

Relationship between temporomandibular joint problem and malocclusion - An awareness survey among dental students and dentists

Aravinthraj Kumar Govindaraj*, S. P. Saravana Dinesh, M. Srirengalakshmi

ABSTRACT

Introduction: One of the most common causes for temporomandibular joint (TMJ) problems is malocclusion. In most cases, the underlying TMJ problems are left unnoticed when the patient comes for general checkup or any other reason. Thus, TMJ should be examined in all the cases whether the chief complaint of the patient is related to TMJ or not, to prevent any future problems of the TMJ. The main aim of this survey is to find out the awareness among the dentists and dental students regarding the relationship between the TMJ disorders (TMD) and malocclusion. **Materials and Methods:** A questionnaire survey containing 14 questions was prepared which contained questions regarding the information about the subject and their knowledge about the relationship between TMD and malocclusion. The questionnaire was prepared using Google forms and was sent to 119 subjects through the mail and by sharing the link of the survey. The subjects included the dental students including the interns and postgraduates, academic staffs, and private practitioners. **Results and Conclusion:** Out of the 119 responses about 91.1% subjects were aware of the relationship between TMD and malocclusion, and the rest were not aware of it. Although the percentage of the subjects who were not aware of it was less, it is very essential for everyone to know the same and examine each and every patient for the presence of any TMD by examining their movements and functions and refer them to a concerned specialist if there any findings regarding the same.

KEY WORDS: Awareness, Examination of temporomandibular joint, Malocclusion, Temporomandibular joint, Temporomandibular joint disorders

INTRODUCTION

Temporomandibular joint (TMJ) is a joint between the glenoid fossa of the temporal bone and the condylar process of the mandible. It is a joint which connects the cranium to the mandible. It is a bilateral synovial joint. It is held position by the joint components which include the muscles and the ligaments. TMJ is divided into superior and inferior compartments by the articular disc. Temporomandibular disorders (TMD) are one of the most common disorders that dentist come across in their daily practice. A significant percentage of the population in Chennai had signs of TMD, and there are chances they develop symptoms of the same.^[1] TMD is a generic term which describes

the signs and symptoms of all the dysfunctions or disorders associated with the TMJ and its associated structures such as the joint components, muscles, and ligaments. There are various TMD, out of which myofascial pain dysfunction syndrome (MPDS), internal derangement, ankylosis, and dislocation are the ones which are more commonly reported.

Management of TMD involves the work of dentists from various specialties. It is multifactorial in nature and requires proper examination and treatment planning. The first and foremost are the work of the specialist from oral medicine and radiology department to identify and diagnose the problem, followed by the work of the orthodontists, prosthodontists, or oral surgeons.

TMD are usually a multi-factorial condition in which malocclusion is one of the factors for its causation. However, there is various opinions regarding the

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Department of Orthodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

***Corresponding author:** Dr. Aravinthraj Kumar Govindaraj, Department of Orthodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India. Phone: +91-8072332799. E-mail: draravinthraj.kumar.sav@gmail.com

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same. Since the connection between occlusion of the dentition and TMJ functions, orthodontists play a predominant role in managing a TMJ disorder or dysfunction. There are studies which showed that there is no or only a mild connection between TMD and malocclusion. Facial esthetics play an important role in the psychological and social development of an individual.^[2] Although there are controversies regarding the relationship between TMD and malocclusion, it has been showed that occlusion has an influence on the masticatory muscle functions.

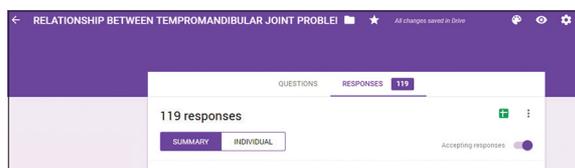
The main purpose of this survey is to study the awareness among the dentists regarding the relationship between TMD and malocclusion and to find if there is any difference in the same between the dentists associated with the institutions and dentists who are private practitioners. Dentists must have the basic knowledge regarding the examination of TMJ and regarding the signs and symptoms of TMD and to refer the patient with the symptoms to the concerned specialist.

