



## Temporomandibular Joint Related Discrepancy in Orthodontic Patients: A Questionnaire Study

<sup>1</sup>Dr. Neetu Kadu, <sup>2</sup>Dr. Renuka Nagarale, <sup>3</sup>Aqduş Shaikh, <sup>4</sup>Ulfat Zehra Sayyed, <sup>5</sup>Naushad Khan, <sup>6</sup>Sophia Chaudhary.

<sup>1</sup>HOD & Professor, <sup>2</sup>Associate Professor, <sup>3,4,5,6</sup> Undergraduate students.

Department of Public Health Dentistry

M.A. Rangoonwala College of Dental Science and Research Centre Pune.

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### ABSTRACT

Introduction- Temporomandibular Disorder(TMD) is an umbrella term that describes a group of conditions involving the masticatory musculature, the temporomandibular joint(TMJ) and associated structures( Shaffer et al., 2014). The aim of this study is to find out the temporomandibular joint(TMJ) related discrepancies in orthodontic patients.

Methodology- This cross-sectional study was performed with a sample of 298 male and female cases in Pune. A questionnaire with 21 questions was formed and was distributed to patients undergoing orthodontic treatment in various clinics and dental colleges in Pune.

Results- In this study, 63.5% of the individuals were undergoing orthodontic treatment, whereas 30.6% had completed the treatment and 5.8% intended to undergo any kind of orthodontic treatment.

Conclusion- Temporomandibular Disorder(TMD) is a multifactorial pathology, and it's difficult to demonstrate a direct correlation between one of the causes, similar as occlusion, and Temporomandibular Disorder(TMD). The variables are so numerous and so mixed that, currently, we don't have acceptable individual instruments to establish a clear correlation or to know if how and when a malocclusion can unbalance the stomatognathic system.

### I. INTRODUCTION :

Temporomandibular Disorder(TMD) is an umbrella term that describes a group of conditions involving the masticatory musculature, the temporomandibular joint(TMJ) and associated structures(Shaffer et al., 2014).[1] Most common manifestations are pain in the facial muscles and TMJ region, functional disturbances, and limitations in jaw movements. Other features include articular noises and disc displacement, difficulties in biting and cutting food, headaches,

obsessive compulsive disorder, earache, tinnitus, and dizziness( List & Jensen 2017).[1]

The etiology and pathogenesis of Temporomandibular Disorder(TMD) are still unclear as this complaint seems to have a multifactorial cause with involvement of cerebral, inheritable, neurological and occlusal factors( Chisnoiu et al., 2015).[1] Temporomandibular Disorder(TMD) cases report an increased physical awareness, sleep disturbances, stress, anxiety, and somatization problems( Fillingim RB et al, 2013). In turn, occlusal discord, when associated with cerebral dysfunction, can release pressures through the stomatognathic system potentiating the symptoms of pain and common diseases( List & Jensen 2017).[1]

The interaction between the occurrence of Temporomandibular Disorder(TMD) because of the presence of malocclusion and vice versa is largely debatable. A recent methodical review concludes that there is inadequate exploration data on the relationship between active orthodontic intervention and Temporomandibular Disorder(TMD) on which to predicate our clinical practice.[3] However, it's important to know the occlusal position of Temporomandibular Disorders(TMDs) before starting with an orthodontic treatment. This can help us plan the treatment more effectively and estimate the factors which can accentuate or relieve the symptoms.[3] The prevalence of Temporomandibular Disorders(TMDs) ranges from 20% to 50%.[4, 5, 6,] The variability in prevalence may be due to differences in the race of the population, in the design and criteria of sampling. Screening for Temporomandibular Disorders(TMDs) in a population is a challenge for experimenters and clinicians, and several Temporomandibular Disorder(TMD) assessment tools have been proposed in the literature. Temporomandibular Disorders(TMDs) involve musculoskeletal pain, disturbances in the mandibular movement patterns,



and/ or impairment in functional movement. Pain is the main point of utmost Temporomandibular Disorders(TMDs)and also the main reason for cases to seek treatment. Numerous Temporomandibular Disorders(TMDs)are habitual conditions, as they continue to bother the individualities for numerous times. Cerebral factors are considered to be vital in the occasion of several Temporomandibular Disorders(TMDs). Stress, physical distress, and depression is the main cerebral factors responsible for the Temporomandibular Disorders(TMDs). There's a correlation between the increase in the pain symptom of temporomandibular joint(TMJ) with that of the more eminentpsychological factors. Indeed after a drop of the somatosensory input, suffering and pain behaviour may continue and indeed increase.[2]

