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ESTUDIOS

The effect of Speech and Language Therapy in adults with Temporomandibular disorder: A systematic review

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ENG **Abstract:** Temporomandibular disorder (TMD) is considered the second most common musculoskeletal pathology. The purpose of this review is to systematically assess the role of speech and language therapy (SLT) in adults with TMD. A search was conducted in the PubMed-Central, ScienceDirect, Scielo, and Academic Search Complete (via EBSCOHost) databases. The research was independently carried out by two researchers, considering primary studies without any time limit. The articles were assessed independently for screening, selection, and duplication of results. Evidence analysis was performed using the "Quality Assessment Tool for Quantitative Studies" scale. A total of 99 articles were extracted for full reading, but only 10 were integrated into the final sample. Most of the included articles (n=8) were classified with a "weak" level of evidence. Agreement between observers on which studies to include was very high. The results of the studies associate the primary intervention of SLT with myofunctional therapy. The most widely described intervention strategies are thermotherapy, relaxation, massage therapy, myotherapy, and functional training of oral functions, although their methodology and application details are not fully specified in the literature. The use of laser and electrostimulation in SLT is starting to be explored as a prior approach to intervention, but its effectiveness is not yet firmly established. The team intervention is described as fundamental for a successful TMD intervention. The role of SLT in TMD is beginning to be described and valued, however, the criteria for choosing best practices and their effects are not yet fully described and verified in the literature.
Keywords: Speech and language intervention; Myofunctional therapy; Rehabilitation; Temporomandibular Joint Disorders.

ENG El efecto de la intervención logopédica en adultos con Trastorno Temporomandibular: una revisión sistemática

ES **Resumen:** Los trastornos temporomandibulares (TTM) se consideran la segunda patología musculoesquelética más común. El propósito de esta revisión es evaluar sistemáticamente el papel de la logopedia en adultos con TTM. Se realizó una búsqueda en las bases de datos PubMed-Central, ScienceDirect, Scielo y Academic Search Complete (EBSCOHost). La búsqueda fue realizada de forma independiente por dos investigadores, considerando los estudios primarios sin límite de tiempo evaluados de forma independiente en cuanto a cribado, selección y duplicación de resultados. El análisis de la evidencia se realizó mediante la escala "Quality Assessment Tool for Quantitative Studies". Se extrajeron 99 artículos pero sólo 10 se integraron en la muestra final. La mayoría de los artículos (n=8) se clasificaron con un nivel de evidencia "bajo". El índice de concordancia entre los evaluadores fue muy alto (κ=0,95). Los resultados asocian la intervención primaria del logopeda con la terapia miofuncional. Las estrategias de intervención más descritas son la termoterapia, la relajación, la masoterapia, la mioterapia y el entrenamiento funcional de las funciones orales, aunque su metodología y detalles de aplicación no están totalmente especificados en la bibliografía. El uso del láser y la electroestimulación en la logopedia está empezando a explorarse como enfoque previo a la intervención, pero su efectividad aún no está firmemente establecida. La intervención en equipo se describe como fundamental. El papel de la logopedia en el TTM está empezando a describirse y valorarse aunque los criterios para elegir las mejores prácticas y sus efectos aún no están completamente descritos en la literatura.

Palabras Clave: Intervención logopédica; Rehabilitación; Terapia miofuncional; Trastornos de la Articulación Temporomandibular.

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Introduction

Temporomandibular disorder (TMD) is described as a group of clinical conditions involving the masticatory muscles (Dias, Cavalcanti, Júnior, Pernambuco & Alves, 2022), the temporomandibular joint (TMJ) and the adjacent structures of the stomatognathic system (Dias *et al.*, 2022; Magri, Melchior, Jarina, Simonaggio & Bataglion, 2016; Sassi, Silva, Santos & Andrade, 2018), causing persistent chronic pain (Magri *et al.*, 2016), experienced for more than three months (Trindade, Cordeiro, José, Ângelo, Alves & Moura, 2021). Considering that certain functions of the stomatognathic system are altered and that its etiology is multifactorial (Sassi *et al.*, 2018) it becomes pertinent to better understand all aspects related to it in order to prevent its occurrence (Ingawalé & Goswami, 2009).

TMD encompasses a variety of clinical conditions and, therefore, multiple diagnoses that may be associated with it (Li & Leung, 2021). It can be categorized as intra-articular (within the joint) or extra-articular (in the surrounding musculature) (Gauer & Semidey, 2015). Thus, the type of TMD (muscle and/or joint), as well as the chronic factor and the generalization of pain, are variables that directly influence the impact on the quality of life (Rodrigues, Magri, Melchior & Mazzetto, 2015). Increasing age, severity, and the association of diagnoses exacerbate the overall impact of TMD (Felício, Folha, Ferreira & Medeiros, 2010). Therefore, urgent to develop precise measures for early intervention to avoid a greater degree of impairment in quality of life (Rodrigues *et al.*, 2015) and determine the impact of SLT (also named speech therapy intervention) on TMD.

One of the goals of research in TMD intervention is to precisely define the necessity and effectiveness of each applied therapeutic modality (Felício, Melchior & Silva, 2009). The existing treatments for TMD are varied, and a previous clinical diagnosis is essential (Sassi *et al.*, 2018). Depending on the severity and degree of TMD diagnosis and the affected muscles, tissues, and/or structures, three treatment possibilities exist: (i) non-invasive; (ii) minimally invasive; or (iii) invasive (Trindade *et al.*, 2021). According to the literature, and considering the multifactorial etiology, non-invasive methods should be given priority (Ingawalé & Goswami, 2009; Sassi *et al.*, 2018; Trindade *et al.*, 2021) to alleviate the reported signs and symptoms (Trindade *et al.*, 2021), and other more invasive procedures should only be considered after exhausting non-invasive options (Ingawalé & Goswami, 2009).

The literature describes several approaches that speech therapists use in TMD intervention, namely: transcutaneous electrical nerve stimulation (TENS) (Gomes & Schapochnik, 2017; Grossmann, Tambara, Grossmann & Siqueira, 2012; Sandoval-Munoz & Haidar, 2021), laser therapy (Herranz-Aparicio, Vázquez-Delgado, Arnabat-Domínguez, España-Tost & Gay-Escoda, 2013; Matos, Berretin-Felix, Bandeira, Lima, Almeida & Alves, 2018) and orofacial myofunctional therapy (OMT) (Dias *et al.*, 2022; Felício *et al.*, 2010; Felício, Melchior, Ferreira & Silva, 2008).

