

Faculté des sciences de la motricité

**Effectiveness of counseling
and self-management in patients
with temporomandibular disorders:
a systematic review**

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INTRODUCTION

I. TMD and its general characteristics

Temporomandibular disorders (TMD) is a term used for clinical presentations that include pain or dysfunction of the masticatory muscles, the temporomandibular joint, or associated structures (1). TMDs are the most common cause of non-dental oro-facial pain and are believed to be the second most common musculoskeletal dysfunction after chronic low back pain (2).

Individuals with TMD present symptoms in various forms. These may manifest as pain in the temporomandibular joint (TMJ) region, masticatory muscles, inner or outer ear, neck, or shoulder. They may complain of joint noises, locking or restriction of TMJ mobility, or functional impairment (1, 3).

The presence of a temporomandibular disorder in an individual results in experiencing pain and functional restrictions, impacting daily life and the psychosocial sphere (2). Indeed, anxiety, depression, and kinesiophobia are frequently present symptoms in patients with TMD (4).

Several risk factors can lead to temporomandibular disorders, such as somatization, mood disorders, parafunctional habits, stress, and the current presence or past experience of other pains (5).

The prevalence is 10 to 15% among the adult population, with only 5% receiving treatment for this condition. The incidence is higher among individuals aged 20 to 40 years (1).

II. Usual treatments in patients with TMD

Several therapeutic approaches are used in the management of TMDs. A survey conducted in the UK in 2013 among professionals showed that 72% of respondents considered physiotherapy as an effective treatment for TMDs. Jaw exercises (79%), ultrasound (52%), manual therapy (48%), and acupuncture (41%) were considered the most effective techniques (6). TMDs are often managed by healthcare professionals such as dentists or physicians (7). The use of occlusal splints is often prioritized by dentists for individuals suffering from TMDs (8). However, in 2020, a systematic review conducted by Riley et al. showed that there

was no certainty that treatment with occlusal splints reduced pain or improved mouth-opening mobility (9).

Current recommendations for managing individuals with TMDs lean towards conservative treatments (10). For patients with TMD experiencing either a first or recurrent episode of pain, current guidelines recommend several interventions including behavior-directed treatment, sensory stimulation, jaw exercises, pharmacological therapy, occlusal appliances, occlusal correction or adjustment, and TMD surgery (11). As for managing patients with persistent TMD pain lasting more than 3 months, recent guidelines were issued by a group of experts and published in 2023 in the British Medical Journal. Among the types of treatment proposed with a high level of recommendation are cognitive-behavioral therapy, jaw-assisted mobilizations, supervised postural exercises, jaw stretching exercises (with or without trigger point treatments), and usual care such as education, self-massage, home exercise programs, and analgesics (12).

III. Counseling and self-management in patients with TMD

In 2016, an international consensus among a group of experts defined self-management, as an approach including education, personal exercises, self-massage, application of cold or heat, nutritional advice, identification, and management of parafunction (13). For their part, in 2013, de Freitas et al. grouped under the term 'counseling' similar interventions such as education about the condition, application of cold or heat, exercises, advice regarding parafunction reduction, diaphragmatic breathing, sleep, and postural advice (14). Their systematic review published in 2013 revealed the effectiveness of counseling compared to the use of interocclusal dental devices in individuals with TMDs (14).

Risk factors leading to temporomandibular disorders are multifactorial (5). Several of them can be identified and modified by the patients themselves, parafunctions and stress being examples. A preliminary study by Xu et al. in 2020 demonstrated the effectiveness of patient education in improving oral hygiene behaviors, which play a role in the onset of temporomandibular disorders (15). Furthermore, a review by Cintra et al. in 2022 mentioned that patients' misconceptions about temporomandibular disorders can have negative consequences on the treatment effect and therefore on the prognosis. This highlights the importance of educating the patient about the condition and its risk factors (16).

IV. Effects of counseling and self-management regarding TMD symptoms

Counseling approach aims to provide the patient with an understanding of the factors that can lead to the onset of temporomandibular disorders and the acquisition of self-management techniques for symptoms. It is therefore an approach seeking a long-term effect, which can play an important role in the prevention of this condition (13). Counseling and patient-centered self-management aim to guide the patients in managing their symptoms and thus make them autonomous in their care. The patients can take action on their own pain, function, and quality of life, which brings about the notion of empowerment (17).

V. Aims of this study

A systematic review was conducted by de Freitas et al. in 2013 on the effectiveness of self-management and counseling on pain and function in patients with TMDs (14). The objective of this study is to undertake a review of the scientific literature, including new studies, to evaluate the effectiveness of counseling and self-management approaches in individuals suffering from temporomandibular disorders. To assess its effectiveness, the effects of counseling and self-management on various impacts of temporomandibular disorders such as function, pain, and quality of life will be evaluated and compared to the effects obtained with other types of therapies.

METHODS

This systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. The PRISMA 2020 checklist is provided in Appendix 1. The study protocol was registered with PROSPERO in March 2024 and is available online (record number: CRD42024529862, link: https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=529862).

I. Search strategy

An electronic bibliographical search was performed in four databases (PubMed, Embase, Cochrane Central, CINAHL) up to March 2024 with no limit of time in the past.

The PICOS method was used to identify keywords and search terms based on the review question: What is the efficacy of counseling and self-management compared to conventional treatment in adults with temporomandibular disorders? An information specialist assisted with the development of search terms on search implementation. Descriptors such as ‘temporomandibular joint disorders’, ‘temporomandibular joint diseases’, ‘counseling’, ‘self-management’, ‘self-care’, and ‘patient education as topic’ were mainly used as well as free-text terms related to temporomandibular joint disorders and counseling. The PICOS criteria aligned with the current review are presented in Table 1 and full search strategy is reported in Appendix 2.

TABLE 1. PICO(S) criteria

Population	Adults with temporomandibular disorders
Intervention	Counseling and/or self-management
Comparator	Conventional treatment
Outcome	<u>Primary:</u> Pain-related outcomes Temporomandibular function disability-related outcomes <u>Secondary:</u> Quality of life -related outcomes
Study design	Randomized controlled trials

II. Study selection and selection criteria

Two reviewers (MH and RV) independently screened all titles and abstracts revealed by this strategy to identify trials of interest. Only randomized controlled trials were selected. Consensus of the two reviewers was needed at the end of this step regarding some studies to rather include or exclude them. Then, full-text screening was conducted by the same reviewers (MH and RV). Any discrepancy in eligibility decisions was resolved through consensus. In addition, a third reviewer (LP) was consulted by the two initial reviewers to help to achieve consensus.

Studies were eligible for inclusion if they met the following criteria:

- (1)-the study was an RCT;
- (2)-the study was published either in English or in French;
- (3)-participants were adults suffering from temporomandibular disorders;
- (4)-the intervention included counseling or self-management techniques that could be named as self-care, education, self-treatment, or behavior modification;
- (5)-clinical settings is a physiotherapy clinic, physiotherapy unit, or dental-care practice;
- (6)-at least one outcome measure was pain-related or temporomandibular function and disability-related

For this review, we considered counseling or self-management techniques as described earlier based on the definition proposed by de Freitas in 2013 and Durham in 2016 (13, 14).

Studies were excluded if they were RCTs in which a cognitive behavioral treatment was compared to an intervention that did not involve education, counseling, or self-management. RCT in which the control group is a waitlist or in which therapists are psychologists or therapists needing competencies in psychology were also excluded. Studies with patients suffering from bruxism were included but those suffering from dysphagia condition, tinnitus, or migraine were excluded. Finally, the authors decided to exclude studies in which there was not at least one study group where counseling or self-management alone was applied.

III. Risk of bias tool

The methodological quality of included studies was assessed with the first version of the Cochrane Risk of Bias tool. To draw conclusions about the overall risk of bias across the selected studies, seven sources of bias are assessed with the chosen tool: random sequence generation, allocation concealment, selective reporting, other sources of bias not addressed above, personnel and participants blinding, outcome assessment blinding and incomplete outcome data. This assessment of methodological quality was performed by two independent evaluators (MH and RV), and the final score was obtained through a consensus. In case of disagreement, a third reviewer was available (LP) to facilitate consensus. The first version of the Cochrane Risk of Bias tool is provided in Appendix 3.

IV. Data extraction

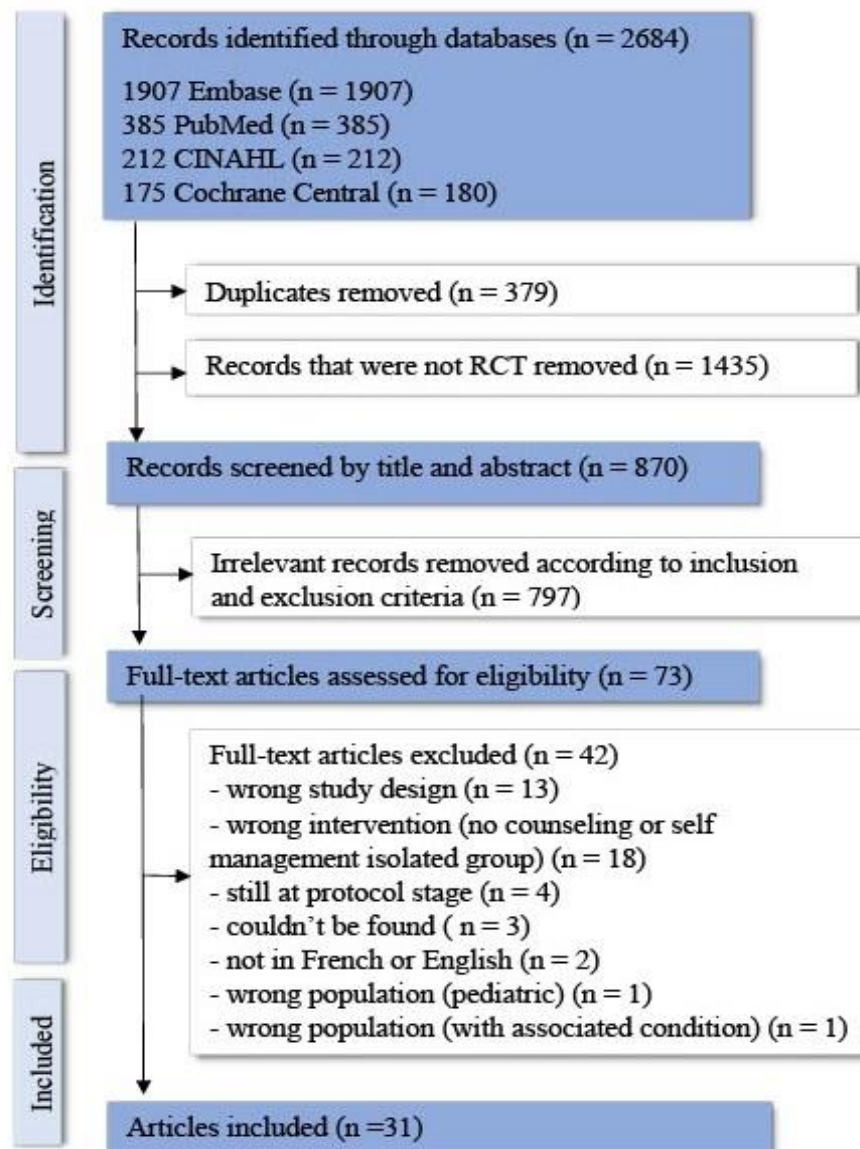
Microsoft Excel was used to create a data extraction tool. The data from the included studies were extracted with standardized form that recorded first author of the study, year of publication, country of the study, care setting, TMD classification, number of participants, their characteristics (age, gender), profession of the evaluator and his training level, type of interventions, outcome measures, length of the follow-up and results (Table 2 and Appendix 5). Data extraction was revised by a second independent evaluator (RV).

RESULTS

I. Study selection

The final electronic search on databases revealed 2684 records. After the removal of duplicate references and studies that were not RCTs, the titles and abstracts of 870 studies were screened, of which 73 met the criteria for further review. The full texts of 73 records were screened, resulting in 31 RCTs meeting the inclusion criteria.

FIGURE 1. The Prisma flow diagram and main results of the literature search



All RCTs included in our analysis featured at least one study group that received counseling or self-management as the exclusive intervention. The 73 full-text records were screened and 13 studies were identified for exclusion due to incorrect study design. Among the other excluded, 18 studies did not have any study group that received counseling or self-management as an isolated intervention. Additionally, four studies were still in the protocol stage, five studies could not be found or were not available in either French or English, and two studies examined populations not aligned with the focus of our review. The Prisma flow diagram of the process and main results of the literature search are shown in Figure 1.

II. Characteristics of the included studies

The study characteristics of the included RCTs are reported in Table 2.

1. Countries and clinical settings

The selection process yielded studies conducted in various countries, with the majority in Brazil (32%), Turkey (16%), USA (16%) and Finland (10%). Two studies were conducted in India and two in Sweden, each comprising 6% of the total. Additionally, one study was conducted in each of the following countries: Belgium, Poland, Australia, and Sweden, with each study representing 3.5% of the total. In most studies, interventions took place in dental or stomatognathic dysfunction school clinics or private clinics. Three studies specified the type of private clinic; one was conducted in a physiotherapy clinic, another in a physical medicine clinic, and the third in a chiropractic clinic. Three other studies did not specify their study setting.

2. Therapists and training

In the majority of the studies, therapists conducting the considered counseling or self-management intervention were predominantly dentists (11 studies) or physical therapists (5 studies). One study specified that the therapist was a physician, another indicated that therapists were dental hygienists, and a third study specified that the therapist was a chiropractor. However, the qualifications of therapists were not specified in the remaining 12 studies. Regarding the level of training, Dworkin et al. reported in their study that 8 hours of training were provided to dental hygienists for the self-care intervention they administered, while Lam et

al. provided 2 days of training to dentists for the education-based intervention they delivered (18, 19). However, the degree of training required or provided to therapists was not specified in all other studies.

3. Population

In each randomized controlled trial (RCT), the study population consisted of adults with temporomandibular disorders (TMD). Women accounted for 81.2% of the total participants. The average age of the participants, representing the entire study population, was 33.3 years. Few studies included a population with only one type of TMD diagnosis. According to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), myofascial pain without mouth opening limitation (IIa) and with mouth opening limitation (IIb) were the most commonly diagnosed conditions in the study groups. Out of the 31 included studies, 19 of them included both the Ia and Ib groups or solely the Ia or Ib group (16, 1, and 2 studies respectively). Six studies included participants diagnosed with arthralgia. One study exclusively enrolled patients with disc displacement without reduction with and without mouth opening limitation (20). Another study included only patients with disc displacement with reduction (21). The remaining studies comprised mixed TMD traits. Six studies did not specify the type of TMD diagnosis for their study participants.

