

Impact of Thumb Sucking Habit on Eruption of Permanent Teeth and Intelligence Quotient Among Children in Karbala City, Iraq

Abrar Abdul Ameer A*, Aseel Haidar M J AL Haidar

Department of Pedodontics and Preventive Dentistry, College of Dentistry, University of Baghdad, Iraq

ABSTRACT

Background: There is a pronounced controversy regarding the dental and mental consequences of thumb sucking habit, which is a familiar nonnutritive pattern of sucking. Commonly, this behavior is harmless, yet those who sustain this pattern may have dental alterations and emotional difficulties. Children's intelligence level influences their capabilities to judge, evaluate and handle priorities and/or problems profoundly and precisely. Thumb sucking habit might be a manner of liberating the psychological tenseness among several children.

Objective: The purpose of this study is to assess the prevalence of thumb sucking habit and its relation to the eruption of permanent teeth and IQ among children aged 6-7 years old.

Subjects and methods: In Karbala city, Iraq, a cross-sectional study was performed through which an over-all of (1222) students at primary schools, 6-7 years old, were included. Questionnaires answered by the parents were used for collecting information regarding the presence of thumb sucking habit. All the students were examined clinically for the stage of eruption of their permanent teeth. Concerning the intelligence quotient (IQ) it was estimated by means of the colored progressive matrices of Raven's test. Data was statistically analyzed utilizing SPSS version 21.

Results: The present study revealed that the prevalence of the thumb sucking habit amongst the whole sample was (7.61%), it was more predominant in the below average IQ category of children (8.99%). Furthermore, it was found that children who practiced the habit had a delay in the eruption of their permanent teeth. Yet, these results showed no statistical significance.

Conclusion: There is an association between thumb sucking habit in children, their intelligence level and the eruption of their permanent teeth, by which the habit was practiced more by children of below average category of intelligence and the eruption of permanent teeth among those who performed the habit was delayed however this result was not significant statistically.

Key words: Intelligence quotient (IQ), Permanent teeth, Karbala, Thumb sucking

HOW TO CITE THIS ARTICLE: Abrar Abdul-Ameer A, Aseel Haidar M J AL Haidar, Impact of thumb sucking habit on eruption of permanent teeth and intelligence quotient among children in Karbala city, Iraq, J Res Med Dent Sci, 2020, 8 (4):77-82.

Corresponding author: Abrar Abdul Ameer A

e-mail ✉: Dr.abrar.a.a.21@gmail.com

Received: 15/06/2020

Accepted: 08/07/2020

INTRODUCTION

Any repetitious behavior being done automatically is identified as a habit [1]. Both children and adults tend to stimulate the mouth with tongue, finger, nail, or a cigarette in fervor and apprehension as an aid in providing comfort in those situations [2]. The concomitant impact of an oral habit is reliant on the onset, duration, and nature of the habit [3]. Thumb sucking habit is a vigorous and periodic sucking of the thumb, which is accompanied by contraction of buccal musculature and lip. It is judged as

being normal in infants and young children who are under the age of 3 years and 6 months [4]. Dental alterations, due to lengthy practicing of this habit beyond 5 years of age, may include: Increase in overjet, open bite in the anterior teeth, labial inclination of maxillary incisors and posterior crossbite [5-8]. Diagnosis of these deleterious habits in the early stages is mandatory, otherwise more complicated methodologies may be needed in order to remedy the problem in sophisticated phases, for example in severe cases the correction of the jaw position, that had been modified due to practicing such habits, occasionally demands orthognathic surgery [9].

Eruption of a tooth may be illustrated as a movement of a tooth in the oral cavity from its site

of evolution in the alveolar bone until it ends up at its eventual location at the occlusal plane. This process is complex and hermetically organized [6]. A tooth is deemed erupted by researchers when part of the tooth crown pierces through the gingival tissue and gets to be in sight in the oral cavity [10,11]. Eruption of the first primary teeth of children is regarded by their parents as a pivotal growth-related event that ought to be accomplished by their children and frequently they be in the quest of the opinion of pediatricians if any delay ensue [12,13]. Numerous variables like genetics, hormones, geography, ethnics, gender, and economical status may influence the eruption times and emergence of permanent teeth [14-16].

