

## Of humans and alligators

Our larynx (voice box) is a very complicated structure. The human voice is created when lung pressure increases and air is pushed through the larynx. An array of complicated movements inside the larynx moves vocal folds towards each other and stretches them. Almost like the string on a stringed instrument, human vocal cords (vocal folds) are elongated and shortened to achieve different tension and thereby distinctive oscillation frequencies, which result in the perceived pitch of our voice. However, larynges of different animals show different degrees of complexity. A study was conducted in which vocal production in American Alligators (*Alligator mississippiensis*) was examined.



Alligators possess a complex vocal repertoire yet Alligators don't have the option to stretch their vocal folds the way humans do. So how does an alligator achieve their pitch modulation? This was the question asked by National Center for Voice and Speech researchers and their colleagues. Dr. Tobias Reide answered, "that leaves them with only two options: changing lung pressure and changing how pressed together their vocal folds are."

The researchers investigated the relation between these variables (lung pressure and laryngeal resistance from vocal fold closure) and the voice pitch in live young alligators while they were calling. They also investigated the morphology of the alligator larynx by dissection and computer tomography.

Lung pressure variations alone did not explain fundamental frequency variations, the researchers found. Implementing physiological and morphological data in a computer model suggested that a fine-tuned interplay between lung pressure variations and vocal fold adduction is necessary to produce alligator sounds.

The alligator larynx represents an evolutionary early version of a larynx. Despite its limited flexibility, the evolved features allow it to produce a rather complex vocal repertoire. Future studies will have to identify specific adaptations which allow the alligators to make rather complex sounds with a larynx of limited flexibility. For example, ongoing investigations will look at the morphology and viscoelastic properties of alligator vocal folds to see if they help in facilitating the enormous frequency modulations.

To learn more about Alligators and their vocal folds read "Subglottal pressure and fundamental frequency control in contact calls of juvenile *Alligator mississippiensis*" by Tobias Riede, Isao T. Tokuda, and C. G. Farmer which can be found [here](#). Or contact the National Center for Voice and Speech to talk to the researchers about their work.

### National Center for Voice and Speech

136 South Main Street, Suite 320, Salt Lake City, Utah 84101-1623  
PH: 801-596-2012 / FAX: 801-596-2013 / [www.ncvs.org](http://www.ncvs.org)