

The influence of thumb-sucking habit towards anterior open bite on Javanese girls aged 6-7 years-old in Ngaglik District, Sleman, Yogyakarta



Risa Miyarsih,* Iwa Sutardjo, Al-Supartinah

Abstract

Objective: Thumb sucking is one of the factors that can influence dentomaxillofacial changes. It is caused by several factors, including the child's inability to respond to external factors. The aim of this study was to determine the influence of thumb sucking towards dentomaxillofacial changes.

Material and Methods: The study was conducted with cross-sectional approach. The samples were Javanese girls aged 6-7 years who attended elementary school in Ngaglik district, Sleman, Yogyakarta. Samples were selected by selective random sampling,

in which 22 children had thumb-sucking and 22 children without thumb-sucking as control group. Dental impressions were taken to measure overjet and overbite. The statistic test used in this study was Chi-Square test.

Result: Thumb-sucking has significant influence to dentomaxillofacial changes ($\chi^2=10.47$; $p<0.001$).

Conclusion: Thumb-sucking has influence on dentomaxillofacial changes on Javanese girls aged 6-7 year-old in Ngaglik district, Sleman, Yogyakarta.

Keywords: Anterior open bite, Dentomaxillofacial changes, Protrusion, Thumb-sucking

Cite this Article: Miyarsih R, Sutardjo I, Supartinah A. 2020. The influence of thumb-sucking habit towards anterior open bite on Javanese girls aged 6-7 years-old in Ngaglik District, Sleman, Yogyakarta. *Journal of Dentomaxillofacial Science* 5(1): 45-47. DOI: [10.15562/jdmfs.v5i1.987](https://doi.org/10.15562/jdmfs.v5i1.987)

Departement of Pediatric Dentistry,
Faculty of Dentistry, Gadjah Mada
University, Yogyakarta, Indonesia

Introduction

Dentomaxillofacial changes in children can disturb the mastication, swallowing, aesthetic, and speech functions. Dentomaxillofacial changes are the third most commonly found dental problems in Indonesia with a prevalence of 80%, which means that these abnormalities are widely found in the population.¹

Dentomaxillofacial changes have several risk factors, including thumb sucking. This habit is considered normal in infants up to the age of 3-4 years old, and if the child continues the habit through mixed dentition period, it creates dentomaxillofacial changes.² The prevalence varies, from 3.1 to 12.4%.²⁻⁵ Thumb-sucking has a massive influence on the oral cavity's tissues, both hard and soft tissues, and also affects the arrangement of teeth. The most representative effect of this habit is the anterior open bite, and anterior protrusion.^{4,6,7}

The changes caused by thumb-sucking do not only occurred in the oral cavity, but also on the thumb. The thumb can be flat and wide, and in some cases, the inflammation and callouses can be found on the affected thumb.⁸

The dentomaxillofacial changes are caused by direct pressure applied by the thumb. The changes occurred because the muscles tried to compensate for the force that was created during thumb-sucking. Dentomaxillofacial changes are initiated by some

changes in the inclination of the maxillary anterior teeth that shifted to labial because the thumb pressure is stronger than the antagonistic force of orbicularis oris muscle, then the overjet increases.⁹ Besides, one of the most classic signs of thumb sucking is an anterior open bite. The anterior open bite happened because the maxillary anterior teeth cannot grow adequately, causing infraocclusion to the anterior teeth because of the forces created by thumb.⁹

The exact causes of thumb sucking are multifactorial, from non-pathological issues such as boredom, sleepy and hunger, to pathological causes, such as the child's inability to deal with and minimize stress. The ability to control and minimize stress is called a coping mechanism, and in children with inadequate coping mechanism, they tend to take shortcuts to achieve a sense of security and comfort through thumb-sucking.⁴ Another issue that affects the occurrence of thumb-sucking is the difference in the growth and development of boys and girls, in which girls' begin earlier and have different manifestations than boys. The emotional development of boys tends to emotionally express or actively dealing with the stressors, while girls tend to try to calm down and diverting the stressors, so girls are more likely to experience thumb sucking.^{2,10}

*Correspondence to: Risa Miyarsih,
Departement of Pediatric Dentistry,
Faculty of Dentistry, Universitas
Gadjah Mada, Yogyakarta, Indonesia
risamiyarsih87@gmail.com

Received: 23 September 2019
Revised: 16 March 2020
Accepted: 28 March 2020
Available Online: 1 April 2020

The purpose of this study was to observe the influence of thumb-sucking habits on the occurrence of anterior open bite in girls aged 6-7 years in Ngaglik district, Sleman, Yogyakarta.

