Perceived Knowledge, Attitude and Practice of Dental Students at University of Washington School of Dentistry Regarding the Diagnosis and Management Strategies of Temporomandibular Disorders.

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Abstract

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BACKGROUND:-Temporomandibular Disorders (TMD) represent a group of conditions that impact the temporomandibular joint (TMJ), the muscles of mastication, and associated structures, frequently resulting in pain, dysfunction, and diminished quality of life. TMD is prevalent in the global population with up to 10% of individuals exhibiting symptoms. Despite its common occurrence, the diagnosis and treatment of TMD is difficult due to the disorders' complex nature which encompass both physical and psychosocial elements. Dental students are trained to recognize the clinical manifestations of TMD, evaluate potential etiologies, and propose suitable therapeutic approaches during their dental education. The perceived knowledge, attitude, and practice (KAP) of dental students concerning TMD is a vital area of investigation to help assess their preparedness to manage the disorder in clinical settings. **Objectives:** To evaluate the level of perceived knowledge of dental students regarding the causes, clinical presentation, and diagnosis of TMD. To determine the attitude of dental students towards diagnosing and treating TMD in clinical practice. To determine the

anticipated practices of dental students towards diagnosing and treating TMD in future clinical practice. **Methods:** Anonymous self-administered cross-sectional survey with closed and open-ended questions which included all 3rd and 4th year University of Washington dental students who had completed at least 6 months of clinical training and at least 2 quarters in a clinical clerkship that trains students in the diagnosis and management of TMD. **Results:** The survey was conducted between 3rd and 4th year dental students. Seventy-five out of 145 recruited students responded to the survey. It was observed that 83% students self-reported understanding of the potential causes and risk factors of TMD and 86.7% reported ability to recognize the common symptoms associated with TMD. Nearly 95% believed that patients with jaw, face or neck pain should be screened for TMD, 96.0% believed TMD has a negative impact on patients' quality of life, and 81.3% believed that TMD represents a public health concern. **Conclusion**: This study indicates that dentistry students at the University of Washington display a high perceived knowledge and predominantly consistent attitude towards the management of temporomandibular disorders; however, students expressed only modest perceived expertise in TMD management likely indicating constrained clinical confidence.

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INTRODUCTION

Temporomandibular Disorders (TMD) represent a group of conditions that impact the temporomandibular joint (TMJ), muscles of mastication, and associated structures, frequently resulting in pain, dysfunction, and diminished quality of life. TMD is prevalent in the global population with up to 10% of individuals exhibiting symptoms [1]. The temporomandibular joints form the interface between the mandible and the temporal bone and are essential for tasks such as speaking, chewing, and swallowing. Complications associated with this joint and the associated musculature may result in jaw pain, discomfort during mastication, auditory clicks or pops, restricted mouth opening, headache, tinnitus, and otalgia [2]. Despite its common occurrence, the diagnosis and treatment of TMD is difficult due to its complex nature and breadth of symptoms which encompass both physical and psychosocial elements [3]. Diagnostic and therapeutic complexity is further increased by other associated conditions that can exacerbate and perpetuate TMD including movement disorders (e.g., nocturnal bruxism and oromandibular dystonia), local and systemic forms of arthritis (e.g., osteoarthritis, rheumatoid arthritis), and psychosocial conditions (e.g., anxiety and depressive disorders) [4].

Dentists are often the first healthcare professionals to encounter patients with temporomandibular disorders, which underscores the importance of comprehensive TMD

training as part of dental education. Dental students are taught to recognize the clinical manifestations of TMD, evaluate potential etiologic factors, and implement appropriate therapy as part of comprehensive dental treatment. In 2020 the Commission on Dental Accreditation (CODA), the accrediting body for dental education in the United States, approved Revised Standard 2-24k to include the teaching of TMD in the predoctoral curriculums of all US dental schools [5]. Following adoption of the registered standard, the American Academy of Orofacial Pain (AAOP) developed a core curriculum framework for implementation of CODA Standard 2-24k, with an aim for all graduates from accredited dental schools in the United States to apply evidence-based knowledge in clinical decision making, treatment planning, and management of TMD, while effectively communicating, and collaborating with orofacial pain specialists and other relevant health professionals in their treatment [6,7]. Given its importance in dental curriculum, and the relatively recent adoption of TMD-related educational standards, we were interested in evaluating the perceived knowledge, attitude, and practice (KAP) of dental students regarding TMD to help assess their preparedness to manage these disorders in clinical practice.

