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From Symptoms to Diagnosis: Interpretation of Patient-Reported Orofacial Pain in Temporomandibular Disorders Among Dentists: A Cross-Sectional Study

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ABSTRACT

Objectives: This study aimed to explore how dentists interpret patient-reported orofacial pain in TMDs and to identify key factors influencing diagnostic accuracy and clinical decision-making.

Materials and Methods: A cross-sectional, scenario-based survey was conducted among 466 practicing dentists. The instrument incorporated clinically relevant patient-reported symptom scenarios to evaluate diagnostic interpretation, alongside measures of professional background, diagnostic confidence, and use of standardized criteria. Statistical analysis included descriptive methods, Chi-square testing, and multivariate logistic regression to identify independent predictors of diagnostic accuracy.

Results: Marked variability was observed in the interpretation of patient-reported symptoms, particularly in ambiguous and non-specific presentations. Higher diagnostic accuracy was significantly associated with formal TMD training, greater clinical experience, and increased diagnostic confidence ($p < 0.05$). Dentists employing an integrative diagnostic approach—combining patient-reported symptoms with clinical examination—demonstrated superior performance ($p < 0.01$). Furthermore, consistent application of standardized diagnostic frameworks was strongly linked to improved interpretative accuracy ($p < 0.001$).

Conclusions: These findings highlight substantial heterogeneity in dentists' interpretation of patient-reported orofacial pain, underscoring the complexity of diagnostic decision-making in TMDs. Enhancing clinician training and reinforcing the use of structured diagnostic criteria are essential to improve diagnostic consistency, accuracy, and patient outcomes.

Keywords: Temporomandibular disorders, Orofacial pain, Diagnostic variability, Clinical reasoning, Dentists, Cross-sectional study.

1. Introduction

Temporomandibular disorders (TMDs) are among the most prevalent causes of orofacial pain, encompassing a range of conditions affecting the temporomandibular joint, masticatory muscles, and associated structures (1,2). These disorders are characterized by diverse clinical presentations,

including localized pain, functional limitations, joint sounds, and referred symptoms (3). Despite advances in diagnostic frameworks, TMDs remain challenging to diagnose accurately due to their multifactorial etiology and symptom overlap with other orofacial conditions (4,5).

A critical aspect of TMD diagnosis lies in the

interpretation of patient-reported symptoms, which are often described using non-clinical and subjective language (6). Patients frequently present with vague complaints such as “ear pain,” “facial discomfort,” or “jaw tightness,” which may not directly correspond to specific diagnostic categories (7). This gap between lay descriptions and clinical terminology requires dentists to engage in a complex cognitive process of interpretation, transforming subjective symptom narratives into structured clinical diagnoses (1,8).

Recent research has emphasized that this interpretative process is not uniform and may vary significantly among clinicians (9). Differences in training, clinical experience, and familiarity with diagnostic criteria can influence how dentists interpret the same patient-reported symptoms (10). As a result, variability in interpretation may lead to inconsistencies in diagnosis, treatment planning, and patient outcomes (2,6).

Moreover, the concept of diagnostic translation—the process of converting patient-reported symptoms into clinical diagnoses—has received increasing attention in contemporary healthcare research (11). In the context of TMDs, this process is particularly complex due to the presence of referred pain, psychosocial factors, and overlapping symptomatology (5,9). Misinterpretation at this stage may contribute to underdiagnosis, overdiagnosis, or inappropriate management (3,12).

Although previous studies have explored knowledge and diagnostic practices related to TMDs, limited research has specifically focused on how dentists interpret patient-reported orofacial pain descriptions (10,12). Understanding this process is essential not only for improving diagnostic accuracy but also for enhancing communication between clinicians and patients.

Therefore, this study aims to investigate how dentists interpret patient-reported symptoms of orofacial pain in the context of TMDs. By focusing on the transition “from symptoms to diagnosis,” this study seeks to provide insights into the cognitive and clinical factors influencing diagnostic interpretation and to identify potential areas for improving consistency in clinical practice (13).

Therefore, this study aims to investigate how dentists interpret patient-reported symptoms of orofacial pain in the context of TMDs. By focusing on the transition ‘from symptoms to diagnosis,’ this study seeks to

provide insights into the cognitive and clinical factors influencing diagnostic interpretation and to identify potential areas for improving consistency in clinical practice.

2. Materials and Methods

2.1 Study Design and Setting

This study employed a cross-sectional, scenario-based survey design to investigate how dentists interpret patient-reported (lay) descriptions of orofacial pain related to temporomandibular disorders (TMDs). Unlike traditional knowledge-based surveys, this study specifically focused on the cognitive process of diagnostic interpretation, using clinically relevant patient narratives. This study was conducted over a period of 8 months in 2025, targeting practicing dentists across different clinical settings.

