are harmful. Anthropologists must actively seek out unsupported claims, assumptions, rumors, and urban legends, and by testing them ensure any narratives that follow are as sturdy as possible.

Data and materials availability

All data is available in the main text or the supplementary materials.

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Author contributions

Conceptualization: MIE; Investigation: All authors; Methodology: MIE, MRB, MR; Resources: MIE, MRB, MR; Writing: All authors.

Declaration of competing interest

Authors declare no competing interests

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jasrep.2019.102002.

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