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Physiotherapy in the Management of Painful Temporomandibular Disorders: A Critical Narrative Review

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ABSTRACT: Painful temporomandibular disorders (TMD) are a common cause of orofacial pain involving the masticatory muscles, temporomandibular joints, or both. Physiotherapy is widely used, but the effectiveness of individual interventions and their added value over active care remain uncertain. This review aimed to critically examine physiotherapy for painful TMD in adults, focusing on clinical presentation, comparative effectiveness and function. Targeted PubMed and Google Scholar searches covered English-language publications since January 2010. Supplementary searches and reference-list screening were also used. Guidelines, systematic reviews, meta-analyses and relevant controlled studies were synthesised narratively. Exercise and selected manual therapy techniques may reduce pain; exercise may also improve maximum mouth opening. However, physiotherapy has not consistently provided additional benefit over education and self-management. Cervical rehabilitation may reduce short-term pain in adults with myogenous TMD, although evidence is heterogeneous and effects on mandibular function remain uncertain. Photobiomodulation and transcutaneous electrical nerve stimulation may provide short-term relief compared with control conditions, although their added benefit over active care remains uncertain. TMD-specific evidence for dry needling is sparse, with broader orofacial-pain evidence of low-to-very-low certainty. Evidence for intra-articular TMD is limited, and consistent additional benefit over education or other conservative care has not been established. Physiotherapy may have a role in conservative management when tailored to clinical diagnosis, symptoms and functional limitations. Evidence is less certain for adjunctive modalities and benefits beyond active care. Further high-quality studies should identify interventions providing clinically meaningful, sustained improvements in specific TMD presentations.

1. INTRODUCTION

Temporomandibular disorders (TMD) are musculoskeletal conditions involving the masticatory muscles, temporomandibular joints, or both. Pain may interfere with chewing, speaking and mouth opening (Busse et al., 2023; Schiffman et al., 2014). Clinical presentations include muscle-related pain, joint pain and intra-articular disorders, which may occur separately or coexist (List and Jensen, 2017; Schiffman et al., 2014). The Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) provide standardised diagnostic criteria for common pain-related TMD and include an Axis II assessment of jaw-related functional limitations, pain-related disability, psychological distress and behavioural factors (Schiffman et al., 2014).

Painful TMD has a multifactorial profile. OPPERA research has identified clinical, psychosocial and general-health factors associated with the onset and persistence of TMD pain (List and Jensen, 2017; Slade et al., 2016). Assessment and treatment

selection should therefore consider the clinical diagnosis, functional limitations and relevant coexisting symptoms rather than local findings alone (Busse et al., 2023; List and Jensen, 2017; Schiffman et al., 2014).

Conservative management of painful TMD involves distinct approaches, including education and self-management, therapeutic exercise, manual therapy, cervical rehabilitation and physical modalities. These interventions have different treatment targets and should not be treated as interchangeable (Busse et al., 2023; Yao et al., 2023). For adults with chronic TMD pain lasting at least three months, the 2023 clinical practice guideline strongly recommends, compared with sham or placebo, therapist-assisted mobilisation, manual trigger-point therapy, supervised postural exercise, supervised jaw exercise and stretching, and usual care (such as home exercises, stretching, reassurance and education) (Busse et al., 2023). The guideline also strongly recommends cognitive behavioural therapy (CBT), with or without biofeedback or relaxation therapy, for chronic TMD pain; these approaches provide context for multimodal care but are outside the physiotherapy interventions examined in detail in this review. The guideline conditionally recommends against low-level laser therapy and transcutaneous electrical nerve stimulation (TENS) (Busse et al., 2023). The supporting network meta-analysis included 153 randomised trials involving 8,713 participants, although the certainty of evidence varied across interventions (Yao et al., 2023).

For intra-articular TMD, a 2026 systematic review of ten studies involving 354 participants concluded that physiotherapy might improve maximal mouth opening, although substantial variation in treatment protocols and the need for higher-quality trials limited the strength of this conclusion (Ferrillo et al., 2026b). More broadly, a 2026 systematic review of 51 randomised controlled trials reported generally favourable effects of physiotherapy on pain and mandibular mobility and function in adults with TMD. However, heterogeneity, small sample sizes and methodological limitations prevented quantitative pooling of the results (Skorupa-Strojna and Kulesa-Mrowiecka, 2026).

Against this background, this critical narrative review synthesises evidence on education and self-management, exercise, manual therapy, cervical rehabilitation and adjunctive modalities for painful TMD in adults. It examines pain, mandibular function, disability and oral health-related quality of life, with particular emphasis on distinguishing improvements compared with sham or minimal care from the additional benefits, if any, of physiotherapy over active conservative treatment.