TABLE 2. : The Study characteristics of the 31 included randomized controlled trials

Authors, year	Country	Care settings	TMD classification	N	Female % CG/ExpG	Age(SD) CG/ExpG	Therapist profession	Therapist training
Alencar et al., 2009 (22)	Brazil	Dental Clinic School	Myofascial pain	42	85.7 % 92,9 % 85.7 %	39 33 31	NS	NS
Benlidayi et al., 2016 (23)	Turkey	NS	Myofascial pain, Arthralgia (III) DDWR (IIa) (RDC/TMD)	16 17	78,6 % 92.9 %	31.1 31.6	Physician	NS
Brandão et al., 2022 (24)	Brazil	Research center	Myofascial (Ia, Ib) DDWR (IIa) (RDC/TMD)	11 12	100 % 73 %	36.7 35.4	NS	NS
Carlson et al., 2021 (25)	USA	Dental care Clinic	Myofascial pain (Ia, Ib)	23 21	77.3 %	34.6	Dentists	NS
Conti et al., 2012 (26)	Brazil	Dental Clinic School	Myofascial (I) (RDC/TMD)	14 21 16	100 % 80.9 % 87.5 %	38.14 38.09 35.25	NS	NS
Conti et al., 2015 (27)	Brazil	Dental Clinic School	DDWR (IIa) Arthralgia (IIIa) (RDC/TMD)	20 20 20	96.7 %	46 38.35 38.4	NS	NS

RDC/TMD, Research diagnostic criteria for TMD classification

Ia, Myofascial pain without limitation of mouth opening

Ib, Myofascial pain with limitation of mouth opening

DDWR (IIa), Disc displacement with reduction

TABLE 2. (continued)

Authors, year	Country	Care settings	TMD classification	N	Female % CG/ExpG	Age(SD) CG/ExpG	Therapist profession	Therapist training
Craane et al., 2012 (20)	Belgium	Physiotherapy clinics	DDW-R (IIB, IIC) (RDC/TMD)	26 23	92 % 100 %	38.5 34.7	Physical therapists	NS
de Resende et al., 2021 (28)	Brazil	Dental Clinic School	TMD - (RDC/TMD)	19 24 21 25	80.9 %	28	NS	NS
Dworkin et al., 2002 (18)	USA	Orofacial Pain Clinic School	TMD - (RDC/TMD)	63 61	88.5 % 81 %	37.4 38	Dental hygienists, Dentists	Hygienists: 8 hours instructions Dentists:NS
Gebska et al., 2023 (29)	Poland	Dental Clinic School	Myofascial pain (Ib) (RDC/TMD)	26 26 26 26 27 27 28	100 %	20-45	Physical therapist (MT)	12 years
Giro et al. 2016 (30)	Brazil	Dental Clinic School	Myofascial pain (Ib) DDWR, DDW-R (II) (RDC/TMD)	13 16 13	100 %	36.4	NS	NS

DDW-R (IIB), Disc displacement without reduction without limitation of mouth opening

DDW-R (IIC), Disc displacement without reduction with limitation of mouth opening

TABLE 2. (continued)

Authors, year	Country	Care settings	TMD classification	N	Female % CG/ExpG	Age(SD) CG/ExpG	Therapist profession	Therapist training
Hasanoglu E. et al., 2017 (31)	Turkey	Faculty of Dentistry	Myofascial pain (I) (RDC/TMD)	20 20	80 % 85 %	32.25 24.6	NS	NS
Kalamir et al., 2013 (32)	Australia	Private TMD and Chiropractic Clinic	Myofascial pain (I) (RDC/TMD)	23 23	65 % 61 %	26.8 28.2	Chiropractor	NS
Katyayan et al., 2014 (33)	India	Dental Clinic School	Myofascial pain (Ia, Ib) (80-85%) DDW-R (IIa, IIb)	40 40	77.5 %	34.4	Dentists	NS
Kokkola et al. 2018 (34)	Finland	Oral and Maxillofacial Clinic School	TMD	32 35	73.2 % 83.8 %	44.0 42.6	Dentist	NS
Lam et al. 2020 (19)	Sweden	Dental care clinic	TMD	20 23	75 % 83 %	27	Dentist	2 days
Magesty et al., 2021 (35)	Brazil	Dental Clinic School	DDWR (RDC/TMD)	37 36	68,4 %	22,88	NS	NS
Melo et al., 2020 (36)	Brazil	Stomatognathic dysfunction Center	TMD (I, II, III, mixed) (RDC/TMD)	28 28 28 28	82.1 %	28	NS	NS
Michelotti et al., 2004 (37)	Italy	TMD Clinic School	Myofascial pain (I) (RDC/TMD)	34 36	91 % 86 %	31.8 28.2	Dentists	NS

TABLE 2. (continued)

Authors, year	Country	Care settings	TMD classification	N	Female % CG/ExpG	Age(SD) CG/ExpG	Therapist profession	Therapist training
Michelotti et al., 2012 (38)	Italy	TMD and orofacial pain Clinic School	Myofascial pain (Ia, Ib) (RDC/TMD)	23 21	77.3 %	31.2	Dentists	NS
Mulet et al., 2007 (39)	USA	NS	Myofascial pain (Ia, Ib) (RDC/TMD)	23 20	95.5 %	24	Physical therapist	NS
Niemelä et al., 2012 (40)	Finland	Dental care clinic	TMD (Ia, II,III) (RDC/TMD)	80	73.2 % 82.1 %	44.1	Dentists	NS
Peixoto et al., 2021 (41)	Brazil	Stomatognathic Dysfunction clinic School	TMD (mixed) (RDC/TMD)	81	NS	18-65	Dentists	NS
Qvintus et al., 2015 (42)	Finland	Oral and Maxillofacial University Hospital	TMD (RDC/TMD)	80	73.2 % 83.8 %	44.03 42.56	Dentists	NS
Ram et al., 2021 (43)	India	4 different institutes (NS)	TMD (RDC/TMD)	160	13.75 % 10.63 % 16.25 % 13.75 %	37.48 37.60 42.25 40.42	Dentists	NS

TABLE 2. (continued)

Authors, year	Country	Care settings	TMD classification	N	Female % CG/ExpG	Age(SD) CG/ExpG	Therapist profession	Therapist training
Simões et al., 2023 (21)	Brazil	Surgery and Periodontics Clinic (University)	DDWR (IIa) (RDC/TMD)	72	68.4%	25.88	NS	NS
Tanhan et al., 2023 (44)	Turkey	NS	Cervical myofascial pain, Myofascial pain (Ia, Ib) (RDC/TMD)	75	65% 76% 90%	20.45 21.41 20.95	NS	NS
Truelove et al., 2006 (45)	USA	Dental school	TMD (Ia, Ib, IIa, IIIa) (RDC/TMD)	200	81 % 87 % 90 %	36 36 35	Dentists	NS
Tuncer et al., 2013 (46)	Turkey	Dental school	Myofascial pain (Ia, Ib) DDWR (IIa) (RDC/TMD)	40	75% 80%	34.8 37.0	Physical therapist	NS
Ucar et al., 2014 (47)	Turkey	Physical medicine and rehabilitation clinic	Myofascial pain (Ia, Ib)	44	61% 60%	29 27	NS	NS
Wright et al., 2000 (48)	USA	Dental care clinic	TMD originating from masticatory muscles	60	83.3% 86.6%	30.8 32.7	Physical Therapist	NS

4. Interventions: counseling and self-management approach

4.1. Specificity regarding the definition of the counseling and self-management approach.

The authors of this systematic review align with De Freitas et al. in their 2013 systematic review regarding counseling, as well as with Durham et al. during an International Delphi process who established a consensus on the definition of self-management. Under the terms 'counseling' and 'self-management', recommendations, patient education, and information given to patients are grouped together, along with exercises that do not require supervision.

Among the selected studies, sixteen included recommendations, instructions, patient education, and information given to the patient, while fifteen incorporated exercises in addition to these recommendations, instructions, patient education, and information. For this review, the authors thus grouped under the term 'counseling and self-management techniques' all interventions that consisted of recommendations, education, and information given to the patient. However, when exercises were included in the intervention, it will be mentioned in addition to counseling and self-management approach.

4.2. Self-care recommendations

Among the self-care recommendations, the most commonly advised practices included avoiding parafunctional habits, such as teeth grinding, biting pens or nails, and keeping the jaw muscles relaxed (18 studies/31). The most popular recommendations, secondly, were to avoid eating hard foods and excessive mouth opening, alongside suggested behavior changes such as avoiding stomach sleeping, resting the jaw on the hand, abstaining from gum chewing, encouraging bilateral mastication, and maintaining good posture (18 studies/31). Equally popular were recommendations for improving sleep hygiene and relaxation techniques. Several studies recommended diet modification and avoiding caffeine (8 studies/31). Heat application on the jaw's painful muscles was also several times advised (9 studies/31).

4.3. Education

Among the education techniques, the information provided mostly focused on the general characteristics of the dysfunction and the etiology of TMD (13 studies/31). Secondly, education about normal jaw function, the potential for overuse or misuse to trigger TMD pain and information regarding the biopsychosocial aspects

of TMD were employed as education techniques in some studies (9 studies/31). Only a very few studies gave information about pain physiology (3 studies/31).

4.4.Exercises

Finally, among the types of exercises, active, passive, and resisted movements were the most commonly prescribed to participants. Four studies chose to follow a standardized exercise program described by Carlson and Magnusson, which included 2 to 3 sessions a day of active and resisted movements such as mouth opening, laterotrusion, and protrusion; stretching of 10 to 20 seconds, all repeated 7 to 10 times per session.

Demonstration and written instructions were given. Additionally, some studies incorporated coordination and postural exercises.

It should be noted that eight studies did not provide detailed information about their counseling and self-management approach. An overview of the various counseling and self-management approaches, as well as the types of exercises used in the interventions across the studies, is presented in Table 3. A more detailed report of the counseling and self-management intervention used in each study is presented in Appendix 4.

5. Interventions: the other therapies compared or combined with counseling and self-management approach

The interventions that were neither counseling and self-management techniques, nor education, nor exercises, included a diverse range of modalities. These interventions were sometimes administered alone, sometimes combined with counseling and self-management approaches, and at times even combined with each other. They were then compared with the effects of isolated counseling and self-management approaches to assess their relative efficacy in treating TMD.

Among the 31 RCTs, 15 included stabilization splint treatment, either in soft or hard form, as part of their interventions. Three RCTs used a nociceptive trigeminal inhibition clenching suppression system (NTT-tss). Many studies included manual therapy techniques, intraoral myofascial therapy, or muscle energy therapy in their interventions (9 studies/31).

One study used specialized physical therapy modalities such as magnetostimulation therapy, magnetoleotherapy, and magnetolaserotherapy. Finally, interventions

such as low-level laser therapy (1 study/31), ultrasound therapy (1 study/31), Kinesio taping (1 study/31), scalp acupuncture (1 study/31), administration of medication (1 study/31), and exercise programs with supervision were also used in some studies (15 studies/31).

TABLE 3. Types of counseling and self-management interventions included in each study.

		Alencar et al., 2009	Benlidayi et al., 2016	Brandão et al., 2002	Carlson et al., 2001	Conti et al., 2012	Conti et al., 2015	Craane et al., 2012	de Resende et al., 2021	Dworkin et al., 2002	Gebbska et al., 2023	Giro et al., 2016	HasanogluE. et al., 2017	Kalamir et al., 2013	Katyayan et al., 2014	Kokkola et al., 2018	Lam et al., 2020	Magesty et al., 2021	Melo et al., 2020	Michelotti et al., 2004	Michelotti et al., 2012	Mulet et al., 2007	Niemelä et al., 2012	Peixoto et al., 2021	Qvintus et al., 2015	Ram et al., 2021	Simões et al., 2023	Tanhan et al., 2023	Truelove et al., 2006	Tuncer et al., 2013	Ucar et al., 2014	Wright et al., 2000	Number of studies	
	Counseling (no or incomplete details)		x										x		x	x							x		x			x			x		8	
Self-care Recommendations:	Avoiding parafunction habits			x					x			x						x	x	x	x	x					x	x	x	x			x	15
	Relax the Jaw/ avoid clenching	x			x	x	x	x	x			x						x		x	x	x				x	x		x			x	15	
	Avoiding eating hard food			x										x				x		x	x	x				x	x						8	
	Avoiding excessive mouth opening			x				x	x			x								x	x	x					x						8	
	Beneficial behavior changes	x				x							x				x		x			x		x		x	x						9	
	Good body posture				x				x										x	x					x			x		x	x		9	
	Avoiding caffeine					x	x		x										x								x						5	
	Diet modification				x	x	x										x	x	x									x					7	
	Improving sleep hygiene				x	x	x		x								x	x	x						x		x	x						10
	Relaxation/breathing exercises				x	x	x			x					x			x			G2						x			x	x			9
	Physical activity				x				x									x		x					x									5
	Heat application					x	x					x									G2		x				x	x		x			x	8
	Ice application																						x					x					x	3
	Limited use of analgesics																									x								1
	Use of analgesics or NSAIDS																	x												x			x	3
	Calcium intake																							x										1
	Self-massage					x							x								G2													

TABLE 3. (continued)

	Alencar et al., 2009	Benlidayi et al., 2016	Brandão et al., 2002	Carlson et al., 2001	Conti et al., 2012	Conti et al., 2015	Craane et al., 2012	de Resende et al., 2021	Dworkin et al., 2002	Geboka et al., 2023	Giro et al., 2016	HasanogluE. et al., 2017	Kalamir et al., 2013	Katyayan et al., 2014	Kokkola et al., 2018	Lam et al., 2020	Magesty et al., 2021	Melo et al., 2020	Michelotti et al., 2004	Michelotti et al., 2012	Mulet et al., 2007	Niemelä et al., 2012	Peixoto et al., 2021	Qvintus et al., 2015	Ram et al., 2021	Simões et al., 2023	Tanhan et al., 2023	Truelove et al., 2006	Tuncer et al., 2013	Ucar et al., 2014	Wright et al., 2000	Number of studies
Education	x							x	x	x			x			x		x		x			x		x							9
	x			x				x	x	x						x			x	x					x				x			10
																					x											1
											x								x	x					x							4
				x					x							x																3
							x				x							x	x	x					x							6
									x				x			x			x	x					x							6
																x																1
Exercises										x	x		x	x	x		G2		G2		x	x		x					x	x		10
											x		x	x	x				G2			x		x				x	x	x		8
											x		x	x	x		G2				G2	x		x			x		x	x		10
										x	x						G2		G2		G2						x					4
																											x					1
																													x	X		2
																															G2	1

^{SE}: Standardised exercise program (Carlson and Magnusson)

X, G2: Exercises given in the first and second group in addition to counseling

G2: Exercises given in the second group only

III. Methodological Quality Assessment of the included studies

All studies showed a high risk of performance bias (red) due to a lack of blinding among therapists administering the intervention. Only two of them did not show other risks of bias apart from this risk of performance bias (20, 32). In two other studies, in addition to the risk of performance bias, one concern (yellow) was raised due to the unavailability of the study protocol for review (33, 45).

Other studies presented one or more than one high risk (red) of bias in addition to more than one concern (yellow). Most of the high risk of bias were attributed to a high attrition and exclusion rate. The second most common reason for a high risk of bias was either associated with a 'no intention to treat' approach or related to participants related to the fact that some participants moved from one group to another. Four studies indicated a high risk of bias resulting from discrepancies between the outcomes specified in the protocol and those measured during the study, or between the intended interventions and those implemented. Finally, three studies showed a risk of bias related to an outcome assessor who was not blinded. All these reasons for the high-risk score attributed to each study are presented in Table 4.

TABLE 4: Summary of risk of bias assessed by the Cochrane risk-of-bias tool for randomized trials (RoB1)

Authors	Random Sequence Generation	Allocation concealment	Selective reporting	Other sources of bias	Blinding (participants and personnel)	Blinding (outcome assessment)	Incomplete outcome data
Alencar et al., 2009	Unclear	Unclear	Unclear	Low	High ^d	Low	Low
Benlidayi et al., 2016	Unclear	Low	Unclear	Low	High ^d	Low	Low
Brandão et al., 2002	Low	Unclear	Low	Low	High ^d	High ^e	Low
Carlson et al., 2001	Low	Unclear	Unclear	High ^b	High ^d	Low	Low
Conti et al., 2012	Unclear	Unclear	Unclear	Low	High ^d	Low	High ^f
Conti et al., 2015	Unclear	Unclear	Unclear	High ^b	High ^d	Low	High ^f
Craane et al., 2012	Low	Low	Low	Low	High ^d	Low	Low
de Resende et al., 2021	Low	Unclear	High ^a	Low	High ^d	Low	Low
Dworkin et al., 2002	Unclear	Unclear	Unclear	Low	High ^d	Unclear	High ^f
Gebska et al., 2023	Unclear	Low	Low	Low	High ^d	Low	Low
Giro et al., 2016	Low	Unclear	High ^a	Low	High ^d	Low	High ^f
HasanogluErbasar et al., 2017	Unclear	Unclear	Unclear	Low	High ^d	Low	Low
Kalamir et al., 2013	Low	Low	Low	Low	High ^d	Low	Low
Katyayan et al., 2014	Low	Low	Unclear	Low	High ^d	Low	Low
Kokkola et al., 2018	Low	Unclear	Unclear	High ^c	High ^d	Low	High ^f
Lam et al., 2020	Low	Low	Low	Low	High ^d	High ^e	High ^f
Magesty et al., 2021	Unclear	Low	High ^a	Low	High ^d	Low	Low
Melo et al., 2020	Low	Unclear	Unclear	Low	High ^d	Low	Low
Michelotti et al., 2004	Low	Unclear	Unclear	High ^b	High ^d	Low	High ^f
Michelotti et al., 2012	Low	Unclear	Unclear	Low	High ^d	Low	Low
Mulet et al., 2007	Low	Unclear	Unclear	Low	High ^d	Low	Low
Niemelä et al., 2012	Low	Unclear	Unclear	High ^b	High ^d	Low	Low
Peixoto et al., 2021	Unclear	Unclear	High ^a	Low	High ^d	Unclear	High ^f
Qvintus et al., 2015	Low	Unclear	Unclear	High ^c	High ^d	Low	High ^f
Ram et al., 2021	Low	Low	Unclear	High ^b	High ^d	High ^e	Low
Simões et al., 2023	Unclear	Low	Low	Low	High ^d	Unclear	Low
Tanhan et al., 2023	Low	Unclear	Low	High ^b	High ^d	Unclear	High ^f
Truelove et al., 2006	Low	Low	Unclear	Low	High ^d	Low	Low
Tuncer et al., 2013	Low	Unclear	Unclear	Low	High ^d	Low	Low
Ucar et al., 2014	Unclear	Unclear	Unclear	High ^b	High ^d	Unclear	Low
Wright et al., 2000	Unclear	Unclear	Unclear	Low	High ^d	Low	Low

Green color indicates a low risk of bias, yellow indicates some concerns because of unclear information, red color indicates a high risk of bias

^a Risk of bias resulting from discrepancies between the outcomes specified in the protocol and those measured during the study or between the intended interventions and those implemented.

