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Efeitos das Placas Estabilizadoras nos Sinais e Sintomas das Disfunções Temporomandibulares de Origem Muscular: Uma Revisão Sistemática

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Lia Rosana Honnef

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Este Trabalho de Conclusão de Curso foi julgado adequado para obtenção do Título de “Cirurgiã-dentista” e aprovado em sua forma final pelo Departamento de Odontologia da Universidade Federal de Santa Catarina.

Florianópolis, 15 de Março de 2021.

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À minha família, sem os quais, jamais teria conseguido concluir esta etapa, com amor, sinceramente dedico.

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.

“Fazei tudo por Amor. Assim não há coisas pequenas: tudo é grande. A perseverança nas pequenas coisas, por Amor, é heroísmo.” (Caminho, 813)

APRESENTAÇÃO

Esta revisão sistemática foi originalmente escrita na forma de artigo na língua inglesa e será submetida ao periódico Journal of Oral & Facial Pain and Headache, em parceria com pesquisadores da Universidade Federal de Santa Catarina (UFSC): Prof.ª Dr.ª Graziela De Luca Canto, Prof.ª Dr.ª Beatriz Dulcineia Mendes de Souza, MSc Patrícia Pauletto e MSc Jéssica Conti Réus, a equipe também contou com uma pesquisadora da Universidade de Brasília (UnB): Profª. Drª. Carla Massignan, uma da Universidade de Nápoles Federico II, na Itália: Profª. Drª. Ambrosina Michelotti, e um pesquisador da Universidade de Alberta, no Canadá: Prof. Dr. Carlos Flores-Mir.

A aluna Lia Rosana Honnef foi bolsista do PIBIC durante a realização dessa pesquisa.

Este Trabalho de Conclusão de Curso será apresentado na seguinte sequência:

1. Introdução
2. Objetivos
3. Artigo científico escrito na língua inglesa
4. Considerações Finais

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RESUMO

Objetivo: Avaliar os efeitos das placas estabilizadoras nos sinais e sintomas das disfunções temporomandibulares de origem muscular em comparação com outros tratamentos. **Métodos:** Uma revisão sistemática foi conduzida por meio de pesquisa em seis bases de dados e na literatura cinzenta. A ferramenta da Colaboração Cochrane para avaliar o risco de viés em ensaios clínicos randomizados foi usada. A certeza na evidência foi determinada através do G*rading of Recommendations Assessment, Development and Evaluation*. Dois revisores independentes fizeram o processo de identificação e seleção do estudo. Uma síntese narrativa dos resultados foi realizada. **Resultados**: Finalmente, 10 ensaios clínicos randomizados foram incluídos, abrangendo 160 indivíduos tratados com placas estabilizadoras e 209 com outras intervenções, todos com diagnóstico de dor miofascial. Oito estudos investigaram a intensidade da dor espontânea, cinco a intensidade da dor à palpação, três acessaram o limiar de dor à pressão, quatro a dor durante a mastigação e três estudos investigaram a abertura bucal. As placas estabilizadoras foram tão eficazes quanto o laser de baixa potência e a terapia educacional, melhor do que o placebo e outros tipos de placas. Além disso, os tratamentos combinados com placas (por exemplo, aconselhamento e terapia manual) foram melhores do que apenas placas. Quatro estudos foram julgados como tendo baixo risco de viés, três como incerto e três como alto risco. A certeza na evidência foi considerada muito baixa para todos os desfechos. **Conclusões**: Com base em evidências de qualidade muito baixa, as placas estabilizadoras podem afetar positivamente os sinais e sintomas das disfunções temporomandibulares de origem muscular. No entanto, as placas combinadas com outras terapias podem ter efeitos ainda melhores quando comparadas com as placas sozinhas.

Palavras-Chave: sinais e sintomas, placas oclusais, revisão sistemática, disfunções da articulação temporomandibular, síndromes da dor miofascial.

ABSTRACT

Aims: To assess the effects of stabilization splints on the signs and symptoms of temporomandibular disorders of muscular origin compared to other treatments. **Methods:** A systematic review was conducted by searching for studies in six electronic databases and the gray literature. The risk of bias of the included studies was evaluated by using the Cochrane Collaboration tool. The Grading of Recommendations Assessment, Development and Evaluation approach determined the certainty of evidence. Two independent reviewers did the process of study identification and selection. A narrative synthesis of the results was performed. **Results:** Finally, ten randomized clinical trials were included, encompassing 160 subjects treated with stabilization splints and 209 with other interventions, all diagnosed with myofascial pain. Eight studies investigated spontaneous pain intensity, five pain intensity by palpation, three accessed pressure pain threshold, four pain during chewing and three studies investigated mouth opening. Stabilization splints were reported to be as effective as low-level laser and education therapy, better than placebo and other types of splints. Moreover, combined treatments with splints (e.g., counselling and manual therapy) were better than splint alone. Four studies were judged at low, three at unclear and three at high risk of bias. The certainty of cumulative evidence was considered very low for all outcomes. **Conclusion:** Based on very low quality of evidence, stabilization splints may positively affect signs and symptoms of temporomandibular disorders of muscular origin. However, splints combined with other therapies may improve the positive effects compared to splint therapy alone.

Keywords: signs and symptoms, occlusal splints, systematic review, temporomandibular joint disorders, myofascial pain syndromes.

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LISTA DE ABREVIATURAS E SIGLAS

Do Inglês:

AAOP: *American Association of Orofacial Pain*

DC/TMD: *Diagnostic Criteria for Temporomandibular Disorders*

GRADE: *Grading of Recommendations Assessment, Development and Evaluation*

ICOP: *International Classification of Orofacial Pain*

MA: *Meta-Analysis*

PRISMA: *Preferred Reporting Items for Systematic Reviews*

PROSPERO: *Prospective Register of Systematic Reviews*

RCT: *Randomized Controlled Trial*

RDC/TMD: *Research Diagnostic Criteria for Temporomandibular Disorders*

RoB: *Risk of Bias*

SR: *Systematic Review*

TMD: *Temporomandibular Disorder*

TMJ: *Temporomandibular Joints*

SUMÁRIO

1 INTRODUÇÃO

As disfunções temporomandibulares (DTMs) são definidas como um grupo de condições que englobam as articulações temporomandibulares (ATMs), os músculos da mastigação e os tecidos adjacentes (DE LEEUW E KLASSER, 2018). O distúrbio funcional dos músculos mastigatórios é o problema mais comum de DTM relatado pelos pacientes (OKESON, 2007). O critério diagnóstico para DTM (DC/TMD), padrão referência para diagnóstico de dor orofacial, anteriormente conhecido como critério diagnóstico e de pesquisa para DTM (RDC/TMD), utiliza o termo mialgia para descrever a dor de origem muscular que é agravada pelos movimentos mandibulares, função ou parafunção (SCHIFFMAN *et al.*, 2014; DE LEEUW E KLASSER, 2018). Os tipos de mialgia podem ser divididos em mialgia local, dor miofascial e dor miofascial com espalhamento (SCHIFFMAN *et al.*, 2014).

As DTMs têm etiologia multifatorial, como trauma (direto, indireto e microtrauma), fatores anatômicos (relações esqueléticas e oclusais), fatores fisiopatológicos e psicossociais (DE LEEUW E KLASSER, 2018). A dor nos músculos da mastigação e outras disfunções, como restrição nos movimentos mandibulares, com dificuldade de abertura da boca, e a má oclusão aguda, são sinais e sintomas associados às DTMs de origem muscular (MCNEILL *et al.*, 1990; OKESON, 2007; MANFREDINI *et al.*, 2011).

AS DTMs de origem muscular frequentemente requerem tratamento recorrente (DE LEEUW E KLASSER, 2018), as modalidades podem incluir educação do paciente e autocuidado, terapia biocomportamental, tratamento farmacológico, fisioterapia e terapia com aparelhos ortopédicos (DE LEEUW E KLASSER, 2018). Além disso, o tratamento inicial deve ser baseado em modalidades terapêuticas conservadoras, reversíveis e fundamentadas em evidências (OKESON, 2007; GREENE, 2010). Muitas modalidades não invasivas têm se mostrado úteis no alívio dos sintomas das DTMs, embora nenhuma terapia específica tenha se mostrado uniformemente eficaz (GREENE, 2010).

Cerca de três milhões de placas são fabricadas por ano, ao custo de US $ 990 milhões apenas nos Estados Unidos (PIERCE *et al.*, 1995). Além disso, a placa estabilizadora (do tipo Michigan) é o aparelho mais comum para o manejo dos

sintomas dolorosos das DTMs musculares (OKESON, 2007; ALQUTAIBI E ABOALREJAL, 2015; ABOUELHUDA *et al.*, 2018; DE LEEUW E KLASSER, 2018). Geralmente, este tipo de placa cobre todos os dentes superiores, leva a oclusão para uma posição mais ideal, e remove qualquer instabilidade entre a oclusão e a ATM (OKESON, 2013; DE LEEUW E KLASSER, 2018).

Embora já existam revisões sistemáticas (RSs) (AL-ANI *et al.*, 2005; FRICTON *et al.*, 2010; EBRAHIM *et al.*, 2012; KUZMANOVIC PFICER *et al.*, 2017; AL-MORAISSI *et al.*, 2020; FOUDA, 2020; RILEY *et al.*, 2020; ZHANG *et al.*, 2020) sobre placas oclusais publicadas, elas apresentam algumas limitações que justificam a necessidade de aprimoramento: as estratégias de busca foram restritas, a pergunta de pesquisa foi ampla incluindo estudos heterogêneos com diferentes tipos de placas para DTMs tanto articular quanto muscular, além disso, outras terapias coadjuvantes foram utilizadas concomitantemente. Até onde sabemos, esta é a primeira RS que investigou os efeitos nos sinais e sintomas das DTMs de origem muscular, em pacientes tratados apenas com placas estabilizadoras, sem tratamentos concomitantes. Portanto, a presente RS tem como objetivo responder à seguinte questão: “Quais são os efeitos das placas estabilizadoras nos sinais e sintomas das disfunções temporomandibulares de origem muscular em comparação com outros tratamentos em adultos?”

2 OBJETIVOS

2.1 OBJETIVO GERAL

Sintetizar a evidência da literatura disponível sobre os efeitos do uso das placas estabilizadoras nos sinais e sintomas das disfunções temporomandibulares em comparação com outras intervenções.

2.2 OBJETIVOS ESPECÍFICOS

Verificar quais os efeitos das placas estabilizadoras e das outras intervenções por sinal e sintoma da disfunção temporomandibular de origem muscular (intensidade da dor espontânea, intensidade da dor à palpação, limiar de dor à pressão, dor durante a mastigação e abertura bucal);

3 ARTIGO CIENTÍFICO ESCRITO NA LÍNGUA INGLESA

Effects of Stabilization Splints on the Signs and Symptoms of Temporomandibular Disorders of Muscular Origin: A Systematic Review

Short title: Stabilization splints on symptoms of TMD

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1 | INTRODUCTION

Temporomandibular disorders (TMD) are defined as a group of conditions that affect the temporomandibular joints (TMJ), the masticatory muscles, and their surrounding tissues[1]. Functional disorders of masticatory muscle are the most common TMD problem as related by patients[2]. The diagnostic criteria for TMD (DC/TMD), the reference standard for diagnosis of orofacial pain, previously known as the research diagnostic criteria for TMD (RDC/TMD), use the term myalgia to describe the pain of muscular origin that is worsted by movements of jaw, function, or parafunction[1,3]. Myalgia can be divided into local myalgia, myofascial pain, and myofascial pain with referral[3].

The TMDs have a multifactorial etiology such as trauma (direct, indirect and microtrauma), anatomical factors (skeletal and occlusal relationships), pathophysiologic and psychosocial factors[1]. Pain in masticatory muscles and many dysfunctions, as the restriction in mandibular movements, difficult mouth opening, and significant malocclusion traits, are signs and symptoms associated with TMD of muscular origin[2,4,5].

The TMDs of muscular origin frequently require recurrent treatment[1]. Management modalities include patient education and self-management, bio-behavioural therapy, pharmacologic management, physical therapy and orthopedic appliance therapy[1]. Furthermore, the initial treatment should be with conservative, reversible and evidence-based therapeutic modalities[2,6]. Additionally, many non-invasive modalities have proven useful in relieving TMD symptoms, although no specific therapies have been proven to be uniformly effective[6].

About three million splints are fabricated per year, at the cost of $990 million in the United States[7] alone. Stabilization splint (Michigan type) is the most common appliance used to managing painful symptoms of myogenous TMD[1,2,8,9]. It covers all maxillary teeth usually, leading the occlusion to an ideal position, removing any instability between occlusion and TMJ[1,10].

Although there are previously Systematic Reviews (SRs)[11-18] on occlusal splints published, they had some limitations that support the need for an improved one: the search was not as broad as in this SR; the focus was not specific to the effects of stabilization splints on the myogenous TMD comparing with other interventions, and they included other types of splints. Moreover, the patients of the included studies used concomitant therapies, leaving a gap in the literature about the real effects of these splints compared to other treatments. To the best of our knowledge, this is the first SR that investigated the effects on signs and symptoms of TMDs of muscular origin in patients treated only with stabilization splints, without concomitant treatments. Therefore, the present SR aims to answer the following question: “What are the effects of stabilization splints used alone on the signs and symptoms of TMDs of muscular origin in adults compared to other treatments?”.

2 | MATERIALS AND METHODS

2.1 | Protocol and Registration

A SR protocol based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P)[19] was developed. This protocol was registered

at the International Prospective Register of Systematic Reviews (PROSPERO) under CRD42021240196. The PRISMA checklist was used to report this study[20].

2.2 | Eligibility Criteria

Inclusion Criteria

We included randomized clinical trials investigating the effects of stabilization splints on TMD clinical signs and symptoms of muscular origin comparing with other treatments in adults. The TMD must have been diagnosed by RDC/TMD[21], DC/TMD[3], the criteria of the American Association of Orofacial Pain (AAOP)[22] or the International Classification of Orofacial Pain (ICOP)[23]. There were no restrictions regarding the period of publication. Only articles published in the Latin (Roman) alphabet were accepted.

The acronym PICOS (Population, Intervention, Comparison, Outcomes, Study design) was used to formulate the focused question:

P: Adults (≥ 18 years old) with TMD of muscular origin;

I: The use of stabilization splint (end of treatment assessments – at least one-week follow-up);

C: Other treatment;

O: Effects on spontaneous pain intensity or by palpation, estimated with any recognized, validated pain scale: visual analogue scale (VAS), numeric rating scale (NRS), characteristic pain intensity (CPI) and symptom severity index (SSI), presence

of pain, pain pressure threshold estimated by algometry, pain during chewing and mouth opening;

S: Randomized controlled trials (RCT).

