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ORIGINAL ARTICLE

Comparing the Tongue and Lip Strength and Endurance of Children with Down Syndrome with Their Typical Peers Using IOPI

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Abstract

Muscular hypotonia is a feature of Down syndrome (DS), and it affects the tongue and lips. A study on oral dysfunction in children with DS concluded that most of them did not have the tongue strength for completing the oral phase of swallowing. Recognizing the weakness of the oral muscles and improving its motor function positively affects mastication and swallowing, and prevents complications. This cross-sectional study aimed to measure the lip and tongue strength and endurance of children with DS and their typical peers, and compare these two groups with each other using Iowa Oral Performance Instrument (IOPI). Eight children with DS and 33 typical children aged 8–13 years were enrolled in this study. To examine the effect of age on the tongue strength and endurance, we divided the children into three groups of 8–9, 10–11, and 12–13 years old. The results showed that both anterior and posterior tongue strength were significantly lower in children with DS ($p=0.004$ and 0.003). But, it was not the case with tongue endurance. Also, in 10–11 years old age group, the mean posterior tongue strength and in 12–13 years old age group the lip endurance was significantly lower in children with DS ($p=0.05$ for both). Lips strength and endurance were both remarkably lower in children with DS ($p=0.004$ and 0.02). In this study, tongue, and lip strength and endurance in both children with DS and typical ones were measured with IOPI for the first time. Moreover, it provided quantitative data on the strength and endurance of the muscles of the tongue and lips, which can contribute to future studies.

Keywords Down syndrome · Iowa Oral Performance Instrument (IOPI) · Tongue · Lip · Muscle strength · Deglutition · Deglutition disorders

Introduction

Down syndrome (DS) or trisomy 21 is the most common survivable autosomal aneuploidy among newborns. The prevalence of DS varies from 0.14 to 1.66 per 1000 live births [1, 2].

Muscular hypotonia is a feature of trisomy, and it affects the tongue and lips, which is noticeable on physical examinations [3]. Many children with DS have functional problems during mastication and swallowing caused by anatomical and neuromotor dysfunction. These abnormalities can lead to aspiration, recurrent pneumonia, chronic respiratory

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Conclusion

In this study, the tongue, and lips strength and endurance in both children with DS and normal children were measured using IOPI for the first time. The anterior and posterior tongue strength was significantly lower in children with DS compared to their typical peers. This was not the case for the tongue endurance. In addition, lips strength and endurance were both notably lower in children with DS. The results of the present study provided quantitative data on the strength and endurance of the tongue and lips, and it can serve future studies for suitable interventions in this targeted group.

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Declarations

Conflict of interest The authors have no conflict of interest to declare.

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