Perceived knowledge denotes the extent to which an individual believes they comprehend the theoretical and clinical dimensions of a topic, in this case a dental student's self-reported comprehension of the pathophysiology, diagnostic subtypes, and treatment options relevant to TMD. As standards for TMD education continue to evolve, dental students may be exposed to many diagnostic instruments, exam techniques, imaging modalities, and various methods of obtaining a patient's history to evaluate TMD with a broad spectrum of management strategies [8]. Diagnosis and management necessitate a thorough understanding of anatomy, physiology, biomechanics, psychosocial factors and diverse treatment modalities that include physical, pharmacologic, and behavioural interventions [9].

Prior research indicates that dental students frequently perceive themselves as insufficiently prepared or educated to diagnose and manage TMD [10]. This may be related to inadequate didactic curriculum in TMD, limited clinical exposure, the complex nature of the conditions, and/or a lack of standardized diagnostic criteria and treatment protocols used in predoctoral training programs [11]. Considering TMD's high prevalence, the low exposure to TMD in medical education, and the shortage of Oral Medicine and Orofacial Pain specialists in the United States, it is crucial that competent and confident general dentists receive comprehensive training in TMD to help address the burden of disease in the community.

Attitude defines an individual's opinion or perception of a topic, for example how a dental student might perceive their personal relationship with TMD as a dental provider or the potential impact of TMD in public health. Perceptions of TMD may influence or shape a dentist's approach to the management of conditions, and contributing factors, falling under the umbrella of TMD. A positive disposition towards TMD may facilitate more proactive, engaged, and thorough treatment, while a negative or apathetic stance may lead to underdiagnosis, misdiagnosis, postponed intervention, ineffective treatment, or lack of appropriate referral.

Practice in this context implies confidence in applying knowledge to a particular situation, such as a dental student's confidence in their ability to translate didactic knowledge related to TMD into effective diagnosis and management in clinical practice. Previous research indicates that dental students frequently employ a cautious approach in the diagnosis and management of TMD, often referring cases to experts when they feel inadequate in their ability. This conservative strategy may stem from lack of confidence in independent TMD management possibly due to limited clinical exposure to TMD and/or limited availability of resources in

clinical practice that were readily available during dental education (e.g., access to Oral Medicine or Orofacial Pain specialists). Although dental students complete didactic education in TMD, the ability to competently apply this knowledge in clinical environments may vary [12,13].

Several previous studies have examined dental students' perceived knowledge, attitudes, and practices regarding the diagnosis and management of TMD. In 2007, Klasser and Greene reported findings from a survey of U.S. and Canadian dental schools, noting significant improvements in the predoctoral curriculum content related to TMD. However, they also highlighted that some institutions were still not providing adequate instruction, thereby exposing patients to a range of treatment modalities that were not always evidence based [14,15]. In response to these concerns, the American Association for Dental Research (AADR) revised its TMD Policy Statement in 2010, recommending that differential diagnosis and treatment planning for orofacial pain (OFP) and TMD should be firmly grounded in evidence drawn from clinical trials, experimental research, and epidemiologic studies [16]. Though subsequent studies in this space have been limited, a 2012 study by Borromeo et al., identified consistently low levels of perceived knowledge and understanding among dental students regarding pain management in various OFP disorders, including TMD, suggesting gaps in pain education during dental training. These findings collectively highlight the ongoing need for comprehensive, evidence-based education on TMD in dental curricula to better prepare students for clinical practice.

Aims– Understanding the perceived KAP of dental students regarding TMD is essential for improving the quality of education and clinical training in this space. Therefore, the aims of this study were to 1) Evaluate the level of perceived knowledge of dental students regarding

the causes, clinical presentation, and diagnosis of TMD 2) Determine the attitude of dental students towards diagnosing and treating TMDs in clinical practice and 3) Determine the anticipated practices of dental students towards diagnosing and treating TMD in future clinical practice.

Hypothesis– Dental students at the University of Washington School of Dentistry will report limited perceived knowledge and experience with the diagnosis and management of TMD and varied attitudes toward TMD treatment in future clinical environments.

MATERIALS AND METHODS

A cross-sectional survey was conducted at University of Washington School of Dentistry (UWSOD) to assess 3rd and 4th year dental students' perceived knowledge, attitudes, and practices (KAP) regarding the diagnosis and management of temporomandibular disorders (TMD). The study population included 3rd and 4th year dental students enrolled during the current academic year. The University of Washington's Institutional Review Board (IRB) approved the study, and the School of Dentistry's Student Affairs office granted permission to use the relevant email list for recruitment. Participation was voluntary with no positive or negative impact on a students academic standing. All data were collected and stored anonymously to ensure participant confidentiality.

