

Original Article

Temporomandibular disorder and headache in university professors

GABRIELLA ARBEX, DDS¹⁾, VICTOR PEREZ TEIXEIRA, DDS, MS, PhD¹⁾,
CAROLINE MORAES MORIYAMA, DDS, MS, PhD¹⁾, ELOISA ANDRADE DE PAULA, DDS, MS, PhD¹⁾,
ELAINE MARCÍLIO SANTOS, DDS, MS, PhD²⁾, SANDRA KALIL BUSSADORI, DDS, MS, PhD^{1, 3)*}

¹⁾ School of Dentistry, Metropolitana de Santos University, São Paulo, Brazil

²⁾ Pro-rectory for Academic Affairs, Metropolitana de Santos University, São Paulo, Brazil

³⁾ Postgraduate Program in Biophotonics Applied to Health Sciences, Universidade Nove de Julho: Vergueiro Street, 235/249 Liberdade, 01504000, São Paulo, SP, Brazil

Abstract. [Purpose] Temporomandibular disorder is a condition with a multifactor etiology that involves the temporomandibular joint, bones, surrounding muscles and facial pain is the most common symptom. This study evaluated the possible association between headache and temporomandibular disorder in university professors. [Participants and Methods] Twenty-seven professors were recruited and answered the Axis II of the Research Diagnostic Criteria for Temporomandibular Disorders for the evaluation and diagnosis of temporomandibular disorder and filled out a “Headache Diary” proposed by the American Headache Society. [Results] The university professors showed headache and temporomandibular disorder, but no association was found between the two conditions. Comparing the gender, the males were most frequently affected, but females had more intensity of signs and symptoms. There is a lack of data on the population addressed in the present study. [Conclusion] Indeed, this was the first such study developed with university professors. It is of considerable importance to develop further studies to investigate the possible association between headache and temporomandibular disorder.

Key words: Temporomandibular disorder, Headache, University professors

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INTRODUCTION

Temporomandibular disorder (TMD) is an umbrella term for a large number of clinical signs and symptoms that affect the masticatory muscles, temporomandibular joint (TMJ) and associated structures¹⁾. Numerous clinical alterations, such as poor posture, bite problems, parafunctional habits, etc., can lead to a typical condition of TMD, which may also be associated with psychological factors²⁻⁵⁾. The most frequent signs and symptoms are sensitivity in the muscles of the head and neck, including the masticatory muscles, pain in one or both TMJs, limited jaw movement, joint noises and headache⁶⁻⁸⁾. Dizziness, hearing loss and ringing in the ears have also been related this disorder^{4, 9)}.

Besides physiopathological causes, psychosomatic factors may also exert an influence on this condition^{10, 11)}. In the literature, the association between TMD and psycho-emotional factors is comparable to that found for other physical conditions, such as comorbidities, malocclusion, tooth loss, trauma and micro traumas^{12, 13)}. Stress, fatigue, anxiety, depression, sleep disorders and a busy lifestyle can exert a negative impact on the human psyche and TMD is more frequent in individuals with such conditions^{14, 15)}.

Orofacial pain is the most common complaint of patients with TMD and can range from mild sensitivity to extreme discomfort due to the increase in muscle activity⁴⁾. Orofacial pain is any pain associated with the soft or hard tissues of

*Corresponding author. Sandra Kalil Bussadori (E-mail: sandra.skb@gmail.com)

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the oral cavity and face and can be referred in the head and neck region or associated with neck pain, primary headache or rheumatic disease¹⁶). Its origin is related to a decrease in blood flow and the accumulation of metabolites in muscle tissues, resulting in fatigue and pain. The sensitivity associated with pain in the masticatory muscles, TMJ, teeth and dental support tissues results in limited jaw movements^{4, 5}).

The signs produced when the masseter is the major muscle involved are described as pain in the mandible. When there is greater involvement of the temporal muscle, there is a complaint of headache. Earache and retro-bulbar pain indicate greater sensitivity of the lateral pterygoid muscle. Pain upon swallowing and in the angle of the mandible stem from the medial pterygoid muscle¹⁷).

Although pain has a subjective component, assessment tools have been created to standardize patient follow up. Questionnaires and scales are used to quantify pain intensity and its impact on activities of daily living.

Such assessment tools may be uni-dimensional or multi-dimensional. A uni-dimensional instrument addresses only one characteristic (generally intensity), whereas a multidimensional instrument addresses pain in more than one dimension (intensity, location, affective qualities, etc.)¹⁸).