Material and Methods

This research was an observational analytic epidemiological study, with a case-control approach to observed the effect of thumb sucking towards the oral cavity, specifically anterior open bite.

The population in this study were children aged 6-7 years who attended school in Ngaglik, Sleman, Yogyakarta. Children with thumb sucking were selected based on questionnaires given to children and their mothers, then 22 of them were selected with random sampling.

The data were collected by making a dental impression on each child, then both overjet and overbite were measured to obtain clinical information and categorized their anterior relationship (anterior open bite or anterior protrusion). The data then processed with SPSS software with a Chi-square test to see the relation between thumb-sucking habits and anterior open bite.

Results

A total of 403 girls aged 6-7 years old from Ngaglik District, Sleman, Yogyakarta were participating in this study, and the result of the study is presented in the table 1. p-value from dentomaxillofacial changes towards thumb-sucking habit had a significant

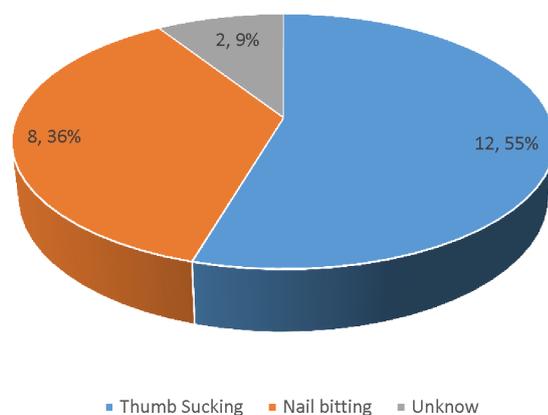


Figure 1 The distribution of anterior open bite's risk factors

value ($p < 0.05$). It showed that thumb-sucking had a significant relationship towards dentomaxillofacial changes, specifically anterior open bite.

Based on the figure 1, the risk factors of the anterior open bite was 12.55%, then followed by nail-biting (8.36%) and unknown factors (2.9%).

Discussion

Thumb sucking is a habit that involved the oral cavity, so if a child had this habit during growth and development period, it can be a destructive habit.^{2,7} Thumbs that placed inside the mouth exert force on the tissues, thus creating physical changes as dentomaxillofacial abnormalities. One of the most representative forms of dentomaxillofacial abnormalities caused by thumb sucking habit is anterior open bite.¹¹

The prevalence of open bite in children with thumb-sucking varies, and its manifestations can be influenced by several factors, individual factors, and the thumb-sucking itself. Individual factors that can affect the severity of anterior open bite are age and the psychological and emotional state of the child. The factors from thumb-sucking habits that can affect the clinical manifestation including the frequency, duration, and the intensity of habit, and also how the children put their thumbs inside their mouths.¹²

Thumb-sucking does not always cause anterior open bite, because thumb-sucking is commonly found on newborn and up until to the age of three or four, as the habit itself is a part oral phase in children. Other theories also stated that this habit is an adaptive response to his physiological needs. For example, children would suck their thumb when they hungry. However, if the child continues the habit until the period of mixed dentition, or if the child's physiological needs have been met, then the habit becomes a non-nutritive and destructive habit.¹²

Thumb-sucking habit gives forces to the tissues of the oral cavity, creating an imbalance muscle tone, where the buccinator muscle will create a negative pressure on the jaw, thus the dental arches become narrower. Thumbs also give pressure to the palate, so that the palate becomes deeper, and the pressure also moves the upper anterior teeth to labial and anterior teeth to lingual. The result is increased overjet and an anterior open bite.^{6,9,13}