MATERIALS AND METHODS

This is a knowledge aptitude practice survey regarding the relationship of TMD and malocclusion. The survey was prepared using Google forms and was sent to the participants using the web link of the survey. This is a survey among dental students and dentists who are private practitioners or associated with any academic institution. 119 subjects belonging to the dental profession were randomly included in the survey. The subjects were asked to give their email id and were asked to do the survey. The survey consisted of 14 questions out of which 10 questions were compulsory questions and 4 were not compulsory questions. Out of the 14 questions, 11 questions were multiple choice questions and 3 questions were short answer questions. Out of 119 subjects 101 subjects were associated with institutions and 18 subjects were private practitioners.

RESULTS

The survey was completed, and the results obtained were plotted into graphs and the values are mentioned in the following tables. For every question, the total number of responses was mentioned and out of it, the



1. Are you a private practitioner or associated with an institution?

Total responses	119
Associated with any institution	80.7%
Private practitioner	19.3%

2.If associated with an institution, what is your institutional position?

Total responses	101
UG student	47.5%
PG student	5.9%
Academic staff	19.3%

3. If a postgraduate student or academic staff, specify department

Total responses	54
Oral medicine and radiology	2
Oral and maxillofacial surgery	8
Oral pathology	6
Orthodontics and dentofacial orthopedics	8
Pedodontics	2
Conservative dentistry and endodontics	9
Public health dentistry	2
Prosthodontics	5
Periodontics	2
Esthetic dentistry	3
Implantology	3
Nil	2

4. Are you aware of the relationship between TMJ and malocclusion?

Total responses	119
Yes	91.6%
No	8.4%

5. How commonly have you noticed malocclusion in patients in your daily routine?

Total responses	119
1 in 5 patients	41.2%
1 in 10 patients	33.6%
1 in 20 patients	19.3%
1 in 50 patients	5.9%

6. How often do you examine your patient for temporomandibular joint problems?

Total responses	119
Always	31.1%
Only if the chief complaint is associated with temporomandibular joint	68.1%
Never	0.8%

7. Do you examine your patient for any temporomandibular joint abnormalities if the patients chief complaint is malocclusion?

Total responses	119
Yes	49.6%
No	14.3%
Not always	36.1%

8. Have you noticed any temporomandibular disorders in your patient associated with the malocclusion?

Total responses	119
Yes	59.7%
No	16%
Not aware	24.4%

9. What is the most common temporomandibular disorder which you have come across?

Total responses	119
Myofascial pain dysfunction syndrome	41.2%
Ankylosis	9.2%
Internal derangement	33.6%
None of the above	16%

10. If your option was none of the above, please specify the temporomandibular disorder which you have come across

Total responses	13
Subluxation	2
Clicking and deviation	3
Mandibular deviation	1
Clicking sound	2
Ankylosis	1
Dislocation of joint	1
Disc displacement	1
Nil/none	2

11. What do you think is the most important factor for causing Myofascial pain dysfunction syndrome?

Total responses	119
Malocclusion	42%
Stress	16%
Genetics	40.3%
Sleeping habit	0.8%
Any defect in the muscle tone which can be caused due to various reasons	0.8%

12. If you come across a patient with malocclusion associated with TMJ problems what will be your line of treatment?

Total responses	119
Treat the temporomandibular joint problems followed by malocclusion correction	31.9%
Correct the malocclusion followed by TMJ treatment	53.8%
No idea	11.8%
None of the above	2.5%

13. If the treatment option is none of the above, please specify your treatment option

Total responses	119
Provide symptomatic relief for temporomandibular joint problem along with correction of malocclusion	1
Nil/none	2
Symptomatic management of the temporomandibular joint first then correct malocclusion then definitive treatment for temporomandibular joint	1
Mentioned above	1

Going for orthodontic treatment without correcting temporomandibular joint disorders may lead to restrictions in mouth opening and will have a need to go for feedback mechanism for temporomandibular joint correction.

Symptomatic management of temporomandibular joint along with orthodontic treatment

14. If you come across a patient with temporomandibular joint problems to which department specialist will you refer the patient?

Total responses	119
Oral medicine	47.1%
Orthodontics	16%
Prosthodontics	5.9%
Oral surgery	31.1%

number of responses for each choice is mentioned in percentage. In case of questions with short answers, the answers were mentioned separately with the total number of responses against it.

