ARE THERE EVIDENCES OF CORRELATION BETWEEN TEMPOROMANDIBULAR DYSFUNCTION AND ORTHODONTIC TREATAMENT?

Ana Paula Zanetti Brochini[1], Thiago Eiras Dela Coleta[1], Roberto Dela Coleta[1], Ana Lúcia Franco-Micheloni[2], Karina Eiras Dela Coleta Pizzol[2]

1 School of Professional Development of Paulista Surgeon Dentists Association, São Carlos, SP, Brazil
2 University Center of Araraquara, Araraquara, SP, Brazil

CORRESPONDING AUTHOR: nkpizzol@ig.com.br

ABSTRACT

Aim: The aim of this study was verifying, through literature review, whether there are evidences of correlation between temporomandibular dysfunctions and the orthodontic treatment.

Material and Methods: Papers published from 1981 to 2015 were excluded and 41 articles and 06 books composed this review.

Results: It is known that temporomandibular dysfunctions is a general term that represents signals and symptoms involving masticatory muscles, the temporomandibular joint and associated structures, and it is the main cause of pain from non-dental origin in the orofacial region, including head, face and other structures. Its etiology is multifactorial involving a large number of direct and indirect causes. Among them, the occlusion was already considered one of the main etiological factors for temporomandibular dysfunction. From epidemiological studies, it is known that signals and symptoms of temporomandibular dysfunction occur in healthy people, they are common in children and adolescents and tend to increase with age, particularly after adolescence, from 13 to 45 years old. The hypothesis for causality between orthodontics and temporomandibular dysfunction has led to legal problems for dentists and orthodontists. For these reasons, the interest on the relation among occlusal factors, orthodontic treatments and temporomandibular dysfunction has growth and several studies were carried out.

Conclusions: We conclude that until this moment, it is not possible affirm that the orthodontic treatment could prevent, cure or cause temporomandibular dysfunction.

KEYWORDS: temporomandibular joint dysfunction syndrome, dental occlusion, corrective orthodontics

INTRODUCTION

Stomatognatic system (SS) is complex system that plays several functions like talk, chew, swallow and breathe. SS is controlled by neuromuscular system, and to work properly is necessary that muscles of head and neck, teeth, bones and ligaments are in harmony. When there is change on the balance of this system, able to affect physiological tolerance/ adaptability of the individual, may occur a collapse of masticatory system causing a dysfunction known as

temporomandibular dysfunction (TMD).[1]

The TMD, after pain original from teeth, are known as the most common condition of chronic orofacial pain that surgeon dentists face. They are sub-classified as musculoskeletal pain.[1] TMD patients may present signals and symptoms that include pain in the temporomandibular joint (TMJ) on the masticatory and cervical muscles, noise on TMJ as clicks and or crackle, pain during the mandibular function, headache, deviation or limitation of mandibular movement, as well as muscle tiredness in rest or function. Otologic symptoms as otalgia, ear fullness, decreased auditory acuity, buzz, dizziness and vertigo are also common and still can present difficulty for mastication.[2-7] TMD may be transitory and self-limiting, being solved with no serious problems along time in certain cases.[1] Longitudinal studies suggest that signals and symptoms of TMD are occasional and floating, alternating periods of crisis and periods of absence of pain that can be confused with remission of the problem.[8]

Last years the etiology of TMD has been considered multi factorial, involving occlusal and neuromuscular factors, states of amplification of pain, psychopathological aspects, muscle tissue and or bone changes, traumas, parafunctional activities, genetics, environmental factors among others. We believe that these factors, in synergic way or not, may lead to the decrease of adaptive skill of SS, predisposing, triggering, maintaining or exacerbating the TMD.[1,9]

For long time, occlusal pathological aspects were considered the main etiologic factors of TMD, but nowadays, the occlusion have been seen inside a major context.[1,10,11] Despite the great number of current publications that consider limited the participation of these factors on the etiology of TMD, controversies about it still remain. In this context, the orthodontic correction may contribute to improve the signals and symptoms of TMD, while for others, it can predispose the patient to pain and dysfunction of SS.[12] Before the exposed, this work had as aim to investigate the correlation between orthodontic treatment and TMD, reviewing and discussing important articles published in national and international literature.

MATERIAL AND METHODS

The search of literature was conducted in electronic data basis using the terms "temporomandibular joint dysfunction syndrome", "dental occlusion" and "orthodontics, corrective" as key-words. Chapters of books which approach the theme were also included as base-reference. In the measure that the articles of interest were localized, they were grouped and discussed following a logical sequence. Only articles published between the years from 1981 to 2015 were included, and altogether, 41 articles and 06 books composed this review.

