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The Presence and Two-Year Follow-up of Temporomandibular Joint Pain Dysfunction Symptoms and Associated Other Body Symptoms in a Group of 64 Female Patients Following Conservative Treatment

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Abstract

Objectives: A 2-year longitudinal study to investigate the existence of self-reported Other Body Symptoms (OBS) in 64 females complaining of Temporo Mandibular Joint (TMJ) symptoms after receiving conservative treatment for OBS and TMJ symptoms.

Methods: Data were collected using three different questionnaires answered by patients over three visits. Questions included information about patients' age, existence, and type of OBS, type of TMJ symptoms, present pain index, and rating of their TMJ symptom and OBS treatment outcomes from the last visit.

Results: Ninety-three percent of subjects reported that at least two OBS occurred concurrently with TMJ symptoms. Neck pain was reported most frequently, followed by back pain, headache, and tinnitus. OBS treatment outcomes showed that 91.5% of patients became symptom-free.

Discussion and Conclusion: TMJ symptoms and conservative management were associated with the presence and improvement of OBS.

Keywords: Temporomandibular joint; Headache; Migraine; Tinnitus; Musculoskeletal pain; Outcome

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Abbreviations

OBS: Other Body Symptoms; TMJ: Temporo Mandibular Joint; PPI: Present Pain Index

Introduction

Temporomandibular joint pain and dysfunction syndrome was described as early as 1934 by Costen et al. [1] since then, many descriptive nomenclatures have been used for this syndrome by different investigators, and there are different sub-groupings of this syndrome according to its etiological features. These sub-groups include Myofascial Pain Dysfunction (MPD) syndrome, in which pain at the Temporo Mandibular Joint (TMJ) has various causes, such as increased muscle tension and spasm; Internal Derangement (ID), in which the problem lies within the joint itself, mainly the position of the articulating disc; and degenerative joint disease, in which arthritic changes result in the degeneration of the articulating surfaces [2].

The multifactorial proposed etiology of TMJ syndrome led to an additional problem for management because different specialties became involved in its management. These specialties include orthodontics and prosthetic dentistry when malocclusion and dental factors are believed to be the causative factor, maxillofacial surgery when local joint factors are present, and psychiatric and behavioral management, which are also carried out in patients who report stress and psychiatric issues or when certain abnormal habitual activities are more prominent.

The association of TMJ syndrome with other symptoms elsewhere in the body also leads to additional management problem and adds a large cost to health care. This burden is mainly due to the gap between medical and dental education programs. Therefore, patients suffering from associated symptoms may undergo many different investigations that are almost always negative

and fail to explain their headaches, [3-8] migraines, [3,8-12] tinnitus, [7,13-15] neck pain, [3,5,16] and back pain [3,6,16,17]. Other syndromes believed to be associated with TMJ syndrome include pelvic pain, [18] Irritable Bowel Syndrome (IBS), [6,18-20] other joint pain, [3,6,16] and dysfunctional uterine bleeding [6].

The aim of the current study is to investigate the following points:

- The existence of other associated symptoms related to TMJ syndrome in a group of 64 female patients and compares it to other similar studies.

- The outcomes of these other associated symptoms over time in response to a conservative treatment protocol for TMJ syndrome.

- The outcomes of the 3 main TMJ symptoms reported by patients in response to a conservative treatment protocol for TMJ syndrome over two years as assessed by the patients themselves.

Materials and Methods

A total of sixty-four consecutive female patients complaining of TMJ symptoms who were referred to the oral and maxillofacial surgery clinic in Al Kharj Military Industries Hospital, Saudi Arabia were included in the study. Only female patients were included in the study to avoid any bias in the treatment results due to gender and also because the number of male patients referred for TMJ symptoms during the study period was very small (only three patients). The same clinician performed the examination, treatment and follow-up for all patients during the study period to avoid any bias in the results. The patients themselves completed three separate forms with the aid of an external neutral assessor (intern dentist) to document their response to the treatment, which was provided over three visits with a one-year interval between visits. At the first visit, patients answered questions regarding their age, existence of associated Other Body Symptoms (OBS), type of OBS present, type of TMJ symptoms present, and Present Pain Index (PPI). The PPI is a visual scale from 0 to 4, in which 0) no pain, 1) mild occasional pain, 2) moderate pain, 3) severe pain and 4) very severe pain. At the second visit, the patients answered the same questions as they answered in visit one except regarding age and OBS. At the third and final visit, each patient answered the same questions as they answered visit two in addition to their rating of the outcome of their TMJ symptoms and the presence of associated OBS on a scale from 0 to 4, in which 0) Symptoms free, 1) Mild and occasional symptoms, 2) Greatly improved, 3) Same symptoms and 4) Worse symptoms. Informed written consent was obtained from all study subjects prior to participation in this study; however, it was not possible to obtain ethical approval for this study, as Al Kharj Military Industries Hospital is a peripheral hospital with no established ethical review board. The follow-up appointments during the study period were performed by the same investigator without any changes in the treatment protocol. All treatments provided to the patients were conservative, nonsurgical treatments that followed The National Institute of Dental and Craniofacial Research (NIDCR) [2].

