

Accepted Manuscript

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PII: S1040-6182(17)31542-2

DOI: [10.1016/j.quaint.2018.04.020](https://doi.org/10.1016/j.quaint.2018.04.020)

Reference: JQI 7381

To appear in: *Quaternary International*

Received Date: 1 December 2017

Revised Date: 29 March 2018

Accepted Date: 8 April 2018

Please cite this article as: Holt, S., Codron, D., Horwitz, L.K., Bone mineral density in the leopard tortoise: Implications for Inter-Taxon variation and bone survivorship in an archaeozoological assemblage, *Quaternary International* (2018), doi: 10.1016/j.quaint.2018.04.020.

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1 **Bone Mineral Density in the Leopard Tortoise: Implications for Inter-Taxon Variation**
2 **and Bone Survivorship in an Archaeozoological Assemblage**

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16 **Abstract**

17 In this study we present data on bone mineral density (BMD) values for the leopard tortoise
18 (*Stigmochelys pardalis*). We found significant inter and intra-skeletal variation in different
19 values of BMD within this species. The intra-skeletal, but not inter-skeletal pattern, was
20 comparable to that of terrestrial mammals of similar size, despite differences in bone
21 structure. Overall, the tortoise has bone density that is intermediate between that of leporids
22 (rabbits/hares) on the one hand and canids (dogs/wolves etc.) and marmots on the other. In
23 this study we have used random effects to test regression models of BMD and demonstrate
24 their value over the simple linear regression models that are currently in use.

25 Finally, we applied the modern leopard tortoise proxy data to test whether different
26 parameters of BMD impact survivorship of tortoise bones in the Holocene strata from
27 Wonderwerk Cave (Northern Cape Province, South Africa). Results indicate that this
28 assemblage has undergone some degree of bone density-mediated attrition, probably
29 influenced by burning and deposition time rather than animal agents.

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