^b Risk of bias associated with a 'no intention to treat' approach.

^c Risk of bias related to the fact that some participants moved from one group to another.

^d Risk of bias due to the fact that the therapist was not blinded when administering the intervention.

^e Risk of bias related to an outcome assessor who was not blinded.

^f Risk of bias associated with a high attrition/exclusion rate.

IV- Results of individual studies

1. Counseling and self-management techniques without exercises, compared to other therapies

Among the 31 included RCTs, eleven of them looked at the effect of counseling and self-management techniques without exercises compared with other types of therapies (18, 20, 22, 24-28, 31, 36, 41, 43). All main results are reported in table 5.

One study showed that scalp acupuncture, occlusal splint treatment, and manual therapy were effective in TMD patients to reduce pain intensity. Within this study, quality of life (QOL) was only improved by occlusal splint and manual therapy treatment. Counseling and self-management techniques did not improve either pain intensity or QOL (41).

Another study demonstrated that adding occlusal splint and muscle energy technique to counseling and self-management intervention improved pain relief and mouth opening whereas counseling and self-management alone did not. Additionally, without the combination of occlusal splint and muscle energy technique, there was no benefit (43).

However, seven RCTs showed that counseling and self-management techniques were as effective as other types of therapies (20, 22, 24, 26-28, 31, 36). One study found that both hard and soft stabilization splints and counseling and self-management intervention were able to equally reduce TMD symptoms (measured with the Modified Symptoms Severity Index) and pain on palpation (22). Another study showed that physical therapy and occlusal splint were as effective as counseling and self-management alone in improving quality of life, the impact of oral health on the QOL, and pain in TMD patients (28). One study revealed that manual therapy or the use of an occlusal splint was equally effective as counseling and self-management alone in improving pain relief (36). Moreover, the integration of an NTI-tss device did not provide any additional benefit in relieving symptoms of myofascial pain and improving function than counseling and self-management (31). Similarly, two separate studies investigated the impact of adding a stabilization splint in one group and an NTI-tss in another group to a counseling and self-management intervention. Both studies observed improvements in pain intensity and indicated that simultaneous use of occlusal devices produces an earlier improvement compared to counseling and self-management interventions alone

(26, 27). The addition of a supervised exercise program was not shown to bring more benefits to pain and function (24). Finally, Craane et al showed that physical therapy was as effective as counseling and self-management alone, both therapies reduced pain, and improved jaw function and mouth opening (20).

Finally, two studies demonstrated more significant pain reduction and mouth opening improvement with counseling and self-management compared to standard dental care which included intra-oral device treatment (18, 25).

2. Counseling and self-management techniques with autonomous exercises compared to other therapies

Twelve studies included in the revue looked at the effect of counseling and self-management techniques along with exercises compared with other types of therapies.

Among these, one study looking at the effect of intra-oral myofascial therapy compared to counseling and self-management along with exercises on mouth opening, pain at rest, and pain when clenching showed greater benefits with intra-oral myofascial therapy unless regarding mouth opening (32).

On the other hand, one study demonstrated that adding another type of therapy to counseling and self-management along with exercises was more effective than self-management and exercises alone. Adding Kinesio-taping treatment to lifestyle counseling and jaw exercises yielded more benefits regarding temporal muscle and TMJ pain upon palpation, pain, function, and mouth opening, compared to lifestyle counseling and jaw exercises alone (23).

Six studies investigated the impact of counseling and self-management with exercises compared to the use of occlusal splint. Five of them found no additional benefit from the occlusal splint in relieving pain, and improving mobility or function compared to counseling and self-management along with exercises alone (19, 33, 40, 42, 45). While the other study similarly found no additional benefit in terms of self-perceived oral health-related quality of life (OHRQoL) (34). Finally, a last study showed a similar effect of low laser therapy or manual pressure release, compared to counseling and self-management with exercises alone (44).

One study revealed greater improvement in muscle pain with education and a home exercise program focused on habit-reversal techniques compared to the use of occlusal splints (38).

3. Autonomous exercises alone compared to other therapies

Three studies looked at the effect of exercises compared to other types of therapies (29, 46, 47).

Among these, one study demonstrated more significant improvements in mouth opening and pain reduction with manual therapy compared to self-therapy, where the self-therapy group consisted solely of jaw exercises (29).

On the other hand, in two separate studies, the addition of manual therapy in one case and ultrasound therapy in the other, to a home exercise program, demonstrated greater benefits in terms of pain reduction and increased mouth opening (46, 47).

4. Counseling and self-management alone compared with counseling and self-management combined with autonomous exercises

Five studies compared the effects of counseling and self-management alone versus counseling and self-management combined with exercises (21, 35, 37, 39, 48).

Two of them showed that counseling and self-management along with exercises revealed greater benefits in terms of pain relief, function, or mouth opening than counseling and self-management alone (35, 48). Additionally, despite somewhat unclear conclusions, one study's results suggested that there may have been a more significant improvement in pain on muscle palpation when exercises were added to counseling and self-management interventions (21).

However, one study indicated that the effect on pain was comparable whether counseling and self-management were administered with or without exercises (39). Another study found no significant improvement in all outcomes related to pain whether counseling and self-management were administered with or without exercises (37).

5. Education and self-management with autonomous exercises compared to education alone

A final study looked at the impact of education, comprising information about the dysfunction and TMD etiology, with self-care, involving self-management techniques and jaw exercises, on mouth opening. The results indicated that combining self-care alongside education led to a greater improvement in mouth opening (30).

TABLE 5. Main results

Counseling and self-management techniques without exercises, compared to other therapies			
Study	Groups	Main Results	Conclusion
Other therapies showing greater benefits			
Peixoto et al., 2021	G1 : counseling G2 : occlusal splint G2 : manual therapy (MT) G4 : Scalp acupuncture	No pain and QOL improvement in G1 Pain reduction in G2, G3, G4 QOL improvement in G3 <u>After 30 days</u>	OS, MT and Scalp acupuncture were effective to reduce pain intensity in the short term. Scalp acupuncture was not effective in improving QOL Counseling did not improve neither pain intensity nor QOL <u>Population:</u> TMD mixed
Greater benefits when counseling and self-management combined with other therapies			
Ram et al., 2021	G1: Education for self-management and counseling G2: Muscle energy therapy G3: Occlusal splint technique G4: Muscle energy therapy + occlusal splint technique	Pain and MMO improvement in all groups Greater improvement in pain and MMO in G2 and G4 <u>After 3 months</u>	All treatment were effective in improving pain and MMO. But greater improvement with muscle energy or muscle energy + counseling <u>Population:</u> TMD
Comparative benefits of counseling and self-management versus other therapies			
Alencar et al. 2009	G1 Non-occluding occlusal splint + counseling G2: Hard occlusal splint + counseling G3: Soft occlusal splint + counseling	Pain reduction in all groups <u>after 60 days</u> Later reduction in G1	All 3 appliances (HS, SS, NS) + counseling resulted in equally reduction of pain <u>Population:</u>
Craane et al. 2012	G1 : education and counseling G2 : Physical therapy + education	Pain and MMO improvement. Similar improvement groups in all groups 3 weeks to 53 weeks	All treatment were effective in improving pain and MMO. Physical therapy did not have an additional effect. <u>Population:</u> IIb, IIc

TABLE 5. (continued)

Counseling and self-management techniques without exercises, compared to other therapies			
Study	Groups	Main results	Conclusions
Comparative benefits of counseling and self-management versus other therapies			
Brandão et al., 2022	G1: Self care orientation G2: Exercises program + self care orientation	Pain reduction in both groups Jaw function improvement for some activities (chewing, drink, eating hard food, sex activity, swallow) in all groups Similar improvement in all groups <u>After 30 days</u>	Improvement not statistically significant <i>Limitation: small sample and short follow-up</i>
Conti et al., 2012	G1: counselling only G2: stabilization appliance + counseling G3: nociceptive trigeminal Inhibition (NTI) + counseling	Pain reduction in all groups Later in G1 (at 3 months) compared to G2 (2 weeks) and G3 (6 weeks) No pain on muscle palpation reduction in any group	All treatments resulted in significant improvement in pain Simultaneous use of stabilization splint produces earlier pain improvement <u>Population:</u> Myofascial pain
Conti et al., 2015	G1: counseling only G2: Anterior repositioning occlusal splint and counseling G3: NTI-TSS and counseling	Pain reduction in all groups Later reduction in G1, similar improvement in all groups No improvement in PPT and MOM in any group <u>After 3 months</u>	All treatment resulted in significant improvement in pain Simultaneous use of intraoral devices and counseling produces earlier pain improvement <u>Population:</u> DDWR
de Resende et al., 2021	G1: Counseling G2: Occlusal Splint G3: Manual therapy G4: Occlusal splint associated with counseling	Pain, OHQL, QOL (physical domain) improvement in all groups Similar improvement in all groups <u>After 30 days</u>	All treatments (counseling, OS, Manual therapy, OS + counseling) are effective in improving quality of life, the impact of oral health on the QOL and symptomatology <u>Population:</u> TMD

TABLE 5. (continued)

Counseling and self-management techniques without exercises, compared to other therapies			
Study	Groups	Main results	Conclusions
Comparative benefits of counseling and self-management versus other therapies			
Hasanoglu E. et al., 2017	G1 : guidance, assurance, counselling, behavioural changes G2 : guidance, assurance, counselling, behavioural changes + NTI-tss device	Pain reduction and jaw function improvement in both groups Similar improvements in both groups <u>After 6 weeks</u>	All treatments (NTI-tss device, counseling techniques) are effective in improving pain and jaw function. Combining NTI-tss device with counseling techniques did not provide additional benefit. <u>Population:</u> Myofascial pain
Melo et al., 2020	G1: counselling G2: occlusal splint G3: manual therapy G4: occlusal splint + counselling	Pain reduction in all groups Similar between groups <u>After 30 days</u>	All treatments resulted in significant improvement in pain <u>Population:</u> TMD mixed
Greater benefits of Counseling and self-management compared to other therapies			
Carlson et al., 2021	G1 : Physical self-regulation training G2 : Flat-plane intra-oral appliance + self-care instructions	Pain reduction in both groups MMO improvement in both groups Greater improvement in G1 than G2 <u>After 6 weeks</u>	Physical self regulation and standard dental therapy is effective in improving pain and ROM. PSR is as effective as standard dental therapy in the short term but provides but provides more benefits over 6 months.
Dworkin et al., 2002	G1 : Self-care intervention G2 : Usual TMD treatment condition	Pain reduction for both groups No jaw function improvement in any group Greater improvement in G1 <u>After 12 months</u>	Self care intervention and usual TMD treatment are effective in reducing pain. Self-care intervention may offer greater benefit than usual TMD treatment

TABLE 5. (continued)

Counseling and self-management techniques with exercises compared to other therapies			
Study	Groups	Main results	Conclusions
Other therapies showing greater benefits			
Kalamir et al., 2013	Pain and MMO improvement in both groups Similar improvement in both groups	Pain and MMO improvements in both groups Greater improvement in G2 <u>After 6 weeks</u>	Both treatments were effective in pain and ROM improvement. Only G2 achieved a clinically significant difference of ≥ 2 points for pain related outcomes <u>Population:</u> Myofascial pain
Greater benefits when counseling and self-management + exercises are combined with other therapies			
Benlidayi et al., 2016	G1: Lifestyle counseling + Instructions for jaw exercises G2: Lifestyle counseling + Instructions for jaw exercises + Kinesio taping	MMO improvement for both groups Pain and Jaw function improvement for G2 only Greater improvement in G2 for pain, MMO and Jaw function	Counseling and TMJ exercises combined to KT is more effective in relieving pain, improving disability and increasing the mobility of TMJ than counseling and exercise alone.
Comparative benefits of counseling and self-management + exercises versus other therapies			
Katyayan et al., 2014	G1 : counseling, instructions for masticatory muscle exercises G2 : stabilization splint therapy, counseling, masticatory muscle exercises	Pain, MMO, PMS improvement in both groups Similar improvement in both groups <u>After 6 months</u>	All treatments were effective in pain, MMO, PMS improvement. No additional benefit from the OS device. <u>Population:</u> TMD-Ia, Ib , IIa, IIb

TABLE 5. (continued)

Counseling and self-management techniques with exercises compared to other therapies			
Study	Groups	Main results	Conclusions
Comparative benefits of counseling and self-management + exercises versus other therapies			
Niemelä et al., 2012	G1 : counseling, instruction for masticatory muscle exercises G2 : stabilization splint, counseling, masticatory muscle exercises	No statistical values to conclude <u>After 6 months</u>	Use of stabilisation splint in combination with counseling and masticatory muscles exercises has no additional benefit in relieving facial pain and increasing ROM than counseling and exercises alon. <u>Population:</u> TMD mixed but without limited opening
Qvintus et al., 2015	G1 : counseling, instruction for masticatory muscle exercises G2 : stabilization splint, counseling, masticatory muscle exercises	Pain reduction in both groups Similar improvement in both groups <u>After a year</u>	All treatment equally reduced pain <u>Population:</u> TMD
Tanhan et al., 2023	G1:Exercise + patient education G2: Low-level laser therapy + Exercises + patient education G3: Manual pressure release group Exercises + patient education	Pain and MMO improvement in all groups Similar improvement in all groups <u>After 4 weeks</u>	All treatments were effective in improving pain and MMO <u>Population:</u> Cervical myofascial pain, Myofascial pain
Greater benefits of Counseling and self-management + exercises versus other therapies			
Michelotti et al., 2004	G1: Education only G2: Education + Home Physical therapy program	Pain free mouth opening improvement in G2 only <u>After 3 months</u> No improvement in PMS, Pain intensity,Pain on chewing-PPT in any groups	Education-only group did not bring more benefit than education + home PT with the exception of pain-free maximal jaw opening. Combination of education and home physical exercise may be more effective than education alone <u>Population:</u> Myofascial pain

TABLE 5. (continued)

Exercises alone compared to other therapies			
Study	Groups	Main results	Conclusions
Greater benefits of other therapies			
Gebska et al., 2023	T1: (magnetostimulation) T2: (magnetoledotherapy) T3: (magnetolaserotherapy) T4: (positional release) T5: (massage & self therapy) T6: (PIR and self therapy) T7: Self Therapy	MMO and Pain improvement in all groups	Superiority of manual therapies interventions over physical and self-therapy Population: Myofascial pain with limited mouth opening (1b)
Greater benefits when exercises combined with other therapies			
Tuncer et al., 2013	G1 : Home physical therapy G2 : Manual therapy + Home physical therapy	Pain and MMO improvement in both groups. Greater improvement in G2 <u>After 4 weeks</u>	Manual therapy + Home physical therapy was more effective in improving pain and MMO than HPT alone
Ucar et al., 2014	G1 : Home exercises G2 : Home exercises + Ultrasound	Pain and MMO improvement in both groups. Greater improvement in G2 <u>After 2 weeks</u>	Combination of home exercises + US appeared to be more effective at than home exercise alone in improving pain and MMO
Counseling and self-management alone compared with counseling and self-management combined with exercises			
Greater benefits when counseling and self-management combined with exercises			
Magesty et al., 2021	Group 1: counseling program Group 2: counseling program + jaw exercises	Pain intensity reduction in both groups Pain related disability and jaw function improved in G2 only <u>After 30 days</u>	Counseling program + jaw exercises is more effective in improving OHRQoL than counseling alone <u>Population:</u> DDWR
Simões et al., 2023	G1: TMD instructions G2: TMD instructions + jaw exercises	Pain on palpation reduction in G2 only <u>After 30 days</u>	TMD instructions combined with exercises would show greater improvement in pain on palpation <u>Population:</u> lia

TABLE 5. (continued)

Counseling and self-management alone compared with counseling and self-management combined with exercises			
Study	Groups	Main results	Conclusions
Greater benefits when counseling and self-management combined with exercises			
Wright et al., 2000	G1: self-management instructions G2: posture training + self-management instructions	Improvement in Pain, MMO, PPT-masseter in all groups Greater improvement in G2 <u>After 4 weeks</u>	Posture training and TMD self-management instructions are significantly more effective than TMD self-management instructions alone <u>Population:</u> TMD originating from masticatory muscles
Comparative benefits of counseling and self-management with or without exercises			
Michelotti et al., 2012	G1: Education only G2: Occlusal Splint	Spontaneous pain reduction only in G1 No reduction of pain during chewing MMO improved in a similar way in both groups <u>3 months</u>	Education was slightly more effective than OS without education in reducing spontaneous pain in patients with TMD. Pain free mouth opening did improve but in a similar way in both groups.
Mulet et al., 2007	G1 : self-care G2 : self-care + 6x6 Rocabado's exercises	Neck and Jaw pain reduction in both groups Similar improvement in both groups <u>4 weeks</u>	The Rocabados' exercises were not significantly more beneficial in reducing the intensity of jaw and neck pain than self-care alone. <u>Population:</u> myofascial pain
Education and self-management with exercises compared to education alone			
Giro et al. 2016	G1: Education and self-care group G2: Education group G3 : Control group	Greater improvement in MVO during mouth opening or mastication in G1 than G2 <u>After 30 days</u>	Treatment with educational and self-care therapies showed greater improvement on the pattern of mandibular movements <u>Population:</u> Ib, II

DISCUSSION

1. Main results

This systematic review is the first since the one carried out by de Freitas et al. in 2013, aiming to assess the effectiveness of counseling and self-management in TMD treatment (14). 31 RCTs were included, and all studies showed a high risk of performance bias due to a lack of blinding among therapists. Only two of them did not show other risks of bias apart from this risk of performance bias. Consequently, the overall quality of the evidence is largely uncertain. Nevertheless, the main results findings of this systematic review lend support for counseling and self-management techniques in treating TMD associated with myofascial pain, disc displacement or arthrogenous pain. It was observed in several included studies that the use of occlusal devices did not yield additional benefits compared to counseling and self-management alone. Moreover, the review indicated that including exercises alongside counseling and self-management techniques could bring additional improvements in pain reduction, jaw function, and jaw mobility.

