we focus on turbinates which are scrolls of bone in the nasal cavity covered to varying degrees in either respiratory or olfactory epithelium. These turbinates are then often used as proxies for the relative importance of either function. Unfortunately, turbinates are rarely preserved and have never been described in detail for a fossil sciuroid, limiting the degree to which we understand nasal anatomy evolution within this diverse group. Here, we present both modern sciuroid turbinate anatomy as well as the first description of well-preserved turbinates in a fossil representative. We used micro-CT scan data to digitally extract and compare extant sciurioids (n = 22) and reconstructed ancestral turbinate number and relative size at each major internal node. We describe the anatomy of the Orellan aplodontiid rodent, *Prosciurus relictus* (USNM PAL 437793) from the Oligocene White River Formation. We found that this taxon preserves two frontoturbinates, four ethmoturbinates, one interturbinate and a branching maxilloturbinate. This turbinate count is consistent with our ancestral state predicted by our modern sample of sciuroids. However, *Prosciurus* differs from its closest extant relative, the aplodontiid *Aplodontia*, in lacking the highly arborized respiratory turbinates that characterize this taxon. *Prosciurus* further differs from *Aplodontia* in lacking the dorsoventrally compressed olfactory turbinates observed in the modern taxon. We also find that while there is considerable variation in turbinate morphology and size, this clade is remarkably consistent in turbinate number, which differs from other well described groups that share similarly varied ecological strategies (e.g. strepsirrhine primates). When testing for disparity in relative olfactory or respiratory turbinate surface areas along ecological variables, there were no significant differences among extant sciuroids when grouped by either locomotor mode or activity pattern. Those results demonstrate that turbinate numbers within sciuroids are relatively constant while morphology and relative size vary. Even though the ecological pressures driving this increase in size remain unclear, future work will investigate the impact of other factors such as diet.

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Technical Session 11: Synapsida (Friday, November 4, 2022, 8:00 AM)

INCONGRUENCE OF MORPHOLOGICAL DISPARITY AND EVOLUTIONARY RATE IN THE FORELIMBS OF PALEOZOIC SYNAPSIDS

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Previous work has shown increased morphological variance within the forelimbs of the Permian synapsid group known as Therapsida over that of their Carboniferous and early Permian forerunners ("pelycosaurs"). Considering that disparity trends have been known to point to underlying macroevolutionary transitions, here we analyzed morphological variance alongside several additional macroevolutionary metrics to better isolate possible evolutionary mechanisms. Shape data was collected on a sample of 119 humeri and 99 ulnae comprising three major synapsid radiations with a temporal range from the Carboniferous into the Triassic. Taxonomic sample included all major groups of pelycosaur-grade synapsids, all five recognized non-cynodontian therapsid clades, and a sample of pre-prozostrodontian cynodonts. Procrustes variance - a multivariate quantification of morphospace occupation - was the chosen disparity metric for the study. Rate of phenotypic change, which considers the amount of shape change that would be necessary to achieve observed morphologies given the shape of the closely related taxa, was analyzed as the metric for evolutionary rate. Both metrics were considered through-time upon genera present in sequential 5 million year time bins.

Our results expand upon previous findings that disparity increases throughout the earliest stages of the Permian, coincident with the diversification of pelycosaurs and the emergence of Therapsida. This expanded dataset further shows that disparity approaches an asymptote around 270 million years ago and only increases marginally through the late Permian, remaining between 0.018–0.021 from 275-245 mya. In contrast, evolutionary rate does not appear to asymptote during this same interval, starting at a low of 6.17e-6 (300 mya) and increasing to a peak of 1.78e-5 right before the End Permian Mass Extinction Event (252 mya). The continuing increase of evolutionary rate shows that morphological change continues across taxa, but the plateauing of morphological disparity suggests that morphospace is not expanding concurrent with this. The incongruence between these two metrics suggests a critical change in evolutionary mode, wherein morphological change continues rapidly but does not result in the evolution of novel morphologies. These results provide some of the strongest quantitative data yet of an evolutionary constraint acting upon the morphology of the synapsid forelimb through deep time.

Funding Sources NSF grant DEB-1754502

Regular Poster Session 4 (Saturday, November 5, 2022, 4:30 - 6:30 PM)

POPULATION VARIATION AND BIOGEOGRAPHY OF EXTINCT SPECIES OF RODENTS FROM THE ISLAND OF HISPANIOLA

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The island of Hispaniola is the center of the speciation of rodents within the Caribbean; however, most species have