Comparison of orbicularis oris muscle strength and endurance in young and elderly adults

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Abstract. [Purpose] The purpose of this study was to compare the strength and endurance of the orbicularis oris muscle in healthy Korean (young vs. elderly adults). [Participants and Methods] A total of 60 participants (30 young adults and 30 elderly adults) were recruited. The Iowa Oral Performance Instrument was used to measure orbicularis oris muscle maximal strength and endurance. [Results] Elderly adults showed significantly lower orbicularis oris muscle strength and endurance than younger adults. [Conclusion] This study confirmed a significant age-related decrease in orbicularis oris muscle strength and endurance. The data collected will be useful as a basis for future on speech and swallowing therapy.

Key words: Endurance, Orbicularis oris muscle, Strength

INTRODUCTION

The orbicularis oris muscle (OOM) is the muscle located in the lower part of the face and is responsible for the shape and movement of the lips. The OOM plays a role in speaking and swallowing, so it is essential to maintain proper strength and endurance1). However, since these muscles are skeletal muscles, they are affected by aging like limb muscles. In other words, aging causes a decrease in strength and endurance in the OOM2). Decreased muscle strength and lowering of endurance of the OOM affect pronunciation, and cause difficulty in lip closure during swallowing. As a result, food may leak out of the mouth and cause a reduction in intraoral pressure during swallowing. These two events result in an overall difficulty in swallowing. Therefore, it is important to maintain strength and endurance of lips in elderly adults. Measuring the strength and endurance of OOM in young adults can help understand how much aging may affect the same in the elderly adult population. The purpose of this study was to determine the difference in the OOM strength and endurance of young and elderly adults by comparing them.

PARTIPICANTS AND METHODS

This study recruited 30 young adults (men: 15, women: 15, age range: 20–35, average: 25.5) and 30 people aged 65 years or older (men: 15, women: 15, age range: 65–72, average: 67.2). The criteria for participation were as follows: 1) a person with no structural or functional problem in speech and swallowing, 2) a person who can communicate properly, 3) a person without any neurological disease, 4) a non-smoker, and 5) a person with proper lip movement. Informed consent for participation was obtained by following the principles of the Declaration of Helsinki.

This study used the Iowa Oral Performance Instrument (IOPI) for OOM muscle strength and endurance measurements.

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The techniques used were the same as those used in previous studies\textsuperscript{1, 2}. First, a rubber bulb, which acts as a pressure sensor for the IOPI, was placed between the disposable tongue depressor. Second, the participant put the tongue depressor in the mouth with the lips protruded. Third, the participant pressed on the bulb through the lip closure. Muscle strength was measured three times consecutively and the mean was recorded. Muscle endurance was measured only once. The statistical analyses were performed using SPSS version 15.0 (IBM Corporation, Armonk, NY, USA). To assess the effects, the paired t-test was used to compare measurement pre and post the intervention. The significance level was set at $p<0.05$.

**RESULTS**

There was a statistically significant difference in OOM strength (OOM strength: 15.5 ± 4.2 kPa vs. 9.3 ± 5.1 kPa, $p<0.05$) as well as endurance between the two groups (OOM endurance: 38.5 ± 18.5 seconds vs. 13.3 ± 5.1 seconds, $p<0.05$).

**DISCUSSION**

This study aimed to compare the OOM strength and endurance of young and elderly adults. The results revealed a significant difference between the OOM strength and endurance of the two groups. The elderly adults had lowered strength and endurance of OOM than young adults. Skeletal muscles, such as OOM, are affected by aging, which can result in muscle volume decline and atrophy\textsuperscript{3).} This phenomenon is called sarcopenia, which is common in elderly people and is known to cause muscle weakness and reduction in endurance\textsuperscript{4).} Previous studies have reported that the strength and endurance of the limbs are significantly reduced in elderly people compared to younger adults, and this is the result of sarcopenia\textsuperscript{5, 6).} OOM is composed of the same type of skeletal muscle as those of the limbs, so it is also affected by muscle weakness. Our findings are consistent with those of previous studies that have reported that elderly adults have significantly lower OOM strength than young adults\textsuperscript{1, 2).} The results of this study confirmed that elderly adults had decreased OOM strength and decreased endurance. The results of this study will be useful as basic data for speech and swallowing therapy for elderly people. This study has some limitations. First, it is difficult to generalize the results of this study. Second, there is a possibility that there is an error related to the measurement.

*Conflict of interest*

None.

**REFERENCES**