Every child has one of a kind attributes of intelligence, and those can be quantified as an intelligence quotient (IQ). Wechsler described intelligence to be the individual's capability to accommodate plus productively unraveling obstacles in the surroundings", whilst IQ is described as a "total score obtained from multiple standardized trials aimed at evaluating human intelligence" [17]. High risks of developing mental ailments, depression [18-20], emotional and behavioral issues, and anxiety complaints [21,22], were experienced by children who scores were poor on the IQ tests [23]. Meanwhile, Bishara, et al. [24] suggested that sustained digit sucking might be a sign of disturbed emotional status. As a result, thumb sucking behavior might be a pattern which is related to the intellectual level of an individual.

This study is one of the infrequent ones linking the thumb sucking habit with the level of intelligence and eruption of permanent teeth among children.

MATERIALS AND METHODS

The protocol of the present study was conformed to the Scientific and Ethical Committee at the College of Dentistry/ University of Baghdad, Iraq, and it was approved after its submission and revision. The Directorate of General Education in Karbala approved conveying the study in the primary schools in the absence of obstructions. Helsinki's declaration guiding principles were complied, by which the parents and/or caretakers of every child were acknowledged utterly (concerning the design, aims, and feasible benefits of the study) prior to their participation

through a signed form of consensus providing them with the right to quit from this study whenever they desire.

The exclusion criteria of the sample were

- ✓ Children who have developmental malformation related to psychiatric disturbance.
- ✓ Children who have acquired or congenital ailment influencing the intelligence capability.
- ✓ Children whose parents refused to participate in the study.

The selected sample for this study included 1222 medically fit and healthy primary school students, who brought back their signed consent and the questionnaire from their parents, they aged between 6 and 7 years. They were related to thirty-six primary schools that were selected randomly as they distributed in different geographical areas in the center of Karbala city.

Assessment of thumb sucking habit

A questionnaire was utilized for gathering information concerning the occurrence of the deleterious thumb sucking oral habit. These questions were distributed to the students and collected in the next day after being answered by their parents [25,26].

The number of the erupted permanent teeth

The permanent teeth were inspected, and their eruptive condition was documented as designated by Pahkala et al. [27]. The tooth was diagnosed as follows:

Stage 0: the tooth is not detectable in the oral cavity.

Stage 1: one cusp is observable in the oral cavity at least.

Stage 2: the whole occlusal surface is observable, yet it does not reach the level of occlusion.

Stage 3: the tooth in occlusion or at the occlusal plane level when the antagonistic tooth was not erupted completely.

All the permanent teeth of the students were examined regarding their eruptive stage- in natural light by dental mirror and the registration of teeth was performed as stated by the FDI scheme of notation [28].

Measurement of intelligence quotient (IQ)

The intellectual capability of every child was estimated by means of Raven’s Colored Matrices [29]. Raven’s test is the utmost satisfactory test for the objective of assessment of the cognitive abilities, furthermore it’s widely utilized for estimating the brain’s normal function [30,31], it encourages children to reveal their intellectual abilities with respect to specifics, memory, and spatial connotation [32]. Simulations of the test were introduced in the pattern of matrices. The child was requested to recognize the absent fragment that finishes the model in every one of the test items [29]. The trial was accomplished in a suitable classroom at the school. Thirty minutes was set to be the ordinary time occupied to finish the test. The trial included 36 questions, starting with easy ones, and terminating with challenging ones. Every problem compromised of a matrix of geometrical layout through 6 substitutions for single removed fragment. Simply one of the choices was matched appropriately. Training for using the Colored Progressive Matrices of Raven’s test was done at the Psychological Researches Center in Baghdad University under the supervision of specialists in this field after getting permission from this center.

Statistical analysis

Data analysis was done by using Statistical Package for Social Science (SPSS Software) version 21. Inferential and descriptive (mean, standard error (SE), frequency and percentage) statistics had been utilized, in addition the probability of error (P-value) was established at 5%.

RESULTS

Thumb sucking habit prevalence among the sample of the present study was 7.61%. Distribution of thumb sucking habit differed according to age and gender, as illustrated in Table 1. Regarding age, this habit was seen more commonly among the younger children (6 years old group) than that presented among the older age children (7 years old group), 55 and 38 children, respectively. Nevertheless, taking into consideration the gender variable, girls tended to suck their thumbs more frequently than boys did (53, 40 respectively), however, no significant difference was found concerning the presence of the habit in relation to age and gender. Children’s allocation based on the existing of the habit by the eruption of the permanent teeth showed that the mean value of the erupted permanent teeth for stage 2, 3 as well as the total erupted teeth among children who sucked their thumb was lower than that of those who did not have the habit. However, statistically this difference was not significant. Despite the fact that the difference between children who sucked their thumbs and those who did not was found to be with no statistical significance in stage 0 and 1, the mean value of the erupted permanent teeth among the thumb sucker group was found to be higher than those who did not suck (Table 2).

