

# Association Between Harmful Oral Habits and Sign and Symptoms of Temporomandibular Joint Disorders Among Adolescents

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## ABSTRACT

**Context:** Temporomandibular disorder (TMD) is defined as a heterogeneous group of psychophysiological disorders commonly characterised by orofacial pain, chewing dysfunction or both. Various Epidemiological studies had shown occurrence of TMD in all age groups including children. Also research had shown that non nutritional oral habits to be associated with TMD.

**Aim:** Present study aimed to find whether harmful oral habits are associated with sign and symptoms of TMD among adolescents in Greater Noida.

**Setting and Design:** Schools in Gautam Buddha district and descriptive study.

**Materials and Methods:** Cross sectional study was carried out among 240 adolescents (10 – 19 years) studying in schools of Greater Noida. Study population were selected by random sampling to whom screening questionnaires recommended by American Academy of Orofacial Pain (AAOP) were distributed. Patient history and clinical examination was used to determine harmful oral habits. Data analysis was done in SPSS version 21 and Chi-square test was applied.

**Results:** Sixty one participants (25.4%) displayed no sign and symptoms of TMD, 34 (14.2%) responded affirmatively to at least one item on the questionnaire and 108(46%) gave at least three affirmative responses. Headache, Neckpain and Toothache were most frequent reported sign and symptoms of TMD (46.2%). There was statistically significant association between gender and sign and symptoms of TMD on three items of the questionnaire ( $p < 0.05$ ). Nail Biting (45.8%), Biting Lips/objects (37%) were most common habits among the study group. There was statistically significant association between Nail Biting ( $p = 0.001$ ), Lip Biting/object biting ( $p=0.001$ ), Grinding of teeth ( $p = 0.01$ ) and sign and symptoms of TMD.

**Conclusion:** A statistically significant association was found between nail biting, lip/ object biting and grinding of teeth with signs and/or symptoms of TMD. Thus there is need for preventive dental treatment and community dental education so that young adults realize importance of early diagnosis and treatment of TMJ disorders.

**Keywords:** Adolescent health, Cross-sectional study, Orofacial pain, Questionnaire

## INTRODUCTION

Temporomandibular joint disorder (TMD) is an enigmatic issue for health care professions all around the globe due to its deleterious effect on stomatognathic system. The term is used to describe “group of orofacial conditions affecting temporomandibular joint and its associated structures” [1]. TMD has multifactorial aetiologies with various initiating factors (trauma, parafunctional habits); predisposing factors (systemic, genetic, structural, psychological) and perpetuating factors (metabolic factors, muscle stress) [2]. It initially manifests as quintessential triology of sign and symptoms in which patient usually experience joint pain followed by clicking sound in joint and finally difficulty in mouth opening [1]. Other commonly occurring sign and symptoms are “soreness of muscles of mastication, attrition of teeth and sensitivity, hyper mobility of teeth, headaches in the temple region, pain in the area of forehead and eyes, pain in the back of the head (possibly extending to the shoulders and neck), fullness in the ears, tinnitus, pressure on the eyes, sensitivity to light, dizzy spells, vertigo, nausea, lack of concentration” [3].

Various epidemiological studies had shown occurrence of sign and symptoms of TMD disorders in all age groups with low prevalence among adolescents [4,5]. Study done by Ebrahimi M et al., and Tecco et al., had shown prevalence of 34.7% and 23.7% among adolescents [6,7]. The range of symptoms occurring in adolescents are considered to be mild in nature [8,9]. Study done by Emodi –

Perlman et al., had shown non nutritional oral habits like lip biting, nail biting being associated with TMD among adolescents [10]. Thus it is necessary to make the adolescents aware about the harmful oral habits that could lead to TMD's. Hence, this study was planned to find the association between parafunctional habits and sign and symptoms of TMD among adolescents residing in Gautam Buddha District.

## MATERIALS AND METHODS

### Overview of District

The present study was carried out in Gautam Buddha Nagar district of Uttar Pradesh, India which was “established from the portions of Ghaziabad and Bulandshahar on 6/9/97” [11]. Its headquarters are located in Greater Noida and total geographical area is of 1442 Sq. Km [11]. It has three Tehsils and four developmental blocks viz. Bsrakh, Dadri, Dankaur & Jewar [12]. According to 2011 census total population of the district is 1,202,030 with 652,819 males and 549,211 females [13].