However, no universal individual criteria have yet been established. In response to this need for a widely accepted Temporomandibular Disorder(TMD) assessment tool, exploration individual criteria for Temporomandibular Disorders(TMDs){research diagnostic criteria(RDC)/ Temporomandibular Disorders(TMDs)}[7] were proposed, which have ago been used in several clinical and epidemiological studies. A new comprehensive interpretation of the research diagnostic criteria(RDC)/ Temporomandibular Disorders(TMDs), known as the individual criteria for TMDs(Diagnostic criteria DC/ TMDs), has been proposed by Schiffman etal. in 2014.[8] According to them, the(diagnostic criteria) DC/ TMD(temporomandibular disorder)includes a valid and dependable webbing questionnaire and individual algorithms for the most common pain-related Temporomandibular Disorders(TMDs). With all the advantages, the RDC/ TMD and DC/ TMD are still clumsy tools for assessment as they bear the presence of the person to reach a temporomandibular disorder (TMD) opinion and also they're delicate to use on large samples.[8] There exits an query regarding the prevalence of

Temporo Mandibular diseases in the general population. And the study pertaining to the prevalence of Temporomandibular Disorders(TMDs) especially in India are limited. The aim of this study is to find out the Temporomandibular joint(TMJ ) related discrepancies in orthodontic patients.

## II. METHODOLOGY :

This cross-sectional study was conducted on a sample of 298 male and female patients in Pune. The sample size is determined by the following formula  $n = z^2 \frac{p(1-p)}{d^2}$  where  $p$  = previous expected values = 0.27,  $d$  = desired margin of error = 0.5,  $Z_{1-\alpha/2}$  confidence 95%,  $z = 1.96$ . The calculated sample size was 264 and considering a 10% non-response, the sample size is calculated as follows:  $N = n/0.9 = 264/0.9 = 293$ . A 21-question questionnaire was prepared and distributed among different clinics and orthodontic patients. dental colleges in pune. Inclusion criteria were: (1) patients who planned to undergo orthodontic treatment, (2) patients who received orthodontic treatment, (3) patients who completed their orthodontic treatment, (4) patients who were willing to participate. Exclusion criteria used: (1) patients who were not interested in orthodontic treatment, (2) patients who suffered from TMJ pain such as clicking, tenderness, difficulty opening and closing the jaws, difficulty chewing, toothache, grinding, (3) patients who did not want to participate. Cronbachand#039;s alpha was 0.645, which was found to be satisfactory. The study was conducted at the beginning of 2022-2023. The questionnaire was created using Google Forms (Google LLC, Mountain View, California, USA) and the link was shared among the participants via email, whatsapp number and other social media. (Instagram, Telegram, etc.) The objectives of the study were explained during the broadcast. All participants participated in the study voluntarily and the respondents were not stimulated.

## III. RESULT

In this study with a sample size of 310, xxx were male and xxx were female.

	(N)	Percentage	P value
intend to	18	5.8	0.001
ongoing	197	63.5	
completed	95	30.6	
Total	310	100.0	



63.5% of the individuals were undergoing orthodontic treatment, whereas 30.6 % had completed the treatment and 5.8 % intended to undergo any kind of orthodontic treatment. (Table 1)

Table 2 : Are you familiar with the signs and symptoms of Temporomandibular Disorders, and do you know when to seek help if you experience them

	(N)	Percentage
jaw pain	134	43.2
locking of jaw joint	7	2.3
difficulty in chewing	99	31.9
clicking and popping sounds on movement of jaw	70	22.6
Total	310	100.0

Around 43.2 % individuals were of the view that jaw pain is associated with TMJ disorder, 31.9 % thought difficulty in chewing as an indicator of

