

# Prevalence of Temporomandibular Disorders among Patients with Partially Edentulous Arches - A Cross-Sectional Study

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**Abstract:** ***Aim:** The aim of the study was to determine the prevalence of Temporomandibular joint disorders among patients with partially edentulous arches. **Introduction:** Temporomandibular Disorders (TMDs) are the most common condition affecting the Temporomandibular joint and associated structures with limitations of masticatory function with complex interaction of factors. **Materials and Methods:** A cross sectional study was conducted among 200 patients with missing teeth in TAGORE DENTAL COLLEGE AND HOSPITAL. They were clinically examined for intraoral findings related to missing occlusal units and extraoral findings related to TMJ symptoms. The patients were partially edentulous RPD or FPD wearers or had not replaced the missing teeth. **Results:** Descriptive statistics were given as mean and standard deviation. The demographic data include Mean (43.8%) , Standard deviation (8.5%)(Min 19%, Max 74%).From the study, 90% of females and 91% of males do not have TMJ pain. However, 6% of males have a mild pain and 5% of females had moderate and 2% had mild and 1% had severe problems. , there is a statistically significant association between sex and TMJ Pain (P<0.0001). **Conclusion:** This study reveals that there is a positive association between sex and TMJ pain, (P<0.0001). This study reveals no significant relation between age and TMJ pain, missing occlusal unit and TMJ pain.*

**Keywords:** Temporomandibular disorders, occlusal units, missing teeth, clicking sound, Temporomandibular symptoms, partially edentulous arches.

## 1. Introduction

Prevalence of temporomandibular disorders in general population is fewer when compared to other dental disorders like tooth decay, gum diseases, receding gums, root infection, cracked or broken tooth and enamel erosion 1.

However, there has been found to be some association between the prevalence of missing posterior teeth and intraarticular TMJ disorders in symptomatic subjects. It is also observed that TMJ disorders have lesser occurrence when there are no missing posterior teeth 2.

Loss of posterior teeth, especially when the number of missing teeth is small, may exert secondary changes, including drifting and tipping of the remaining teeth. Studies have not shown positive association between malocclusion alone and TMD symptoms. Also, patients with multiple missing teeth were found to have TMD associated symptoms more frequently when it was not associated with malocclusion<sup>11</sup>. Some other authors have suggested that abnormal occlusion does have an effect on TMD symptoms, since the occlusal interference increases with more number of teeth present<sup>14</sup>. The results of another study indicates that the number of missing posterior teeth and the number of dental quadrants with missing posterior teeth affects the severity of the TMD symptoms.

Previous studies reported that complete denture wearers had a higher prevalence of TMD symptoms than the population

with natural dentition 6. However, others reported a higher figure of TMD signs in dentate individuals when compared with edentulous patients 7, this may be attributed to the low percentage of edentulous patients who complain of TMD 8. In trying to correlate TMD signs or symptoms to age, it has been reported that signs and symptoms of TMD decrease with increasing age 9. While other studies reported that signs and symptoms of TMD increase with age. 10.

The prevalence of TMD signs and symptoms in partially edentulous patients restored with maxillary and/or mandibular fixed partial dentures has not been well-documented in the literature. In one particular study, there was a dramatic improvement in the patients' occlusal comfort after initial occlusal equilibration of the final restorations. Other studies reveal however that the most prevalent occlusal interferences that inhibited lateral gliding articulation movements were found in the most posterior tooth area (second or third molars), both on working and nonworking sides. This finding seems to be biomechanically logical 13.

A positive association between missing mandibular posterior teeth and the presence of disk displacement was found in various studies<sup>7</sup>. Another study correlated clicking sound of TMJ and missing teeth, but it does not seem to be conclusive. There are no other definitive studies indicating the correlation between the Tmd signs and symptoms and missing teeth.

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Also, there do not seem to be any systematic dental occlusal differences that clearly separate symptomatic from asymptomatic patients<sup>14</sup>.

The purpose of this study is to determine the prevalence of temporomandibular disorders among patients with partially edentulous arches.

## 2. Materials and Methods

This cross-sectional study was conducted among 200 patients with missing teeth who reported to the outpatient Department of TAGORE DENTAL COLLEGE. They were clinically examined for intraoral findings related to missing occlusal units and extraoral findings related to TMJ symptoms and the findings were tabulated. They were then asked to fill a 12 item, close ended questionnaire and given a time of 10 minutes for the same.

The study includes the partially edentulous patients who were classified under the category of Eichner class A & B based on number of occlusal units and those having temporomandibular joint disorders. Completely edentulous patients on either or both arches, patients who have undergone Maxillectomy and Mandibulectomy, those having TMJ ankylosis, rheumatoid arthritis and osteoarthritis or undergone TMJ arthroscopic surgery were excluded from the study.

