Rev Dor. São Paulo, 2010 out-dez;11(4):329-333

ARTIGO DE REVISÃO

Occlusion and temporomandibular disorders: a critical analysis of the literature*

Oclusão e disfunção temporomandibular: uma análise crítica da literatura

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SUMMARY

BACKGROUND AND OBJECTIVES: Occlusion has been considered an important risk factor for the temporomandibular disorders (TMD). To check the pertinent literature in a systematic way and proceed to a critical analysis to elucidate the relation of the occlusal factors with temporomandibular disorders and to establish a consensus to standardize and define behaviors in clinical practice as well as select effective/safety treatments for the patient.
CONTENTS: The therapeutic modalities that change the occlusal surface, teeth position and the mandibular position will be discussed to establish parameters that can assess the real importance of these factors in the etiology of the TMD. The following databases were researched: PubMed (1966-2008), Lilacs (1982-2008). Manual search was also carried out. The search strategy was realized according to each database. The selected articles were submitted to a critical analysis.
CONCLUSION: The failure to obtain of an ideal/functional occlusion won't necessarily results in signals and symptoms of TMD. The occlusal adjustment wouldn't be indicated to treat TMD; it does not present adequately effectiveness and safety. Orthodontic treatment wouldn't be recommended to prevent or treat TMD. The stabilization splint of nocturnal use shows evidence/effective and safe intervention to the control of the masticatory myofascial pain.
Keywords: Dental occlusion, Evidence based clinical practice, Evidence based dentistry, Occlusal adjustment, Temporomandibular joint disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A oclusão tem sido considerada importante fator de risco de disfunção temporomandibular (DTM). O objetivo foi revisar a literatura de forma sistemática e proceder à análise crítica para elucidar a relação dos fatores oclusais com DTM, e criar consenso para a prática clínica.
CONTEÚDO: Este estudo discute modalidades de tratamento que modificam a superfície oclusal, a posição dentária e a posição mandibular para se estabelecer parâmetros que avaliem o real papel desses fatores na etiologia da DTM. É apresentado um consenso, baseado em evidência, para padronizar/definir condutas na prática clínica e selecionar tratamentos eficazes e seguros para o paciente. Foram pesquisadas as bases de dados: Pubmed (1966-2007) e LILACS (1982-2007). Foi realizada busca manual em revistas e referências de artigos incluídos. A estratégia de busca foi adaptada a cada base de dados.
CONCLUSÃO: A não obtenção de uma oclusão ideal/funcional não resulta necessariamente em sinais/sintomas de DTM. O ajuste oclusal não deve ser indicado para tratar DTM, por não apresentar efetividade e segurança adequados. O tratamento ortodôntico não deve ser recomendado para prevenir ou tratar DTM. A placa estabilizadora de uso noturno apresenta evidência como intervenção segura e efetiva para o controle da dor miofascial mastigatória.
Descritores: Ajuste oclusal, Oclusão dentária, Odontologia baseada em evidências, Prática clínica baseada em evidências, Transtornos da articulação temporomandibular.

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INTRODUCTION

Occlusion has been considered an important risk factor for temporomandibular disorders. In 1934, Costen correlated signs and symptoms of TMD with the occlusal factors. Since then, it has been discussed, without an adequate understanding on the terms of the treatment that modify the occlusal surface, the teeth and jaw position as the occlusal adjustment, orthodontic treatment and occlusal appliances[1,2].

These differences led different types of interventions for the same condition leaving the clinician many times confused in the selection of appropriate, safer and more effective intervention for the control of temporomandibular disorder. Thus, there is a need to establish parameters to evaluate the real role of these factors in the etiology of TMD, as well as protocols drawn up to standardize and define conduct that becomes necessary to justify the clinical practice in effective and safe treatments to the patient[3].

To check the possible association between occlusion and temporomandibular joint dysfunction was established the following hypothesis: can occlusal changes be considered a risk factor in the development of temporomandibular disorder?