Inclusion criteria

- 3rd or 4th year dental student at UWSOD.
- A minimum of 6 months of clinical exposure.
- Completion of at least 2 academic quarters in the Oral Medicine clerkship (DENTCL456 and DENTCL546).

Exclusion Criteria

- Students enrolling with advanced standing (i.e., International DDS program) holding a postgraduate degree in oral medicine or orofacial pain.

Survey Instrument– The survey consisted of an anonymous questionnaire with 1 open-ended question and 44 closed-ended questions utilizing a five-level Likert scale. The closed-ended questions were divided into three sections with the following distribution:

- Perceived Knowledge: 8 questions
- Attitude: 10 questions
- Practice: 26 questions (subdivided into two categories: treatments personally administered by the practitioner and those referred to a specialist).

Prior to the distribution, the survey was piloted with 10 graduate students to assess the clarity, comprehensiveness, and feasibility. Participants were asked to provide feedback on wording, structure, and length of the questionnaire. Adjustments were made based on their input to enhance the clarity and neutrality of the questions. Pilot responses were not included in the final data analysis.

Survey Distribution and Data Collection– The survey was distributed without regard to participants' cultural or socioeconomic backgrounds, and all students were provided the option to complete the survey in electronic or paper format based on their preference.

Eligible subjects received an email invitation containing a direct survey link and QR code. data were collected and managed using REDCap electronic data capture tools hosted at the University of Washington and the Institute of Translational Health Sciences (ITHS) [17]

Responses were saved anonymously, without identifying information, and securely stored in a password-protected database.

Paper surveys were distributed during classroom sessions, after didactic lectures. Instructions emphasized that no names or identifying information should be included, and each participant was permitted to complete the survey only once, in either paper or electronic form. Upon completion, students placed their surveys into a designated, secure submission envelope or box. Collected paper surveys were stored in a locked file cabinet to maintain confidentiality. Responses completed on paper surveys were then entered into REDCap to facilitate data analysis.

The survey remained open for three weeks. Two reminder emails were sent at intervals of 7–10 days to maximize response rates.

Statistical analysis– Survey data were compiled and analyzed using SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Mann–Whitney U tests were applied to Likert scale scores to analyze differences between 3rd and 4th year students, and between students identifying as male and female. Statistical significance was set at a p-value of <0.05.

RESULTS

Table 2.1 shows the baseline data of the study subjects. Surveys were completed by 75 of 145 eligible students. Forty-five (60.0%) of respondents were in the 3rd year and 30 (40.0%) were in the 4th year. The response rate for 3rd year students was 61.6% and 41.6% for 4th year

students. The mean age of subjects was 29.8±5.3 years. The majority of survey respondents were female (N=47, 62.7%).

Table 2.2 shows a summary of response frequencies and percentage for each item on a 5-point Likert scale. Results show that participants generally have strong perceived knowledge of potential causes and risk factors (82.7%) and recognizing common symptoms (86.7%). However, familiarity with the biopsychosocial model (61.4%) and knowledge of treatment options (68.0%) are comparatively lower. The majority of participants believe TMD is a public health concern (81.3%), and that patients with jaw, face, or neck pain should be screened for TMD (94.7%). In terms of anticipated practice, participants feel well-prepared to manage TMD using conservative therapies (86.7%), NSAIDs (85.3%), muscle relaxants (77.3%), and to a lesser extent, occlusal guards or splints (73.4%). They also express confidence in consulting other health professionals (81.3%).

Table 2.3 compares responses by gender. When compared to their male counterparts, female dental students self-reported: higher familiarity with the biopsychosocial model for TMD ($p = 0.02$), higher likelihood to view TMD as a public health concern ($p = 0.03$), greater belief that patients with jaw, face, neck pain should be screened for TMD screening ($p = 0.02$), greater belief that TMD impacts quality of life ($p = 0.04$), and belief that TMD training is necessary in dental education ($p = <0.001$). Females also reported greater confidence in interdisciplinary collaboration in the management of TMD ($p = <0.001$) with a trend toward greater confidence in personal use of conservative therapy to manage TMD ($p = 0.05$).

Table 2.4 shows a comparison of responses to survey questions according to a student's training year. Third-year students showed higher levels of confidence in managing TMD with

occlusal equilibration while 4th years were more neutral (p = 0.01). Fourth-year students reported greater confidence in managing TMD through consultation with other health professionals in their future clinical practice (p = 0.02). Fourth-year students also reported greater confidence in determining the need for referral for occlusal guards/splints in their future clinical practice (p = 0.03).