DISCUSSION

TMD are one of the most common reasons for pain and discomfort in the oral and the maxillofacial region including the ears and forehead. These disorders being a multifactorial condition may be caused due to many factors such as genetics, stress, and malocclusion. The discussion about this relationship between the TMJ and malocclusion began as early as 1934 when Costen said that patients with symptoms of dysfunction of TMJ such as dull pain within and about the ears and constant and severe headache localized to occiput or behind the ears showed marked improvement which following the correction of the overbite, renewal of molar occlusion to relieve the constant pressure off the surface of the condyle, and resulting establishment of proper articulation of the condyle within the articular fossa.^[3]

The questions were framed in a way that the first 3 questions gave the information about the subject taking part in the questionnaire and the remaining 14 questions regarding the awareness of the same about the relationship of the TMD and malocclusion.

The 1st question was asked to find out if there is any difference in the perception and views regarding the TMJ examination between the private practitioners or dentists associated with any institution. Being associated with an institution students are asked to examine the TMJ before starting any treatment, usually while filling the case history of the patient. The 2nd question and the third question gave us information regarding the institutional position of the subject and their specialty. This is to find out if there is any change

in the perspective of dentists belonging to a different specialty. The values were not statistically significant ($P > 0.05$), and hence, further study is essential to find the variation between departments.

The 4th question was regarding the awareness question regarding the relationship between TMD and malocclusion and out of 119 responses 91.6% ($n = 109$) were aware and shockingly 8.5% ($n = 10$) were not aware of the same and the difference in subjects aware and not aware was statistically very significant ($P < 0.05$). Out of the 10 subjects who were not aware two were private practitioners and remaining eight were associated with the institution. However, this difference was not statistically significant.

The 5th question was regarding the prevalence of malocclusion in the patients they see in their day-to-day routine, and the result showed about 41.2% ($n = 49$) saw about 1 in 5 patients with malocclusion. There were many studies regarding the prevalence of malocclusion in various population. Prabhakar *et al.* stated that there was an increased prevalence of angle's Class 1 malocclusion in school going children in Chennai.^[4] The prevalence of malocclusion in the population of Himachal Pradesh school children was studied by Singh *et al.*^[5] It stated that around 37.55% of the total sample was in great need for orthodontic treatment. A retrospective study by Sandeep and Sonia^[6] also stated the increased prevalence of Angle's Class 1 malocclusion by selecting the samples from a dental hospital in Rwanda.

The 6th question was regarding the examination of TMJ movement and functions. Out of the 119 responses, 1 answered never and about 81 answered that they will examine the TMJ only if the chief complaint of the patient is associated with the same. The 7th question was a similar question asking the subjects regarding the examination of TMJ if the chief complaint of the patient was malocclusion and the result showed that still, 14.35% ($n = 17$) answered no. Although it is essential for examining the TMJ in all patients, it is very important to rule out any TMJ problems in patients with a chief complaint of malocclusion before treating the latter. Müller *et al.*^[7] compared different methods such as mri, orthodontic examination and ultra sound examination for the examination of tmj in children with juvenile idiopathic arthritis. They stated that though none of the above-mentioned methods were very efficient, orthodontic examination was better in diagnosing the problems related to tmj than ultra sound. Küsel *et al.*^[8] and Koos *et al.*^[9] also stated the importance of clinical findings and symptoms in diagnosing children with juvenile idiopathic arthritis. Paesani *et al.*^[10] stated that with a diagnostic accuracy of 43% clinical examination cannot be used as a tool for determining the status of internal derangement of TMJ.

