

**Correlation between parafunctional habits and temporomandibular dysfunction:  
Systematic review**

**Correlação entre hábitos parafuncionais e disfunção temporomandibular: Revisão  
sistemática**

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**ABSTRACT**

**Introduction:** Temporomandibular dysfunction (TMD) is a term belonging to the orofacial pain group that affects the masticatory muscles, temporomandibular joint and adjacent structures. TMD can be triggered by parafunctional habits, which are actions performed without specific natural function of the human being, becoming risk factors. **Objectives:** To evaluate through a literature review the correlation between parafunctional habits and temporomandibular dysfunctions. **Methods:** The articles were researched in the PubMed and Scielo databases, from 2009 to 2019. **As inclusion criteria:** articles published in English and Portuguese with the key words "Temporomandibular Joint", "Parafunctional Habits" and "Temporomandibular Dysfunction". Themes that were not related to the theme were excluded. **Results:** Eight articles were selected, in which six of them correlated the parafunctional habits with the signs and symptoms of TMD. Through these studies, it was seen that people develop a painful symptomatology, affecting even quality of life. In parallel, through other articles, there is a possible relationship between the intensity of physical activity with the degree of TMD found, and also the emergence of certain habits after certain surgeries. **Conclusion:** It is remarkable the correlation between the various parafunctional habits and TMD. Thus, the dentist should be paid, during diagnosis, to their presence and consider, as part of the treatment, guidelines for the reduction of these habits, obtaining success in controlling dysfunction.

**Keywords:** Joint Temporomandibular, Parafunctional Habits e Temporomandibular Dysfunction.

**RESUMO**

**Introdução:** Disfunção Temporomandibular (DTM) é um termo pertencente ao grupo de dor orofacial que afeta os músculos mastigatórios, a articulação temporomandibular e as estruturas adjacentes. A DTM pode ser desencadeada por hábitos parafuncionais, que são ações realizadas sem função natural específica do ser humano, tornando-se fatores de risco. **Objetivos:** Avaliar através de uma revisão bibliográfica a correlação entre os hábitos parafuncionais e as disfunções temporomandibulares. **Métodos:** Os artigos foram pesquisados nas bases de dados PubMed e Scielo, de 2009 a 2019. **Como critérios de inclusão:** artigos publicados em inglês e português com as palavras-chave "Temporomandibular Joint", "Parafunctional Habits" e "Temporomandibular Dysfunction". Foram excluídos os temas que não estavam relacionados ao tema. **Resultados:** Foram selecionados oito artigos, nos quais seis deles correlacionavam os hábitos parafuncionais com os sinais e sintomas da DTM. **Através destes estudos,** observou-se que as pessoas desenvolvem uma sintomatologia dolorosa, afetando inclusive a qualidade de vida. **Em paralelo,** através de outros artigos, existe uma possível relação entre a intensidade da atividade física com o grau de DTM encontrado, e também o surgimento de certos hábitos após certas cirurgias. **Conclusão:** É notável a correlação entre os vários hábitos parafuncionais e as TMD. Assim, o dentista deve ser pago, durante o diagnóstico, pela sua presença e considerar, como parte do tratamento, diretrizes para a redução desses hábitos, obtendo sucesso no controle das disfunções.

**Palavras-chave:** Hábitos Conjuntos Temporomandibular, Parafuncional e Temporomandibular Disfunção.

## 1 INTRODUCTION

Temporomandibular dysfunction is the term used for the orofacial pain group that affects the masticatory muscles, temporomandibular joints and adjacent structures<sup>1</sup>. Its symptoms are characterized by the presence of pain in the face, limitations of certain movements considered functional of the mouth and presence of joint noises, such as cracking and crackling<sup>2</sup>.

The prevalence of TMD is high and may affect children, adolescents, adults or the elderly. Age and gender are considered risk factors, and there is a higher predominance in women, whether mild, moderate or severe<sup>3</sup>. Systemic, psychological and local factors may contribute to the emergence of signs and symptoms of TMD, thus being multifactorial origin<sup>4,5</sup>.

Parafunctional habits are among the main etiological factors for the onset of TMD, which are grinding and/or tightening teeth (during the day and/or at night); chew gums; bite the tongue, lips and cheeks; gnawing nails/cuticles; put your hand and support the chin; press the tongue against the teeth and bite/gnaw objects such as pens or pencils. These practices cause an increase in muscle activity higher than necessary<sup>6,7</sup>. Among the parafunctional habits, bruxism is a repetitive muscle activity of the jaw involving the tightening or grinding of teeth during sleep or during wakefulness, being a controversial phenomenon that is not usually observable and measurable directly. The first parafunctional oral habits are acquired in childhood the most frequent is the habit of non-nutritive sucking, being related to sensations of comfort and protection. These practices can last until adulthood, such as nail gnawing, and can also be exchanged for other habits, since they are integrated into the subconscious of the individual, so he does not always realize that he performs it.

