Etiological factors of temporomandibular joint disorders

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Abstract:

The temporomandibular joint disorders are defined as a collective term embracing a number of clinical problems that involve the masticatory muscles, the TMJ and associated structures. Myofacial pain dysfunction syndrome (MPDS) is the most common functional disorder of TMJ.

Many etiological factors have been blamed to produce pain and dysfunction of TMJ such as stress, malocclusion and parafunctional habits.

Stress is thought to be responsible for hyperactivity of the muscles of mastication which leads to muscle fatigue then muscle spasm and pain.

The purpose of this study was to determine the role of stress as an etiological factor in (MPDS).

One hundred dental students were used in this study and evaluated for having MPDS. Another sample of one hundred persons from the general population were evaluated in the same manner to be used as control.

The results of this study indicated that (55%) of participating students have (MPDS) because of the great amounts of stress they are going through. While in control group there was only (7%).

Keywords:

TMJ Disorder, TMJ etiology, Stress and TMJ.

Introduction:

The temporomandibular joint disorders (TMD) are a collection of problem involving the temporomandibular joint (TMJ), the soft tissue structures within the joint and the muscles of mastication. According to the American Academy of Orofacial pain the (TMD) are defined as "a collective term embracing a number of clinical problems that involve the masticatory muscles, the TMJ and associated structures , or both " They are considered to be a sub classification of musculoskeletal disorders [1].

They include two primary diagnostic categories: Arthrogenous and Myogenous disorders[2]. The first one includes disorders associated with structural abnormalities of TMJ. While the second one includes disorders associated with stress and parafunctional oral habits [3].

The most common form of functional disturbance of TMJ and masticatory muscles is myofacial pain dysfunction syndrome. It is a muscle-related pain with the predominant feature a dull deep radiating pain or ache in the pre-auricular area. Characteristic signs and symptoms are clicking noise in the TMJ during opening and closing movements of the mouth, tenderness in

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the muscles of mastication, limitation of mandibular movement and pain in the joint particularly during chewing [4].

The etiology of myofacial pain dysfunction syndrome has been an issue of controversy over a period of several decades extends back to the twenties of last century [5]. One of the earliest researchers in this problem was an otolaryngologist (costen) who mentioned several signs and symptoms in the ear and sinuses associated with headache believed to be dependent on the loss of posterior teeth and recommended "bite raising " to relieve the abnormal pressure in the join [6].

It was believed that the pain and dysfunction experienced by patients originated from fatigue and spasm in the muscles. There was a correlation between physiological characteristics and symptoms of TMJ disorders. A hypothesis was then developed that certain individuals when subjected to stress and anxiety, they tend to release it through clenching and grinding of teeth. This sustained muscle activity can result in pain and spasm [7-9].

It has been believed that patients with TMJ dysfunction are similar to patient with other psychosomatic or psycho-physiologic symptoms .these patients are described as hyper-normal, characterized by somatic tensions and addicted to various tension releasing oral habits [10].

Some what later, malocclusion was blamed as a major factor in causing TMJ dysfunction and pain through muscle spasm produced by muscle fatigue and over-stimulation, which is accompanied by accumulation of metabolic products [11,12].

One of the most famous researches on TMJ disorders was Laskin who published numerous articles on different aspects of the subject .He felt that mal-occlusion, rather than being a cause of pain and dysfunction symptoms, was a result of muscle spasms[13]. He believed that muscle spasm does not only lead to pain and limitation of movement but also may produce a slight change in jaw positions so that the teeth don't occlude properly. If this abnormal jaw relationship persists for several days or longer, the teeth will shift to accommodate the jaw position [14- 16].

An attempt was made to explain the relationship between psychic tension and occlusal disharmonies, muscle spasms, and the development of pain dysfunction syndrome. Some individuals are psychologically predisposed to magnify stress producing situations and thus experience excessive stress[17]. When this stress is not released externally, but channeled into somatic pathways, a psycho-somatic disorder such as gastric ulcer, colitis, hypertension or neurodermatitis may develop. Some patients channel these tensions through the stomatognathic system with a resulting increase in clenching and bruxism. When an occlusal discrepancy is present certain compensatory movement must be made by the masticatory muscles to avoid the discrepancy [18,19].

The psychologically induced bruxism and clenching are then reflected by compensatory movements and the activity of these muscles is increased disproportionally .If functional demands exceed the psychological limits of the affected motor units they become progressively more uncoordinated and finally go in to spasm with resulting dysfunction and pain [20,21].