DISCUSSION

Temporomandibular disorders (TMD) include a collection of musculoskeletal problems impacting the temporomandibular joint (TMJ), masticatory muscles, and related structures. These conditions frequently present in dental practice, typically manifesting as orofacial pain, functional impairments, and psychosocial comorbidities. A complete understanding of TMD is essential for general dental practitioners due to their multifaceted origin and implications for chronic pain [18]. This study sought to assess the perceived knowledge, attitudes, and practice of 3rd and 4th year dental students at the University of Washington School of Dentistry regarding TMD and its management.

In the current study a majority of the students reported high perceived knowledge of the potential causes and common clinical features of TMD while endorsing lower familiarity with the biopsychosocial model, a crucial element in comprehensive patient evaluation [19]**.** This finding aligns with other research undertaken in diverse educational environments, which has demonstrated that dental students frequently encounter restricted exposure to the multifactorial aspects of TMD [20]. Previous studies have identified numerous biopsychosocial factors that increases the risk of TMD onset and persistence while showing that significant changes in

biopsychosocial function correspond with change in TMD status, both positively and negatively [21, 22].

A limited number of respondents in the study were well acquainted with the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), a globally recognized diagnostic system that is a benchmark for clinical and research applications in TMD. The DC/TMD have been translated into 18 languages and is recognized as the primary diagnostic criteria in both clinical and research settings worldwide. The seminal paper on DC/TMD by Schiffman et al., published in 2014 has been cited in over 3000 TMD-related studies [23]. The restricted familiarity with this diagnostic method suggests a probable deficiency or inconsistency in formal training on evidence-based protocols or limited ability to translate DC/TMD training into clinical practice. Inadequate familiarity with current diagnostic criteria may hinder students' ability to systematically assess and correctly diagnose TMD patients with the potential for underdiagnosis, misdiagnosis, and suboptimal treatment [24].

Survey responses suggest that most students recognize TMD diagnosis and management as important elements in general dental practice, and that the majority are confident managing TMD with conservative therapy (e.g., identification and elimination of parafunctional habits, dietary modification, ice, heat, passive stretching, etc.), non-steroidal anti-inflammatory drugs, muscle relaxants, and/or occlusal guards all of which are recognized as evidence-based protocols with high efficacy in managing TMD [25]. Similarly, a significant number of participants felt confident in determining the need for referral for other treatment modalities more commonly performed by dental specialists, most notably trigger point injections and neurotoxin. In contrast a survey of general dentists and dental specialists in Italy by Mozhdeh et al, reported that only 50% of study participants demonstrated adequate factual knowledge of

TMD, indicating limited ability to effectively treat in clinical practice [26]. Their study design differed from the present study by including objective questions regarding TMD knowledge rather than self-report of TMD-related knowledge. This may have influenced differences in study results. Ashwin and colleagues utilized a hybrid design assessing factual knowledge in TMD while also assessing perceived attitudes and practice, in a cohort of post-graduate dental students. Respondents demonstrated minimal diagnostic knowledge while reporting low confidence in managing TMD based on their scoring system [27].

In the current study, it is interesting to note that knowledge and confidence levels did not differ substantially based on a student's training. At the University of Washington, the preponderance of didactic TMD training takes place in the 3rd year of dental education. Concurrent survey responses in 3rd and 4th year students imply that the existing curriculum effectively reinforces TMD-related knowledge in the clinical setting through both years of training. Though responses were consistent among 3rd and 4th year students, gender-based differences were observed: females reported greater familiarity with the biopsychosocial model for TMD, higher likelihood to view TMD as a public health concen, and greater likelihood to consider TMD training a necessary part of dental education. These findings are similar to those reported by Park and colleagues, in a dental school in Korea, in which women reported greater awareness and knowledge of TMD while linking experience and educational opportunities to a better understanding of TMD [28].

Though students' responses in this study aligned with evidence-based therapy in most instances, it is also notable that a significant number of 3rd year students reported confidence in using occlusal equilibration to treat TMD, which differs from evidence-based management strategies emphasized in the UWSOD Oral Medicine curriculum. Occlusal equilibration has

shown no evidence of lasting therapeutic effect in high-level of evidence studies including systematic reviews and meta-analyses while also irreversibly changing tooth structure [29]. Given limited evidence of benefit in the treatment of TMD and the irreversible nature of the intervention, removal of occlusal interference should be approached with caution and clear understanding of the utility and limitations of the intervention [30]. We hypothesize that this finding likely indicates a greater focus on occlusion in other coursework outside of the Oral Medicine curriculum, despite its limited evidence as a TMD risk factor [31].

