

Tension-Type Headache of Longer Duration is associated With Higher Frequency of Nausea and Vomiting in Temporomandibular Disorder Individuals.

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Abstract:

Introduction: Nausea and vomiting are common disorders reported with different frequencies by patients with different headache disorders.

Aim: Evaluate frequency of nausea and vomiting in subjects with craniomandibular disorders, bruxing behavior and tension-type headache, test the hypothesis that both disorders increase in frequency with longer pain duration.

Methods: Clinical evaluation, pain history, questionnaires, palpation of muscles and joints, criteria for craniomandibular disorders, bruxing behavior and tension-type headache and self-report in 208 subjects with tension-type headache.

Outcome: Frequencies of nausea in different pain duration ranges were as follows: 0-1 year: 14/39=35,9%; 2-4 years: 17/54=31,5%; 5-7 years: 13/36=36,1%; 8-10 years: 20/26=38,5%; 11-15 years: 20/25=80%; 16 years or longer: 21/28=75%. As for vomiting, the frequencies in different pain duration ranges were about 0-1 year: 4/39=10,3%; 2-4 years: 5/54= 9,3%; 5-7 years: 7/36= 19,4%; 8-10 years: 5/26=19,2%; 11-15 years: 11/25= 44%; 16 years/longer pain duration: 15/28=53.6%. The frequency of nausea increased with longer duration of headache (Chi-squared for independence $p < 0,0004$, for trends $p < 0,0001$). The frequency of vomiting increased with longer duration of pain: Chi-squared for independence $p < 0,0001$, for trends $p < 0,0001$.

Conclusions: Nausea and vomiting may be reported frequently in patients with tension-type headache and their frequency increases with longer chronicity of tension-type headache. Multiple neurophysiologic mechanisms including those associated with the parasympathetic one, are involved in the development of nausea and vomiting.

Keywords: Nausea Vomiting Tension-Type Headache Craniomandibular Disorders.

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I. Introduction

Craniomandibular Disorders (CMDs), are a heterogeneous set of disorders usually affecting the masticatory system and adjacent anatomic structures presenting with signs and symptom of musculoskeletal origin including a complaint of pain, impaired jaw movements, tenderness to palpation, joint noises and headache^[1]. Headache including Tension-type headache (TTH) is reported frequently by CMDs patients. TTH is a headache disorder usually described as bilateral, pressing and mild or moderate in intensity, not aggravated by physical activity, not associated with nausea and vomiting and usually classified as acute or chronic. In clinical and epidemiological studies in individuals with or without CMDs, TTH is regarded as the most common headache type^[2].

Nausea and vomiting are very common and distressing symptoms associated with a number of underlying causes in patients with both acute and chronic disorders^[3] and with or without headache. Nausea definition is entirely subjective and is described as the sensation that immediately precedes vomiting in which patients report that they feel as they are about to vomit. Vomiting is a highly specific physical event resulting

in the rapid, forceful evacuation of gastric content following a retrograde route from the stomach to the mouth^[3]. Nausea and vomiting occur very frequently in patients with headache with or without CMDs. Some patients presenting with TTH may also demonstrate some pathophysiological features that are usually seen in migraine^[4]. These symptoms are annoying, disturbing and sometimes impede many patients from eating during the episodes because of nausea and fear of vomiting^[5]. Although nausea is regarded as an essential element in the diagnosis of migraine^[6], this symptom may also be observed in many TTH patients. The pathophysiology of the transformation of TTH to a chronic form is not fully understood^[7]. However, because of increased sensitization and alterations in the autonomic nervous system with time, the pathophysiology of the disorder may change with pain duration, thus influencing in some way the description of pain, medication use and frequency of some signs and symptoms. Although clinical and epidemiological studies report that nausea and vomiting constitute common elements in migraine but are less frequently observed in TTH, there is a paucity of studies about these symptoms in CMDs individuals with concomitant TTH. Thus, the goal of this investigation is twofold:

1. Evaluate the frequency of nausea and vomiting in a large sample of CMDs patients presenting with concomitant TTH;
2. Test the hypothesis that the frequency of both symptoms increases with longer duration of TTH pain.

