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Influence of Myofascial Pain Disorder on Mandibular Border Movements and Bennett Angle Values

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Abstract: ***Myofascial pain was the most common cause of oro-facial chronic pains. It was also the leads cause of the patientto a dentist due to some other problems thantoothache. Myofascial pain was themost common form of mandibular jointdisorders.The Jaw movement measurements combined with clinical examination of the masticatory system could be utilize in the diagnosis of different tempromandibular joint disorders. Twenty patients with myofascial pain examined according to Research Diagnostic Criteria for Temporomandibular Disorders and twenty-control group. Cadiax compact II used to evaluate Bennett angle value. The result showed lower mean value of boarder movement and Bennett angle for myofascial group compared with control with significant difference between the two groups. The assessment of the masticatory system movement using mechanical devices contributing together for better evaluation of different disorder of jaw locomotor system.***

Keywords: Myofascial, Bennett angle, Cadiax compact II

1. Introduction

Myofascial pain was a substantial health problem, affecting about 85% of the general population one-time in their lifetime, while the assessed overall prevalence was~46 percentage [1].

Myofascial pain disorder was collection of the sensory, motor, and autonomic symptoms that comprise local and referred pain, and decreased range of motion. The health impact of myofascial pain can be quite severe as patients with disorder not only suffer from decreased functional status associated with musculoskeletal pain and loss of function, but also suffer from impaired mood as well as reduced quality of life [2].

Myofascial pain syndrome arises from the muscle and is composed of symptoms from the motor,sensory and autonomic systems. Myofascial pain caused by myofascial trigger points, which identified by palpation as discrete foci of hypercontracted areas within a muscle [3].

Myofascial pain considered multifactorial disorder. Some related the etiology to inadequate dentitions or unsatisfactory occlusion. Other investigators distinguished that hyperfunction might provoke myofascial pain and declared that TMJ disturbances usually related to dysfunction of the masticatory muscles [4].

Myofascial pain disorder might cause pain, limitation in jaw movement, jaw deviation in closing and opening the mouth and sensitivity in touching masticatory muscles that might mimic sign and symptoms of other Craniomandibular disorder [5].

The Bennett angledesigned between the sagittal plane andthe average path of the advancing condyle, as observed in the horizontal plane during the lateral mandibular movements [6].

Errors in evaluating the Bennett angle, will affect the ridges and groove positions in the working and nonworking sides and, to a lesser extent, the cusp height [7].

One of the fundamental tests to assess mandibular jaw joint function is determination of the range of motion of the joints during maximum jaw opening and lateral and protrusive movements; restriction of these movements reflected a sign of dysfunction [8].

The use of devices for quantitatively assessing mandibular movement had become more common, in the dental investigations. Often, the goal has been to provide an objective foundation for diagnosing musculoskeletal disorders of the jaws or to monitor the progress, of the active treatment methods [9].

The aim of this study was to determine boarder movement measurements and values of Bennett angle for patients with myofascial pain disorder and compare them with control group.

The study excluded the edentulous patients, patients with parathyroid gland disease, neoplastic disease, and patients with developmental disorders of the TMJ such as condylar aplasia, hypoplasia, or hyperplasia.

2. Subject, Materials and Methods

The study sample consist of twenty patients with Myofascial pain (10 male and 10 female)diagnosed according to Diagnostic Criteria for Temporomandibular Disorders "Clinical Protocol and Assessment Instruments"2013,and twenty-control group (10 male and 10 female).

A scientific committee in Baghdad University / college of dentistry as well as Ministry of Health in Iraq granted the ethical approval for this case control study

The study conducted in College of dentistry Baghdad University. Patients age range from 25-55 years old. Moreover, all patients informed about the study and informed consent obtained from the Patients.

The patient was sitting "securely upright" in a chair, which could adjusted for height. The patient position, in the chair should adjusted for utmost comfort for both the patient and the examiner.

The examiner was standing to the" patient's right" and fronting the patient. This position permits the examiner to execute the "full examination" using each hand as necessary, while the other hand used, to stabilize the patient's head or the mandible.

For opening movements, maximum unassisted opening measured and maximum assisted opening also determined.
The Excursive movements complement open movements for full assessment of jaw mobility; these involve mediotrusion left and right and protrusion movement.