Occlusal splints appear as an option to correct the type of occlusion in a less traumatic way and are widely used in short-term orthodontic treatments before speech therapy intervention (Ingawalé & Goswami, 2009). This approach has been described as dependent on speech therapy (Magri *et al.*, 2018) for the reduction of symptoms, reorganization of functions, and occlusion stabilization (Martins, Aquino, Meloto & Barbosa, 2016).

Recent results in the literature demonstrate that the signs and symptoms of TMD can negatively affect the quality of life of individuals, necessitating effective intervention for the treatment or control of this dysfunction (Alves, Almeida, Cebola, Oliveira & Pezarat-Correia, 2021; Dias *et al.*, 2022). Therefore, all questions related to the intervention of this pathology and its impact on people's lives became the main focus of this study. Despite the available approaches, there is a real lack of consensus and evidence regarding the speech therapist's role in TMD. Thus, the aim was to systematically investigate the effect of the speech therapist's actions on TMD.

Methods

Research strategy

This work was registered online, following the PRISMA guidelines (Page *et al*., 2021), in the International Prospective Register of Systematic Reviews (PROSPERO), with the number *CRD42022369827*.

The search for articles was conducted independently by two researchers between February 3 and 13, 2022, using the PubMed Central, ScienceDirect, Scielo, and the following databases via EBSCOHost: CINAHL Complete, Cochrane Collection Plus, Nursing & Allied Health Collection and MedicLatina.

To minimize search bias the publication dates of articles were not restricted. The search strategy was adapted to meet the requirements of the databases (refer to Table 1 named "Search strategy used in databases") as

mentioned in the literature (Cooper, Booth, Varley-Campbell, Britten & Garside, 2018; Donato & Donato, 2019; Gupta *et al.*, 2018), which followed the guidelines of the PRESS research strategies (McGowan, Sampson, Salzwedel, Cogo, Foerster & Lefebvre, 2016).

PubMed does not have any search restrictions regarding Boolean words and operators, while ScienceDirect only allows searching with a maximum of eight Boolean operators and does not support truncation. EBSCOHost is very similar to PubMed, allowing comprehensive searching without restrictions and quick and easy export of results from different databases. All of these databases require searching in English. Alternatively, Scielo, being a Latin database, allows research in both English and Portuguese. It is also an intuitive database making it easy to export the obtained results. The selected terms were: "temporomandibular joint", "temporomandibular joint disc", "temporomandibular joint disorders", "temporomandibular joint diseases", "temporomandibular joint dysfunction", "temporomandibular joint dysfunction syndrome", "speech therapy", "myofunctional therapy", "orofacial myotherapy", "orofacial myology", "oral myotherapy", "intervention", "treatment", "therapeutics", "methods", "therapy", and "rehabilitation". The search was conducted by combining the aforementioned descriptors (MESH Terms) using Boolean operators "AND" and "OR," along with truncation and proximity operators "", and (). All synonyms used were based on the specific literature from well-known entities, such the American Speech-Language-Hearing Association (ASHA) (refer to Table 1).

Table 1 - Search strategy used in databases

Database	Results
Scielo temporomandibular AND (speech therapy) AND treatment temporomandibular AND (speech therapy) AND (intervention OR treatment OR therapeutics OR methods OR therapy OR rehabilitation)	8 17
EBSCOHost CINAHL Complete, Cochrane Collection Plus, Nursing & Allied Health Collection, and MedicLatina via EBSCOHost	12 15
PubMed Central (((((speech therapy[MeSH Terms]) OR (myofunctional therapy[MeSH Terms])) OR (myofunctional therapy*[MeSH Terms])) OR ("orofacial myology")) OR (rehabilitation[MeSH Terms])) AND ((((((disc, temporomandibular joint[MeSH Terms]) OR (temporomandibular joint[MeSH Terms])) OR (temporomandibular joint disorder[MeSH Terms])) OR (temporomandibular joint disease[MeSH Terms])) OR (temporomandibular joint dysfunction syndrome[MeSH Terms]))) ("speech therapy"[MeSH Terms] OR "myofunctional therapy"[MeSH Terms] OR "myofunctional therapy*"[MeSH Terms] OR "orofacial myology"[All Fields] OR "rehabilitation"[MeSH Terms]) AND ("temporomandibular joint disc"[MeSH Terms] OR "temporomandibular joint"[MeSH Terms] OR "temporomandibular joint disorders"[MeSH Terms] OR "temporomandibular joint disorders"[MeSH Terms] OR "temporomandibular joint dysfunction syndrome"[MeSH Terms])	98 88
ScienceDirect temporomandibular AND "speech therapy" AND treatment ("temporomandibular joint" OR "temporomandibular joint disc" OR "temporomandibular joint disorder*" OR "temporomandibular joint diseases" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunction syndrome") AND "speech therapy" AND treatment temporomandibular AND ("speech therapy" OR intervention OR treatment OR therapeutics OR methods OR therapy OR rehabilitation)	1518 1652 1714

Selection Criteria

The sample collected considered the following inclusion and exclusion criteria described below. Inclusion criteria were: (i) articles including adult subjects of both genders with TMD; (ii) primary articles (i.e., randomized clinical trials, case-control studies, quantitative studies, and case studies) relevant to the defined objective; and (iii) articles with full accessibility. Articles written in English, Spanish, French, and Portuguese were included. Grey literature was not incorporated into the research as it is not peer-reviewed and originates from non-formal databases (Gupta *et al.*, 2018; Mahood, van Eerd & Irvin, 2014; McGowan *et al*., 2016).

Exclusion criteria applied were: (i) articles that did not include adults with TMD or included adults with TMD along with other muscle pathologies; (ii) articles that involved invasive or minimally invasive approaches for the treatment of TMD; (iii) review studies; and (iv) letters to editors, opinion articles, and other documents classified as grey literature. The inability to access the full format of the studies was also considered as an exclusion criterion.

Data Analysis

The analysis of the collected data was conducted following the PRISMA checklist in three phases: screening, data collection process, and evaluation of the quality of the studies. The entire process was meticulously recorded, as recommended (Page *et al.,* 2021), and independently performed by the two researchers. This phase was carried out autonomously by both researchers. After searching the aforementioned databases and downloading the results, they were entered into the Rayyan software (Ouzzani, Hammady, Fedorowicz & Elmagarmid, 2016). The elimination of duplicates was carried out in a double-blind mode. The subsequent selection of studies was done by reading the title and abstract of each one to validate the inclusion and

exclusion criteria. After fully reading the articles with open access, all their references were analyzed to identify possible relevant works that had not been retrieved in the online search (Donato & Donato, 2019).