### Sample Size Calculation

Sample size was determined by conducting a pilot study among 50 adolescents attending OPD in the Department of Public Health Dentistry. Prevalence rate obtained during pilot study was 18% and considering a confidence interval of 95% with precision fixed at 0.05 the sample size calculated by formula:

$$n = 4pq/L^2$$

This is a questionnaire to know about your oral habits and to find if it can lead to temporomandibular dysfunction in future. Please feel free to give your honest response for the questions stated below. Your identity and responses will be kept confidential and will be used with your consent for research purpose only.

S.NO  AGE  GENDER-

Q.1) Do you have any of the following habits

- a) Nail Biting                      Yes                       No
- b) Clenching of Teeth              Yes                       No
- c) Grinding of Teeth                Yes                       No
- d) Biting lip/ Objects                Yes                       No
- e) Chewing Gums                      Yes                       No

Q.2) Do you have difficulty, pain or both when opening your mouth, for instance, to yawn?

Yes                       No

Q.3) Does your jaw get "stuck", "locked" or out of place?

Yes                       No

Q.4) Do you have difficulty, pain or both when chewing, speaking or using your jaws?

Yes                       No

Q.5) Do you hear sounds in your jaw joints?

Yes                       No

Q.6) Do your jaws get stiff, tight or tired regularly?

Yes                       No

Q.7) Do you have pain in or around your ears, temples or cheeks?

Yes                       No

Q.8) Do you get headaches, neck pain or toothaches often?

Yes                       No

Q.9) Have you suffered recent trauma to your head, neck or jaws?

Yes                       No

Q.10) Have you felt any recent change in your bite?

Yes                       No

Q.11) Have you had recent treatment for an unexplained problem in your jaw joints?

Yes                       No

Parents / Teacher Signature

[Table/Fig-1]: Screening Questionnaire Recommended by "AAOP" Used in the Study

Where  $n$  = sample size;  $p$  = approximate prevalence rate of disease prevalence rate;  $q = 1 - p$  and  $L$  is permissible error in the estimation of  $p$ .  $n$  obtained from the pilot study was 236 (236 ~ 240). In the final study 240 adolescents were included for the study. Ethical clearance was approved by Institute Review Committee of I.T.S Dental College Greater Noida.

#### Inclusion Criteria

Adolescents studying in the schools of the district in age group of 10-19 y present on the day of survey along with their parents were included in the study.

#### Exclusion Criteria

Adolescents undergoing orthodontic treatment, having cranio-facial injury and not residing in the district were not included in the study.

#### Sampling Procedure

A descriptive cross-sectional study was conducted from January 2014 to June 2014 in which four schools were randomly selected (each school from each developmental block). Informed consent was obtained either from school authorities or parents. Sign and symptoms of TMD and parafunctional habits were analysed by using

screening questionnaire recommended by American Academy of Orofacial Pain which consisted of ten questions with yes/no response along with patient history and detailed clinical examination [1,14] [Table/Fig-1]. According to guidelines of AAOP, three or more 'Yes' responses indicate TMD [1]. Total 240 adolescents were included from four schools of the district. Clinical Examination was carried by single calibrated examiner in the school premises.

### STATISTICAL ANALYSIS

The data obtained was subjected to statistical analysis using Statistical Package for Social Science (SPSS), version 21.0. p-value <0.05 considered as statistically significant at 95% Confidence level. Chi-square test was applied to find association between parafunctional habits and sign and symptoms of TMD.

### RESULTS

Study population comprised of 110 (45.8%) male and 130 (54.2%) females with mean age of 13.52± 1.8. Sixty one (25.4%) adolescents reported no sign or symptoms of TMD. Thirty four (14.2%) responded yes to atleast one statement of AAOP questionnaire. 37 (15.4%) participants responded yes to atleast two statements of AAOP questionnaire and a total of 108 (46%) adolescents responded yes to three or more questions.

Total number of 59 (24.6%) participants had no harmful oral habits while 91 (37.9%) and 40 (16.8%) participants had presence of two and three or more habits respectively. Statistically significant association was found between nail biting, biting lip / objects, grinding of teeth with sign and symptoms of TMD (p ≤ 0.05) [Table/Fig-2].