Pain induced in muscles via palpation was a classic clinical test. The intent is to determine if the patient reports pain from palpation of a muscle or joint and determine if any induced pain duplicates or replicates the patient's pain complaint. Extra-oral masticatory muscles: temporalis and masseter 1kg of pressure, palpation zones for temporalis involve anterior, middle and posterior while for masseter involved superior, middle and inferior

For Supplemental Muscles Palpation (0.5 kg palpation pressure) involved Posterior, submandibular masticatory muscle areas, lateral pterygoid area and temporalis tendon.
Start up the Cadiax compact II Software on the computer. Next, the patient data had entered and device mounted on the patient, the patient brought into the reference position with unforced "chin point guidance". The coordinates of this position recorded. Excursive movements made from this reference position. All movements carried out three times figure (1).

The patient asked to carry out the movement, which were protrusive movement, mediotrusion movement to the left and mediotrusion to the right side and opening and closing movement.

The "Cadiax® system" supports different articulator brands to program the patient setting. The Denar® Mark II had been chosen.

Statistical analysis:
All data interpreted in a computerized database structure. "Statistical Package for Social Sciences" (SPSS) version 20 was applied. Comparisons were done using; Two Independent Samples t-test,two independent Mann-Whitney test And Contingency Coefficient (CC), with P value considered statistically significant when < 0.05.

Figure 1: Cadiax compact II mounted on patient

3. Results

Demographical Characteristics variables (DCv.):

Table 1an observed frequencies, and their percentages distribution of studied "Demographical Characteristics" variables (DCv.), age groups, and gender with comparisons significant.

Table 1: Distribution of the studied Myofascial, and Controlled Groups according to (Age and Gender) with comparison's significant

DCv.	Age Groups	No. and %	Groups			C.S. P-value
			Myofascial	Control	Total	
Age GroupsYrs.	25 -	No.	9	12	53	CC=0.199 P=0.438 NS
		%	45%	60%	44.2%	
	35 -	No.	10	8	47	
		%	50%	40%	39.2%	
	45 - 55	No.	1	0	20	
		%	5.0%	0.0%	16.7%	
Mean ± SD			35.3± 8.07	34.05± 4.61	34.67 ±6.51	
Gender	Male	No.	10	10	54	CC=0.000 P=1.000 NS
		%	50%	50%	45%	
	Female	No.	10	10	66	
		%	50%	50%	55%	

(*) NS: No Sig. at P>0.05; Testing based on Contingency Coefficient (CC).

The results indicated that no significant different at P>0.05 are accounted for (DCv.) concerning age groups among disordered (Myofascial), and controlled groups, as well as mean, and standard deviation estimates are illustrated for the studied disordered group, and controlled which showed that the Myofascial group had registered similar age groups compared with the control group. In addition to that, the gender distribution reported no significant difference at P>0.05.

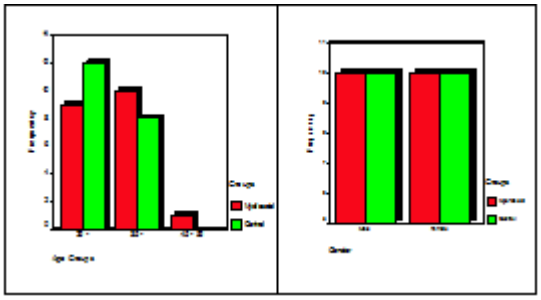

Figure 2: Distribution (Age and Gender) of the studied Myofascial, and Controlled Groups

Table 2: Summary Statistics of mouth opening parameter in studied Myofascial and Controlled groups

Parameter	Groups	No.	Mean	SD	CS P_{-value}
Maximum opening	Myofascial	20	42.05	3.71	0.000 HS
	Control	20	48.80	4.19	
Maximum assisted opening	Myofascial	20	44.40	3.75	0.000 HS
	Control	20	51.70	4.78	

(*)HS: Highly Sig. at P<0.01; Testing based on two independent t-test.

The results indicated a significant different at P>0.05 are accounted for Maximum opening and Maximum assisted opening between myofascial and control group

Table 3: Summary Statistics of Mediotrusionparameter in studied Myofascial and Controlled groups

Parameter	Groups	No.	Mean	SD	CS P_{-value}
Mediotrusion Right	Myofascial	20	6.60	0.88	0.000 HS
	Control	20	9.50	1.00	
Mediotrusion Left	Myofascial	20	6.65	1.14	0.000 HS
	Control	20	9.25	1.02	

(*) HS: Highly Sig. at P<0.01; Testing based on two independent t-test.