Regarding the relation of thumb sucking habit to the intelligence quotient categories. Table 3 revealed that the percentage of children who sucked their thumb tended to be the highest among the below average children while it was the least among the intellectually superior ones, however, this difference was not significant statistically.

Table 1: Prevalence of the thumb sucking habit by age and gender.

Age	6 Years				p value	Total	7 Years				p value	Total		
	Boys		Girls				Boys		Girls					
Gender	No.	%	No.	%		No.	%	No.	%		No.	%		
Presence of thumb sucking habit					0.323					0.357				
No thumb sucking habit	283	92.2	276	89.9		559	91	284	94.7		286	92.9	570	93.75
Thumb sucking habit	24	7.8	31	10.1		55	9	16	5.3		22	7.1	38	6.25
Total	307	100	307	100		614	100	300	100		608	100		

Table 2: Distribution of children with and without thumb sucking habit in relation to the eruption of permanent teeth.

Stage of eruption	Presence of the habit			Absence of the habit			T	df	p value
	N	Mean	SE	N	Mean	SE			
S0	93	21.366	0.408	1129	21.199	0.109	0.418	1220	0.676
S1	93	0.355	0.073	1129	0.346	0.02	0.12	1220	0.905
S2	93	0.989	0.129	1129	1.101	0.037	0.838	1220	0.402
S3	93	5.29	0.387	1129	5.353	0.107	0.162	1220	0.871
Total eruption	93	6.634	0.408	1129	6.801	0.109	0.418	1220	0.676

Table 3: Distribution of the study sample in relation to intelligence quotient categories (IQ).

Categories of intelligence	Absence of the habit		Presence of the habit		FEBT	p value	Total No.
	No.	%	No.	%			
Intellectually impaired	111	91.74	10	8.26	5.1	0.277	121
Below average	172	91.01	17	8.99			189
Intellectually average	556	91.6	51	8.4			607
Above average	214	94.27	13	5.73			227
Intellectually superior	76	97.44	2	2.56			78
Total	1129	92.39	93	7.61		1222	

DISCUSSION

This is one of the infrequent studies relating the level of intelligence quotient and eruption of permanent teeth to thumb sucking habit among children; thus, unfortunately no data was available regarding this relation. However, despite this "lack of literature" and the limitations faced during conducting this study, the results can be considered logical and interpretable. The purpose of this study was to assess the prevalence of thumb sucking habit and its relation to IQ and eruption of the permanent teeth among children.

The thumb sucking habit prevalence was 7.61%. Above the half of that percentage was found in the group of the younger children (6 years) as expected, and this result was consistent with the study of Bishara et al. [33] who reported a decrease in the incidence of this habit as the child gets older. In addition, this result came in accordance with another study, which stated that during early ages; thumb sucking habit was the mostly practiced habit [34]. This might be explained relying on the facts provided by the psychoanalytic theory which proclaims that when children get older, they are prone to quitting some habits and sustaining others [35].

Concerning gender, it was found that girls tended to suck their thumbs more frequently than boys did (Even though the result was not significant statistically). It could be due to the fact that girls are more sensitive than boys, whilst others proclaimed that several oral habits had been practiced more frequently by females [36], meanwhile some authors justify that girls had a greater tendency to the development of sucking habits because they had more emotional problems than boys have [37,38].

Regarding the relation of thumb sucking habit and eruption, there was scarce data regarding this issue. However, Agurto et al. [39] mentioned that persistent thumb sucking habits could lead to disharmony in the forces exerted by the

internal and external muscles of the orofacial complex which in turn have an impact on the stomato-gnathic system, meanwhile, Shah et al. [40] extended his view to state that the resultant forces due to this habit were acting on both; teeth and alveolar process likewise. Imbalances and discrepancies might be arising from the prolonged sucking habit. Delayed eruption of permanent teeth in a minor degree among the thumb suckers (even though the result was not statistically significant) could be due to the increased contraction resulted during sucking. This contraction resulted from the strong buccal and lip musculature [41] together with the increased pressure from the cheek during the contraction of the buccinator muscle [6], in addition to the increased pressure applied on the anterior region [42].

