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Influence of Supraglottic Swallow on Swallowing Kinematics

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Objective
This study was conducted to evaluate the influence of supraglottic swallowing maneuver on swallowing kinematics using kinematic analysis of a videofluoroscopic swallowing study (VFSS).

Method
Twenty healthy volunteers (10 in a young group (< 40 years) and 10 in an elderly group (≥60 years)), participated in this study. After structured instruction by a skilled physician, the subjects swallowed 5 ml of diluted barium in the neutral position without any swallowing maneuvers, as well as with supraglottic swallow maneuver under digital videofluoroscopy, three times each. Kinematic analysis was conducted by digitization of video files for movements of hyolaryngeal structures, including the hyoid bone, larynx, arytenoid, and epiglottis. We measured the maximum displacements and velocities of the hyolaryngeal structures during swallowing.

Result
The most remarkable change in supraglottic swallow was the maximum vertical displacement (mm) of the hyoid bone during swallowing in both groups (11.5±3.34–19.7±6.88 in the young group, P=0.009; 13.4±2.13-22.8±5.35 in the elderly group, P < 0.001). For velocity variables, patterns of change differed between the young and elderly groups. In the young group, the maximum vertical velocities of the larynx and arytenoid were decreased (P < 0.05), but in the elderly group, the maximum 2D velocity of hyoid bone, maximum horizontal and 2D velocity of the larynx and maximum horizontal velocity of the arytenoid were increased (P < 0.05). There were no significant differences in changes between the young and elderly groups.

Conclusion
This study showed that supraglottic swallow could affect hyolaryngeal movements, particularly vertical hyoid movement, during swallowing. Beneficial kinematic changes in supraglottic swallow were more pronounced in the elderly group. Therefore, supraglottic

swallow may contribute to swallowing improvement by enhancing hyolaryngeal movements during swallowing, in addition to laryngeal closure.