Most dentists are unaware of which parafunctional habits result in TMD and what the best treatment approach is associated, associating or not with psychological follow-up. Therefore, a literature review would be very relevant that encompassed this theme, in order to direct a better diagnosis to provide adequate treatment to patients with TMD and associated parafunctional habits.

Therefore, the aim of this study was to review the literature evaluating the relationship between parafunctional habits and temporomandibular dysfunctions.

## 2 METHODOLOGY

This systematic review was written according to prism. The research was carried out in Pubmed and Scielo databases, seeking studies conducted in humans published in English and Portuguese between 2009 and 2019 with the key words: "Temporomandibular Joint", "Parafunctional Habits" and "Temporomandibular Dysfunction."

TABLE 01: PubMed Search Summary.

Keywords	Number of articles found
“parafunctional habits” and “temporomandibular dysfunction”	22
“parafunctional habits” and “temporomandibular joint”	47

TABLE 02: Summary of Search in Scielo (It was performed in Portuguese)

Keyword	Number of articles found
“parafunctional habits”	13
“parafunctional habits” and “temporomandibular dysfunction”	9
“parafunctional habits” and “temporomandibular joint”	8

TABLE 03: Search Table.

Total Articles	99
Total articles after duplicity exclusion	95
Total articles after title readings	20
Total articles after summaries readings	12
Total selected articles	8

## 2.1 ELIGIBILITY CRITERIA

Inclusion criteria:

- Articles that were in English and Portuguese;
- Articles published in the last 10 years;
- Studies done in humans;

Exclusion criteria:

- Articles that did not relate parafunctional habits and TMD, only mentioned.

## 2.2 SCREENING PROCESS OF ARTICLES

Initially the articles were selected by title and summary according to the research strategy described. Articles that appeared in more than one database were considered only once. Finally, we used the inclusion and exclusion criteria in the appropriate period, and 08 articles were selected.

## 3 RESULTS

In view of the studies, several parafunctional habits were identified and reported, with the prevalence of bruxism most often. Concomitantly, some results did not define whether there was correlation with the signs and symptoms of TMD, but that risk factors for this dysfunction were considered.

TABLE 04. Results of the comparison of articles.

AUTHOR/YEAR	RATED PARAFUNCTIONAL HABIT	GROUP OF PEOPLE	EVALUATION METHOD	RELATIONSHIP WITH TMD
Medeiros et al., 2011	Grinding/tightening teeth; nail gnawing; bite objects; chew gums; bite the cheek, sleep on one side; support objects on the chin;	Study involving 347 university students enrolled in the first and last years of health courses.	Anamnatic questionnaire containing questions related to TMD symptoms and the presence of parafunctional habits.	YES
Bortolletto et al., 2013	Nocturnal and daytime bruxism; gnawing nails and cuticles;	A study involving 205 people, but after exclusion criteria, 172 volunteers remained.	Questionnaire recommended by the American Academy of Orofacial Pain (AAOP).	YES
Cortese et al., 2013	Day and night bruxism, chew gum, bite lips, cheek and objects.	Study involving 54 patients aged between 10 and 15 years.	Questionnaire using the DRC/TMD, and self-report questionnaire regarding habits.	-
Motghare et al., 2015	Gnawing nails, lips; bite objects.	Study involving 240 adolescents between 10 and 19 years of age who study at school .	Screening questionnaire recommended by the American Academy of Orofacial Pain (AAOP), jointly analyzing patient history and clinical examination.	YES
Oliveira et al., 2016	Grinding/tightening teeth; nail gnawing; bite objects; chew gums; bite the cheek, sleep on one side; support objects on the chin;	A study of 129 students, aged 16 to 19 years from public high schools.	Anamnatic questionnaire containing questions related to TMD symptoms and the presence of parafunctional habits.	-
Chatzopoulos et al., 2017	Evaluate the prevalence of symptoms of temporomandibular dysfunction (TMD) and parafunctional habits, as well as to investigate their association with age, gender and number of missing teeth.	4204 randomly selected patients who were examined to determine their Symptoms of TMD, and presence parafunctional habits.	Anamnatic questionnaire	-
Navarro, et al., 2018	Day-time bruxism and tightening	A study involving 200 adolescents of both sexes, aged between 10 and 19 years.	Self-reported questionnaire regarding habits, and questionnaire on the practice of physical activity according to the instrument proposed in the National School Health Survey (PeNSE).	NO
Ellie et al., 2018	Habits in general	Eighty girls from two 16-year-old high school, with or without symptoms, were invited to health information on two occasions and 60 girls participated.	Structured information on normal anatomy and function of muscles and joints on occlusion, oral habits and symptoms of orofacial pain/dysfunction and headache were provided. General relaxation has been instructed and trained. In a three-month follow-up, the same questionnaire about baseline symptoms was completed.	YES
Bruguiere et al., 2018	Habits in general	We included 237 patients undergoing orthodontic and surgical treatment for poor occlusions associated with dentofacial deformities	The diagnostic criteria were defined according to the DRC/TMD, as well as a self-report questionnaire on the habits of	NO