2. MATERIALS AND METHODS

2.1 Review design and scope

This study was conducted as a critical narrative review of physiotherapy interventions used in the conservative management of painful temporomandibular disorders (TMD) in adults. The review focused on four main outcome domains: pain intensity; mandibular function; disability and limitations in daily activities; and oral health-related quality of life, where reported. Particular attention was paid to differences in clinical presentation, intervention characteristics, comparator conditions and follow-up periods, as these factors may influence the interpretation of treatment effects.

The review was informed by the Scale for the Assessment of Narrative Review Articles (SANRA), which addresses six domains of narrative review quality: justification of the review's importance, clarity of its aims, description of the literature search, referencing, scientific reasoning and presentation of relevant outcome data (Baethge et al., 2019).

2.2 Literature search and source selection

Targeted literature searches were conducted in PubMed and Google Scholar to identify English-language articles published from January 2010 onward. Search terms combined terminology related to TMD, including “temporomandibular disorders”, “temporomandibular joint disorders” and “TMD”, with intervention terms including “physiotherapy”, “physical therapy”, “therapeutic exercise”, “manual therapy”, “cervical rehabilitation”, “patient education”, “self-management”, “photobiomodulation”, “laser therapy”, “transcutaneous electrical nerve stimulation”, “dry needling”, “manipulation”, “mobilisation” and “occlusal splint”. Supplementary targeted searches were conducted for specific interventions and clinical presentations identified during the review of the retrieved literature. Reference lists of relevant clinical guidelines, systematic reviews and meta-analyses were also screened to identify additional publications.

A representative search combination was: (“temporomandibular disorders” OR “temporomandibular joint disorders” OR TMD) AND (“physiotherapy” OR “physical therapy” OR “therapeutic exercise” OR “manual therapy” OR “cervical rehabilitation” OR “patient education” OR “self-management” OR “photobiomodulation” OR “laser therapy” OR

"transcutaneous electrical nerve stimulation" OR TENS OR "dry needling" OR "manipulation" OR "mobilisation" OR "occlusal splint"). Search syntax was adapted to the functionality of each search platform.

The search was designed to identify major evidence syntheses and representative clinical studies relevant to the review objectives rather than to retrieve every potentially eligible publication. Clinical guidelines, systematic reviews, meta-analyses, randomised controlled trials and relevant non-randomised controlled studies evaluating conservative interventions for painful TMD in adults were considered. Diagnostic, observational and mechanistic studies were also consulted when they helped explain clinical presentations or provided context for interpreting treatment effects. Studies involving paediatric populations, postoperative rehabilitation, major trauma or systemic inflammatory arthropathies were outside the scope of this review and were not considered. Retrieved publications were assessed for relevance to the review questions, with particular attention to the clinical diagnosis, intervention characteristics, comparator, outcomes and duration of follow-up. Evidence syntheses were used to establish the broader evidence base, while individual clinical trials were examined where they provided additional information about treatment effects or the applicability of findings to specific patient groups.

2.3 Narrative synthesis

The selected literature was organised by intervention category and synthesised according to clinical presentation, participant characteristics, treatment content, comparator and follow-up. The analysis considered outcomes relating to pain intensity, maximum mouth opening, mandibular function, disability and oral health-related quality of life. Particular emphasis was placed on distinguishing changes observed within treatment groups from between-group differences, as well as differentiating comparisons with sham or minimal care from those assessing the additional benefit of physiotherapy over active conservative treatment.

Where reported in the original publications or evidence syntheses, effect estimates, confidence intervals, risk-of-bias assessments, certainty of evidence and measures of clinical importance were considered when interpreting the findings. Differences in study populations, diagnostic criteria, intervention protocols and outcome measures were taken into account when evaluating consistency across studies.

3. RESULTS AND DISCUSSION

3.1 Clinical presentation, pain mechanisms and treatment selection

Physiotherapy studies do not all examine the same clinical presentation. Some focus on myogenous TMD, whereas others include arthralgia, disc displacement or degenerative joint disease. These diagnoses may coexist, but they should not be treated as interchangeable when interpreting treatment effects (Peck et al., 2014; Schiffman et al., 2014; Shaffer and Naze, 2023b). An effect observed in a muscle-related sample cannot, by itself, establish that the same intervention will have a comparable effect in patients whose symptoms are primarily intra-articular. Symptom duration also matters: recommendations developed for chronic pain lasting at least three months should not automatically be extrapolated to acute or shorter-duration presentations (Busse et al., 2023).