Guidelines and Included the Following:

- Counseling, assurance and discussion of the nature of their TMJ pain and dysfunction syndrome (TMD).

- TMD protocol consisting of two weeks of resting the joints *via* minimum mouth opening, a soft diet, avoidance of cutting hard food with the front teeth, avoidance of protrusive and lateral excursions of the lower jaw, and avoidance of aggressive yawning.

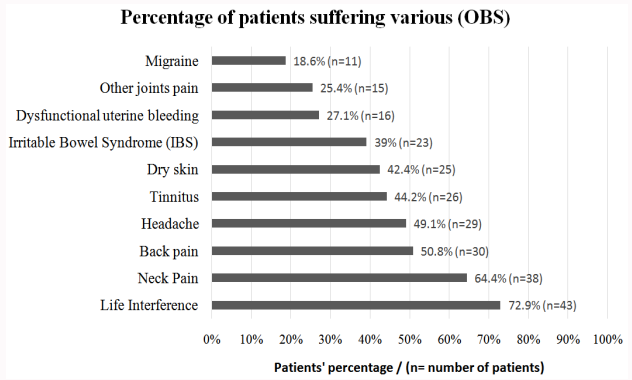

Figure 1: Present Other Body Symptoms (OBS) Percentages at the First Visit.

- The use of a non-steroidal anti-inflammatory medication when needed.

- External application of cold packs over the joint area in cases of severe TMJ pain.

- Gentle massage over the joint area in the case of severe TMJ pain.

- Exercising stress reduction habits, especially at bed time.

- Finally, the results of these noninvasive and nonsurgical treatments were solely assessed by patient according to their view of their prognosis without any interference by the investigator or clinician.

Statistical Analysis

Summary and descriptive tables and figures were constructed. Chi-square tests were used to assess the association between TMJ symptoms and OBS regarding the outcomes of OBS and TMJ symptoms over the study period.

Results

A total of sixty-four patients were included in this study and followed up for a minimum of two years. Fifty nine patients (92.2%) complained of OBS, while only five patients (7.8%) did not report any of these symptoms. The average age in this sample was 22.5 (± 4.9) years, with nearly half of the subjects in the study were 21 to 30 years (35 patients =54.6%). The age group differences in regards to the presence or absence of OBS were also being studied (Table 1). Analysis of the frequency of existing OBS in the group of 59 patients who reported suffering of OBS showed that a higher percentage of patients reported interference with their daily life activities (72.9%), followed by neck pain (64.4%), back pain (50.8%), and migraine (18.6%) Figure 1, Table 2 summarizes the significant differences ($P<0.001$) among these symptoms in each average age group. The patients were grouped according to their reported TMJ symptoms into three main groups: TMJ clicks only, TMJ click + pain, and TMJ click + pain + locking. The differences in the percentages of these symptoms between the group of patients without associated OBS and those with associated OBS were studied (Table 3). No patient in the group of patients without any associated OBS complained of TMJ clicks + pain + locking, 20% complained of TMJ + pain (1 patient), and 80% complained of TMJ clicks only. The majority of patients who complained of OBS had TMJ clicks only (59.3%), followed by TMJ clicks + pain (32.2%), and TMJ clicks + pain + locking (8.5%). Table 4