2.2 Participants and Sampling

A total of 500 responses were initially received. Of these, 34 responses were excluded due to incomplete questionnaires or failure to meet the inclusion criteria. Consequently, 466 responses (93.2%) were included in the final analysis. Participants were recruited using a convenience sampling strategy through professional networks and online platforms, including WhatsApp groups, Facebook professional communities, Telegram groups, and university-affiliated communication channels. Eligible participants included general dentists and specialists actively involved in clinical practice. Dentists who were not currently practicing or who provided incomplete responses were excluded from the analysis.

Formal TMD training was defined as structured educational exposure to temporomandibular disorders through undergraduate coursework, postgraduate education, continuing professional development courses, workshops, or certified clinical training programs.

The scenario interpretations and predefined correct responses were reviewed by experts in orofacial pain and aligned with DC/TMD guidelines to enhance clinical validity.

2.3 Survey Instrument Development

A structured, self-administered questionnaire was developed based on current literature on TMD diagnosis and clinical reasoning. The questionnaire consisted of

five sections: (1) demographic and professional characteristics, (2) self-reported diagnostic confidence, (3) interpretation of patient-reported symptom scenarios, (4) clinical reasoning and decision-making patterns, and (5) alignment with standardized diagnostic criteria.

The core component of the survey included scenario-based questions, where participants were presented with common patient-reported complaints (e.g., “ear pain during chewing,” “jaw locking,” “diffuse facial pain with stress”). Participants were asked to select the most likely diagnosis or clinical interpretation. This design allowed assessment of diagnostic translation from lay descriptions to clinical reasoning, distinguishing this study from conventional knowledge-based assessments.

The questionnaire items were developed based on established diagnostic criteria for temporomandibular disorders, particularly the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), as well as previously published studies on orofacial pain assessment. Each scenario-based question had one predefined correct answer based on current clinical guidelines, while incorrect answers represented common misinterpretations reported in the literature.

2.4 Validity and Pilot Testing

The questionnaire was reviewed by experts in oral pathology and orofacial pain to ensure content validity and clinical relevance. A pilot test was conducted on a small group of dentists ($n = 20$) to assess clarity, comprehension, and response consistency. Minor modifications were made based on feedback, and pilot responses were excluded from the final analysis. The content validity approach used in this study is consistent with previously published questionnaire-based research (28).

2.5 Data Collection

Data were collected electronically using an online survey platform. Participation was voluntary, and informed consent was obtained prior to questionnaire completion. All responses were anonymized to ensure confidentiality.

2.6 Outcome Measures

The primary outcome was diagnostic interpretation accuracy, defined as the selection of the correct answer for each scenario based on established DC/TMD criteria (29). Each correct response was assigned a score

of 1, while incorrect responses were assigned a score of 0. A composite accuracy score was calculated by summing the total correct responses for each participant.

2.7 Statistical Analysis

Data were analyzed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequencies and percentages) were used to summarize participant characteristics and response patterns. Associations between categorical variables were assessed using the Chi-square test. A composite interpretation accuracy score was calculated based on correct responses to scenario-based questions.

Multivariate logistic regression analysis was performed to identify independent predictors of high diagnostic accuracy, including variables such as years of experience, specialty, formal TMD training, and diagnostic confidence. Statistical significance was set at $p < 0.05$. Similar statistical approaches have been used in previous cross-sectional studies (30).

2.8 Ethical Considerations

The study protocol was approved by the institutional ethical committee of Sirte University. Participation was voluntary, and all data were collected anonymously in accordance with ethical research standards.

2.9 Reliability and Internal Consistency

The internal consistency of the questionnaire was evaluated using Cronbach's alpha coefficient. The overall reliability of the scenario-based items demonstrated acceptable internal consistency (Cronbach's $\alpha = 0.78$), indicating good reliability of the instrument.

2.10 Sample Size Calculation

The sample size was calculated using the formula for cross-sectional studies:

$$n = Z^2 \times p(1 - p) / d^2$$

where $Z = 1.96$ at a 95% confidence level, p was assumed to be 0.5 due to lack of prior data, and $d = 0.05$ margin of error.

The minimum required sample size was 384 participants. To enhance statistical power and account for potential non-response, a total of 466 dentists were included in the final analysis. The sample size was calculated using standard formulas for cross-sectional studies (31).

3. Results

A total of 466 dentists participated in this study, and all responses were complete and included in the final analysis.

3.1 Participant Characteristics

The study population included dentists with diverse

clinical backgrounds. A majority were general practitioners (298; 63.9%), while specialists accounted for 168 (36.1%). Regarding clinical experience, 172 (36.9%) had less than 5 years of experience, 149 (32.0%) had 5–10 years, and 145 (31.1%) had more than 10 years. Notably, 286 participants (61.4%) reported no formal training in TMD diagnosis. As shown in Table 1.