The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) has been the most widely used diagnostic protocol for studies on TMD since its publication in 1992¹⁹). This classification system based on the biopsychosocial model of pain has two axes. Axis I constitutes a physical evaluation using practical, reliable diagnostic criteria. Axis II is used to evaluate an individual's psychosocial state and debilitation due to pain. The intent is to perform a clinical diagnosis while simultaneously identifying other relevant characteristics that may influence the manifestation and treatment of TMD²⁰).

Primary headache is frequent in the general population. The prevalence of headache varies considerably during development, increasing throughout childhood and adolescence, followed by a stable period and then declining in both gender after the third to fifth decade of life. Headache can exert a negative impact on many aspects (psychological, work/study and social relationships) of quality of life^{21, 22}).

Pain diaries have been used for many decades in different populations for the most diverse purposes. In the population with headache, such diaries are primarily used with the aim of evaluating the impact of pain and the efficacy of treatment²³).

Headache and chronic orofacial pain have common symptoms in the general population. The literature estimates that headache occurs in 50 to 80% of individuals with TMD, compared to 13 to 23% among those without TMD²⁴⁻²⁷).

The population of university teaching staff represents a universe of individuals with an advanced academic background, researchers, members of societies, individuals who work in both public clinics and private institutions with ever-present deadlines and goals, which can make the routine of such individuals quite stressful. University professors are sometimes affected by headache due to predisposing behavioral factors. Recurrent headache has been reported to be related to stress and psychological symptoms²⁸), distress²⁹) and anxiety³⁰), however, is not related to TMD. TMD pain co-exists with headache and other bodily pain^{30, 31}). In these cases, to investigate the possible association between headache and TMD would guide and be relevant for the physiotherapist in the correct diagnosis, treatment and the risk of developing TMD pain. Therefore, the aim of the present study was to evaluate the possible association between primary headache and temporomandibular disorder (TMD) in university professors at a private higher education institution.

PARTICIPANTS AND METHODS

This study received approval from the Human Research Ethics Committee of the *Universidade Metropolitana de Santos* (certificate number: 48311015.2.0000.5509). The evaluators and participants were affiliated with the university. All participants received clarifications regarding the objectives of the study and signed a statement of informed consent. Axis II of the RDC/TMD was distributed to 35 male and female university professors. The mean time required to fill out the questionnaire was approximately five minutes.

The participants were also instructed to keep a Headache Diary (proposed by the American Headache Society) to record the occurrence of headache. Entries to the diary were made four times a day at five-hour intervals (7:00 AM, 12:00 AM, 5:00 PM and 10:00 PM) for a period of one week. The occurrence of headache was recorded in the following manner: 0="no headache"; 1="mild no headache, only noticed when thinking about it"; 2="mild no headache that could sometimes be ignored"; 3="moderate headache that did not affect daily activities"; 4="intense headache making it difficult to concentrate, but enabling the performance of less demanding tasks" and 5="very intense, debilitating headache, making any task impossible". The data obtained from the RDS/TDM were tabulated and submitted to descriptive analyses and the headache diary were tabulated and submitted to both descriptive and statistical analyses by Fisher's exact test to examine the significance of the association.

RESULTS

Twenty-seven of the 35 questionnaires distributed to the professors were returned (response rate: 77.14%). The male accounted for 52% of the participants and the female accounted for 48%. Five participants (19%) were between 30 and 40 years of age, nine (33%) were between 40 and 50 years of age and 13 (48%) were older than 50 years of age.

Analyzing the responses on Axis II of the RDC/TMD questionnaire, 100% of the females (n=14) considered their general

Table 1. Distribution of answers on RDC-TMD according to gender

	Male 14	Female 13
Facial pain at the time of filling out the questionnaire		
None (0)	13	12
A little pain (1–5)	1	1
A lot of pain (6–10)	0	0
Worst pain in past six months		
None (0)	10	10
A little pain (1–5)	3	1
A lot of pain (6–10)	1	2
Average of all pain in past six months		
None (0)	10	10
A little pain (1–5)	3	2
A lot of pain (6–10)	1	1
Interference of pain in daily activities in past six months		
None	12	11
A little interference (1–5)	2	2
A lot of interference (6–10)	0	0
Interference in ability to take part in leisure, social and familial activities in past 6 months		
None	10	11
A little interference (1–5)	4	2
A lot of interference (6–10)	0	0
Interference in work capacity in past six months		
None	11	11
A little interference (1–5)	3	2
A lot of interference (6–10)	0	0
Episode of lock jaw in the past		
No	13	12
Yes	1	1
Audible clicking/popping when chewing or opening and closing mouth		
No	10	10
Yes	4	3
Crepitus when chewing or opening and closing mouth		
No	10	11
Yes	4	2
Clenching or grinding the teeth at night		
No	10	11
Yes	4	2
Clenching or grinding the teeth during the day		
No	13	12
Yes	1	1
Sensation of tired/sore jaw upon waking		
No	12	11
Yes	2	2
Ringling in the ears		
No	13	11
Yes	1	2

health to be good to excellent and one of the males (7.1%) of the males qualified his health as only fair. All 27 participants qualified their oral health as good to excellent.