More recent studies discussed the over all relationship of psychological

factor to the onset, progress and treatment of myofacial pain dysfunction syndrome concluded that stress is one of the major etiological factors in the development of muscle hyperactivity then muscle fatigue leading to muscle spasm, pain and dysfunction [22-24].

The purpose of this study was to evaluate the role of stress in the etiology of myofacial pain dysfunction syndrome.

Material and methods:

One hundred fifth and fourth year dental students were used in this study (age ranged between 20-27 years old); they were all evaluated for having MPDS. The evaluation was done by the author during the period of mid year examinations and consisted of history and clinical examinations according to the criteria suggested by Greenberg [25].

A control group of one hundred people from the general population, of similar age group (20-27 years) were also used in this study. They were evaluated for having MPDS in the same manner. Data were recorded and analyzed.

For evaluation of presence or absence of stress the participants in study and control groups are being asked the following questions.

We are all going through a lot of stress in our daily life

1. Do you think you are so? Yes No
2. Do you think that you're going through tremendous amount of stress? Yes No
3. Do you think that you are experiencing stress in this school more than students in other schools? Yes No
4. Do you think that stress during examination is much more than the rest of the year? Yes No
5. Do you think that stresses you are going through are more than you could withstand? Yes No

Participants who collect four or more (Yes) answers are considered to have stress which is more than that of normal daily life.

The medical history was taken for all participants looking for stress related diseases such as GIT ulcers.

The criteria used for evaluation of study and control groups

History questions to ask when evaluating a patient with TMJ dysfunction

- Do you have pain in the face, in front of the ear and temple area.
- Do you get headaches, earaches.
- When is pain at its worst, morning, on awakening or evening.
- Do you experience pain when using the jaw (opening wide, yawning or chewing).
- Do you experience pain in the teeth.
- Do you experience joint noises (clicking).
- Does your jaw ever lock.
- Does your jaw motion feel restricted.
- Have you had an abrupt change in the way your teeth meet together.
- Does your bite feel off or uncontrolled.
- Have you had any jaw injury.
- Have you had treatment for the jaw symptoms.
- Do you have any other muscle, bone, or joint problem (arthritis).
- Do you have pain in any other body sites.

Clinical examination when evaluating a patient with TMJ dysfunction

Inspection: Facial asymmetry, swelling, and masseter and temporalis hypertrophy, opening pattern, deviation, limitation, uncoordinated movement.

Assessment of range of Mandibular Movement: Maximum opening with comfort, with pain, and with clinician assistance, maximum lateral and protrusive movement.

Palpation examination: Masticatory muscles, TMJ, lymph nodes, and Neck muscles.

Provocation tests: Static pain test (mandibular resistance against Pressure) Pain in the joints or muscles with teeth Clenching.

Intraoral examination: Signs of Parafunction, cheek or lip biting, linea alba, scalloped tongue, occlusal wear, teeth mobility., generalized sensitivity to percussion, multiple fractures of enamel and restoration, partially erupted third molars, pericoronitis.

Result

The result of this study revealed that 55 students have some degree of TMJ dysfunction as any combination of any two or more symptoms. In comparison to control group of the same category there was 7%.

The distribution of symptoms. found in this study revealed that click in the TMJ was the most common symptom and found in 72% (12% control). Tenderness in the muscles of mastication was found 46% of students (9% control). Pain in TMJ area on palpation on chewing was found in 40% (10% control). Limitation of movement on deviation on opening was found in 12% (3%control). These results are shown in fig (1).

