

Laryngeal vocals in old world locals: air sacs usage in bonobos

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Except for humans, extant great apes have evolutionarily conserved lateral ventricular air sacs extending from laryngeal saccules. Humans are the only species of Hominidae that lack this anatomical feature attached to the primary vocal apparatus. As we are the only species that produces spoken language, this association has led to hypothesis that the loss of lateral ventricular air sacs was necessary for the evolution of spoken language. However, why these sacs are conserved in all other hominids remains unclear. Computer modeling has indicated that air sacs may increase resonance properties, but there are no data from great apes indicating which vocalizations include the use of air sacs during their production. Previous studies are of radiological imaging, not apes actively vocalizing. In this project, we are gathering data on when great apes inflate laryngeal air sacs through noninvasive imaging during vocal production in bonobos (*Pan paniscus*). We are using high-speed digital audio/video recordings, frame-by-frame image analysis of the region of interest, and the difference in area between resting and vocalizations. We will then quantify and temporally correlated the inflation of laryngeal air sacs for multiple call types. These methods should be reproducible in a variety of settings, enabling data collection to test hypotheses regarding the putative function of laryngeal air sacs in extant great apes. Augmenting our understanding of the conservation of laryngeal are sacs in non-human great apes will strengthen hypotheses related to the loss of these sacs in humans and its relevance for the evolutionary origin of language.