

ORIGINAL ARTICLE

RELATIONSHIP BETWEEN DENTAL MALOCCLUSION WITH PARENT'S EDUCATIONAL STATUS

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ABSTRACT

Objective: To determine the relationship between prevalence of malocclusion in children and parents educational status. **Methods:** A total of 2000 Saudi male and female subjects between the ages 12-16 years were selected randomly from secondary schools within Aseer region. Subjects presenting with identified systemic diseases were excluded from the study and were examined for malocclusion using a standard orthodontic assessment form. SPSS software, version 14.0, has been used to analyse the statistics of data thus collected. **Results:** The prevalence of malocclusion for children of parents with post-doctoral degrees was lowest at 76.6%. Parents with master's degree show a slightly higher prevalence of malocclusion among their children at 4% and 8% in children of parents with only primary education. The highest prevalence of malocclusion was noted in subjects of the parents with Bachelor's degrees (at 48%) and with secondary level education at 25%. **Conclusion:** The study shows that parents with higher levels of education have protective effect on their child's occlusion probably due to better access to resources and higher level of motivation to interrupt habits which affected the child's oral health. Further research involving larger sample size and distribution involving multiple co variables should be done to explore the potential role of various risk factors of malocclusion.

Key Words: Child, Education, Malocclusion, Parents

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INTRODUCTION

Malocclusion, as defined by the Index of Orthodontic Treatment Need (IOTN), occurs in 20–50% of adolescents in Asia, with a reported prevalence of 62.4% to 90% in Saudi Arabia.¹⁻²

Several of these abnormal occlusal traits are influenced by a combination of dental and skeletal development variations, which are genetically determined and influenced by environmental factors.³ Malocclusions in general represents a deviation of normal growth and development process and is greatly influenced by various factors during the prenatal and postnatal developmental period.⁴⁻⁵ Although the prenatal development is greatly influenced by genetic variation; the post natal developmental disturbances are reported to be greatly influenced by environmental risk factors including behavioural factors and socioeconomic determinants.

The last decade has seen a greater emphasis on the role of economic, social, and environmental factors as risk determinants of malocclusion. The need for orthodontic treatment was found to be relatively more common amongst deprived children in comparison to those subjects with a higher socioeconomic status.⁶⁻¹⁰ Measuring variables such as income, educational level and occupation helps in assessing the socioeconomic status, which are known to fundamentally structure the condition or environmental circumstance.¹¹

The role played by socioeconomic determinants in dental occlusion status remains unclear. The socially disadvantaged adolescents were assumed to have a higher prevalence of malocclusion than their more affluent counterparts due to multiple factors including individual and contextual socioeconomic determinants such as educational level of parents that can positively influence awareness to dental health and access to resources. The influence of these determinants on malocclusion is thought to occur through oral habits, psychological factors, general patterns of disease,¹² patient's level of dental health awareness and active involvement to seek specialist intervention to manage malocclusion.

The Educational level of parents allows for better understanding of the significance of health outcomes and we wanted to explore this possible link between prevalence of malocclusion in children and the level

of education of their parents. Our study was based on the hypothesis that higher educational status of parents positively influences attitude and motivation towards dental health. Higher education levels would mean better skilled and higher occupational status which can contribute to higher socioeconomic indicators, an increased awareness to health concerns and better access to resources allowing for clear understanding of the health outcome and its significance.

MATERIALS AND METHODS

This study was conducted in the department of Orthodontics of college of dentistry at King Khalid University and the ethical clearance was obtained from the research committee (reference number SRC/ETH/2015-16/011).

A total of 2000 subjects consisting of 1000 males and 1000 female students were selected randomly from secondary schools within Aseer region of Saudi Arabia. The subjects were randomly selected from Grade 6 to Grade 10 (children aged 12–16 years) to evaluate malocclusion in late mixed and permanent dentition in concurrence with IOTN that gives acceptable reproducibility after the age of 11 years.^{13,14}

An informed and written consent was obtained from the parents of all the study subject and a questionnaire was distributed to record the educational status of the parents. The questionnaire also included specific questions on potential prenatal and postnatal co factors that can possibly contribute to the development of malocclusion such as mother's lifestyle during pregnancy (alcohol consumption and smoking habits, X-ray exposure), complications during child birth, type of delivery, birth weight, etc were analysed, discussed and excluded from the study. Those subjects with a history of preventive / corrective orthodontic therapy or Habit breaking intervention (such as tongue thrusting, thumb sucking, etc) were also excluded from the study.