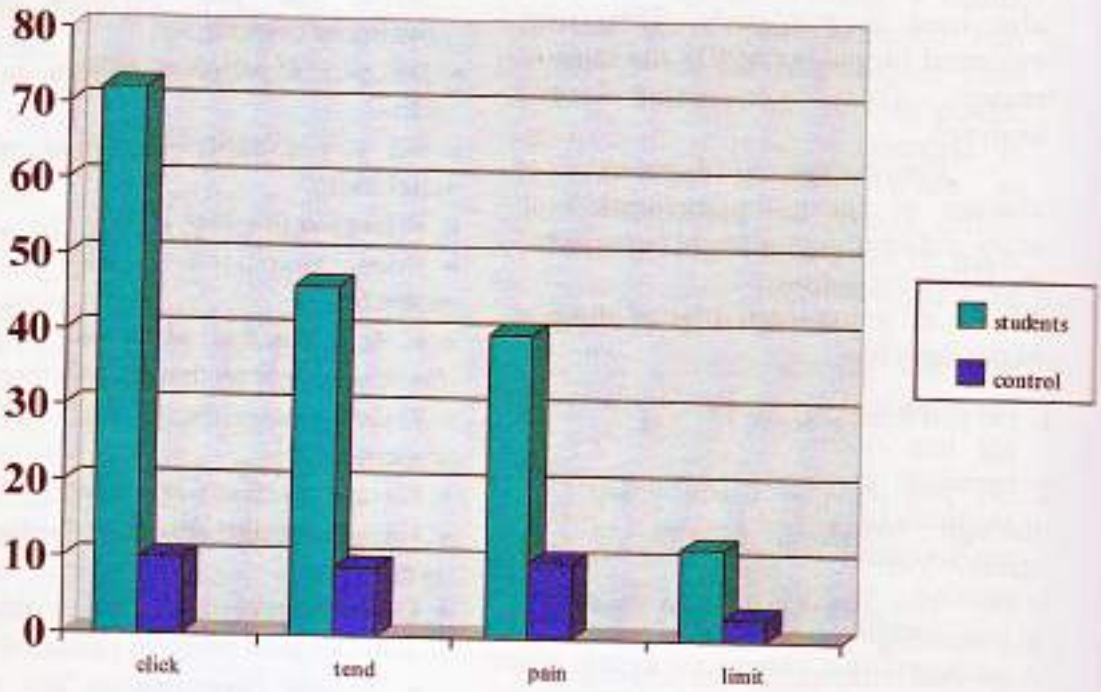

Fig (1): Percentage of symptoms presents in study group and control group

Some students revealed a combination of two or more symptoms (TMJ dysfunction syndrome). Students who revealed TMJ pain with click were 40% (6% control). Those who had TMJ pain with tenderness of muscles of mastication were 30% (5%control). TMJ pain with click and tenderness of muscles of mastication were found 28% (2%control). While students who revealed TMJ pain with click, muscle tenderness and limitation of movement was found in 3% (non in control) Fig (2).

