



Research Article

INVOLVEMENT OF MYOFACIAL MUSCLES IN PATIENTS WITH TEMPOROMANDIBULAR DISORDERS- A CLINICAL STUDY

AbhishekSoni¹ and AbhirajSoni²

¹Department of Oral Medicine & Radiology, Modern Dental College & Research Center, Opp. Gandhi Nagar, Airport Road, Indore (Madhya Pradesh) India

²Modern Dental College & Research Center, Opp. Gandhi Nagar, Airport Road, Indore (Madhya Pradesh) India

ARTICLE INFO

Article History:

Received 6th February, 2018
Received in revised form 20th March, 2018 Accepted 8th April, 2018
Published online 28th May, 2018

Key words:

Humans, temporomandibular joint disorders, muscles, facial pain, myofacial muscles

ABSTRACT

Objective-To investigate the involvement of myofacial muscles in different diagnostic categories in patients with temporomandibular disorders.

Material and Methods- In this cross-sectional study, 50 consecutive patients (20=males; 30=females) with TMJ disorders were selected with the documented presence of signs and symptoms of TMDs. For each patient, a standardized protocol was followed for history taking and clinical examination and then exploration was carried out according to the RDC/TMD axis I criteria, in accordance with routine clinical practice. All the patients were classified into the diagnostic categories according to the RDC/TMD criterion. All the muscles of mastication were palpated for tenderness and positive findings were noted down. Clinical parameters were compared using paired and unpaired t-tests, and Kruskal-Wallis test.

Results- In this study, masseter was found to be involved more frequently in all the diagnostic categories, (20%- Group Ia; 33%- Group IIa; 27%- Group IIb; 50%- group IIIb), followed by pterygoideus lateralis muscle (16%- Group Ia; 24%- Group IIa; 30%- Group IIb; 0%- group IIIb) and pterygoideus medialis. The least involved was the trapezius muscles (10%- Group Ia; 0%- Group IIa; 03%- Group IIb; 0%- group IIIb).

Conclusions- Within the limitations of this study, we can conclude that the most frequent involved muscle in all the diagnostic categories of temporomandibular disorders was masseter muscle followed by pterygoideus lateralis muscle.

Copyright©2018 **AbhishekSoni and AbhirajSoni**. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Temporomandibular disorders (TMD) include alterations of the temporomandibular joint (TMJ) and associated structures, including facial and neck muscles (Dimitroulis G, 1998). It is a term used to describe disorders involving the (TMJ), masticatory muscles and occlusion resulting in muscle or TMJ pain, restricted movement, deviation or deflection of the mouth opening path, muscle tenderness, and intermittent joint sounds (Dimitroulis G, 1998; Bonjardim LR *et al.*, 2009). It characteristically involves the masticatory muscles and refers to involve other muscles in the orofacial region. Primary pain in one of the orofacial structures may also lead to secondary changes in another site that then becomes a further source of pain leading to functional impairment (Parker MW, 1990; Sessle BJ *et al.*, 1991; Schiffman EL *et al.*, 1992).

Previous literature showed that little attention has been paid exclusively to the involvement of masticatory muscles in patients with TMD. The present study is an attempt to investigate the involvement of myofacial muscles in patients present with TMDs in each diagnostic category based on RDC/TMD criteria.

MATERIAL AND METHODS

This cross-sectional study was conducted on 50 patients (20 males and 30 females) with TMDs, who reported to the outpatient department of Oral Medicine and Radiology, Modern Dental College and Research Centre (MDCRC), Indore. An approval from the Institutional Ethics Committee was obtained. All ethical guidelines were followed. Patients were given proper instructions about the goals of the research and experimental procedures and a signed informed consent form was taken from each patient participating in the study.

Inclusion Criteria

Patient with temporomandibular disorder; preferably older than 18 years of age, with the documented presence of limited

*Corresponding author: **AbhishekSoni**

1Department of Oral Medicine & Radiology, Modern Dental College & Research Center, Opp. Gandhi Nagar, Airport Road, Indore (Madhya Pradesh) India

range or disturbed mandibular movement; masticatory muscle or TMJ pain; TMJ sounds; pain on jaw movement has been selected to participate in the study.

Exclusion Criteria

- Patients with cervico-facial and neurological disorders.
- Patients with any systemic disease or strong psychogenic factors related to their symptoms.
- Patient underwent orthodontic treatment
- Patient with history of malignant disease or major or minor surgery in orofacial region in past three months.
- Patient on chemotherapy or radiotherapy or patient recovering from facial injuries.
- Patient not willing to participate in the study.

Data collection and examination method

For each patient, a detailed clinical case history was recorded followed by complete examination of muscles, TMJ and dental structures for evaluating the signs and symptoms of TMD. All the muscles of mastication were palpated for tenderness and positive findings were noted down.

