

Pain Sensitivity of Sub-Occipital Muscles in Temporomandibular Disorder Patients: A Comparison with Normal Subjects

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Background: Temporomandibular disorders (TMDs) are one of the most communal musculoskeletal disorders. Sub-occipital muscle tenderness shows a significant role in the pathogenesis of TMD. The main purpose of this study was to find out the Pressure Pain Threshold (PPT) level in patient with TMD.

Material and Method: A total of two hundred participants were divided into group A with 100 participants presenting with signs and symptoms of TMD and group B with 100 participants of normal individuals. Age of the participant was between 18-49 years. Sub-occipital muscle sensitivity was measured by Pressure pain threshold algometer.

Results: The mean value of PPT for group A found very low, for male=3.77±0.16 (Right side), 4.52±0.26 (left side) and for female=3.77±0.16 (right side), 4.52±0.26 (left side). whereas mean value of group B for male 4.94±.46 (Right side), 4.94±.46 (left side) and for female 4.94±.46 (right side), 4.94±.46 (left side). These results were statistically significant ($\square < 0.05$).

Conclusion: Participants with TMD showed low PPT as compare to normal control subjects. Therefore, it is important for the clinician to give importance to the sub-occipital muscles for better management of TMD patients.

Keywords: Temporomandibular Disorders, Pressure Pain Threshold, Sub-Occipital Muscles

Introduction

The pain which arise from temporomandibur joint, disk, masticatory muscles and related structures is known as Temporomandibular Disorder (TMD). This term is used to refer to a group of symptoms which involves the neuromuskuloskeletal structures around the Temporomandibular joint, [1] and the cost effects is very high. [2]

The common clinical features exhibit as pain at orofacial area and ear, clicking and popping sounds, and limited jaw movements. [3-5] Due to CNS involvement, TMD patients show increased pain sensitivity and psychosomatic dysfunction. [5,6] Study proved that in 70% of TMD patient shows neck pain. [7, 8] Neuroanatomical and functional networks between masticatory and cervical areas are debated as enlightenments for

associated mandible and neck symptoms. [9, 10]

There is a relation between stomatognathic system and upper cervical spine with TMD dysfunction. If further relationship is established, new clinical strategies that target both regions should be considered and therefore, the need of a multidisciplinary approach should be reinforced in the management of TMD patients. But, there are very few studies which show there is effect of TMJ dysfunction on sub-occipital muscles and vice versa. This study aims to see if there is any cause and effect relationship between sub-occipital muscles and TM joint pathology.

Materials and Method

This study is an observational cross-sectional study and carried out during May 2018 to March 2019,

Department of Physiotherapy, Lovely Professional University, Punjab. Pain sensitivity was assessed by digital pressure Algometer, FDX (Wagner, Greenwich, USA).

Total 200 participants aged between 18 and 49 years were selected for the study. The subjects were divided into two groups. Group A is comprised of 100 participants with TMD and group B is included of 100 asymptomatic participants without any signs and symptoms of TMD. Institutional research and institutional ethical committee approval were obtained before recruiting the patient (LPU/IEC/2019/01/05) for the proposed study. Written, signed informed consent was obtained from all participants. The participants were included for group A, pain and positive three finger test with limited MMO of less than 30mm (but not necessarily painful) clearly originating in the TMJ. For group B subjects without any signs and symptoms of TMD with these who are not

suffering from systemic conditions which may affect the functioning of TMJ, for example, rheumatoid arthritis, scleroderma, and septic arthritis.

The participants were excluded from the study for group A, those who are having history of hypertension, diabetes, asthma, epilepsy, and trauma to the maxillofacial area, any previous history of surgery to the maxillofacial area and malignancy.

Results and Analysis

Statistical analysis was carried out using SPSS 16 and paired t-test was used to compare the TMD and normal healthy population which are known to control group. Demographic variables (age, weight, height, BMI) are showing in the (Table-1). Statistical analysis (Table-2) revealed low PPT score among TMD patients.

Table 1: Demographic data of the subjects (Mean±SD)

Variables	TMD	Control Group
	Mean ± SD	Mean ± SD
Age(y)	39±10.11	38±12.12
Weight(kg)	66.22±5.93	67.32±7.58
Height(cm)	163.34±8.52	164.33±7.24
Gender	Female (n=68) Male (n=32)	Female(n=60) Male (n=40)
Body mass Index(kg/m ²)	22.55±3.65	23.32±3.15

Table 2: PPT in subjects with TMD and without TMD (males and females).

Group	Male		Female	
	Right	Left	Right	Left
Group-A	3.77±0.16	4.52±0.26	3.77±0.16	4.52±0.26
Group-B	4.94±.46	4.94±.46	4.94±.46	4.94±.46
	<i>P</i> < 0.001	<i>P</i> < 0.001	<i>P</i> < 0.001	<i>P</i> < 0.001

Discussion

The main objective of this study was to investigate the sub-occipital musculature sensitivity in patients with TMD. Numerous studies scrutinised that the presence of signs and symptoms in the cervical area of TMD's patients is quite common, which is in line with the outcomes of this study.^[11-16]

Pain is a difficult phenomenon predisposed by both biologic and psychological reasons.^[17] Several studies suggested that neck muscle tenderness in which palpation technique was used.^[18, 19] It seems there is a relationship exist between mandible and Upper Cervical vertebra i.e. C1 and C2. During mastication of food, there are movement happening in the superior Cervical Spine in coordination with mouth depression and elevation as revealed by previous studies and that is again due to coordination of cervical muscles and muscles of mastication. Thus, the fixation or change in head position may cause alteration in movement of lower jaw.^[18]

Biomechanical study proved that depression of mouth is directly associated with upper cervical spine extension.^[16] Patients with TMD have revealed noteworthy restrictions in movement of superior cervical spine in compared to normal individuals.^[15] Hence TMJ dysfunction can cause Neck dysfunction and vice versa.

Many study proved that sign and symptoms are present in cervical area those who are suffering with TMD and they have been showing that the presence of tenderness in the cervical musculature also which is in line with the findings of this study.^[20-23] The outcomes of these studies recommend that a more integrated treatment approach including sub-occipital muscle assessment is important when handling patients with TMD.

Conclusion

The result of this study shown that there is a higher rate of sub-occipital musculature tenderness in subjects with temporomandibular disorders. Therefore, for the better management of TMD clinician should consider these factors, otherwise treatment may become unproductive and may give rise to treatment failure.

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Conflict of Interest: Author does not have any conflict of interest

Ethical Clearance: Institutional research and institutional ethical committee approval were obtained before recruiting the patient (LPU/IEC/2019/01/05) for the proposed study.

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