International Journal of Drug Research and Dental Science
Volume 3 Issue 1 (Page: 73-79), 2021 ISSN: 2582-0826

An Analytical Study on Awareness of Neuromuscular Dentistry as Emerging Practicing Field with Respect to Dentists in a City of Maharashtra

Gayatri Mehrotra[1*], Bhushan S. Ahire[2], Ajay Bhoosreddy[3], Chetan Bhadage[4], Komal Sharma[5]

[1]MDS OMDR, Oral and Maxillofacial Radiologist, Agra, Uttar Pradesh, India.

[2]Senior Lecturer, Department of Oral Medicine & Radiology, MGV's KBH Dental College & Hospital, Nashik, Maharashtra, India.

[3]Professor & Head, Department of Oral Medicine & Radiology, MGV's KBH Dental College & Hospital, Nashik, Maharashtra, India.

[4]Reader, Department of Oral Medicine & Radiology, MGV's KBH Dental College & Hospital, Nashik, Maharashtra, India.

[5]Senior Lecturer, Department of Oral Medicine and Radiology, S.G.T Dental College and Hospital, Gurgaon, India.

Original Article

Address for Correspondence Author
Dr. Gayatri Mehrotra; MDS OMDR, Oral and Maxillofacial Radiologist, Agra, Uttar Pradesh, India.
E-mail: drgayatri.mehrotra@gmail.com
Crossref doi: https://doi.org/10.36437/ijdrd.2021.3.1.J

ABSTRACT

Neuromuscular Dentistry (NMD) is the latest approach in the diagnosis and treatment of Temporomandibular disorder (TMD). The aim of this study was to analyze and compare knowledge and awareness among General Dental Practitioners, College Faculty, and Postgraduate Students regarding Neuromuscular Dentistry in the city of Nashik, Maharashtra. A cross-sectional survey was carried out among 150 dental practitioners who were given a self-administered questionnaire which comprised of 20 questions regarding TMD and therapeutic and diagnostic tools used in Neuromuscular Dentistry in relation with TMD. The faculty members (64.75%) had more awareness among the three groups. Among all the three groups, General Practitioners were having the least awareness of Neuromuscular Dentistry (NMD). Thus, more awareness needs to be spread through CDE programmes, workshops, etc which will help in the early diagnosis and treatment of TMD.

Keywords: Awareness, Electromyography, Neuromuscular Dentistry, Temporomandibular Disorder, Transcutaneous Electrical Nerve Stimulation.

Introduction

Temporomandibular Disorder (TMD) is a complex multifaceted disorder which is characterized by pain and tenderness in temporomandibular joints, masticatory muscles, and adjacent soft tissues.[1] Basically, it is a

cycle of pain and muscle spasm which results when the balance between teeth, jaw joints, and muscles is lost. Moreover of all orofacial pain, TMD has been found to be the most common one rising from the musculoskeletal origin.[2] TMD has a number of etiological factors which make its diagnosis and treatment complicated and a challenging one. A number of treatment modalities have been suggested for the treatment of TMD. They are categorized into two main groups- a) Definitive Therapy b) Supportive Therapy.[3] However, the decision regarding the appropriate treatment is still a difficult task. So, here comes the role of Neuromuscular Dentistry (NMD).

NMD is the latest approach in the diagnosis and treatment of TMD. Its role is to evaluate the complex relationship among teeth, temporomandibular joint, and masticatory muscles; in order to achieve Neuromuscular Occlusion; which is an occlusion based on the relationship between the mandible and skull. NMD thus helps to relax the muscles which control the jaw position to establish a true physiologic rest position on which further treatment modalities are based.[4] The main striking difference between Traditional Dentistry (TD) and Neuromuscular Dentistry (NMD) is that NMD takes nerves, muscles as well as correct positioning of the jaw into consideration whereas TD just focuses on teeth and joints.

Diagnostic tools included in NMD are: [4]

1. Electromyography (EMG)
2. Electrosonography (ESG) or Joint Vibration Analysis (JVA)
3. Computerized Mandibular Scanning (CMS)
4. Cone Beam Computed Tomography (CBCT)

Therapeutic tools included in NMD are: [4]

1. Transcutaneous Electrical Nerve Stimulation (TENS)
2. Occlusal Splints

Many studies have been conducted regarding the knowledge about TMD among dentists. There have also been studies comparing the prediction of treatment outcomes by TMD specialists and general dentists. However, there has been no study conducted yet which evaluates awareness about Neuromuscular Dentistry (NMD) amongst dental practitioners. Since NMD is the latest tool in the field of TMD, it is necessary to bring forward this technique into our daily practice. Thus, the present study was conducted with the aim to analyse awareness of NMD as an emerging practicing field; with regard to dentists in the city of Maharashtra.