- *Temporalis*: It was palpated simultaneously with the fingertips aligned in a row from the hair line just above the supraorbital ridge to above the ear.
- *Masseter*: It was palpated bilaterally in the area overlying the anterior border of the mandibular ramus. The belly of the masseter was palpated against the ascending ramus of mandible.
- *Medial Pterygoid*: It was palpated near its insertion by placement of the index finger laterally and posteriorly into the floor of the mouth towards the medial surface of the angle of the mandible.
- *Lateral Pterygoid*: The index finger was positioned distal and posterior to the maxillary tuberosity and posterior pressure was exerted to compress tissue against this muscle.
- *Sternocleidomastoid*: Palpation was done bilaterally near its insertion on the surface of the mastoid behind the ear. The entire length of the muscle was palpated down to its origin near clavicle.
- *Trapezius*: The upper part was palpated from behind the sternocleidomastoid, inferolaterally to the shoulder and any trigger points were recorded.

In TMJ examination, following parameters were noted:

- Facial symmetry/ asymmetry
- Extent of mouth opening
- Interincisal distance- It is the distance between the incisal edges of the upper and lower central incisors with the mouth fully opened.
- Possible jaw deviation or deflection during mouth opening
- The temporomandibular joint was palpated with gentle digital pressure bilaterally to assess the degree of pain and quality of joint noises (clicking/ crepitus), and their relationship to jaw opening.
- Auscultation with stethoscope was done for the confirmation of palpatory findings

A complete dental examination was performed which includes recording of maxilla-mandibular occlusal relationship, occlusion interferences (presence of any high points or premature contacts), presences of any restoration or prosthesis, missing teeth. Special emphasis was given to the attrition, abrasion, abfraction of the teeth, occlusal facet which would suggest the presence of parafunctional habits such as bruxism or clenching.

After complete clinical examination, all the patients underwent standardized radiographic examinations to assess the joint status. When data recording for each patient had been completed, exploration was carried out according to the RDC/TMD axis I criteria, in accordance with routine clinical practice. All the patients were classified into the diagnostic categories according to the RDC/TMD criterion.

Statistical analysis

When the entire data had been collected, statistical analysis was performed to analyze the available data, estimated from the individuals in various groups. The values were tabulated and evaluated statistically by using t-test and Kruskal–Wallis test with help of statistical package for the social sciences (SPSS) 14 software. The p-value less than 0.01 were considered as highly significant; between 0.05-0.01 significant and more than 0.05 was considered as non-significant.

RESULTS

In our study, the most frequent involved muscle was the masseter muscle in all the diagnostic categories, (20%- Group Ia; 33%- Group IIa; 27%- Group IIb; 50%- group IIIb). The second most frequently affected muscle was the pterygoideus lateralis muscle (16%- Group Ia; 24%- Group IIa; 30%- Group IIb; 0%- group IIIb) followed by pterygoideus medialis. The smallest number of changes was found in the trapezius muscles (10%- Group Ia; 0%- Group IIa; 03%- Group IIb; 0%-group IIIb). Sternocleidomastoid muscle is mainly involved in myofascial pain cases (diagnostic category Ia) (Table 1 and Figure 1).

Table 1 Distribution of muscle involvement in each diagnostic category of TMD

	Ia	IIa	IIb	IIIb
M	1	0.7	0.8	1
T	0.8	0.3	0.6	1
MP	0.9	0.5	0.5	0
LP	0.8	0.5	0.9	0
SCM	1	0.1	0.1	0
TZ	0.5	0	0.1	0

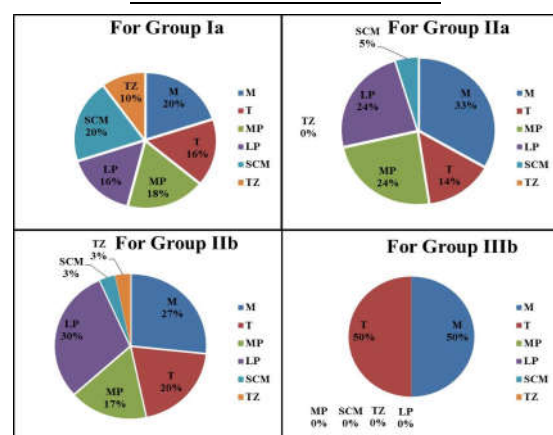


Figure 1 Pie diagram showing involvement of muscles in different diagnostic categories of TMD

DISCUSSION

Pain in the masticatory muscles and TMJ is the main symptom of TMD. It mainly refers to muscles in the orofacial region and exacerbated by mandibular movement and stomatognathic functions (Furquim BD *et al.*, 2015). In patients with TMDs, muscle tenderness is considered to be the most common sign (Wanman A, 1995; Visscher CM *et al.*, 2004; Farella M *et al.*, 2000; Silva RSS *et al.*, 2005), and muscle pain is the most common symptom (Okeson JP, 2005).