#### 4 DISCUSSION

Temporomandibular dysfunctions, when it comes to their etiology, have a multifactorial character, presenting several signs and symptoms<sup>8</sup>. Occlusal trauma, psychosocial issues and parafunctional habits are some of the risk factors that can trigger a temporomandibular dysfunction. The latter is one of the examples of local factors in which studies show great relevance to the onset of joint or muscle pain in patients<sup>6,7,8</sup>.

When evaluating the conditions of a group of patients, showed the degree of severity of temporomandibular dysfunction, with the prevalence of mild temporomandibular dysfunction, results mainly in female patients, since this group seeks treatment more frequently, and several studies relate this prevalence to physiological differences in sex, such as hormonal variations and lower pain threshold<sup>4</sup>. This agrees with the results of other authors who also showed the same results<sup>9</sup>. However, among these results it was found that parafunctional habits are not always associated with temporomandibular dysfunction, that is, they do not have a statistically significant association, but may be related to other factors, such as emotional tension and stress. Other habits such as putting your hand on the chin and sleeping on one side were also reported during studies<sup>10</sup>. In addition, the habit of chewing cliclete is also seen as a parafunction since it promotes the functioning of the masticatory system. It is a habit that is related to adolescence, which is a common habit<sup>11</sup>. These habits may or may not affect the structures of the masticatory system, provided that the physiological tolerance of the individual is not exceeded. If this occurs, parafunctions may become risk factors for the emergence of temporomandibular dysfunction<sup>4,5,9</sup>.

There is still a few studies that relate parafunctional habits with temporomandibular dysfunction, but through the literature it is known that these habits constitute a group of risk factors that influences the onset of muscle and joint pain in certain patients. According to Motghare *et al* (2015)<sup>1</sup> certain habits such as biting lips or objects, chewing gum, gnawing nails and grinding or tightening teeth cause a force superimposed on the muscle triggering fatigue and certain muscle fatigue, causing even a pain to the Patient. At the same time, in Cortese *et al* (2013)<sup>5</sup> showed in its results that people with bruxism, that is, habit of grinding or tightening teeth, can trigger a possible unusable muscle pain, even if they are children or young people. Bruxism is a very common parafunction of being found clinically<sup>12</sup> and is still constituted without a defined etiology, thus having contributing factors, such as genetics, anxiety, emotional stress, among others<sup>10,12</sup>.

Therefore, it is also confirmed what was reported by Bortolletto *et al* (2013)<sup>7</sup> in which bruxism is rather a risk factor that is related to the appearance of muscle and joint pain, arising a temporomandibular dysfunction, which can become severe. But this does not exclude other

parafunctional habits of also being predisposed to cause fatigue and muscle fatigue, and consequently having a temporomandibular dysfunction.

Some studies suggest that bruxism be analyzed separately to other parafunctions, due to its different pathophysiology. This condition generates peripheral sensitization, since there is a release of inflammatory substances, making it a source of continuous pain that can lead to central sensitization.

It is known that there is a strong relationship between bruxism and temporomandibular dysfunction, but it is still undetermined whether it is actually considered a cause for this dysfunction. According to Ronald E. Goldstein *et al* (2017)<sup>13</sup> daytime bruxism exacerbates the symptoms of temporomandibular dysfunction, which include headaches, joint and muscle pain in the jaw, in addition to the hyperactivity of the muscles involved, causing discomfort to the patient.

Bruxism is a phenomenon that also affects children, both in deciduous or permanent dentition. According to studies adult viscount wizards were also identified as wizards in the childhood period, that is, during life they brought this habit with them, generating even more possible temporomandibular dysfunction<sup>7,12,13,14</sup>.

