

Evaluation of Pterygoid Muscles in Patients with Temporomandibular Disorders

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ABSTRACT

Objective: To evaluate pterygoid muscles in patients with temporomandibular disorders.

Study Design: Descriptive Cross-sectional study.

Place and Duration of Study: This study was conducted at the Nishtar Institute of Dentistry, Multan from April 2021 to March 2022 in one year duration.

Materials and Methods: Total 100 subjects were selected for the study purpose including 40%, 17%, 15%, 16% and 12% from prosthodontics, oral and maxillofacial surgery, operative dentistry, orthodontics, and general dentistry respectively. A survey was administered to one hundred dentists representing five dental specialties in district Multan, including both dental institutes and private practices. The survey questionnaire was to assess dentists' preferred methods for evaluating the medial pterygoid, inferior lateral pterygoid, superior lateral pterygoid, masseter, and temporalis muscles.

Results: When evaluating the superior and inferior lateral pterygoid muscles, the majority of dentists (54% and 60% respectively) preferred using the combination of palpation and functional manipulation method, which is consistent with the published literature. A minority of participants chose digital palpation as their preferred method for assessing the lateral pterygoid muscles. When it came to evaluating the medial pterygoid muscles, 59% of the dentists favored a combination of techniques, while 22% endorsed relying solely on functional manipulation.

Conclusion: The study's limitations lead to several notable conclusions. Firstly, a significant number of local dentists demonstrate a preference for utilizing digital palpation when assessing the masseter and temporalis muscles during TMJ examinations. Conversely, when it comes to evaluating the pterygoid muscles, the majority of local dentists tend to employ a combination of palpation and functional manipulation techniques. Nevertheless, it is essential to carry out additional research to thoroughly assess the diagnostic approaches utilized by dentists in the local context and compare them with universally established standards.

Key Words: Pterygoid Muscles, Masticatory muscles, Temporomandibular Joint and disorder.

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INTRODUCTION

Temporomandibular disorders (TMD) encompass a range of symptoms affecting the temporomandibular joint (TMJ), the muscles responsible for chewing, and the surrounding tissues¹.

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These disorders can result in abnormal or impaired TMJ function, and may stem from issues with the joint's structural components or the muscles themselves, distinguishing the nature of the disorder as either extra-capsular or intra-capsular.² Patients with TMD most commonly report functional problems with their chewing muscles when seeking dental treatment.³ The muscles associated with the TMJ are divided into mandibular depressors, which open the jaw, and mandibular elevators, which close it. The lateral pterygoid muscle is the primary opener and plays a significant role in protruding and laterally moving the jaw.⁴ The mylohyoid, geniohyoid, and digastric muscles are additional muscles that contribute to the depression of the mandible. Conversely, the masseter, temporalis, and medial pterygoid muscles are the primary elevators of the mandible.⁵ In the various movements of TMJ, the lateral pterygoid muscle plays a significant role and has been a subject of extensive debate. Originating from the palatine bone and lateral pterygoid plate and inserting onto the ramus and angle of the medial surface of the

mandibles. There are two distinct heads of lateral pterygoid⁶ The superior head of the lateral pterygoid originates from the infratemporal crest of the sphenoid bone and connects to the articular disk. On the other hand, the inferior head arises from the lateral plate of the pterygoid process and attaches to the condylar process of the mandible.

Patients experiencing functional disorders of their masticatory muscles often report muscular pain or myalgia as their primary symptom.⁷ An essential factor in pinpointing the precise origin of pain is the observation that local provocation should accentuate the pain.⁸ However, while digital palpation may effectively provoke muscles like the masseter and temporalis, it may not be as applicable when assessing the pterygoid muscles.^{9,10} Literature provides studies that support both digital palpation and functional manipulation methods, yet a consensus regarding the superior approach has not been reached. Dentists tend to choose their preferred method based on personal preference. Therefore, the aim of this cross-sectional survey was to assess the evaluation practices employed by local dental practitioners during TMJ evaluations, specifically focusing on the assessment of masticatory muscles. To the best of the authors' knowledge, there is a scarcity of reported data in this particular context.