Exclusion criteria

(1) Studies in which sample includes individuals younger than 18 years old or patients with other type of TMD than muscular origin (e.g.: articular or mixed TMD), or that did not specify the type of TMD; (2) Studies that reported that sample includes individuals using concurrent medication for TMD treatment, or anxiolytic, or antidepressant, or studies that do not make clear that sample were not taking concurrent medications; (3) Studies with repeated samples; (4) Studies in which sample includes patients using TMD management approaches other than stabilization splints, or patients doing other types of treatments besides using the stabilization splints (e.g.; needling, physiotherapy); (5) Studies in which patients were not followed up for at least one week; (6) Studies in which the effects of stabilization splint on the clinical signs and symptoms of TMD of muscular origin was not reported; (7) Studies that did not investigate the outcomes of interest, or that did not provide separate outcomes by the stabilization splint type or that had insufficient data, even after trying to contact corresponding authors; (8) Studies whose authors not diagnosed TMD by RDC/TMD[21], DC/TMD[3], the criteria of AAOP[22] or ICOP[23]; (9) Quasi-experimental studies, reviews, case-reports, case-series, protocols, short communications, personal opinions, letters, posters, conference abstracts, and laboratory research; (10) Studies published in other languages than Latin (Roman) alphabet; (11) Full text not available.

2.3 | Information Sources and Search Strategy

Search strategies were developed with the help of an experienced librarian and applied on six databases: Cochrane Central Register for Controlled Trials, Embase, LILACS, PubMed, Scopus, and Web of Science. An additional search of the gray literature was performed on Google Scholar, OpenGrey, and ProQuest Dissertation and Thesis. All database searches were performed on February 4, 2021 (Appendix 1). Moreover, the reference list of included studies was hand-searched. Also, three top experts in TMD and occlusal splints, defined according to Scopus analyzed search results, were consulted by email following the recommendation of Greenhalgh and Peacock[24]. One email was sent each week for one month to try to identify additional studies. Duplicate articles were removed using reference manager software (EndNote X7 ®; Thomson Reuters, Philadelphia, PA, USA).

2.4 | Study Selection

The study selection was performed in two phases using the Rayyan® Online Software (Qatar Computing Research Institute, Qatar). In phase-1, two authors (L.R.H. and P.P.) individually screened all selected references' titles and abstracts blindly applied eligibility criteria and cross-checked the information. In phase-2, the same authors applied the eligibility to the full-text studies. A third author (J.C.R.) was consulted to decide both phases if any disagreements arise.

2.5 | Data Extraction Process and Data Items

Two authors performed the data collection from the included studies (L.R.H. and P.P.). A third author (J.C.R.) was involved if any disagreements arose. The data collection

consisted of the study characteristics (author, publication year, country, and study design), demographic features (sample size, gender, and age), clinical characteristics, as a subtype of TMD of muscular origin, method of diagnostic, signs and symptoms evaluated, follow up time, outcomes measured and its scale, main conclusions (if improvement in signs and symptoms were noted), the comparison groups and the conclusions of the study. If the required data was missing from the main text, four attempts were made over one month to contact the corresponding authors by email.

2.6 | Risk of Bias in Individual Studies and Across Studies

The risk of bias (RoB) of the included studies was evaluated by two authors (L.R.H. and P.P.) using The Cochrane Collaboration's tool for assessing the risk of bias in randomized clinical trials [25]. In cases of disagreement, a third reviewer (J.C.R.) was consulted to make a final decision. Studies were assessed according to the following: (i) low risk (bias, if present, is unlikely to alter the results seriously); (ii) unclear risk (a risk of bias that raises some doubt about the results); and (iii) high risk (bias may alter the results seriously). Figure 2 was generated using robvis, Risk-of-bias VISualization[26]. The patient blinding regarding the treatment received was the main point evaluated across studies; even though it is impossible to blind, it can generate reporting bias.

2.7 | Summary Measures

The effects of stabilization splints on the clinical signs and symptoms of TMD of muscular origin were analyzed after treatment compared with other intervention groups (considered control for this SR). The summary measurements were evaluated by mean

differences with standard deviation or standardized mean differences for continuous variables. For dichotomous data, the reported relative or absolute frequencies of patients who obtained improvement were analyzed. Furthermore, to standardize the results, the investigated outcomes were renamed when possible, to spontaneous pain intensity or by palpation, pressure pain threshold, pain during chewing and mouth opening.

2.8 | Synthesis of Results

A qualitative analysis of results based on the effects of the stabilization splints and other treatments on signs and symptoms of TMD will be performed. Meta-analyses (MA) are initially planned if the studies were homogenous in relation to the control group, TMD diagnostic, follow-up period, categorized as short (one week), medium (from one week to six months) and long (>six months), outcome measured and the used pain scale. However, it was not possible to do it.

2.9 | Confidence in Cumulative Evidence

A summary of the overall certainty of available evidence was presented, divided by groups analyzed, using "Grading of Recommendations Assessment, Development and Evaluation" (GRADE)[27]. Summary of Findings (SoF) tables were produced on GRADE online software (GRADEpro GTD, Copenhagen, Denmark). The following domains were considered: risk of bias, inconsistency, indirectness, imprecision, and publication bias.

3 | RESULTS

3.1 | Study Selection

The search in the main databases identified 5706 citations. The gray literature showed 184 citations, but none were included because the identified references were already in the main databases. After removing the duplicates, the eligibility criteria were applied in 3247 titles and abstracts. Then, 348 articles were selected for phase-2 (full-text reading), of which 338 were excluded (Appendix 2). No additional articles were found in the reference lists and by the experts. Finally, 10 articles[28-37] were included in the qualitative analyses. A flowchart summarizing the selection process is shown in Fig 1.

3.2 | Studies Characteristics

The included studies were from Asia (China[37], India[29] and Turkey[28,33,34,36]), Europe (Italy[32] and Spain[30]) and South America (Brazil[31,35]).

In our analysis, we considered “study group,” the group of patients treated with stabilization splints, regardless of whether they were called the control or case group in the primary studies. The comparison groups were treated with different interventions.

The total sample treated with stabilization splint comprised 160 patients, of which 21 (13%) were male, 95 (59.5%) female, and 44 (27.5%) patients did not have gender reported by the articles or the study did not separate genders. The total sample treated with other interventions comprised 209 patients, of which 31 (15%) were male, 111 (53%) were female, and 67 (32%) patients did not have gender reported or separated by articles. Regarding the type of TMD, all participants[28-37] had myofascial pain.

More details of the included study's characteristics are available in Table 1. Attempts were made to contact one corresponding author of the primary study[32] to acquire missing data, and the author responded.

3.3 | Risk of Bias Within Studies

Four studies were judge at low[32,35-37], three at unclear[28,31,33] and three at high RoB[29,30,34]. Figure 2 and Appendix 3 present the RoB summary and detailed information on the RoB assessment.

3.4 | Results of Individual Studies

Details of the outcomes by each study can be found in Table 3.

Altindis and Gungormus[28] evaluated the effects of stabilization splints compared to low-level laser in the treatment of myofascial pain. From 18 patients, ten used splints, considering spontaneous pain intensity measured with NRS, significant differences were observed between baseline and three months follow-up evaluation. Similar results were observed for pain intensity by palpation measured with a 0-3 scale. Both treatments were effective.

Amin, Meshramkar and Lekha[29] compared the effects of stabilization splints in 15 patients to other splints (soft and liquid) used by 30 individuals. Pain intensity by palpation, measured with a 0-3 scale, and spontaneous pain intensity measured with SSI, had improved significantly for stabilization type, which had better results in a shorter duration of time, followed by liquid and soft splints.

Espí-López et al. [30] estimated the effects of stabilization splint compared to manual therapy + splint. Of 16 patients, eight used only splints, considering spontaneous pain intensity by VAS, clinical improvement was observed, without statistical difference before and after treatment. For pain pressure threshold measured with algometry, no difference was found. The conjugated treatment showed to be more effective than splint alone.

Maracci et al. [31] investigated the therapeutic effects of stabilization splints compared to low-level placebo laser and placebo laser. Eleven patients who used splint had significant differences between baseline and followed up in the following symptoms: pain intensity by palpation estimated with RDC and spontaneous pain presence investigated. Low-level laser and placebo laser was not efficient to reduce myofascial pain.

Michelotti et al. [32] evaluated the effects of stabilization splint compared to education only. Considering the 18 patients treated with a splint, none had significant statistical differences before and after treatment, but they had improved clinically in pain during chewing by VAS and mouth opening. On the other hand, the same patients worsening in spontaneous pain intensity. Education was more effective in treating spontaneous pain intensity in 23 patients.

Oz et al. [33] investigated the effects of splints compared to low-level laser, with 20 individuals in each group. Patients that used splint improved in mouth opening, pain intensity by palpation measured with VAS and pressure pain threshold measured by algometry, with statistical significance. The low-level laser had the same effect.

Ozkan, Cakir Ozkan, and Erkorkmaz[34] compared the effects of stabilization splints in 25 patients to trigger points local anesthetic injection + splint used by the same quantity individuals. Considering spontaneous pain intensity by VAS and mouth opening, all had improved with statistical differences before and after treatment with splints. In contrast, the presence of pain during chewing had only clinical improvements. Trigger point injections combined with splints had better responses.

Santos et al. [35] investigated splints' effects on the management of myofascial pain, compared to counselling and self-care + splint, with ten patients in each group. Spontaneous pain intensity by VAS changes significantly at the splint group, while pain pressure threshold measured by algometry had slight improvement after treatment. The combined therapy had similar effects at six months period.

Yurttutan, Sancak and Tuzuner[36] compared the effects of stabilization splints in 25 patients to botulinum toxin therapy + splint (n=24) and botulinum toxin only (n=24). Considering pain intensity by palpation measured with VAS and jaw function limitation, significant differences were observed between baseline and follow-up evaluation to splint group. All treatments were beneficial to patients, although botulinum toxin therapy and combined therapies were more effective.

Zhang et al. [37] investigated stabilization splints compared to non-occluding placebo splints (only in palatal), with 18 patients in each group. In the stabilization group, patients improved clinically in spontaneous pain intensity by VAS, and in jaw function limitation, placebo splint had worse results.

3.5 | Synthesis of Results

Clinical and methodological heterogeneity across studies was considered significant (pain scales used to measure the outcomes were broad different between studies). As meta-analysis was not justifiable, a narrative synthesis was carried out considering subgroups by outcomes.

The results comparing the effects on signs and symptoms before and after treatment in both groups were presented in a graphical format in Table 3.

Spontaneous pain intensity

Five studies evaluated with VAS[30,32,34,35,37], one with SSI[29] and one with NRS[28]. The stabilization splint group had improved in a medium follow-up, except in one study[32] that patients had worsened. Moreover, in comparison with other treatments, the splint alone was less effective in treating spontaneous pain than education[32] and combined therapies (splint with manual therapy[30] or anesthesia injection[34] or counselling [35]). Still, it was better than placebo splint (non-occluding)[37] and other types of splints[29] (in a shorter duration of time, after three months, the effects were equal for all splints). Furthermore, no differences were found between the low-level laser group and splint[28]. Two studies[31,34] informed the absolute number of patients who had spontaneous pain before and after the treatment. Both studies showed that stabilization splint groups had improved. In comparison with other interventions, a splint was less effective than combined therapy[34] (splint with anesthesia injection) and better than a low-level laser[31].

Pain intensity by palpation

Two studies measured pain intensity by palpation through VAS[33,36], two by 0-3 scale[28,29] and one by RDC/TMD[31]. All patients treated with stabilization splint had improvement in pain intensity by palpation in a medium follow-up period. Comparing splint with low-level laser, both treatments were effective in two studies[28,33], and in other[31], splint had better results. Furthermore, combined therapy (splint with botulinum toxin) was better than splint alone[36], and other types of splints were not so effective than stabilization type[29] (in a shorter duration of time, after three months, the effects were equal for all splints).

Pain pressure threshold

Measured with algometry, patients treated with stabilization splint had improved in two studies[33,35] and had no differences in one[30]. Combined therapies[30,35] (splint + manual therapy or counselling) were better than splint alone to increase pain pressure threshold, and low-level laser[33] had similar effects of splinting.

Pain during chewing

Two studies measured pain during chewing by VAS[32,34] and two with jaw functional limitation scale (JFLS)[36,37]. Groups treated with stabilization splint improved. In comparison with other treatment, a splint was better than placebo splint[37] and similar to education therapy[32], moreover, was less effective than combined therapies[34,36] (splint and anesthesia injection or botulinum toxin).

Mouth opening

Measured by inter incisal distance, stabilization splint increase mouth opening in all patients, education therapy[32] and low-level laser[33] had similar effects, and combined therapy[34] (splint with anesthesia injection) was better than splint alone.

3.6 | Risk of Bias Across Studies

The main reason for downgrading the risk of bias was the non-blinding of the patients regarding the treatment received. Even it is impossible to do; a reporting bias must be considered, as the patient may suffer from external opinions regarding his treatment. In addition, the non-blinding of those who measured the outcomes also increased the bias in three studies[29,30,34].

3.7 | Certainty of Evidence

The GRADE evaluation was done according to all assessed outcomes of the included studies. A separation by subgroups was made for analysis. The certainty in cumulative evidence was considered very low for all analyzed outcomes (spontaneous pain intensity, pain intensity by palpation, pain pressure threshold, pain during chewing and mouth opening). The RoB was evaluated as serious (downgrade of 1 point) due to the patient blinding regarding the treatment received in the included studies. Even though it is impossible to blind, it can generate reporting bias. The inconsistency was very serious (-2 points) due to high clinical and methodological heterogeneity (different scales to measure the same outcome and several comparison groups), making it impossible to perform a MA. The presence of imprecision (-1 point) was considered severe, for all analyzed outcomes, attributable to small sample sizes (Guyatt et al. [38] recommend downgrading the level of evidence for outcomes with sample <400).

Furthermore, confidence intervals were broad. Publication bias was not detected due to the comprehensive search, including gray literature; moreover, the included studies were not sponsored. More information can be found in Table 2.

4 | DISCUSSION

To our knowledge, this is the first SR that included articles that only investigated the effects of stabilization splints on the signs and symptoms of TMDs of muscular origin, without concomitant treatments, and compared them to other interventions. Additionally, our search was quite broad, showing the importance of this study to guide future clinical treatment.

The stabilization splint type was the most frequently used splint, is generally made with hard acrylic[39], is 2mm thick and covers all the maxilla, with canine guidance (variations exist), and is used to treat symptoms of muscular and articular TMD[1,10]. In summary, the ten included articles[28-37] in our SR classified the TMD as myofascial pain, thought the RDC or DC/TMD, the reference standard for diagnosing orofacial pain. No study had a long follow-up period.