The use of medications can cause this habit of grinding/tightening teeth, especially selective serotonin reuptake inhibitors and other classes of drugs that affect dopamine and other neurotransmitters<sup>15</sup>. Daytime bruxism may be related to nocturnal bruxism due to the affected neurotransmitters, but it is known that this daytime bruxism has a strong psychosocial component, and may be related to the stress suffered daily, for example, in professions that demand this emotion<sup>12,13</sup>.

At the same time, studies show the use of muscle relaxants in short periods of time to attenuate this bruxism. These medications often offer a drowsiness to the patient, affecting their daily lives<sup>16</sup>. In addition to medications botulinum toxins are also used as a way to decrease the symptoms of this bruxism. They are injected directly into the masseter and temporal muscles, and it is expected to have a decrease in muscle pain reducing the effects of this habit<sup>17</sup>.

Although some antidepressants have the ability to induce sleep, improving this cycle and reduce orofacial pain, these medications increase the ability of individuals to develop bruxism, or significantly increase this habit in people who have already has<sup>18</sup>. The use of paroxetine, venlafaxine and duloxetine was more likely to be associated with the development of bruxism<sup>19</sup>. Therefore, physicians should always report to patients about possible adverse effects during their prescription, particularly inhibitors of paroxetine and serotonin reuptake and norepinephrine<sup>18,19</sup>.

Psychoemotional aspects such as stress, anxiety and depression can be triggers for the onset of parafunctional habits, which can lead to the onset and persistence of myofascial pain<sup>20</sup>. According to Navarro *et al* (2018)<sup>21</sup> is undeniable that physical exercise is essential the lives of people, both adolescents and adults, and that this brings health benefits as a whole. But in view of the study, it was

to observe whether the appearance of habits was intertwined with adolescents who exercised physical activity, but it was confirmed that although the practice of exercises decreased stress, there was no significant association with the presence, amount or type of parafunctional habit or with the presence of orofacial pain points, which could lead to a TMD<sup>21</sup>.

Through studies, it is known that there is a correlation between orthodontics and the class of temporomandibular dysfunction, since the two "work" observing the occlusion of people, and thus having diagnoses of cross bites or open bites.

Lighter occlusions can be corrected with the use of orthodontic devices, but there are situations that is necessary with this a surgical treatment. Through studies, Bruguiera *et al* (2018) analyzed whether there was an association between oral habits and the presence of signs and symptoms of temporomandibular dysfunction after orthognathic surgeries, and it was shown that there is a prevalence of bruxism in patients, but beyond this for function other habits risk factors for the presence of temporomandibular dysfunction symptoms are considered, even though orthodontic treatment is present and a combination with surgery. However, the control of these habits before surgeries helps prevent adverse health outcomes of temporomandibular dysfunction <sup>22</sup>.

Finally, when you have information about anatomy, the function of the chewing muscles, the temporomandibular joint and guidance on reducing parafunctional habits can reduce the frequency of temporomandibular dysfunction symptoms<sup>22</sup>

## **5 CONCLUSION**

According to the studies, we conclude that there is a positive correlation between parafunctional habits and temporomandibular dysfunction, demonstrating that these habits may be risk factors for predisposing a temporomandibular dysfunction, whether mild or severe. Therefore, it is important that patients with this dysfunction have a multidisciplinary follow-up to have a reduction of these habits, obtaining control of this disorder. However, even yes, more studies are needed for greater understanding of this subject.

