



TEMPOROMANDIBULAR DISORDERS AND ITS CORRELATION WITH MALOCCLUSION- A PILOT STUDY

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ABSTRACT

Background: The objective of this pilot study was to evaluate the correlation between temporomandibular disorders and static malocclusion among patients reporting with symptoms of temporomandibular disorders. **Methods:** In this case control study, 50 patients (both male and female gender) were enrolled from outpatient department and divided into 2 groups. The 25 patients in Group I were diagnosed with temporomandibular disorder (TMD) and 25 patients in group 2 were diagnosed not to be suffering from TMD. The age range for both groups was between 16 to 50 years. Research Diagnostic criteria Axis -1 (RDC/TMD) was used for diagnosis of TMD in group 1. First molar relationship with static occlusion features of overjet, overbite, open bite, edge to edge bite and cross bite were considered for diagnosis of malocclusion for both group 1 and 2. Chi square test was performed for data analysis. **Results:** Chi square test analysis for group 1 (TMD) and group 2 (without TMD) result showed that, the observed p value was 0.777, which is not lesser than the 0.05. Hence, there is no statistical significant correlation between the TMD disorder and malocclusion. **Conclusion:** Our study showed no correlation between malocclusion and temporomandibular disorders. Longitudinal studies including both static and dynamic malocclusion and skeletal malocclusion should be planned in future to further evaluate the role of occlusal status with temporomandibular disorders.

KEYWORDS: Temporomandibular disorders, Malocclusion and Static occlusion.

INTRODUCTION

The Temporomandibular disorders (TMD) are a subgroup of oro-facial pain disorders. TMD consists of the pain in the temporomandibular joint (TMJ) region, muscle fatigue of the masticatory muscles, impaired jaw movement, and articular sound.^[1] TMD are considered as one of the common non-odontogenic oro-facial pain condition.^[2]

TMD diagnosis is done with associating signs and symptoms, as some features of TMD may be present in non patients also.^[3] The prevalence of TMD varies between 28% to 88% depending on the type of population studied and the diagnostic criteria used. Earlier TMD was considered as the presentation of Costen syndrome and the new paradigm proposes a multifactorial etiology.^[4] The etiology of TMD is considered to be associated with untreated malocclusions, unstable occlusion, stress, other psychological factors, trauma, individual predisposition,

and structural conditions. The influence of occlusion as risk factor for TMD has varied from no effect to considerable.^[5] The TMD etiology may occur due to mutual interactions of pain, bruxism, and psychosocial factors.^[6]

Association between malocclusion and TMD has been shown by some epidemiological and postmortem studies. Angle's class II, overjet, class III malocclusions, cross bite and open bite are correlated with TMD.^[7] Occlusal factors influence the prolonged low level static contractions or intermittent isometric contractions of masticatory muscles; this may correlate with the development of muscular fatigue, discomfort and pain due to dental occlusion factors.^[8] Thus, the malocclusion traits may be linked with the onset of temporomandibular disorders.

Open bite, posterior cross bite and deep bite were associated with temporomandibular disorders in patients

with general malocclusion and cleft lip and cleft palate.^[9] The association of TMD with anterior open bite, increased maxillary overjet, balanced side interferences, and centric slide has been found significantly higher in a studied population¹⁰. Symptoms and signs of TMD were associated with distal molar occlusion, extreme maxillary overjet, open bite, unilateral cross bite, midline displacement and errors of tooth malformation. Higher risk of developing TMD was linked in children with severe malocclusions.^[11] While few studies have shown a low and no significant association between TMD and Static malocclusion (Cross bite, overbite, open bite, overjet).^[6,12,13] Thus, the exploration for the role of malocclusion is still considered in TMD. We have considered RDC/ TMD axis 1 for physical diagnosis of TMD because RDC/TMD criteria has been proposed for standardized diagnosis.^[2] The objective of this case control study was to investigate that whether presence of malocclusion and TMD diagnosed in a patient suggests any link between two or it is a coincidence. The diagnosis made in this study was based on history, questionnaire and clinical examination of the patient.