From the articles included in the final sample, data were extracted using the *Critical Appraisal Skills Programme* (CASP) for the different types of studies present (Critical Appraisal Skills Programme, 2020). Considering that the quality of the systematic review depends on the quality of the included studies, this was carefully analyzed (Cooper *et al.*, 2018; Donato & Donato, 2019). The level of evidence of the quantitative studies was assessed using the *Quality Assessment Tool for Quantitative Studies* (Thomas, Ciliska, Dobbins & Micucci, 2004). The final decision of both reviewers could be weak (rated 3), moderate (rated 2), or strong (rated 1). Considering the literature, it was defined that qualitative studies would be considered a low level of evidence (Sampaio & Mancini, 2007), namely case-control studies and case studies. Their inclusion in the sample was important for the understanding and evolution of the subject under analysis, considering the limited information available, and for the formulation of future research questions. These articles were classified as level 3 (weak degree of evidence) for the aforementioned reasons.

The application of the *CASP* and the *Quality Assessment Tool for Quantitative Studies* was performed by the two researchers independently. Later, in an online meeting, the results of these applications were presented. When discrepancies occurred between reviewers in the overall rating of an article, the rating forms were compared, the reasons for the discrepancies were identified, and a consensus was reached.

Results

According to the recommended guidelines for a systematic review, a flowchart was created (Figure 1) to provide a summary of the number of studies collected, selected, evaluated, and included/excluded at each phase.

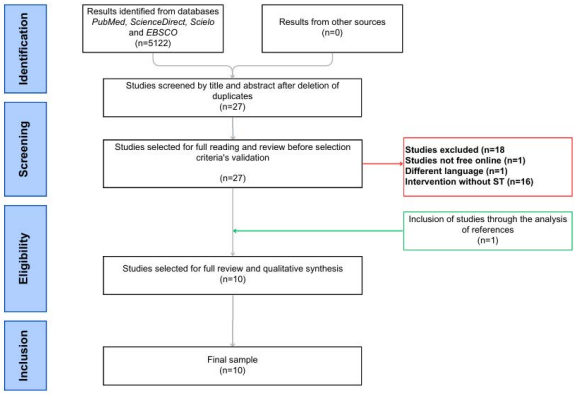

Figure 1. Flowchart of the research process and selection of studies

The summary table (Table 2) was constructed using data collected from the articles included in the sample. This table likely contains information such as study characteristics, interventions, outcomes, and other relevant data extracted from the included studies.

The *Quality Assessment Tool for Quantitative Studies* protocol by the "Effective Public Health Practice Project" (Thomas *et al.*, 2004) was used for analysis, resulting in the following findings: there were no level 1 studies, two level 2 studies, and the remaining eight studies were classified as level 3 (see Table 2).

To determine the inter-observer agreement for all studies, the *IBM Statistical Package for Social Sciences* (SPSS Statistics) software, version 27.0.1.0, 64-bit for Macbook, was used. *Kappa test* was applied and a score of 0.95 was obtained, indicating excellent agreement between the evaluators. This analysis demonstrates the rigorous approach taken to assess the quality of the included studies and the high level of agreement among the evaluators during the selection process.

Discussion

Despite the growing body of research on speech therapist intervention in TMD, there remains little consensus regarding the most effective therapeutic techniques and their benefits (Sassi *et al.*, 2018).

Dias and colleagues emphasize the significance of a multidisciplinary and personalized approach, incorporating techniques such as TENS and OMT (Dias *et al.*, 2022). Both TENS and laser therapy have been shown to facilitate the speech therapist's intervention by promoting a reduction in TMD-related pain intensity (Rodrigues-Bigaton, Almeida, Berni, Pedroni, Gonçalves & Bérzin, 2008). Grossmann and other researchers (2012) have also reported the use of TENS to alleviate pain in TMD. Similarly, another study conducted by Gomes and Schapochnik (2017) underlines the importance of applying TENS for analgesia and pain reduction in TMD before utilizing other non-invasive approaches.

In recent studies, the involvement of speech therapists in the treatment of TMD has been highlighted (Ferreira *et al.*, 2011), with OMT being the most frequently mentioned approach in the literature (Shortland, Hewat, Vertigan & Webb, 2021).

In an early study, Felício, Silva and Mazzetto (1991) examined the use of an occlusal splint in combination with OMT, administered by a speech therapist, and concluded that a multidisciplinary approach could effectively address both the symptoms and underlying causes of TMD. This study's OMT protocol includes arm and head relaxation techniques, thermotherapy applied to the TMJ and mastication muscles for five minutes, and massage therapy employing slow circular movements with some pressure, repeated four times. Additionally, specific exercises were incorporated to prepare for subsequent training of other oral functions. However, it is important to note that this article is one of the few in the literature to mention the use of cryotherapy in some cases (which were not specified) for enhanced activation of exteroceptors, despite acknowledging that cryotherapy is not recommended in the literature (Felício *et al.*, 1991).

Upon analyzing a collection of articles, there is a consensus on the techniques utilized in OMT, which align with those previously mentioned. Several studies (Alves *et al.*, 2021; Batista, Coêlho, Almeida, Spinelli-Pessoa, Vasconcelos & Alves, 2019; Felício, Freitas & Bataglion, 2007; Felício *et al.*, 2010; Machado, Mazzetto, Silva & Felício, 2016; Sassi *et al.*, 2018) mention the use of techniques to relax the masticatory muscles, head, shoulders, neck, and arms.

Regarding thermotherapy, eight articles emphasized its significance in addressing the mandible, trapezius, and neck muscles, including the sternocleidomastoid (Alves *et al.*, 2021; Batista *et al.*, 2019; Dias *et al.*, 2022; Felício *et al.*, 1991; Felício *et al.*, 2007; Ferreira *et al.*, 2011; Machado *et al.*, 2016; Sassi *et al.*, 2018). However, the duration of the thermotherapy application is either not described or varies between five minutes (Felício *et al.*, 1991) and 20 minutes (Felício *et al.*, 2007).