Top three symptoms of TMD reported by study population were headache, neckpain, toothache (46.2%), pain in mouth opening (38.8%) and jaw sounds (34.2%). [Table/Fig-3] describes the detailed description of sign and symptoms of TMD reported by the study population. Statistically significant gender difference was observed for three statements of AAOP questionnaire (p< 0.05) [Table/Fig-4] with higher frequency was observed in females for sign and symptoms of TMD when compared to their male counterparts. Higher frequency of TMD symptoms was reported in age group of 13 and 14 y.

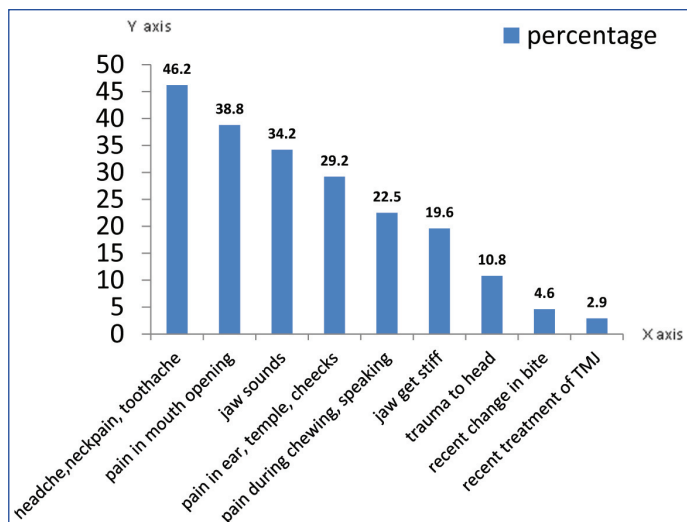
Study subjects who gave three or more positive response to the "AAOP" questionnaire were further categorized as "patients with TMD" and who gave upto two positive response were categorized as "without TMD". Statistically significant association was found between patients with TMD and sign and symptoms like headache, pain in mouth opening, sounds from joint etc [Table/Fig-5].

Harmful habits		Sign & symptoms of TMD		p value
		Upto 2 sign and symptoms (n)	3 or more sign and symptoms (n)	
1. Nail Biting	Yes	39	71	0.001*
	No	93	37	
2. Clenching of teeth	Yes	26	26	0.41
	No	106	82	
3. Grinding of teeth	Yes	14	24	0.625
	No	118	84	
4. Biting Lip / Object	Yes	28	61	0.001*
	No	104	47	
5. Chewing Gums	Yes	41	39	0.40
	No	91	69	

[Table/Fig-2]: Association between harmful habits and sign and symptoms of TMD \* = p value ≤ 0.05 was considered statistically significant

### DISCUSSION

Present study was aimed to find association between parafunctional habits and sign and symptoms of TMD among adolescent residing in Gautam Buddha District. In present study there was statistically significant association between harmful oral habits (nail biting; object/



[Table/Fig-3]: Prevalence of sign and symptoms of TMD in study population

Variables	Male		Female		p-value
	Yes	No	Yes	No	
1. Difficulty, pain while opening your mouth	43	67	50	80	0.92
2. Jaw get "stuck", "locked" or out of place	12	98	17	113	0.60
3. Difficulty, pain or both when chewing, speaking or using your jaws	22	88	32	98	0.39
4. Hear sounds in your jaw joints	38	72	44	86	0.90
5. Jaws get stiff, tight or tired regularly	15	95	32	98	0.03*
6. Pain around your ears, temples or cheeks	25	85	45	85	0.04*
7. Getting headaches, neck pain or toothaches often	53	57	58	72	0.58
8. Suffered any recent trauma to your head, neck or jaws	7	103	19	111	0.04*
9. Felt any recent change in your bite	2	108	9	121	0.06
10. Recent treatment for an unexplained problem in your jaw joints	1	109	6	124	0.08

[Table/Fig-4]: Association between gender and sign and symptoms of TMD \* = p value ≤ 0.05 was considered statistically significant

