Article ID: WMC005339 ISSN 2046-1690

# The relationship between temporomandibular disorders and posture: a systematic review

***Peer review status:***
No

***Corresponding Author:***
Dr. Elisa Pacella,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome - Italy - Italy

***Submitting Author:***
Dr. Elisa Pacella,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unity - Italy - Italy

***Other Authors:***
Dr. Martina Dari,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome - Italy - Italy

Dr. Denise Giovannoni,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome - Italy - Italy

Dr. Ludovica Caterini,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome - Italy - Italy

Dr. Martina Mezio,
Attender, Department of Oral and Maxillo Facial Sciences, Sapienza, Orthognathodontics Unit - Rome - Italy - Italy

**Article ID:** WMC005339

**Article Type:** Systematic Review

**Submitted on:**23-Oct-2017, 05:55:57 AM GMT **Published on:** 24-Oct-2017, 06:52:40 AM GMT

**Article URL:** http://www.webmedcentral.com/article_view/5339

**Subject Categories:**ORTHODONTICS

**Keywords:**TMJ, TMD, posture, balance, cervical spine, dysfunction,

**How to cite the article:**Pacella E, Dari M, Giovannoni D, Caterini L, Mezio M. The relationship between temporomandibular disorders and posture: a systematic review. WebmedCentral ORTHODONTICS 2017;8(10):WMC005339



**Source(s) of Funding:**

No funding has been taken.

 

**Competing Interests:**

None

 

# The relationship between temporomandibular disorders and posture: a systematic review

***Author(s):*** Pacella E, Dari M, Giovannoni D, Caterini L, Mezio M

## Abstract

Nowadays temporomandibular disorders are often critically reviewed both on a diagnostic and a therapeutic point of view. This happens as a result of the huge number or patients visiting a specialist because of articular dysfunctions, temporo-mandibular pain, headaches, postural and muscular disorders recognizing as a common origin a TMJ malfunction.

A TMJ pathology cannot be just seen with a cause-effect point of view but must take into account a lot of other factors who can lead to the appearance of the pathology and one of these, seems to be posture, as it seems legit that it can play a role in the developing of the temporomandibular disorders.

The aim of this review is to carefully analyze the knowledge achieved in the past and by current researches in order to give the reader an idea of what is already well known in this field and the components that are not fully understandable yet.

## Introduction

To understand the complexity of the relationships existing between the different factors leading to a TMD it must be explained that for a long time the main thought was that the stomatognatic system is a system in which his four main components (dento-periodontal, neuromuscular, osteo-basal and TMJ) are linked by a linear relationship and, as a result of this, an alteration in one of this components automatically lead to a change in all the other components. This can lead to a dysfunction or not if the system adapts itself to the new condition.

NowadaysÂ  it is common sense to think that not only this four components should be taken into account if talking about the stomatognatic system and that the relationship underlying them cannot be a linear one: the concept of a "integrated cybernetic sytem" has been introduced. This model adds to the previous components some new ones related to psycho-emotional factors and the individual biological tolerance linking neurophysiologic, biologic, biomechanical, postural and psychoambiental knowledge in this field. The relationship between these components is no more linear but is more complex and is based on smart mechanisms of feedback and feedforward.

As a result of this, a TMJ pathology cannot be just seen with a cause-effect point of view but must take into account a lot of other factors who can lead to the appearance of the pathology.

A lot of authors agree with this multifactorial point of view but still the problem is to find out which are these factors. Since the beginning of the XXth century specialists from different medical fields studied deeply the TMD etiological factors and they brought into play occlusion, the relationship between intra- and extra-capsular structures, parafunctional activities, neuro-muscular imbalances, the loss of occlusal vertical dimension, stress and postural disorders. By now, the main thought is that there is a relationship between the stomatognatic system, posture, psych and biological tolerance.

## Review

Speaking of posture, the relationship between occlusion, posture and temporomandibular dysfunction is a fairly controversial topic that has not yet reached satisfactory results despite years and years of research. The results obtained in the various studies are in fact quite contradictory.

The guidelines of the American Academy of Orofacial Pain suggest a link between TMD and cervical spine. According to Mehta et al. [1] pathologies of the temporomandibular joint can be grouped into three major groups named "triad of dysfunction." These groups represent the majority of complaints from patients and are: myofascial pain and dysfunction, internal derangement of the TMJ and dysfunction of the cervical spine.

Since the temporomandibular joint is directly related to cervical and scapular region through an interconnected neuromuscular system, it is thought that modifications in the cervical spine can cause TMJ disorders and vice versa. Head and the neck muscles are closely related to the stomatognathic system and an increasing number of dentists often recognize signs and symptoms of dysfunction of the cervical spine in patients with TMD. Various researches confirmed that

 

postural changes of the head and the body may have a negative effect on the TMJ biomechanics and lead to temporomandibular dysfunction but not all authors agree with this statement, having obtained unclear or contradictory results from their studies [2].