The pain was the primary outcome in our SR, described as pain intensity (spontaneous or palpation), pressure pain threshold, pain during chewing and mouth opening. Patients of the analyzed articles had a positive result for all outcomes related to pain, in a medium follow-up period, after treatment with stabilization splints. This result can be explained by the reduced masticatory muscles activity during sleep in the first days of stabilization splint treatment[40], after that, regular visits and adjustments of the splint's occlusal surface to compensate for maxillomandibular changes and provide a

stable physiologic posture of the mandible probably contributed to good results[1]. Other SRs[11-13,15,16,18] demonstrated a reduction in pain intensity. Still, the authors also assessed studies with other concomitant therapies besides stabilization splints (e.g., counseling), and most of them without standardized diagnostic methods of TMD (RDC or DC/TMD). The same occurred with the others. In contrast, Fouda[14] demonstrated an increase in pain intensity; however, other splints were included in MA. Due to methodological variability in the measured data of included studies in previously SRs, significant heterogeneity was noted, making it difficult to compare our findings to theirs.

Concerning mouth opening, patients had increased after the stabilization splints treatment. Any restriction of mandibular movement can be caused by extra-capsular pain, with muscular origin[2], thus, if the pain improves, the patient will gain range of motion. Other SRs[12,14,17] concluded that stabilization splints not provided significant changes in mouth opening, but again, they included concomitant therapies.

A brief conclusion was extracted from comparison groups. Two studies[28,33] showed that stabilization splints were as effective as low-level laser therapy, and two[31,37] concluded that low-level laser and/or placebo were not as effective as a splint. One study[29] infer that other splints compared to the stabilization type were not effective quickly. Combined therapies with splints (e.g., manual therapy, counselling, trigger points injections, botulin toxin) were better than splint alone in four studies[30,34-36]. Finally, one study[32] concludes that education therapy was better to reduce spontaneous pain intensity than stabilization splints; however, no differences were found for mouth opening and pain during chewing. The parafunctional habit of awake bruxism must be considered in the Michelotti *et al.* [32] study. Unlike the group that

received an education, the splint group used it only during the night and clenching teeth during the treatment period.

Additionally, it is known that clenching/grinding of teeth is a strong confounding factor. Different authors showed that daytime clenching or grinding is a significant risk factor for myofascial pain[41-45]. A previous systematic review[46] suggested a positive association between self-reported bruxism and TMD pain. This could explain why treatments with stabilization splints can fail or not be so effective; thus, if the patient has awake bruxism and does not receive instructions on avoiding bruxism during the day, TMD symptoms would increase, even if splints are used at night. In the included studies, no counseling on parafunctions was given for groups that used stabilization splints.

Based on that, stabilization splints seem to be better than placebo. Nevertheless, combined therapies showed to be even better than splint alone. Moreover, the initial treatment should be with conservative and reversible therapeutic modalities[2,6]. The stabilization splints proved to positively affect the signs and symptoms of TMD of muscular origin, although the current recommendations guide self-care as the primary treatment for TMD[1]. Combined treatment (stabilization splint and self-care) should be considered by clinicians. During the day, patients can avoid parafunctional habits with self-managing. At night, the stabilization splint reduces masticatory muscle activity.

Furthermore, the natural remission of TMD signs and symptoms must be considered. They could be transient and self-limiting, and the power of the placebo effect can contribute to an outcome improvement[34,47]. All included studies had no control group without therapy, making it impossible to determine other factors contributing to good

results[34,36]. Only two studies[31,37] had a placebo group, and the conclusions were that stabilizations splints were more effective in treating myofascial pain, although some patients with improvements in placebo groups.

Studies suggested that reevaluation of patients who did not show a positive response after four weeks should be done; moreover, other variables have to be investigated, such as chronic pain behavior, comorbidities, systemic disease, misdiagnosis and non-compliance of the patient[1,39]. Chronic pain has a component of the central nervous system. Thus, it is more challenging to manage than acute pain[2]. The clinician must differentiate muscle disorders to apply the correct treatment[2]. Multiple factors can contribute to a chronic condition; hence, a multidisciplinary approach may be needed[1].

5 | LIMITATIONS

Some limitations of this SR should be considered. In most studies, the methodological steps were not always clear. Future studies should clarify randomization, blinding, and explanations for dropouts in the follow-up and report it in the article. The certainty of the evidence was downgraded in the RoB domain due to these lacks' information.

Furthermore, imprecision was very serious for most investigated outcomes, probably due to high clinical heterogeneity, for future studies, muscles disorders regarding it is chronic or acute, if patients have comorbidities, systemic disease, parafunctional habits, sleep or awake bruxism should be considered for a better understanding of the effects of the stabilization splints in TMD symptoms of muscular origin compared to other treatments. In addition, the follow-up period should be longer than six months in future searches.

The comparison groups were too different across studies, making it impossible to group in a MA. More studies comparing stabilization splints to other interventions are necessary, mainly with the combined therapies.

6 | CONCLUSION

Based on very low quality of evidence and in studies with a moderate-term follow-up period some preliminary suggestions are:

- Stabilization splints had positive effects on signs and symptoms of TMD of muscular origin.
- Splints combined with other therapies (e.g., counselling, manual therapy, anesthesia injection or botulinum toxin) had even better effects than splint alone on signs and symptoms of TMD of muscular origin by reducing pain intensity (spontaneous and palpation), pain during chewing, and increasing mouth opening and pressure pain threshold.

Due to the very low certainty level future studies can change the direction and magnitude of the reported suggestions.

HIGHLIGHTS

- Very low level of certainty was identified to support our suggestions.
- Stabilization splints appear to have some positive effects on signs and symptoms of temporomandibular disorders of muscular origin.
- Splints combined therapies with other therapies (counselling, manual therapy, anesthesia injection or botulinum toxin) may have better effects than stabilization splints alone.

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FIGURA 1 - Flow diagram of literature searches and selection criteria (adapted from Preferred Reporting Items for Systematic Reviews and Meta-Analysis).

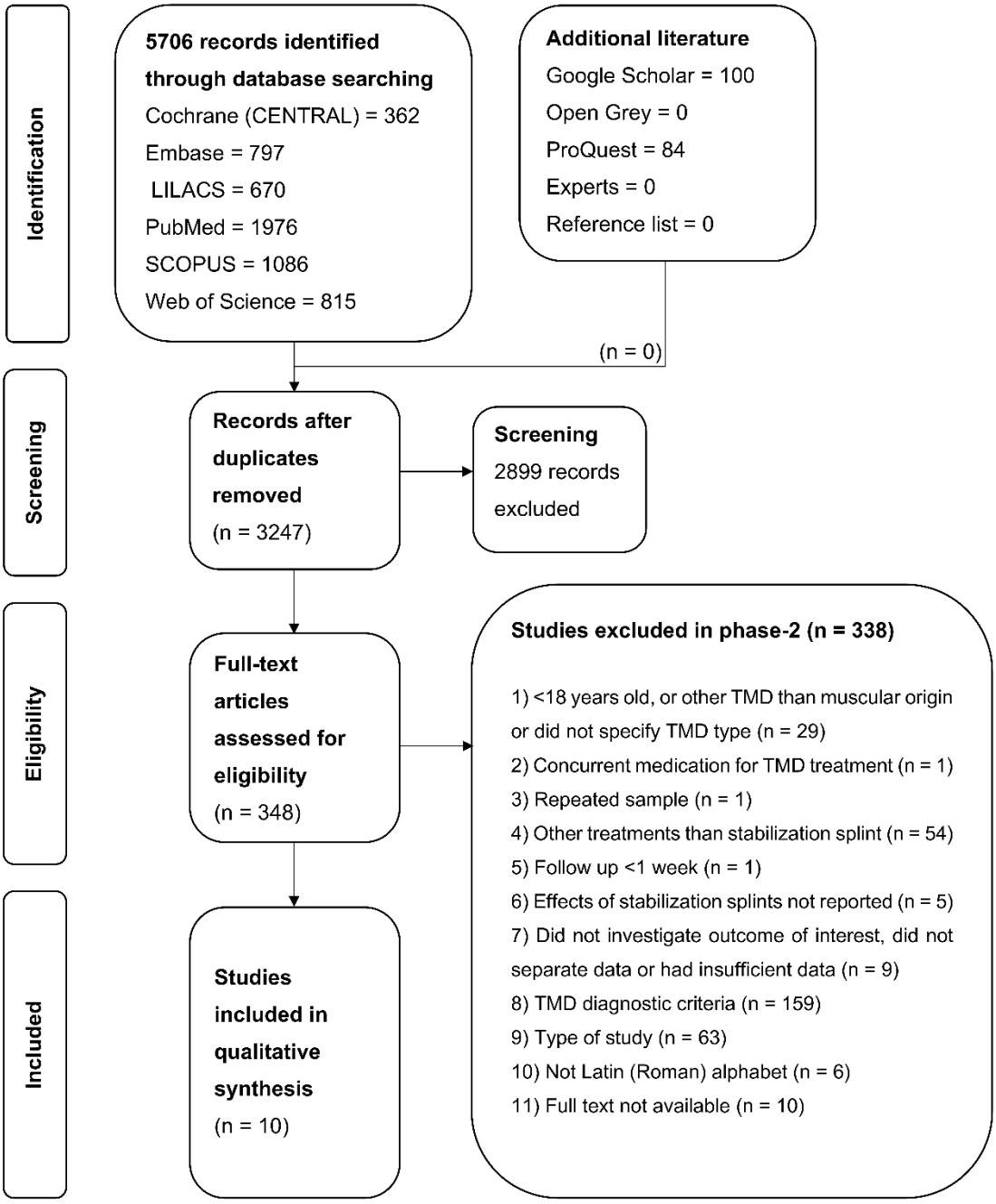


FIGURA 2 - Risk of bias summary, assessed by The Cochrane Collaboration's tool for assessing risk of bias in randomized trials: author's judgements for each included study (generated using the robvis, Risk-of-bias VISualization).

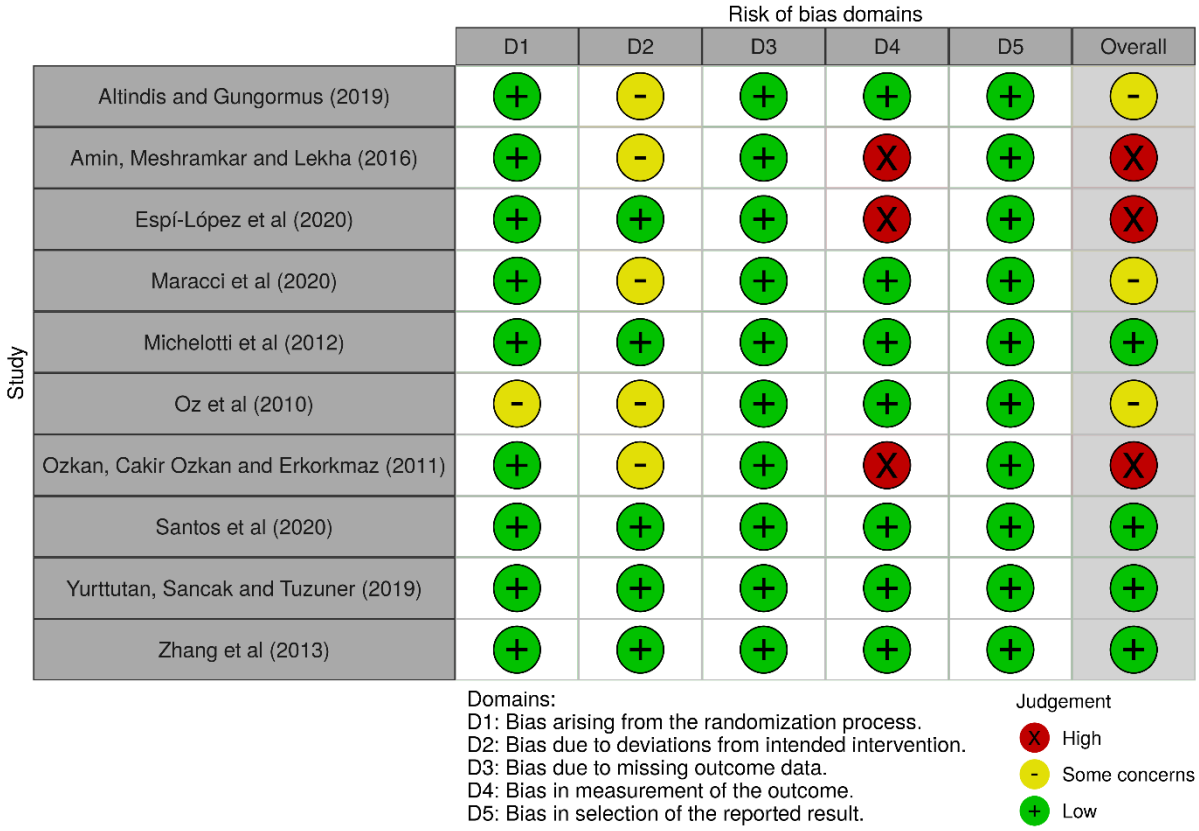


TABELA 1 - Descriptive characteristics of included randomized controlled studies (n= 10).

Author, year, country	Stabilization splint group Patients N (m/f) Age in years Mean (Range)	Comparison groups Patients N (m/f) Age in years Mean (Range)	Follow up TMD diagnostic criteria	Scale	Outcomes	Stabilization splint group Improved (+) Equal (=) Worst (-)	Comparison groups Improved (+) Equal (=) Worst (-)	RoB	Conclusions
Altindis and Gungormus, 2019, Turkey	10 (0/10) 27.8 ± 4.13	Low-level laser 8 (0/8) 28.75 ± 3.45	3m RDC/TMD	Scale (0-3) for palpation NRS (11 points) for spontaneous	Pain intensity by palpation Spontaneous pain intensity	+	+	Unclear	Both treatments modalities were found to be effective in the treatment of MP
Amin, Meshramkar and Lekha, 2016, India	15 (NR) 18-65	Soft splint 15 (NR) 18-65 Liquid splint 15 (NR) 18-65	1w; 1m; 2m; 3m RDC/TMD	Scale (0-3) for palpation Mod-SSI for spontaneous	Pain intensity by palpation Spontaneous pain intensity	+	+	High	Stabilization splints were more effective in shorter duration of time followed by liquid splints and lastly soft splints
Espí-López et al., 2020, Spain	8 (0/8) 29.8 ± 14.6	Manual therapy techniques + splint therapy 8 (3/5) 30.0 ± 11.6	1m DC/TMD	VAS (0-10) for pain intensity Algometry for PPT	Spontaneous pain intensity Pressure pain threshold	+ =	+ +	High	Manual therapy plus splint showed reduction on perceived pain and higher PPT compared to splint alone
Maracci et al., 2020, Brazil	11 (NS) NS	Low-level laser therapy 10 (NS) NS Low-level laser therapy placebo 9 (NS) NS	1m RDC/TMD	RDC/TMD for pain by palpation Question for pain presence	Pain intensity by palpation Spontaneous pain presence	+	Low-level laser (-) Placebo laser (+) +	Unclear	Stabilization splint proved to be efficient in reducing myofascial pain. The rapid low-level laser protocol was not efficient in reducing myofascial pain.