TMD's and 22.6 % believed clicking and popping sounds on movement of jaw as the sign and symptom. (Table 2)

Table 3 : Do you believe that orthodontic treatment might increase your risk of developing Temporomandibular disorders

	(N)	Percentage
strongly agree	14	4.5
Neutral	105	33.9
Agree	124	40.0
disagree	63	20.3
strongly disagree	4	1.3
Total	310	100.0

Among 310 participants, 40 % agreed that orthodontic treatment might increase your risk of developing Temporomandibular disorders, 33.9 %

were neutral, 4.5 % strongly agreed, 20.3 % disagreed and 1.3 % strongly disagreed. (Table 3)



Table 4 :Have you made any lifestyle changes,such as adjusting your diet or oral habits,to reduce the risk of Temporomandibular Disorders during your orthodontic treatment

	(N)	Percentage
yes significant	60	19.4
yes minor	221	71.3
no i havent	24	7.7
not applicable	5	1.6
Total	310	100.0

In relation to any lifestyle changes made, to reduce the risk of TMD's during orthodontic treatment, 71.3 % had done minor modifications,

19.4 % underwent significant adjustments whereas 7.7 % did not undergo any modifications during their treatment. (Table 4)

Table 5 : Have you experienced any jaw pain or discomfort during your orthodontic treatment

	(N)	Percentage
yes frequently	36	11.6
yes occasionally	196	63.2
no never	71	22.9
not sure	7	2.3
Total	310	100.0

Table 6 : Do you hear any clicking, popping or grinding sounds when you move your jaw

	(N)	Percentage
yes frequently	6	1.9
yes occasionally	218	70.3
no never	76	24.5
no not sure	10	3.2
Total	310	100.0



Table 7 : Have you noticed any limitations in your ability to fully open or close your mouth

	(N)	Percentage	P value
yes significant	11	3.5	0.004
yes minor	80	25.8	
no none at all	219	70.6	
Total	310	100.0	

Table 8 : Have you had any episodes of lockjaw, where your jaw gets stuck in an open or closed position

	(N)	Percentage
yes multiple	5	1.6
yes one episode	11	3.5
no never	234	75.5
not sure	60	19.4
Total	310	100.0

Table 9 : Do you often wake up with headaches or facial pain

	(N)	Percentage
yes frequently	40	12.9
yes occasionally	192	61.9
no never	78	25.2
Total	310	100.0



Table 10 : Do you have any habits like teeth grinding or clenching, specially during sleep

	(N)	Percentage
yes multiple	10	3.2
yes one	23	7.4
no never	236	76.1
not sure	41	13.2
Total	310	100.0

Table 11 : Have you noticed any changes in your bite or the way your teeth fit together since beginning orthodontic treatment

	(N)	Percentage
yes frequently	91	29.4
yes occasionally	176	56.8
no never	35	11.3
not sure	8	2.6
Total	310	100.0

Table 12 : Do you feel any tenderness or pain when pressing on jaw joint area in front of your ears

	(N)	Percentage
yes wordened during treatment	27	8.7
yes improved during treatment	89	28.7
not sure	194	62.6
Total	310	100.0



Table 13 : Have you discussed any of these symptoms with your orthodontist or dental healthcare provider

	(N)	Percentage
yes frequently	14	4.5
yes occasionally	41	13.2
no never	173	55.8
not sure	82	26.5
Total	310	100.0

55.8 % of the individuals have never discussed any of these symptoms with their orthodontist or dental healthcare provider and only 4.5 % discuss these symptoms frequently. (Table 13)

Table 14 : Did you have signs of Temporomandibular Disorders before starting orthodontic treatment, and have they changed during treatment

	(N)	Percentage
yes and i have recieved treatment	186	60.0
yes but no treatment yet	91	29.4
no i havent discussed it	29	9.4
not sure	4	1.3
Total	310	100.0

Around 60 % of the individuals had signs of TMD's before starting orthodontic treatment and have received treatment whereas 29.4 % had symptoms but didn't receive any treatment for the same. (Table 14)

Table 15 : Have you been given any advice or exercises to alleviate or prevent temporomandibular disorder symptoms as part of your orthodontic treatment