In this study, the p-value was 0.001 which indicates that thumb-sucking is associated with dentomaxillofacial changes, specifically anterior open bite. This is consistent with previous studies which stated that the risk factor of the anterior open bite is non-nutritive and repetitive sucking habits, one of them is a thumb-sucking habit.^{2,14}

Table 1 The distribution of anterior open bite towards thumb-sucking group and control group

	Openbite n=22	Normal n=22	X ²	P
TS	12	2	10.47	0.001
Non TS	10	20		

The consideration of choosing of 6-7-year-old children was based on the opinion that thumb-sucking had a tendency to occur in girls for several reasons, mostly due to the psychological developments and their responses to different stressors are different compared to the boys of the same age.¹⁰ In addition, the selection of the age group in this study was because it is during the mixed dentition period and in the middle of growth and development, including in the dentomaxillofacial area, thus if there were some disturbances in dentomaxillofacial area, the clinical manifestations could be seen and could be prevented as early as possible with interceptive treatment.^{12,15}

Conclusion

Thumb-sucking influences dentomaxillofacial changes, especially anterior open bite.

Acknowledgment

This paper and the research behind it would not have been possible without the supports, assistances, and advices from my supervisors and staffs from Postgraduate Program of Clinical Dentistry, Study Concentration of Pediatric Dentistry, Faculty of Dentistry, Universitas Gajah Mada. I would also like to express my gratitude to all the participants of this study.

Conflict of Interest

The authors report no conflict of interest.

References

1. Syada, Nazarullah A, Kurniawan, et al. Comparison of severity and level of orthodontic treatment need using a malalignment index. *Dentino J Kedokteran Gigi* 2017;2. (In Indonesia)
2. Garde JB, Suryavanshi, Rajendra K, et al. An epidemiological study to know the prevalence of deleterious oral habits among 6 to 12 years old children. *J Int Oral Health* 2014;6: 39-43.
3. Karimi, Mohammed. Dental complications of sucking thumbs interventions in pediatric dentistry: Open Access J 2018;1.
4. Achmad MH, Natsir M, Rasmidar S. Malocclusion in children and its management. Yogyakarta: Sagung Seto; 2016. p. 4, 51, 116-117, 254-255.
5. Vishnoi, Pradeep, Kambalyal, et al. Age-wise and gender-wise prevalence of oral habits in 7-16-year-old school children of mewar ethnicity, india. *Indian J Dent Sci* 2019;9: 184-188.
6. Elianora, Dewi. Treatment of bad thumb sucking habits with ortho trainers. *Cakradonya Dent J* 2015;7: 745-806. (In Indonesia)
7. Indushekar, Gupta B, Bhavna G, et al. Childhood thumb sucking habit: the burden of a preventable problem. *J Dent Medic Med Sci* 2012;2: 1-4.
8. Shekhar, Saurabh, Raj, et al. Thumb sucking causing callus formation: an indicator for malocclusion. *Kronic Dent Sci* 2017;2: 25-30.
9. Singh, Surinder. Deleterious effect of oral habit. *Indian J Dent Sci* 2009;1: 15-20.
10. Sinha, Smriti, Latha GS. Coping response to same stressors varies with gender. *National J Physiol Pharm Pharmacol* 2018;7: 1053-1057.
11. Artese, Alderico, Drummond, et al. Criteria for diagnosing and treating anterior open bite with stability. *Dental Press J Orthod* 2011;16: 136-161.
12. Shetty, Raghavendra M, Shetty, et al. Three-alarm system: revisited to treat thumb-sucking habit. *Int J Clin Pediatr Dent* 2015;8: 82-86
13. Proffit, William R, Fields, et al. Contemporary orthodontics, 4th ed. Philadelphia: Mosby Elsevier; 2007. p. 43-47, 148-143.
14. Dimberg, Lillemor, Lennartsson, et al. Malocclusion in children at 3 and 7 years of age: a longitudinal study. *Eur J Orthod* 2011;35: 131-137.
15. Pawinru AS. Angulation change of the third molar tooth in orthodontic treatment. *J Dentomaxillofac Sci* 2017;2: 40-45.



This work is licensed under a Creative Commons Attribution