Michelotti et al., 2012, Italy	18 (5/13) 30.3 ± 11.4	Education 23 (4/19) 30.2 ± 13.0	3m RDC/TMD	Inter incisal distance VAS (0-100) for pain during chewing and pain intensity	Mouth Opening Pain During Chewing Spontaneous pain intensity	+ -	+ +	Low	Education was slightly more effective than an occlusal splint in treating spontaneous pain intensity. The treatments didn't have significantly different effects in terms of pain free mouth opening and pain during chewing
Oz et al., 2010, Turkey	20 (3/17) 34.52 ± 12.82	Low-level laser 20 (3/17) 31.25 ± 8.23	3m RDC/TMD	Inter incisal distance VAS (0-100) by palpation Algometry for PPT	Maximum assisted opening Pain intensity by palpation Pressure pain threshold	+	+	Unclear	Low-level laser therapy was as effective as an occlusal splint in the treatment of MP
Ozkan, Cakir Ozkan and Erkorkmaz, 2011, Turkey	25 (4/21) 30.36 ± 8.94	Stabilization splint + trigger points local anesthetic injection 25 (2/23) 30.4±9.22	3m RDC/TMD	Inter incisal distance VAS (0-100)	Mouth opening Spontaneous pain presence Presence of pain during chewing Spontaneous pain intensity	+	+	High	Trigger points injection therapy, in combination with splint therapy is more effective than splint therapy alone for management of TMD
Santos et al., 2020, Brazil	10 (0/10) 27 ± 4	Counseling and self-care techniques + splint 10 (0/10) 27 ± 4	1m; 3m; 6m DC/TMD	VAS (0-100) for pain intensity Algometry for PPT	Spontaneous pain intensity Pressure pain threshold	+	+	Low	Stabilization splint and combined therapies have a similar positive effect on patient´s perception of pain over a 6-month period. Both treatments reported a slightly improvement on tenderness at a short-term basis (<3m), the combined therapies presented an increased beneficial effect after 6m

Yurttutan, Sancak and Tuzuner, 2019, Turkey	25 (9/16) 31 ± 7.33	Botulinum toxin therapy 24 (9/15) 30.5 ± 9.95 Stabilization splint + botulinum toxin therapy 24 (10/14) 30.2 ± 8.63	6m RDC/TMD	VAS (0-10) by palpation JFLS	Pain intensity by palpation Jaw Function Limitation (chewing)	+	+	Low	Occlusal splint will benefit patients, although botulinum toxin therapy and combined therapies were more effective
Zhang et al., 2013, China	18 (NR) 31.4 ± 9	Placebo (non-occluding palatal splints) 18 (NR) 31.3±8.3	1m RDC/TMD	VAS (0-100) to pain intensity JFLS	Spontaneous pain intensity Jaw function limitation (chewing)	+	+	Low	Occlusal splint could eliminate or improve the signs and symptoms of TMD patients with myofascial pain

Note: (+) Signs and symptoms that had improvement after the use of the splints or other interventions; (=) No change in signs and symptoms after the use of the splints or other interventions; (-) Worsen in signs and symptoms after the use of the splints or other interventions.
Abbreviations: d, days; DC/TMD, Diagnostic Criteria for Temporomandibular Disorders; JFLS, Jaw functional limitation scale; mm, millimeters; Mod-SSI, Modified Symptom Severity Index; m, mouth; MP, myofascial pain; NR, Not Reported; NS, Not Separated; NRS, Numerical Rating Scale; PPTs, Pressure pain threshold scores; RDC/TMD, Research Diagnostic Criteria for Temporomandibular Disorders; RoB, Risk of Bias; TMJ, Temporomandibular Joint; VAS, Visual Analogue Scale; w, week.

TABELA 2. GRADE summary of findings table. Question: What are the effects of stabilization splints used alone on the signs and symptoms of temporomandibular disorders of muscular origin in adults compared to other treatments?

№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Quality
Spontaneous pain intensity							
8	randomised trials	serious †	very serious ‡	not serious	serious §	none	⊕◯◯ VERY LOW
Pain intensity by palpation							
5	randomised trials	serious †	very serious ‡	not serious	serious §	none	⊕◯◯ VERY LOW
Pain pressure threshold							
3	randomised trials	serious †	very serious ‡	not serious	serious §	none	⊕◯◯ VERY LOW
Pain during chewing							
4	randomised trials	serious †	very serious ‡	not serious	serious §	none	⊕◯◯ VERY LOW
Mouth opening							
3	randomised trials	serious †	very serious ‡	not serious	serious §	none	⊕◯◯ VERY LOW

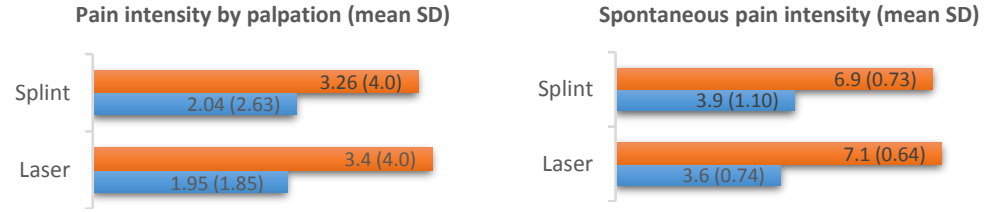
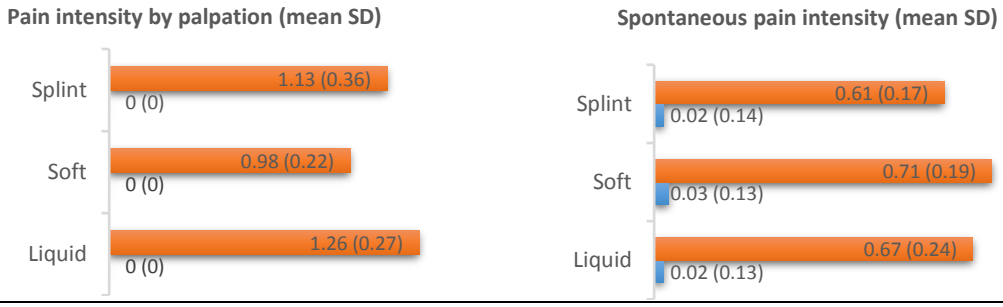
EXPLANATIONS

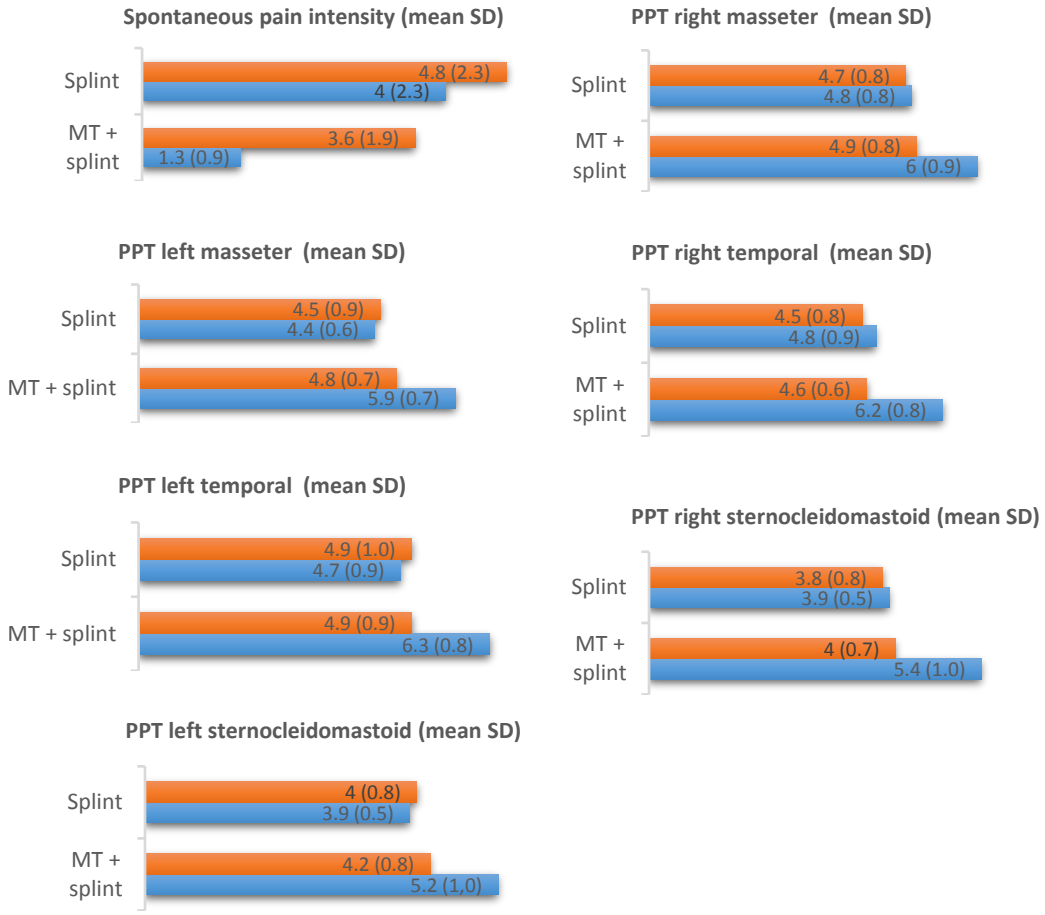
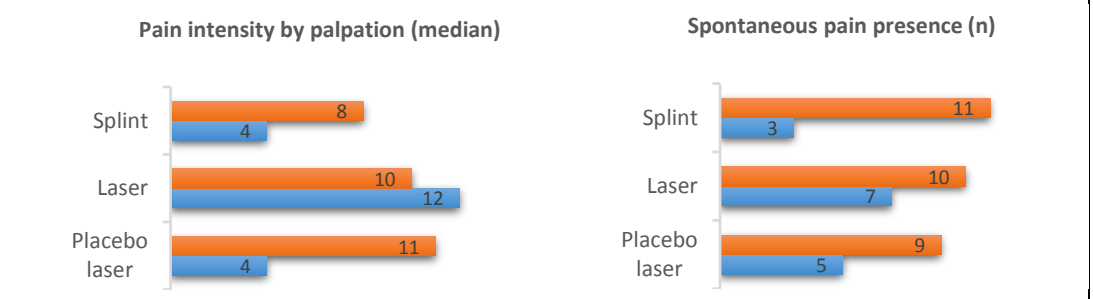
† Due to the patient blinding regarding the treatment received in the included studies, even though it is impossible to blind, it can generate reporting bias.

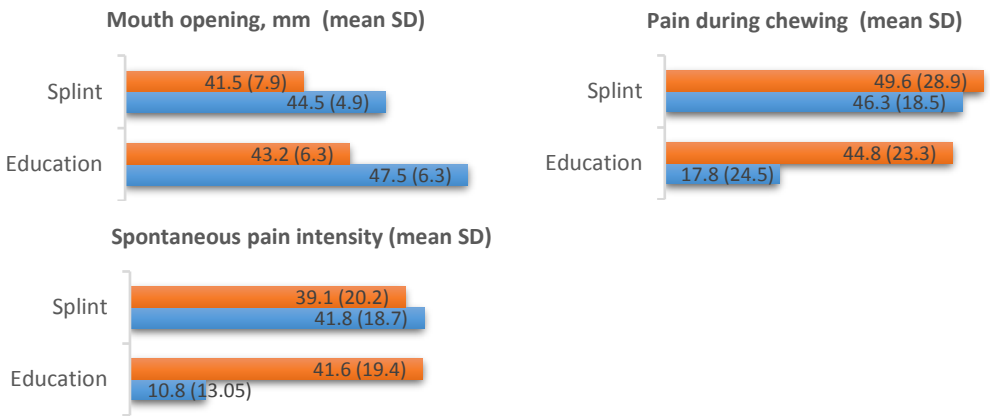
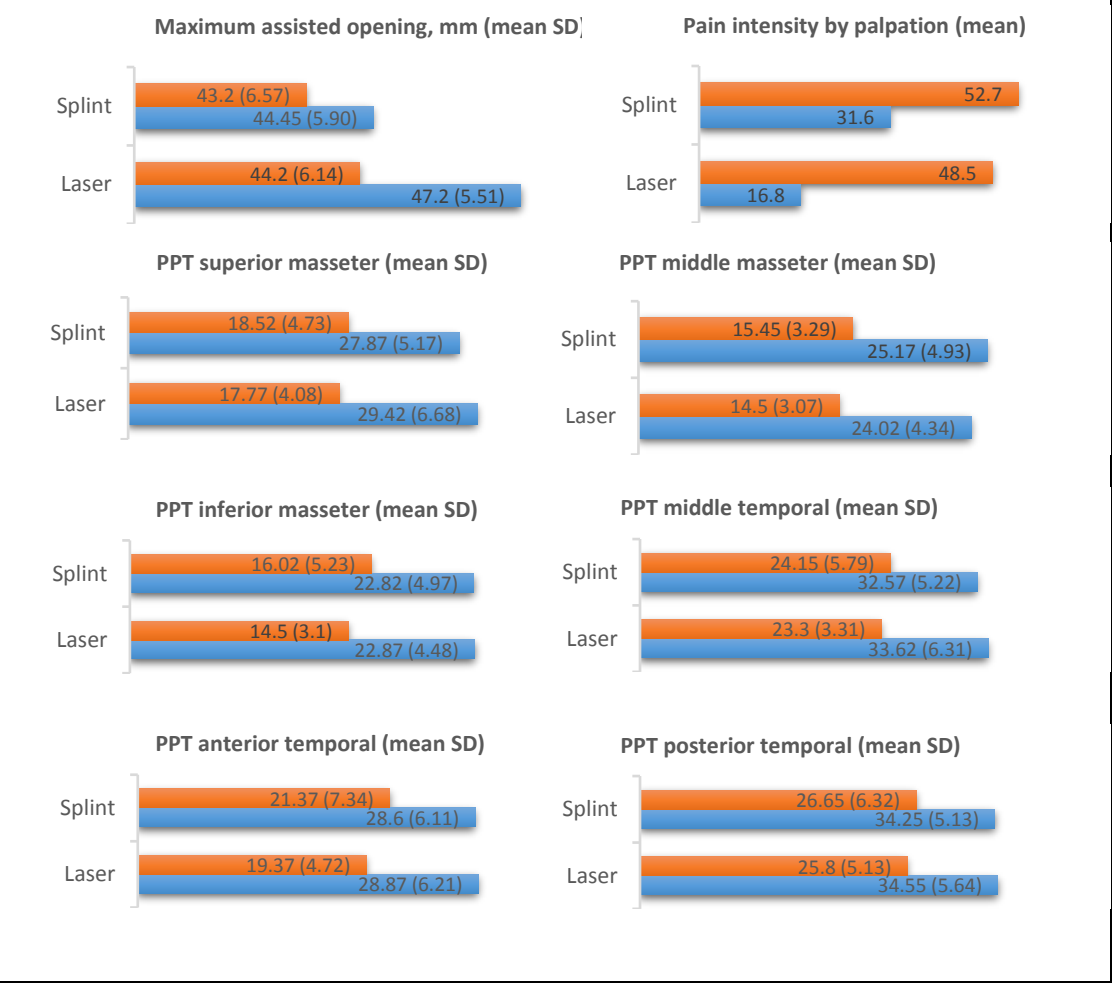
‡ High clinical and methodological heterogeneity of the included studies, due to that, a meta-analysis was not possible.