MATERIAL AND METHODS

STUDY SAMPLE- The study was conducted for two months in the department of Oral Medicine and Radiology, Faculty of Dentistry, Jamia Millia Islamia, India. Institutional ethical committee, Jamia Millia Islamia, approved the study protocol. The study sample composed of two groups of subjects who were recruited from amongst the patients reporting to the OPD of the Department of Oral Medicine and Radiology. The procedures followed were in accordance with the ethical standards laid down by the ICMR. Written informed consent was taken from every patient and pertinent

information regarding the research was provided using subject information sheets. The group 1 included 25 patients diagnosed with TMD and group 2 included 25 patients from outpatient department with absence of sign and symptoms of TMD. Age and gender of (control) group 2 were matched to (TMD) group 1.

Patients within the age range of 16 to 50 years having intact molars in all the 4 quadrants were only considered for enrollment in this study. The RDC TMD questionnaire and examination based protocol was recorded for all enrolled cases. Diagnosis of TMD was based on RDC/TMD axis 1 criteria.^[2,14] The clinical examination was conducted following universal sterilization protocols, under adequate light source with patient sitting comfortably on dental chair in supine position.

A dental malocclusion was considered, when the individual teeth within one or both jaws were abnormally related to each other. Occlusion status was registered based on Angle's method of molar relation was assessed for malocclusion diagnosis which is as follows-

Angles class I Malocclusion – Maxillary first molar occlude in the mesiobuccal groove of the mandibular first molar.

Angle's class II malocclusion – Mesiobuccal groove of first molar receives distobuccal cusp of first maxillary molar or it may be even more posteriorly placed.

Angle's class III malocclusion in which mandibular first permanent molar is mesial to maxillary first molar. Reference is required here.

The following occlusal features were clinically recorded in habitual contact or centric occlusion for each patient: (Table 1).^[15,16,17]

Anterior open bite – Vertical overlap is < 0 mm.	The distance which the maxillary incisal margin closes vertically past the mandibular incisal margin,
Deep bite- Vertical overlap is >4 mm.	The vertical measurement between the maxillary and mandibular incisal margins is excessive.
Overjet- Horizontal overlap is > 4 mm.	The distance between the lingual aspect of the maxillary incisors and the labial surface of the mandibular incisors.
Crossbite	A condition where one or more teeth may be abnormally malposed buccally or lingually or labially with reference to the opposing tooth or teeth.
Edge to edge bite	A state of zero overjet

Molar relationship with malocclusion was evaluated for group 1 (TMD cases) and group 2 (control).

Chi square test was performed for analyzing comparison of occlusion status of group 1 and group 2.

RESULT

The mean age of TMD patients in group 1 was 28 years and TMD was seen more commonly in the second decade. The prevalence of temporomandibular disorders

patients in group 1 showed that more females reported with TMD compared to males with ratio of (16:9) 2:1.

TMD patients reported most commonly with the complaint of pain in pre-auricular (80%) and temple region (60%) followed by uncomfortable bite (36%), headache (36%), history of lock jaw (28%) and history of trauma (24%). While, ear pain (8%) was least commonly reported by TMD patients.

Average active inter-incisal mouth opening in group 1 was 39 mm and during passive movement was 44 mm.

Clinically pain during opening was observed by 92% of TMD patients, 72% reported pain while mouth opening and tenderness with provocation. (Table-2).

Pain during movement	Percentage of cases
Clicking on protrusion	16%
Clicking on lateral movements	36%
Opening	72%
Unilateral	20%
Bilateral	56%
Absence of clicking on protrusion	12%
Pain during opening	92%
Pain while closing	56%
Provocation	72%

The prevalence of disc displacement with reduction was highest followed by disc displacement without reduction and limited mouth opening. One case of arthralgia was recorded in our study, as our study sample was small with age range not above 50 years while arthralgia is

most commonly seen in patients above 50 years, this might be the reason for one case of arthralgia recorded in our study.^[18] The details of prevalence of TMD found in our study are given in table 1.