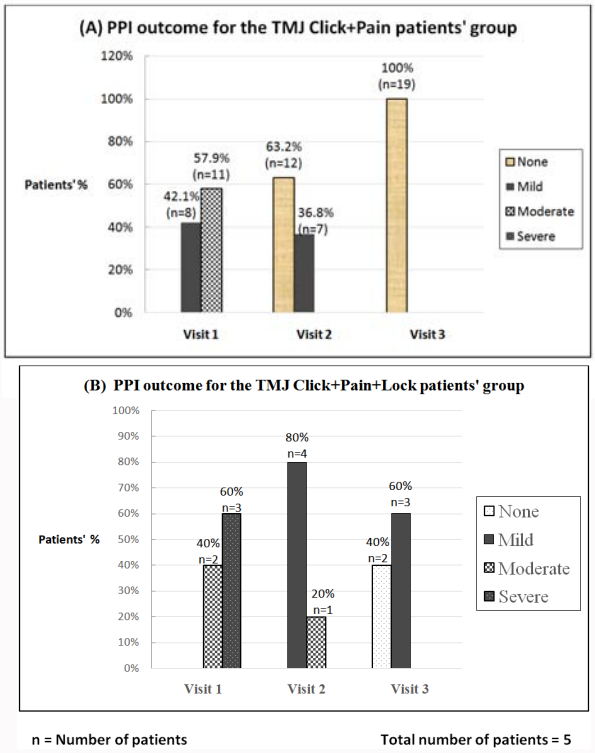

Figure 2: A and B Present Pain Index (PPI) Outcome in patients with (OBS) reporting TMJ Click+ Pain *vs.* TMJ Click + Pain + Joint Lock.

presents the number of reported OBS in relation to the severity of TMJ symptoms. Only 6.7% of patients report one OBS, and the remaining (93.3%) reported having more than two OBS. The majority of patients who reported OBS reported having OBS ranging between two to five symptoms. Differences in the average age among the TMJ subgroups were studied. Table 5 shows that patients with TMJ click + pain + locking were significantly older than patients who reported other less severe TMJ symptoms. Patients who complained of pain, whether as OBS or in the TMJ subgroups of TMJ click + pain and TMJ click + pain + lock, were also asked to rate the present pain index at the first visit; the results are summarized in Table 6. Only one patient in the group without any associated OBS suffered from mild pain at the first visit. In the group of patients with associated OBS, approximately 42% and 58% patients who reported TMJ clicks + pain suffered from mild and moderate pain, respectively. The 5 patients suffering from TMJ clicks + pain + locking reported higher indices of present pain, with 2 patients (40%) and 3 patients (60%) complaining of moderate and severe pain, respectively. The outcomes of the conservative treatment provided was assessed through different parameters, such as comparing the changes in the present pain index, TMJ symptoms, and existence of any associated OBS over two years with one-year intervals between the first, second, and third visits. First, comparing the changes in the present pain index for the group of patients suffering from OBS in addition to TMJ clicking and pain, it was shown that by the third visit, none of the 19 patients who complained of mild and moderate pain at the first visit complained of pain. Similarly, the one patient in the group without OBS had no pain at the second and third visit (Figure 2). Secondly, the overall outcome of the different TMJ symptoms, as evaluated by the patients themselves at the end of the two years follow-up period, was studied. The results showed that for patients with no other body symptoms: Four patients (80%) were

Table 1: Age groups variation in relation to present or absent OBS. (First Visit).

	Age groups (years)	(n)	Mean (± SD)
No Other Body Symptoms	10-20	2	19 (± 1.4)
	21-30	3	21.8 (± 1.1)
	Total	5	20.6 (± 1.8)
With Other Body Symptoms	10-20	25	19 (± 1.0)
	21-30	32	24.5 (± 2.7)
	31-40	1	34
	41-50	1	48
	Total	59	22.7 (± 5.0)

The average age for the general group (64 patients) =22.5 (± 4.9) years (n=Number of patients)

Table 2: The Prevalence of OBS and their average age group. (First Visit).

	Mean Age (± SD)	t-value	p-value
Life Interference	23.8 ± 5.3	3.183	0.00*
Headache	24.9 ± 6.2	3.795	<0.00*
Migraine	30 ± 6.4	7.758	<0.00*
Neck ache	22.2 ± 5.5	-0.612	0.543
Backache	23.4 ± 6.1	1.323	0.191
Other Joints Pains	26.1 ± 7.4	3.541	0.00*
Spasmodic Colon	22.5 ± 4.4	-0.084	0.934
Tinnitus	22.5 ± 3.5	-0.063	0.95
Dysfunctional Uterine Bleeding	26.8 ± 3.1	4.657	<0.00*
Dry SKIN	24.3 ± 6.4	2.417	0.019*