Smekal D *et al.* (2008) in their study found that the most frequent involved muscle with associated trigger points and tender points was the masseter muscle (in 91.3%), followed by the pterygoideus lateralis muscle (89.1%) and the pterygoideus medialis muscle (in 67.4%). Similarly in our study, the muscle which is most frequently involved in TMDs was the masseter muscle in all the diagnostic categories, (20%- Group Ia; 33%- Group IIa; 27%- Group IIb; 50%- group IIIb) followed by the pterygoideus muscle (the lateral and medial pterygoids). But, in contrast, Travell and Simons (1998) in their study found that, trigger points most frequently present in the pterygoideus lateralis muscle (36%), followed by pterygoideus medialis muscle (17%) and only upto 3% in the masseter muscle. This difference may be due to different pressure applied for palpation or different assessment of the TePs and TrPs. According to Travell and Simons (1998), myofacial trigger points are the most frequent cause of pain in the region of the TMJ.

In patients, myofacial trigger points present as focal areas in muscle that appear stiff and hypercontracted and are painful particularly when palpated (Jafri MS, 2014). This stiffness might arise from hypercontracture of the sarcomere in this area (Dommerholt J *et al.*, 2006; Simons DG *et al.*, 1976). The persistence of the myofacial trigger point may be due to sustained hypercontraction/activity that may lead to increased metabolic stress and reduced blood flow to the musculature; and is probably contemplated to be the foci for secondary changes. In addition to this, psychological stress may also leading to persistence of myofacial trigger points (Jaeger B, 2013). Myofacial trigger points showed increased myogenic activity as compared to the adjacent muscle that remained silent under psychological stress (McNulty WH *et al.*, 1994).

CONCLUSION

Involvement of the myofacial muscles in TMDs is the most common clinical presentation; and this study is an attempt to analyze the predominant involvement of myofacial muscles in various clinical categories of TMDs. In summary, it appears reasonable to conclude that the result of the present clinical study may serve as a guide for further future studies with larger representative sample to confirm our findings.

References

Bonjardim LR, Lopes-Filho RJ, Amado G, Albuquerque Jr RLC, Goncalves SRJ. Association between symptoms of temporomandibular disorders and gender, morphological occlusion, and psychological factors in a group of university students. *Indian J Dent Res* 2009; 20:190-4.

Dimitroulis G. Temporomandibular disorders: A clinical update. *BMJ* 1998;317:190-4.

Dommerholt J, Bron C, Franssen J. Myofacial trigger points: an evidence-informed review. *J Man ManipTher* 2006;14:203-221.

Farella M, Michelotti A, Steenks MH, Romeo R, Cimino R, Bosman F. The diagnostic value of pressure algometry in myofacial pain of the jaw muscles. *J Oral Rehab* 2000;27:9-14.

Furquim BD, Flamengui LM, Conti PC. TMD and chronic pain: A current view. *Dental Press J Orthod* 2015;20:127-33.

Jaeger B. Myofacialtrigger point pain. *Alpha Omegan* 2013;106:14-22.

Jafri MS. Mechanisms of Myofacial Pain. *IntSch Res Notices* 2014;2014:523924.

McNulty WH, Gevirtz RN, Hubbard DR, Berkoff GM. Needle electromyographic evaluation of trigger point response to a psychological stressor. *Psychophysiology* 1994;31:313-6.

Okeson JP. The Clinical Management of Orofacial Pain. In: Okeson JP. *Bell's Orofacial Pains: 6th edition*. Surrey, Canada: Quintessence Books;2005.

Parker MW. A dynamic model of etiology in temporomandibular disorders. *J Am Dent Assoc* 1990; 120:283-90.

Schiffman EL, Anderson GC, Friction JR, Lindgren BR. The relationship between level of mandibular pain and dysfunction and stage of temporomandibular joint internal derangement. *J Dent Res* 1992; 71:1812-5.

Sessle BJ, Hu JW. Mechanisms of pain arising from articular tissues. *Can J PhysiolPharmacol* 1991; 69:617-626.

Silva RSS, Conti PC, Lauris JR, da Silva RO, Pegoraro LF. Pressure pain threshold in the detection of masticatory myofacial pain: an algometer-based study. *J Orofac Pain* 2005;19:318-24.

Simons DG, Stolov WC. Microscopic features and transient contraction of palpable bands in canine muscle. *Am J Physical Med* 1976; 55:65-88.

Smekal D, Velebova K, Hanakova D, Lepsikova M. The effectiveness of specific physiotherapy in the treatment of temporomandibular disorders. *Acta Univ Palacki OlomucGymn* 2008;38:45-53

Travell, JG, Simons DG. Myofacial pain and dysfunction: The trigger point manual: The upper extremities. Baltimore: Williams & Wilkins. 1998.

Visscher CM, Lobbezoo F, Naeije M. Comparison of algometry and palpation in the recognition of temporomandibular disorder pain complaints. *J Orofac Pain* 2004; 18:214-19.

Wanman A. The relationship between muscle tenderness and craniomandibular disorders: a study of 35-year-olds from the general population. *J Orofac Pain* 1995; 9:235-43.