Table 1: Demographic Characteristics (n = 466)

Variable	Category	n (%)
Years of Experience	<5 years	172 (36.9)
	5–10 years	149 (32.0)
	>10 years	145 (31.1)
Specialty	General dentists	298 (63.9)
	Specialists	168 (36.1)
Formal TMD Training	Yes	180 (38.6)
	No	286 (61.4)

3.2 Diagnostic Confidence

Participants reported varying levels of confidence in interpreting patient-reported symptoms. Moderate confidence was the most commonly reported level (205; 44.0%), followed by high confidence (149; 32.0%) and low confidence (112; 24.0%). Dentists with high confidence demonstrated significantly greater diagnostic accuracy compared to those with low confidence (68.5% vs. 48.2%, $\chi^2 = 12.87$, $p = 0.002$).

3.3 Interpretation of Patient-Reported Scenarios

Substantial variability was observed in the interpretation of clinical scenarios. Higher agreement was noted in clearly defined mechanical symptoms such as jaw locking (312; 67.0% correct), while lower accuracy was observed in non-specific presentations, including diffuse facial pain (214; 45.9% correct) and clicking without pain (201; 43.1% correct).

These findings indicate considerable inconsistency in translating patient-reported symptoms into clinical diagnoses. As shown in Table 2.

Table 2: Scenario-based interpretation

Scenario	Correct n (%)	Incorrect n (%)
Ear pain during chewing	289 (62.0)	177 (38.0)
Jaw locking	312 (67.0)	154 (33.0)
Clicking without pain	201 (43.1)	265 (56.9)
Diffuse facial pain with stress	214 (45.9)	252 (54.1)
Referred pain (temple/neck)	238 (51.1)	228 (48.9)

3.4 Clinical Reasoning Patterns

A combined diagnostic approach (integration of patient-reported symptoms and clinical examination) was the most commonly reported strategy (243; 52.1%), followed by reliance primarily on clinical examination (149; 32.0%) and symptom-based reasoning alone (74; 15.9%). Dentists using a combined approach demonstrated significantly higher diagnostic accuracy

compared to those relying solely on symptoms (64.2% vs. 49.5%, $\chi^2 = 9.76$, $p = 0.008$).

3.5 Use of Standardized Diagnostic Criteria

Only 118 participants (25.3%) reported consistent use of standardized diagnostic criteria (DC/TMD), while 211 (45.3%) reported occasional use and 137 (29.4%) reported no use. Regular use of DC/TMD was

significantly associated with higher diagnostic accuracy (69.5% vs. 52.3%, $\chi^2 = 14.21$, $p < 0.001$).

3.6 Inferential Statistical Analysis

A significant association was observed between formal TMD training and diagnostic accuracy. Dentists with formal training demonstrated higher correct interpretation rates (129/180; 71.7%) compared to those without training (161/286; 56.3%) ($\chi^2 = 13.02$, $p < 0.001$).

Similarly, years of experience were significantly associated with diagnostic performance. Dentists with more than 10 years of experience showed higher accuracy (103/145; 71.0%) compared to those with less than 5 years (92/172; 53.5%) ($\chi^2 = 10.84$, $p = 0.004$).

Multivariate logistic regression analysis identified formal training (OR = 2.18, 95% CI: 1.45–3.27, $p < 0.001$), high diagnostic confidence (OR = 1.89, $p = 0.006$), and >10 years of experience (OR = 1.76, $p = 0.011$) as independent predictors of accurate interpretation.

Overall, the findings demonstrated significant variability in the interpretation of patient-reported orofacial pain, with diagnostic accuracy significantly influenced by formal TMD training, clinical experience, and self-reported diagnostic confidence.

4. Discussion

The present study investigated how dentists interpret patient-reported orofacial pain in the context of temporomandibular disorders (TMDs), with particular emphasis on the transition from subjective symptom descriptions to clinical diagnosis. The findings demonstrated considerable variability in diagnostic interpretation, especially in non-specific and ambiguous clinical scenarios. These findings highlight the complexity of diagnostic translation and support the concept that TMD diagnosis depends not only on clinical knowledge but also on cognitive interpretation and clinical reasoning processes.

The observed inconsistency in interpreting patient-reported symptoms is consistent with previous literature emphasizing the subjective and multifactorial nature of TMDs. Patients frequently describe orofacial pain using vague and overlapping expressions, which may complicate diagnostic interpretation and contribute to variations in clinical judgment (13,14). In addition, referred pain and psychosocial influences have been identified as important contributors to diagnostic ambiguity in TMD cases (15). This is reflected in the

current study, where lower diagnostic accuracy was observed in scenarios involving diffuse facial pain and referred symptoms.