Each participant was enquired and examined for any adverse oral habits such as finger sucking, tongue thrusting in childhood, frequency of tooth brushing, nutritional status, early childhood care (type of feeding and use of a pacifier) was recorded in the proforma.

Malocclusion was evaluated using dental cast models, dental clinical examination findings and a standard orthodontic assessment form.

The data was collated and statistically analysed using SPSS software, version 14.0.

RESULTS

The prominent education level among the parents of the study subjects was Bachelor's degree followed by secondary education, primary education, master's degree and post-doctoral education level.

Study subjects whose parents had education upto bachelor degree level comprised of 1086 students

with 953 of them presenting with malocclusion of varying severity (Fig 1). The next big group consisted of 586 students whose parents had education upto secondary level with 500 of them presenting with malocclusion. Subjects whose parents had education upto primary level alone accounted for 187 subjects with 159 of them presenting with malocclusion. Subjects whose parents had education upto master's degree comprised of 94 subjects with 74 of them presenting with malocclusion and lastly subjects whose parents had education upto post-doctoral degrees included 47 subjects out of which 36 children had malocclusion.

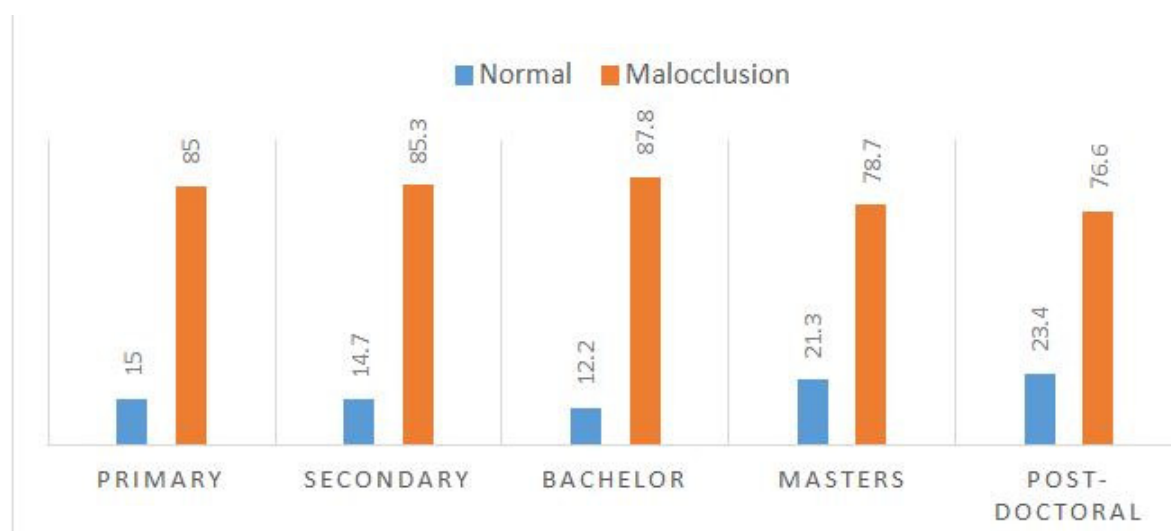


Figure1: Distribution of Malocclusion according to parent's education

The disparity between normal occlusion and malocclusion was almost the same for all the groups except for the group whose parents had bachelor degrees, where the disparity was highest in the median. Among the individual traits of malocclusions, a statistically significant association was noted between parental level-of-education groups and position of canine (0.000), spacing (0.000), crowding (0.000), overbite (0.000), overjet (0.000), posterior cross-bite (0.000) and posterior open bite (0.001). The molar relationship (0.099), anterior crossbite (0.058), and anterior open bite (0.556) showed no statistically significant association with parental level-of-education groups studied. The value of degrees of freedom used to

define the chi-square distribution in our study and to evaluate independence for the test is 4. (Table 1)