While this work provides a valuable "snapshot" into dental student perception of TMD and TMD education, the study also has inherent limitations. The survey sample was confined to a single dental school, which limits generalizability to dental students trained at other institutions. TMD-related education curricula, clinical experiences, and even philosophies in treatment may vary between institutions, potentially impacting reported KAP. Multi-institution survey studies have been completed in other areas of dental education and future studies in TMD could benefit through cross-institutional collaboration [32,33]. A second limitation in this study is its cross-sectional design that captures impressions at a singular point in time and may not adequately represent longitudinal changes in knowledge or clinical preparedness. This limitation was offset by surveying students in both 3rd and 4th year but is still limited in the ability to judge individual and/or cohort level changes in KAP over time. Future studies should employ longitudinal designs to examine the potential variations in KAP throughout clinical dental education, potentially in relation to specific education programs or interventions intended to increase student knowledge and/or enhance clinical exposure. Finally, despite efforts to avoid bias in the survey design, question prompts, particularly in relation to attitudes and beliefs may have led students to respond in a more uniform and affirmative way than may exist in reality. The response patterns in our study suggest that the items either targeted concepts

with limited variability in opinion among participants (i.e., in which a range of opinions would be unexpected) or that question design may have influenced self-reported attitudes. To reduce response bias in future studies, researchers could employ updated verbiage asking students to report "to what degree" they agreed with a particular statement or modified question design to intermix questions in which both positive and negative responses would be expected. Alternatively, question stems could require respondents to choose between multiple discrete choices (e.g., TMD is a public health concern versus TMD is not a public health concern) to further reduce bias. Lastly, the survey included one open-ended question inviting students to suggest any additional training or resources they believe would strengthen their preparedness to diagnose and manage TMD in clinical practice. The question received a lower number of responses (N = 24) which was insufficient for formal analysis. Despite this, respondents emphasized the value of additional clinical experiences, particularly in administration of neurotoxin injections for TMD.

CONCLUSION

This study indicates that dental students at the University of Washington display high perceived knowledge and predominantly consistent attitude towards the management of temporomandibular disorders. These findings contrasted with our initial hypothesis. Attitudes toward TMD-related practice were largely uniform across the cohort, though statistically differences in treatment attitudes were identified, most notably between male and female students. These results suggest perceived challenges in incorporating foundational, evidence-based TMD-related knowledge when transitioning from didactic training in dental education to independent clinical practice. Continuing to enhance TMD education will better prepare future dentists to help address TMD in the community which has the potential to expand

accessibility and improve patient quality of life. By cultivating both proficiency and confidence in TMD management, dental schools may ensure their graduates are adequately prepared to provide thorough and compassionate care.

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Table 2.1: Demographic data of the study subjects

Variables	N=75	%
Gender		
Male	28	37.3
Female	47	62.7
Training Year		
3rd Year	45	60.0
4th Year	30	40.0
Age in years; Mean±SD	29.8±5.4	