CONTENTS

The following databases were researched: Pubmed (1966-2008) and LILACS (1982-2008). Manual search was carried out in periodic considered important for this review. The search strategy was adapted to each database.

Inclusion criteria - The articles were included according to the provisions of figure 1 and table 1, respecting and obeying the hierarchy of evidence, according to figure 2.

Exclusion criteria - The articles that did not fulfill the requirements quoted in figure 1 and 2 and in table 1 were not considered in this work.

Obtaining an ideal/functional occlusion should be the goal of a reconstructive occlusal treatment (oral rehabilitation, occlusal adjustment, orthodontics), aiming at the obtainment of all possible ideal parameters for the occlusion. It is important to consider that the lack of an ideal/functional occlusion will not necessarily result in TMD signs and symptoms[1]. The following criteria should not be neglected.

These are considered requirements for an ideal/functional occlusion[4]: difference of Retruded Cuspal Position (RCP) for Intercuspal Position (ICP) until 2 mm; effective incisive guide; effective side guide; lack of contacts from non-working; absence of posterior contacts in the protrusive movement; effective simultaneous bilateral contacts (A, B e C – *stoppers/equalizers*); principles of mutually protected occlusion.

So the occlusion without significant risk for TMD may submit the following[4] : RCP ≠ ICP until 2,0 mm; deep overbite; overjet less than 4,0 mm (limit); dental midline discrepancy; all Angle occlusion classifications; unilateral RCP contacts; less than five missing posterior teeth.

Table 1 - Criteria to be evaluated in a critical analysis*

Items Evaluated	Points	Items Evaluated	Points
Description of the selection	3	Measures of bias	3
Number of patients seen and reason for rejection	3	Dates of studies	2
Definition of treatment regimen	3	Results of randomization	2
Planning of follow-up	3	Fixing the “beta estimate”	3
Test adherence to treatment	3	Main outcome	4
Blinding of allocation	10	Limit of confidence	3
Blinding of participants	8	Repeated measures	2
Observer blind to the treatment	8	Control of events	4
Observer blind to the results	4	Analysis correlation / regression	2
Randomization tested	3	Statistical analysis	4
Blinding tested	3	Withdrawals	4
“Rules of stopping”	3	Management of withdrawals	4
Setting up the size of the sample	3	Point of view discussion	3

* Quality of the protocol of study, analysis and presentation of data in accordance with the scale of quality of Antczak-Bouckoms.

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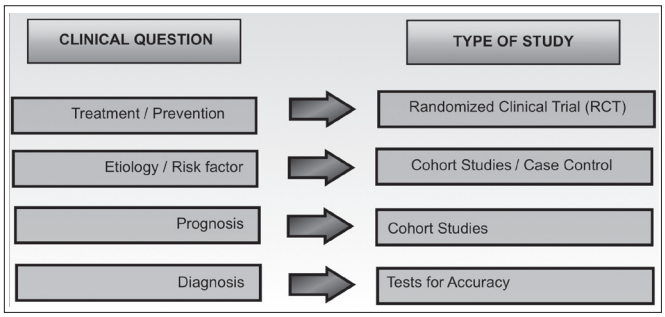

Figure 1 - Scheme types of study.

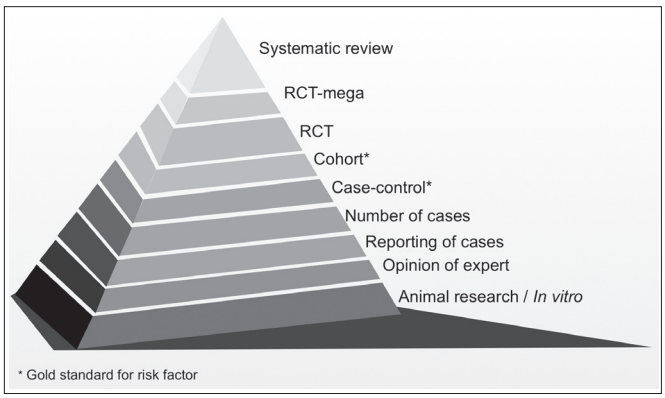

Figure 2 - The hierarchy of evidence.