II. Material And Methods

Sample

All clinical charts of all patients (n=208), who sought diagnosis and treatment between January 2010 and November 2018 for CMDs that according to the use of questionnaires and clinical examination demonstrated signs and symptoms of TTH, CMDs and BB, were retrieved from a database and carefully evaluated retrospectively by one expert in the field of CMDs and Orofacial Pain (OFM). During clinical evaluation, the principles of the Helsinki Declaration were followed: Patients were informed that their clinical evaluation, palpation and use of questionnaires had no absolute risk for their health, that any physical or psychological discomfort, warranted the discontinuity of the evaluation, that an accurate and comprehensive evaluation was necessary in order to obtain accurate data and diagnosis before planning any treatment, that the principal examiner was scientifically experienced and qualified and that her/his data would provide practical and clinical benefits in future studies and treatments. Patients signed a formal consent allowing use of their clinical and demographic data for research purposes. Because it would be fruitless to compare frequency of nausea and vomiting in subjects with and without headache, the control group was formed by 30 subjects without CMDs, but with or without some type of headache. If headache was present in this control group, most of the time, was a unilateral or bilateral myofascial headache. Thus, this study involved the evaluation of 208 charts in the experimental subgroups and 30 in the control one. Experimental and control subjects were evaluated regarding the frequency of nausea and vomiting.

Inclusion criteria for CMDs: Presence of TMJ noises, pain on palpation of the TMJs and masticatory muscles, difficulties to perform normal jaw movements, a complaint of muscle and/or joint pain and seeking active treatment for CMDs.

Inclusion Criteria for BB: Patient's report of catching himself/herself clenching or grinding the teeth at night or during the day, friends or relatives' report of catching himself or herself grinding or clenching the teeth at night, fatigue in the masticatory muscles during the day and/or on awakening in the morning, awakening with facial, TMJ pain and/or headache in the morning and a report of jaw locking on awakening in the morning.

Inclusion criteria for TTH: The criteria of the International Headache Society^[8] was used to classify patients as presenting TTH in the current study: Headache lasting from 30 minutes to 7 days, bilateral location, pain described as pressing/tightening or band-like, non throbbing, mild or moderate in intensity, pain described in the temporal and frontal area, bilateral location and not aggravated by routine physical activity such as walking or climbing stairs. Only patients reporting pain with the same intensity in both sides of the head, occurring at the same time were included in the current investigation.

Exclusion criteria for pain: Charts in which pain was reported as alternating from one side to the other, pain described as very intense in one side and weak in the other side and pain described as mild or moderate, not aggravated by physical activity but occurring in only one side of the head were excluded from this investigation.

Exclusion criteria in experimental and control subjects: Subjects presenting with severe psychiatric disorders, difficulties to respond properly to questionnaires and with neuromuscular disorders: Parkinson's disease, other epilepsy type, speech and cognitive difficulties and those that for some reason were not fully evaluated, were not included in the current study.

III. Statistical Analysis

Kruskall-Wallis' statistics was used to compare means in different subgroups. Chi-squared for trends and independence was used to evaluate data (nausea and vomiting) in the set of subgroups with TTH but with different pain durations. Fisher's exact test was used to evaluate significance when the frequency of nausea and vomiting was compared in two subgroups.

IV. Results

There was a predominance of females (more than 90%) in the experimental subgroups with TTH. This is so, as females predominate in subgroups of CMD subjects. Mean ages in the six experimental subgroups (0-1 year; 2-4 years; 5-7 years; 8-10 years; 11-15 years; and 16 years or longer, were about 24,6 (SD=9,6, range=11-53), 29,2 (SD=10,9, range=14-51), 33,0 (SD=9,5, range=19-54), 33,9 (SD=12,3, range=19-66), 39,9 (SD=12,0, range=18-63), 46,0 (SD=9,8, range 23-72), respectively. There were 26 females and 4 males in the control group and mean age was about 29,4 (SD=10,3, range=17.5).

The frequency of nausea in the whole group of 208 CMDs with TTH was about 95/208=45.6% and 8/30=26.6% in the control group. The frequency was higher in the experimental group, but it was not statistically significant (Fisher's exact test $p=0.07$).