Table 2.2: Self-report of perceived knowledge, attitude, and practice toward TMD

STATEMENTS	STRONGLY DISAGREE		DISAGREE		NEUTRAL		AGREE		STRONGLY AGREE	
	N	%	N	%	N	%	N	%	N	%
PERCEIVED KNOWLEDGE										
I understand the potential causes and risk factors of TMD	2	2.7	2	2.7	8	10.7	51	68.0	11	14.7
I can recognize the common symptoms associated with TMD	2	2.7	0	0.0	7	9.3	50	66.7	15	20.0
I am able to accurately apply the Diagnostic Criteria for TMD	3	4.0	5	6.7	21	28.0	42	56.0	3	4.0
I am able to recognize signs of TMD on imaging	3	4.0	8	10.7	19	25.3	42	56.0	2	2.7
I am familiar with the biopsychosocial model as it relates to TMD	3	4.0	11	14.7	14	18.7	38	50.7	8	10.7
I know the natural course of TMD.	3	4.0	14	18.7	25	33.3	27	36.0	5	6.7
I am knowledgeable about the various treatment options for TMD	2	2.7	5	6.7	16	21.3	44	58.7	7	9.3
I am able to critically evaluate TMD literature	4	5.3	13	17.3	26	34.7	28	37.3	3	4.0
ATTITUDE										
I believe that TMD is a public health concern.	1	1.3	0	0.0	12	16.0	39	52.0	22	29.3
I believe patients with jaw, face or neck pain should be screened for TMD.	1	1.3	0	0.0	3	4.0	38	50.7	33	44.0
I believe TMD has a negative impact on patients' quality of life.	0	0.0	0	0.0	3	4.0	31	41.3	41	54.7
I believe TMD is a frequently misdiagnosed as another type of orofacial pain.	0	0.0	0	0.0	12	16.0	29	38.7	34	45.3
I believe that patients are hesitant to seek treatment for TMD from their dental provider.	0	0.0	10	13.3	13	17.3	30	40.0	22	29.3
I believe TMD has a bidirectional relationship with systemic health.	1	1.3	2	2.7	11	14.7	43	57.3	18	24.0
I believe that the treatment of TMD is interdisciplinary.	1	1.3	1	1.3	5	6.7	33	44.0	35	46.7
I believe that training in TMD is necessary for healthcare providers.	0	0.0	0	0.0	6	8.0	34	45.3	35	46.7
I believe that there are an adequate number of dentists in WA state to treat TMD.	4	5.3	31	41.3	18	24.0	16	21.3	6	8.0
I believe Dentists should be the primary resource for patients with TMD.	1	1.3	4	5.3	18	24.0	37	49.3	15	20.0
PRACTICE - TREAT										
Conservative therapy such as ice, heat, stretching, education, etc.	0	0.0	0	0.0	10	13.3	42	56.0	23	30.7
Occlusal guards/splints	2	2.6	5	6.7	14	18.7	35	46.7	19	25.3
Occlusal equilibration	4	5.3	13	17.3	25	33.3	27	36.0	5	6.7
Orthodontic treatment	7	9.3	28	37.3	24	32.0	12	16.0	4	5.3
Full mouth prosthodontic rehabilitation	9	12.0	25	33.3	24	32.0	11	14.7	6	8.0
Trigger point injections	3	4.0	11	14.7	22	29.3	28	37.3	11	14.7
Neurotoxin injections	11	14.7	17	22.7	23	30.7	17	22.7	7	9.3
Biofeedback therapy	11	14.7	20	26.7	24	32.0	13	17.3	7	9.3
NSAIDs	1	1.3	0	0.0	10	13.3	40	53.3	24	32.0
Muscle relaxants	0	0.0	5	6.7	12	16.0	40	53.3	18	24.0

Table 2.2 (continued):

STATEMENTS	STRONGLY DISAGREE		DISAGREE		NEUTRAL		AGREE		STRONGLY AGREE	
	N	%	N	%	N	%	N	%	N	%
Systemic steroids	7	9.3	19	25.3	28	37.3	16	21.3	5	6.7
Opioids	15	20.0	17	22.7	24	32.0	11	14.7	7	9.3
Ordering CBCT Imaging	2	2.7	6	8.0	14	18.7	36	48.0	17	22.7
Ordering MRI Imaging	3	4.0	12	16.0	18	24.0	32	42.7	10	13.3
Consultation with other health professionals	0	0.0	2	2.7	12	16.0	33	44.0	28	37.3
PRACTICE - REFER										
Occlusal guards/splints	1	1.3	6	8.0	10	13.3	35	46.7	20	26.7
Occlusal equilibration	1	1.3	8	10.7	19	25.3	29	38.7	16	21.3
Orthodontic treatment	0	0.0	9	12.0	10	13.3	31	41.3	25	33.3
Full mouth prosthodontic rehabilitation	2	2.7	11	14.7	10	13.3	28	37.3	24	32.0
Trigger point injections	2	2.7	6	8.0	13	17.3	30	40.0	24	32.0
Neurotoxin injections	2	2.7	14	18.7	13	17.3	21	28.0	24	32.0
Physical therapy	1	1.3	5	6.7	12	16.0	31	41.3	25	33.3
Cognitive Behavioural Therapy CBT)/Behavioural counselling	1	1.3	9	12.0	11	14.7	35	46.7	19	25.3
Biofeedback therapy	3	4.0	15	20.0	15	20.0	19	25.3	23	30.7
Arthrocentesis	8	10.7	19	25.3	10	13.3	19	25.3	19	25.3
Orthognathic or open joint surgery	7	9.3	18	24.0	9	12.0	18	24.0	22	29.3

