

Review Article

Etiology of Temporomandibular Disorder- A Brief Review: Part I

Ruhani Singh¹, Sehajneet Kaur²

^{1,2}BDS (Intern), Sri Guru Ram Das Institute of Dental sciences & Research, Amritsar, Punjab.

ABSTRACT:

The temporomandibular joint receives its name from the two bones that enter into its formation, namely the temporal bone and the mandible. This complex synovial system is composed of two temporomandibular joints together with their articulating ligaments and masticatory muscles. This articulation affects other synovial joints that relate specifically to masticatory function. Temporomandibular joint pain has various medical and dental etiological factors. The etiology of temporomandibular joint pain is enigmatic; no single etiological factor is regarded as the cause. Its distribution is also not confined to a single area. This article presents the basic etiological factors. As overwhelming majority of medical and dental conditions or issues related to etiology of temporomandibular pain in patients have traditionally been presented and interpreted from the clinician's point of view.

Key words: Temporomandibular joint, temporomandibular disorders.

Received: 11 August 2018

Revised: 22 September 2018

Accepted: 23 September 2018

Corresponding author: Dr Ruhani Singh, BDS (Intern), Sri Guru Ram Das Institute of Dental sciences & Research, Amritsar, Punjab, India

This article may be cited as: Singh R, Kaur S. Etiology of Temporomandibular Disorder- A Brief Review: Part I. J Adv Med Dent Scie Res 2018;6(10):78-81.

INTRODUCTION

Temporomandibular joint (TMJ) disorder refers to the cluster of conditions characterized by pain in the TMJ or its surrounding tissues, functional limitations of the mandible, or clicking in the TMJ during motion.^{1,2} TMJ disorders are common and often self-limited in the adult population.³ It is evident from numerous epidemiologic studies on the occurrence of temporomandibular disorders (TMD) in the general population that there are a number of consistent findings. Firstly, signs of temporomandibular disorders (TMD) appear in about 60-70% of the general population and yet only about 1 in 4 people with signs are actually aware of or report any symptoms⁴. Another consistent finding is that among those who seek treatment for temporomandibular disorders (TMD), by far the greatest majority is females; outnumbering males by at

least four to one.⁵ **Table 1** enumerates the classification of Temporomandibular disorders.

ETIOLOGICAL FACTORS

The causes of temporomandibular disorders⁵ are complex & multifactorial. There are numerous factors that can contribute to temporomandibular disorders. Factors that increase the risk of temporomandibular disorders(TMD) are called "*Pre disposing factors*" and those causing the onset of temporomandibular disorders(TMD) are called "*Initiating factors*" and factors that interfere with healing or enhance the progression of temporomandibular disorder (TMD) are called "*Perpetuating factors*".⁷ **Table 2** shows the different predisposing factors⁸

TABLE 1: TEMPOROMANDIBULAR DISORDERS⁶	
<u>Articular disorders</u>	
<u>Congenital or developmental</u>	
<ul style="list-style-type: none"> • first and second brachial arch disorders: hemifacial microsomia, • Treacher Collins syndrome, bilateral facial microsomia • Condylar hyperplasia • Idiopathic condylar resorption 	
<u>Disk derangement disorders</u>	
<ul style="list-style-type: none"> • displacement with reduction • displacement without reduction • perforation 	
<u>Degenerative disorders</u>	
<ul style="list-style-type: none"> • Inflammatory: capsulitis, synovitis, polyarthritides • Non inflammatory: osteoarthritis 	
<u>Trauma</u>	
<ul style="list-style-type: none"> • Contusion • Intracapsular hemorrhage • Fracture 	
<u>TMJ hypermobility</u>	
<ul style="list-style-type: none"> • joint laxity • Subluxation • Dislocation 	
<u>TMJ hypomobility</u>	
<ul style="list-style-type: none"> • Trismus • Post radiotherapy fibrosis • Ankylosis: true ankylosis (bony or fibro-osseous, pseudoankylosis) 	
<u>Infection</u>	
<u>Neoplasia</u>	
<u>Masticatory muscle disorders</u>	
Myofascial pain disorder	
Local myalgia	
Myositis	
Myospasm	
Myofibrotic contracture	
Neoplasm	

*Classification scheme adapted from the guidelines of the American Academy of Orofacial Pain. TMJ denotes temporomandibular joint .