Materials and Methods: The present cross-sectional study was conducted in a city of Maharashtra where general dental practitioners, college faculty members, and postgraduate students were included in the study. They were divided into 3 groups with 50 participants in each group making it to a total of 150 participants. The sample size was decided on the basis of the study population available in the institution.

A performed closed-ended questionnaire comprising 20 questions was prepared and given to the subjects. The validity of the questionnaire was assessed by the dental faculty members and corrections were made accordingly. The questionnaire contained questions related to awareness regarding TMD, diagnostic tools, and therapeutic measures used in TMD in relation to Neuromuscular Dentistry. They were asked to tick any one of the appropriate answers. It was made sure that the subjects filled the questionnaire in front of the investigator itself to reduce the chances of being biased. Consent was taken from each subject which was mentioned in the questionnaire itself. They were then informed about the right answers and their queries

regarding any of the questions were discussed at that time itself.100% response rate was seen regarding all the questions by all subjects. A score of 1 was given for the right answer and 0 for the wrong answer.

Statistics: All the data collected was then sorted and tabulated in Microsoft Excel. Thereafter, the comparison and analysis was done. Analysis was done using SPSS software. One way ANOVA test was applied for the evaluation of knowledge between the three groups followed by unpaired 't' test. A p value <0.05 was considered statistically significant.

Results: The result was determined in terms of percentage (Table 1). All three groups were equally aware of the term Neuromuscular Dentistry. 80% of the faculty members were aware that Neuromuscular Dentistry includes teeth, joints, and muscles. Regarding the etiological factor of TMD which includes psychological stress, macrotrauma, and microtrauma- the PG students had more knowledge (90%). When enquired about how many TMD patients they come across a week, all the 3 groups stated for less than 5 a week. The discrepancy in maximum intercuspation leads to muscle imbalance- a maximum of the faculty members agreed with this statement (84%) compared to GP (76%) and PG (78%) respectively. 70% of the faculty were aware that there exists a relationship between body posture and TMD whereas GP (30%) were hardly aware regarding this and 50% of PG were known to this fact. When asked about where do they refer their TMD patients to- faculty and PG refer more to the OMR specialist whereas the GP refer more to the Prosthodontist. Only 38% of the GP were aware that diagnostic tools for TMD include EMG (electromyography), ESG (electrosonography), and CMS (computerized mandibular scanning) whereas faculty (58%) and PG (60%) were more aware.

Questions	General practitioner(GP)	Faculty	Post Graduates (PG)
1. Aware of term NMD	90%	96%	94%
2. Where have you heard	Literature- 16% CDE programmes-28% Fellow dentists-50%	Literature-24% CDE programmes-34% Fellow dentists-42%	Literature- 40% CDE programmes-16% Fellow dentists-44%
3. Aware about NMD includes	70%	80%	72%
4. Aware of etiological factor in TMD	80%	84%	90%
5. Aware of discrepancy in maximum intercuspation leads to muscle imbalance	76%	84%	78%
6. Aware of relation between body posture and TMD	30%	70%	50%
7. Where to they refer TMD patients	Ortho- 12% OMR-36% Prostho-52%	Ortho-4% OMR-54% Prostho-42%	Ortho-6% OMR-66% Prostho-28%
8. Aware of diagnostic tools in TMD	38%	60%	58%
9. Aware of what is Electromyography (EMG) used for	42%	58%	48%
10. Aware about when should EMG be used	58%	64%	70%
11. Aware about the role of computerized	12%	18%	16%

mandibular scanning(CMS)			
12. Aware about role of CBCT in NMD	28%	62%	56%
13. How many times do you perform masticatory muscle examination	Always-24% Sometimes-66% Never-10%	Always-46% Sometimes-52% Never- 2%	Always-44% Sometimes-34% Never- 22%
14. Aware about K7 jaw tracking device	10%	16%	28%
15. What treatment do you suggest TMD patients	Occlusal correction-10% Drug therapy-2% Both- 88%	Occlusal correction-16% Drug therapy-4% Both- 80%	Occlusal correction-18% Drug therapy-6% Both- 76%
16. Aware about the role of Transcutaneous Electrical Nerve stimulation (TENS) in TMD	60%	88%	90%
17. How many have tried TENS on their patients	2%	12%	16%
18. How to bring more awareness	Syllabus- 50% CDE programme-34% Workshop-16%	Syllabus-48% CDE programme-28% Workshop-24%	Syllabus-60% CDE programme-36% Workshop-4%
19. Overall awareness	53.75%	64.75%	61.5%

Table.1 Response of Various Groups to the Questions Asked

Only 58% of the faculty members were aware that EMG is used for muscle activity and not for bite force. All the 3 groups were aware of the fact that EMG should be used both before and after treatment. Very little awareness was found among all the groups about the role of CMS that it helps in identifying the relationship of the mandible to the skull and for identifying the movements of the mandible. Out of that GP were least aware (12%) compared to faculty (18%) and PG (16%). Again GP (28%) were least aware regarding the role of CBCT in ND whereas faculty and PG being more aware. All the groups do not always perform masticatory muscle examination. None of the group had much awareness about the K7 jaw tracking device with GP being the least aware (10%). As a treatment modality for TMD, most of them believed that both drug therapy and occlusion correction should be advised.90% of the PG were aware that TENS plays a role in TMD treatment however only 16% have used it on their patients. On the other hand, only 2% GP and 12% faculty have used it. So, to bring more awareness, they advised that ND should be included in UG and PG syllabus followed by CDE programmes and literature respectively.

