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Effects of inhalatory abdominal wall movement on vertical laryngeal position during phonation

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The configuration of the body resulting from inhalatory behaviour is sometimes considered a factor of relevance to voice production in singing and speaking pedagogy and in clinical voice therapy. The present investigation compares two different inhalatory behaviours; 1) with a “paradoxical” inward movement of the abdominal wall, and 2) with an expansion of the abdominal wall, both with regard to the effect on vertical laryngeal position during the subsequent phonation. Seventeen male and 17 female healthy, vocally untrained subjects participated. No instructions were given regarding movements of the rib cage. Inhaled air volume as measured by respiratory inductive plethysmography, was controlled to reach 70% inspiratory capacity. Vertical laryngeal position was recorded by two-channel electroglottography during the subsequent vowel production. A significant effect was found; the abdomen-out condition was associated with a higher laryngeal position than the abdomen-in condition. This result apparently contradicted a hypothesis that an expansion of the abdominal wall would allow the diaphragm to descend deeper in the torso, thereby increasing the tracheal pull, which would result in a lower laryngeal position. In a post-hoc experiment including six of the subjects, the body posture was studied by digital video recordings, revealing that the two inhalatory modes were clearly associated with postural changes affecting laryngeal position. The “paradoxical” inward movement of the abdominal wall was associated with a recession of the chin towards the neck, such that the larynx appeared in a lower position in the neck, for reasons of a postural change. The results suggest that the laryngeal position can be affected by the inhalatory behaviour if no attention is paid to posture, implying that instructions from clinicians and pedagogues regarding breathing behaviour must be carefully formulated and adjusted in order to ensure that the intended goals are reached.