



# Laryngograph

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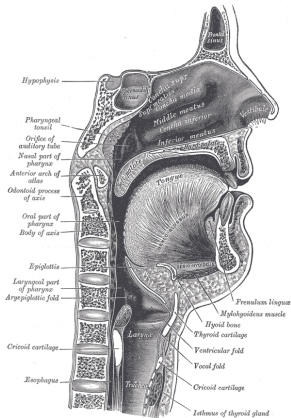
# Introduction



Laryngograph

The glottis

The  
Laryngograph



## The vocal tract

The glottis is positioned in the larynx

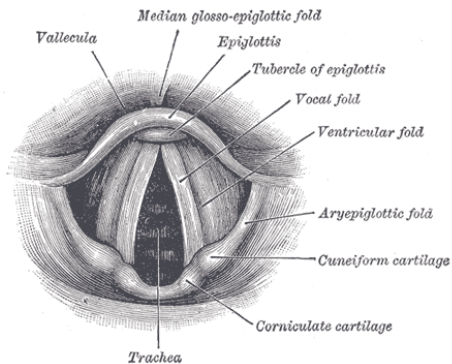
# View on the glottis



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The vocal folds

The vocal folds vibrate during voiced speech.

# Vocal fold vibrations



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The glottis

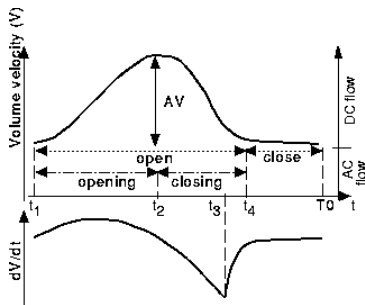
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<ext> Source: YouTube <http://www.youtube.com/watch?v=v9Wdf-RwLcs>

Sound generation

Stroboscopic recordings of the vocal folds during voicing



## Glottal flow during phonation

Figure 13. Schematic description of a glottal waveform  $U_g$  and its time derivative (after: Hanson, 1996:11; Sluijter, 1995: 97). The following abbreviations are used:  $T_0$  - duration of the pitch period,  $t_1$ -begin of the airflow,  $t_2$ - instant of the maximum glottal flow of the amplitude  $AV$  through the glottis,  $t_3$ - moment of the glottal closure and maximum change of glottal flow,  $t_4$  - instant of complete glottal closure.

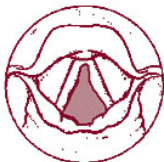
# Measuring vocal fold vibrations



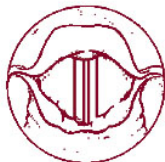
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**Vocal cords  
abducted  
to breathe**



**Vocal cords  
adducted  
to speak**

During phonation, the vocal folds open and close

The air in the wind-pipe does not conduct electricity. Closed focal folds conduct electricity. This change in resistance can be measured with contacts on the throat.

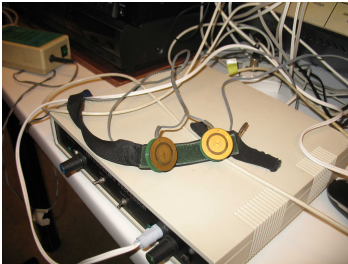
# Using the Laryngograph



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Laryngograph and placement of the contacts

The metal contacts are placed on the sides of the larynx (wind-pipe) at the height of the glottis.

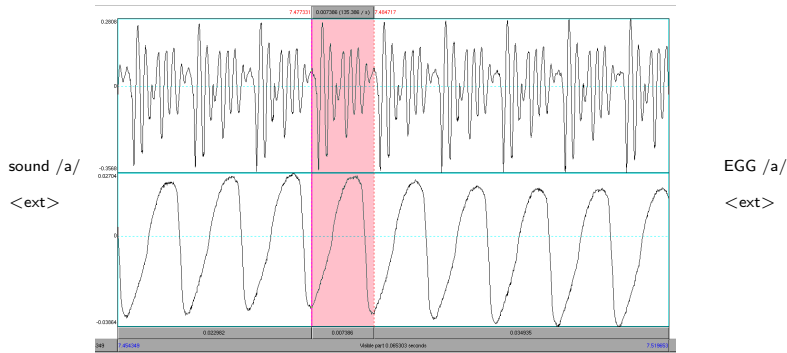
# Electro Glotto-Gram



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Laryngograph signal (bottom) for a sustained /a/ (top)

The indicated segment corresponds to one open-closed cycle of the vocal folds. Note the position of the start and end of the cycle in the sound.



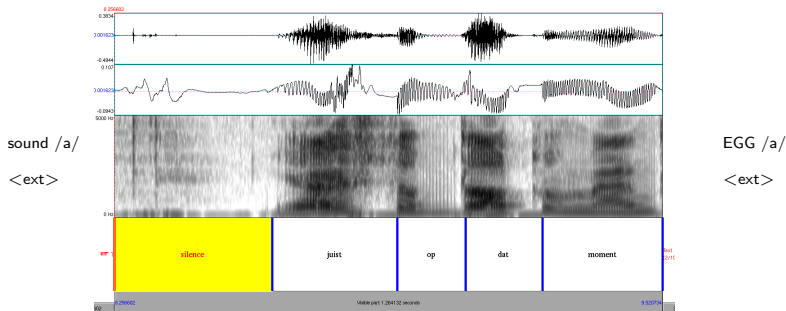
# EGG of running speech



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Story reading: fragment of “The North wind and the Sun”

Larynx movements are visible as non periodic signals.

E.g., to the left: sound of opening of the mouth and inhaling, possibly larynx lowering