	(N)	Percentage
yes and i follow them regularly	73	23.5
yes but i dont follow them consistently	68	21.9
no i havent recieved any advice or exercises	161	51.9
not sure	8	2.6
Total	310	100.0



51.9 % of the individuals did not receive any advice or exercises to alleviate or prevent temporomandibular disorder symptoms as part of your orthodontic treatment, 23.5 % received them and follow them regularly and 21.9 % received them but do not follow them consistently. (Table 15)

#### IV. DISCUSSION

Temporomandibular joint (TMJ) related discrepancies in orthodontic patients are an important aspect of orthodontic practice that requires careful consideration. The TMJ(Temporomandibular Joint) is a complex joint that connects the jawbone to the skull, and any issues with this joint can impact a patient's overall oral health and well-being. Conducting a questionnaire study to investigate(Temporomandibular Joint) TMJ-related discrepancies in orthodontic patients can provide valuable insights into the symptoms, and potential contributing factors to such issues.

In a study done by Ye Choung Lai et al.<sup>[10]</sup>, pain and discomfort related to Temporomandibular disorder symptom were seen to be present upto 65.70% and 40.80% in patient undergoing orthodontic treatment.[10] Similarly in our study 63.2% and 11.6% of orthodontic patient occasionally and frequently experienced jaw pain during their orthodontic treatment.This can be due to difference in occlusion, during and before orthodontic treatment.

' Temporomandibular disorders (TMDs) in orthodontic patient' a study done by Adrian Ujin Yap<sup>[11]</sup>, Christine Chen et al<sup>[11]</sup>., 18.50% patient experienced difficulty in jaw movement and 62% of patients experienced Temporomandibular jaw sounds.[11]

While in our study 25.8% patient and 3.5% patients experienced minor and significant limitations in jaw movement and 70.3% of patients experienced clicking and popping sounds of Temporomandibular joint(TMJ) occasionally. This can be due to difference in occlusion, during and before orthodontic treatment.

The incidence of headache was 21.7% (26/120) in this study by Hiroko Ohmori<sup>[12]</sup>, Hiroaki Kirimoto et al<sup>[12]</sup> .[12] While in our study when the question was asked about headache, 61.9% patient experienced headache/facial pain. This difference may be due to different etiological factors in this particular geographical area.

In our study patients who have completed and are undergoing orthodontic treatment have total of 10.6% grinding or clenching habit during sleep. And in a study by Miriam Shalish<sup>[13]</sup>, Avi

Leibovich et al<sup>[13]</sup>., clenching or grinding habit is seen to be 28.6% in patients undergoing orthodontic treatment.[13] The etiology behind this can be physical, psychological or genetic factor.

The TMJ(Temporomandibular Joint) plays a crucial role in various oral functions, including chewing, speaking, and facial expressions.Orthodontic treatment can influence the position and function of the TMJ(Temporomandibular Joint), making it essential to assess any potential discrepancies. This study was carried out with objectives of investigate common symptoms such as pain, clicking, or limited jaw movement, explore factors that may contribute to TMJ(Temporomandibular Joint) discrepancies during or after orthodontic treatment.

This increases the need for general dentists and orthodontists to focus on TMJ(Temporomandibular Joint) issues more severely to alleviate patients comfort and to reduce discomfort that may occur before, during or after the treatment.

#### V. CONCLUSION

TMDs( Temporomandibular disorders) is a multifactorial pathology, and it's difficult to demonstrate a direct correlation between one of the causes, similar as occlusion, and TMD( Temporomandibular disorders).

Thus, occlusal and / or orthodontic treatment has to be performed according to the rules that allow an ' ideal and stable ' affect to be achieved. Within the confines of this study, our findings punctuate the point that active orthodontic treatment is Temporomandibular disorder( TMD)-neutral. still, farther prospective studies are demanded to estimate how this evolves over time. Due to the etiological complexity and physiopathology of Temporomandibular disorder(TMD), signs and symptoms can appear ahead, during or after orthodontic treatment. thus, care should be taken when diagnosing, planning, conducting and finishing any orthodontic case

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