Ten males (71.4%) and ten females (76.9%) reported no facial pain in the mandible, sides of the head, in front of the ear or in the ear in the previous four weeks. Among those who reported pain, all stated that pain began at least one year earlier and presented in a sporadic manner. All the females with pain sought professional help, whereas one of the males (25%) did not undergo any evaluation. Among the individuals who reported pain, only two (7.4%) were in pain at the time of the interview. Mean reported pain was rated as 2 on a scale from 0 to 10. However, when asked about the worst pain in the previous months, the mean was 6.0 ± 0.7 , causing up to ten days of having to suspend routine activities. All participants reported that pain interfered little in their daily activities. However, two participants reported a moderate change in their willingness to perform leisure, social and familial activities and one reported that pain moderately affected work activities (Table 1).

Episodes of lock jaw were rare in the population studied. Thirteen of the males (92.8%) and twelve of the females (92.3%) reported that mandible had never locked in such a way that they were unable to completely open their mouths. Moreover, among those who reported experiencing lock jaw, there were no changes in chewing activity.

Four of the males (28.5%) and three of the females (23%) reported hearing joint noises when chewing or opening and

Table 2. Distribution of responses to items on Question 20 of the RDC-TMD

	In the past four weeks, how much have you been distressed by...?				
	Not at all (%)	A little bit (%)	Moderately (%)	Quite a bit (%)	Extremely (%)
Headaches	89	7	4	0	0
Loss of sexual interest or pleasure	89	7	0	0	4
Faintness or dizziness	93	4	4	0	0
Pains in the heart or chest	78	15	7	0	0
Feeling low in energy or slowed down	63	30	7	0	0
Thoughts of death or dying	96	0	4	0	0
Poor appetite	96	4	0	0	0
Crying easily	85	15	0	0	0
Blaming yourself for things	74	19	7	0	0
Pains in the lower back	74	11	11	4	0
Feeling lonely	93	4	4	0	0
Feeling blue	78	19	4	0	0
Worrying too much about things	22	52	15	11	0
Feeling no interest in things	89	7	4	0	0
Nausea or upset stomach	81	11	4	4	0
Soreness in your muscles	74	19	0	7	0
Trouble falling asleep	74	15	4	4	4
Trouble getting your breath	96	0	4	0	0
Hot or cold spells	81	19	0	0	0
Numbness or tingling in parts of your body	78	19	4	0	0
A lump in your throat	96	4	0	0	0
Feeling hopeless about the future	74	22	4	0	0
Feeling weak in parts of your body	81	7	7	4	0
Heavy feelings in your arms or legs	74	22	4	0	0
Thoughts of ending your life	96	4	0	0	0
Overeating	67	26	7	0	0
Awakening in the early morning	78	15	4	0	4
Sleep that is restless or disturbed	74	15	4	4	4
Feeling everything is an effort	89	11	0	0	0
Feelings of worthlessness	100	0	0	0	0
Feeling of being caught or trapped	89	11	0	0	0
Feelings of guilt	93	7	0	0	0

closing the mouth. Clenching or grinding the teeth at night was found among four of the males (28.5%) and two of the females (15.3%), with two males (14.2%) and two females (15.3%) reporting the jaw fatigue upon waking. The daytime habit of clenching/grinding the teeth was found in only one man (7.14%) and one females (7.6%). Ringing in the ears was reported in only one man (7.1%) and two females (15.3%).

Only two of the females reported a history of rheumatoid arthritis, lupus or any other condition that affects the joints of the body. An analysis of the questionnaire, however, revealed that neither of these females had complaints or a history of facial pain.

The participants reported being distressed or worried in the previous four weeks for the reasons listed in [Table 2](#).

Analyzing the headache diaries, five of the males (35.7%) reported having had headaches: four (80%) with mild intensity and one (20%) with moderate intensity; one (20%) reported a frequency of once a week, two (40%) reported a frequency of twice a week, one (20%) reported a frequency of three times a week and one (20%) reported a frequency of four times a week.