Because counseling and self-management interventions were implemented in various forms across the studies, this aspect should be taken into consideration when interpreting the results. Indeed, the interventions involved various aspects, ranging from advising on avoiding parafunctions and improving diet and sleep to educating on the etiology of TMD, teaching breathing techniques, and prescribing home exercises.

In addition to covering various aspects, the interventions took different forms, such as oral advice and instructions, the provision of booklets containing diverse educational information and self-management techniques, and demonstrated or written exercises. In one of the studies, the intervention took the form of online modules lasting 40 minutes, to be completed weekly over 7 weeks, along with homework assignments after each (19). In another study, the counseling and self-management intervention was administered through videos, one focusing on educational instructions and the other on self-care therapies (30). Lastly, four studies used a standardized exercise program described by Carlson and Magnusson (33, 34, 40, 41).

II. Comparison with previous literature

The findings of this review, while careful consideration is advised, align with the previous review by de Freitas et al. in 2013, which shared the same objective (14). The outcome measures of their selected studies were comparable to those of the present review. They demonstrated the efficacy of counseling and other self-management therapies for treating myofascial TMD, showing similar results for spontaneous pain, muscle tenderness on palpation, and maximum opening with and without pain. Furthermore, de Freitas et al. revealed that combining counseling with interocclusal appliances did not offer additional benefits for TMD treatment. This notion is consistent with 11 studies among those included in the present review, which found no added benefit of occlusal splint treatment compared to a counseling and self-management approach (19, 22, 26-28, 34, 36, 40, 42, 43, 45). On their part, Kelemen et al. conducted a systematic review demonstrating that the additional use of splint therapy was not superior to physiotherapy. Furthermore, Fouda et al. showed no evidence of the effectiveness of splint therapy for TMD, as the benefits were insignificant and even diminished in the long term (49, 50).

De Freitas et al.'s review also revealed that including counseling and self-management techniques alongside posture training and physical therapy programs resulted in additional benefits (14). Given that "physical therapy programs" as mentioned by de Freitas include exercises, it is consistent with the present review regarding the additional benefit of incorporating exercises into a counseling and self-management intervention. Among the five studies that compared the effects of counseling and self-management alone versus counseling and self-management combined with exercises, three of them demonstrated that incorporating exercises resulted in greater benefits in terms of pain relief, function, or mouth opening compared to counseling and self-management alone (21, 35, 48). This idea is reinforced by a recent systematic review that demonstrated the significant impact of exercise therapy on pain relief and mobility in patients with TMD (51).

It is now understood that psychological factors can contribute to the onset of TMD (5). This highlights the need to consider the psychosocial aspects and thus the biopsychosocial model in TMD treatment (2, 52). Education to the patient is therefore needed to explain the role of psychological factors on TMD symptoms.

It is also known that TMD symptoms can lead to psychological distress (4). Helping with psychological distress would thus be reasonable, but it is interesting to note what was recently revealed by Luo et al. in their systematic review. They found that interventions for TMD present benefits in improving symptoms of depression and anxiety (53). Some methods are used to assist with psychological distress. Relaxation and diaphragmatic breathing are methods shown to help patients experiencing psychological distress (54). Additionally, a systematic review in 2022 indicated that these methods were beneficial for managing orofacial pain (55).

Willassen et al. have demonstrated that catastrophizing is a strong predictor for TMD (56). This highlights the importance of providing information to patients regarding TMD symptoms, this benign disorder, and its good prognosis. This information can help reassure patients and prevent the development of a tendency to catastrophize.

Furthermore, according to Buttler et al., including explanation of pain physiology into patient treatment is crucial for individuals experiencing pain. Understanding the physiology of pain, its origins, and triggers allows for better self-management of pain (57).

Finally, counseling, self-management and home exercise methods can be seen as integral components of an approach that ultimately leads to the concept of empowerment, a practice to be promoted as it has been demonstrated to be effective in improving healthcare outcomes (58). Furthermore, these methods represent cost-effective approaches, making them more accessible and thus able to reach a wider population. The economic aspect of treatments is therefore an important factor to consider in treatment selection (59).

III. Strengths and limitations of this review

This review shows notable strengths in the methodological approach used. Firstly, it conducted an extensive literature search across four major databases. Secondly, to ensure impartiality, the study selection and data extraction processes were independently conducted by two individuals (MH and RV), each blinded to the other's decisions. Furthermore, a pilot test was conducted at two stages of the process to ensure consistency in study selection and risk of bias assessment.

Additionally, a large sample size of records was selected and assessed for risk of bias using a validated Cochrane risk of bias tool. Finally, adherence to PRISMA guidelines provided a strong framework for the review process.

Another strength to highlight is that each study included one study group that received an intervention consisting of either counseling and self-management without exercises, counseling and self-management with exercises, or exercises alone. This allowed for the assessment of the isolated effect of these types of interventions.

However, the high heterogeneity of the interventions in the studies regarding counseling and self-management makes it difficult to assess the effectiveness of this approach. The authors also identified heterogeneity among the measured outcomes, as well as variations in the tools used for outcome assessment. Duration of the study interventions varied, ranging from 10 days to 12 months, and outcome measurements were conducted at different time points throughout the studies. Because of these variations, it was challenging to compare the study outcomes.

The variability among subjects of the selected studies, in terms of TMD diagnostic criteria according to RDC/TMD also adds complexity to determine which classes of TMD patients would benefit from counseling and self-management. However, regarding the studies' population, women represented 81.2% of participants, with an average age of 33.3 years. These findings align with the prevalent characteristics of the TMD patient group under investigation in this review (predominantly female, aged between 20-40 years) (1). This alignment can therefore allow the reliability of the study findings.

The therapist's profession administering the intervention was rarely specified among the 31 included studies, which is unfortunate as it would enable a better analysis of the reproducibility of these interventions in various clinical settings. Moreover, the description of the counseling and self-management approach intervention was sometimes incomplete, with only "counseling" or "self-management" mentioned for the group receiving the intervention. A detailed description was noticeably lacking.

Another inherent limitation of this study is the generally moderate methodological quality observed across the 31 studies, indicating that several

studies have significant biases. The inability of the studies' interventions to blind the clinicians treating the patients was a bias present in all selected studies. Additionally, among the 31 studies, ten studies showed a high attrition rate and seven did not conduct intention-to-treat analyses. Therefore, it is essential to interpret the results with caution.

Finally, certain statistical values necessary to determine the significance of improvements were missing in some studies, hindering conclusive analysis.

IV. Interpretation and Clinical Implications

Counseling and self-management, with or without exercises, were shown to provide benefits in terms of pain relief and jaw function in patients with TMD. This study shows that adding counseling and self-management to standard treatment yields greater benefits than standard treatment alone. However, it is important to note that factors leading to TMD are multifactorial, and patients may present different symptoms depending on their diagnostic TMD group. The response of TMD population to counseling and self-management may vary depending on their diagnosis and this aspect should be taken into consideration.

Considering the psychosocial factors that may be associated with TMD and the psychological symptoms like stress, anxiety, and depression that TMD can trigger, it becomes evident that psychological intervention should be considered if, after evaluation, these factors or symptoms are identified in the TMD patient. In line with this idea, a recent systematic review conducted by Christidis et al. demonstrated that psychological treatments could reduce pain intensity among individuals with TMD. Moreover, the review suggested that combining psychological treatment with standard treatment may lead to even better improvements (60).

A final interesting aspect highlighted in Melo et al.'s study is the idea of initially examining habits and other potential factors contributing to the onset of TMD dysfunction. This approach would enable better targeting of advice and information provided to patients according to their needs, thus offering individualized treatment (36).

V. Implication for future research

Further research is needed to establish standardized protocols for counseling and self-management interventions in TMD treatment. A standardized protocol for

counseling and self-management would facilitate the comparison of the effects of counseling and self-management intervention alone with those of other therapies. Additionally, ensuring consistency in the terminology used to describe treatment techniques such as counseling, self-management, self-care, patient education, and home exercise program is essential.

CONCLUSIONS

This systematic review suggests, although with an uncertain quality of evidence, that counseling and self-management techniques provide benefits in terms of pain relief and jaw function in treating individuals with TMD. Combining counseling and self-management with standard treatment shows greater benefits compared to standard treatment alone. Moreover, including exercises alongside counseling and self-management techniques may lead to further improvement in pain reduction and jaw mobility.

Establishing a common terminology for treatment techniques like counseling, self-management, self-care, patient education, and home exercise programs is crucial. Subsequently, future studies could adopt this terminology and also benefit from a standardized protocol for counseling and self-management interventions in TMD treatment. This would facilitate the comparison of the effects of counseling and self-management interventions alone with those of other therapies.

Acknowledgments

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ABBREVIATION

NSAID: Non-steroidal anti-inflammatory drugs
AMO: Active mouth opening
GCPS CPI: Graded Chronic Pain Scale Characteristic Pain Intensity
GCPS DS: Graded Chronic Pain Scale Disability Scale
iMPP: internet-based multimodal pain program
JFLS: jaw functional limitation scale
LM: lateral movement
MCS: mean change score
MFIQ: The Mandibular Function Impairment Questionnaire
MMO: maximal mouth-opening
Mod-SSI: modified symptom severity index
MPQ : Mc Gill Pain Questionnaire
MVO: maximal vertical opening
N/A: not applicable
NGRS: numerical graphic rating scale
NRS: numerical rating scale
NS: not specified
ns: non-significant
NTI-tss device: nociceptive trigeminal inhibition-tension suppression system
PPT: pressure pain threshold
PPT-m, pain pressure threshold masseter
PPT-t, pain pressure threshold temporalis
QOL: quality of life
RDC: Research Diagnostic Criteria for TMD assessment
SS: smallest detectable difference in millimeters
Sx: symptoms
TMD : temporomandibular joint
VAS: visual analog scale
VRS: verbal rating scale
WHOQOL: World Health Organization Quality of Life

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Appendix 1. PRISMA 2020 Checklist



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	

Appendix 1. (continued)



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: <http://www.prisma-statement.org/>

APPENDIX.

Appendix 2. Search strategies

Search strategy for Embase:

('temporomandibular joint'/exp OR 'jaw disease'/exp OR 'jaw disease':ti,ab,kw OR 'jaw diseases':ti,ab,kw OR 'articulation temporomandibularis':ti,ab,kw OR 'craniomandibular joint':ti,ab,kw OR 'craniomandibular joints':ti,ab,kw OR 'jaw joint':ti,ab,kw OR 'jaw joints':ti,ab,kw OR 'joint, mandibular':ti,ab,kw OR 'joint, mandibulotemporal':ti,ab,kw OR 'mandible joint':ti,ab,kw OR 'mandible joints':ti,ab,kw OR 'mandibular joint':ti,ab,kw OR 'mandibular joints':ti,ab,kw OR 'mandibulotemporal joint':ti,ab,kw OR 'mandibulotemporal joints':ti,ab,kw OR 'temporo mandibular joint':ti,ab,kw OR 'temporo mandibular joints':ti,ab,kw OR 'temporomandibular articulation':ti,ab,kw OR 'temporomandibular articulations':ti,ab,kw OR 'temporomandibular joint':ti,ab,kw OR 'temporomandibular joints':ti,ab,kw OR 'temporomandibular joint meniscus':ti,ab,kw OR 'temporomandibular joint disorder'/exp OR 'costen syndrome':ti,ab,kw OR 'craniomandibular disorder':ti,ab,kw OR 'craniomandibular disorders':ti,ab,kw OR 'craniomandibular joint syndrome':ti,ab,kw OR 'temporomandibular dysfunction':ti,ab,kw OR 'temporomandibular dysfunctions':ti,ab,kw OR 'temporomandibular joint disease':ti,ab,kw OR 'temporomandibular joint diseases':ti,ab,kw OR 'temporomandibular joint disorder':ti,ab,kw OR 'temporomandibular joint disorders':ti,ab,kw OR 'temporomandibular joint dysfunction':ti,ab,kw OR 'temporomandibular joint dysfunctions':ti,ab,kw OR 'temporomandibular joint dysfunction syndrome':ti,ab,kw OR 'temporomandibular joint pain':ti,ab,kw OR 'temporomandibular joint syndrome':ti,ab,kw OR 'temporomandibular joint syndromes':ti,ab,kw OR 'temporomandibular disorder':ti,ab,kw OR 'temporomandibular disorders':ti,ab,kw OR 'temporomandibular disease':ti,ab,kw OR 'temporomandibular diseases':ti,ab,kw)

AND

('counseling'/exp OR 'counseling':ti,ab,kw OR 'counselling':ti,ab,kw OR 'self care'/exp OR 'self care':ti,ab,kw OR 'self management':ti,ab,kw OR 'self treatment':ti,ab,kw OR 'self-management':ti,ab,kw OR 'self-nurturance':ti,ab,kw OR 'selfcare':ti,ab,kw OR 'selfmanagement':ti,ab,kw OR 'selftreatment':ti,ab,kw OR 'patient education'/exp OR 'education, patient':ti,ab,kw OR 'patient education':ti,ab,kw OR 'patient education as topic':ti,ab,kw OR 'patient medication knowledge':ti,ab,kw)

Search strategy for PubMed:

((("temporomandibular joint disorders"[MeSH Terms]) OR ("jaw diseases"[MeSH Terms]) OR "disorder, temporomandibular joint"[Title/Abstract] OR "disorders, temporomandibular joint"[Title/Abstract] OR "joint disorders, temporomandibular" [Title/Abstract] OR "TMJ disorders"[Title/Abstract] OR "disorder, TMJ"[Title/Abstract] OR "disorders, TMJ"[Title/Abstract] OR "TMJ disorder"[Title/Abstract] OR "disorder, temporomandibular"[Title/Abstract] OR "disorders, temporomandibular"[Title/Abstract] OR "disease, temporomandibular joint"[Title/Abstract] OR "diseases, temporomandibular joint"[Title/Abstract] OR "TMJ diseases"[Title/Abstract] OR "disease, TMJ"[Title/Abstract] OR "diseases, TMJ"[Title/Abstract] OR "TMJ disease"[Title/Abstract] OR "craniomandibular