As for massotherapy, which involves employing slow circular movements and applying some pressure to alleviate localized pain in the TMJ and masticatory muscles, several consistent articles have been found (Alves *et al.*, 2021; Batista *et al.*, 2019; Dias *et al.*, 2022; Felício *et al*., 1991; Felício *et al*., 2007; Felício *et al.*, 2010; Ferreira *et al.*, 2011; Machado *et al.*, 2016; Sassi *et al.*, 2018). However, the exact number of movements performed and the time spent on massotherapy are not uniform across the studies or have not been explicitly reported.

The initial guidelines for individuals with TMD, along with the clarification of doubts, the provision of practical strategies, and raising awareness about the dysfunction and possible oral habits, are all described and included in OMT in various studies (Alves *et al.*, 2021; Batista *et al.*, 2019; Dias *et al.*, 2022; Felício *et al.*, 2010; Ferreira *et al.*, 2011; Machado *et al.*, 2016; Melchior, Machado, Magri & Mazzetto, 2016; Melchior, Magri & Mazzetto, 2018; Sassi *et al.*, 2018). However, a standardized script detailing what should be conveyed and how it should be done is not consistently described or shared across these studies.

Regarding myotherapy, which is also a component of OMT, there is an increasing focus on the specific muscles that should be targeted during the intervention. These muscles include those involved in mastication, such as the lips, tongue, cheeks, soft palate, and pharyngeal wall. Descriptive presentations or tables with examples of isometric and isotonic exercises have been used to illustrate the myotherapy techniques in the literature (Alves *et al.*, 2021; Batista *et al.*, 2019; Dias *et al.*, 2022; Felício *et al.*, 1991; Felício *et al.*, 2007; Felício *et al.*, 2008; Felício *et al.*, 2010; Ferreira *et al.*, 2011; Machado *et al.*, 2016; Melchior *et al.*, 2016; Melchior *et* al., 2018; Richardson, Gonzalez, Crow & Sussman, 2012; Sassi *et al.*, 2018).

Lastly, the training to balance oral functions is reported as the final phase of OMT, as it involves dependent particularities that are achieved through the application of other techniques (Alves *et al.*, 2021; Batista *et al.*, 2019; Dias *et al.*, 2022; Felício *et al.*, 2007; Felício *et al.*, 2010; Machado *et al.*, 2016; Melchior *et al.*, 2016; Melchior *et* al., 2018; Sassi *et al.*, 2018). However, the specific application method and methodology for this phase are not extensively described, except for the usage of food and the performance without pain, TMJ noises (e.g., clicking sounds, crepitus), or other symptoms (Alves *et al.*, 2021; Felício *et al.*, 2010).

Felício and other collaborators applied OMT with an occlusal splint to one case and reported a better disposition for social activities and work (Felício *et al.*, 2007). The results suggested that OMT associated with the occlusal splint could lead to positive improvements in oral functions and the treatment of TMD (Felício *et al.*, 2007).

In a subsequent study (Felício *et al.*, 2008) researchers applied OMT to adults with TMD and concluded that it had a positive effect in minimizing symptoms. Additionally, the results indicated that adults with TMD did not show improvement without any type of intervention (Felício *et al.*, 2010). Between the interventions with the occlusal splint and OMT, the results showed more improvement with OMT, similar to the previous study (Felício *et al.*, 2010). Years later, other researchers corroborated these conclusions and highlighted the importance of combining dental treatment with OMT for TMD (Melchior *et al.*, 2018). In this study, they utilized occlusal splint installation, provided guidance on practical strategies, raised awareness about the dysfunction and possible oral habits, and incorporated myotherapy and training of oral functions for all participants. The study reported a decrease in pain, reduction of pain on palpation in the masseter, anterior temporal and TMJ region, decrease in the intensity of joint noises, and more balanced chewing with more action from the masseters than from the temporal muscles (Melchior *et al.*, 2018).

In contrast, one study (Machado *et al.*, 2016) mentioned that the combination of laser with orientation and awareness, relaxation techniques, thermotherapy, massage therapy, myotherapy, and functional training of the oral functions in OMT was more effective when compared to using OMT and laser separately. Another study (Melchior *et al.*, 2016) reported a reduction in the signs and symptoms of TMD after applying analgesia with low-power laser and incorporating guidance, awareness, myotherapy, and functional training of oral functions in OMT.

Alves and colleagues (2019) supported the results mentioned above, as they observed that low-power laser enhanced muscle performance and reduced levels of fatigue. However, determining the appropriate

dosages and parameters for laser therapy remains a challenge due to conflicting information in the literature and variations in applied methodologies (Herranz-Aparicio *et al.*, 2013). Two studies (Alves *et al.*, 2021; Batista *et al.*, 2019) mentioned the application of laser bilaterally, with light contact with the skin, on five TMJ sites (lateral pole, superior, anterior, posterior, and inferior points of the condylar position), in addition to other painful sites such as the masseter, temporalis, sternocleidomastoid, and trapezius muscles. However, a study (Machado *et al.*, 2016) did not report laser application on the trapezius and sternocleidomastoid muscles, another (Melchior *et al.*, 2016) did not specify any application site.

Despite the small sample size and limited detail in data collection and processing, Batista and other researchers (2019) identified positive effects with laser treatment for TMD, as it enhanced the gains achieved through OMT. They emphasized that laser is an important resource in speech therapy, as it provides immediate analgesia and positively contributes to the adequacy of the structures and functions of the stomatognathic system. However, the authors also emphasized that OMT is fundamental in the rehabilitation of TMD and that laser therapy alone is not sufficient (Batista *et al.*, 2019). In support of this notion, another recent study (Alves *et al.*, 2021) concluded that combining both laser and OMT, applied simultaneously, potentiated the intended results in speech therapy. This combination showed benefits in terms of functional limitation, physical pain, psychological discomfort, physical/psychological/social limitation, and incapacity associated with TMD.

Previously, in a literature review on the physiology of exercises applied to orofacial motricity, the authors concluded that despite describing the exercises used, there was a lack of information regarding the frequency, duration, number of repetitions, and objectives of each exercise applied. This review highlighted the importance of providing a more detailed description of these aspects, which is still inadequate in the literature. (Ferreira *et al.*, 2011).

Sassi and colleagues (2018) reached the conclusion that protocols combining several techniques, such as OMT associated with laser or combining the occlusal splint with OMT, yielded better results compared to individual OMT. However, the most significant outcomes were observed with OMT, particularly in terms of mandibular mobility, reduction of orofacial pain, and overall improvement in the functionality of the orofacial myofunctional system. Another study conducted with adults with TMD also mentioned that laser treatment contributed to a significant improvement in pain reduction and jaw opening, as well as achieving better muscular balance when combined with exercises used in OMT (Matos *et al.*, 2018).