RESULTS

Relation between orthodontic treatment and TMD constitutes one of the more controversial and studied matters in contemporaneous orthodontics. The need to investigate this relation comes with the occurrence of judicial trials in which patients attributed to orthodontists the cause of symptoms of TMD during or after orthodontic treatment.[13] In the late 80s, orthodontics community was alerted and investigations were started. In the middle of the last century, works already investigated the interference of orthodontic treatments on the normality of SS function. One of these studies, through electromyography, concluded that muscular activity, during the orthodontic treatment was within the expectations and certain muscle characteristics were changed by the orthodontic therapy in transitory way.[14]

DISCUSSION

TMD is a common problem that affects the population and appears in third place among chronical diseases, right after common headaches and backaches.[6,7] For years, static and functional changes of occlusion were considered the main etiologic factors of TMD. Then, TMD supposedly will disappear when eliminated the malocclusion through orthodontic treatment or prosthetic rehabilitation. In the last 80s and early 90s, literature review showed there is no difference on signals or symptoms of TMD among patients treated and no treated with orthodontics, evidencing a small relationship between TMD problems and orthodontic treatment.[15,16] These results contributed to demystify the believe that problems of TMD were originated in occlusal problems. Over the years, despite significant progress on ability of diagnosis and treatment of TMD, still did not could clarify totally the nature and magnitude of this possible relation.

For years, the role of morphological and functional occlusion, as well as the influence on the orthodontic treatment on the appearance of TMD has been discussed.[17,18] Despite the correlation between TMD and some malocclusions had been evidenced, among them the pattern Class III of Angle, posterior cross bite, open bite, loss of subsequent containment and extreme overjet (higher than 6 mm)[18,19-24], they

should not be considered exclusively. Certainly, if we think in a harmonic working, the occlusal balance brings functional advantages to SS, but, despite it, there are evidences that certain variations of ideal occlusal pattern variation do not result obligatorily in signals and symptoms of TMD.[18]

There are authors who demonstrated the use of fixed orthodontic appliances seemed so effective for articular and muscular pain, than the use of an inter-occlusal device in short term (first six months of treatment). However, clinical implications for use in long term are not clarified.[25] Other several evidences agree that correction of occlusion seems exercise few or no effect on TMD, therefore, it should not be considered a treatment for TMD for most patients.[26-28] Hence, it is concluded that there are no enough research data to base the orthodontic practice or occlusal adjust for treatment of signals and symptoms of TMD.[26-28]

In a review, eight conclusions refused the possible association between TMD and orthodontics. They are: 1) signals and symptoms of TMD can occur with health individuals; 2) signals and symptoms of TMD increase with age, particularly during adolescence, and however, the TMD originated during the treatment cannot be related to the treatment; 3) orthodontic treatment performed during the adolescence generally does not increase or decrease the chance to develop TMD later in life; 4) teeth extraction as part of orthodontic planning does not increase the risk to develop TMD; 5) there is no elevated risk to associate TMD to any type of orthodontic mechanics; 6) despite a stable occlusion is the aim of orthodontic treatment cannot something near to the ideal occlusion does not result in signals and symptoms of TMD; 7) no prevention method of TMD have been demonstrated as the use of appliances; 8) when severe signals and symptoms of TMD were present, simple treatments can relief them for most patients.[18]

The hypothesis of different techniques and orthodontic treatments, for example, functional appliances mandibular advancement, mechanic of elastic Class II and III, chincup, fixed or removed appliances intra and extra oral, Begg technique, extractions, facial mask, excessive retraction of superior incisive, among others, could be involved with etiologic factors for TMD also was studied last decades.[28,29-34] However, this idea was refused once it was no evidence that TMD were more prevalent or increase the risk for its presence on those who were submitted to the mentioned orthodontic treatments.[15,21,29,34-42] There was not also possible relate the orthodontic treatment to internal breakdown of TMJ, but the displacement of disk was present both in patients treated and no treated orthodontically.[43] Studies demonstrated there are still no evidences which support the hypothesis that orthodontic treatment performed in children and adolescents are risk factors for development of TMD on the adult age.[21,44,45] Signals and symptoms of TMD occur in health people, are common in children and adolescent and tend to increase with age, particularly after adolescence, between 13 and 45 years old.[4,6,7,46] Therefore, TMD that originated during the orthodontic treatment in the adolescence are not necessarily related to orthodontics.[18] Probably the individual would be affected by this problem independently on the orthodontics or not.[44]

Recently the genetic influence on the TMD etiology has been researched. Among people with a variant of gene that codify catechol-O-methyltransferase, an enzyme associated to the responsiveness to pain, the risk of development of TMD was significantly superior on individuals who had reported a history of orthodontic treatment in comparison to those who did not used orthodontics. Despite more studies are necessary to investigate this correlation, this genetic variant could help to identify, in the future, patients with risk to develop TMD, serving as risk marker useful on the planning of orthodontic treatment.[47]

Studies performed on the prevalence of TMD in cases pre and post orthodontic treatments and also cases of malocclusion showed few or no difference between the groups analyzed. Then, it is emphasized that orthodontic treatment itself does not constitute a risk factor on the development of TMD, because orthodontic therapy produces changes whose the masticatory system will adapt gradually.[28,39,45] However, orthodontists should be alert to any preexisting change on TMJ before starting the orthodontic treatment.[40]

CONCLUSIONS

Based on the scientific results reviewed is possible conclude that: (1) it is not possible assert that the orthodontic treatment is a etiologic factor for TMD; (2) there is no evidence that support that orthodontic treatment has to be performed for treatment of TMD.

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