TABLE 2: PREDISPOSING FACTORS	
Occlusal factors	Personality
Parafunction (bruxism)	Age
Trauma	Gender
Hypermobility	Heredity
Stress	Systemic diseases

Occlusal factors and their association and contribution to TMD have been and continue to be the subject of an intense discussion within the dental community. For eg , reverse articulation is thought to lead to an assymetric muscular function,⁹ but whether or not it is directly related to TMD has not yet been established.^{10,11}

In the perpetuating factors the following may be included:

- Behavioral factors (grinding, clenching & abnormal head posture)
- Social factors (could effect perception and influence of learned response to pain)

- Emotional factors(depression and anxiety)
- Cognitive factors (negative thoughts and attitudes which can make resolution of the illness more difficult)

Predisposing factors are pathophysiologic, psychological or structural processes that alter the masticatory system sufficiently to increase the risk of development of temporomandibular disorders. Pullinger, Seligman and Gornbein¹² applied multiple factor analysis, which indicated the low correlation of occlusion to temporomandibular disorder(TMD)s. However, the following occlusal factors had a slight relation:

- open bite
- overjet greater than 6-7mm
- retruded contact position/intercuspal position with sliding greater than 4mm
- unilateral lingual crossbite
- five or more missing posterior teeth
- faulty restorations and ill-fitting prosthesis⁷

A protocol (**Table 3 & 4**) should be followed before examining TMJ which is as follows:

EXAMINATION PROTOCOL

Is it difficult or painful to open the mouth (eg yawning)?

Does the jaw get stuck, locked, or go out?

Is it difficult or painful to chew and talk?

Do the jaw joints make sounds?

Do the jaws often feel stiffness and muscular tiredness?

Are headaches, neck aches or toothaches frequent?

Has there been previous treatment for any unexplained facial pain or a jaw joint problem?

Have there been any recent changes in bite? (orthodontic or prosthodontic treatment)

is there any history of trauma?

CLINICAL FINDINGS

The following things are evaluated during examination of the temporomandibular joint:

Functional movement of mandible and temporomandibular joint with the jaws separated (range of motion)

The anteroposterior relationship of the mandible and the maxilla

The symmetry of jaws

The presence of clicking and snapping of the joints (auscultation)

The presence of swelling

There is some evidence to suggest that anxiety, stress, and other emotional disturbances may exacerbate TMJ disorders, especially in patients who experience chronic pain.¹³ As many as 75 percent of patients with TMJ disorders have a significant psychological abnormality.¹³ Recognition and treatment of concomitant mental illness is important in the overall approach to management of chronic pain, including pain caused by TMJ disorders.³

Females present a greater risk of chronic myofascial pain (MFP)¹⁴ and may present with characteristics (eg

hormonal, constitutional factors, behavioral or psychological differences) that contribute to chronic TMD.^{15,16} Even though the lower prevalence of pain conditions in TMJ dysfunction in men has not yet been clarified, the reduction in TMJ pain with testosterone at supraphysiological serum levels can be helpful in explaining this gender difference.¹⁷ It has also been shown in a study that the appearance of pain in TMD increases approximately 30% in patients receiving hormone replacement therapy (HRT) in postmenopausal women (estrogens), and approximately 20% among women who use oral contraceptives.¹⁸

Bruxism is an oral parafunctional activity where there is excessive clenching and grinding of teeth. It can occur during sleep or whilst awake. The cause of bruxism itself is not completely understood, but psychosocial factors appear to be implicated in awake bruxism and dopaminergic dysfunction and other central nervous system mechanisms may be involved in sleep bruxism. Conversely, awake bruxism tends to cause symptoms that slowly get worse throughout the day, and there may be no pain at all upon waking. The relationship of bruxism with TMD is debated. Many suggest that sleep bruxism can be a causative or contributory factor to pain symptoms in TMD.

Trauma, both micro and macrotrauma, is sometimes identified as a possible cause of TMD; however the evidence for this is not strong. Prolonged mouth opening (hyperextension) is also suggested as a possible cause. It is thought that this leads to microtrauma and subsequent muscular hyperactivity. It has been proposed that a link exists between whiplash injuries (sudden neck hyper-extension usually occurring in road-traffic accidents), and the development of TMD. This has been termed "post traumatic TMD", to separate it from "idiopathic TMD".

The relationship between hypermobility and TMD has also been examined. An association was determined between loose joint syndrome and TMJ symptoms.

Michalowicz et al.¹⁹ evaluated the hypothesis that signs and symptoms of TMD may be hereditary, but in a recent study the authors concluded that genetic factors and the family environment exert no relevant effect upon the presence of symptoms and signs of the TMJ. Age is also not associated with the risk of MFP.^{14,20}

Many orofacial and ontological conditions can mimic TMD, hence it is very important to differentiate TMD pain from other orofacial pain. Few causes of orofacial pain are enumerated below in **Table 5**

TABLE 5: CAUSES OF OROFACIAL PAIN

DENTAL CAUSES <ul style="list-style-type: none"> • Caries • Tooth abscess • Tooth eruption 	NEUROGENIC CONDITIONS <ul style="list-style-type: none"> • Trigeminal neuralgia • Post herpetic neuralgia • Glossopharyngeal neuralgia
OTOLOGICAL CONDITIONS <ul style="list-style-type: none"> • Acute otitis media • Otitis externa • Mastoiditis • Eustachian tube dysfunction 	INFLAMMATORY CONDITIONS <ul style="list-style-type: none"> • Temporal arteritis • Rheumatoid arthritis • SLE • Parotitis
HEADACHE DISORDERS <ul style="list-style-type: none"> • Tension type headache • Migraine • Cluster headache 	TRAUMATIC <ul style="list-style-type: none"> • Mandibular fracture • Temporal bone fracture
OTHERS <ul style="list-style-type: none"> • Atypical facial pain • Sinusitis • Eagle syndrome¹⁹ 	