In general, regarding methodology, the articles in the sample consistently collected clinical information and confirmed the diagnosis before implementing interventions. The primary focus has been on attenuating or eliminating painful signs and symptoms. However, there is a lack of studies that thoroughly analyze the impact of TMD on the quality of life (Dias *et al.*, 2022). Alves and colleagues (2021) also emphasized the importance of such analysis, as the limitations caused by TMD significantly affect daily life, routines, and social interactions (Dias *et al.*, 2022).

The study conducted by Ferreira and other researchers (2011) also highlighted the scarcity of articles with control groups and small sample sizes in the literature. The use of small samples may influence the analysis of study efficiency, impact, and generalization (Lash, Fox, Maclehose, Maldonado, Mccandless & Greenland, 2014).

Overall, the most frequently advised and applied therapy for TMD appears to be a combination of laser treatment, administered by a specialist and trained speech therapist, for its analgesic effects in chronic cases (Dias *et al.*, 2022). This is often followed by OMT, which focuses on rehabilitating the functions of the stomatognathic system, leading to improved performance, reduced fatigue, increased strength gain, and muscle relaxation (Alves *et al.*, 2019). Additionally, electrostimulation, particularly the use of a TENS current, can be applied by qualified speech therapists to provide analgesia and relief from TMD symptoms (Sandoval-Munoz & Haidar, 2021). It is worth noting that despite a decline in adherence to occlusal splint treatment in recent years, it has still been reported as effective in cases of bruxism (Fornaini, Pelosi, Queirolo, Vescovi & Merigo, 2015).

Regarding research bias in the articles included in the sample, several weaknesses can be identified, leading to potential limitations and explanations for these issues:

(i) little methodological rigor and inadequate detail in describing the measurement of variables in the applied protocols, whether it is related to OMT, laser, or electrostimulation. This lack of clarity can make it challenging for other researchers to replicate the study or understand the full scope of the interventions;
(ii) insufficiently defined criteria for the methodology to be applied, particularly when it comes to different types of TMD diagnosed. Without clear and standardized criteria, it becomes challenging to compare results across studies or draw reliable conclusions;
(iii) lack of knowledge regarding the optimal time duration for applying each therapeutic approach and the number of exercise repetitions. This information is critical for ensuring the effectiveness of the interventions and for guiding clinicians in their practice;
(iv) absence of collection and recording of data from participants in a specific, detailed, and computerized manner, and preferably by an independent person. Proper data collection and recording are essential for maintaining accuracy and minimizing potential bias in the results;
(v) issues with randomization, particularly in control groups, where specific software for randomization might not have been utilized. Randomization is crucial for ensuring unbiased allocation of participants to different treatment groups;

(vi) small sample sizes that may not be representative of the broader population. Larger and more diverse samples are needed to increase the generalizability of study findings;
(vii) data analysis and processing conducted without specific software or by external and specialized individuals. Proper analysis using appropriate statistical methods and software is essential for drawing valid conclusions from the data.

It is important to highlight that the limited number of articles that met the criteria for the current review can be a constraint on the overall strength of the evidence available. More comprehensive and well-designed studies are needed to provide robust evidence on the effectiveness of different therapeutic techniques for TMD treatment and management.

Conclusion

The study's findings emphasize the significant impact of TMD as a major non-dental pain disorder worldwide. The lack of understanding about its origins, causes, and symptoms often leads to its devaluation, making it essential to share the results and conclusions of this study with the medical and therapeutic community, as well as society at large. Additionally, raising awareness about warning signs and potential consequences in case of untreated TMD is crucial to bring about a paradigm shift and promote early intervention.

The study highlights the important role of speech therapists in managing TMD of muscular origin. The main goals reported include restoring oromotor function, relieving musculoskeletal pain, and indirectly reducing inflammation. OMT emerges as the primary approach utilized by speech therapists, incorporating techniques such as thermotherapy, relaxation, massotherapy, myotherapy, and functional training of oral functions. The application of OMT has shown promise in reducing the risk of TMD aggravation, lowering pain sensitivity to muscles' palpation, and improving the range of mandibular movements, thus positively impacting oral functions. However, due to the heterogeneity of the included studies, caution is advised when interpreting these results.

The study sheds light on the speech therapist's role in TMD treatment as described in the literature. It points out that speech therapy interventions can be potentially beneficial in enhancing oralmotor functions and providing pain relief for patients with TMD. However, the lack of consistency and short-term follow-up in the studies indicates a need for further investigation into the lasting effects of these interventions.

Future studies should aim to examine the specific efficacy of individual speech therapist techniques in adult TMD interventions. Establishing the effectiveness of speech therapy in TMD requires more comprehensive research, and developing a protocol or clinical guidelines that encompass various approaches like OMT, laser, and electrostimulation would be valuable for clinical practice. Moreover, detailed information about exercise prescription, timing, and dosage is essential for replicating these interventions in the clinical setting. Large, randomized samples with meticulous methodological designs are necessary to minimize investigation bias. Studies should be adequately powered, employ valid and reliable outcome measures, and include longer follow-ups to assess lasting effects.

The study also underlines the complexity of TMD, emphasizing the significance of multidisciplinary collaboration in its clinical management.

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References

Alves, P. M. M., Almeida, A. M. C. S. de, Cebola, P. M. T. C., Oliveira, R. A. N. da S., & Pezarat-Correia, P. L. C. de. (2021). Effects of therapeutic and aerobic exercise programs in temporomandibular disorder-associated headaches. *Journal of Applied Oral Science, 29,* e20210059. https://doi.org/10.1590/1678-7757-2021-0059

Alves, V., Furlan, R., & Motta, A. (2019). Immediate effects of photobiomodulation with low-level laser therapy on muscle performance: an integrative literature review. *Revista CEFAC*, *21*(4). https://doi.org/10.1590/1982-0216/201921412019

Batista, S., Coêlho, J., Almeida, L., Spinelli-Pessoa, L., Vasconcelos, M., & Alves, G. (2019). Oral amplitude and orofacial pain in patients with temporomandibular dysfunction submitted to lasertherapia and myofunctional orofacial therapy. *Rev. bras. ciênc. saúde*, *23*(2), 85–94. https://doi.org/10.22478/ufpb.23176032.2019v23n2.48415