Concerning the prevalence of thumb sucking habit among the different categories of intelligence quotient, it was found that thumb suckers were the least among the intellectually superior group (2.56%), while they were found to be the highest at the below average group (8.99%). This might be interpreted by relying on the fact that a person's level of intellectuality influences his potentialities of being capable of adjusting to different circumstances, dealing with abstract notions, and utilizing wisdom for the sake of modifying own surroundings [43]. Thus children with high level of intelligence are those who are more efficient in dealing with/ adapting to new events in their lives such as school which was described by Kamdar et al. [41] to be stressful in different forms. On the other hand, Ralston et al. [44] concluded that the psycho-social dimensions of children with below average IQ were quite like those with learning disabilities (LD). So thumb sucking for children could be a way of dealing with unachievable tasks in schools for instance, since this habit was considered as a comforting behavior for young children [45], a form of de-stressing [41] and a way of releasing mental tension [1].

CONCLUSION

Thumb sucking habit was more prevalent among girls as well as the younger age students but with no statistical significance. There was an association between thumb sucking habit, the intelligence level and the eruption of permanent teeth in children, by which the habit was practiced more among children of the below average category of IQ and the eruption of permanent teeth among those who performed the habit was delayed, yet the result was not significant from a statistical point of view.

REFERENCES

- Shahraki N, Yassaei S, Moghadam MG. Abnormal oral habits: A review. *J Dent Oral Hyg* 2012; 4:12-15.
- Baer PN, Lester M. The thumb, the pacifier, the erupting tooth and a beautiful smile. *J Pedod* 1987; 11:113-119.
- Piteo AM, Kennedy JD, Roberts RM, et al. Snoring and cognitive development in infancy. *Sleep Med* 2011; 12:981-987.
- Maguire JA. The evaluation and treatment of pediatric oral habits. *Dental Clin North Am* 2000; 44:659-669.
- Gale EN, Ager WA. Thumb sucking revisited. *Am J Orthod* 1969; 55:167-170.
- Proffit WR, Fields HW. Contemporary orthodontics. 3rd Edn Mosby Inc 2000.
- Warren JJ, Bishara SE, Steinbock KL, et al. Effects of oral habits' duration on dental characteristics in the primary dentition. *J Am Dent Assoc* 2001; 132:1685-1693.
- Yemitan TA, daCosta OO, Sanu OO, et al. Effects of digit sucking on dental arch dimensions in the primary dentition. *Afr J Med Sci* 2010; 39:55-61.
- Ferreira HR, Rosa EF, Antune JL, et al. Prolonged pacifier use during infancy and smoking initiation in adolescence: Evidence from a historical cohort study. *Eur Addict Res* 2015; 21:33-38.
- Folayan M, Owotade F, Adejuyigbe E, et al. The timing of eruption of the primary dentition in Nigerian children. *Am J Physical Anthropol* 2007; 134:443-448.
- Soliman NL, El-Zainy MA, Hassan RM, et al. Timing of deciduous teeth emergence in Egyptian children. *East Mediterr Health J* 2011; 17: 875-881.
- Peretz B, Ram D, Hermida L, et al. Systemic manifestations during eruption of primary teeth in infants. *J Dent Child* 2003; 70:170-173.
- Indira MD, Nandlal B, Narayanappa D, et al. Perception about teething among the nursing mothers of mysore. *J Int Med Dent* 2016; 3:119-125.
- Adler P. Effect of some environmental factors on sequence of permanent tooth eruption. *J Dent Res* 1963; 42:605-616.
- Garn SM, Sandusky ST, Nagy JM, et al. Negro-caucasoid difference in permanent tooth emergence at a constant income level. *Arch Oral Biology* 1973; 18:606-615.
- Diamanti J, Townsend GC. New standards for permanent tooth emergence in Australian children. *Australian Dent J* 2003; 48:39-42.
- Neisser U. Rising scores on intelligence tests. *Am Scient* 1997; 85:440-447.
- Gale CR, Hatch SL, Batty GD, et al. Intelligence in childhood and risk of psychological distress in adulthood: The 1958 national child development survey and the 1970 British cohort study. *Intelligence* 2009; 37:592-599.
- Gale CR, Deary IJ, Boyle SH, et al. Cognitive ability in early adulthood and risk of 5 specific psychiatric disorders in middle age: The Vietnam experience study. *Arch Gen Psychiatry* 2008; 65:1410-1418.
- Gale C, Batty G, Tynelius P, et al. Intelligence in early adulthood and subsequent hospitalization for mental disorders. *Epidemiol* 2010; 21:70-77.
- Fergusson DM, Horwood LJ, Ridder EM. Show me the child at seven II: Childhood intelligence and later outcomes in adolescence and young adulthood. *J Child Psychol Psychiatry* 2005; 46:850-858.
- Martin LT, Kubzansky LD, LeWinn KZ, et al. Childhood cognitive performance and risk of generalized anxiety disorder. *Int J Epidemiol* 2007; 36:769-775.
- Tamboli SS, Joglekar C, Desle V, et al. Parental perception of low IQ facts or fiction: retrospective data from clinic in semi-rural Maharashtra. *Int J Clin Biomed Res* 2019; 5:5-9.
- Bishara SE, Larsson E. Finger habits: Their effects and their treatments-Part 1. *Dent Assistant* 2007; 76:14-16.
- Al-Kinane SM. Clinical and microbiological effects of thumb sucking habit in 3-5 years old children in Hilla city/Iraq. MSc thesis submitted to the college of dentistry, university of Baghdad 2016.
- Le TT. Nail biting and related health issues: Perspectives of oral health professionals and nail bitters. PhD thesis of philosophy. Centre for rural health, school of health sciences university of Tasmania 2016.
- Pahkala R, Pahkala A, Laine T. Eruption pattern of permanent teeth in a rural community in northeastern Finland. *Acta Odontologica Scandinavica* 1991; 49:341-349.
- Yadav SS, Sonkurla S. Sarjeev's supernumerary tooth notation system: A universally compatible add on to the two digit system. *Indian J Dent Res* 2013; 24:395.
- Raven J, Raven JC, Court JH. Coloured progressive matrices. 7th Edn Oxford Psychologists Press 1998.
- Li Y, Jing X, Chen D, et al. Effects of endemic fluoride poisoning on the intellectual development of children in Baotou. *Fluoride*. 2008; 1:161-164.
- Kargul B, Caglar E, Tanboga I. History of water fluoridation. *J Clin Pediatr Dent* 2003; 27:213-217.