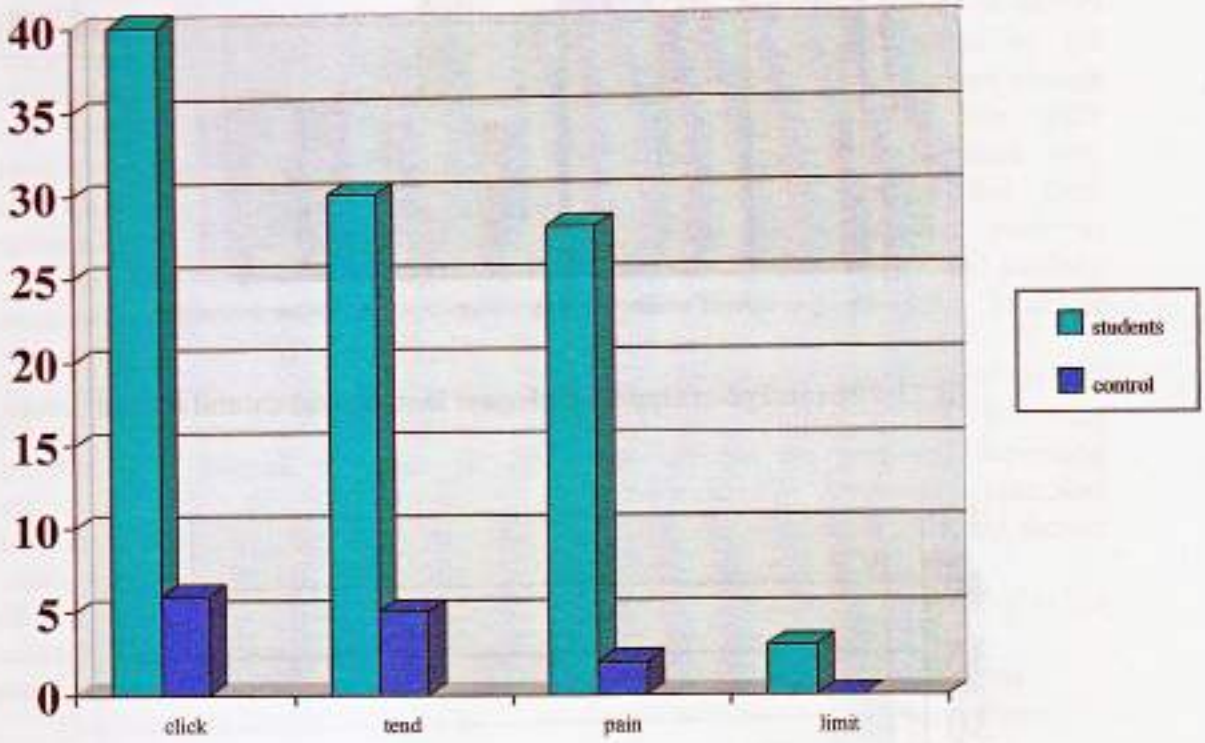

Fig (2): Combinations of symptoms present in study and control group

From the result of this study it has been found that stress was the most common etiological factor which was experienced by 70% of student (42% control). Para function was found in 43% of student (18% control). Malocclusion was found in 22% of students (20%contol). Dental irritants such as partially erupted wisdom teeth, caries, or high spots were found in 50% of students (40% control). These results are shown in fig (3).

It has been found that the more the number of etiological factors in one case the more severity of symptoms and dysfunction. In watching the combinations of etiological factors it has been found that stress and parafunction was found in 42% of cases (7% control). Stress and malocclusion was found in 9% of cases (3% control). Stress, malocclusion and parafunction were found in 4% of cases (none in control) stress, malocclusion, parafunction, and dental irritant were found in 2% of students (none in control). These results are shown in fig (4).