Table 2.3: Comparison of response by gender

STATEMENT	Median		p-value
	Male	Female	
PERCEIVED KNOWLEDGE			
I understand the potential causes and risk factors of TMD.	4.0	4.0	0.26
I can recognize the common symptoms associated with TMD.	4.0	4.0	0.18
I am able to accurately apply the Diagnostic Criteria for TMD (DC-TMD).	4.0	4.0	0.20
I am able to recognize signs of TMD on imaging.	4.0	4.0	0.98
I am familiar with the biopsychosocial model as it relates to TMD.	3.0	4.0	0.02*
I know the natural course of TMD.	3.0	3.0	0.48
I am knowledgeable about the various treatment options for TMD.	4.0	4.0	0.57
ATTITUDE			
I am able to critically evaluate TMD literature.	3.0	3.0	0.15
I believe that TMD is a public health concern.	4.0	4.0	0.03*
I believe patients with jaw, face or neck pain should be screened for TMD.	3.0	3.0	0.02*
I believe TMD has a negative impact on patients' quality of life.	4.0	4.0	0.04*
I believe TMD is a frequently misdiagnosed as another type of orofacial pain.	4.0	4.5	0.24
I believe that patients are hesitant to seek treatment for TMD from their dental provider.	4.0	5.0	0.56
I believe TMD has a bidirectional relationship with systemic health.	4.0	4.0	0.56
I believe that the treatment of TMD is interdisciplinary.	4.0	4.0	0.10
I believe that training in TMD is necessary for healthcare providers.	4.0	5.0	0.00*
I believe that there are an adequate number of dentists in WA state to treat TMD.	3.0	2.5	0.60
I believe Dentists should be the primary resource for patients with TMD.	4.0	4.0	0.28
PRACTICE - TREAT			
Conservative therapy such as ice, heat, stretching, education, etc.	4.0	4.0	0.05
Occlusal guards/splints	4.0	4.0	0.36
Occlusal equilibration	3.0	3.0	0.22
Orthodontic treatment	3.0	2.0	0.31
Full mouth prosthodontic rehabilitation	3.0	3.0	0.71
Trigger point injections	3.0	2.0	0.25
Neurotoxin injections	3.0	3.0	0.57
Biofeedback therapy	3.0	3.0	0.88
NSAIDs	4.0	4.0	0.18
Muscle relaxants	4.0	4.0	0.02*
Systemic steroids	3.0	3.0	0.98
Opioids	3.0	3.0	0.48
Ordering CBCT Imaging	4.0	4.0	0.27
Ordering MRI Imaging	4.0	4.0	0.87
Consultation with other health professionals	4.0	4.0	0.00*
PRACTICE - REFER			
Occlusal guards/splints	4.0	4.0	0.09
Occlusal equilibration	4.0	4.0	0.92
Orthodontic treatment	4.0	4.0	0.08
Full mouth prosthodontic rehabilitation	4.0	4.0	0.16
Trigger point injections	4.0	4.0	0.10
Neurotoxin injections	3.0	4.0	0.23
Physical therapy	4.0	4.0	0.22
Cognitive Behavioral Therapy (CBT)/Behavioral counseling	4.0	4.0	0.87
Biofeedback therapy	3.0	4.0	0.89
Arthrocentesis	3.0	4.0	0.97
Orthognathic or open joint surgery	3.0	4.0	0.84