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**REFERÊNCIAS**

1. Motghare V; Kumar J; Kamate S; Kushwaha S; Anand R; Gupta N; Gupta B; Singh I. Association Between Harmful Oral Habits and Sign and Symptoms of Temporomandibular Joint Disorders Among Adolescents. *J Clin Diagn Res.* 2015 Aug;9(8):45-48
2. Bruguiere F; Sciote JJ; Roland-Billecart T; Raoul G; Machuron F; Ferri J; Nicot R. Pre-operative parafunctional or dysfunctional oral habits are associated with the temporomandibular disorders after orthognathic surgery: An observational cohort study. *J Oral Rehabil.* 2019 Apr;46(4):321-329.
3. Chatzopoulos G S; Sanchez M; Cisneros A; Wolff LF. Prevalence of temporomandibular symptoms and parafunctional habits in a university dental clinic and association with gender, age, and missing teeth. *Cranio.* 2019 May;37(3):159-167
4. Medeiros, S.P; Batista, A.U.D; Forte, F.D.S. Prevalence of temporomandibular dysfunction and oral parafunctional habits in university students. *Rev. Gaúcha Odontologica. RGO - Rev Gaúcha Odontol., Porto Alegre, v.59, n.2, p.201-208, abr./jun., 2011.*
5. Cortese F.G; Fridman, D.E; Farah C.L; Bielsa F; Grinberg J; Biondi A.M. Frequency of oral habits, dysfunctions, and personality traits in bruxing and nonbruxing children: a comparative study. *Journal of Craniomandibular & Sleep practice,* 2013 Oct;31(4):283-90.
6. Augusto, V. G., Perina, K. C. B., Penha, D. S. G., Santos, D. C. A. dos, & Oliveira, V. A. S. (2016). Temporomandibular Dysfunction , Stress and Common Mental Disorder in University Students. *Acta Ortop Bras, 24(6), 330–333.*
7. Bortolletto, P.P.B; Moreira, A.P.S.M; MADUREIRA, P.R. Analyses parafunctional habits and association with Temporomandibular Disorder. *Rev assoc paul cir dent* 2013;67(3):216-21.
8. Motta L.J; Bussadori S.K; Godoy C.L.H; Biazotto-Gonzales D.A; Martins M.D; Silva R.S. Temporomandibular Disorder Acoording to the Level of Anxiety in Adolescents. *Psicologia: Teoria e Pesquisa.* 2018, vol.31; pp. 389-395.
9. Oliveira C.B., Lima, J.A.S., Silva P.L.P., Forte F.D.S., Bonan P.R.F., Batista A.U.D. Temporomandibular disorders and oral habits in high-school adolescents: a public health issue? *Rev Gaúcha Odontológica. Porto Alegre, v.64, n.1, p. 08-16, jan./mar., 2016.*
10. Miyake R, Ohkubo R, Takehara J, Morita M. Oral Parafunctions and association with symptoms of temporomandibular disorders in Japanese university studentes. *J Oral Rehabil.* 2004;31(6):518-23.
11. Winocur E, Gavish A, Finkelshetein T, Halachmi M, Gazit E. Oral habits among adolescent girls and their association with symptoms of temporomandibular disorders. *J Oral Rehabil.* 2001;28(7):624-9.
12. Bracci A, Djukic G, Favero L, Salmaso L, Guarda-Nardini L, Manfredini D. Frequency of awake bruxism behaviours in the natural environment. A 7-day, multiple-point observation of real-time report in healthy young adults. *J Oral Rehabil;* 45(6):423-429
13. Goldstein R. E, Auclair Clark W. The clinical management of awake bruxism. *J Am Dent Assoc.* 2017; 148(6):387-391

14. Carlsson GE, Egermark I, Magnusson T. Predictors of bruxism, other oral parafunctions, and tooth wear over a 20-year follow-up period. *J Orofac Pain*. 2003;17(1):50-57.
15. Melis M, Abou-Atme YS. Prevalence of bruxism awareness in a Sardinian population. *J Craniomandibular Pract*. 2003;21(2):1-8.
16. Lobbezoo F, van der Zaag J, van Selms MK, Hamburger HL, Naeije M. Principles for the management of bruxism. *J Oral Rehabil*. 2008; 35(7):509-523.
17. Shetty S, Pitti V, Satish Babu CL, Surendra Kumar GP, Deepthi BC. Bruxism: a literature review. *J Indian Prosthodont Soc*. 2010;10(3):141-148.
18. Uca AU1, Uğuz F, Kozak HH, Gümüş H, Aksoy F, Seyithanoğlu A, Kurt HG. Antidepressant-Induced Sleep Bruxism: Prevalence, Incidence, and Related Factors. *Clin Neuropharmacol*. 2015 Nov-Dec;38(6):227-30.
19. Milanlioglu A. Paroxetine-induced severe sleep bruxism successfully treated with buspirone. *Clinics (Sao Paulo)* 2012;67:191–192.
20. Michelotti, A, Ohrbach, R. (2018). The Role of Stress in the Etiology of Oral Parafunction and Myofascial Pain. *Oral and Maxillofacial Surgery Clinics of North America*, 30(3), 369–379.
21. Navarro G; Baradel A.F; Baldini L.C; Navarro N; Franco-Micheloni A.L; Pizzol K.E.D.C; Parafunctional habits and its association with the level of physical activity in adolescents. *Br J Pain*. 2018, jan-mar;1 (1):46-50
22. Ellie S, Mejersjö C. A method for preventive intervention regarding temporomandibular pain and dysfunction, *Acta Odontologica Scandinavica*. 2018. Oct;76(7):482-487.