The outcomes used to judge treatment also matter. Pain intensity, maximum mouth opening, jaw-related functional limitation and quality of life capture different aspects of recovery, and improvement in one does not necessarily imply improvement in the others. Within-group improvement is also not equivalent to a between-group treatment effect, particularly when symptoms may improve over time or when both groups receive active care. When cervical rehabilitation is studied, coexisting neck symptoms and clinically relevant cervical impairment should be considered because they help define the rationale and applicability of that intervention (Cuenca-Martínez et al., 2020; Shaffer and Naze, 2023a). The evidence below is therefore discussed by intervention and interpreted in light of presentation, comparator, outcome and follow-up.

Painful TMD should not be assumed to arise from the same mechanism in every patient. The proposed grading system for musculoskeletal nociplastic pain considers chronic pain lasting more than three months, regional rather than discrete pain distribution, the absence of sufficient nociceptive or neuropathic explanations, and clinical evidence of evoked pain hypersensitivity. A history of pain hypersensitivity and associated comorbidities further support a probable classification (Kosek et al., 2021). These criteria provide a general musculoskeletal framework and are not specific diagnostic criteria for TMD. A systematic review found lower pressure-pain thresholds at trigeminal and remote sites in people with TMD, whereas pooled differences in thermal pain thresholds were not statistically significant (La Touche et al., 2018). These group-level findings are

consistent with increased mechanical pain sensitivity in TMD populations, but they neither establish a single pain mechanism in an individual nor provide a validated basis for selecting a specific physiotherapy technique.

Cervical and mandibular disability may coexist. An observational systematic review and meta-analysis found a clinically relevant association between neck disability and jaw disability, together with moderate evidence of lower pressure-pain thresholds and restricted cervical range of motion in people with TMD. However, no significant differences were identified in cervical alignment or craniocervical position (Cuenca-Martínez et al., 2020). These observational findings do not establish a causal relationship between cervical impairment and TMD. Accordingly, the rationale for cervical rehabilitation should be based on relevant symptoms and functional impairment rather than posture alone (Cuenca-Martínez et al., 2020; Shaffer and Naze, 2023a).

3.2 Core rehabilitation interventions

3.2.1 Education and self-management

Education and self-management are relevant both as components of conservative TMD care and as comparison conditions in trials evaluating additional interventions. Programmes commonly explain the condition, address activities that may aggravate symptoms, advise on temporary modification of jaw loading and encourage a gradual return to function. Their content and intensity vary between studies, so education should not be treated as a single standardised intervention (Aggarwal et al., 2019; Bijelic et al., 2026; Busse et al., 2023; Ferland et al., 2026; Yao et al., 2023). In clinical trials, education or information about oral habits has also been used as a comparison or background intervention when evaluating the additional effects of physiotherapy in patients with masticatory muscle pain and disc displacement without reduction (Craane et al., 2012a; Craane et al., 2012b). Education has also been compared directly with occlusal splint therapy in patients with myofascial pain of the jaw muscles (Michelotti et al., 2012).

The evidence for self-management is mixed. A systematic review of self-management interventions for chronic orofacial pain, principally TMD, included 14 trials and found small long-term effects on pain intensity (SMD −0.32, 95% CI −0.47 to −0.17) and depressive symptoms (SMD −0.32, 95% CI −0.50 to −0.15). The certainty of evidence for these two outcomes was rated as high using GRADE (Aggarwal et al., 2019). An umbrella review of 11 systematic reviews, comprising 49 unique primary studies, found favourable results in six reviews, whereas five judged the comparative evidence insufficient. Twenty-six of the 49 unique primary studies (53%) appeared in more than one review; the corrected covered area (CCA) was 9%, which the authors classified as moderate overlap (Bijelic et al., 2026). These findings are not necessarily contradictory, as the reviews differed in scope, included evidence and assessment methods. In particular, the broader chronic orofacial-pain evidence should be distinguished from evidence restricted to TMD populations.

A more recent TMD-specific systematic review and meta-analysis by Ferland et al. included 47 randomised controlled trials involving 3,238 participants and found that none was at low risk of bias overall: 44 were judged at high risk and three at unclear risk of bias. The certainty of evidence for key outcomes ranged from low to very low (Ferland et al., 2026). In three studies involving 154 participants, adding non-surgical interventions to education and self-management was associated with an additional short-term improvement in health-related quality of life (SMD 0.50, 95% CI 0.18–0.82), although the certainty of this evidence was very low (Ferland et al., 2026). This finding therefore indicates a possible short-term benefit rather than providing a reliable basis for routinely adding further treatment. In most other pooled comparisons, combining education and self-management with additional non-surgical interventions did not demonstrate consistent between-group improvements in pain, function or quality of life. Some individual non-pooled trials favoured combined treatment for short-term pain, but these findings were at high risk of bias (Ferland et al., 2026).