The children of parents with post-doctoral degrees showed the lowest prevalence of malocclusion at 2%. Parents with master's degree show a slightly higher prevalence of malocclusion among their children at 4% and at 8% in children of parents with only primary education. The highest prevalence of malocclusion was noted in subjects of the parents with Bachelor's degrees (at 48%) and with Secondary level education at 25% (Table 2). The Relationship between Gender and malocclusion was statistically insignificant. (Table:3)

Table 1: Relationship between Malocclusion and Parent's Educational Level

Malocclusion type		Parent's Education Level					Total N(%)	Chi-Square	df	P-Value
		Primary N (%)	Secondary N (%)	Bachelor N (%)	Master N (%)	Post-Doctoral N (%)				
Molar	Normal	102 (5.1)	341 (17.0)	686 (34.3)	61 (3.0)	29 (1.4)	1219 (61.0)	7.802	4	0.099
	Malocclusion	84 (4.2)	246 (12.3)	400 (20.0)	33 (1.6)	18 (0.9)	781 (39.0)			
Canine	Normal	110 (5.5)	321 (16.0)	739 (37.0)	56 (2.8)	30 (1.5)	1256 (62.8)	30.857	4	0.000*
	Malocclusion	76 (3.8)	266 (13.3)	347 (17.4)	38 (1.9)	17 (0.8)	744 (37.2)			
Spacing	Normal	136 (6.8)	437 (21.8)	898 (44.9)	83 (4.2)	36 (1.8)	1590 (79.5)	25.330	4	0.000*
	Malocclusion	50 (2.5)	150 (7.5)	188 (9.4)	11 (0.6)	11 (0.6)	410 (20.5)			
Crowding	Normal	137 (6.8)	425 (21.2)	883 (44.2)	65 (3.2)	38 (1.9)	1548 (77.4)	23.331	4	0.000*
	Malocclusion	49 (2.4)	162 (8.1)	203 (10.2)	29 (1.4)	9 (0.4)	452 (22.6)			
Overbite	Normal	113 (5.6)	325 (16.2)	467 (23.4)	53 (2.6)	27 (1.4)	985 (49.2)	38.771	4	0.000*
	Malocclusion	73 (3.6)	262 (13.1)	619 (31.0)	41 (2.0)	20 (1.0)	1015 (50.8)			
Overjet	Normal	114 (5.7)	328 (16.4)	483 (24.2)	58 (2.9)	32 (1.6)	1015 (50.8)	41.712	4	0.000*
	Malocclusion	72 (3.6)	259 (13.0)	603 (30.2)	36 (1.8)	15 (0.8)	985 (49.2)			
Anterior crossbite	Normal	177 (8.8)	535 (26.8)	1037 (51.8)	90 (4.5)	45 (2.2)	1884 (94.2)	15.072	4	0.058
	Malocclusion	9 (0.4)	51 (2.6)	47 (2.4)	4 (0.2)	2 (0.1)	113 (5.6)			
Anterior open bite	Normal	184(9.2)	578(28.9)	1072(53.6)	93(4.65)	45(2.25)	1972(98.6)	3.011	4	0.556
	Malocclusion	3(0.15)	8(0.4)	14(0.7)	1(0.05)	2(0.1)	28(1.4)			
Posterior crossbite	Normal	167 (8.4)	504 (25.2)	1028 (51.4)	86 (4.3)	44 (2.2)	1829 (91.4)	38.704	4	0.000*
	Malocclusion	19 (1.0)	83 (4.2)	58 (2.9)	8 (0.4)	3 (0.2)	171 (8.6)			
Posterior open bite	Normal	180 (9.0)	546 (27.3)	1054 (52.7)	92 (4.6)	47 (2.4)	1919 (96.0)	19.615	4	0.001*
	Malocclusion	6 (0.3)	41 (2.0)	32 (1.6)	2 (0.1)	0 (0.0)	81 (4.0)			