**Table 1: Demographic Data**

	Age	No. of missing teeth
Mean	43.805	3.225
SD	8.586361	1.675833
Min	19	1
Max	74	10

**Table 2**

S.NO	Clinical Examination	Frequency distribution of symptoms and clinical findings among study participants				
1.	Period of edentulism	3-6 Months	6months -1 Year	1-2 Years	3 Years and Above	
		36(18)	94(47)	65(32.5)	5(2.5)	
2.	Artificial teeth	<b>RPD</b>	<b>FPD</b>			
	<b>U</b>	54(27)	20(10)			
	<b>L</b>	41(20.5)	29(14.5)			
	<b>UL</b>	31(15.5)	8(4)			
	<b>NIL</b>	73(36.5)	143(71.5)			
3.	Missing occlusal unit	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>0</b>
		9(4.5)	23(11.5)	4(2)	1(0.5)	163(81.5)
4.	Normal mouth opening	Adequate	Inadequate			
		191(95.5)	9(4.5)			
5.	Clicking sound	<b>Y</b>	<b>N</b>			
		17(8.5)	183(91.5)			
6.	Pain on palpation	<b>Y</b>	<b>N</b>			
	Masseter	42(21)	158(79)			
	Temporalis	16(8)	184(92)			
	Medial pterygoid	15(7.5)	185(92.5)			
	Lateral pterygoid	36(18)	164(82)			
7.	Pain in TMJ	<b>Y</b>	<b>N</b>			
		183(91.5)	17(9.4)			
	PERIOD OF PAIN	<b>1 Month</b>	<b>3 Month</b>	<b>6 Month</b>	<b>More than year</b>	
		10(5)	6(3)	0(0)	1(0.5)	
	SEVERITY	<b>Critical</b>	<b>High</b>	<b>Moderate</b>	<b>LOW</b>	<b>Informational</b>
		2(1)	2(1)	4(2)	8(4)	0(0)
8.	Pain in HEAD AND NECK REGION					
	HOW LONG	<b>1 Month</b>	<b>3 Month</b>	<b>6 Month</b>	<b>More than year</b>	
		75(37.5)	88(44)	16(8)	3(1.5)	
	SEVERITY	<b>Critical</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>	<b>Informational</b>
		5(2.5)	21(10.5)	149(74.5)	7(3.5)	0
		<b>Y</b>	<b>N</b>			
9.	Discomfort during opening of jaws	8(4)	192(96)			
10.	Difficulty in lateral movements of jaw	133(66.5)	66(33)			
11.	Difficulty in protrusive movement of jaw	176(88)	24(12)			
12.	Discomfort during mastication	148(74)	52(26)			
13.	Chewing in both sides	93(46.5)	107(53.5)			
14.	Fatigue during chewing	114(57)	86(43)			
15.	Night grinding	2(1)	189(94.5)			
		<b>Never</b>	<b>Hardly Ever</b>	<b>Occasionally</b>	<b>Fairly Often</b>	<b>Very Often</b>
16.	Clicking sound in mastication and speech	107(53.5)	47(23.5)	45(22.5)	1(0.5)	0(0)
17.	Difficulty in chewing hard or tough food	83(41.5)	40(20)	73(36.5)	4(2)	0(0)

**Table 3:** Association between missing occlusal unit and TMJ pain

Parameter	Value
Spearman's rank correlation coefficient (rs)	<b>0.004171</b>
P-value	0.9533
Covariance	4.5176
Sample size (n)	200
Statistic	0.0587
Power	0.9917

**Table 4:** Association between Sex and Pain

	No	a	B	C	d
Female	90.90909	2.5974026	5.194805195	0	1.298701
Male	91.86992	6.50406504	1.62601626	0	0
P Value	0.0000				

**Table 5:** Association between Age and TMJ Pain

Parameter	Value
Spearman's rank correlation coefficient (rs)	-0.1022
P-value	0.1499
Covariance	-165.266
Sample size (n)	200
Statistic	-1.4453
Power	0.9917