Cooper, C., Booth, A., Varley-Campbell, J., Britten, N., & Garside, R. (2018). Defining the process to literature searching in systematic reviews: A literature review of guidance and supporting studies. *BMC Medical Research Methodology*, *18*(1), 1–14. https://doi.org/10.1186/s12874-018-0545-3

Critical Appraisal Skills Programme. (2020). *CASP systematic review checklist.* https://casp-uk.net/casp-tools-checklists/

Dias, W., Cavalcanti, R., Júnior, H., Pernambuco, L., & Alves, G. (2022). Efeitos da fotobiomodulação associada a terapia miofuncional orofacial na qualidade de vida de indivíduos com disfunção temporomandibular. *CODAS*, *34*(5). https://doi.org/10.1590/2317-1782/20212020313

Donato, H., & Donato, M. (2019). Stages for undertaking a systematic review. *Acta Medica Portuguesa*, *32*(3), 227–235. https://doi.org/10.20344/amp.11923

Felicio, C., Freitas, R., & Bataglion, C. (2007). The effects of orofacial myofunctional therapy combined with an occlusal splint on signs and symptoms in a man with TMD-hypermobility: case study. *International Journal of Orofacial Myology*, *33*, 21–29. https://doi.org/10.52010/ijom.2007.33.1.2

Felício, C., Melchior, M., & de Silva, M. (2010). Effects of orofacial myofunctional therapy on temporomandibular disorders. *Journal of Craniomandibular Practice*, *28*(4), 249–259. https://doi.org/10.1179/crn.2010.033

Felício, C., Melchior, M., Ferreira, C., & da Silva, M. (2008). Otologic symptoms of temporomandibular disorder and effect of orofacial myofunctional therapy. *The Journal of Craniomandibular Practice*, *26*(2), 118–125. https://doi.org/10.1179/crn.2008.016

Maria de Felicio, C., de Oliveira Melchior, M., & Rodrigues Da Silva, M. A. M. (2009). Clinical Validity of the Protocol for Multi-Professional Centers for the Determination of Signs and Symptoms of Temporomandibular Disorders. Part II. *CRANIO®, 27*(1), 62–67. https://doi.org/10.1179/crn.2009.010

Felicio, C. M., Rodrigues da Silva, M. A., Mazzetto, M. O., & Centola, A. L. (1991). Myofunctional therapy combined with occlusal splint in treatment of temporomandibular joint dysfunction-pain syndrome. *Brazilian Dental Journal, 2*(1), 27–33. https://pubmed.ncbi.nlm.nih.gov/1819352/

Ferreira, T. S., Mangilli, L. D., Sassi, F. C., Fortunato-Tavares, T., Limongi, S. C. O., & Andrade, C. R. F. de. (2011). Fisiologia do exercício fonoaudiológico: uma revisão crítica da literatura. *Jornal Da Sociedade Brasileira de Fonoaudiologia, 23*(3), 288–296. https://doi.org/10.1590/s2179-64912011000300017

Fornaini, C., Pelosi, A., Queirolo, V., Vescovi, P., & Merigo, E. (2015). The "at-home LLLT" in temporo-mandibular disorders pain control: a pilot study. *Laser Therapy, 24*(1), 47–52. https://doi.org/10.5978/islsm.15-OR-06

Gauer, R. L., & Semidey, M. J. (2015). Diagnosis and Treatment of Temporomandibular Disorders. *American Family Physician, 91*(6), 378–386. https://www.aafp.org/pubs/afp/issues/2015/0315/p378.html?utm_medium=email&utm_source=transaction

Gomes, C., & Schapochnik, A. (2017). O uso terapêutico do LASER de Baixa Intensidade (LBI) em algumas patologias e sua relação com a atuação na Fonoaudiologia. *Distúrbios Da Comunicação*, *29*(3), 570. https://doi.org/10.23925/2176-2724.2017v29i3p570-578

Grossmann, E., Tambara, J. S., Grossmann, T. K., & Siqueira, J. T. T. de. (2012). O uso da estimulação elétrica nervosa transcutânea na disfunção temporomandibular. *Revista Dor, 13*(3), 271–276. https://doi.org/10.1590/s1806-00132012000300013

Gupta, S., Rajiah, P., Middlebrooks, E., Baruah, D., Carter, B., Burton, K., Chatterjee, A., & Miller, M. (2018). Systematic Review of the Literature: Best Practices. *Academic Radiology*, *25*(11), 1481–1490. https://doi.org/10.1016/j.acra.2018.04.025

Herranz-Aparicio, J., Vazquez-Delgado, E., Arnabat-Dominguez, J., Espana-Tost, A., & Gay-Escoda, C. (2013). The use of low level laser therapy in the treatment of temporomandibular joint disorders. Review of the literature. *Medicina Oral Patología Oral Y Cirugia Bucal*, e603–e612. https://doi.org/10.4317/medoral.18794

Ingawalé, S., & Goswami, T. (2009). Temporomandibular joint: Disorders, treatments, and biomechanics. *Annals of Biomedical Engineering*, *37*(5), 976–996. https://doi.org/10.1007/s10439-009-9659-4

Lash, T., Fox, M., Maclehose, R., Maldonado, G., Mccandless, L., & Greenland, S. (2014). Good practices for quantitative bias analysis. *International Journal of Epidemiology*, *43*(6), 1969–1985. https://doi.org/10.1093/ije/dyu149

Li, D., & Leung, Y. (2021). Temporomandibular Disorders: Current concepts and controversies in diagnosis and management. *Diagnostics*, *11*(459). https://doi.org/10.3390/diagnostics11030459

Machado, B., Mazzetto, M., Silva, M., & Felício, C. (2016). Effects of oral motor exercises and laser therapy on chronic temporomandibular disorders: a randomized study with follow-up. *Lasers in Medical Science*, *31*(5), 945–954. https://doi.org/10.1007/s10103-016-1935-6

Magri, L., Melchior, M., Jarina, L., Simonaggio, F., & Bataglion, C. (2016). Relationship between temporomandibular disorder symptoms signs and Burnout syndrome among dentistry students. *Revista Dor*, *17*(3), 171–177. https://doi.org/10.5935/1806-0013.20160065

Mahood, Q., van Eerd, D., & Irvin, E. (2014). Searching for grey literature for systematic reviews: Challenges and benefits. *Research Synthesis Methods*, *5*(3), 221–234. https://doi.org/10.1002/jrsm.1106