Sign & Symptoms		Without TMD	With TMD	Total	p value
		N(%)	N (%)		
1. Difficulty, pain while opening your mouth	Yes	15 (16.2%)	78 (83.8%)	93 (100%)	0.001*
	No	114 (27.6%)	33 (22.4%)	147 (100%)	
2. Jaw get "stuck", "locked" or out of place	Yes	8 (27.5%)	21 (72.5%)	29 (100%)	0.003*
	No	121 (57.3%)	90 (42.7%)	211 (100%)	
3. Difficulty, pain or both when chewing, speaking or using your jaws	Yes	13 (24.1%)	41 (75.9%)	54 (100%)	0.001*
	No	116 (62.3%)	70 (37.7%)	186 (100%)	
4. Hear sounds in your jaw joints	Yes	8 (9.8%)	74 (90.2%)	82 (100%)	0.001*
	No	121 (76.5%)	37 (23.5%)	158 (100%)	
5. Jaws get stiff, tight or tired regularly	Yes	15 (32%)	32 (68%)	47 (100%)	0.001*
	No	114 (59%)	79 (41%)	193 (100%)	
6. Pain around your ears, temples or cheeks	Yes	14 (20%)	56 (80%)	70 (100%)	0.001*
	No	115 (67.6%)	55 (32.4%)	170 (100%)	
7. Getting headaches, neck pain or toothaches often	Yes	26 (23.5%)	85 (76.5%)	111 (100%)	0.001*
	No	103 (79.8%)	26 (20.2%)	129 (100%)	
8. Felt any recent change in your bite	Yes	2 (18.2%)	9 (81.8%)	11 (100%)	0.015*
	No	127 (55.4%)	102 (44.5%)	229 (100%)	
9. Suffered any recent trauma to your head, neck or jaws	Yes	4 (15.4%)	22 (84.6%)	26 (100%)	0.001*
	No	125 (58.4%)	89 (41.5%)	214 (100%)	

[Table/Fig-5]: Frequency & percent of TMD according to presence of sign & symptoms \* = p-value ≤ 0.05 was considered statistically significant



lip biting; grinding of teeth) and sign and symptoms of TMD with higher frequency of sign and symptoms observed among females which was accordance to study done by Lauriti et al., [15]. Previous published literature had enumerated factors like hormonal, genetic, emotional factors which contribute to higher prevalence of TMD among females [16-18]. Significant gender difference was observed in present study for sign and symptoms of TMD which was similar to previous published reports among Iranian and Swedish adolescents [6, 18].

Study done by Lobbezoo et al., and Respetto C et al., had stated "bruxism, clenching/grinding of teeth, nail biting, object biting, forward thrust of mandible as parafunctions" [19,20]. In present study statistically significant association was found between Nail biting and TMD. The results were in accordance to study done by Wincur E et al., and Troeltzsch M et al., while Almoudi N et al., and Emodi-Perlman A et al., found no association [10,21-23]. These parafunctional habits should be considered as risk factor for TMD as they act as triggering point for appearance of TMD due to its effect on stomatognathic system.

In present study 46% of adolescents showed sign and symptoms of TMD. Study done by Motta et al., and Thailander et al., showed the prevalence to be 20% and 25% among adolescents, Morinushi et al., showed the prevalence to be 31% in age group of 12 – 14 years and 39.6% among 15- 17 y and Nunes et al., (1997) used helmiko index along with AAOP questionnaire and concluded that 34% adolescents showed mild symptoms of TMD [1,5,24,25]. Headache, neckpain, toothache (46.2%), sounds in the joint (38.7%) and pain in mouth opening (34.1%) were top three sign and symptoms of TMD, similarly observed by Motta et al., among Brazilian adolescents [1]. These three sign and symptoms are considered as classic triad of TMD disorder occurring in a sequential pattern.

AAOP Questionnaire is being recommended by American Association of Orofacial Pain and can be used for screening and diagnosis of individuals with TMD disorders. These screening questionnaires can help in initial identification of individuals having sign and symptoms of TMD which can be sent further for preventive treatment.

## CONCLUSION

This study concluded that there was an association between parafunctional habits and sign and symptoms of TMD, however one of the limitation of this screening questionnaire was that it does not measure the severity of sign and symptoms of TMD and hence further studies need to be conducted for generalizability of the results.

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