

Evaluation of masticatory performance by motion capture analysis of jaw movement

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Abstract

Background:

The assessment of masticatory performance (MP) is conducted in hospitals, but is difficult to perform in nursing facilities that lack specialists in dysphagia. To select the appropriate food textures in nursing practice, a simple method of evaluating the MP should be developed.

Objective:

The purpose of this study was to investigate motion parameters that influence MP by motion capture analysis of maxillofacial movement on chewing gummy jelly in healthy adults.

Methods:

The subjects were 50 healthy adults. The state of chewing gummy jelly was photographed using a high-speed camera. Simultaneously, we evaluated the amount of glucose extracted (AGE) obtained with gummy jelly as a reference value for MP. The subjects were divided into two groups: normal and low masticatory groups (NG and LG, respectively) based on the AGE. The cycle of mastication was classified into 3 phases: closing phase (CP), transition phase (TP), and opening phase (OP) through motion capture analysis of the video photographed. Parameters of jaw movement, and their associations with the AGE were examined.

Results:

The transition phase rate (TR), and opening phase rate (OR) were correlated with the AGE. Furthermore, the TR in the NG was significantly higher than in the LG, whereas the OR was significantly lower than in the LG. The age, TR, and Opening velocity were significant independent variables.

Conclusion:

Motion capture technology facilitated the analysis of jaw movement. The results suggested that MP can be evaluated by analyzing the TP and OP rates.