Martins, A., Aquino, L., Meloto, C., & Barbosa, C. (2016). Counseling and oral splint for conservative treatment of temporomandibular dysfunction: preliminary study. *Revista de Odontologia Da UNESP*, *45*(4), 207–213. https://doi.org/10.1590/1807-2577.28515

Matos, A., Berretin-Felix, G., Bandeira, R., Lima, J., Almeida, L., & Alves, G. (2018). Laser therapy applied to orofacial motricity: perception of members of the Brazilian Orofacial Motricity Association - Abramo. *Revista CEFAC*, *20*(1), 61–68. https://doi.org/10.1590/1982-021620182017317

McGowan, J., Sampson, M., Salzwedel, D. M., Cogo, E., Foerster, V., & Lefebvre, C. (2016). PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement. *Journal of Clinical Epidemiology, 75*(1), 40–46. https://doi.org/10.1016/j.jclinepi.2016.01.021

Melchior, M., Machado, B., Magri, L., & Mazzetto, M. (2016). Effect of speech-language therapy after low-level laser therapy in patients with TMD: a descriptive study. *CODAS*, *28*(6), 818–822. https://doi.org/10.1590/2317-1782/20162015099

Melchior, M., Magri, L., & Mazzetto, M. (2018). Orofacial myofunctional disorder, a possible complicating factor in the management of painful temporomandibular disorder: case report. *Brazilian Journal Of Pain*, *1*(1). https://doi.org/10.5935/2595-0118.20180017

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan - a web and mobile app for systematic reviews. *Journal of Biomedical Science*, *5*(1). https://doi.org/10.1186/s13643-016-0384-4

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & McGuinness, L. A. (2021). The PRISMA 2020 statement: an Updated Guideline for Reporting Systematic Reviews. *International Journal of Surgery, 88*(105906), 105906. https://doi.org/10.1016/j.ijsu.2021.105906

Richardson, K., Gonzalez, Y., Crow, H., & Sussman, J. (2012). The Effect of Oral Motor Exercises on Patients with Myofascial Pain of Masticatory System. *The New York State Dental Journal*, *78*(1), 32–37.

Rodrigues, C., Magri, L., Melchior, M., & Mazzetto, M. (2015). Evaluation of the impact on quality of life of patients with temporomandibular disorders. *Revista Dor*, *16*(3), 181–185. https://doi.org/10.5935/1806-0013.20150036

Rodrigues-Bigaton, D., Almeida, A., Berni, K., Pedroni, C., Gonçalves, R., & Bérzin, F. (2008). Use of different electrical stimulations for treating pain in women with temporomandibular disorders. *Brazilian Journal of Physical Therapy, 12*(6), 476–481. https://doi.org/10.1590/s1413-35552008005000004

Sampaio, R., & Mancini, M. (2007). Estudos de revisão sistemática: um guia para síntese criteriosa da evidência científica. *Revista Brasileira de Fisioterapia, 11*(1), 83–89. https://doi.org/10.1590/s1413-35552007000100013

Sandoval-Munoz, C., & Haidar, Z. (2021). Neuro-Muscular Dentistry: the “diamond” concept of electro-stimulation potential for stomatognathic and oro-dental conditions. *Head and Face Medicine*, *17*(2). https://doi.org/10.1186/s13005-021-00257-3

Sassi, F., Silva, A., Santos, R., & Andrade, C. (2018). Tratamento para disfunções temporomandibulares: uma revisão sistemática. *Audiology - Communication Research*, *23*(0). https://doi.org/10.1590/2317-6431-2017-1871

Shortland, H.-A., Hewat, S., Vertigan, A., & Webb, G. (2021). Orofacial Myofunctional Therapy and Myofunctional Devices Used in Speech Pathology Treatment: A Systematic Quantitative Review of the Literature. *American Journal of Speech-Language Pathology*, *30*(1), 301–317. https://doi.org/10.1044/2020_AJSLP-20-00245

Thomas, B. H., Ciliska, D., Dobbins, M., & Micucci, S. (2004). A Process for Systematically Reviewing the Literature: Providing the Research Evidence for Public Health Nursing Interventions. *Worldviews on Evidence-Based Nursing, 1*(3), 176–184. https://doi.org/10.1111/j.1524-475x.2004.04006.x

Trindade, D., Cordeiro, R., José, H. C., Ângelo, D. F., Alves, N., & Moura, C. (2021). Biological Treatments for Temporomandibular Joint Disc Disorders: Strategies in Tissue Engineering. *Biomolecules, 11*(7), 933. https://doi.org/10.3390/biom11070933