Appendix 2. (continued)

joint"[Title/Abstract] OR "craniomandibular joints"[Title/Abstract] OR "jaw joint"[Title/Abstract] OR "jaw joints"[Title/Abstract] OR "mandibular joint"[Title/Abstract] OR "mandibular joints"[Title/Abstract] OR "temporo mandibular joint"[Title/Abstract] OR "temporo mandibular joints"[Title/Abstract] OR "temporomandibular articulation"[Title/Abstract] OR "temporomandibular articulations"[Title/Abstract] OR "temporomandibular joint"[Title/Abstract] OR "temporomandibular joints"[Title/Abstract] OR "temporomandibular joint meniscus"[Title/Abstract] OR "temporomandibular joint disorder"[Title/Abstract] OR "costen syndrome"[Title/Abstract] OR "craniomandibular disorder"[Title/Abstract] OR "craniomandibular disorders"[Title/Abstract] OR "temporomandibular dysfunction"[Title/Abstract] OR "temporomandibular dysfunctions"[Title/Abstract] OR "temporomandibular joint disease"[Title/Abstract] OR "temporomandibular joint diseases"[Title/Abstract] OR "temporomandibular joint disorder"[Title/Abstract] OR "temporomandibular joint disorders"[Title/Abstract] OR "temporomandibular joint dysfunction"[Title/Abstract] OR "temporomandibular joint dysfunctions"[Title/Abstract] OR "temporomandibular joint dysfunction syndrome"[Title/Abstract] OR "temporomandibular joint pain"[Title/Abstract] OR "temporomandibular joint syndrome"[Title/Abstract] OR "temporomandibular joint syndromes"[Title/Abstract] OR "temporomandibular disorder"[Title/Abstract] OR "temporomandibular disorders"[Title/Abstract] OR "jaw disease"[Title/Abstract] OR "jaw diseases"[Title/Abstract] OR "temporomandibular disease"[Title/Abstract] OR "temporomandibular diseases"[Title/Abstract])

AND (((("self-management" [MeSH Terms]) OR ("self management"[Title/Abstract] OR "management, self"[Title/Abstract])) OR ("self care" [MeSH Terms])) OR ("care, self"[Title/Abstract] OR "self-care"[Title/Abstract])) OR ("patient education as topic"[MeSH Terms])) OR ("education, patient"[Title/Abstract] OR "patient education"[Title/Abstract] OR "education of patients"[Title/Abstract]))

Search Strategy for Cinahl:

“tempormandibular joint diseases” OR **“jaw diseases”** OR "temporomandibular joint diseases" OR "temporomandibular joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular joint syndrome" OR "temporomandibular joint dysfunction" OR "temporomandibular disorder" OR "temporomandibular disorders"

AND

“counseling” OR **“counseling”** OR **“counselling”** OR "self management" OR **“self-management”** OR **"self care"** OR **“self care”** OR **“self-care”** OR **“self treatment”** OR **"patient education"** OR "patient education" OR **"Coping assistance (Iowa NIC)"** OR **“behavior modification”**

Appendix 2. (continued)

Search Strategy for Cochrane Central:

“temporomandibular joint disorders” OR **“jaw diseases”** OR "articulation temporomandibularis" OR "craniomandibular joint" OR "craniomandibular joints" OR "jaw joint" OR "jaw joints" OR "joint, mandibular" OR "joint, mandibulotemporal" OR "mandible joint" OR "mandible joints" OR "mandibular joint" OR "mandibular joints" OR "mandibulotemporal joint" OR "mandibulotemporal joints" OR "temporo mandibular joint" OR "temporo mandibular joints" OR "temporomandibular articulation" OR "temporomandibular articulations" OR "temporomandibular joint" OR "temporomandibular joints" OR "temporomandibular joint meniscus" OR "temporomandibular joint disorder" OR "costen syndrome" OR "craniomandibular disorder" OR "craniomandibular disorders" OR "craniomandibular joint syndrome" OR "temporomandibular dysfunction" OR "temporomandibular dysfunctions" OR "temporomandibular joint disease" OR "temporomandibular joint diseases" OR "temporomandibular joint disorder" OR "temporomandibular joint disorders" OR "temporomandibular joint dysfunction" OR "temporomandibular joint dysfunctions" OR "temporomandibular joint dysfunction syndrome" OR "temporomandibular joint pain" OR "temporomandibular joint syndrome" OR "temporomandibular joint syndromes" OR "temporomandibular disorder" OR "temporomandibular disorders" OR “joint disease, temporomandibular” OR “joint diseases, temporomandibular” OR “disorders, temporomandibular” OR “joint disorders, temporomandibular” OR “disease, TMJ” OR “TMJ disorder” OR “disorders, temporomandibular joint” OR “disorder, TMJ” OR “disorder, temporomandibular” OR “disease, temporomandibular joint” OR “diseases, temporomandibular joint” OR “disorders, TMJ” OR “TMJ Disease” OR “TMJ diseases” OR “diseases TMJ” OR “joint disorder, temporomandibular” OR “TMJ disorders” OR “disorder, temporomandibular joint” OR "jaw disease" OR "jaw diseases" OR “temporomandibular disease” OR “temporomandibular diseases”

AND

“counseling” OR “counseling” OR “counselling” OR **“self care”** OR “self-care” OR “self care” OR “care, self” OR **“self-management”** OR “self-management” OR “self management” OR “management, self” OR **“patient education as topic”** OR “patient education” OR “education of patients” OR “education, patient ”

Appendix 3. Cochrane Risk of Bias Tool (RoB1)

Cochrane Risk of Bias Tool

Use the modified Cochrane Collaboration tool to assess risk of bias for randomized controlled trials. Bias is assessed as a judgment (high, low, or unclear) for individual elements from five domains (selection, performance, attrition, reporting, and other).

AUB KQ1 Risk of Bias Assessment (Reference ID #)

Domain	Description	High Risk of Bias	Low Risk of Bias	Unclear Risk of Bias	Reviewer Assessment	Reviewer Comments
<i>Selection bias</i> Random sequence generation	Described the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups	Selection bias (biased allocation to interventions) due to inadequate generation of a randomized sequence	Random sequence generation method should produce comparable groups	Not described in sufficient detail	High Low Unclear	
<i>Selection bias</i> Allocation concealment	Described the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen before or during enrollment	Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment	Intervention allocations likely could not have been foreseen in before or during enrollment	Not described in sufficient detail	High Low Unclear	
<i>Reporting bias</i> Selective reporting	Stated how the possibility of selective outcome reporting was examined by the authors and what was found	Reporting bias due to selective outcome reporting	Selective outcome reporting bias not detected	Insufficient information to permit judgment†	High Low Unclear	
<i>Other bias</i> Other sources of bias	Any important concerns about bias not addressed above*	Bias due to problems not covered elsewhere in the table	No other bias detected	There may be a risk of bias, but there is either insufficient information to assess whether an important risk of bias exists or insufficient rationale or evidence that an identified problem will introduce bias	High Low Unclear	

* If particular questions/entries were pre-specified in the study's protocol, responses should be provided for each question/entry.

† It is likely that the majority of studies will fall into this category.

Assess each main or class of outcomes for each of the following. Indicate the specific outcome.

Appendix 3. (continued)

AUB KQ1 Risk of Bias Assessment (Reference ID #)

Outcome:

Domain	Description	High Risk of Bias	Low Risk of Bias	Unclear Risk of Bias	Reviewer Assessment	Reviewer Comments
<i>Performance bias</i> Blinding (participants and personnel)	Described all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provided any information relating to whether the intended blinding was effective.	Performance bias due to knowledge of the allocated interventions by participants and personnel during the study.	Blinding was likely effective.	Not described in sufficient detail	High Low Unclear	
<i>Detection bias</i> Blinding (outcome assessment)	Described all measures used, if any, to blind outcome assessors from knowledge of which intervention a participant received. Provided any information relating to whether the intended blinding was effective.	Detection bias due to knowledge of the allocated interventions by outcome assessors.	Blinding was likely effective.	Not described in sufficient detail	High Low Unclear	
<i>Attrition bias</i> Incomplete outcome data	Described the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. Stated whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported.	Attrition bias due to amount, nature or handling of incomplete outcome data.	Handling of incomplete outcome data was complete and unlikely to have produced bias	Insufficient reporting of attrition/exclusions to permit judgment (e.g., number randomized not stated, no reasons for missing data provided)	High Low Unclear	

Appendix 4. Variety of Counseling, Self-Management, and Exercise Techniques in Study Interventions (as described in the studies)

Alencar et al., 2009	Counseling: -Education about TMD condition, etiologically contributing factors -Explanation about resting postural position of the mandible (teeth apart, lips slightly touching, tongue not pushing against teeth) -Instruction to perform simultaneous bilateral mastication (not to load any TMJ or masticatory muscles)
Benlidayi et al., 2016	Lifestyle counseling: no more details Instruction for jaw exercises: -ROM exercises (right and left laterotrusions, active mouth opening, protrusion) -Strengthening exercises (towards patient's own fingers resistance for 8 sec) Parameters: 8 repetitions, 3x/day for 6 weeks
Brandão et al., 2022	Self-care orientation: -To control not opening the mouth widely, avoiding hard food, and oral parafunction <i>Group 2: exercise program added to self-care orientation</i>
Carlson et al., 2021	<u>PSR: Self-care and + specific physical self-regulation strategies</u> -Information concerning the role of pain and possible etiologic mechanisms -Specific physical self-regulation strategies for management of the presenting pain complaints -7 specific domains: monitoring and reducing muscle parafunction in the head and neck region, proprioceptive awareness training to improve symmetric head and neck region, instructions for improving sleep onset, position-oriented relaxation training, physical activity, nutrition/fluid management, training in diaphragmatic breathing. 1st session (50 minutes): presentation of 6 domains 2nd session (50 minutes) 3 weeks later: 6 domains reviewed + diaphragmatic training 1-page handout: summary of the entire protocol <u>Group 2: self-care instructions included general information regarding etiology and self-care strategies for managing myofascial pain (eat soft food, relax the jaw during the day).</u>
Conti et al., 2012	Counselling: -Instructions about beneficial behavioral changes, containing information about relaxation techniques, sleep hygiene, diet modification, thermotherapy and massage in the painful area, avoidance of caffeine and daytime clenching -A printed version of the instructions was given
Conti et al., 2015	Behavioral counseling: -Instructions about relaxation techniques, sleep hygiene, diet modification, hot thermotherapy, avoidance of caffeine, and awaking clenching

Appendix 4. (continued)

Craane et al., 2012	Information and instruction to the patient: -Information about normal jaw function, that overuse/misuse or parafunction could enhance or provoke their complaints. -Instructions to keep the jaw muscles relaxed, to avoid non-functional tooth contacts, excessive mouth opening -Instructions were given orally and a brochure with the instructions was also given
de Resende et al., 2021	Counseling: -Information about the etiology of TMD and possible harmful and parafunctional habits, such as biting a pen, nails, mouth corners; chewing gum; conscious teeth tightening; and wide mouth opening for eating and yawning. -Information about the importance of physical exercises, avoiding caffeinated drinks at night, body posture, and good quality of sleep was also advised.
Dworkin et al., 2002	Self-care: -Education about the biopsychosocial model of TMD, chronic pain, the multifaceted aspects of TMD etiology, management methods, rationale for self-management -Guided reading with structured feedback: rationale for breathing, relaxation methods, knowledge about TMD, communicating with health care providers, emotions, bodily changes -Relaxation and stress management training -Self-monitoring of signs and symptoms -Development of personal TMD self-care plan -Supervised practice and reinforcement of dentist-prescribed self-care treatment -Maintenance and relapse prevention <i>G2: physiotherapy, patient education (parafunctional oral behaviors, diet, nature of the condition), medications, intraoral flat plane occlusal appliances.</i>
Gebska et al., 2023	Self-therapy = therapeutic exercise program: Gerry's exercises: active opening and closing mouth Active exercises for lateral movements of the mandible Side-to-side exercises with a pencil held between teeth Protrusion and mouth opening: Parameters: 10x, 6x/day

Appendix 4. (continued)

Giro et al. 2016	<u>Video of educational instructions:</u> -Reassurance about the problem, the structures involved, the possible causes, and the good prognosis for these disorders -Information about self-care related to the mandibular muscles, emphasizing that overuse of these muscles could be one of the causes of the signs and symptoms of TMD -Instruction to keep the mandibular muscles relaxed, to avoid harmful oral habits and excessive mandibular movement. <u>Video on self-care therapies:</u> -Teaches a sequence of procedures: - Thermotherapy (moist heat pads on the painful muscle 15min 3x/day) - Mandibular exercises (to improve strength, coordination, and mobility) repeated 6 times 3x/day - Self massage 3x/day -Written instructions about TMD education and the sequence of self-care procedures that they should perform daily at home <i>G2: only the second video was shown.</i>
Hasanoglu E. et al., 2017	Guidance, assurance, counseling, behavioral changes. No more details.
Kalamir et al., 2013	Education and self-care: -Short scripted lectures on the basic anatomy, biomechanics, pathophysiology of the TMJ, role of stress -Slow diaphragmatic breathing exercises and general advice on relaxation awareness -Advice on avoidance of potentially problematic foods (nuts, chewing gum, etc.) -Exercises to stimulate, stretch the joint capsule, and relax masticatory muscles -Guided and controlled jaw excursions: opening guided with patient hand -Post isometric stretches: resisted isometric contraction of 10 seconds in lateral deviation and opening
Katyayan et al., 2014	Counseling: no more details Standardized exercise program: described by Carlson and Magnusson -Active movements: mouth opening, laterotrusion, protrusion -Resisted movements: opening, laterotrusion, protrusion -Stretching : opening(10-20sec) -Parameters: 7-10x/session, 2-3x/day Demonstration and written instructions were given
Kokkola et al. 2018	Counseling: no more details Standardized exercise program: described by Carlson and Magnusson -Active movements: mouth opening, laterotrusion, protrusion -Resisted movements: opening, laterotrusion, protrusion -Stretching : opening(10-20sec) -Parameters: 7-10x/session, 2-3x/day Demonstration and written instructions were given

Appendix 4. (continued)

Lam et al. 2020	Guided internet-based multimodal pain program: 7 modules, 40 min/module, 1/week. Based on CBT and SM principles, designed to be used without guidance 7 treatment modules + homework assignments (offline activities) after every module 1-Information about the treatment program, CBT, goal setting 2-Information about etiology, epidemiology, TMD pain, anatomy, masticatory system 3-Information about modulating and maintaining factors of TMD, pain physiology, acute and chronic pain, the link between quality of life and TMD pain 4-Info. about treatment alternatives including analgesics, relaxation, jaw exercises, different OS, acupuncture, massage 5-Information about stress responses, the link between stress and pain 6-Information about stress and pain management, breathing exercises, diet, sleep, training, time management, setting boundaries and acceptance, continued relaxation and jaw exercises 7-Information about setbacks and maintenance planning, a summary of the program
Magesty et al., 2021	Counseling Program: -Diet changing, limited to soft foods -Avoid habits that overload the masticatory muscles, such as chewing gum, also, avoid yawning, yelling, singing, and long sessions at the dentist -Avoid parafunctional habits like biting nails and pencils -Application of hot compress over the painful area for 10 min until feeling tingling: 2-4x/day -Keep the teeth separated, and maintain good posture -Trying to improve sleep quality -Decrease caffeine intake
Melo et al., 2020	Counseling: - Investigation made first into habits and other factors that might be responsible for the etiology of the patient's dysfunction -Oriented guidelines according to personal needs -Information about the general characteristics of the disease, so that patients understood their condition and felt able to manage it themselves. - A written booklet with dietary guidelines, physical exercises, deleterious habits, and instructions on correct mandibular function, posture, and sleep hygiene.
Michelotti et al., 2004	Patient education: - General info about self-care of jaw musculature - Information about the problem, suspected etiology, and good prognosis of this benign disorder - Information about normal jaw function, the overuse of the muscles that could be the major cause of their complaints - Instruction to pay close attention to their jaw muscle activity, to avoid oral habits and excessive mandibular, to keep to a soft diet, to keep the jaw muscles relaxes by holding the mandible in its postural position (teeth apart) -Information about the relationship between chronic pain and psychosocial distress

Appendix 4. (continued)