The 8th question was whether the patient had any experience of seeing patients with malocclusion with TMD. Though 59.7% ($n = 71$) answered yes, there were still 24.4% ($n = 29$) of subjects who were not aware of the same. This shows difference of opinion with the responses from the previous question. Thilander *et al.*^[11] showed the prevalence of TMD and its association with malocclusion and stated that TMD was associated with the posterior crossbite, anterior open bite, Angle Class III malocclusion, and extreme maxillary overjet. Runge *et al.*, in early 1989,^[12] showed the relationship between the TMJ sounds and malocclusion. It stated that there was increased inter-incisal angle in the sound-present group, and wear of the dental surfaces and increased overbite in the subgroup of reciprocal-clicking may be the associated factors. A review of the relationship between malocclusion and TMJ diseases was studied by Chokalingam and Das.^[13] The relationship between malocclusion and the need for orthodontic treatment in patients with temporomandibular dysfunction was studied by Kaselo *et al.*^[14] It also stated that in patients with malocclusion, pain from TMJ has a significant negative impact on activities of daily living. Mohlin *et al.*^[15] compared the symptoms of subjects with mild-to-moderate TM joint dysfunction with that of subjects with no signs and symptoms of temporomandibular dysfunction stated that orthodontic treatment seems to be neither a major preventive nor a significant cause of TMD. Gesch *et al.*^[16] and Vanderas^[17] also gave insight regarding the relationship between malocclusion and craniomandibular or TMD. The latter was a review article in early 1993 which stated that early orthodontic treatment to prevent the development of temporomandibular dysfunctions was not justified scientifically in that period. Reynders^[18] published an early article containing the review of literature 1966–88 regarding orthodontics and TMD stated that there were conflicting opinions between the same and also that orthodontic treatment is not specific or necessary to cure the signs and symptoms of temporomandibular dysfunction.

The 9th question and the 10th questions were regarding the most common TMD the subjects have come across, the result showed that about 41.2% ($n = 49$) of the population answered as MPDS and about 33.6% ($n = 40$) answered as internal derangement. By seeing few responses for question ten it can be clearly seen that few subjects were not aware of the types of TMD and what are the various types, signs, and symptoms of internal derangement. Muthukrishnan and Sekar showed the prevalence, so symptoms of various TMD's in his study stated that there are signs and symptoms of MPDS in 0.8% of the population, the signs of internal derangement in 38.3%, and osteoarthritis in about 14.6% of the population of the total samples taken into the study.

The 11th question regarding the awareness of the subjects about the etiology of MPDS. The result showed about 40.3% ($n = 48$) and 42% ($n = 50$) answered as stress

and malocclusion, respectively, as the cause for MPDS. Laskin^[19] stated that according to the psychophysiological theory, the spasm of the masticatory muscles is the primary factor in the etiology of the myofascial pain-dysfunction syndrome. Friction *et al.*^[20] stated that MPDS is a common but misunderstood muscular pain disorder involving referred pain from the tender trigger points within the myofascial structures or distant from the area where the pain is located. Stegenga *et al.*^[21] stated that osteoarthritis was the cause of craniomandibular pain and dysfunction.

The 12th and the 13th questions were regarding the management of TMD associated with the malocclusion. The result showed about 53.8% ($n = 64$) subjects responded as the management of malocclusion followed by management of TMD as the line of treatment, and 31.9% ($n = 38$) of subjects responded as the management of TMD followed by correction of malocclusion as the line of treatment. Shirani *et al.*^[22] stated that low-level laser therapy was very effective in management in pain in patients with MPDS. Kaselo *et al.*^[14] stated that in patients with malocclusion, the pain from the TMJ had a significant negative impact on their daily activities and orthodontic treatment was required for managing the same.

The 14th question was regarding the knowledge of the subjects regarding the referral of the patients with TMJ problem to the concerned specialty. The result showed that only about 47.1% ($n = 56$) of the subjects will refer the patients to the oral medicine and radiology department specialist and 16% ($n = 19$), 5.9% ($n = 7$), and 31.1% ($n = 37$) of the subjects will refer the patients to specialists of orthodontics, prosthodontics, and oral and maxillofacial surgery, respectively. Although the management of TMD involves a multi-disciplinary approach including the specialists from various departments, the initial diagnosis should be always better done by an oral medicine and radiology specialist.

The limitation of this study is that the sample size is limited to 119 and further study is essential to provide a very effective statistical difference of all the results obtained. Although there was a statistical significant number of the population who were aware of the relationship between TMD and malocclusion, it is very essential for all the dental practitioners and dental students to have a complete knowledge regarding the anatomy, function, and diagnosis and management of dysfunction of the TMJ and its relationship with malocclusion.

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