MATERIALS AND METHODS

This descriptive Cross-sectional study was conducted at Nishtar Institute of Dentistry, Multan from April 2021 to March 2022 in one year duration. Prior to its distribution, a self-administered questionnaire underwent the necessary steps of development and testing to ensure its validity and reliability. The questionnaire comprised of closed-ended inquiries covering multiple areas of interest, including the number of diagnosed cases of temporomandibular disorder (TMD), the skill to distinguish between capsular (intra and extra) disorders, and the favored assessment methods for various muscles, such as the pterygoid (inferior lateral, medial, superior lateral), temporalis and masseter. Subsequently, the questionnaire was disseminated to a group of hundred dentists representing diverse dental specialties and practicing in both dental institutions and private clinics across district Multan. Following data collection, an analysis and descriptive statistics were computed to summarize the findings using version 21 of SPSS.

RESULTS

Total 100 subjects were selected for the study purpose including 40%, 17%, 15%, 16% and 12% from prosthodontics, oral and maxillofacial surgery, operative dentistry, orthodontics, and general dentistry respectively. (Table-1) Out of these, 29% were consultants, 59% were residents and 12% were general practitioner. (Table-2)

As per the question regarding the skill to distinguish between capsular (intra and extra) disorders, 15% responded as "always", while 21% responded as "never", while 64% responded as "not always". (Table-3) Average number of cases diagnosed were 113.4 ± 162.8 with range of 2-600. (Table-4) The methods preferred for the assessment of the different muscles of mastication have been illustrated in table-5.

Table No. 1: Specialty

Specialty	Number	Percentage
Prosthodontics	40	40.0
Oral & maxillofacial surgery	17	17.0
Operative dentistry	15	15.0
Orthodontics	16	16.0
General dentistry	12	12.0

Table No. 2: Clinical status

Clinical status	Number	Percentage
Consultant	29	29.0
Resident	59	59.0
General practitioner	12	12.0

Table No. 3: Skill to Distinguish Between Capsular (Intra And Extra) Disorders

Question	Yes	No	Not always
Can you always differentiate between Intra-capsular and Extracapsular Disorders?	15 (15.0)	21 (21.0)	64 (64.0)

Table No. 4: Number of Temporomandibular Disorder (Tmd) Cases Diagnosed By Study Subjects

Number of study subjects	Minimum cases	Maximum cases	Mean	S.D.
100	2	600	113.4	162.8

Table No. 5: Method Preferred by Dentists for Evaluation of Muscles of Mastication

Muscle	Palpation	Functional manipulation	Combination of palpation and functional manipulation
Medial pterygoid	19 (19.0)	22 (22.0)	59 (59.0)
Inferior lateral pterygoid	12 (12.0)	34 (34.0)	54 (54.0)
Superior lateral pterygoid	10 (10.0)	30 (30.0)	60 (60.0)
Temporalis	57 (57.0)	8 (8.0)	35 (35.0)
Masseter	63 (63.0)	5 (5.0)	32 (32.0)

DISCUSSION

After reviewing the existing literature on temporomandibular disorders (TMDs), it is evident that most published articles focus on newer management therapies or the general examination process for the temporomandibular joint (TMJ). Proponents of digital palpation and functional manipulation of muscles tend to emphasize their preferred methods while disregarding alternative approaches. However, there is a notable absence of data reporting the specific practices employed by dentists when evaluating the muscles of mastication in relation to TMDs. Given the high prevalence of TMDs,⁷ it is crucial to assess and document the diagnostic practices utilized by treating dentists regarding its diagnosis.