Table 3: Details of cases of temporomandibular disorder of group based on RDC/TMD Axis-1.^[19]

Temporomandibular disorder diagnosis based on RDC/TMD Axis I in group 1	Number of patients in group 1 /25
(Ia) Myofacial pain	4
(Ib) Myofacial pain with limited mouth opening	1
(IIa) Disc displacement with reduction	11
(IIb) Disc displacement without reduction and limited mouth opening	5
(IIc) Disc displacement without reduction and without limited mouth opening	3
(IIIa) Arthralgia	1
(IIIb) Osteoarthritis	0
(IIIc) Osteoarthrosis	0

Static occlusion observed in the study showed that class I molar relationship is commonly found in TMD patients. Overbite was commonly seen preceded by overjet, crossbite, edge-to-edge bite and openbite. Control group also showed class I molar relation as most common molar relation. Overbite and overjet is commonly seen and edge to edge bite, crossbite are least commonly seen in our study (Table 4).

Static occlusion	Case	Control
Overjet	7	6
Overbite	8	7
Crossbite	2	1
Edge-to-edge bite	2	1
Open bite	2	2
Class I molar	17	20
Class II molar	7	5
Class III molar	2	0

Chi square test was done for statistical analysis for comparing occlusion status of group 1 (TMD) and group 2. (Table-5).

		Result		Total
		Normal occlusion	Malocclusion	
Subtype	Cases	13	12	25
	Control	14	11	25
Total		27	23	50

Chi-Square Tests (Table-6)

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.081 ^a	1	.777		
Continuity Correction ^b	.000	1	1.000		
Likelihood Ratio	.081	1	.777		
Fisher's Exact Test				1.000	.500
N of Valid Cases	50				

($\chi^2=0.081$, $df=1$, $p=0.777$) The interpretation based on the Chi-square test. The p value is 0.777, which is not lesser than the 0.05. Hence our study showed no statistically significant correlation between temporomandibular disorder and malocclusion.

DISCUSSION

The analysis of our pilot study showed no relevant correlation between temporomandibular disorder and malocclusion features. Malocclusion is considered as one of the etiological factor for TMD. However, various studies support a diminished role of occlusal abnormalities and misalignments in the etiology of TMDs. The studies adopting multifactorial etiology of disease suggested that dental occlusion features are poorly associated with muscle and TMJ pain. Parafunctional activities and psychological factors are suggested as factors for pain symptoms to occur.^[6] On the other hand, there is some orthodontic and maxillofacial surgery literature suggesting the existence of a possible skeletal predisposition to TMJ disc displacement.^[20, 21] Thus, the possibility that certain occlusal features may be associated with an increased risk for disc displacement was worthy of investigation.^[6]

Static occlusion refers to contact between teeth in the intercuspal position when the jaw is closed and stationary and dynamic occlusion refers to occlusal contacts made when the jaw is moving in lateral or protrusive movements of the mandible.^[22]

Our study supports previous studies, which state that static occlusal factors (overjet, overbite, open-bite, and crossbite) have no significant association with TMD and the contribution of malocclusion features to predict TMD is minimal, with no clinical relevance.^[6,23,12]

Orthopedic instability surrounding the TMJ and loading of the joint has been considered as etiological factors for TMD.^[24] Some malocclusions that disrupt the stomatognathic structure should be considered as risk factors for developing TMD. The human TMJ is able to adapt to small, static occlusal discrepancies, without showing signs of pathology.^[12] Dynamic occlusal factors should be assessed because of their potential to disrupt the TMJ. Absence of canine guidance, laterotrusion interferences, non working side occlusal interferences and RCP-MI discrepancies ≥ 2 mm may act as risk factors in TMD.^[6,12,25]

As this study was a short term study and only static occlusal factors were considered, a long term study should be planned for further research. The multifactorial paradigm for TMD suggests that studies should be conducted for factors other than static occlusion such as; correlation of TMD and parafunctional habits, orthopedic instability, dynamic occlusion, impacted molars along with static occlusion.

CONCLUSION

This study supports that, the static malocclusion has no correlation with temporomandibular disorder. A longitudinal study, which includes static and dynamic malocclusion may be considered for a better evaluation of the role of occlusal status and temporomandibular disorders.

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