Annex 1

Table 2 – Included studies

	Reference	Sample characteristics (age, sex and etiology)	Type of study and objectives	Sample and intervention	Main results	Level of evidence
1	Alves *et al.* (2021)	11 women with bilateral muscle TMD, mild or moderate level, aged between 25 and 55 years	RCT *single blind* study Investigate the influence of photobiomodulation associate to OMT in people with TMD.	Positive Control Group (CG): 6 women submitted to OMT associated with inactive photobiomodulation (placebo), during 12 sessions; Experimental Group (EG): 5 women submitted to OMT associated with bilateral photobiomodulation, in five regions of the TMJ and other painful sites, during 12 sessions.	Significant reduction the pain reference in both groups. Significant improvement in the opening movements, laterality and protrusion in EG and in lateral movements in the CG. Significant improvement in pain, in closing, laterality, protrusion, TMJ noise in opening/protrusion/right laterality, right TMJ noise on closing and noise in the left TMJ, in the left laterality in the EG. Significant improvement in functional limitation, physical pain, psychological discomfort, physical/psychological/ social limitation and disability in the EG. Improvement in physical pain, psychological discomfort and physical limitation in the CG. TMD treatments with photobiomodulation added to OMT enhance the results of speech therapy.	3
2	Batista, *et al.* (2019)	19 adults with muscle TMD, both sexes, aged between 18 and 60 years	RCT study Compare the effects of laser therapy and OMT in measures of oral amplitude and degree of pain in users with TMD	Experimental Group (EG): 11 adults submitted to 10 sessions of infrared laser application, associated with OMT; Control Group (CG): 8 adults submitted to 10 sessions of placebo application of infrared laser, associated with OMT.	Increase in the oral amplitude before and after laser, from the first session on the EG. The amplitude pre and post-OMT increased in the EG from the first session, and in the GC it decreased in the second. In the degree of pain, there was a significant decrease in the first laser applications only in the EG. In pre and post-OMT, the EG showed significant results from the first session, and the GC decreased only from the penultimate one. Positive effects were identified with the treatment of laser therapy for TMD, which enhances the OMT gains, increasing results.	3
3	Melchior, *et al.* (2018)	1 woman with TMD and myofunctional disorder (MD), 35 years, complaining of loud joint noises and pain in the orofacial region for 17 years	Case Study To introduce clinical association between DTM and PM and address the importance of dental therapeutic intervention and speech therapy.	Installation of occlusal splint Orofacial myofunctional therapy Occlusal splint self-management guidelines	Decreased myofascial pain. Reduction of pain on palpation in the masseter, previous temporal and TMJ region. Decrease in intensity of joint noises. More balanced chewing with more masseter action than the temporals.	3
4	Machado *et al.* (2016)	82 adults (76 women and 6 men) with TMD distributed by the 4 intervention groups and 20 adults without TMD in the control group (CG)	RCT study Investigate the effectiveness of the combination low level laser therapy (LLLT) and oromotor exercises (OM) in the treatment of TMD in comparison with OMT and LLLT, isolated. Effects of each program at two different times: T2 and T3.	Assessment in three moments: T1: beginning of the treatment; T2: after the end of the treatment; T3: three months later (follow-up). Group I (GI): LLLT + OM (n=21) Group II (GII): OMT (n=22) Group III (GIII): LLLT placebo + OM (n=21) Group IV (GIV): LLLT (n=18) Control Group (CG): without intervention (n=20)	LLLT and OM combined has more effect than isolated LLLT. Efficiency in combination of LLLT and OM in the treatment of TMD in comparison with OMT and LLLT isolated. They also concluded that LLLT combined with OM has more effect than LLLT alone.	2
5	Melchior *et al.* (2016)	5 women with muscle TMD, associated with articulate, aged between 50 and 61 years	Quantitative descriptive study Analyze the effect of OMT in the treatment of patients with TMD, after analgesia with low-level laser therapy.	Application of laser therapy. Later application of OMT during 10 to 13 sessions, 50 minutes each, one month after laser therapy.	The OMT promoted balance of orofacial functions and decrease in TMD signs and symptoms, after analgesia with low level laser therapy.	3
6	Richardson *et al.* (2012)	3 women with TMD (2 aged 28 years and 1 aged 56 years)	Quantitative descriptive study Exploring the impact of oral motor exercises on myofascial pain.	Therapeutic evaluation. Three individual sessions with application of oral motor exercises.	Oral motor exercises showed benefits in pain. They concluded that speech therapists offer a positive contribution in the treatment of TMD.	3

	Reference	Sample characteristics (age, sex and etiology)	Type of study and objectives	Sample and intervention	Main results	Level of evidence
7	Felício *et al.* (2010)	40 women with TMD aged between 13 and 68 years	RCT study Analyze the Effect of OMT in the treatment of adults with muscle and joint TMD	OMT group (T): treatment with OMT weekly for 30 days, and fortnightly up to 120 days of treatment, with the same speech therapist + home exercise program (n=10). Occlusal splint group (OS): continuous use of the splint for 15 days (except during meals and oral hygiene) and then only night use until the 45th day of treatment (n=10). Control group with symptoms (SC): initial assessment and reassessment 120 days later; without intervention (n=10). Control group without symptoms (AC): initial assessment and reassessment 120 days later; without intervention (n=10).	In the final stage improvements have been demonstrated in the intervention groups (T and OS) with advantages for the T group regarding the OS. The SC and AC groups had no significant differences in between the beginning and end of treatment. Concluded That the application of OMT: - decreases the feeling of pain to palpation in the muscles of mastication but not in TMJ; - increases the amplitude movements of the jaw; - decreases the frequency and severity of signs and symptoms. The results showed that individuals with TMD do not improve without treatment.	2
8	Felício *et al.* (2008)	28 women with TMD, average age of 31,4 years	RCT study Investigate the frequency of symptoms in TMD, the relationship between the main signs and symptoms in TMD, and the effect of OMT in frequency and severity of TMD symptoms.	OMT Group (T): 10 women submitted to the treatment of OMT, weekly for 30 days, and fortnightly until the end of, at least, 9 sessions and a maximum of 13 sessions. Control group with symptoms (CDTM): consisting of 10 women that have not been submitted to no intervention; only initial assessment and re-assessment. Control group without symptoms (C): made up of 8 women who they were not submitted to any intervention; only initial assessment and re-assessment.	In phase D (initial) they were detected positive correlations between symptoms and the palpation of the muscles and the TMJ as well as in the severity of symptoms and orofacial symptoms. No differences were detected between the T Group and the CDTM, except in palpation of the left suprahyoid muscle. The T group revealed significant differences with the C group. In the final stage the T and CDTM groups revealed differences on palpation of the masseter muscles, time and ATM, on the right and left side. In the end, the authors found significant differences in palpation of muscles and the signs and symptoms. The application of the OMT revealed positive effects in the incidence of TMD symptoms.	3
9	Felício *et al.* (2007)	1 man aged 49 years, with TMD and myofunctional disorder (MD)	Case Study Describe a case of TMD with signs of hypermobility treated with OMT and occlusal splint.	Assessment by specialist dentist and placement of occlusal splint. Assessment of signs and symptoms, orofacial structures and functions of the stomatognathic system, by a speech therapist. Start of OMT 60 days later of the placement of occlusal plate. Intervention of 50 minutes, fortnightly for two months. Therapeutic reassessment after 5 sessions of additional BMT.	Improvement of symptoms, like the buzz, elevator muscle pain and at the TMJ and muscle fatigue. After 4 months of follow-up, there was maintenance of measures jaw excursions and enhanced severity score of symptoms like buzz, TMJ pain and muscle fatigue, whose occurrence has been reported as only sporadic. The results suggest that OMT associated with occlusal splint it was effective for functional improvement of the Stomatognathic System and, consequently, for the treatment from DTM.	3
10	Felício *et al.* (1991)	19 adults with TMD	Case-Control study Investigate (i) the relationship between phonetic pattern changes and oral functions, and (ii) the etiology of the TMD.	The 19 adults were divided into two groups: - Group with occlusal splint (n=5) - Group with occlusal splint and OMT (n=14)	The use of the occlusal splint with OMT proved to be positive for changes in phonetic pattern and for oral functions, in most cases. They concluded that apply myofunctional reeducation by a speech therapist is the first step to follow in the treatment of TMD. The results suggest that a multidisciplinary approach fade both symptoms and causes of TMD.	3