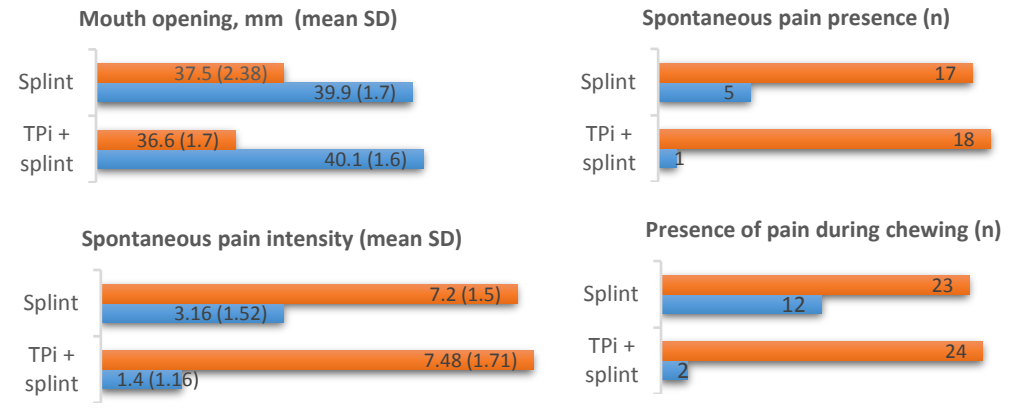
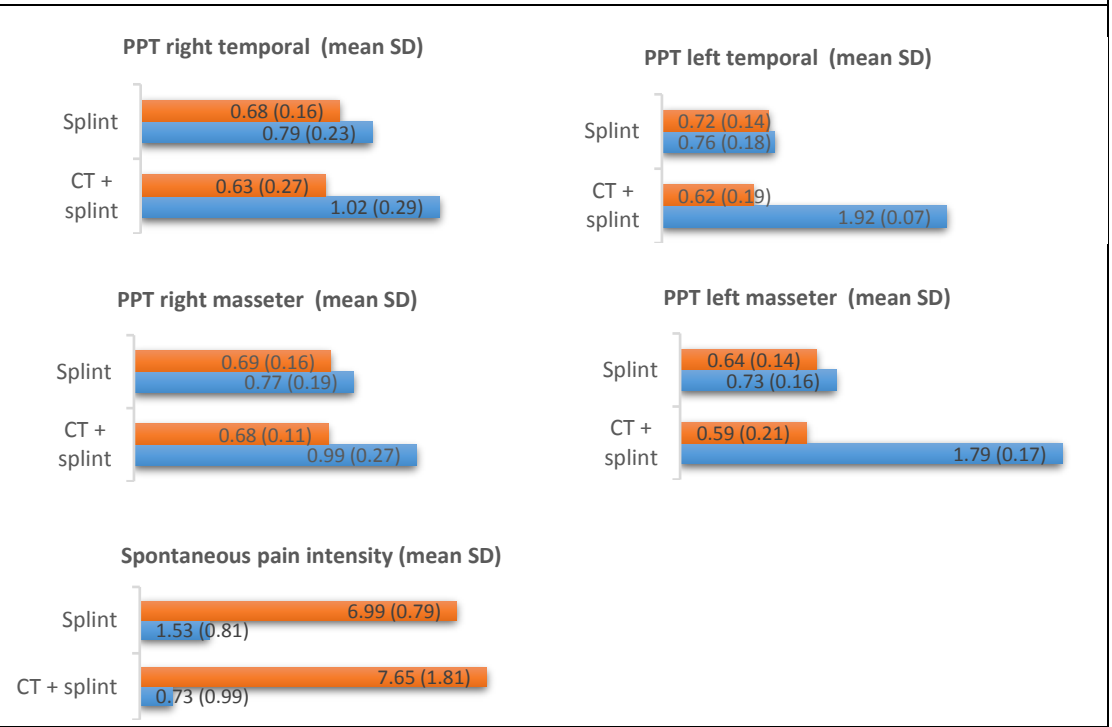
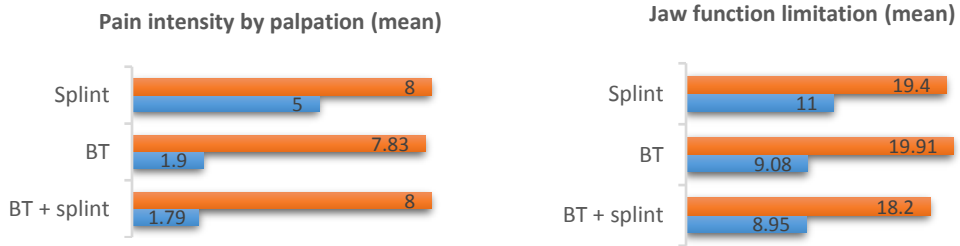
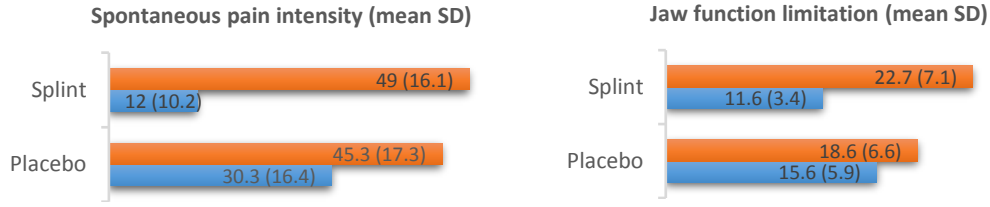
§ Sample sizes were generally small (<400). Thus, confidence intervals were broad.

TABELA 3. Graphical analysis comparing the effects before and after between study group (stabilization splint) and comparison groups (other interventions).

Author, year, country	Follow-up period	Comparison between groups
Altindis and Gungormus, 2019, Turkey	3m	
Amin, Meshramkar and Lekha, 2016, India	3m	

Espí-López et al., 2020, Spain	1m	
Maracci et al., 2020, Brazil	1m	

Michelotti et al., 2012, Italy	3m	
Oz et al., 2010, Turkey	3m	

Ozkan, Cakir Ozkan and Erkorkmaz, 2011, Turkey	3m	
Santos et al., 2020, Brazil	6m	
Yurttutan, Sancak and Tuzuner, 2019, Turkey	6m	
Zhang et al., 2013, China	1m	

Abbreviations: BT, Botulinum Toxin therapy; CT, Counseling and self-care techniques; JFLS, Jaw functional limitation scale; MT, Manual Therapy; Mod-SSI, Modified Symptom Severity Index; m, mouth; NRS, Numerical Rating Scale; PPTs, Pressure pain threshold scores; SD, standard deviation; TPi, Trigger Points anesthetic injection; VAS, Visual Analogue Scale.

APPENDIX 1 – Data Search Strategy.

Database	Search query February 4th, 2021
PubMed	#1 = ("Occlusal Splints"[MeSH Terms] OR "stabilization devices"[All Fields] OR "stabilization device"[All Fields] OR "splints"[MeSH Terms] OR "splints"[All Fields] OR splint[All Fields]OR "oral device"[All Fields] OR "oral devices"[All Fields] OR "intraoral"[All Fields] OR "night guard"[All Fields] OR "bite guard"[All Fields] OR "interocclusal appliances"[All Fields] OR "interocclusal device" OR "interocclusal devices" OR "nociceptive trigeminal inhibitory" OR "repositioning appliance") #2 = ("temporomandibular joint disorders"[MeSH Terms] OR "temporomandibular disorder" OR "temporomandibular disorders" OR "temporomandibular joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular dysfunction" OR "temporomandibular dysfunctions" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunctions" OR "Temporomandibular Joint Syndrome" OR "craniomandibular disorders"[MeSH Terms] OR "craniomandibular disorder" OR "craniomandibular disorders" OR "temporomandibular joint disease" OR "temporomandibular joint diseases" OR "TMJ disorder" OR "TMJ disorders" OR "TMJ disease" OR "TMJ diseases") #3 = #1 AND #2
SCOPUS	TITLE-ABS-KEY ("temporomandibular disorder" OR "temporomandibular disorders" OR "temporomandibular joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular dysfunction" OR "temporomandibular dysfunctions" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunctions" OR "Temporomandibular Joint Syndrome" OR "craniomandibular disorder" OR "craniomandibular disorders" OR "temporomandibular joint disease" OR "temporomandibular joint diseases" OR "TMJ disorder" OR "TMJ disorders" OR "TMJ disease" OR "TMJ diseases") AND TITLE-ABS-KEY ("stabilization devices" OR "stabilization device" OR "splints" OR splint OR "oral device" OR "oral devices" OR "intraoral" OR "night guard" OR "bite guard" OR "interocclusal appliances" OR "interocclusal device" OR "interocclusal devices" OR

	"nociceptive trigeminal inhibitory" OR "repositioning appliance") AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SUBJAREA , "DENT"))
LILACS	("stabilization devices" OR "stabilization device" OR "splints" OR splint OR "oral device" OR "oral devices" OR "intraoral" OR "night guard" OR "bite guard" OR "interocclusal appliances" OR "interocclusal device" OR "interocclusal devices" OR "nociceptive trigeminal inhibitory" OR "repositioning appliance" OR "dispositivos de estabilização" OR "dispositivo de estabilização" OR "dispositivo oral" OR "dispositivos orais" OR “dispositivo oral” OR " dispositivo intraoral" OR “dispositivos intraorais” OR "placa noturna" OR "placa de mordida" OR “placa oclusal” OR “placas oclusais” OR “placas oclusales” OR "aparelhos interoclusais" OR "dispositivo interoclusal" OR "dispositivos interoclusais" OR "inibidor nociceptivo trigeminal" OR "aparelho de reposicionamento" OR "dispositivos estabilizadores" OR "dispositivo estabilizador" OR "dispositivos orales" OR "aparatos interoclusales" OR "dispositivos interoclusales" OR "inhibidor nociceptivo del trigémino") AND ("temporomandibular disorder" OR "temporomandibular disorders" OR "temporomandibular joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular dysfunction" OR "temporomandibular dysfunctions" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunctions" OR "Temporomandibular Joint Syndrome" OR "craniomandibular disorder" OR "craniomandibular disorders" OR "temporomandibular joint disease" OR "temporomandibular joint diseases" OR "TMJ disorder" OR "TMJ disorders" OR "TMJ disease" OR "TMJ diseases" OR "desordem temporomandibular" OR "desordens temporomandibulares" OR "desordem da articulação temporomandibular" OR "desordens da articulação temporomandibular" OR "disfunção temporomandibular" OR "disfunções temporomandibulares" OR "disfunção da articulação temporomandibular" OR "disfunções da articulação temporomandibular" OR "síndrome da articulação temporomandibular" OR "desordem craniomandibular" OR "desordens craniomandibulares" OR "doença da articulação temporomandibular" OR "doenças da articulação temporomandibular" OR

	"distúrbio da ATM" OR "distúrbios da ATM" OR "doença da ATM" OR "doenças da ATM" OR "disfunção da ATM" OR "disfunções da ATM" OR "DTM" OR "trastorno temporomandibular" OR "trastornos temporomandibulares" OR "trastorno de la articulación temporomandibular" OR "trastornos de la articulación temporomandibular" OR "disfunción temporomandibular" OR "disfunción de la articulación temporomandibular" OR "disfunciones de la articulación temporomandibular" OR "síndrome de la articulación temporomandibular" OR "trastorno craneomandibular" OR "trastornos craneomandibulares" OR "enfermedad de la articulación temporomandibular" OR "enfermedades de la articulación temporomandibular" OR "trastorno de la ATM" OR "trastornos de la ATM" OR "Enfermedad ATM" OR "enfermedades ATM" OR "disfunción de la ATM" OR "mal funcionamiento de la ATM")
Embase	('stabilization devices':ti,ab,kw OR 'stabilization device':ti,ab,kw OR splints:ti,ab,kw OR splint:ti,ab,kw OR 'oral device':ti,ab,kw OR 'oral devices':ti,ab,kw OR intraoral:ti,ab,kw OR 'night guard':ti,ab,kw OR 'bite guard':ti,ab,kw OR 'interocclusal appliances':ti,ab,kw OR 'interocclusal device':ti,ab,kw OR 'interocclusal devices':ti,ab,kw OR 'nociceptive trigeminal inhibitory':ti,ab,kw OR 'repositioning appliance':ti,ab,kw) AND ('temporomandibular disorder':ti,ab,kw OR 'temporomandibular disorders':ti,ab,kw OR 'temporomandibular joint disorder':ti,ab,kw OR 'temporomandibular joint disorders':ti,ab,kw OR 'temporomandibular dysfunction':ti,ab,kw OR 'temporomandibular dysfunctions':ti,ab,kw OR 'temporomandibular joint dysfunction':ti,ab,kw OR 'temporomandibular joint dysfunctions':ti,ab,kw OR 'temporomandibular joint syndrome':ti,ab,kw OR 'craniomandibular disorder':ti,ab,kw OR 'craniomandibular disorders':ti,ab,kw OR 'temporomandibular joint disease':ti,ab,kw OR 'temporomandibular joint diseases':ti,ab,kw OR 'tmj disorder':ti,ab,kw OR 'tmj disorders':ti,ab,kw OR 'tmj disease':ti,ab,kw OR 'tmj diseases':ti,ab,kw)
Web of Science	(TS=("stabilization devices" OR "stabilization device" OR "splints" OR splint OR "oral device" OR "oral devices" OR "intraoral" OR "night guard" OR "bite guard" OR "interocclusal appliances" OR "interocclusal device" OR "interocclusal devices" OR "nociceptive trigeminal inhibitory" OR "repositioning appliance")) AND (TS=("temporomandibular disorder" OR "temporomandibular disorders" OR "temporomandibular joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular dysfunction" OR "temporomandibular dysfunctions" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunctions" OR "Temporomandibular Joint Syndrome" OR "craniomandibular disorder" OR