*Statistically significant

free of TMJ clicks, while 1 patient (20%) had mild and occasional symptoms at the end of the two-year follow-up period. On the other hand, the group of patients with associated Other Body Symptoms (OBS) also reported apparent improvement in their symptoms. Approximately 62.9% and 63.8% of patients in the group with TMJ clicks only and TMJ clicks + pain stated that they were symptom free, respectively, while 37.1% and 63.2% reported only having mild and occasional symptoms, respectively. Those patients with TMJ clicks + pain + jaw locking at the first visit reported mild and occasional symptoms (Table 7). Thirdly, at the end of two-year follow-up period, the existence of associated OBS was studied in the three groups of patients with different TMJ symptoms. This analysis showed that for the group of patients with only TMJ clicks, all patients became symptom-free compared to 89.5% and 40% of patients suffering from TMJ clicks + pain and TMJ clicks + pain + locking at the first visit, respectively. Furthermore, the remaining 10.5% and 60% of the TMJ clicks + pain and TMJ clicks + pain + locking patients reported that their OBS was reduced to mild and occasional, respectively. However, the overall outcome for the entire group of patients with regard to the existence of associated OBS showed that 91.5% became symptom-free and only 8.5% had mild and occasional symptoms. The TMJ click only group who reported OBS reported that they were 100% symptom-free (p-value =0.001). Whereas, the patients in the TMJ click + pain group who reported OBS, 89.5% become symptom-free and 10.5% had mild and occasional pain (p-value =0.002*), while 40% of the TMJ click + pain + lock group who reported OBS were found to be symptoms free and 60% had mild and occasional pain (p-value =0.444) (Table 7).

Table 3: TMJ Symptoms versus Other Body Symptoms (OBS). (First Visit).

	TMJ Click only n (%)	TMJ Click + Pain n (%)	P value $	TMJ Click + Pain + Lock n (%)	P value#	P value&
No OBS (n=5)	4 (80%)	1 (20%)	0.444	0 (0%)	0.606	0.88
With OBS (n=59)	35 (59.3%)	19 (32.2%)		5 (8.5%)		
TOTAL (n=64)	39 (60.9%)	20 (31.3%)		5 (7.8%)		

Table 4: The presence of OBS in relation to severity of TMJ symptoms. (First Visit).

	Click only n (%)	Click + pain n (%)	P value $	Click + pain + lock n (%)	P value#	P value &	Total n (%)
OBS (<2)	2 (3.3%)	2 (3.3%)	0.373	0 (0%)	0.003*	0.123	4 (6.7%)
OBS (2-5)	31(52.2%)	14 (23.0%)		2 (3.3%)			47 (79.6%)
OBS (>5)	2 (3.3%)	3 (5.0%)		3 (5.0%)			8 (13.5%)
Total	35 (59.4%)	19 (32.2%)		5 (8.47%)			59 (100%)

Table 5: TMJ and body Symptoms versus Average Patients' Age. (First Visit).

	TMJ Click Only	TMJ Click + Pain	TMJ Click + Pain + Lock	p-value
No Other body Symptoms (n=5)	n = 4	n = 1	n =0	
	20 ± 1.4	23± 0		--
With Other body Symptoms (n=59)	n =35	n=19	n = 5	
	21.3 ± 3.1	23.9 ± 6.6	28.2 ± 5.4	0.005*

*Statistically significant

Table 6: The Present Pain Index (PPI) variation for the TMJ pain groups with and without OBS. (First Visit).

	Present Pain Index	TMJ Click + Pain	TMJ Click + Pain + Lock
No Other Body Symptoms (n=1)	Mild	1 (100%)	0
		(n=1)	(n=0)
With Other Body Symptoms (Total n=24)	Mild Moderate Severe	8 (42.1%)	0
		11 (57.9%)	2 (40%)
		0	3 (60%)
		(n=19)	(n=5)

Table 7: Overall TMJ symptoms outcome versus OBS outcome.(Patients with OBS at the first visit).

	TMJ Click only n (%)		TMJ Click + Pain n (%)		TMJ Click + Pain + Lock n (%)	
	TMJ Symptoms	OBS	TMJ Symptoms	OBS	TMJ Symptoms	OBS
Symptoms free	22 (62.9%)	35 (100.0%)	7 (36.8%)	17 (89.5%)	0 (0.0%)	2 (40.0%)
Mild, occasional and greatly improved	13 (37.1%)	0 (0.0%)	12 (63.2%)	2 (10.5%)	5 (100.0%)	3 (60.0%)
Total	35 (100%)		19 (100%)		5 (100%)	
p-value	<0.001*		0.002*		0.444	