*Statistically Significant at 5%

Table 2: Distribution of Malocclusion according to parent's education

	Primary N(%)	Secondary N(%)	Bachelor N(%)	Master N(%)	Post-Doctoral N(%)	Total
Normal	28(15)	86(14.7)	133(12.2)	20(21.3)	11(23.4)	278(13.9)
Malocclusion	159(85)	500(85.3)	953(87.8)	74(78.7)	36(76.6)	1722(86.1)

Table 3: Relationship between Malocclusion and Gender

		Normal	Malocclusion	Chi-square	df	P-Value
		Count	Count			
Gender	Male	149	851	1.671	1	0.196
	Female	129	871			

**Statistically Significant at 5%*

DISCUSSION

The main aim of our study was to determine the possible link between prevalence of malocclusion in children and the level of education their parents had received. Parental education is believed to positively influence awareness and behavioural attitude of parents against potential risk factors of dental health and dental malocclusion such as adverse oral habits, oral hygiene measures, dietary intake, etc. Education helps parents to be better informed about dental health and various dental care measures such as preventive dental care at home and/or professional intervention.¹⁵

Our results show a significant association between educational status of parents and malocclusion in children. The disparity between normal occlusion and malocclusion was significant for the group whose parents had bachelor degrees at a relatively high prevalence of 48% and with the groups whose parent had secondary level education at a prevalence of 25%.

The low prevalence of malocclusion among parents with higher than bachelor level of education is in concurrence with our hypothesis that higher level of education influences awareness to identify and control known predisposing factors of malocclusion such as oral habits and initiate better dietary consumption which are known to influence growth and development process of the jaws. These findings were similar to studies conducted across various schools located in less affluent societies where adolescents with poor socioeconomic and education indicators presented with higher incidence of malocclusion in comparison to those with better affluence and education.^{6, 16} However, these findings are in sharp contrast to reports where the need for orthodontic treatment was more in higher income

groups,¹⁷ probably because these studies are based in developed countries such as United States where higher educational levels doesn't always mean higher affluence or socioeconomic indicator and vice versa.

Exploring social determinants such as education and its influence on malocclusion as a product of socioeconomic affluence is a huge challenge in such diametrically opposite demographic countries. The contrasting observations between educational determinants versus malocclusion of the population under investigation are due to unreliable measurement of socioeconomic status as a consequence of education levels alone. Socioeconomic status is not always dependent on education levels. At the same time, higher levels of education believed to reflect improved socioeconomic status in the present study, suggests a protective effect on their child's occlusion. This may be because of better informed parents and better access to resources that helps to intervene the addiction to deleterious oral habits such as thumb sucking, etc.

Although significant in terms of higher values, a possible reason for such high prevalence in bachelor degree and secondary education groups in our study could be due to the higher number of study subjects in these groups in comparison to other groups that showed lesser prevalence in our study.

Apart from sample size and distribution, the lack of unanimous indices to quantifiably measure social affluence as a consequence of educational status is a major limitation to our study. The huge variation in the malocclusion indices used across various studies can influence data uniformity and reproducibility. All our findings were recorded at one single time point, giving no indication of whether exposures to

environmental or epigenetic risk factors of malocclusion occurred before, during or after the onset of malocclusion, except for verbal evaluation while recording case history. Moreover, subjects with a history of orthodontic intervention in the past or during the study were excluded. Although a detailed prenatal history with possible exposure to environmental or epigenetic risk factors of malocclusion were recorded, the subjects were excluded because measurement of these co variants and its influence on causing malocclusion were beyond the scope of this study.

The role of environmental factors in comparison to genetic factors in dental malocclusion has been a basis for evolving further research on its influence on causing malocclusion.¹⁸ Extrapolating findings from such research on social determinants and its influence on growth and development of jaws can contribute to better planning for oral health interventions in vulnerable groups and/or initiation of preventive orthodontics.