	"craniomandibular disorders" OR "temporomandibular joint disease" OR "temporomandibular joint diseases" OR "TMJ disorder" OR "TMJ disorders" OR "TMJ disease" OR "TMJ diseases"))
Cochrane Central Register for Controlled Trials	("Occlusal Splints" OR “stabilization devices" OR “stabilization device" OR "splints" OR "splints" OR splint OR "oral device" OR "oral devices" OR "intraoral" OR "night guard" OR "bite guard" OR "interocclusal appliances" OR "interocclusal device" OR "interocclusal devices" OR "nociceptive trigeminal inhibitory" OR "repositioning appliance") AND ("temporomandibular joint disorders" OR "temporomandibular disorder" OR "temporomandibular disorders" OR "temporomandibular joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular dysfunction" OR "temporomandibular dysfunctions" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunctions" OR "Temporomandibular Joint Syndrome" OR "craniomandibular disorders" OR "craniomandibular disorder" OR "craniomandibular disorders" OR "temporomandibular joint disease" OR "temporomandibular joint diseases" OR "TMJ disorder" OR "TMJ disorders" OR "TMJ disease" OR "TMJ diseases")
	Grey Literature
Google Scholar	("stabilization device" OR splint OR "oral device" OR "intraoral" OR "night guard" OR "bite guard" OR "interocclusal appliances" OR "interocclusal device" OR "repositioning appliance") AND ("temporomandibular disorder" OR "temporomandibular dysfunction" OR "temporomandibular joint disease OR "TMJ disorder" OR "TMJ disease")
Open Grey	("stabilization device" OR splint OR "oral device" OR "intraoral" OR "night guard" OR "bite guard" OR "interocclusal appliances" OR "interocclusal device" OR "repositioning appliance") AND ("temporomandibular disorder" OR "temporomandibular dysfunction" OR "temporomandibular joint disease OR "TMJ disorder" OR "TMJ disease")
Proquest Dissertations and Thesis	noft("stabilization devices" OR "stabilization device" OR "splints" OR splint OR "oral device" OR "oral devices" OR "intraoral" OR "night guard" OR "bite guard" OR "interocclusal appliances" OR "interocclusal device" OR "interocclusal devices" OR "nociceptive trigeminal inhibitory" OR "repositioning appliance") AND noft("temporomandibular disorder" OR "temporomandibular disorders" OR "temporomandibular

	joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular dysfunction" OR "temporomandibular dysfunctions" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunctions" OR "Temporomandibular Joint Syndrome" OR "craniomandibular disorder" OR "craniomandibular disorders" OR "temporomandibular joint disease" OR "temporomandibular joint diseases" OR "TMJ disorder" OR "TMJ disorders" OR "TMJ disease" OR "TMJ diseases")

APPENDIX 2 - Articles Excluded and Reasons for Exclusion (n=338).

Author	Reasons for exclusion
Greene and Laskin (1972)[1]	TMD diagnostic criteria
Horn (1973)[2]	Type of study
Jerez Manzanero (1973)[3]	TMD diagnostic criteria
Gelb and Tarte (1975)[4]	TMD diagnostic criteria
Griffin (1975)[5]	TMD diagnostic criteria
Laws (1976)[6]	Type of study
Rozencweig (1976)[7]	TMD diagnostic criteria
Shore (1976)[8]	Type of study
Nel (1978)[9]	TMD diagnostic criteria
Clark et al (1979)[10]	Type of study
Beard and Clayton (1980)[11]	TMD diagnostic criteria
Bratschko and Moser (1980)[12]	Type of study
Magnusson and Carlsson (1980)[13]	TMD diagnostic criteria
Suvin (1981)[14]	Not Latin (Roman) alphabet
Dahlstrom, Carlsson and Carlsson (1982)[15]	TMD diagnostic criteria
Keng (1982)[16]	TMD diagnostic criteria
Okeson, Kemper and Moody (1982)[17]	TMD diagnostic criteria
Lederman and Clayton (1983)[18]	TMD diagnostic criteria
Manns et al (1983)[19]	TMD diagnostic criteria
Okeson et al (1983)[20]	TMD diagnostic criteria
Allen et al (1984)[21]	TMD diagnostic criteria
Clark (1984)[22]	Type of study
Dahlstrom and Carlsson (1984)[23]	TMD diagnostic criteria
Watanabe, Sasaki and Kanuma (1984)[24]	TMD diagnostic criteria
Dahlstrom and Haraldson (1985)[25]	TMD diagnostic criteria
Kobayashi (1985)[26]	TMD diagnostic criteria
Le Bell and Kirveskari (1985)[27]	TMD diagnostic criteria
Okeson and Hayes (1986)[28]	TMD diagnostic criteria
Scholes (1986)[29]	Type of study
Solberg (1986)[30]	TMD diagnostic criteria
Bradley (1987)[31]	TMD diagnostic criteria
Lamey and Barclay (1987)[32]	TMD diagnostic criteria
Lundh (1987)[33]	TMD diagnostic criteria
Maruyama et al (1987)[34]	Not Latin (Roman) alphabet
Or (1987)[35]	TMD diagnostic criteria

Rubinoff, Gross and McCall (1987)[36]	TMD diagnostic criteria
Williamson and Sheffield Jr (1987)[37]	TMD diagnostic criteria
Chung and Lee (1988)[38]	TMD diagnostic criteria
Clark, Lanham and Flack (1988)[39]	TMD diagnostic criteria
Heuser (1988)[40]	TMD diagnostic criteria
Lundh et al (1988)[41]	TMD diagnostic criteria
Stegenga et al (1988)[42]	TMD diagnostic criteria
Wenneberg, Nystrom and Carlsson (1988)[43]	TMD diagnostic criteria
Bumann et al (1989)[44]	Type of study
Gonzalez, Tobon and Uribe (1989)[45]	TMD diagnostic criteria
Heuser (1989)[46]	TMD diagnostic criteria
Humsi et al (1989)[47]	TMD diagnostic criteria
Mori et al (1989)[48]	TMD diagnostic criteria
Tsuga et al (1989)[49]	TMD diagnostic criteria
Le Bell and Kirveskari (1990)[50]	TMD diagnostic criteria
Tallents et al (1990)[51]	TMD diagnostic criteria
Zajko, Satko and Hirjak (1990)[52]	TMD diagnostic criteria
Ferraris (1991)[53]	TMD diagnostic criteria
Gray et al (1991)[54]	Type of study
Kirk Jr (1991)[55]	TMD diagnostic criteria
Nemcovsky et al (1991)[56]	TMD diagnostic criteria
Bauer et al (1992)[57]	Not Latin (Roman) alphabet
List and Helkimo (1992)[58]	TMD diagnostic criteria
List et al (1992)[59]	TMD diagnostic criteria
Lundh et al (1992)[60]	TMD diagnostic criteria
Maeda et al (1992)[61]	TMD diagnostic criteria
Stefani (1992)[62]	TMD diagnostic criteria
Uppgaard (1992)[63]	TMD diagnostic criteria
Fried (1993)[64]	Type of study
Le Bell and Forssell (1993)[65]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Skeppar and Nilner (1993)[66]	TMD diagnostic criteria
Brown and Gaudet (1994)[67]	TMD diagnostic criteria
Dao et al (1994)[68]	TMD diagnostic criteria
De Leeuw et al (1994)[69]	TMD diagnostic criteria
Gray et al (1994)[70]	TMD diagnostic criteria
Sato et al (1994)[71]	TMD diagnostic criteria

Widmark, Haraldsson and Kahnberg (1994)[72]	Type of study
Chen, Boulton and Gage (1995)[73]	TMD diagnostic criteria
Clifford et al (1995)[74]	Type of study
Elsharkawy and Ali (1995)[75]	Full text not available
Giordani and Nóbilo (1995)[76]	Type of study
Linde, Isacsson and Jonsson (1995)[77]	TMD diagnostic criteria
Sato, Kawamura and Motegi (1995)[78]	TMD diagnostic criteria
Simmons III and Gibbs (1995)[79]	TMD diagnostic criteria
Visser, Naeije and Hansson (1995)[80]	TMD diagnostic criteria
Willis (1995)[81]	TMD diagnostic criteria
Wright, Anderson and Schulte (1995)[82]	TMD diagnostic criteria
Krogstad et al (1996)[83]	TMD diagnostic criteria
Krogstad et al (1996)[84]	TMD diagnostic criteria
Lobbezoo-Scholte et al (1996)[85]	TMD diagnostic criteria
Contin (1997)[86]	Type of study
Davies and Gray (1997)[87]	Other treatments than stabilization splint
Davies and Gray (1997)[88]	TMD diagnostic criteria
Greco et al (1997)[89]	TMD diagnostic criteria
Kurita, Kurashina and Kotani (1997)[90]	TMD diagnostic criteria
Pomeranc, Mercedes and Cardim (1997)[91]	TMD diagnostic criteria
Summer and Westesson (1997)[92]	TMD diagnostic criteria
Baldissara et al (1998)[93]	Type of study
Ekberg (1998)[94]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Ekberg et al (1998)[95]	TMD diagnostic criteria
Ekberg, Vallon and Nilner (1998)[96]	TMD diagnostic criteria
Emshoff and Bertram (1998)[97]	TMD diagnostic criteria
Oliveira (1998)[98]	Type of study
Pettengill et al (1998)[99]	TMD diagnostic criteria
Soboleva et al (1998)[100]	Effects of stabilization splints not reported
Vallon, Nilner and Soderfeldt (1998)[101]	TMD diagnostic criteria
Williamson and Rosenzweig (1998)[102]	TMD diagnostic criteria
Yap (1998)[103]	TMD diagnostic criteria
Yatani et al (1998)[104]	TMD diagnostic criteria
De Boever et al (1999)[105]	TMD diagnostic criteria
Felício et al (1999)[106]	Type of study
Magnusson and Syren (1999)[107]	Full text not available

Wassell, Adams and Kelly (1999)[108]	Type of study
Buchner (2000)[109]	Full text not available
Da Silva (2000)[110]	Type of study
Oliveira and Duarte (2000)[111]	Type of study
Patel, Hemmings and Vaughan (2000)[112]	Effects of stabilization splints not reported
Yang, Han and Zhou (2000)[113]	Other treatments than stabilization splint
Al-Saad and Akeel (2001)[114]	TMD diagnostic criteria
Bertram et al (2001)[115]	TMD diagnostic criteria
Duarte et al (2001)[116]	TMD diagnostic criteria
Magnusson, Egermark and Carlsson (2001)[117]	TMD diagnostic criteria
Maloney et al (2001)[118]	Other treatments than stabilization splint
Raphael and Marbach (2001)[119]	Other treatments than stabilization splint
Eberhard, Bantleon and Steger (2002)[120]	TMD diagnostic criteria
Ekberg and Nilner (2002)[121]	TMD diagnostic criteria
Ekberg, Vallon and Nilner (2002)[122]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Gavish et al (2002)[123]	Type of study
Hofmann et al (2002)[124]	Type of study
Kuttila et al (2002)[125]	TMD diagnostic criteria
Landulpho et al (2002)[126]	TMD diagnostic criteria
Murakami et al (2002)[127]	TMD diagnostic criteria
Stiesch-Scholz et al (2002)[128]	TMD diagnostic criteria
Bataglion et al (2003)[129]	Type of study
Casanova Rivero, López and Ramos (2003)[130]	TMD diagnostic criteria
Demirel and Saygili (2003)[131]	Full text not available
Ekberg, Vallon and Nilner (2003)[132]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Felício et al (2003)[133]	TMD diagnostic criteria
Fu et al (2003)[134]	Type of study
Raphael et al (2003)[135]	Other treatments than stabilization splint
Tecco et al (2003)[136]	TMD diagnostic criteria
Wahlund (2003)[137]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Wahlund, List and Larsson (2003)[138]	Other treatments than stabilization splint
Wong and Cheng (2003)[139]	Type of study

Babadag, Sahin and Gorgun (2004)[140]	TMD diagnostic criteria
Ekberg and Nilner (2004)[141]	TMD diagnostic criteria
Fayed et al (2004)[142]	TMD diagnostic criteria
Garino, Capurso and Garino (2004)[143]	TMD diagnostic criteria
Magnusson et al (2004)[144]	Full text not available
Wassell, Adams and Kelly (2004)[145]	TMD diagnostic criteria
Al Quran and Kamal (2005)[146]	TMD diagnostic criteria
Conti et al (2005)[147]	TMD diagnostic criteria
Jokstad, Mo and Krogstad (2005)[148]	Other treatments than stabilization splint
Owais and Glaros (2005)[149]	TMD diagnostic criteria
Schmitter et al (2005)[150]	TMD diagnostic criteria
Sima and Gil (2005)[151]	TMD diagnostic criteria
Simmons III and Gibbs (2005)[152]	TMD diagnostic criteria
Simmons III and Gibbs (2005)[153]	TMD diagnostic criteria
Stiesch-Scholz et al (2005)[154]	TMD diagnostic criteria
Tecco et al (2005)[155]	TMD diagnostic criteria
Wright et al (2005)[156]	TMD diagnostic criteria
Alencar, Mendes and Guimarães (2006)[157]	TMD diagnostic criteria
Aristeguieta et al (2006)[158]	Effects of stabilization splints not reported
Baad-Hansen et al (2006)[159]	Other treatments than stabilization splint
Conti et al (2006)[160]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Glaros, Owais and Lausten (2006)[161]	Other treatments than stabilization splint
Gomes et al (2006)[162]	TMD diagnostic criteria
Ohnuki et al (2006)[163]	TMD diagnostic criteria
Qasim (2006)[164]	TMD diagnostic criteria
Wassell, Adams and Kelly (2006)[165]	TMD diagnostic criteria
Zanatta et al (2006)[166]	TMD diagnostic criteria
Behr et al (2007)[167]	TMD diagnostic criteria
Chong (2007)[168]	Type of study
Hotta et al (2007)[169]	Type of study
Ismail et al (2007)[170]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Klasser and Greene (2007)[171]	Type of study
Mejersjo and Wenneberg (2007)[172]	Other treatments than stabilization splint
Alpaslan et al (2008)[173]	TMD diagnostic criteria
Ardehali et al (2008)[174]	TMD diagnostic criteria

Badel et al. (2008)[175]	Type of study
Bergstrom, List and Magnusson (2008)[176]	TMD diagnostic criteria
Dogu et al (2008)[177]	Not Latin (Roman) alphabet
Lindfors et al (2008)[178]	Type of study
Naikmasur et al (2008)[179]	TMD diagnostic criteria
Nilner et al (2008)[180]	Did not investigate outcome of interest, did not separate data or had insufficient data
Sagawa (2008)[181]	Type of study
Alencar and Becker (2009)[182]	Other treatments than stabilization splint
Badel et al (2009)[183]	Type of study
Badel et al (2009)[184]	Type of study
Bedi and Sharma (2009)[185]	Type of study
Giannasi and De Oliveira (2009)[186]	Type of study
Mazzeto, Hotta and Mazzetto (2009)[187]	TMD diagnostic criteria
Nilsson et al (2009)[188]	Other treatments than stabilization splint
Ré et al (2009)[189]	Type of study
Steinmetz et al (2009)[190]	TMD diagnostic criteria
Chang et al (2010)[191]	Other treatments than stabilization splint
De Felicio, De Oliveira and Da Silva (2010)[192]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Doepel et al (2010)[193]	Other treatments than stabilization splint
Giannasi and De Oliveira (2010)[194]	Type of study
Haketa et al (2010)[195]	TMD diagnostic criteria
Hirata et al (2010)[196]	Type of study
Kalamir et al (2010)[197]	Other treatments than stabilization splint
Martins-Junior et al (2010)[198]	Other treatments than stabilization splint
Mortazavi et al (2010)[199]	TMD diagnostic criteria
Rohida and Bhad (2010)[200]	TMD diagnostic criteria
Torii and Chiwata (2010)[201]	Other treatments than stabilization splint
Badel et al (2011)[202]	Follow up <1 week
Daif (2011)[203]	TMD diagnostic criteria
Gusmão et al (2011)[204]	TMD diagnostic criteria
Huang et al (2011)[205]	TMD diagnostic criteria
Inchingolo et al (2011)[206]	TMD diagnostic criteria
Kurt et al (2011)[207]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Machon, Hirjak and Lukas (2011)[208]	TMD diagnostic criteria