*Statistically significant

Discussion

Several authors have suggested an association between TMD and other chronic pain symptoms [3-7,10,11,18,19,21]. One large study investigated the association between TMJ symptoms and other comorbid pain, and the results revealed that TMJ symptoms were usually accompanied by 2 or more comorbid pains and did not occur separately; this tendency was particularly strong in women [3]. Regarding these chronic pain symptoms, many studies concluded there was an association between TMJ symptoms and other body symptoms, including headaches, [3-8] migraine, [3,8-12] neck pain, [3,5,16] back pain, [3,6,16,17] irritable bowel syndrome IBS or abdominal pain, [6,18-20] other joint pain, [3,6,16] and tinnitus [7,13-15]. There was an observable impact of this type of pain, including TMJ symptoms, on their daily life [9,21]. The causal relationship between TMJ symptoms and OBS is not yet understood. Nevertheless, it is also not established whether one of these chronic pain issues contributes to the onset of the other, and the potential comorbidity of TMD and these OBS is not clear. A cohort study reported that comorbid pain, such as musculoskeletal pain and headaches, significantly contributed to the onset, persistence, and severity of TMD [21]. On the other hand, one cohort study and another epidemiological study suggested the importance of TMD in the progression of migraine and headaches in addition to the ability of the TMD intensity to aggravate a pre-existing headache or to act as a risk factor. Moreover, the International Headache Society recognized that headaches can be attributed to presence of TMD [11,22,23]. Ultimately, other studies showed that headache/migraine and TMD are comorbid diseases, which means that the presence of one affects the severity and frequency of the other at a rate above that expected if they occurred together simply by chance [9,12,20,24]. Multiple studies concluded that the development of other body pain is a risk factor associated with the onset of TMD, while a 3-year prospective study of 266 females free of TMD reported that 6% of patients who developed TMD later reported increases in headaches, muscle soreness or pain and other body pain at the same time, which

was not observed in patients who did not develop TMD [25-27]. One of the aims of this study was to investigate whether there was any association between TMJ symptoms and one or multiple coexisting, self-reported other body symptoms occurring concurrently or as clusters [6]. While most previous studies were conducted to investigate the association between TMD and one or two other coexisting body symptoms, the present study found that some of these OBS appeared as clusters, reaching up to 8 self-reported symptoms. Ninety-three percent of individuals who reported TMJ symptoms had at least two self-reported OBS. However, 79.6% reported having between two and five other body symptoms. The remaining (6.7%) patients did not report any other body symptoms with TMJ symptoms (4 click only and 1 in click + pain). Meanwhile, this low percentage with an absence of OBS corresponds to a large national US study in which the percentage of people with TMJ symptoms alone without the presence of any other body symptoms was as low as 0.77%. Dahan et al. [3] also documented that 62% of TMD patients complained of other body comorbidities, with 30% complaining of more than two other body symptoms. Simultaneously, Chen et al. [10] reported that 22% of their study sample reported pain outside the Orofacial region [19]. Taking the limitations of this study into account, which include the relatively low number of subjects and uneven distribution of subjects in the TMJ groups who would benefit from an assessment of the possible association of the number of reported OBS with the severity of TMJ? Hence, the authors recommend a larger sample with a more balanced distribution of subjects among the TMJ symptoms group in future studies. Furthermore, the data were based on self-reported body symptoms, which subjected them to recall bias. Other self-reported symptoms have been investigated in previous studies, such as Restless Leg Syndrome, Fibromyalgia, Interstitial Cystitis, vertigo, and Chronic Fatigue Syndrome, and should be should be considered in future studies [9,10]. Despite these limitations, the study results suggest a broad range of clinical manifestations and several clinical implications for TMJ symptoms. The previous studies and the current study strongly suggest that there is a close relationship between the presence of OBS and TMJ symptoms. Therefore, clinicians should screen patients complaining of TMJ symptoms for the presence of other body symptoms to help assess and manage the patient's general condition. Additionally, the longitudinal nature of this study allowed us to assess the outcome of conservative treatment of TMJ symptoms over three years and therefore, its sequelae on other body symptoms, which notably suggests the potential of TMJ conservative treatment for patients complaining of other body symptoms. These study findings showed an evident improvement of OBS as reported by patients along with an improvement in TMJ symptoms using the conservative treatment provided. These findings aligned with previous reported studies performed for one or two specific OBS and conservative TMJ treatment. Tullberg found that 43% of subjects with tinnitus showed improvement after two years of TMD treatment ($P<0.001$). Velly et al. [28] indicated the difficulty of managing TMD cases associated with OBS, especially fibromyalgia, suggesting the use of interdisciplinary pain clinics with a team of clinicians. This diversity of TMD patient profiles suggests possible subgroups of TMD patients with different clusters of pain that require different management strategies [21,29].

Conclusion

TMJ symptoms were highly associated with the presence of OBS, reaching up to 8 self-reported OBS, and TMJ symptoms rarely existed alone. Conservative treatment of TMJ symptoms over two years produced an evident improvement in OBS as well as TMJ symptoms.

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