A significant association was identified between formal TMD training and diagnostic accuracy. Dentists who reported receiving structured TMD-related education demonstrated higher correct interpretation rates compared with those without formal training. This finding is consistent with previous studies reporting that structured educational exposure and continuing professional development are associated with improved diagnostic reasoning and greater consistency in TMD assessment (16,17). Nevertheless, some reports suggest that variability in interpretation may still occur even among trained clinicians because pain assessment remains inherently subjective (18). Therefore, formal education alone may not completely eliminate diagnostic inconsistencies, although it appears to contribute positively to clinical interpretation.

Clinical experience was also significantly associated with diagnostic performance. Dentists with more than 10 years of experience demonstrated higher interpretation accuracy than less experienced practitioners. Similar findings have been reported in previous studies suggesting that increased clinical exposure enhances pattern recognition and clinical decision-making skills over time (19). However, experience alone may not guarantee optimal diagnostic accuracy in complex disorders such as TMDs, emphasizing the importance of combining clinical exposure with standardized educational approaches and evidence-based diagnostic criteria (20).

Another important finding was the association between self-reported diagnostic confidence and interpretation accuracy. Participants with higher confidence levels demonstrated better diagnostic performance. Previous literature has similarly suggested a relationship between clinical confidence and professional competence (21). However, excessive confidence without adequate evidence-based assessment may increase the possibility of diagnostic error in some clinical situations (22). Accordingly, confidence should be supported by structured clinical reasoning and standardized diagnostic frameworks.

The findings further demonstrated that dentists using a combined diagnostic approach integrating patient-reported symptoms with clinical examination achieved higher diagnostic accuracy compared with those relying

primarily on symptoms alone. This observation supports current recommendations emphasizing multidimensional assessment in TMD diagnosis (23). Reliance solely on symptom descriptions may increase the likelihood of misinterpretation because many TMD symptoms overlap with other orofacial pain conditions. Previous studies have also reported variability in diagnostic strategies among dentists, reflecting differences in training, experience, and clinical practice patterns (24).

An additional observation in the present study was the limited consistent use of standardized diagnostic criteria such as the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD). Although these criteria are widely recognized for improving diagnostic reliability and standardization, only a minority of participants reported regular use. Similar findings have been reported in previous literature, indicating a gap between evidence-based recommendations and routine clinical practice (25). Nevertheless, increasing adoption of standardized criteria has been reported in specialized clinical settings, suggesting variability in implementation across professional environments (26).

From a broader perspective, the variability identified in this study has important implications for both clinical practice and future research. Inconsistent interpretation of patient-reported symptoms may contribute to delayed diagnosis, underdiagnosis, or inappropriate management, potentially affecting patient outcomes and quality of care. Furthermore, variability in diagnostic interpretation may influence epidemiological research and prevalence estimates for TMDs, particularly in studies relying on clinician-based diagnoses (27).

4.1 Limitations

Several limitations of this study should be acknowledged. First, the cross-sectional design limits the ability to establish causal relationships between clinical factors and diagnostic interpretation accuracy. Second, the use of self-reported responses may introduce response bias and may not fully reflect actual clinical behavior in practice. Third, although the scenario-based approach was designed to simulate realistic clinical situations, it cannot entirely reproduce the complexity of real patient encounters and clinical interactions. In addition, convenience sampling through online professional platforms may limit the generalizability of the findings and introduce selection

bias, as participation depended on voluntary response and online accessibility. Finally, while the questionnaire scenarios and predefined correct responses were developed according to DC/TMD principles and reviewed for content validity, some degree of subjectivity in clinical interpretation may still remain.

4.2 Future Directions

Future studies should consider the use of longitudinal or interventional designs to better evaluate the effect of educational programs and standardized diagnostic training on clinical performance. Research involving direct clinical assessment rather than scenario-based responses may provide a more comprehensive understanding of diagnostic behavior in real-world settings. In addition, multicenter studies with more representative sampling methods are recommended to improve generalizability across different healthcare systems and professional backgrounds. Further investigation into the role of cognitive biases, communication patterns, and artificial intelligence-assisted diagnostic tools in TMD assessment may also contribute to improving diagnostic consistency and patient care.

5. Conclusions

In conclusion, this study demonstrated substantial variability in dentists' interpretation of patient-reported orofacial pain associated with temporomandibular disorders. Diagnostic accuracy was significantly associated with formal TMD training, clinical experience, diagnostic confidence, and the use of combined diagnostic approaches. The findings emphasize the importance of strengthening educational strategies and encouraging greater adoption of standardized diagnostic criteria such as DC/TMD to improve consistency in diagnostic interpretation and support more reliable patient care.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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