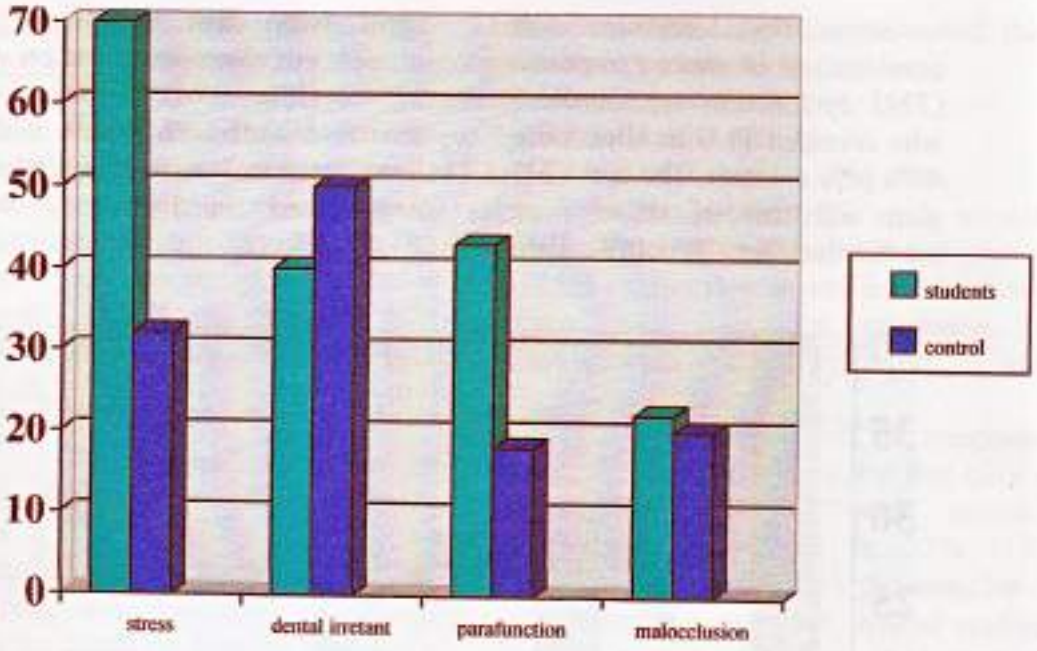

Fig (3): Percentage of etiological factors in study and control groups

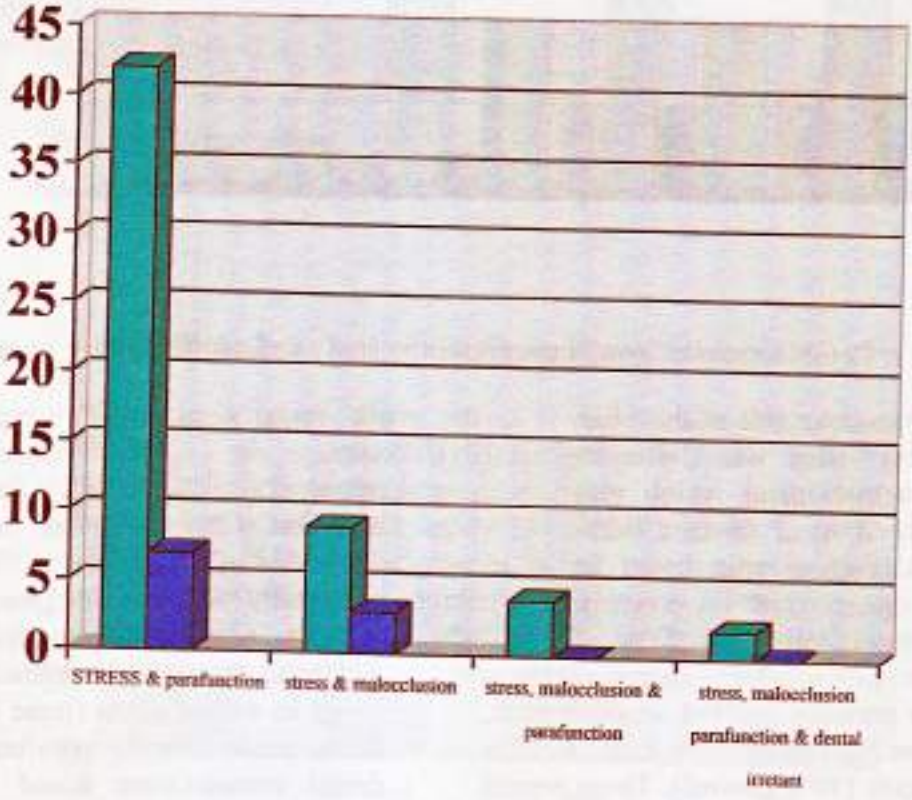

Fig (4): Combination of etiological factors in study and control groups

The medical history for stress related disorders indicated the 3 students (3%) have GIT ulcers.

Discussion and conclusions:

It has been mention in the literature that MPD syndromes constitute about 90% of all cases of TMD. The etiology of MPDS has not been satisfactorily established. The most widely accepted hypotheses are the occlusal disharmony and the psychological stress, with the last one being supported by more literature [26-29].

The TMJ disorder starts as a consequence of psychological stress that is usually due to the individual's stressful environment and becomes more severe as stresses increase in number and magnitude. The logical sequence of events indicates that this psychological stress leads to parafunctional habits such as teeth clenching and grinding that result in muscle hyperactivity and muscle fatigue then muscle spasm which is usually accompanied by pain.

The hyperactivity is believed to produce pain by a course of events: These muscles consume oxygen faster than normally functioning muscles; this causes a buildup of lactic acid, potassium and histamine in the intramuscular space, this buildup irritates the afferent nerve fibers in the muscle blood vessel walls and this is perceived as a dull, radiating deep pain of the same quality as other known muscle pains.

The students participated in this study have been passing through tremendous amounts of stress caused by the examinations period, in addition to the daily life stresses that are known to every one of us in this country.

This fact explains the results of this study, which revealed a high percentage of TMJ dysfunction and pain, (55%), compared to the control group (7%), and puts stress in the first rant among etiological factors of MPDS. It is wrathful to indicate that stress in highly blamed as a cause of GIT ulcers in this study as there students has GIT ulcers.

The issue of severity of MPDS has been over given looked by the literature and has not been given enough attention, the results of this study indicated that MPDS becomes very severe when the patient has three etiological factors together such as having stress, malocclusion and partially erupted third molars with recurrent infections.

Because of wide scale of severity of MPDS symptoms, the following classifications are proposed depending on the number of symptoms experienced by the patient, or the etiological factors available in one case.

Proposed classification according to the number of symptoms: -

Complete MPDS	4 symptoms
Partial MPDS	2-3 symptoms
Predisposed MPDS	1 symptom

Proposed classification according to etiological factors: -

Severe	3 etiological factors
Moderate	2 etiological factors
Mild	1 etiological factor

Treatment of MPDS should be directed towards trying to reduce the muscle tension by relaxation procedures, modify the psychological source to the muscle tension and modify the psychological consequences to the muscle hyperactivity.

From the result of this study one can conclude that MPDS is most likely a multifactorial disorder, with stress being

the strongest and most effective factor especially when it becomes concentrated and for a long period of time.

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