

Individual Subject Laryngeal Dimensions of Multiple Mammalian Species for Biomechanical Models: A Supplement

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This memo serves as a supplement to the papers: E. J. Hunter & I. R. Titze. A Technical Note: Individual Subject Laryngeal Dimensions Of Multiple Mammalian Species for Biomechanical Models. Ann.Otol.Rhinol.Laryngol. (In Review) and M. J. Kim, E. J. Hunter, & I. R. Titze. Comparison of human, canine, and ovine laryngeal dimensions. Ann.Otol.Rhinol.Laryngol. 113 (1):60-68, 2004. While the Kim et al. paper did a necessary comparative study of the cartilages and introduced a systematic landmark labeling system, it only reported the average dimensions and standard deviation of the cartilage sizes; individual subject data were not given. Individual subject data are becoming increasingly important as biomechanical models increase in complexity and move from a generic representation to a model of specific functions (normal and/or abnormal) in a specific larynx. Thus, more detailed anatomy would be needed to verify current models and is presented in Hunter and Titze (in review). This memo supplements those papers by providing the data tables in electronic spreadsheet form for easier implementation by the reader. The tables (found in a compressed file containing multiple Excel spreadsheet files), as well as updates to this memo, can be downloaded at <http://www.ncvs.org/ncvs/library/tech>.

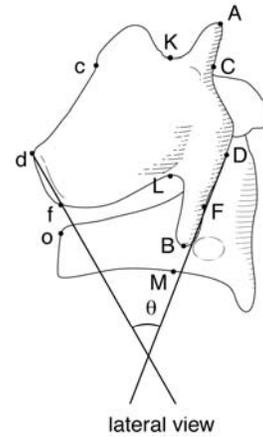
Keywords: laryngeal skeleton, geometric measurement, ovine larynx, thyroid cartilage, cricoid cartilage, arytenoid cartilage, subject specific data.

Hunter & Titze: Individual Subject Laryngeal Dimensions of Multiple Mammalian Species...

Introduction

Understanding the morphology of the laryngeal framework is a crucial step in mapping laryngeal function of both human and animals. It is also a necessary step toward quantitative biomechanical modeling of voice disorders, which requires accurate dimensions of all structures of the larynx. Particularly important is dimensions of those structures which describe function in mechanical terms (e.g., laryngeal muscle orientation, cartilage length/width, and joint size/range).

Measures of the individual subjects (i.e., the human male, human female, canine, and ovine) were listed for cartilage measures of the thyroid [File: *Thyroid-human.xls*, *Thyroid-canine.xls*, *Thyroid-ovine.xls*, or all in one file, *Thyroid-All.xls*], cricoid [File: *Cricoid-human.xls*, *Cricoid-canine.xls*, *Cricoid-ovine.xls*, or all in one file, *Cricoid-All.xls*], and arytenoid [Files: *Arytenoid-human.xls*, *Arytenoid-canine.xls*, *Arytenoid-ovine.xls*, or all in one file, *Arytenoid-All.xls*]. In all of the files, averages and



lateral view
Figure 1. Schematic of the definitions of measurements on the laryngeal cartilages.

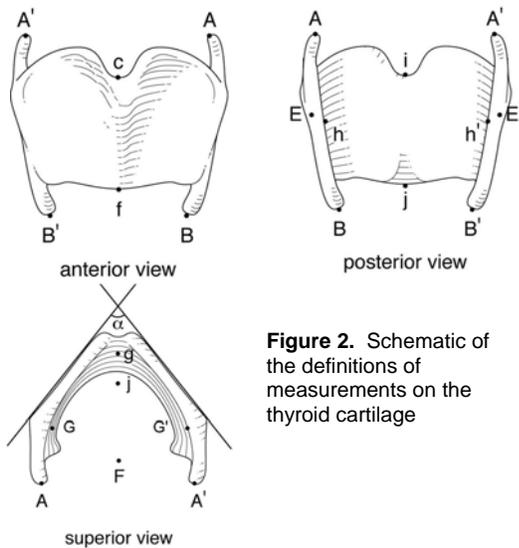


Figure 2. Schematic of the definitions of measurements on the thyroid cartilage

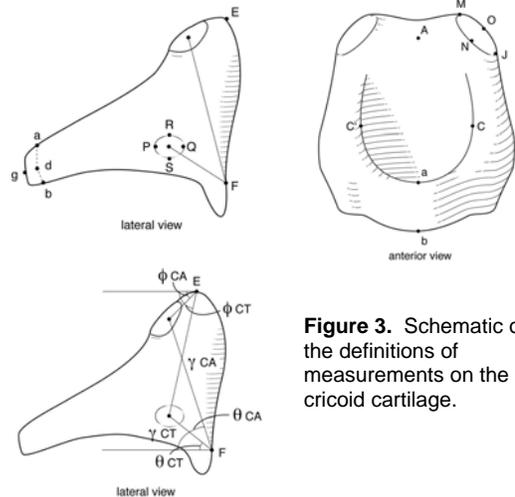


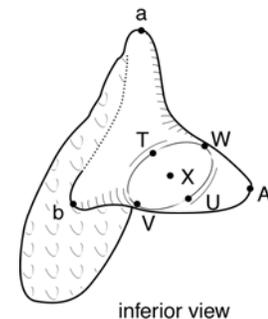
Figure 3. Schematic of the definitions of measurements on the cricoid cartilage.

standard deviations across all measures for a Table (and thus a species) were also listed. All distance measures listed in the tables are in millimeters, and all angle measures are in degrees.

References

M. J. Kim, E. J. Hunter, and I. R. Titze. Comparison of human, canine, and ovine laryngeal dimensions. *Ann.Otol.Rhinol.Laryngol.* 113 (1):60-68, 2004.

E. J. Hunter & I. R. Titze. A Technical Note: Individual Subject Laryngeal Dimensions Of Multiple Mammalian Species for Biomechanical Models. *Ann.Otol.Rhinol.Laryngol.* (in review)



inferior view
Figure 4. Schematic of the definitions of measurements on the arytenoid cartilage.

Acknowledgements

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Revisions

1.0 Eric Hunter, main content and formatted (Feb-2005)