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Emily Anderson

Matthew A. McLain
The Master's University

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DOES THE FOSSIL RECORD OF NON-MAMMALIAN SYNAPSID DIGITS SHOW AN INCREASING “MAMMAL-NESS?”

Emily Anderson, and **Matthew A. McLain**, The Master’s University, 21726 Placerita Canyon Road, Santa Clarita, California 91321 emilyanderson2122@gmail.com, and mmclain@masters.edu

ABSTRACT

Non-mammalian synapsids (NMS) are a group of extinct amniotes present in the Carboniferous-Cretaceous geologic systems. NMS are recognized by evolutionary scientists as transitional forms between reptile-like animals and mammals, and are thought to increase in mammal-like characteristics as they progress through the fossil record, especially among the six therapsid subtaxa. Given that Scripture is clear that God created many independent kinds of land animals (Genesis 1:20-25), we sought to investigate the currently accepted evidence which is used to support the claim that NMS are transitional forms. In this study we focused on the NMS hands and feet, which have been argued to show a transition from a reptilian to a mammalian digit formula. Amniotes are thought to plesiomorphically possess a 2-3-4-5-3 hand (manus) digit formula and a 2-3-4-5-4 foot (pes) digit formula, whereas most mammals possess a 2-3-3-3-3 manus and a 2-3-3-3-3 pes. Various NMS are known to possess the reptilian, mammalian, or even completely unique digit formulae. Previous research done in this area focused on explaining NMS digit formula patterns with phylogeny, whereas we took a stratigraphic approach. To understand how NMS digits correlated with stratigraphy, we analyzed the literature and put taxa and digit characteristics in stratigraphic bins. We found that each therapsid group independently shows mammal-like digits at some point in the geologic record (minus Biarmosuchia). The mammalian condition is present in most therapsid groups with nearly their first appearance in the fossil record (minus Cynodontia). There is a lack of progression within the stratigraphic record to the mammalian digit condition in most therapsid subtaxa. These findings put into question traditional, evolutionary perspectives on the NMS acquisition of mammalian digits. Our data would suggest the rejection of the current premise that NMS show an evolutionary transition from reptile-like animals to mammals in their manual and pedal digits. However, we do not yet understand why there is such great variability in digit formulae among the NMS, which we think would be a promising research area.

KEYWORDS

Non-mammalian synapsid, mammal, digits, stratigraphy, paleontology

THE AUTHORS

Emily Anderson graduated from The Master’s University with a B.S. degree in Biology, emphasizing in Environmental Biology and Paleontology.

Matthew McLain is Associate Professor of Biology and Geology at The Master’s University in Santa Clarita, CA, where he teaches courses on paleontology, biology, and geology. He has a BS in Geology (Cedarville University) and a PhD in Earth Sciences (Loma Linda University). He is president of the Creation Biology Society and has published paleontology papers in both the conventional and creationist literature.