The results indicated a significant different at P>0.05 are accounted for mediotrusion left and right between myofascial and control group

Table 4: Summary Statistics of Protrusion parameter in studied Myofascial and Controlled groups

Parameter	Groups	No.	Mean	SD	CS P_{-value}
Protrusion	Myofascial	20	4.95	0.94	0.000 HS
	Control	20	7.85	0.75	

(*) HS: Highly Sig. at P<0.01; Testing based on two independent t-test.

The results indicated a significant different at P>0.05 are accounted for protrusion parameter between myofascial and control group.

Table 5: Summary Statistics of Bennett angle3mm, and 5mmparameter in studied Myofascial and Controlled groups

Parameters	Groups	No.	Mean	SD	CS P_{-value}
3mm - Right	Myofascial	20	6.40	1.50	0.047 S
	Control	20	8.00	3.09	
5mm- Right	Myofascial	20	6.50	1.79	0.253 NS
	Control	20	7.25	2.27	
3mm - Left	Myofascial	20	5.90	2.57	0.017 S
	Control	20	7.85	3.22	
5mm - Left	Myofascial	20	5.75	2.57	0.043 S
	Control	20	7.25	2.24	

(*) HS: Highly Sig. at P<0.01; S: Sig. at P<0.05; NS: No Sig. at P>0.05; Testing based on two independent t-test, and two independent Mann-Whitney test.

The results indicated a significant different at P>0.05 are accounted for (Bennett angle) at 3 and 5mm between myofascial and control group except for 5˚ right.

4. Discussion

The results indicated that no significant different concerning gender distribution and age groups among disordered (Myofascial), and controlled groups in which mean age for both group were close which taken in account during sample collection.

Reduced range of mouth opening in agreement withBlečić*et al.*, [10] who stated that myofascial pain" had a huge influence on mandibular mobility. They observed a significant difference between patients with myofascial pain of the masticatory muscles and healthy controls in relation to maximal unassisted opening, assisted opening.

Lateral movements of less than 8 mm classified as restricted (some authors set the cut-off point to 7 mm), the mean values for lateral movement of control patients in this study were within range of normal [11]

The result showed a significant difference between control group and myofascial regarding mediotrusion left and right, the studies by Celic*et al.*, [12] clarified that the statistically significant differences in the range of lateral mandibular movements clearly separated asymptomatic subjects and patients with muscle and TMJ disorders.

For protrusion, result showed significant correlation between myofascial and control group,Protrusive movements of less than 7 mm considered restricted, although they are not always signs of pathology that urgently calls for treatment[13].

Restricted protrusion that causes pain is usually from the inferior head of the painful side lateral pterygoid [14].

The evidence suggested that the muscle pain straightly related to the functional activity of the muscles involved. Therefore, the patients repeatedly stated that the pain usually influence their functional activity limiting there boarder movement explaining low mean value of opening, mediotrusion and protrusive movements [15].

The sagittal condylar inclination and Bennett angle comprise the condylar guidance settings on many articulators, and precise condylar guidance values can help increase the precision of prosthetic restorations [16].

The average value of Bennett angle in this study for control group were about 7-8 degree, which in agreement Samir Cimi*et al.*, [17],they found that the value of the Bennett angle was 8 degrees. The Bennett angle value of the present study were nearly similar to those obtained in Canning *et al.*, [19] (8 degrees), Theusner*et al.*, [19] (7.6 degrees), and Hernandez *et al.*, [20] (about 8 degrees).

The results of this study revealed that the mean values Bennett angle of myofascial-disordered group is less than that of control group.

That result might attributed to restricted mandibular movement that determined Bennett angle which also affected by articular disk, the degree of tension on the associated ligaments and the neuromuscular system [21].

JoaehimTheusner and Donald A. Curtis[22] illustrated in their study in 1993 that Bennett angulation was different in the symptomatic group, and significantly lower compared to asymptomatic group, which was the nearly the same outcome of this study, and claimed that the alteration in jointcomponent could be responsible for the results.

5. Conclusion

This study conclude that determination of mandibular boarder movement and the use of mandibular tracing device that determine Bennett angle values could be used as noninvasive method for diagnosis of myofascial pain disorder since there is significant difference compared to control group.

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