DISCUSSION

The temporomandibular disorders (TMD) are a collective term that involves clinical changes that affect the masticatory muscles, Temporomandibular Joint (TMJ) and associated structures or both[1].

The appropriate classification of temporomandibular disorders should combine different signs and symptoms to help the diagnosis. Some classifications were proposed by the International Headache Society (IHS)[5], the American Academy of Orofacial Pain (AAOP)[1] and the Research and Diagnostic Criteria for Temporomandibular Disorders (RDC / TMD)[6]. However, only two have been widely used, the clinically driven by AAOP and RDC / TMD, which is used for clinical research.

The challenge to establish a unique classification for the TMD is due to the complexity of the etiology and pathogenesis, to the multiple symptoms and to the limited knowledge about causes and natural progression of these conditions. Thus, it is strongly recommended to obtain a reliable diagnostic, which is dependent on the accepted taxonomy and some specific diagnostic criteria[1,7]. The actual diagnostic criteria not always clarify all clinical conditions, once the requirements for sensibility and specificity of diagnostic are frequently different for the researcher and the clinician that evaluates and treats the patient. It is necessary to establish a connecting link between the research and clinical practice[8].

The prevalence of TMD in distinct studies varies from 34.4 to 63% in young adults[8,9]. This variation can be due to the fact that the population included in these studies presents different cultural, socioeconomic and racial conditions.

The mainly risk factors found in the literature are: occlusion[10], gender[11], hormonal alterations, age[10] and clicking[1,10]. The etiologic factors are: structural factors[12], occlusion, hormonal conditions[12], alterations in the modulatory pain system[10,12], comportamental alterations[10], psychosocial aspects (stress, depression, presence of multiple somatic symptoms)[10].

The significance of occlusal factors as etiology or risk factors has been largely investigated during the last years. Actually, the relationship between occlusion and TMD is being considered weak or inexistent, based on epidemiological data and systematic reviews[13].

The interest in occlusion and in other structural factors was initiated with the Costen[2] hypothesis, and became popular among dentists during decades, being denied later[4]. Occlusal treatments like occlusal adjust in natural dentition, orthodontic treatment and occlusal appliance were largely utilizes, based on the principle that unfavorable occlusal contacts could lead to neuromuscular alterations. However, no conclusion was obtained, based on the existent studies, concerning the types of occlusal interferences that are harmful for the function, what is the best indication and the correct way to perform an occlusal adjust, and if TMD is related to the orthodontic treatment. Besides this, it is not clear what is the best design for the occlusal appliances and if its mechanism of action is related or not exclusively to the occlusion[3].

The evidence-based practice is the conscientious and explicit use of the best scientific information for the decision making on the patient care, integrating the individual clinical experience with the best external clinical evidence obtained by researches and patient values.

Adequate methodological studies (clinical trials, cohort studies, case-control studies, transverse studies and case reports) are necessary to establish the real role of these factors at the beginning and/or maintenance of TMD[14] (Figure 1).

One of the main objectives of the scientific studies is to answer the following questions: which are the risk factors for the determined clinical situation? Which is the best treatment? Which are the effects of the proposed intervention?

The best way to clarify these questions is to perform a systematic review – a type of secondary study that makes

easier to elaborate clinical behaviors, being extremely useful for the decision making in health area[5].

When it is not possible to assemble relevant scientific data that fits in systematic review inclusion criteria, in order to conclude about a decision making, it is necessary to perform primary studies, to answer the question: is the randomized clinical trial the best method of study for therapeutic?[7,15].

Cohort studies are useful to evaluate risk factors. Individuals are divided in "exposed" and "non-exposed" groups and are followed for a determined period of time (prospective or retrospective). This type of study aims at determining which patients develop or not a disease and if the previous exposition is related to this condition[16].

These studies design (Cohort and clinical trials) are considered "gold standard" to determine risk factors and better interventions.

