POSTER 98

TRIGEMINAL NERVE MORPHOLOGY IN THE AMERICAN ALLIGATOR: IMPLICATIONS FOR INFERING SENSORY POTENTIAL IN EXTINCT SPECIES

Ian George, M.S. (Graduate Student)

Jong-In P. Kim (Undergraduate Student)

(Casey Holiday, PhD)
Department of Pathology and Anatomical Sciences

Among the many adaptations of modern crocodilians, one of the most intriguing is their derived sense of face touch, in which numerous trigeminal nerve-innervated dome pressure receptors speckle the face and mandible and sense vibrations and other mechanical stimuli, directing the animal towards, or away from stimuli. However, the morphological features of this system are not well known, and it remains unclear how aspects of the trigeminal system change during ontogeny and how they scale with other cranial and nervous structures.

A cross-sectional study integrating histological, morphometric, and 3D imaging analyses was conducted to identify patterns in cranial nervous and bony structures of the American Alligator (*Alligator mississippiensis*). Nine individuals from a broad size range were CT-scanned followed by histomorphometric sampling of mandibular and maxillary nerve divisions of the trigeminal nerve. Endocast volume (a proxy for brain size), trigeminal fossa volume, and maxillomandibular foramen size were compared with nerve counts from proximal and distal regions of the trigeminal nerves in order to identify scaling properties of the structures.

The trigeminal fossa has a significant positive correlation with skull length and endocast volume. Nerve fiber density is greater in smaller alligators and total nerve count has a significant negative correlation with skull size. These variables were then collect from several fossil crocodilians from differing habitats to test for ecomorphological significance. These findings are important for not only understanding sensory evolution in living crocodilians but also for predicting sensory potential in fossil taxa.