

Bone histology of the graviportal dinocephalian therapsid *Jonkeria* from the middle Permian *Tapinocephalus* Assemblage Zone of the Karoo Basin of South Africa

Mohd Shafi Bhat, Christen D. Shelton, and Anusuya Chinsamy

Acta Palaeontologica Polonica 66 (4), 2021: 705-721 doi:<https://doi.org/10.4202/app.00872.2021>

Here we examine the bone histology of multiple skeletal elements of three individuals of *Jonkeria* from the middle Permian *Tapinocephalus* Assemblage Zone of the Karoo Basin of South Africa. Our histological results reveal a predominance of highly vascularized, uninterrupted fibrolamellar bone tissue, which suggests rapid periosteal bone deposition and an overall fast growth. However, in a rib, the periosteal bone deposition periodically stops abruptly, resulting in the deposition of several lines of arrested growth. The absence of bone growth marks in the limb bones (except for an annulus in a radius) suggests a young ontogenetic status for all specimens of the studied sample. All the skeletal elements are characterized by thick bone walls, extensive secondary reconstruction and the complete infilling of the medullary cavity by bony trabeculae. The latter condition is different to observations of contemporaneous graviportal terrestrial pareiasaurs, but similar to the observations in the modern semi-aquatic *Hippopotamus*, and suggests a possible semi-aquatic lifestyle for *Jonkeria*. On the basis of our histological findings, we assert that during early ontogeny *Jonkeria* experienced rapid sustained rates of growth, whereas later in ontogeny they experienced cyclical rates of growth.

Key words: Therapsida, Synapsida, bone microstructure, middle Permian, Beaufort Group, Abrahamskraal Formation, South Africa.

Mohd Shafi Bhat [shafialig@gmail.com] and Anusuya Chinsamy [anusuya.chinsamy-turan@uct.ac.za], Department of Biological Sciences, University of Cape Town, Private Bag X3, Rhodes Gift 7701, South Africa. Christen D. Shelton [cshelton@rsu.edu] Department of Biological Sciences, University of Cape Town, Private Bag X3, Rhodes Gift 7701, South Africa; current address: Biology/Mathematics & Physical Science Departments, Rogers State University, Claremore, OK 74017-3252, USA and Natural History Department, New Jersey State Museum, Trenton, NJ 08625-0530, USA.

This is an open-access article distributed under the terms of the Creative Commons Attribution License (for details please see creativecommons.org), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

 [Full text \(4,971.3 kB\)](#)