Huggare [3] believes that an important role in maintaining the balance of the head is played by the muscles of the neck and the muscles of the stomatognathic system. These muscles work together to form a coordinated system whereby an alteration of the masticatory muscles can negatively affect the entire posture of the head and vice versa. So, according to him, by manipulating the jaw muscles also the posture of the head can be changed.

Even Gonzalez and Manns [4] found some correlations: they observed an hyperextension of the upper cervical vertebrae and a straightening of the lower ones in patients with TMD. This condition known as lordosis occurs in patients with a "forward head posture", a condition characterized by an extension of the head and upper cervical vertebrae (C1-C3) accompanied by a bending of the last cervical vertebrae (C4-C7); as a result of that the cervical curvature is increased.

Among the authors who found a correlation between TMD and cranio-cervical posture Jung-Sub An [5] analyzed the relationship between the disk dislocation and the cranio-cervical posture and between the disk displacement and the hyoid bone position. The results showed that there is a positive correlation between the disk displacement and the head and neck extended posture associated with Class II with an hyper divergent skeletal pattern. The same correlation could not be found on his relationship with the hyoid bone position which seems relatively stable in the patients with disc displacement.

The goal of these studies is to understand whether a "postural" kind of therapy is possible in patients with TMD. According to above-mentioned authors the postural therapy is an option for this kind of patients and some of them even obtained promising results.

Nicolakis et al. [6], for example, proposed a protocol that requires the use of passive mandibular movements, correction of body posture and relaxation techniques in a group of patients with irreducible disc displacement. They observed a marked improvement of the dysfunction and the disappearance of the painful symptoms and that is why they support the usefulness of an "exercise therapy" in this type of patients.

Souza et al. [7] conducted an interesting study on a group of 51 subjects with and without symptoms of a TMJ disorder in order to evaluate body posture and the distribution of plantar pressure when the mandible is in rest position and during maximum intercuspation. The postural analysis was conducted using photogrammetry (SAPO). The plantar pressure was valued through a baropodometric platform. Among 18 angular measurements, three seemed to be significantly different in the two groups (symptomatic and asymptomatic). The symptomatic group showed more pronounced cervical distance, right heel valgus and less pronounced pelvic tilt. Baropodometry showed that patients with temporomandibular dysfunction had a greater weight distribution in the posterior part of the foot and less distribution in the anterior part compared to asymptomatic patients. The authors concluded that both symptomatic and asymptomatic patients have postural imbalances but these imbalances are more pronounced in patients with TMD. In addition, symptomatic patients showed abnormal plantar distribution, suggesting that the temporomandibular dysfunction can affect the postural system.

# Conclusion(s)

Although many studies showed a relationship between the postural system and the temporomandibular joint these are not enough to speak of a correlation between temporomandibular disorders and altered posture. These studies, whose aim is to make the gnathology world increasingly more interdisciplinary, are often poor in design or diagnostic techniques and therefore require further study to establish a direct link between poor posture and TMD [8,9].

# References

[1] Mehta NR, Forgione AG, Rosenbaum RS, Holmberg R "TMJ" triad of dysfunctions: a biologic basis of diagnosis and treatment

[2] Shweta Channavir Saddu,1 Sujatha Dyasanoor,2 Nidhin J Valappila, 3 and Beena Varma Ravi. The Evaluation of Head and Craniocervical Posture among Patients with and without Temporomandibular Joint Disorders- A Comparative Study

[3] Huggare JA, Raustia AM. Head posture and craniovertebral and craniofacial morphology in patients with craniomandibular dysfunction. Cranio. 1992;10(3):173e179

[4] Gonzalez HE, Manns A. Forward head posture: its structural and Functional Influence on the masticatory

 

system, a conceptual study. Cranio. 1996;14:71e80

[5] Jung-Sub An, Da-Mi Jeon, Woo-Sun Jung, Il-Hyung Yang, Won Hee Lim, Sug-Joon Ahn. Influence of temporomandibular joint disc displacement on craniocervical posture and hyoid bone position

[6] Nikolakis P, Erdogmus B, Kopf A, et al. Effectiveness of exercise therapy in patients with internal derangement of the temporomandibular joint. J Oral Rehabil. 2001;28:1158e1164.

[7] Souza JA1, Pasinato F2, CorrÃªa EC3, da Silva AM4. Global body posture and plantar pressure distribution in individuals with and without temporomandibulardisorder: a preliminary study.

[8] Fuentes R, Freesmeyer W, HenrHenre J. [Influence of body posture in the prevalence of craniomandibular dysfunction]. Rev Med Chil 1999; 127:1079-85.

[9] Rahmatalla S, Deshaw J. Predictive discomfort of non-neutral head-neck postures in fore-aft whole-body vibration. Ergonomics 2011; 54:263-72.

Â