Palpating the pterygoid muscles presents challenges due to their anatomical location. Proponents of digital palpation recommend instructing the patient to open their mouth wide and move it laterally towards the side of the lateral pterygoid muscle under evaluation. The examiners moves its index or little finger posteriorly, superiorly, and medially after placing at the area of the maxillary third molar behind the tuberosity until reaching the outer surface of the lateral pterygoid plate.¹¹ To palpate the pterygoid's one needs to navigate the upper portion of the medial pterygoid. Furthermore, for medial pterygoid's direct palpation one needs to place a finger on the lateral aspect of the pharyngeal wall located in the throat, which can be both challenging and uncomfortable for the patient.³ Conversely, certain clinicians express concerns regarding the reliability and feasibility of digitally palpating the pterygoid muscles.¹² They propose that a more effective evaluation can be achieved through the use of "functional manipulation" techniques.

Functional manipulation relies on the concept that if a muscle is impaired, additional movements such as flexion or extension will result in heightened pain.⁸ In the present study, a significant number of dentists expressed a preference for digitally palpating the temporalis and masseter muscles, which is consistent with the approaches documented in the available literature for evaluating these muscles.^{3, 8, 13, 14 & 15} The accessible anatomical location of these muscles allows for easy and comfortable palpation, making digital palpation a reliable and repeatable method with valid diagnostic value. It should be noted that most participants in the study, who were trainees, acknowledged difficulty in differentiating between extra- and intra-capsular disorders. However, it is expected that their ability to differentiate will improve with time and experience. On the other hand, when evaluating the pterygoid (superior and inferior lateral), the bulk of dentists preferred using the combination of palpation and functional manipulation method (54% and 60% respectively), which is consistent with the

published literature.^{8, 9, 13 & 15} A minority of participants chose digital palpation as their preferred method for assessing the lateral pterygoid muscles. Among dentists, 59% preferred using a combination of multiple techniques for evaluating the medial pterygoid muscles, while 22% supported relying solely on functional manipulation. As already discussed, the deep location of the pterygoid muscles poses challenges for their assessment through digital palpation. Performing digital palpation on these muscles can cause significant discomfort for the patient and potentially elicit pain even without provoking the muscle.³ When diagnosing a medical or dental condition, it is crucial to use a diagnostic method that is reliable (i.e., consistent, replicable, and reproducible) and valid.¹² However, in the specific context of evaluating the pterygoid muscles, the reliability and validity of digital palpation as a diagnostic approach remain uncertain. Nonetheless, when combined with modern diagnostic imaging techniques like MRI or EMG, digital palpation may offer improved outcomes.¹¹

The notion that local dentists adhere to international standards when evaluating the muscles of mastication is supported by current study. However, this study has its limitations. Since it was questionnaire-based, there is a potential reporting bias from the study participants. Furthermore, a significant portion of the candidates in this study were residents, indicating that their knowledge and experience may be limited. Moreover, the sample size used in the study was relatively small, and there is a lack of similar studies available for reference and comparison with the study's results.

Additionally, it was observed that as dental specialization continues to increase, general dentists, orthodontists, and operative dentists encounter fewer patients presenting with TMD symptoms. While the evaluation of the temporomandibular joint (TMJ) is typically included in the examination of the head and neck, orthodontists and operative dentists don't regularly perform TMJ evaluations, leading to potential unfamiliarity with TMD examination protocols. To address this, it is suggested to conduct additional studies with a larger and more diverse sample, specifically focusing on maxillofacial surgeons and prosthodontists who regularly treat patients suffering from TMD. This would help gather more comprehensive insights into the subject. This would allow for a more comprehensive assessment of the practices followed by local dentists and facilitate a comparison with established universal standards.

CONCLUSION

The study's limitations lead to several notable conclusions. Firstly, a significant number of local dentists demonstrate a preference for utilizing digital palpation when assessing the masseter and temporalis muscles during TMJ examinations. Conversely, when it

comes to evaluating the pterygoid muscles, the majority of local dentists tend to employ a combination of palpation and functional manipulation techniques. Nevertheless, it is essential to carry out additional research to thoroughly assess the diagnostic approaches utilized by dentists in the local context and compare them with universally established standards.

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