In a randomised trial involving 148 participants with chronic painful TMD, Aguiar et al. examined the additional effect of two sessions of pain science education (PSE) delivered alongside a six-week programme of manual therapy and therapeutic exercise. At treatment completion, the group receiving additional education showed a statistically and clinically meaningful improvement in disability, measured using the Craniofacial Pain and Disability Inventory (mean difference 6.1 points, 95% CI 3.3–8.8), but no significant between-group difference in the primary pain-intensity outcome. Secondary follow-up analyses suggested a clinically meaningful benefit for pain at 10 weeks and for disability at 18 weeks (Aguiar et al., 2023). These findings suggest that additional pain science education may provide benefits for selected outcomes and follow-up periods rather than producing a consistent additional effect across all outcomes at treatment completion.

3.2.2 Therapeutic exercise and functional rehabilitation

Exercise programmes can target restricted jaw mobility, coordination, endurance or strength, but the intervention should be defined by its intended target, content and dose. A meta-analysis of 16 studies involving 812 participants reported reduced pain (SMD −0.58, 95% CI −1.01 to −0.12) and improvements in active and passive maximum mouth opening (Idáñez-Robles et al., 2023). These pooled findings suggest beneficial effects of exercise, although they do not establish a single optimal prescription, as the included programmes and comparators varied. The findings should therefore be interpreted alongside the outcome measures, follow-up periods and clinical presentation.

Shimada et al. reviewed five studies involving 145 participants and reported favourable findings, particularly for coordination exercises, in reducing pain and improving jaw mobility. However, the small number of studies and substantial heterogeneity prevented quantitative pooling. The authors highlighted the need for further research to establish optimal exercise parameters and improve consistency in terminology and treatment structure (Shimada et al., 2023). Exercise selection may therefore be guided by the main functional limitation, with the programme adjusted according to the patient's symptoms and performance rather than applied as a fixed protocol.

Trials that compare physiotherapy with an active treatment such as education address a different question from trials using placebo or minimal care. In the study by Craane et al., improvements were observed in both groups of patients with masticatory muscle pain over one year. However, the physiotherapy programme did not demonstrate a statistically significant additional benefit over education (Craane et al., 2012a). This finding concerns the specific programme and comparison investigated and does not establish whether other exercise approaches may provide additional benefits.

In a randomised trial comparing the TheraBite jaw-motion device with standard physiotherapy exercises for myogenous TMD, the device was associated with greater improvement in mandibular functional impairment at the six-week assessment, but pain and maximum mouth opening did not differ significantly between groups. By three months, both groups showed similar improvements. The authors reported that the functional advantage of the device was evident within the first week of treatment (Kraaijenga et al., 2014).

In a randomised trial with six-month follow-up involving 45 patients with chronic TMD, physiotherapy was associated with a greater reduction in characteristic pain intensity than stabilisation splint or control therapy, while both physiotherapy and splint therapy improved pain-free opening compared with control (Gikić et al., 2021). In a smaller randomised trial, mandibular exercises and conservative treatment involving an occlusal splint and counselling produced similar reductions in palpatory pain, although mandibular exercises showed a greater improvement in pain-free unassisted mouth opening at the three-month assessment (de Negreiros et al., 2025).

Evidence for resistance training remains limited. A 2025 systematic review identified only three studies, involving 108 participants in total. Although all included studies reported reductions in pain intensity and improvements in neuromuscular performance following resistance training, the overall certainty of evidence was very low. Consequently, its comparative effectiveness relative to other interventions remains uncertain (Asquini et al., 2025).

A systematic review and meta-analysis by Armijo-Olivo et al. examined manual therapy and therapeutic exercise. The overall certainty of evidence was considered low, as the included trials were generally at unclear or high risk of bias. Most reported effect sizes were low to moderate, with no clear indication that therapeutic exercise was superior to other conservative treatments. Manual therapy alone or combined with jaw or cervical exercises showed potentially beneficial effects (Armijo-Olivo et al., 2016).