### 3. Result

In this study the Descriptive statistics is expressed as frequencies and percentages. The mean of study participants was 43.8 with minimum age 19 and maximum age 74 and standard deviation 8.5. Mean number of missing teeth was 3.22 with minimum 1, maximum 10 and standard deviation at 1.67. The study participants were divided into 6 age groups. The distribution of participants based on age group and gender is depicted in **TABLE 1**. Out of 200 participants number of males were 123 (61.55%) and females were 77(38.5%).The frequency distribution of symptoms such as pain in TMJ, head and neck, clicking and difficulty in chewing etc and clinical findings such as number of missing occlusal units , mouth opening and participants using artificial teeth etc are described in **TABLE 2**. The association between number of missing occlusal units, sex and age with TMJ pain was statistically analysed using Spearman's correlation and is described in **TABLE 3,4&5** respectively. **TABLE 3** shows that there is a non – significant very small positive relationship between X and Y, ( $r(198) = .00417, p = .953$ ). It reveals that as the number of missing occlusal unit increases TMJ pain also increases. **TABLE 4** shows that there is a non significant very small negative relationship between X and Y, ( $r(198) = .102, p = .150$ ). It indicates that as the age increases TMJ pain decreases. When the distribution of TMJ pain based on gender was evaluated in **TABLE 5** it was found that 90% of female & 91% of males did not have TMJ pain Whereas, 2% of females & 6.5% of males had mild pain, 5% of females & 1.6% of males had moderate pain, and 1.2% of females had severe pain. Chi square test revealed statistically significant association between sex and TMJ pain.

### 4. Discussion

The prevalence of TMD among dentate, partially edentulous and completely edentulous individuals have been investigated. However, an association between

temporomandibular disorder and missing teeth has not been established (1). Few studies comparing the TMJ symptoms between dentate and partially dentate individuals have shown higher prevalence in dentate individuals.(2),whereas other studies which investigated TMD symptoms among partially edentulous individuals reveal that as the span and time of edentulousness increased the signs of TMJ dysfunction became more prevalent (3). Another study which evaluated the association of edentulousness with TMD symptoms showed more prevalence of TMD symptoms among completely edentulous individuals as compared to partially and fully dentate individuals (4).

In the study the correlation between number of missing occlusal units and TMJ symptoms were assessed using spearman's correlation (0.00417).Although the correlation was not statistically significant ( $p>0.05$ ) it has a very small positive association between missing occlusal unit and TMJ pain which suggests that as the missing occlusal unit increases the TMJ pain also increases. This is in agreement with the study done by Wang MQ, Xue F et all who concluded that individuals with missing posterior teeth in more quadrants have a higher prevalence of TMD(5). However the study done Osama A,Al-Jabrah et all showed partially edentulous individuals with upper and lower RPD to have significantly higher prevalence of TMD compared to edentulous individuals wearing CD (6). This difference in TMD symptoms between partially edentulous and completely edentulous individuals may be due to pathologic migration of teeth and occlusal interference present in partially edentulous individuals which contribute to the TMD symptoms.

In the study the correlation between age and TMJ pain was assessed using spearman's correlation (-0.1022).Although the correlation was not statistically significant ( $p>0.05$ ) it has a very small negative relationship between age and TMJ pain which suggests that when the age increases TMJ pain decrease. Epidemiological studies has shown that significantly higher prevalence of TMD in the 20 – 40 year age group(7 8 9 10). The results of this study are in contrast to a study done by Anuna Laila Mathew, Amar A Sholapurkar, Keerthilatha M Pai which showed that Radiographic abnormalities in the mandibular condylar morphology increased with age. in patients with temporomandibular dysfunction and loss of teeth. Intra examiner and inter examiner reliability was high indicating a good reliability in assessing the condylar changes using panoramic radiograph. However the study done by Janal MN, Raphael KG et all revealed that TMD prevalence was inversely proportional to age was oriented with the study (11)

In the study the correlation between the sex and TMJ pain was assessed using Chi square test. The correlation was statistically significant ( $p>0.05$ )association between age and TMJ pain. Epidemiological studies showed that females have higher TMJ pain when compared to the males possibly due to biological, psychological and other social factors (12).This study revealed that number of males with TMJ symptoms were more compared to the females. This may be due to the factor in our study number of missing occlusal unit were considered rather than number of missing teeth.

Study done by Vikram anuja, Vikash Ranjan et all revealed that Stress is a significant etiologic factor involved in initiation and maintenance of TMDs (13). Other study done by Ahmad Mottaghi, S.MohammadRazavi et all revealed that there is a parallel increase of temporomandibular disorders and anxiety between the two stages ca suggest a possible relationship between anxiety and temporomandibular disorders (14)

## 5. Conclusion

A significant association between sex and TMJ pain was found in this study. However it does not have a significant association between the missing occlusal unit and TMJ pain and association between sex and TMJ pain. Although the literature does not suggest that replacement of these teeth will prevent the development of TMJ disorders, their absence may accelerate the development of degenerative joint

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