CONCLUSION

The review has attempted to emphasize the etiological factors of temporomandibular joint and myofascial pain. Temporomandibular joint disorders do not constitute one particular or single abnormal condition; rather they are multifactorial, and include stressful activities, emotional diseases, structural malrelationships, trauma, malocclusion and various types of arthritis or viral diseases. Sound clinical knowledge and experience is needed to differentiate TMD from other orofacial pain for a prompt and correct diagnosis.

REFERENCES

1. Dworkin SF, Huggins KH, Le Resche L, Von KORFF M, Howard J, Truelove E, et al. Epidemiology of signs and symptoms in temporomandibular disorders: clinical signs in cases and controls. *J Am Dent Assoc* 1990;120:273-81
2. Koh H, Robinson PG. Occlusal adjustment for treating and preventing temporomandibular joint disorders. *J Oral Rehabil* 2004; 31:287-92.
3. Buescher JJ. Temporomandibular joint disorders. *Am Fam physician* 2007; 76: 1477-82, 1483-84.
4. Graber, Rakosi, Petrovic. Functional analysis- examination of temporomandibular joint and condylar movement. In: *Dentofacial Orthopedics with Functional Appliances*. 2nded. St. Louis: Mosby; 2009.p135-40.
5. Athanasiou AE. Orthodontics and Craniomandibular disorders. In: Samire, Bishara. *Textbook of Orthodontics*. 2nd ed. Philadelphia: Saunders; 2003. p478-93.
6. Scrivani SJ, David A, Keith, Leonard B, Kaban. Temporomandibular disorders. *N Eng J Med* 2008; 359: 2693-705.
7. Sharma S, Gupta DS, Pal US, Jurel SK. Etiological factors of temporomandibular joint disorders. *Nat J Maxillofac Surg* 2011; 2(2):116-119.
8. Oral K, Kucuk BB, Ebeoglu B, Dincer S. Etiology of temporomandibular disorder pain. *AGRI* 2009; 21(3):89-94.
9. Alarcon JA, Martin C, Palma JC. Effect of unilateral posterior crossbite on the electromyographic activity of human masticatory muscles. *Am J Orthod Dentofacial Orthop* 2000; 118: 328-34.
10. Landi N, Manfredini D, Tognini F, Romagnoli M, Bosco M. Quantification of the relative risk of multiple occlusal variables for muscle disorders of the stomatognathic system. *J Prosthet Dent* 2004; 92: 190-5
11. McNamara JA Jr, Seligman DA, Okeson JP. Occlusion, Orthodontic treatment, and temporomandibular disorders: a review. *J Orofac Pain* 1995; 9: 73-90.
12. Pullinger AG, Seligman DA, Gornbein JA. A multiple regression analysis of risk and relative odds of temporomandibular disorders as a function of common occlusal features. *J Dent Res* 1993; 72: 968-79.
13. Okeson JP, for the American Academy of Orofacial Pain: Guidelines for assessment, Diagnosis, and Management. Chicago III.: Quintessence Pub, 1996.
14. Velly AM, Gornitsky M, Philippe P. contributing factors to chronic myofascial pain: a case control study. *Pain* 2003; 104: 491-9.
15. De Leeuw JR, Steenks MH, Ros WJ, Bosman F, Winnubst JA, Scholte AM. Psychosocial aspects of cranio-mandibular dysfunction. An assessment of clinical & community findings. *J Oral Rehab* 1994; 21: 127-43.
16. Dworkin SF, Le Resche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations & specifications, criteria. *J Craniomandib Disord* 1992; 6: 301-55.
17. Fischer L, Clemente JT, Tambeli CH. The protective role of testosterone in the development of temporomandibular joint pain. *J Pain* 2007; 18: 192-7.
18. Lupton DE. Psychological aspects of temporomandibular joint dysfunction. *J Am Dent Assoc* 1969; 79: 131-6.
19. Michalowicz BS, Pihlstrom BL, Hodges JS, Bouchard TJ Jr. No heritability of temporomandibular joint signs and symptoms. *J Dent Res* 2000; 79: 1573-8.
20. Von Korff M, Dworkin SF, Le RescheL, Kruger A. An epidemiologic comparison of pain complaints. *Pain* 1988; 32: 173-83.

Source of support: NilThis work is licensed under CC BY: **Creative Commons Attribution 3.0 License.****Conflict of interest:** None declared