Madani and Mirmortazavi (2011)[209]	Other treatments than stabilization splint
Nilsson, Vallon and Ekberg (2011)[210]	Other treatments than stabilization splint
Restrepo, Medina and Patino (2011)[211]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Stoustrup et al (2011)[212]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Turcio et al (2011)[213]	Other treatments than stabilization splint
Vicente-Barrero et al (2011)[214]	TMD diagnostic criteria
Botelho et al (2012)[215]	Type of study
Broch et al (2012)[216]	TMD diagnostic criteria
Conti et al (2012)[217]	Other treatments than stabilization splint
Doepel et al (2012)[218]	Other treatments than stabilization splint
Giannasi et al (2012)[219]	Type of study
Mora et al (2012)[220]	Other treatments than stabilization splint
Nichthauser et al (2012)[221]	TMD diagnostic criteria
Niemela et al (2012)[222]	Other treatments than stabilization splint
Rehm et al (2012)[223]	TMD diagnostic criteria
Silva et al (2012)[224]	Type of study
Tavera et al (2012)[225]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Aldemir et al (2013)[226]	Effects of stabilization splints not reported
Chen et al (2013)[227]	Not Latin (Roman) alphabet
Erixon and Ekberg (2013)[228]	Full text not available
Ficnar et al (2013)[229]	Concurrent medication for TMD treatment
Goz (2013)[230]	Type of study
Katyayan et al (2013)[231]	Other treatments than stabilization splint
Kostrzewa-Janicka et al (2013)[232]	Type of study
Pita et al (2013)[233]	Did not investigate outcome of interest, did not separate data or had insufficient data
Rampello et al (2013)[234]	TMD diagnostic criteria
Soares et al (2013)[235]	TMD diagnostic criteria
Ström et al (2013)[236]	Did not investigate outcome of interest, did not separate data or had insufficient data
Villalon et al (2013)[237]	Type of study
Weggen (2013)[238]	Full text not available
Aksakalli (2014)[239]	TMD diagnostic criteria
Alajbeg, Gikic and Valentic-Peruzovic	Type of study

(2014)[240]	
Al-Rafah, Alammari and Banasr (2014)[241]	TMD diagnostic criteria
Bortoletto et al (2014)[242]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Caria et al (2014)[243]	Did not investigate outcome of interest, did not separate data or had insufficient data
Christidis et al (2014)[244]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Cordeiro et al (2014)[245]	Type of study
Demirkol et al (2014)[246]	Type of study
De Paula Gomes et al (2014)[247]	TMD diagnostic criteria
Qvintus et al (2014)[248]	Other treatments than stabilization splint
Seifeldin and Elhayes (2014)[249]	TMD diagnostic criteria
Simmons III (2014)[250]	Type of study
Stoustrup et al (2014)[251]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Troeltzsch et al (2014)[252]	TMD diagnostic criteria
Vilanova et al (2014)[253]	Type of study
Zonnenberg and Mulder (2014)[254]	Other treatments than stabilization splint
Alajbeg, Gikic and Valentic-Peruzovic (2015)[255]	Repeated sample
Alqutaibi and Aboalrejal (2015)[256]	Type of study
Attanasio et al (2015)[257]	TMD diagnostic criteria
Conti et al (2015)[258]	Other treatments than stabilization splint
Costa et al (2015)[259]	Other treatments than stabilization splint
Costa et al (2015)[260]	Effects of stabilization splints not reported
Costa et al (2015)[261]	Other treatments than stabilization splint
Gawriołek et al (2015)[262]	Other treatments than stabilization splint
Klaric et al (2015)[263]	Other treatments than stabilization splint
Nagata et al (2015)[264]	Other treatments than stabilization splint
Wahlund, Nilsson and Larsson (2015)[265]	Other treatments than stabilization splint
Ahmed et al (2016)[266]	TMD diagnostic criteria
Al-Ani et al (2016)[267]	Type of study
Baklaci (2016)[268]	Type of study
Duc, Huning and Grossi (2016)[269]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Giannakopoulos et al (2016)[270]	Other treatments than stabilization splint

Jiang et al (2016)[271]	Not Latin (Roman) alphabet
Molina-Torres et al (2016)[272]	Other treatments than stabilization splint
Nayak (2016)[273]	Type of study
Sharma and Crow (2016)[274]	Type of study
Yu and Qian (2016)[275]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Canales et al (2017)[276]	Other treatments than stabilization splint
Celakil et al (2017)[277]	TMD diagnostic criteria
Chen et al (2017)[278]	Did not investigate outcome of interest, did not separate data or had insufficient data
Devi, Verma and Gupta (2017)[279]	Other treatments than stabilization splint
Erbasar, Alpaslan and Inan (2017)[280]	Other treatments than stabilization splint
Hasegawa et al (2017)[281]	TMD diagnostic criteria
Hasegawa et al (2017)[282]	TMD diagnostic criteria
Hosgor, Bas and Celenk (2017)[283]	Other treatments than stabilization splint
Isola et al (2017)[284]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Melchior et al (2017)[285]	Type of study
Rosar et al (2017)[286]	Did not investigate outcome of interest, did not separate data or had insufficient data
Tatli et al (2017)[287]	Other treatments than stabilization splint
Taylor, Sletten and Dumont (2017)[288]	TMD diagnostic criteria
Van Grootel et al (2017)[289]	Other treatments than stabilization splint
Wahlund and Larsson (2017)[290]	Other treatments than stabilization splint
Wahlund and Larsson (2017)[291]	Other treatments than stabilization splint
Akbulut et al. (2018)[292]	Type of study
Alajbeg, Brakus and Brakus (2018)[293]	TMD diagnostic criteria
Bilici et al (2018)[294]	Other treatments than stabilization splint
Giannakopoulos et al (2018)[295]	Other treatments than stabilization splint
Haggiag and De Siqueira (2018)[296]	Type of study
Hegab et al (2018)[297]	Other treatments than stabilization splint
Huttunen et al (2018)[298]	Other treatments than stabilization splint
La Mantia, Grillo and Andaloro (2018)[299]	TMD diagnostic criteria
Michiels et al (2018)[300]	TMD diagnostic criteria
Pihut et al (2018)[301]	Other treatments than stabilization splint
Shousha, Soliman and Behiry (2018)[302]	TMD diagnostic criteria
Tanveer (2018)[303]	Type of study

Boulad et al (2019)[304]	TMD diagnostic criteria
Cebola et al (2019)[305]	Type of study
Dalewski et al (2019)[306]	TMD diagnostic criteria
De Resende et al (2019)[307]	TMD diagnostic criteria
Dordević et al (2019)[308]	Did not investigate outcome of interest, did not separate data or had insufficient data
He et al (2019)[309]	Did not investigate outcome of interest, did not separate data or had insufficient data
Huhtela (2019)[310]	TMD diagnostic criteria
Malekzadeh, Cahlin and Widmark (2019)[311]	Other treatments than stabilization splint
Martins et al (2019)[312]	Type of study
Sabu et al (2019)[313]	Full text not available
Saha et al (2019)[314]	TMD diagnostic criteria
Tolevski Meshkova (2019)[315]	Did not investigate outcome of interest, did not separate data or had insufficient data
Tonlorenzi et al (2019)[316]	Type of study
Unell et al (2019)[317]	Type of study
Vrbanović and Alajbeg (2019)[318]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Wanman and Marklund (2019)[319]	Other treatments than stabilization splint
Abbasgholizadeh, Evren and Ozkan (2020)[320]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Alajbeg et al (2020)[321]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Altaweel, Ismail and Fayad (2020)[322]	TMD diagnostic criteria
Azangoo Khiavi et al (2020)[323]	Other treatments than stabilization splint
Bergmann et al (2020)[324]	<18 years old, or other TMD than muscular origin or did not specify TMD type
De Sousa et al (2020)[325]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Figueroa, Stefanelli and Bernasconi (2020)[326]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Gerstner et al (2020)[327]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Hara et al (2020)[328]	Type of study
Incorvati et al (2020)[329]	Other treatments than stabilization splint
Kang (2020)[330]	Other treatments than stabilization splint

Krohn et al (2020)[331]	Full text not available
Lindfors, Magnusson and Ernberg (2020)[332]	Full text not available
Luki et al (2020)[333]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Melo et al (2020)[334]	TMD diagnostic criteria
Noguchi, Kashiwagi and Fukuda (2020)[335]	TMD diagnostic criteria
Sousa et al (2020)[336]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Priyadarshini et al (2021)[337]	<18 years old, or other TMD than muscular origin or did not specify TMD type
Vijayaranga et al (2021)[338]	<18 years old, or other TMD than muscular origin or did not specify TMD type

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APPENDIX 3 - Risk of Bias Table, Assessed by The Cochrane Collaboration's Tool for Assessing Risk of Bias in Randomized Trials: author's judgments for each included study (n= 10).

Unique ID	1	**Study ID**	Altindis and Gungormus (2019)[1]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	Signalling question	Response	Comments
Bias arising from the randomization process	1.1 Was the allocation sequence random?	NI	Insufficient explanations (just said that randomization was done).
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	NI	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	NI	The professional asked patients not to take medication concomitantly with TMD treatment, but they did not evaluate it afterwards.
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?		

	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?		
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	Y	
	Risk of bias judgement	**Some concerns**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	PN	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	

Overall bias	**Risk of bias judgement**	**Some concerns**	

Unique ID	2	**Study ID**	Amin, Meshramkar and Lekha (2016)[2]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to intervention…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	**Signalling question**	**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?	PY	Insufficient explanations (just said that a table randomization was done).
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	NI	Insufficient data.
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?		
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?		

	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	Y	
	Risk of bias judgement	**Some concerns**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	PY	Yes, they probably knew and this may have generated bias in the results, the way the researchers asked the question to the patient may have influenced their answer, and can influence the patient's self-perception.
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	PY	Yes, they probably knew and this may have generated bias in the results, the way the researchers asked the question to the patient may have influenced their answer, and can influence the patient's self-perception.
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	PY	
	Risk of bias judgement	**High**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	

	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**High**	

Unique ID	3	**Study ID**	Espí-López et al (2020)[3]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	**Signalling question**	**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?	Y	
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	Y	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	Y	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	N	

	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	N	
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	NA	
	Risk of bias judgement	**Low**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	PY	Yes, they probably knew and this may have generated bias in the results, the way the researchers asked the question to the patient may have influenced their answer, and can influence the patient's self-perception.
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	PY	Yes, they probably knew and this may have generated bias in the results, the way the researchers asked the question to the patient may have influenced their answer, and can influence the patient's self-perception.
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	PY	
	Risk of bias judgement	**High**	
Bias in selection of	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was	Y	

the reported result	finalized before unblinded outcome data were available for analysis?		
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**High**	

Unique ID	4	**Study ID**	Maracci et al (2020)[4]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	**Signalling question**	**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?	Y	
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	

	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	NI	Insufficient data.
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?		
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?		
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	Y	
	Risk of bias judgement	**Some concerns**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	N	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	

	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**Some concerns**	

Unique ID	5	**Study ID**	Michelotti et al (2012)[5]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	**Signalling question**	**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?	Y	
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	Y	

	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	N	
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	N	
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	NA	
	Risk of bias judgement	**Low**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	N	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	

	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**Low**	

Unique ID	6	**Study ID**	Oz et al (2010)[6]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	**Signalling question**	**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?	N	Method based on therapy data.
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	Y	
	Risk of bias judgement	**Some concerns**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	NI	The professional asked patients not to take medication concomitantly with TMD treatment, but they did not evaluate it afterwards.
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?		

	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?		
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	Y	
	Risk of bias judgement	**Some concerns**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	N	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	

Overall bias	**Risk of bias judgement**	**Some concerns**	

Unique ID	7	**Study ID**	Ozkan, Cakir Ozkan and Erkorkmaz (2011)[7]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	**Signalling question**	**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?	NI	Insufficient explanations (just said that randomization was done).
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	NI	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?		
	2.5. [If applicable:] Was there non-adherence to the assigned intervention		

	regimen that could have affected participants' outcomes?		
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	Y	
	Risk of bias judgement	**Some concerns**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	Y	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	Y	Yes, they knew and this may have generated bias in the results, can influence the patient's self-perception.
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	Y	
	Risk of bias judgement	**High**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	

Overall bias	**Risk of bias judgement**	**High**	

Unique ID	8	**Study ID**	Santos et al (2020)[8]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	Signalling question	Response	Comments
Bias arising from the randomization process	1.1 Was the allocation sequence random?	Y	
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	Y	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	N	
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	N	

	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	NA	
	Risk of bias judgement	**Low**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	N	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**Low**	

Unique ID	9	**Study ID**	Yurttutan, Sancak and Tuzuner (2019)[9]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	**Signalling question**	**Response**	**Comments**
Bias arising from the randomization process	1.1 Was the allocation sequence random?	Y	
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	Y	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	N	
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	N	
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis	NA	

	used to estimate the effect of adhering to the intervention?		
	Risk of bias judgement	**Low**	
Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	PN	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**Low**	

Unique ID	10	**Study ID**	Zhang et al (2013)[10]	**Assessor**	Honnef and Pauletto
Ref or Label		**Aim**	adhering to intervention (the 'per-protocol' effect)	**The effect of adhering to interventio n…**	occurance of non-protocol interventions; failures in implementing the intervention that could have affected the outcome; non-adherence to their assigned intervention by trial participants
Experimental	Stabilization splint	**Comparator**		**Source**	Journal article(s)
Outcome		**Results**		**Weight**	1