Michelotti et al., 2012	Education: -Information about self-care of jaw musculature. -Home exercise program focused on habit-reversal techniques. -Reassurance: explain the problem, the suspected etiology, and the good prognosis for this benign disorder -Info. about the normal jaw muscle function, emphasizing that overuse of these muscles could be one of the causes of their pain. -Advice to pay close attention to their jaw muscle activity, to avoid their usual oral habits and excessive mandibular movements, to follow a soft diet, and to keep the muscles relaxed. -Information about the relationship between chronic pain and psychosocial stress.
Mulet et al., 2007	Self-care: -Optimistic counseling, patient education, reassurance about TMD symptoms, encouragement to rest the masticatory muscles, application of heat and ice, control of maladaptive behaviors (tooth clenching, grinding, caffeine intake, gum chewing, stomach sleeping, resting the jaw on the hand, wide opening of the mouth, implementation of a pain-free diet, bilateral chewing, calcium intake) <i>Group 2: Self-care + Rocabado's exercises</i>
Niemelä et al., 2012	Counseling: no more details Standardized exercise program: described by Carlson and Magnusson -Active movements: mouth opening, laterotrusion, protrusion -Resisted movements: opening, laterotrusion, protrusion -Stretching : opening(10-20sec) -Parameters: 7-10x/session, 2-3x/day Demonstration and written instructions were given
Peixoto et al., 2021	Counseling: verbal and written guidelines, reinforced within 15 days Explanation about the general characteristics of the dysfunction, to be able to self-manage themselves Flyer with dietary guidelines and recommendations on physical exercises, harmful habits, posture, sleep hygiene
Qvintus et al., 2015	Counseling: no more details Standardized exercise program: described by Carlson and Magnusson -Active movements: mouth opening, laterotrusion, protrusion -Resisted movements: opening, laterotrusion, protrusion -Stretching : opening(10-20sec) -Parameters: 7-10x/session, 2-3x/day Demonstration and written instructions were given

Appendix 4. (continued)

Ram et al., 2021	Education for SM and counseling: - Education regarding the diagnosis and generally favorable prognosis of TMD when appropriate, reassurance that TMD is a typically benign condition and self-limiting in the vast majority of cases - Education about the biopsychosocial etiology of TMD, sleep practices, time-limited use of analgesics, anatomy, and functions of TMJ and associated musculature - Education about identification, monitoring, and avoidance of any parafunctional behavior that can exacerbate the pain and were made conscious to avoid daytime clenching, clicking, or grinding of teeth - Advice to avoid unilateral chewing gum, to take proper rest and sleep, to deep breathing exercises - Advice for a pain-free diet for 2 weeks followed by a review to check the tolerance to firmer consistency foundation to apply moist heat to the area of discomfort for 10 min each time for 2-3 days
Simões et al., 2023	Counseling Program: -Diet changing, limited to soft foods -Avoid habits that overload the masticatory muscles (chewing gum, yawning, yelling, singing, long sessions at the dentist) -Application of hot compress over the painful area for 20 minutes. Cold compress over the painful area for 10 min until feeling tingling (2-4x/day) -Keep teeth separated -Maintaining good posture -Trying to improve sleep quality -Avoid parafunctional habits like biting nails and pencils -Decrease caffeine intake
Tanhan et al., 2023	Patient education: -Advice about reducing parafunctional habits, psychological factors, and pain sensation -Suggestion for reducing pain in daily life -Booklet with all the information, including illustrations of the exercises Exercises (based on Rocabado and Kraus exercises): -Tongue position at rest, isometric exercises in all directions, neuromuscular control (goldfish), chin tucks, correction of body posture, cervical stretching and strengthening -Parameters 3X6 repetitions/day, 3x/week
Truelove et al., 2006	Recommendations: -Jaw relaxation, reduction of parafunction, thermal packs, NSAIDs, passive opening stretches -Suggestion about stress reduction -Self-care strategies -Advice to avoid narcotic analgesics, antidepressant medications, use of non-study prescribed splint

Appendix 4. (continued)

Tuncer et al., 2013	Education concerning the presumed etiology of the pain -Ergonomic advice -Breathing exercises, relaxation techniques -Posture correction exercises -Mandibular exercises (active and repetitive assisted muscle stretching, mouth -opening, and closing, medial and lateral gliding, resistance exercises)
Ucar et al., 2014	Patient education and exercise therapy: -Techniques for dealing with TMJ pain through lifestyle changes -Coping mechanisms -Ergonomic regulation -Exercise program: - Slow active and passive mouth opening and closing exercises, resistive mouth exercises -Parameters: 10x6sec, 2x/day
Wright et al., 2000	TMD self-management instructions: -Encouragement to rest their masticatory muscles, to improve their posture -Advice to become aware of parafunctional habits (teeth clenching...) and to eliminate them -Advice to apply heat/ cold to the most painful masticatory areas -Advice to use over-the-counter NSAID <i>G2: Self-management and exercises: chin tucks, chest stretch, wall stretch, on-your-back chest stretch, face down arm lifts (strengthening)</i>

Appendix 5. Data extraction

Study	Interventions	Outcomes	Main results (95%CI) - Intra groups	Main results (95%CI) - Between groups
Alencar et al., 2009	G1 (NS): non-occluding occlusal splint + counseling (14) G2 (HS): Hard occlusal splint + counseling (14) G3 (SS): Soft occlusal splint + counseling (14)	Objective pain (muscular palpation on masseter, temporalis, pterygoid muscle = total number of extraoral muscles sites on a scale 0-3) Subjective pain (modified-SSI) Follow Up: Baseline 7 days 30 days 60 days 90 days	<u>Pain on palpation</u> at baseline/7d/ 30d/ 60d/ 90d G1:0.8 (0.9)/ 0.7(0.9)/ 0.6(0.9)/0.5(0.9)/ 0.3(0.7) -> Significant improvement at 60, 90 days: $P \leq 0.05$ G2: 0.9(0.8)/ 0.7(0.8)/ 0.5(0.8)/ 0.3(0.5)/ 0.3(0.5) -> Significant improvement at 30, 60, 90 days: $P \leq 0.05$ G3: 0.8 (0.8)/ 0.6(0.8)/ 0.5(0.7)/ 0.5(0.7)/ 0.3(0.6) -> Significant improvement at 90 days: $P \leq 0.05$ <u>Pain Mod-SSI</u> at baseline/7d/ 30d/ 60d/ 90d G1: 0.54(0.07)/0.39(0.2)/0.30(0.26)/0.27(0.25)/ 0.24(0.24) -> Significant improvement at 60, 90 days: $P \leq 0.05$ G2: 0.57(0.17)/ 0.33(0.23)/ 0.33(0.21)/0.24(0.2)/ 0.31(0.2) -> Significant improvement at 30, 60, 90 days: $P \leq 0.05$ G3: 0.67(0.15)/ 0.37(0.23)/ 0.31(0.23)/ 0.28(0.2)/ 0.30(0.26) -> Significant improvement at 30, 60, 90 days: $P \leq 0.05$	<u>Pain on palation:</u> In G1, improvement started after 60 days, later than in G2, but before G3? <u>Pain Mod-SSI:</u> In G1, improvement started after 60 days, later than in G2, G3.

Appendix 5. (continued)

Benlidayi et al., 2016	G1(CG): Lifestyle counseling + Instructions for jaw exercises (16) G2(ExpG): Lifestyle counseling + Instructions for jaw exercises + Kinesio taping (17)	Active mouth opening (AMO) Pain on palpation (VAS for masseter, temporal muscle, TMJ) Pain score (Biobehavioral Questionnaire) Follow up: Functional limitation (FL) Baseline 1st week 6th week	AMO (cm) : G1: p1-0: 0.002 p6-0: 0.002 G2: p1-0: 0.002 p6-0: 0.001 -> significant improvement for G1, G2 from baseline VAS-t (cm) : G1: p1-0: 0.180 p6-0: 0.414 G2: p1-0: 0.042 p6-0: 0.018 -> significant improvement for G2 from baseline VAS-m (mm) : G1: p1-0: 0.180 p6-0: 0.414 G2: p1-0: 0.042 p6-0: 0.018 -> significant improvement for G2 from baseline VAS-tmj (cm) : G1: p1-0: 0.246 p6-0: 0.216 G2: p1-0: 0.030 p6-0: 0.011 -> significant improvement for G2 from baseline FL : G1: p1-0: 0.655 p6-0: 0.414 G2: p1-0: 0.001 p6-0: 0.001 -> significant improvement for G2 from baseline Pain score : G1: p6-0: 1.000 G2: p6-0: 0.001 -> significant improvement for G2 from baseline	<u>AMO (cm)</u> : P1-6: 0.003 -> Statistically significant difference, greater improvement in G2 <u>VAS-t (cm)</u> : P6-0: 0.005 -> Statistically significant difference greater improvement in G2 after 6 weeks <u>VAS-m (cm)</u> : P6-0: 0.090 No difference between groups. <u>VAS-tmj (cm)</u> : P6-0:0.046 -> Statistically significant difference from baseline, greater improvement in G2. <u>FL</u> : P6-0: 0.000 -> Statistically significant difference, greater improvement in G2 <u>Pain score (BQ): 1st week/6th week</u> P : 0.001/0.000 -> Statistically significant difference from baseline to 1st and 6th, greater improvement in G2.
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Appendix 5. (continued)

Study	Interventions	Outcomes	Main results (95% CI) - Intra groups	Main results (95% CI) - Between groups
Brandão et al., 2022	G1 (CG): Self care orientation (11) G2(Exp.G): Exercises program: 2x30-minute sessions 2x/week + self care orientation (12)	Pain Functional limitation (FL) Follow-up Baseline 30 days after	<u>Pain</u> -> Degree of disability associated with pain improved in G1, G2 <u>FL (% of subjects):</u> ->No statistical values : N/A	<u>Degree of pain:</u> Effect size (ϵ^2): 0 ->No difference between groups <u>Functional limitation:</u> Effect size (ϵ^2): 0.07 ->No difference between groups <i>*Epsilon square for effect size</i>
Carlson et al., 2021	G1 (PSR): Physical self-regulation training G2 (SDC): Standard dental care: Flat-plane intra-oral appliance + self-care instructions <i>SC instructions for G2: general information regarding etiology and self care strategies for managing myofascial pain (eat soft food, relax the jaw during the day). PSR : SC + specific physical self-regulation strategies</i>	Pain (self-monitored VAS-mm) Pain severity (MPI-Multidimensional Pain Inventory, score 0-6) Active mouth opening without pain (AMO-mm) Active mouth opening with pain (AMO-mm) Follow-up: Baseline 6 weeks after 26 weeks after	<u>Pain daily self-monitored:</u> P: 0.002 Significant reduction during the initial 6-w treatment for PSR and SDC <u>Pain severity (0-6):</u> P: 0.000 Significant reduction for PSR and SDC <u>AMO W/O pain :</u> P:0.001 Significant improvement for PSR and SDC <u>AMO with pain :</u> P: 0.02: Significant improvement in PSR	<u>Pain daily self-monitored:</u> Effect-size: 0.57: Greater significant reduction in PSR Pain severity (0-6): Effect-size: 0.67 <i>Focused a priori contrast P < 0.05 at 26 weeks: Greater significant reduction in PSR</i> <u>AMO W/O pain :</u> Effect size: 0.45 <i>Focused a priori contrast P < 0.05 at 26 weeks: Greater significant improvement in PSR</i> <u>AMO with pain :</u> Effect-size: 0.33 <i>Focused a priori contrast P < 0.05 at 26 weeks: Significant improvement in PSR</i>

Appendix 5. (continued)

Conti et al., 2012	G1: counselling only (14) G2: stabilisation appliance + counseling (21) G3: nociceptive trigeminal Inhibition (NTI) + counseling (16)	Pain (VAS) Pressure Pain Treshold (PPT) Follow up: Baseline 2 weeks after 6 weeks after 3 months after	<u>Pain (VAS)</u> -> Significant decrease (P<0.005) for all groups <u>PPT(kgf cm-2):</u> For anterior, middle and posterior temporalis, superficial and deep masseter: ->No significant differences detected within groups	<u>Pain (VAS)</u> Significant decrease took longer (3months) in G1 compared to G2 and G3 <u>Pain (VAS value) reduced by half</u> (% of patients): -> High percentage of subjects responsive to treatment in G2, G3 (decrease of their VAS values by at least 50%) <u>PPT (kgf cm-2):</u> ->No significant differences between groups
Conti et al., 2015	G1-control: counseling only G2: Anterior repositionning occlusal splint and counseling G3: NTI-TSS and counseling NTI-tss= Nociceptive Trigeminal Inhibition Clenching Suppression System	Pain intensity (VAS) Pain pressure threshold (PPT) Maximal opening mouth (MOM) Follow up: Baseline 2 weeks 6 weeks 3 months	<u>Pain (VAS)</u> Significant decrease in pain intensity (p<0.05) for all groups <u>PPT (kgf/cm2)</u> ->No difference within groups at different times <u>MOM: (mm)</u> ->No difference within groups at different times	<u>Pain (VAS)</u> Baseline/3 months Significant decrease in pain intensity appears at 3 months for G1, at 2 weeks for G2 and G3 -> Faster significant improvements for G2 and G3 compared to G1 Greater significant decrease in pain intensity in G2 compared to G1 <u>PPT (kgf/cm2)</u> -> No difference between groups at different times <u>MOM:</u> -> No difference between groups at different times

Appendix 5. (continued)

Craane et al., 2012	G1 (control): education and counseling G2 (PT): Physical therapy + education	Pain intensity (PI-VAS) Pressure Pain threshold masseter and temporal muscle (PPT-m, PPT-t) Maximal active mouth opening (MMOa) Maximal passive mouth opening (MMOp) MFIQ Follow Up: (T0-T5) Baseline, 3 weeks, 6 weeks, 12 weeks, 26 weeks, 52 weeks	<u>PI-VAS:</u> T0-T5: G1: 46.5 G2: 39.5 <u>PPT-m</u> (kgf/cm2) T0-T5 G1:55.8 G2 :33.7 <u>PPT-t</u> (kgf/cm2) T0-T5 G1: 92.7 G2: 60.5 <u>MMOa</u> (mm) T0-T5 G1:10.1 G2: 7.8 <u>MMOp</u> (mm) T0-T5 G1: 9.4 G2:7.9 <u>MFIQ</u> T0-T5 G1 19.1 G2:18.5 -> Significant improvement overtime for all outcomes	PI-VAS, PPT-m, PPT-t, MMOa, MMOp: -> No significant difference between groups
de Resende et al., 2021	G1(C): Counseling G2(OS): Occlusal Splint G3(MT): Manual therapy G4(OSC): Occlusal splint associated with counseling	Pain (VAS) Impact of OHQL (OHIP-14) Quality of life- WHOQOL (physical domain) Follow up: Baseline 30 days after	<u>Pain (VAS)</u> P-value overtime: <0.001 Effect size overtime: 0.277 (large) -> significant decrease over time in all groups <u>OHQL (OHIP)</u> P overtime: <0.001 Effect size overtime: 0.489 (large) -> significant decrease over time in all groups <u>WHOQOL (physical domain)</u> P overtime: <0.001 Effect size overtime: 0.257 (large)-> significant decrease over time in all groups	<u>Pain (VAS)</u> P-value between groups: 0.260 Effect size 0.048 (small) -> no significant difference between groups <u>OHQL (OHIP)</u> P between groups: 0.961 Effect size 0.003 (small) -> no significant difference between groups <u>WHOQOL (physical domain)</u> at baseline/ 30 days P between groups: 0.254 Effect size 0.046 (small) -> no significant difference between groups

Appendix 5. (continued)

Dworkin et al., 2002	G1 (SC): Self-care intervention G2 (UT): Usual TMD treatment condition (UT=physiotherapy, patient education, medications, intraoral flat plane occlusal appliances)	Pain intensity (scale 0 -10) Pain related activity interference (scale 0 -10) Painful extraoral muscle palpation (scale 0-10) Follow up: Baseline, Post-tx 6 months, 12 months	<u>Pain</u> Decrease for both groups <u>Pain related activity interference</u> G1 showed a fairly sustained decrease over the entire period G2 decline gradually over the first 6 months <u>Vertical Jaw range of motion</u> -> no data (figure 3) <u>Painful extraoral muscle palpation</u> (scale 0-10) G1 : decrease of 1.3 painful muscle sites, P: 0.002 -> significant improvement	<u>Pain</u> After 12 months: P=0.036 -> More marked decline for G1 from post treatment time to 12 months. <u>Pain related activity interference</u> After 12 months: P=0.01 -> Significantly greater interference at 12 months in G2 than in G1 <u>Vertical Jaw range of motion</u> -> NS between groups <u>Painful extraoral muscle palpation</u> (scale 0-10) After 12 months: P=0.007 -> Significantly greater decrease in G1 compared to G2 after 12 months
Gebska et al., 2023	Control group: without TMD; T1: Physical Therapy (magnetostimulation); T2: Physical therapy (magnetoelectrotherapy); T3: Physical therapy (magnetolaserotherapy); T4: Manual Therapy (positional release); T5: Manual therapy (massage & self therapy); T6: Manual therapy (PIR and self therapy); T7: Self Therapy	TMJ mobility (MMO-mm) Pain intensity (NRS) Follow up: After each tx day (1-10)	MMO: effect of 10 days therapy P < 0.001 -> significant improvement in all groups NRS: P < 0.001 -> significant improvement in all groups	Statistical differences (p<0.001) in all parameters between control group and T1-T7 NRS+A11:F14, MMO: Effect of 10 days therapy between groups: -> Greater improvement in T4, T5, T6 compared to T1, T2, T3, T7 => More favourable therapeutic effect by manual therapies (T4-T6) compared to physical therapies (T1-T3)