32. Carroll JB. Human cognitive abilities. Cambridge University Press 1993.
33. Bishara SE, Warren JJ, Broffitt B, et al. Changes in the prevalence of nonnutritive sucking patterns in the first 8 years of life. *Am J Orthod Dentofacial Orthop* 2006; 130:31-36.
34. Varas VF, Gil BG, Izquierdo FG. Prevalence of childhood oral habits and their influence in primary dentition. *Rev Pediatr Aten Primaria* 2012; 14:13-20.
35. Omer MI, Abuaffan AH. Prevalence of oral habits and its effect in primary dentition among Sudanese preschool children in Khartoum City. *Ind J Dent Edu* 2015; 8:57-62.
36. Kharbanda OP, Sidhu SS, Sundaram KR, et al. Oral habits in school going children of Delhi: A prevalence study. *J Ind Soc Pedo Prev Dent* 2003; 21:120-124.
37. Leite-Cavalcanti A, Medeiros-Bezerra PK, Moura C. Breast-feeding, bottle-feeding, sucking habits and malocclusion in Brazilian preschool children. *Rev Salud Publica* 2007; 9:194-204.
38. Santos SA, Holanda ALF, Sena MF, et al. Nonnutritive sucking habits among preschool-aged children. *J Pediatr* 2009; 85:408-414.
39. Agurto PV, Diaz RM, Cadiz OD, et al. Oral bad habits frequency and its association with dentomaxilar abnormal development, in children three to six-year-old in Santiago Oriente. *Rev Chil Pediatr* 1999; 70:470-482.
40. Shah AF, Batra M, Sudeep CB, et al. Oral habits and their implications. *Annals Medicus* 2014; 1:179-182.
41. Kamdar RJ, Al-Shahrani I. Damaging oral habits. *J Int Oral Health* 2015; 7:85-87.
42. Yokota R, Mishiro M, Abe T, et al. Pressure on anterior region of palate during thumb-sucking. *Bull Tokyo Dent Coll* 2007; 48:57-66.
43. Navit S, Malhotra G, Singh J, et al. Interrelationship of intelligence quotient with caries and gingivitis. *J Int Oral Health* 2014; 6:56-62.
44. Ralston MB, Fuerst DR, Rourke BP. Comparison of the psychosocial typology of children with below average IQ to that of children with learning disabilities. *J Clin Exp Neuropsychol* 2003; 25:255-273.
45. Borrie FR, Bearn DR, Innes NP, et al. Interventions for the cessation of non-nutritive sucking habits in children. *Cochrane Database Systematic Reviews* 2015.