The frequencies of nausea in the six experimental subgroups with different pain duration ranges were about 14/39=35,9%; 17/54=31,5%; 13/36=36,1%; 10/26=38,5%; 20/25=80%; and 21/28=75%. Chi-square for independence and for trends ($p<0,0004$ and $p<0,0001$, respectively), demonstrated that the subgroups were independent and that there was a strong trend for a higher frequency of nausea with longer duration of TTH. When the different TTH subgroups with different pain durations were compared with the control group, only the subgroups 11-15 years of TTH duration and 16 years /longer of TTH duration showed a statistically and significant difference regarding frequency of nausea, ($p<0.0004$, $p<0.0005$), respectively.

The frequency of vomiting in the whole group of 208 subjects with CMDs and TTH was about 47/208=22,6% and 3/30=10% in the control group. The frequency was higher in the experimental group, but the difference was not statistically significant (Fisher's exact test $p=0,15$). The frequencies of vomiting in the different TTH duration ranges in subjects with TTH were about 10,3% (0-1 year of pain duration), 9,3% (2-4 years), 19,4% (5-7 years), 19,2% (8-10 years of pain duration), 44% (11-15 years), and 53,6% (16 years or longer of pain duration). Based on Fisher's exact test, a statistically and significant difference was observed only when the subgroups 11-15 years of pain duration ($p<0,03$) and 16 years or longer ($p<0,0005$), were compared with the control subgroup.

V. Discussion

In the current investigation we found that the prevalence of nausea was higher in the experimental subgroup and that such frequency increased with longer duration of TTH. Data in this research indicate that nausea may be observed frequently in TTH individuals but is not a characteristic of such type of headache. The outcome in the current study is not in line with one investigation^[9] asserting that nausea is rarely encountered in TTH subjects. It may be that a very low frequency of nausea is observed when researchers evaluate subjects in the general population and/or when they examine small rather than large samples of subjects from nonclinical populations. Because in the current investigation, the frequency of nausea was very high and increased with headache duration, this outcome is endorsed by one investigation^[10] indicating that nausea may be a common characteristic in TTH subjects. A similar investigation^[11] carried out in 448 subjects with a complaint of headache, reported a frequency of 48,2% nausea, which is very similar as compared with the frequency of 45.6% reported in the current study. This study carried out in a clinical population of patients presenting with both CMDs and TTH, shows that the frequency of nausea increased with longer pain duration. Thus, this outcome is reinforced by a similar study^[7] indicating that higher frequency of nausea may be observed in chronic TTH. Further, a higher frequency of nausea may be a characteristic of chronic headache patients^[7].

Vomiting followed the same trend in the current investigation. Such symptom increased with longer TTH duration. Noteworthy to mention is that the frequency of such symptom remained low in the age range of 4 years of pain duration, then it doubled in frequency in the range of 5 to 10 years of chronicity and then increased abruptly in frequency in the age range of 11-15 years and 16 years or longer of pain duration. In these two age ranges, the frequencies were higher with a statistically significant difference as compared with the control group. Because the frequency of vomiting was very high in the pain duration range of 16 years or longer, it would be wise to include vomiting as a characteristics of TTH in subgroups presenting with TTH of longer duration and if possible to avoid stating that vomiting is only present in individuals suffering of migraine. Findings in this investigation are not congruent with some studies^[9, 10] asserting that vomiting is rarely encountered in TTH subjects. The frequency of 22.6% vomiting reported in this investigation is a little

bit higher as compared with 13.6% reported in a previous investigation^[11]. However, these researchers did not evaluate a nonclinical population which may have yielded a lower prevalence of vomiting. More severe pain and pain of longer duration in TTH subjects may be related with significant changes in the central nervous system and even in the autonomic one. These changes may include increased firing of nociceptive neurons and negative changes in other neurophysiologic pathways including those related with nausea and vomiting. This point of view is endorsed by one investigation^[7] demonstrating that nausea or vomiting increases in frequency in subgroups presenting with a form of chronic headache. Because higher frequencies of nausea and vomiting were found more specifically in chronic TTH cases with more intense pain, this outcome is congruent with one investigation^[4] stating that patients with chronic TTH may present with some signs and symptoms frequently observed in migraine headache. The development of nausea and vomiting is undoubtedly influenced by more chronic and intense pain. In this regard, one investigation^[12], evaluated 12 patients with occipital neuralgia (a model of severer pain) presenting with generalized pain of explosive onset and reported that all patients described nausea, vomiting and photophobia.