CONCLUSION

The study shows that prevalence of malocclusion is relatively less among children whose parents have higher level of education. They have a relatively better influence on their child's occlusion probably due to better access to resources and higher level of motivation to interrupt habits which potentially affect the child's occlusion. Further research involving larger sample size and distribution involving multiple co variables should be done to explore the potential role of various risk factors of malocclusion.

Conflict of Interest: None

REFERENCES

1. Tumurkhuu T, Fujiwara T, Komazaki Y, et al. Association between maternal education and malocclusion in Mongolian adolescents: a cross-sectional study. *BMJ Open* 2016; 6:e012283. Doi: 10.1136/bmjopen-2016-012283
2. Baeshen H. The Prevalence of Major Types of Occlusal Anomalies among Saudi Middle School Students. *J Contemp Dent Pract* 2017;18(2):142-146.
3. Harris EF, Johnson MG. Heritability of craniometric and occlusal variables: a longitudinal sib analysis. *Am J OrthodDentofacialOrthop*. 1991 Mar;99(3):258-268
4. Proffit WR, Henry W, Fields J, et al. Contemporary orthodontics. 4thedn. Canada: Mosby, Elsevier, 2007:130–161.
5. Ovsenik M. Incorrect orofacial functions until 5 years of age and their association with posterior crossbite. *Am J Orthod Dentofacial Orthop* 2009;136:375–381.
6. Tickle M, Kay EJ, Bearn D. Socio-economic status and orthodontic treatment need. *Community Dent Oral Epidemiol*. 1999 Dec;27(6):413-418.
7. Deli R, Macrì LA, Radico P, Pantanali F, Grieco DL, Gualano MR, et al. Orthodontic treatment attitude versus orthodontic treatment need: differences by gender, age, socioeconomic status and geographical context. *Community Dent Oral Epidemiol*. 2012 Feb;40(Suppl 1):71-76.
8. Frazão P, Narvai PC. Socio-environmental factors associated with dental occlusion in adolescents. *Am J OrthodDentofacialOrthop*. 2006 Jun;129(6):809-816.
9. vonCramon-Taubadel N. Global human mandibular variation reflects differences in agricultural and hunter-gatherer subsistence strategies. *Proc Natl AcadSci U S A* 2011;108:19546–19551.
10. Ovsenik M, Farcnik FM, Korpar M, et al. Follow-up study of functional and morphological malocclusion trait changes from 3 to 12 years of age. *Eur J Orthod* 2007;29:523–529.
11. ICOHIRP. Social inequalities in oral health: from evidence to action. Secondary social inequalities in oral health: from evidence to action. 2015. <http://www.icohirp.com/monograph.html>
12. Tomita NE, Sheiham A, Bijella VT, Franco LJ. The relationship between socioeconomic determinants and oral habits as risk factors for malocclusion in preschool children. *PesquiOdontol Bras*. 2000 Apr-Jun;14(2):169-75. Portuguese.
13. Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. *Eur J Orthod* 1989;11:309–320.
14. Cooper S, Mandall NA, DiBiase D, et al. The reliability of the Index of Orthodontic Treatment Need over time. *J Orthod* 2000;27:47–53.
15. Inglehart MR, Filstrup SL, Wandera A. Oral health and quality of life in children. In: Oral health-related quality of life, Inglehart, MR, Bagramian R, Carol S. III, Quintessence Publishing Company. 2002; 79–88.
16. Mtaya M, Brudvik P, Astrøm AN. Prevalence of malocclusion and its relationship with socio-demographic factors, dental caries, and oral hygiene in 12- to 14-year-old Tanzanian schoolchildren. *Eur J Orthod* Oct;2009;31(5):467-476.
17. Proffit WR, Fields HW Jr, Moray LJ. Prevalence of malocclusion and orthodontic treatment need in the United States: estimates from the NHANES III survey. *Int J Adult OrthodonOrthognath Surg*. 1998;13(2):97-106.
18. Robert S. Corruccini, An Epidemiologic Transition In Dental Occlusion In World Populations, American Journal of Orthodontics and DentofacialOrthopedics, The C. V. Mosby Company, Elsevier Inc. 1984, 86(5): 419-426.