Test: Mann-Whitney U; *: statistically significant

Table 2.4: Comparison of response by training year

STATEMENT	Median		p-value
	3rd year	4thYear	
PERCEIVED KNOWLEDGE			
I understand the potential causes and risk factors of TMD.	4.0	4.0	0.45
I can recognize the common symptoms associated with TMD.	4.0	4.0	0.30
I am able to accurately apply the Diagnostic Criteria for TMD (DC-TMD).	4.0	4.0	0.09
I am able to recognize signs of TMD on imaging.	4.0	4.0	0.37
I am familiar with the biopsychosocial model as it relates to TMD.	4.0	4.0	0.87
I know the natural course of TMD.	3.0	3.5	0.89
I am knowledgeable about the various treatment options for TMD.	4.0	4.0	0.79
I am able to critically evaluate TMD literature.	3.0	3.0	1.00
ATTITUDE			
I believe that TMD is a public health concern.	4.0	4.0	0.91
I believe patients with jaw, face or neck pain should be screened for TMD.	4.0	4.0	0.19
I believe TMD has a negative impact on patients' quality of life.	5.0	4.0	0.22
I believe TMD is a frequently misdiagnosed as another type of orofacial pain.	4.0	5.0	0.19
I believe that patients are hesitant to seek treatment for TMD from their dental provider.	4.0	4.0	0.60
I believe TMD has a bidirectional relationship with systemic health.	4.0	4.0	0.61
I believe that the treatment of TMD is interdisciplinary.	4.0	4.0	0.49
I believe that training in TMD is necessary for healthcare providers.	5.0	4.0	0.09
I believe that there are an adequate number of dentists in WA state to treat TMD.	2.0	3.0	0.28
I believe Dentists should be the primary resource for patients with TMD.	4.0	4.0	0.47
PRACTICE - TREAT			
Conservative therapy such as ice, heat, stretching, education, etc.	4.0	4.0	0.07
Occlusal guards/splints	4.0	4.0	0.11
Occlusal equilibration	4.0	3.0	0.01*
Orthodontic treatment	3.0	3.0	0.75
Full mouth prosthodontic rehabilitation	3.0	2.0	0.26
Trigger point injections	4.0	3.0	0.49
Neurotoxin injections	3.0	2.0	0.08
Biofeedback therapy	3.0	3.0	0.23
NSAIDs	4.0	4.0	0.41
Muscle relaxants	4.0	4.0	0.81
Systemic steroids	3.0	3.0	0.85
Opioids	2.5	3.0	0.22
Ordering CBCT Imaging	4.0	4.0	0.37
Ordering MRI Imaging	4.0	4.0	0.63
Consultation with other health professionals	4.0	4.0	0.02*
PRACTICE - REFER			
Occlusal guards/splints	4.0	4.0	0.03*
Occlusal equilibration	4.0	4.0	0.56
Orthodontic treatment	4.0	4.0	0.15
Full mouth prosthodontic rehabilitation	4.0	4.0	0.15
Trigger point injections	4.0	4.0	0.31
Neurotoxin injections	4.0	4.0	0.56
Physical therapy	4.0	4.0	0.20
Cognitive Behavioral Therapy (CBT)/Behavioral counseling	4.0	4.0	0.27
Biofeedback therapy	3.0	4.0	0.92
Arthrocentesis	3.0	4.0	0.83
Orthognathic or open joint surgery	4.0	3.5	0.98

Test: Mann-Whitney U; *: statistically significant

APPENDIX

PERCEIVED KNOWLEDGE

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understand the potential causes and risk factors of TMD.					
I can recognize the common symptoms associated with TMD.					
I am able to accurately apply the Diagnostic Criteria for TMD (DC-TMD).					
I am able to recognize signs of TMD on imaging.					
I am familiar with the biopsychosocial model as it relates to TMD.					
I know the natural course of TMD.					
I am knowledgeable about the various treatment options for TMD.					
I am able to critically evaluate TMD literature.					

Optional Comments:

ATTITUDE

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I believe that TMD is a public health concern.					
I believe patients with jaw, face or neck pain should be screened for TMD.					
I believe TMD has a negative impact on patients' quality of life.					
I believe TMD is frequently misdiagnosed as another type of orofacial pain.					
I believe that patients are hesitant to seek treatment for TMD from their dental provider.					
I believe TMD has a bidirectional relationship with systemic health.					
I believe that the treatment of TMD is interdisciplinary					
I believe that training in TMD is necessary for healthcare providers.					
I believe that there are an adequate number of providers in WA state to treat TMD.					
I believe Dentists should be the primary resource for patients with TMD.					

Optional Comments:

FUTURE CLINICAL PRACTICE

In my future clinical practice, I will feel confident managing TMD with:	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Conservative therapy such as ice, heat, stretching, education, etc.					
Occlusal guards/splints					
Occlusal equilibration					
Orthodontic treatment					
Full mouth prosthodontic rehabilitation					
Trigger point injections					
Neurotoxin injections					
Biofeedback therapy					
NSAIDs					
Muscle relaxants					
Systemic steroids					
Opioids					
Order CBCT Imaging					
Order MRI Imaging					
Consultation with other health professionals.					

Optional comment:

In my future clinical practice I will feel confident determining the need for referral for:	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Occlusal guards/splints					
Occlusal equilibration					
Orthodontic treatment					
Full mouth prosthodontic rehabilitation					
Trigger point injections					
Neurotoxin injections					
Physical therapy					
CBT/Behavioral counseling					
Biofeedback therapy					
Arthrocentesis					
Orthognathic or open joint surgery					

Optional comment:

Open-ended question-

What additional resources or training would enhance your ability to diagnose and manage TMD more effectively?