The mechanisms responsible for the development of nausea and vomiting are challenging. Increased central sensitization, stimulation of neurons associated with the autonomic nervous system and even chronic medication abuse with increased duration of headache may be involved. Increased excitability of trigeminal nociceptive pathways may play a major role in the pathophysiology of some headaches^[7] including the development of some specific symptoms like nausea and vomiting. One investigation^[3] asserts that adverse medication reactions including those associated with NSAIDs, antihypertensive drugs and oral contraceptives, are among the most common causes of nausea and vomiting. NSAIDs are thought to activate peripheral afferent pathways most likely vagal, which in turn, stimulate specific neurons in the brainstem nucleus which coordinate nausea and vomiting^[3]. Further, intense headache episodes may activate multiple hypothalamic, limbic and cortical structures, all of which contain neurons that project to the preganglionic parasympathetic system in the superior salivary nucleus. Such neurons may activate postganglionic parasympathetic neurons in the sphenopalatine ganglion, and thus, induce vasodilation, nausea and vomiting^[5].

VI. Conclusion

Based on the outcome and data in this investigation, it is concluded that there is a high frequency of nausea and vomiting in CMDs subjects with TTH. The frequency of both symptoms increases with TTH duration. Excitability of nociceptive pathways and pain sensitization associated with longer duration of pain may be involved in recruiting autonomic pathways associated with nausea and vomiting.

Table 1: Social and demographic data in 208 subjects with CMDs and TTH SUBGROUPS (TTH duration in years)

	0-1 n=39	2-4 n=54	5-7 n=36	8-10 n=26	11-15 n=25	16 years longer=28	Control n=30
GENRE	n %	n %	n %	n %	n %	n %	n %
Females	37 94,4	49 90,7	34 94,4	26 100	24 96	28 100	26 86,7
Males	2 5,1	5 9,3	2 5,6	0 0	1 4	0 0	4 13,3
Totals	39 100	54 100	36 100	26 100	25 100	28 100	30 100
Mean age	24,6	29,2	33,0	33,9	33,9	46,0	29,4*
SD	9,6	10,9	9,5	12,3	12,0	9,8	10,3
Range	11-53	14-51	19-54	19-66	18-63	23-72	17-56

*Kruskal-Wallis test $p < 0,0001$. There was a statistically significant difference in age when subjects were allocated to different TTH durations.

Table 2: Frequency of nausea and vomiting in subgroups of 208 subjects presenting with different TTH durations (age ranges) SUBGROUPS: ranges of TTH duration (Years)

		0-1 n=39	2-4 n=54	5-7 n=36	8-10 n=26	11-15 n=25	16 or longer=28	Control n=30	
		n %	n %	n %	n %	n %	n %	n %	
Nausea	Yes	14 35,9	17 31,5	13 36,1	10 38,5	20 80	21 75*	8 26,7	
	No	25 64,1	37 68,5	23 63,9	16 61,5	5 20	7 25	22 73,3	
	Totals	39 100	54 100	36 100	26 100	25 100	28 100	30 100	
Total frequency of nausea		14	17	13	10	20	21	95=	45,6%
Vomiting	Yes	4 10,3	5 9,3	7 19,4	5 19,2	11 44	15 53,6**	3 10	
	No	35 89,7	49 90,7	29 80,6	21 80,8	14 56	13 46,4	27 90	
	Totals	39 100	54 100	36 100	26 100	25 100	8 100	30 100	
Total									

frequency of vomiting		4	5	7	5	11	15	47=	22,6%
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* Chi-squared for independence $p < 0,0004$, for trends $p < 0,0001$

**Chi-squared for independence $p < 0,0001$, for trends $p < 0,0001$.

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