Appendix 5. (continued)

Giro et al. 2016	G1(ESG): Education and self-care group G2(EG): Education group G3 (CG): Control group	MMO: effect of 10 days therapy P < 0.001 -> significant improvement in all groups NRS: P < 0.001 -> significant improvement in all groups		<u>MVO during maximum mouth opening: $\Delta T0-T1$</u> G1: $\Delta T0-T1$: 5.1 $\pm$ 3.4 G2: $\Delta T0-T1$: 1.8 $\pm$ 3.5 G3: $\Delta T0-T1$: 0.9 $\pm$ 3.8 <u>MVO during masticatory cycle: T0-T1</u> G1: $\Delta T0-T1$: 1.4 $\pm$ 1.1 G2: $\Delta T0-T1$: -0.3 $\pm$ 1.7 G3: $\Delta T0-T1$: 0.5 $\pm$ 1.5 No statistical values	<u>MVO during maximum mouth opening: T0/T1/T2</u> $\Delta T0-T1$: P=0.012 -> At T1: Improvement in MVO (>5mm) in G1(ESG) significantly higher than in G2(EG), G3(CG) <u>MVO during masticatory cycle: $\Delta T0-T1$: P=0.065</u> -> At T1: Improvement in MVO significantly higher in G1(ESG) than in G2(EG). *statistically significant differences P<0.05)
Hasanoglu E. et al., 2017	G1 (CG): guidance, assurance, counselling, behavioural changes G2 (NTI-tss): guidance, assurance, counselling, behavioural changes + NTI-tss device	Pain (100-mm VAS) Jaw function (self assessment-100-mm VAS)	Baseline 3 weeks 6 weeks	<u>Severity of pain</u> -> Significant difference at 3 and 6 weeks compared to baseline for both groups: P=0.000 <u>Jaw dysfunction</u> -> Significant improvement at 6 weeks compared with baseline: P=0.003	<u>Severity of pain</u> No significant difference between groups: P=0.922 (>0.05) <u>Jaw dysfunction</u> No significant difference between groups: P=0.927 (>0.05)

Appendix 5. (continued)

Kalamir et al., 2013	G1(ESC): Education and self-care group G2(IMT): intra-oral myofascial therapy group	Pain at rest (RP) Opening pain (OP) Clenching pain (CP) Opening range (OR) in mm Follow up: Baseline 6 weeks	Average change (6weeks vs baseline) <u>RP, OP, CP:</u> -> Statistically significant reductions in pain at 6 weeks for G1 and G2 but only G2 group achieved a clinically significant difference of ≥ 2 points <u>OR:</u> -> Statistically significant improvement from baseline for G1, G2. Minimum clinically significant range change of 5mm was not achieved.	RP, OP, CP: difference of ≥ 2 points = clinically significant <u>Average adjusted pain scores at 6 weeks (98.3%CI)</u> <u>RP:</u> G2 vs G1: P value <0.001 <u>OP:</u> G2 vs G1: P value <0.001 <u>CP:</u> G2 vs G1: P value <0.001 -> Statistically significant difference between groups. Greater improvement in G2 <i>Minimum clinically significant range change (≥ 2 points) not achieved between groups</i> <u>OR:</u> P=0.416 -> no significant difference between groups <i>Minimum clinically significant range change (≥ 5mm) not achieved between groups</i>
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Appendix 5. (continued)

Katyayan et al., 2014	G1 (CG): counseling, instructions for masticatory muscle exercises G2 (SP): stabilization splint therapy, counseling, masticatory muscle exercises	Pain intensity-VAS Anterior maximal opening (AMO) Number of painful muscle sites (PMS) Follow up: Baseline 6 months after treatment	Pain - mean difference: G1: 1.9875 G2: 2.2350 AMO(mm) - mean difference : G1: -1.0875 G2: -1.6650 PMS - mean difference: G1: 2.150 G2: 2.900 P-values for all outcomes in all groups <0.0001 -> significant difference in G1 and G2	Difference between means Pain: P= 0.182 AMO: P= 0.119 PMS: P= 0.169 -> no significant difference between groups.
Kokkola et al. 2018	G1 (CG): counselling, instruction on masticatory home exercises G2 (SG): stabilization splint treatment, counselling, instruction on masticatory muscle home exercises	OHRQoL (OHIP questionnaire) -Functional limitation -Physical pain -Physical disability	<u>Severity mean= sum of OHIP-14 impacts reported</u> (range 0-56) Baseline/ 3 months/6 months/ 1 year G1: 15.94/ 14.84/ 11.46/11.86 G2: 17.57/ 12.05/ 15.95/ 13.17 No statistical values to conclude	No statistically significant differences between groups in any of the OHIP variables

Appendix 5. (continued)

Lam et al. 2020	G1 (iMPP G): guided internet- based multimodal pain program (based on CBT and SM principles), 7 modules, 40min/module, 1/week. G2 (OS): occlusal splint	Pain intensity (PI) - GCPS Pain related disability - Graded Chronic Pain Scale Disability Score Jaw Functional limitation (JFL)- Jaw functional limitation scale-8 Follow up: Baseline 3 months 6 months	<u>PI:</u> 3months/6months G1: -1.3/-1.6 G2: -2.0/-2.5 -> significant reduction at 3 and 6 months for G2 <u>PrD:</u> 3months/6months G1 G: 0.0 / 0.0 G2: -0.3/-0.7 <u>JFL:</u> 3months/6months G1: -0.5/ -0.5 -> significant reduction at 6 months G2: 0.0/ -0.8 -> significant reduction at 6 month	P-value N/A P=0.003/ 0.001 P-value N/A N/A P-value P= 0.06/ 0.02 P= 0.09/0.02	P values at 3 mon,ths/ 6 months PI: P=0.58 / P=0.41 PrD: P=0.51/ P=0.12 JFL: P=0.45/ P=0.90 ->No significant difference between groups at any follow-up
Magesty et al., 2021	Group 1: counseling program Group 2: counseling program + jaw exercises	OHRQL (OHIP-14): Jaw functional limitation (JFL) Pain Intensity (PI) Pain related disability (PrD) Follow up: Baseline 30-days post treatment:	<u>JFL:</u> baseline/30 days G1: 0.30/0.36 P value = 0.458 G2 : 0.36/0.09 P value= 0.024 ->Statistically significant decrease in G2 <u>PI:</u> baseline/30 days G1: 2.73/1.76 P value = 0.015 G2 : 3.06/1.00 P value <0.001 ->Statistically significant decrease in G1, G2 <u>PrD:</u> baseline/30 days G1: 0.70/0.39 P value = 0.109 G2 : 0.61/0.15 P value = 0.048 ->Statistically significant decrease in G2		At 30-days <u>JFL:</u> P value = 0.052 G1: 0.06 G2: -0.26 -> no significant difference between groups <u>PI:</u> P value = 0.004 G1: -0.96 G2: -2.11 ->Greater significant decrease in G2 <u>PrD:</u> P value = 0.398 G1: -0.30 G2: -0.50 -> NS difference between groups

Appendix 5. (continued)

Melo et al., 2020	G1(CS): counseling (28) G2(OS): occlusal splint (28) G3(MT): manual therapy (28) G4(OSCS): occlusal splint + counselling (28)	Pain (VAS) Follow up: Baseline 30 days	<u>Pain</u> : mean at baseline/ 30 days G1(CS): 5.00/ 4.41 G2(OS): 3.50/ 1.82 G3(MT): 3.43/ 1.76 G4(OSCS): 4.68/ 2.52 P-value over time: <0.001 -> Statistically significant reduction after 30 days in all groups.		P-value between groups = 0.260 No significant difference between groups
Michelotti et al., 2004	G1: Education only G2: Education + Home Physical therapy program which is a self supportive exercise program	No. of sites tender to palpation -PMS Pain intensity (100-mm VAS) - PI Pain-free maximum opening (mmm) -PfMO Pain on chewing (100-mm VAS) - PoChew Pain Pressure threshold (kPa)- PPT Follow up: Baseline 3 months	PMS: mean at baseline/ 3months G1: 15.2 ± 3.8 / 8.78 ± 5.34 G2: 15.0 ± 4.1 / 8.27 ± 4.84 PI: mean at baseline/ 3months G1: 21.6 ± 19.5 / 10.8 ± 13.1 G2: 29.3 ± 7.5 / 8.1 ± 14.4 PfMO: mean at baseline/ 3months G1: 43.2 ± 6.4/ 47.4 ± 6.2 G2: 41.3 ± 7.5 / 50.7 ± 4.8 PoChew: mean at baseline/ 3months G1: 24.9 ± 23.3/ 17.8 ± 24.5 G2: 23.3± 25.6/ 10.8 ± 19.7 PPT-m: mean at baseline/ 3months G1: 139.7 ± 37.6/ 138.1 ±43.1 G2: 141.5 ± 58.3/138.5 ± 44.6 PPT-t: mean at baseline/ 3months G1: 152.8 ±44.7 / 154.9 ± 45.0 G2: 152.1 ±46.6/ 161 ± 55.5	P value NS NS P value NS NS P value P=0.017 NS P value NS NS Pvalue NS NS	<u>PfMO</u> : P-value = 0.017 -> significantly greater improvement in G1 <u>PMS, PI, PoChew, PPT-m, PPT-t</u> : -> no significant differences

Appendix 5. (continued)

Michelotti et al., 2012	G1: Education only G2: Occlusal Splint	Spontaneous muscle pain Pain during chewing Maximum pain-free mouth opening (MMO pain-free) Follow up: Every 3 weeks, during 3 months	<u>Spontaneous muscle pain:</u> -> Significant change in G1 across time (P=0.017) -> No significant change in G2 across time (P=0.540) <u>Pain during chewing:</u> -> No significant change across time ($F \geq 1.1$; $P \geq 0.106$; $ES \leq 0.10$) <u>MMO pain-free:</u> means (SD) -> Significant change over time (F=12.1; P= 0.001)	<u>Spontaneous muscle pain:</u> P=0.034; ES: 0.33 -> Significant differences between groups Significant reduction in G1 and not in G2. <u>Pain during chewing:</u> $F \geq 1.1$; $P \geq 0.106$; $ES \leq 0.10$ -> No significant difference between groups <u>MMO pain-free:</u> -> No significant difference between groups ($F = 0.41$; $P = 0.528$; $ES = 0.20$).
Mulet et al., 2007	G1 (SC): self-care (22) G2 (SC+): self-care + 6x6 Rocabado's exercises (20)	Pain intensity in masticatory muscle -PI-jaw(NGRS) Pain intensity in masticatory muscle -PI-jaw (VAS) Pain intensity in neck muscle-PI-neck (NGRS) Pain intensity in neck muscle PI-neck (VRS) Follow up: Baseline Week 1 Week 4	<u>PI-jaw (NGRS):</u> mean at baseline/ 4weeks/change G1: 5.16 ± 0.29 / 3.05 ± 0.26 / -2.11 ± 0.26 P < 0.001 G2: 5.60 ± 0.31 / 3.40 ± 0.27 / -2.20 ± 0.27 P < 0.001 -> Significant decrease after 4 weeks in G1, G2 <u>PI-jaw(VAS):</u> mean change G1: -0.73 P=0.006 G2: -0.65 P=0.006 -> Significant decrease for G1, G2 (clinically significant) <u>PI-neck (NGRS):</u> mean change, P value G1: -1,18 P=0.002 G2: -1.60 P=0.002 -> Significant decrease for G1, G2 (clinically significant) <u>PI-neck (VAS)</u> mean change G1: -0.50 P=0.01 G2: 0.62 P=0.01 -> Significant decrease for G1, G2 (clinically significant)	<u>PI-jaw (NGRS):</u> At baseline/ 4weeks/change P values between groups: P=0.30/ 0.35/ 0.82 -> No significant difference, similar change in both groups. <u>PI-jaw (VAS):</u> Change: P=0.068 -> No significant difference, similar change in both group <u>PI-neck (NGRS):</u> Change: P=0.69 -> No significant difference, similar change in both group <u>PI-neck (VAS):</u> Change: P=0.62 -> No significant difference, similar change in both group

Appendix 5. (continued)

Niemelä et al., 2012	G1 : counseling, instruction for masticatory muscle exercises (41) G2 : stabilisation splint, counseling, masticatory muscle exercises (39)	Pain intensity (VAS) Active mouth opening (AMO) Number of painful muscle sites TMJ pain on palpation (TMJ PoP) Follow up: Baseline 1month after	<u>Pain intensity (VAS):</u> mean (s.d) at Baseline/ 1 month G1: 4.8 (2.4) / 4.0 (2.6) G2: 5.3 (2.8) /3.4 (3.2) ->No statistical value to confirm a decrease <u>Active mouth opening (AMO):</u> mean (s.d) at Baseline/ 1 month G1: 46.6 (7.5) / 46.5 (7.8) G2: 44.6 (9.1) / 45.9 (8.7) -> No statistical value to confirm an improvement in G2 <u>Number of painful muscle sites:</u> mean (s.d) at Baseline/ 1 month G1: 8.9 (4.7)/ 9.3 (5.3) G2: 10.1 (3.8) / 9.5 (4.6) -> No statistical value to conclude <u>TMJ PoP (% of patients):</u> mean (s.d) at Baseline/ 1 month G1: 26 (70.3) / 20 (54.1) G2: 19 (48.7) / 21 (53.8) -> No statistical value to confirm a decrease in G1 or increase in G2	<u>VAS:</u> P-value between groups after 1 month: P=0.11 <u>AMO:</u> P-value between groups after 1 month: P=0.13 <u>TMJ PoP (% of patients):</u> P-value between groups after 1 month: P=0.35 ->No statistically significant difference in change in any outcome between groups
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Appendix 5. (continued)

Peixoto et al., 2021	G1 (C): counseling (24) G2 (OS): occlusal splint (20) G3 (MT): manual therapy (19) G4 (SA): Scalp acupuncture (18)	Pain intensity (VAS) QOL (WHOQOL-Bref) <u>Follow up:</u> Baseline 30 days after treatment	PI (VAS): mean at baseline/ 30 days G1 (C): 4.53 (2.61) / 4.40 (2.82) P= 0.843 G2 (OS): 4.53 (3.11) / 2.33 (1.54) P= 0.01 G3 (MT): 3.60 (2.22) / 1.46 (2.06) P= 0.014 G4 (SA): 4.40 (2.79) / 2.46 (2.50) P= 0.015 -> Significant improvement in G2, G3, G4 <u>QOL (WHOQOL):</u> Physical domain: mean at baseline/ 30 days P-values G1: 58.33 (12.71) / 60.23 (15.25) P=0.444 G2: 60.71 (13.22) / 67.83 (13.56) P = 0.056 G3: 65.24 (11.72) / 75.0 (8.32) P= 0.011 G4: 61.42 (13.58) / 66.66 (16.17) P=0.102 -> Significant improvement over time in G3 only	PI (VAS): P- value between groups at baseline/ 30 days P= 0.794/ 0.015 -> Significant difference between groups Mann-Whitney post test P = 0.004 -> Significant difference only between G3 (MT) and G1 (C) <u>QOL (WHOQOL)-Physical domain:</u> P- value between groups at baseline/ 30 days P= 0.367 / 0.058 -> No significant difference between groups
Qvintus et al., 2015	G1 (41): counseling, instruction for masticatory muscle exercises G2 (39) : stabilisation splint, counseling, masticatory muscle exercises	Pain intensity-PI (VAS) <u>Follow up:</u> Baseline 1 month, 3 months 6 months, 1 year	<u>PI (VAS):</u> mean (SD) at baseline/ 1 year/ change G1 (C): 4.59 (2.57)/3.37 (2.84)/1.22 (2.64) G2 (OS+C): 5.22 (2.78)/4.24 (3.00)/0.97 (3.12) -> significant decrease in both group	<u>PI (VAS):</u> P-values across between groups Baseline: P=0.301 1 year: P=0.189 Change: P=0.707 ->No statistically significant difference between groups