Domain	Signalling question	Response	Comments
Bias arising from the randomization process	1.1 Was the allocation sequence random?	Y	
	1.2 Was the allocation sequence concealed until participants were enrolled and assigned to interventions?	PY	
	1.3 Did baseline differences between intervention groups suggest a problem with the randomization process?	N	
	Risk of bias judgement	**Low**	
Bias due to deviations from intended interventions	2.1 Were participants aware of their assigned intervention during the trial?	Y	It is not possible to blind the participants and the professional, but it can generate bias. Professional can induce patient's response.
	2.2 Were carers and people delivering the interventions aware of participants' assigned intervention during the trial?	Y	
	2.3. [If applicable:] If Y/PY/NI to 2.1 or 2.2: Were important non-protocol interventions balanced across intervention groups?	Y	
	2.4. [If applicable:] Were there failures in implementing the intervention that could have affected the outcome?	N	
	2.5. [If applicable:] Was there non-adherence to the assigned intervention regimen that could have affected participants' outcomes?	N	
	2.6. If N/PN/NI to 2.3, or Y/PY/NI to 2.4 or 2.5: Was an appropriate analysis used to estimate the effect of adhering to the intervention?	NA	
	Risk of bias judgement	**Low**	

Bias due to missing outcome data	3.1 Were data for this outcome available for all, or nearly all, participants randomized?	Y	
	3.2 If N/PN/NI to 3.1: Is there evidence that result was not biased by missing outcome data?	NA	
	3.3 If N/PN to 3.2: Could missingness in the outcome depend on its true value?	NA	
	3.4 If Y/PY/NI to 3.3: Is it likely that missingness in the outcome depended on its true value?	NA	
	Risk of bias judgement	**Low**	
Bias in measurement of the outcome	4.1 Was the method of measuring the outcome inappropriate?	N	
	4.2 Could measurement or ascertainment of the outcome have differed between intervention groups?	N	
	4.3 Were outcome assessors aware of the intervention received by study participants?	N	
	4.4 If Y/PY/NI to 4.3: Could assessment of the outcome have been influenced by knowledge of intervention received?	NA	
	4.5 If Y/PY/NI to 4.4: Is it likely that assessment of the outcome was influenced by knowledge of intervention received?	NA	
	Risk of bias judgement	**Low**	
Bias in selection of the reported result	5.1 Were the data that produced this result analysed in accordance with a pre-specified analysis plan that was finalized before unblinded outcome data were available for analysis?	Y	
	5.2 ... multiple eligible outcome measurements (e.g. scales, definitions, time points) within the outcome domain?	N	
	5.3 ... multiple eligible analyses of the data?	N	
	Risk of bias judgement	**Low**	
Overall bias	**Risk of bias judgement**	**Low**	

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4 CONSIDERAÇÕES FINAIS

Com base em evidências de qualidade muito baixa e em estudos com um período de acompanhamento médio, algumas sugestões preliminares são:

• As placas estabilizadoras tiveram efeitos positivos nos sinais e sintomas das disfunções temporomandibulares de origem muscular.

• Placas combinadas com outras terapias (por exemplo, aconselhamento, terapia manual, injeção de anestesia ou toxina botulínica) tiveram efeitos ainda melhores do que a placa sozinha nos sinais e sintomas das disfunções temporomandibulares de origem muscular, reduzindo a intensidade da dor (espontânea e à palpação), dor durante a mastigação, e aumentando a abertura bucal e o limiar de dor à pressão.

Devido ao nível de certeza muito baixo, estudos futuros podem mudar a direção e a magnitude das sugestões relatadas.

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ANEXO 1 – ATA DA DEFESA

UNIVERSIDADE FEDERAL DE SANTA CATARINA
CENTRO DE CIENCIAS DA SAÚDE
CURSO DE ODONTOLOGIA
DISCIPLINA DE TRABALHO DE CONCLUSÂO DE CURSO DE ODONTOLOGIA

ATA DE APRESENTAÇÃO DO TRABALHO DE CONCLUSÃO DE CURSO

Aos 15 dias do mês de Março de 2021, às 14 horas, em sessão pública na plataforma online RPN desta Universidade, na presença da Banca Examinadora presidida pela Professora Graziela De Luca Canto e pelos examinadores:

1 – Patrícia Pauletto,

2 – Carla Massignan,

a aluna Lia Rosana Honnef apresentou o Trabalho de Conclusão de Curso de Graduação intitulado: Efeitos das placas estabilizadoras nos sinais e sintomas das disfunções temporomandibulares de origem muscular: uma meta-análise

como requisito curricular indispensável à aprovação na Disciplina de Defesa do TCC e a integralização do Curso de Graduação em Odontologia. A Banca Examinadora, após reunião em sessão reservada, deliberou e decidiu pela aprovação do referido Trabalho de Conclusão do Curso, divulgando o resultado formalmente ao aluno e aos demais presentes, e eu, na qualidade de presidente da Banca, lavrei a presente ata que será assinada por mim, pelos demais componentes da Banca Examinadora e pelo aluno orientando.

Documento assinado digitalmente
Graziela de Luca Canto
Data: 15/03/2021 15:05:46-0300
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Presidente da Banca Examinadora

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Examinador 1

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Carla Massignan
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Examinador 2

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Aluno

ANEXO 2 – NORMAS DA REVISTA

Journal of
Oral & Facial Pain and Headache

ISSN 2333-0384 (print)
ISSN 2333-0376 (online)

Guidelines for Authors

The Journal of Oral & Facial Pain and Headache is a quarterly journal that publishes scientifically sound articles of interest to practitioners and researchers in the field of pain, particularly orofacial pain and related conditions such as headache and temporomandibular disorders (TMD).

The journal has adopted the classification systems as below for the research and diagnosis of pain in the head, face, and neck. The journal requires that studies on headache, facial, and cervical pain and TMD to use the diagnostic entities, adhering to the terminology and criteria as in the ICOP, ICHD, and DCTMD when describing and analyzing their data.

A. The International Classification of Orofacial Pain (ICOP), published by the International Headache Society, specifically expands on dentoalveolar, oral, and facial pains and proposes some novel regional pains that may or may not be related to headache. ICOP is freely downloadable (https://doi.org/10.1177/0333102419893823). ICOP is aligned with the ICHD, ICD, and Diagnostic Criteria for Temporomandibular Disorders (DCTMD).

B. DCTMD. Studies on TMD are required to adhere to the methodology, terminology, and diagnostic criteria within the publications by Schiffman et al (2014) and Peck et al (2014), which describe the DCTMD. The journal discourages the use of painful TMD as a diagnostic entity. Please visit the INfORM website (www.rdc-tmdinternational/) for patient examination guidelines, forms to use, and a number of invaluable resources needed to plan and perform research on TMD. All are freely downloadable.

C. The International Classification of Headache Disorders (ICHD, version 3, 2018), published by the International Headache Society, covers headaches and most facial and cervical pains. The classification is freely downloadable (www.ichd-3.org/).

1. International Classification of Orofacial Pain (ICOP) Cephalalgia 2020;40:129–221.
2. Schiffman E, Ohrbach R, Truelove E, et al. Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for clinical and research applications: Recommendations of the International RDC/TMD Consortium Network and Orofacial Pain Special Interest Group. J Oral Facial Pain Headache 2014;28:6–27.
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Notwithstanding, diagnostic research that aims to test existing criteria and propose evidence-based revisions or suggestions on how to develop new criteria are invited, as long as a reference frame to existing classifications is included.

The journal publishes several types of peer-reviewed original articles:

1. Clinical and basic science research reports—based on original research in pain, especially orofacial pain and related conditions.
2. Case reports—provided they are based on important, uncommon, or special cases relevant to orofacial pain and related conditions. Must include a background, well-documented clinical features (history, diagnostic, and management approaches), and a concise and focused discussion. Accepted case reports are normally published online only.
3. Topical reviews—dealing with a subject of relevance to pain, in particular orofacial pain and related conditions.

4a. Invited focus articles—presenting a position or hypothesis on a basic science or clinical subject of relevance to orofacial pain and related conditions. These articles are not intended for the presentation of original results. Authors are selected by the editorial board.

4b. Invited commentaries—critiquing a focus article by addressing the strong and weak points of the focus article. Authors of the commentaries are selected by the editorial board in consultation with the focus article author, and the focus article and the commentaries on it are published together in the journal.

5. Proceedings of symposia, workshops, or conferences—covering topics of relevance to orofacial pain and related conditions.

In addition, the journal publishes:

6. Literature abstracts—abstracts of selected journal articles.
7. Meeting reviews—highlights of selected scientific meetings.
8. Invited guest editorials—may periodically be solicited by the editorial board.
9. Letters to the Editor—may be submitted to the editor-in-chief; these should normally be no more than 500 words in length.
10. Poster abstracts—presented at the scientific meetings of the AAOP or other affiliated academies (online only).

Review/editing of manuscripts. Manuscripts will normally be reviewed by the editor-in-chief, one associate editor, and at least two reviewers with expertise in the article's subject matter. The journal operates a conventional single-blind reviewing policy in which the reviewer's name is always concealed from the submitting author. External peer review is not mandatory in the journal. After review by the editor-in-chief and/or an associate editor, a decision is made whether to reject the work or to continue the review process. Any works where the editor-in-chief is a contributor will be handled and decided upon by an associate editor. We attempt to begin the review process as rapidly as possible, and a decision is reached as soon as the reviewer's comments are received, typically within 8 to 10 weeks.

Publication. Every effort is made to publish accepted articles expediently. Authors should address all inquiries regarding this process to the Managing Editor, Ms Hallie Koontz (hkoontz@quintbook.com).

The publisher reserves the right to edit accepted manuscripts to ensure conciseness, clarity, and stylistic consistency, subject to the author's final approval.

Online only. The journal reserves the right to publish any accepted article in the online version only as determined by the journal's editorial board or staff.

Adherence to guidelines. Manuscripts not prepared in accordance with these guidelines or written in improper English will be returned with instructions to correct these problems prior to resubmission and review.

Manuscript Preparation

The Journal will follow as much as possible the recommendations of the International Committee of Medical Journal Editors in regard to preparation of manuscripts and authorship (Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals; www.icmje.org/recommendations).

In the submission letter, authors will be required to guarantee that the submission represents original work for first publication in the journal and that it is not being considered for publication elsewhere. The work cannot have been already published other than in abstract form (please acknowledge such), and permissions for the reproduction of any copyright inclusions not owned by the author/s must have been obtained. Submission to the journal explicitly implies that the author/s own all rights to the work. The journal regards copyright infringement, plagiarism, and other related publication malpractice very seriously. Submitted articles are processed employing duplication-checking software.

- **Title page.** This should include the title of the article and the names, academic degrees, and professional affiliations for all authors. A fax number and email address must also be provided for the corresponding author. If the paper was presented before an organized group, the name of the organization, location, and date should be included. Please select titles that reflect the core aspects of the work, are easy to read, and describe the study design if relevant (ie, randomized controlled trial, case-control study, cohort study, etc). Concise titles are preferred.
- **Abstract/keywords.** Please include a maximum 250-word structured abstract (with headings Aims, Methods, Results, and Conclusion) and five keywords.
- **Introduction.** Summarize the rationale and purpose of the study, giving only pertinent references. Clearly state the working hypothesis or study objectives.
- **Materials and Methods.** Present materials and methods in sufficient detail to allow confirmation of the observations. Published methods should be referenced and discussed only briefly, unless modifications have been made. Studies involving human subjects must include statements regarding institutional review board approval (including approval number) and patient consent. In the section "Expanded Methodological and Reporting Requirements" a list of specific and relevant reporting methodologies are described. Authors must include the relevant document with the submitted work. Often, the use of a figure to show study design, progress, and processes is extremely useful. Report how many individuals were eligible, how many declined to participate, and how many were lost to follow-up. Animal research requires appropriate institutional approval (including approval number) and must use protocols that conform to the NIH guidelines (Guide for the Care and Use of Laboratory Animals, NIH Publication 86-23).
- **Statistical Methods.** Indicate the statistical methods used, if applicable, in a separate section. Describe all details of the statistical analyses. Use of one-tailed analyses requires clear justification. Indicate the alpha (cut-off) value set for statistical significance. Report all *P* values as ".XX" and do not use "not significant" or its abbreviation. For *P* values between .001 and .10, report the value within three decimal places. For *P* values greater than .10, please report the value with two decimal places. For *P* values less than .001, report as "$P < .001$," except for genome-wide association studies. For group differences, show the appropriate effect measure (eg, relative risk, absolute risk, difference of means).

- **Results.** Present results in a logical sequence in the text, tables, and illustrations. The primary outcome should be presented first, followed by secondary outcomes and subgroup analyses. Do not repeat in the text all the data in the tables or illustrations; emphasize only important observations. If relevant, describe the sample and provide necessary characteristics. Consider the judicious use of tables and/or figures to avoid repeating the same numbers in the text, tables, and figures.
- **Discussion.** Structured discussions are easier to read. Begin with a summary of the findings in order of importance and how these findings compare with previously published studies. Emphasize new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or other material given in the Introduction or Results section. Relate observations to other relevant studies; point out the implications of the findings and their limitations. Importantly, authors should discuss statistically significant results in view of their clinical importance. Does the result obtained translate into a meaningful clinical effect? Often results may be of statistical significance, but on further examination, may reflect a negligible clinical result.
- **Conclusions.** A succinct summary of major findings that includes bullet points, as below.
- **Highlights.** Authors are requested to include two to five bullet points clearly emphasizing the work's highlights. Insert these after the Conclusions section, above the reference list. Select a heading based on the research area:
  - Clinical research
  - Clinical implications
  - Public health relevance
  - Basic science research
  - Key findings
  - Possible translational implications
- **Acknowledgments.** Please describe the contribution(s) made by each author included in the work. Acknowledge persons who have made substantive contributions to the study but are not in the author list. Specify grant or other financial support, citing the names of all supporting organizations and grant numbers. Note whether authors do or do not have conflicts of interest. If the study had no external funding source or if the funding source had no role in the study, state so explicitly.
- **Figure legends.** Figure legends should be grouped at the end of the text.
- **Abbreviations.** The full term for which an abbreviation stands should precede its first use in the text unless it is a standard unit of measurement.
- **Trade names.** Generic terms are to be used whenever possible, but trade names and manufacturer should be included parenthetically at first mention.
- **Tooth numbering.** Please use the international (FDI) system. Citing tooth by name is generally preferred.

References

- All references must be cited in the text, numbered in order of appearance.
- The reference list should appear at the end of the article in numeric sequence.
- Do not include unpublished data or personal communications in the reference list. Cite such references parenthetically in the text and include a date.
- Avoid using abstracts as references.
- Provide complete information for each reference, including names of all authors (up to 6). If the reference is part of a book, also include the title of the chapter with page numbers and the name(s) of the book's editor(s).

Journal reference style:

1. Cateano A, Ladeira F, Mendonça M, et al. Underuse of prophylactic treatment among Portuguese patients with primary headache: A retrospective observational study. J Oral Facial Pain Headache 2019;33:331–336.

Book reference style:

1. Garg AK. Full-Arch Implant Rehabilitation. Chicago: Quintessence, 2019.

Figures and Tables

- All figures and tables should be numbered and cited in the text.
- Figures and tables can be grouped at the end of the manuscript or uploaded individually.
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