The most utilized treatments for TMD control described in literature are: occlusal appliance, occlusal adjustment by selective grinding, orthodontic treatment, oral rehabilitation, pharmacotherapy, cognitive/behavior therapy, biofeedback, physiotherapy, surgery, and others. Among these treatments, occlusal appliances and occlusal adjustment are the most divulged and utilized by the clinicians[3].

Regarding to occlusal adjustment for prevention or treatment of TMD, Koh and Robinson[13], in a systematic review, have not recommended this intervention as a safe and effective treatment for this condition. Forssell and Kalso[3], in a critical literature review, also concluded that TMD treatment with occlusal adjustment is not recommended, since its efficacy is not known.

In the same way, other irreversible treatment modalities, such as orthodontics and oral rehabilitation, are also not recommended to prevent/treat a TMD, once they have no proof their effectiveness. Although a stable occlusion is the goal of these treatments, the lack of an ideal occlusion doesn't results in sings and symptoms of TMD[3,13].

Regarding TMD treatment using occlusal appliances, the literature presents some conclusive studies with an adequate methodology[17]. Even being a conservative and reversible treatment modality, it is necessary to re-evaluate its indiscriminate use, in order to establish treatment protocols. The occlusal appliance for night use is effective for masticatory myofascial pain control both in short (75 days) and long-term (365 days), when compared to no intervention or placebo[17,18]. It is important to point out that the mechanism of action of occlusal appliances is not fully understood. We cannot assume that the remission of the symptoms is due only to the occlusion, since it is impossible to know if the success of the treatment is related to placebo effect, mean regression, spontaneous remission or individual variability of signs and symptoms[19,20]. The unsuccessful of the treatment can be related to diagnostic errors, non-compliance, individual variation or other determining factors related to the disease[11,19,20].

The small number and the poor quality of the majority of the published RCT (Randomized controlled trial) do not permit, however, to get good conclusions about this subject. However, the lack of evidence cannot be interpreted as lack of effect. Well conducted RCT are necessary to provide answers and to eliminate divergent opinion. The high scientific pattern in TMD studies should motivate all researchers to increase the potential of evidence-based studies, aiming at achieving a higher scientific level for TMD treatment[3].

Considering the present critical literature analysis, it is possible to conclude that there are still subjects to be clarified concerning TMD prevention and treatment. It is necessary to develop a consensus to define and standardize clinical behaviors, even with a lower evidence level, since the actual studies are defective and not clear. This consensus should orientate clinical practice until more adequate studies with methodological quality should be realized and could define these questions.

CONCLUSION

The actual studies, selected to elucidate the association of occlusal risk factors and TMD, are not able to clarify these questions, because they don't present an adequate methodology. Thus, cohort studies, case control studies or analytical transverse studies (gold standard studies) should be performed for each risk factor, in order to establish or not its roll in TMD.

Because of the multifactor etiology of TMD, occlusion cannot be over valuated as the only risk factor. Other risk factors should be considered to evaluate and treat TMD patients.

Occlusal adjustment and orthodontic treatment should not be indicated to treat or prevent TMD, because they do not present adequate efficacy and safety, besides the lack of evidence of theirs benefits.

The occlusal appliance for night use presents good quality evidence as a safe and secure intervention to control myofascial pain, both in short (75 days) and long (365 days) term.

Until cohort studies, case control studies or analytical transverse studies should be performed, investigating

each risk factor, this consensus should be useful to standardize and define clinical conducts regarding TMD treatment and prevention, in a secure and efficient way.

ACKNOWLEDGMENTS

We would like to thank our dental surgeon colleagues: Dr. Anísio Bueno de Carvalho, Dr. Ariovaldo Alberto da Silva Júnior, Dr. Ricardo Carvalho Lopes Silva, Dr. Carlos Wagner Barbieri Camargos e Dra. Patrícia Furtado Gonçalves for the scientific support and collaboration.
critical analysis*

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Presented in July, 30, 2010.
Accepted for publication in December, 06, 2010.