Appendix 5. (continued)

Ram et al., 2021	G1: Education for self-management and counseling (40) G2: Muscle energy therapy (40) G3: Occlusal splint technique (40) G4: Muscle energy therapy + occlusal splint technique (40)	Pain intensity -PI (VAS) MMO (Maximal mouth opening) Follow up: Baseline 1 week 2 weeks 1 month 3 months	<u>PI (VAS): mean at baseline/ 1 month/ 3 months</u> G1: 5.45 (±1.28)/ 3.75 (±1.70)/ 3.47 (±1.98) G2: 6.05 (±1.32)/ 1.62 (± 1.23)/ 1.22 (±1.20) G3: 5.75 (±1.41)/ 2.24 (±1.30)/ 1.49 (±1.45) G4: 6.10 (±1.53)/ 1.43 (±1.37)/ 0.89 (±1.17) -> No statistical values to conclude <u>MMO (mm): baseline/ 1 month/ 3 months</u> G1: 35.51(±2.69)/ 35.76 (±2.90)/ 36.07 (±2.91) G2: 35.31 (±3.42)/ 39.74 (± 3.26) / 39.98 (±3.27) G3: 35.85 (±2.61)/ 36.48 (± 2.35)/ 37.16 (±2.61) G4: 34.45 (±3.10)/ 38.84 (± 3.20)/ 39.47 (±3.17) -> No statistical values to conclude G2, G3, G4 : Significant reduction in pain and improvement in MMO after 3 months	<u>PI (VAS)</u> P values intergroups at baseline/1w/ 2w/1m/3m: P=0.11/ 0.08/ 0.02 / <0.001 / <0.001 ->No significant difference at 1 and 2 weeks ->Significant difference at 1 and 3 months Between groups (mean difference) at 1m/ 3m G2 vs G1: -2.13 / -2.25 P < 0.001/ P < 0.001 G3 vs G1: -1.51 / -1.98 P < 0.001/ P < 0.001 G4 vs G1 : -2.32 / -2.58 P < 0.001/ P < 0.001 -> Compared to Group1, G2, G3 and G4 had a significant difference at 1 month and 3 months, pain improved significantly more in G2,G3,G4 <u>MMO (mm)</u> P values intergroup at baseline/1w/ 2w/1m/3m: P= 0.22/ 0.55/ 0.002/ <0.001/ < 0.001 -> Significant difference at 1 and 3 months Between groups (mean difference) at 1m/3m G2 vs G1: -3.98 / 3.92 P < 0.001 / P < 0.001 G3 vs G1: -0.72 / -1.09 P < 0.29 / P=0.13 G4 vs G1 : -3.07 / -3.40 P < 0.001/ P < 0.001 -> Compared to Group 1, only G2 and G4 had a significant difference at 1 month and 3 months. No significant difference between G3 and G1 after 1 or 3 months
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Appendix 5. (continued)

Simões et al., 2023	G1: TMD instructions (36) G2: TMD instructions + jaw exercises (36)	Pain (palpation at specific points, pain scale (0-3) Oral health (OHIP-14) <u>Follow up:</u> Baseline 24h 7 days 30 days	<u>Pain on palpation</u> at baseline/ 24h/ 7 days/ 30 days TMJ (right side): G1: P=0.016 G2: P=0.059 TMJ (left side): G1: P=0.033 G2: P=0.001 Medium masseter (right side): G1: P= 0.115 G2: P= 0.004 Medium masseter (left side): G1: P=0.096 G2: P= 0.025 G1 and G2 were effective in improving outcomes	<u>Pain on palpation:</u> G2 showed higher efficacy across time compared to G1
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Appendix 5. (continued)

Tanhan et al., 2023	G1: E-Exercise + patient education (20) G2: LLLT-Low-level laser therapy + Exercises + patient education (17) G3: MPR - Manual pressure release group Exercises + patient education (22)	TMJ activity pain (VAS) Maximum mouth opening (MMO) Pressure pain threshold (PPT) of muscle <u>Follow up:</u> Baseline After 4 weeks of therapy	Mean at baseline / 4 weeks/ difference <u>TMJ pain</u> (VAS): G1: 1.55 (2.11)/0.60 (1.23)/ 0.95 (1.31) P<0.001 G2: 2.2 (1.6)/ 0.64 (0.93)/ 1.6 (1.2) P<0.01 G3: 1.6 (1.7)/ 0.72(1.07)/ 0.95 (1.04) P<0.01 -> Significant improvement in all groups <u>MMO:</u> G1: 3.99 (0.62)/ 4.48 (0.62)/ 0.48 (0.38) p<0.001 G2: 4.3(0.49)/ 4.74 (0.52)/ 0.44 (0.47) p<0.01 G3: 4.24 (0.62)/ 4.65 (0.52)/ 0.4 (0.42) p<0.001 -> Significant improvement in all groups <u>PPT (right temporal):</u> G1: 12.78 (5.0)/ 16.4 (5.47)/ 2.61 (2.68) G2:10.58 (4.60)/ 14.94 (5.74)/ 4.35 (4.42) G3: 8.84 (3.69)/15.9 (6.34)/ 7.06 (4.79) <u>PPT (left temporal):</u> G1: 13.32 (6.73)/ 15.37 (6.88)/ 2.05 (3.49) G2: 11.53 (4.36)/ 17.53 (6.26)/ 6 (4.6) G3: 10.31 (6.10)/ 17.13 (5.41)/ 6.81 (5.41) <u>PPT (right masseter):</u> G1: 5.76 (4.03)/ 8.11 (3.99)/ 2.35 (2.31) G2: 5.08 (3.53)/ 9.76 (4.39)/ 4.67 (4.16) G3: 3.61 (1.67)/ 8.2 (3.74)/ 4.59 (2.85) <u>PPT (left masseter):</u> G1: 4.77 (2.68)/ 7.57 (4.28)/ 2.8 (2.8) G2: 5.12 (3.89)/ 9.34 (4.76) / 4.21 (2.26) G3: 4.11 (2.09)/ 8.2 (3.16)/ 4.9 (2.94) -> P< 0.001: Significant difference in all groups for masseter and temporal PPT-values across time	P-values: G2, G3, G4 compared to G1 at baseline /4-w/difference <u>TMJ pain</u> (VAS) -> No significant difference G1-G2: 0.121/ 0.541/ 0.086 G1-G3:0.614/ 0.067/ 0.821 G2-G3: 0.225/ 1/ 0.074 <u>MMO</u> -> No significant difference G1-G2: 0.146/ 0.108/ 0.426 G1-G3: 0.160/0.216/0.287 G2-G3: 0.943/0.589/0.700 <u>PPT (right temporal):</u> G1-G2: 0.064/ 0.436/ 0.257 G1-G3: 0.001 / 0.411/ <0.001 G2-G3: 0.212/ 0.887/ 0.030 -> Higher values in G3 compared to G1, G2 <u>PPT (left temporal):</u> G1-G2: 0.502/ 0.401/ 0.008 G1-G3: 0.112/0.545/ 0.002 G2-G3: 0.202/0.723/0.702 -> Significant difference for G2, G3 compared to G1. G2 and G3 left temporal PPT values are higher than in G1. <u>PPT (right masseter):</u> G1-G2:0.658/ 0.285/ 0.033 G1-G3: 0.151/ 0.879/ 0.011 G2-G3: 0.230/0.274/ 0.733 -> Significant difference for G2, G3 compared to G1. G2 and G3 right masseter PPT values are higher than in G1. <u>PPT (left masseter):</u> -> No significant difference G1-G2: 0.951/ 0.285/ 0.112 G1-G3: 0.360/ 0.596/0.136 G2-G3: 0.599/0.513/0.932
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Appendix 5. (continued)

Truelove et al., 2006	G1 (UT): Usual conservative self-care treatment (64) G2 (HS): UT + conventional flat-plane hard acrylic splint (68) G3 (SS): UT + soft vinyl splint (68)	Characteristic pain intensity (the mean of present, average, worst TMD related pain in the past 2 months)- CPI Vertical Jaw opening Muscle and TMJ palpation pain (PoP) Limitation in chewing (% of participants) <u>Follow up:</u> Baseline 3 months 6 months 12 months	<u>CPI:</u> Average score for G1,G2,G3 (mean) At baseline: 5.5 (1.9) At 12 months: 3.1 (2.3) P < 0.001 -> Significant decrease from baseline to 12 months <u>Vertical Jaw opening:</u> P > 0.2 -> No significant improvement from baseline to 3 and 12 months <u>PoP: mean number of 16 extraoral muscles sites</u> at baseline / 3 months/ 6 months G1: 6.1 (3.1)/ 4.3 (4.0)/ 4.5 (4.5) G2: 7.3 (4.5)/ 5.6 (5.4)/ 3.6 (4.1) G3: 6.7 (3.8)/ 4.7 (4.1)/ 4.1 (4.4) <u>PoP: mean number of 4 intraoral muscles sites</u> at baseline / 3 months/ 6 months G1: 2.7 (1.3)/ 2.5 (1.6)/ 2.6 (1.4) G2: 3.0 (1.2)/ 3.0 (1.4)/ 2.6 (1.6) G3: 3.0 51.2)/ 2.8 (1.6)/ 3.0 (1.4) <u>PoP : mean number of 4 TMJ sites</u> at baseline/ 3 months/ 6 months G1: 1.5 (1.0)/ 1.1 (1.3)/ 0.8 (0.9) G2: 1.5 (1.1)/ 1.3 (1.5)/ 0.9 (1.1) G3: 1.2 (1.1)/ 1.1 (1.4)/ 1.0 (1.0) -> Decrease for extraoral muscle sites and 4 TMJ sites -> No change from baseline for 4 intraoral muscle sites <u>Limitation in chewing</u> (% of participants) at baseline/3 months/6 months G2: 22/ 4/ 11 G3: 16/ 7/ 6 G1: 19/ 8 /8 -> Percentage of participants reporting limitation in chewing significantly decreased	<u>CPI:</u> At baseline, 3 months, 6 months , difference between groups (P-value) P>0.40 ->No significant difference, comparable decrease for all groups across time <u>Muscle sites and TMJ sites palpation:</u> At baseline, 3 months, 6 months , difference between groups (P-value) P>0.2 -> No significant differences between groups on palpation of 16 extraoral muscle sites, 4 intraoral muscle sites, 4 TMJ sites -> comparable decrease for 16 extraoral sites -> comparable decrease for 4 TMJ sites <u>Limitation in chewing</u> : difference between groups across time (P-values) At baseline: P=0.66 At 3 months: P=0.70 At 6 months: P=0.59 -> No significant difference, comparable decrease in all groups
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Appendix 5. (continued)

Tuncer et al., 2013	G1 (HPT): Home physical therapy (20) G2 (MT-HPT): Manual therapy + Home physical therapy (20)	Pain intensity at rest (VAS) Pain intensity with stress (VAS) Pain free maximum mouth opening (MMO) <u>Follow up:</u> Baseline 4 weeks (at the end of the period)	<u>VAS at rest</u> (mm) at baseline/ 4 weeks G1: 17.5 (21.5)/ 4.5 (10.0) G2: 23.0 (23.6)/ 0.5 (2.2) -> significant decrease in both groups (P<0.001) <u>VAS with stress</u> (mm) at baseline/ 4 weeks G1: 66.5 (20.6)/ 43.5 (20.8) G2: 62.5 (20.5)/ 7.0 (12.6) -> significant decrease in both groups (P<0.001) <u>MMO</u> (mm) at baseline/ 4 weeks G1: 39.0 (6.1)/ 41.4 (4.7) G2: 38.6 (6.7)/ 44.4 (4.4) -> significant increase in both groups	<u>VAS at rest:</u> P-value time*treatment P<0.15-> No significant difference between groups <u>VAS with stress:</u> P-value time*treatment P<0.001 -> Significant decrease greater in G2 (MT-HPT) compared to G1 (HPT) <u>MMO:</u> P-value time*treatment P=0.009 -> Greater increase in G2 <u>SDD</u> after 4 weeks: G1: 4.4 G2: 10.0 -> clinical effectiveness of treatment in the MT-HPT group
Ucar et al., 2014	G1 (HE): Home exercises (22) (18) G2 (HE + US): Home exercises + US (22) (20)	TMJ pain (VAS) Pain free mouth opening (MMO) <u>Follow up:</u> Baseline 2 weeks after	Values expressed as median (25-75th percentiles) <u>TMJ pain</u> (VAS) at baseline/ 2 weeks / difference G1: 40 (28-60)/ 26 (16-44)/ 14 G2: 42 (30-58)/ 18 (14-36)/ 24 -> Decrease in both groups <u>MMO (mm)</u> at baseline/ 2 weeks G1: 28 (22-30)/ 36 (34-40)/ 8 G2: 28 (21-31)/ 42 (38/46)/ 14 -> Improvement in both groups	TMJ pain scores and pain-free MMO increased more in G2 (HE+US) than in G1 (HE)

Appendix 5. (continued)

Wright et al., 2000	G2: self-management instructions (30)G1: posture training + self-management instructions (30)	TMD symptoms (modified-SSI) Maximum pain free opening (MMO) Masseter muscle pressure pain threshold (PPT-m) <u>Follow up:</u> Baseline 4 weeks after	<u>TMD sx (VAS 0-100):</u> mean at baseline/4w/improvement G1: 59.5 (18.3)/ 56.3 (20.9)/ 3.2 (10.7) G2: 61.4 (16.1)/ 38.6 (19.9)/ 22.8 (15.9) P<0.001 -> significant improvement <u>MMO (mm):</u> mean at baseline/4w/improvement G1: 33.2(10.1)/ 34.4 (11.6)/ 1.2 (5.6) G2: 32.9 (12.5)/ 38.2 (11.5)/ 5.3 (8.8) P<0.05 -> significant improvement <u>PPT-m (kg/cm2):</u> mean at baseline/4w/improvement G1: 2.80 (0.80)/ 2.83 (0.99)/ 0.03 (0.56) G2 2.63 (0.98) /3.18 (1.22)/ 0.55 (0.86) P<0.05 -> significant improvement	<u>TMD sx:</u> G1: Mean reduction was 5.3 G2: Mean reduction was 22.8 -> Significantly greater reduction in G2 (PT+SM) <u>MMO:</u> G1: Mean MMO increased by 1.2mm G2: Mean MMO increased by 5.3mm -> Significantly greater increase in G2 (PT+SM) <u>PPT-masseter:</u> G1: Mean improvement was 0.03 kg/cm2 G2: Mean improvement was 0.55 kg/cm2 ->No statistical value to conclude
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ABSTRACT

Background : Temporomandibular disorders (TMD) are characterized by pain or dysfunction in the jaw joint or associated structures, impacting daily life and often accompanied by psychological symptoms. Risk factors include somatization, mood disorders, parafunctional habits, and stress, with higher prevalence among adults aged 20 to 40 years. Therapeutic approaches vary widely, with physiotherapy, jaw exercises, and manual therapy among the most commonly considered effective. Conservative treatments, including counseling and self-management, are recommended for managing TMD. Counseling and self-management techniques empower patients to manage their symptoms and improve their quality of life. This systematic review aims to provide an updated assessment of the effectiveness of counseling and self-management on patients with TMD suffering from pain or limited jaw function.

Methods: A literature search was conducted in four databases by two independent reviewers to identify randomized controlled trials that compared counseling and self-management approach with other types of therapies. Included RCTs were assessed with the Cochrane Risk of Bias tool.

Results: 31 randomized controlled trials were included. Two studies favored other therapies over counseling and self-management intervention. In 17 studies, counseling and self-management approaches demonstrated comparable benefits to other types of therapies. four studies indicated greater benefits from counseling and self-management interventions compared to other therapies. Four studies showed the additional benefits of including exercises into counseling and self-management intervention. Lastly, four studies showed that combining counseling and self-management with other therapies led to better improvements compared to these therapies administered alone.

Limitations: The heterogeneity of interventions and outcome measurements across studies on counseling and self-management present difficulties in assessing their effectiveness. A generally moderate methodological quality was noted across the 31 included studies, resulting in an overall uncertain quality of evidence.

Conclusions: Counseling and self-management techniques offer benefits for individuals with TMD, in pain relief and jaw function. Combining these approaches with standard treatment shows greater efficacy than standard treatment alone. Including exercises alongside counseling and self-management may further improve outcomes. Standardizing terminology and protocols can enhance future research comparability in TMD management.