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Influence of Nasogastric Tube on Swallowing Saliva in Stroke Patients measured with Ultrasonography

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Objective
To investigate the influence of nasogastric tubes (NGT) on swallowing saliva in stroke patients

Methods
Three groups of participants were enrolled into the study : group A (20 stroke patients with NGT), control group B (25 stroke patients without NGT), or group C (25 healthy adults). Patients in group A were tested twice; with NGT (group A-1) and after NGT were removed (group A-2). The distance of the hyoid bone movement was measured by subtracting the shortest distance between the mandible and hyoid bone (S) from the distance at resting state (R) with ultrasonography. The degree of the movement was calculated by (R-S)/R. The trajectory area of the hyoid bone movement (Area) and the interval between the initiation of hyoid bone movement and the moment of the shortest hyoid-mandible approximation (Interval) were calculated by computer program.

Results
Within group A, R-S and (R-S)/R of group A-2 (1.14±0.36 cm and 0.30 ± 0.09) were significantly greater than those of group A-1 (0.81±0.36 cm and 0.22 ± 0.08), (p= 0.009 and 0.005). After removing NGT as seen in group A-2, R-S and (R-S)/R were improved to the level of those of group B (1.2±0.32 cm and, 0.30±0.09), (p=0.909 and 0.997). Area of group A2 was larger and Interval of group A2 was shorter than those of group A1 without statistical significance.

Conclusion
NGT interferes with the movement of the hyoid bone during swallowing 1 mL of water in stroke patients and it is restored after removing NGT.

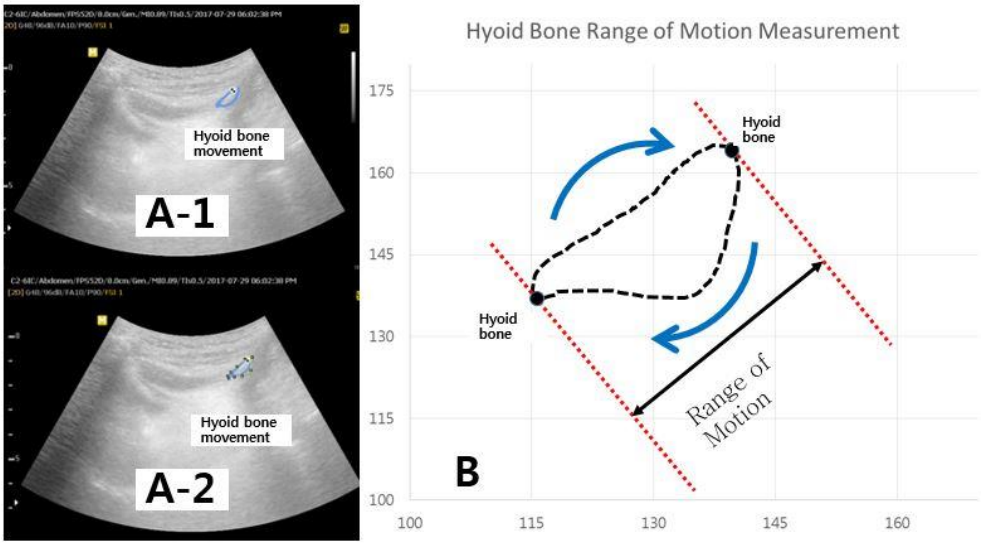
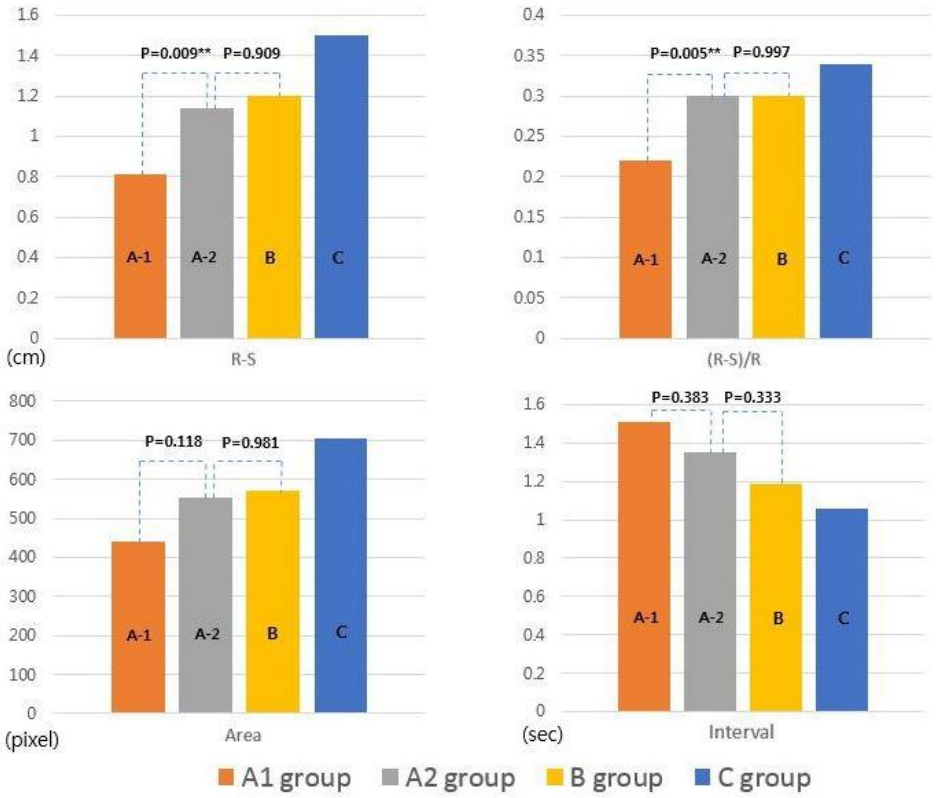


Fig. 1 The range of the hyoid bone movement depicted by a tracer marker at the ultrasonography video taken using a KINVOVEA program 0.8.15 (microanalysis for video) (A-1). The marked range of motion was then measured in pixel units using image J, an image processing and analysis program (A-2). Illustration of the range-of-motion measurement for a hyoid bone trajectory.(B) The illustration shows a hyoid bone trajectory (in black) over a single swallow. The initial resting position of the hyoid is marked with the black circle. The blue arrow shows the direction of motion for the trajectory. The range-of-motion measurement is made by finding the largest displacement between any two points on the hyoid bone trajectory during the swallow. (red dots)



Comparison of ultrasonographic findings in Group A-1, A-2, B and C