For the treatment of such pain, two (40%) took an analgesic and three (60%) did not take any type of medication. Three of the females (23%) reported having had headaches: one with mild intensity (33.4%) and two with moderate intensity (66.6%); one (33.40%) reported a frequency of twice a week and two (66.60%) reported a frequency of three times a week. The females who reported mild pain did not take any type of medication, whereas those who reported moderate pain made use of medication. There were no reports of severe headache during the week of evaluation among either the males or the females.

DISCUSSION

Temporomandibular disorder (TMD) is one of the most frequent subtypes of orofacial pain and is considered a musculoskeletal pain condition of a muscle, joint or muscle + joint origin, generically known as “TMJ dysfunction”⁷). Of a multifactor etiology, TMD is associated with biological characteristics, environment factors, parafunctional habits, stress, anxiety, postural problems and trauma^{8, 32, 33}). The characteristic signs and symptoms of this disorder are facial asymmetry, limited mouth opening, localized pain, headache, difficulty chewing and joint noises (clicking, popping or crepitus during

opening and closing of the mouth)^{6, 7}). The most common symptoms of TMD are facial pain (96%), discomfort in the ears (82%), headache (79%) and jaw pain or dysfunction of the mandible (75%). The main complaints of affected individuals are headache, joint pain, joint sounds (clicking/popping) and muscle pain⁸). In the present study, 26% of the participants reported pain in these sites (facial pain, discomfort in the ears, headache and pain in the mandible region); 24% reported hearing noises in front of the ears when chewing or opening and closing the mouth; 15% reported feeling a tired or sore jaw upon waking; and 11% reported ringing in the ears.

Only 7% reported rheumatoid arthritis, lupus or any other condition that affects the joints. However, these patients had no complaints of either facial pain or headache.

TMD-related pain can exert a negative impact on daily activities, psychosocial functioning and quality of life²⁰).

In the present study, all participants with pain reported an effect on their routines, but only a small percentage reported a moderate change in their ability to take part in leisure, social or familial activities or that pain exerted a moderate effect on their work activities. Nonetheless, the analysis of the questionnaires enabled the identification of possible anguish-causing factors that can modulate the pain response, such as worrying too much (52%), overeating (26%), feeling hopeless about the future (22%), feeling tired (22%), feeling sad (19%), feeling guilty (19%), restless, disturbed sleep (15%) and feeling weak in parts of the body (7%).

Headache is the most common symptom reported in the population. Primary headache is that with no certain etiology, which is also known as migraine or tension headache^{34, 35}). Epidemiological studies report that headache affects 18% of females and only 6% of males and that females are also affected more frequently³¹). In the present study, headache was reported more among the males (35.7 vs. 23%) and was also more frequent among the males, reaching a frequency of four times a week (40%), whereas the females reported a maximum frequency of three times a week (66.60%). Despite the greater frequency among the males, pain intensity was stronger among the females (33.40% reported mild intensity and 66.60% reported moderate intensity) than the males (80% reported mild intensity and 20% reported moderate intensity).

Medication is not necessarily used in the treatment of headache. Patients may be counseled to improve their sleeping habits, diminish factors that cause emotional stress and change their diet, all of which are factors that can trigger headache^{32, 36}). In the present study, 40% of the males with headache used an analgesic and only the females who reported headache of moderate intensity (66.60%) took some type of medication. Primary headache often does not interfere with one's daily activities, work or social life. The impact on the daily routine is mild to moderate for the majority of headache sufferers and severe for a minority²¹).

While some studies suggest that TMD may be related to primary headache, this association has not yet been indubitably established. Headache is not necessarily accompanied by TMD, but the disorder can be accompanied by headache, with greater chronic pain stemming from TMD leading to greater headache pain. Thus, the treatment of this disorder is believed to enable diminishing the intensity and frequency of headache³⁷). Studies about the treatment of this disease association have shown that a simultaneous therapeutic approach to the 2 diseases is more effective than the separate treatment of each^{33, 34, 38}). Thus, physical therapists can help patients develop pain-modulation strategies, including improved sleep hygiene, progression of physical activity, massages, practice of diaphragmatic breathing, methods for reducing stress, and approaches for relaxation of the mandibular elevators ("teeth apart and breathe")³⁸).

In the present study, both headache and TMD occurred in the university professors, but no association was found between the two conditions. Comparing gender, males were affected more, but females had more intensive signs and symptoms. There is a lack of data on the population addressed in the present study. Indeed, this was the first such study developed with university professors. It is of considerable importance to develop further studies to investigate the possible association between headache and temporomandibular disorder.

Conflict of interest

The authors report no conflicts of interest.

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