

**Measuring tooth pit size to identify carnivore taxa at the early Pleistocene site of
Dmanisi, Georgia**

UROP Spring 2015 Research

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RESULTS:

This project was meant to help determine which carnivore species were most active at the site of Dmanisi, in the country of Georgia by examining tooth mark size to identify the present taxa. Originally my project was to consist of:

1. Casting molds of tooth marks/preparing molds
2. Recording and keeping a database of all molds and casts
3. Examining casts and molds using Lecia GZ 16 microscope to determine width, depth, and length of tooth marks/determining roughness average of toothmarks
4. Analyze and interpret data

Unfortunately, I was not able to complete my project as I had planned. The casting material, and molding material that were necessary for my project were very difficult to obtain. Despite having ordered the materials at the beginning of the semester, the molding materials did not arrive until Week 12 of the semester due to the product being on back order. As of May 7, 2015 the casting materials have yet to arrive.

Therefore, I was only able to work with the few molds that Tappen had made of bones chewed on by a jaguar at the Tbilisi Zoo in Tbilisi, Georgia. This totaled 18 specimens. Only 14 of these specimens could be used. The tooth marks on the 4 excluded specimens were too chaotic to measure. While this reduced the number of available specimens to be analyzed 3 of the molds had distinct differentiated tooth marks that could be analyzed.

Since I was waiting for materials, I was not able to take as many measurements as I had planned. While I had originally stated that I would take width, depth, length, and roughness average measurements, I was only able to take width and length measurements using ImageJ software. These measurements can be found below in Table 1.

Since I was not able to create casts or molds of bones modified by carnivore taxa other than the jaguar, I cannot determine which carnivore species were most active at the site of Dmanisi.

Reflection:

While my UROP experience did not go according to plan, I still learned a lot. Before I began my UROP I was not able to use the Leica microscope and various software programs in the anthropology labs. My UROP allowed me to become familiar with these programs and equipment, and I can now operate them quite skillfully. I was able to undergo the research process, and learn how to conduct research. Ultimately, my UROP experience was very rewarding and enjoyable.

DATA:

Statistics

Width:

N: 19

Min: 0.130mm

Q1: 0.382mm

Average: 2.007mm

Q3: 3.518mm

Max: 5.855mm

σ : 1.800

Length:

N: 19

Min: 1.631mm

Q1: 3.681mm

Average: 6.850mm

Q3: 10.169mm

Max: 13.477mm

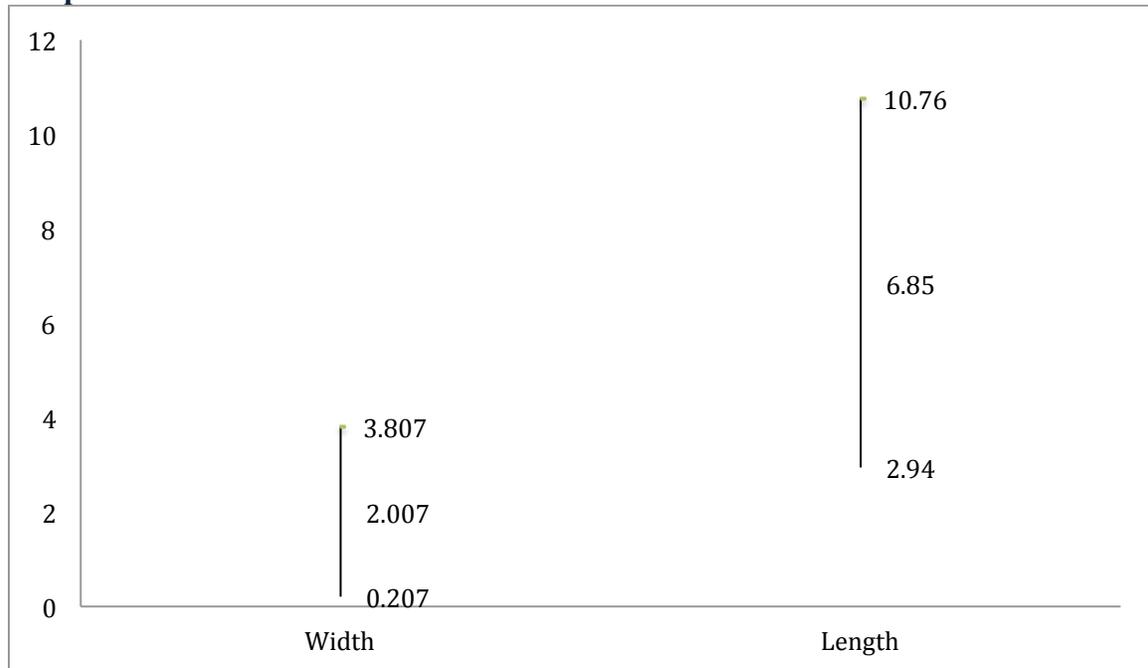
σ : 3.910

Table 1

Specimen	Greatest Width	Greatest Length
GE-10-01	4.943mm	3.681mm
GE-10-02a	3.424mm	3.532mm
GE-10-02b	2.720mm	3.966mm
GE-10-02c	2.617mm	4.147mm
GE-10-02d	3.106mm	3.922mm
GE-10-04	5.855mm	1.631mm
GE-10-06a	2.536mm	3.819mm
GE-10-06b	4.876mm	2.453mm
GE-10-07a	0.518mm	10.169mm
GE-10-07b	0.130mm	7.616mm
GE-10-08	1.338mm	9.175mm
GE-10-11	0.396mm	9.768mm
GE-10-12	0.287mm	7.535mm
GE-10-13	3.158mm	12.461mm
GE-10-14	0.428mm	12.895mm
GE-10-15	0.382mm	5.273mm
GE-10-16	0.218mm	12.256mm
GE-10-17	0.944mm	13.477mm
GE-10-18	0.274mm	2.385mm
AVERAGE	2.007mm	6.850mm

Specimens and their width & length measurements. Specimen numbers followed by a letter indicate one mold that had numerous tooth marks.

Graph 1



Average \pm 1 standard deviation.

REFERENCES:

Delaney-Rivera, C., Tw Plummer, Ja Hodgson, F. Forrest, F. Hertel, and Js Oliver. 2009. Pits and pitfalls: Taxonomic variability and patterning in tooth mark dimensions. *Journal of Archaeological Science* 36 (11): 2597-608.

Merceron, G., G. Escarguel, Jm Angibault, and H. Verheyden-Tixier. 2010. Can dental microwear textures record inter- individual dietary variations? *Plos One; PLoS One* 5 (3).

Merceron, Gildas, Cé Blondel, Michel Brunet, Laurent Viriot, Sevket Sen, Nikos Solounias, and Emile Heintz. 2004. The late miocene paleoenvironment of afghanistan as inferred from dental microwear in artiodactyls. *Palaeogeography, Palaeoclimatology, Palaeoecology* 207 (1-2): 143-63.

Monnier, Gilliane F., and Emily Bischoff. 2014. Size matters. an evaluation of descriptive and metric criteria for identifying cut marks made by unmodified rocks during butchery. *Journal of Archaeological Science* 50 : 305-17.