To compare whether the average knowledge scores of the 3 groups differ significantly or not, one-way ANOVA was applied at 95% confidence level and (2 & 147) degrees of freedom. The calculated value of test statistic F 3.352 was found significant with a p-value of 0.0377. Further to understand which pair differ significantly in the average knowledge scores, an unpaired 't' test was applied at 95% confidence level and 98 degrees of freedom. The results obtained were shown in the table. (Table 2)

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Pair of comparison	Mean Score	S.D	S.E	t value	P-value	Remark
GP (A) Faculty (B)	4.58 6.4	3.511 3.54	1.0177	-1.7882	0.008	S
GP(A) PG (C)	4.58 5.8	3.511 3.692	1.0399	-1.1731	0.713	NS
Faculty (B) PG (C)	6.4 5.8	3.54 3.692	1.0411	0.5747	0.902	NS

S=significant ($p<0.05$); NS=not significant

Table.2 Comparison of Knowledge about Neuromuscular Dentistry between the Three Groups

Discussion: Accurate diagnosis and treatment of TMD is still a mystery today. It has been observed that among all the three groups, Faculty Members are most aware of NMD followed by Post Graduate students and General Practitioners respectively. As per the literature searched, there has been no other study conducted regarding awareness of NMD. There is literature regarding NMD which explains its role and diagnostic and therapeutic tools used.[4,5,6] NMD also explains the role of occlusal diseases and posture in TMD.[7] Studies have been conducted regarding awareness of TMD and orofacial pain among the Dental Practitioners.[8-15]

Thus, the present study evaluated awareness regarding NMD among General Practitioners, Faculty Members, and Post Graduate students. All three groups were less aware of the tools used in NMD. As per the survey, it was found that both OMR specialists and Prosthodontist play a significant role when it comes to referring TMD patients. Regarding Electromyography (EMG), fewer participants were aware that it is used to evaluate muscle activity both before and after treatment. It has nothing to do with an evaluation of bite force.

It is also to be noted that on average, only 15% of participants were aware of the role of Computerized Mandibular Scanning (CMS) and hardly 10% have used Transcutaneous Electrical Nerve Stimulation (TENS) for TMD patients. CMS is a jaw tracking device that helps in analyzing the movements of the jaw. A tiny magnet is used here which is placed on gums below mandibular incisors. It is thus helpful to evaluate the accuracy of jaw position after treatment. Participants were aware of TENS therapy but they have not used it in their daily clinical practice which accounts for their less awareness. TENS basically helps in the relaxation of muscles where a mild electrical stimulus is delivered to the muscles via a neural pathway.

It was quite significant to note that there was hardly any awareness about the K7 jaw tracking device and the same needs to be spread among the dental fraternity. K7 device is actually a combination of all three diagnostic tools used in NMD i.e EMG, ESG (JVA), and CMS. Hence, the teamwork of dentists from different specializations will help in better diagnosis and treatment of TMD.

Overall, it can be concluded that the term Neuromuscular Dentistry being new, it may not be known to the GP and hence the scores were less. On the other hand, the faculty who is in touch with the recent development knows it better and maybe also imparting it to their students and hence there is no significant difference obtained between average knowledge scores of Faculty and PG students though the scores are less for PG students.

The present study reveals an overall good knowledge and awareness among General Practitioners, Faculty Members, and Post Graduate students. However, General Practitioners have shown less awareness among all the three groups specifically in relation to NMD. Thus, more awareness needs to be spread regarding NMD through CDE programmes, workshops, etc which will help in the early diagnosis and treatment of TMD. NMD thus concerns itself with how a properly aligned bite affects not only the head, neck, and jaw but the patient's health as a whole.

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How to cite this Article: **Gayatri Mehrotra, Bhushan S. Ahire, Ajay Bhoosreddy, Chetan Bhadage, Komal Sharma;** *An Analytical Study on Awareness of Neuromuscular Dentistry as Emerging Practicing Field with Respect to Dentists in a City of Maharashtra;* Int. J. Drug Res. Dental Sci., 2021; 3(1): 73-79, **doi:** https://doi.org/10.36437/ijdrd.2021.3.1.J
Source of Support: Nil, **Conflict of Interest:** Nil.
Received: 14-1-2021 **Revised:** 27-2-2021 **Accepted:** 3-3-2021