A 2025 systematic review of 12 studies involving 775 participants also suggested that therapeutic exercise may improve activity, participation and quality of life in individuals with TMD. However, confidence in the cumulative evidence was very low, and these findings should therefore be interpreted cautiously (Scrase et al., 2025).

In a 2026 randomised trial involving 66 patients with myogenous TMD, adding proprioceptive neuromuscular facilitation to conventional exercise was associated with a greater reduction in pain over four weeks, with a moderate effect size. Between-group differences in mandibular range of motion were small. As outcomes were assessed only immediately after the intervention, the persistence of these effects beyond the treatment period remains uncertain (Ergezen Sahin et al., 2026).

In clinical practice, an exercise prescription may be more readily evaluated when the targeted impairment, initial programme, progression and completed exercise dose are clearly documented. Recording adherence and the patient's response can also help guide subsequent treatment adjustments.

3.2.3 Manual therapy and mobilisation

Manual therapy includes several approaches, such as soft-tissue techniques, assisted stretching and joint mobilisation. Vieira et al. included 20 randomised controlled trials and reported beneficial effects of manual therapy on pain, maximum mouth opening and disability. The certainty of evidence ranged from moderate to high for several outcomes, although the magnitude of effects varied across outcomes and treatment comparisons (Vieira et al., 2023). Their clinical relevance should therefore be interpreted in relation to the outcome measures and the thresholds considered meaningful for patients.

Direct comparisons between manual-therapy trials are difficult because techniques and treatment protocols differ, as Calixtre et al. (2015) noted. In a randomised trial involving 46 participants, intra-oral myofascial therapy resulted in significantly lower pain scores than education and self-care at six weeks. However, the average between-group differences did not reach the two-point benchmark for clinical importance. A secondary responder analysis favoured myofascial therapy for achieving a clinically meaningful reduction in pain, although the estimated effects had wide confidence intervals. Maximum mouth opening did not differ significantly between groups (Kalamir et al., 2013). These findings suggest a possible benefit for pain reduction, although the magnitude and clinical relevance of the average treatment effect remain uncertain.

A 2026 systematic review of 18 randomised controlled trials reported that manual therapy was associated with reductions in pain and improvements in maximum mouth opening. However, the certainty of evidence was limited, and most reported effects were short-term. Variation in techniques, professional settings and study designs, together with limited long-term data, makes it difficult to draw firm conclusions about the durability of treatment effects or the superiority of specific techniques (Chiaramonte et al., 2026).

For adults with chronic TMD pain, the network meta-analysis by Yao et al. (2023) found moderate-certainty evidence that selected manual techniques improved pain outcomes compared with placebo or sham. The estimated absolute increase in the probability of achieving at least a 1-cm improvement on a 10-cm pain scale was 36 percentage points for therapist-assisted mobilisation (95% CI 31–40) and 32 percentage points for manual trigger-point therapy (95% CI 29–34). These estimates relate specifically to comparisons with placebo or sham. They do not establish equivalent benefits across all TMD subtypes or demonstrate the same additional effects when exercise or other active treatments are already in place.

A 2025 single-blind randomised trial evaluated a four-week multimodal programme in adults with TMD and restricted mouth opening. The study reported 156 participants randomised (78 per group), with 146 included in the final analysis. The report contains inconsistencies in sample-size and dry-needling dose reporting. Although post-treatment pain, pressure-pain thresholds and maximum mouth opening favoured the multimodal group, the bundled intervention and absence of longer-term follow-up limit interpretation and prevent attribution of the effects to an individual treatment component (Patra et al., 2025). A 2023 randomised trial involving 82 women with painful myofascial TMD and restricted mobility compared therapeutic exercise alone with massage plus exercise and post-isometric relaxation plus exercise. Massage combined with exercise produced the largest reduction in pain, while mobility findings varied according to the measure assessed. The short 10-day treatment period limits conclusions about the persistence of these effects (Gębska et al., 2023). In a separate randomised trial involving 50 patients, adding three sessions of ischaemic compression to a programme of jaw and postural exercises improved painless and maximum assisted mouth opening at week one. However, no significant between-group differences were observed in pain, pressure-pain threshold or jaw functional limitation, and the early improvements in mouth opening were not maintained as additional between-group differences at week four (Şahin et al., 2021). Manual therapy may therefore be considered as part of conservative rehabilitation, particularly when selected according to the patient's clinical presentation and functional limitations. However, the available evidence does not establish the consistent superiority of one manual technique over another. The possible value of short-term symptom relief in facilitating active rehabilitation should also be considered a clinical rationale rather than an established outcome of the trials reviewed.

3.2.4 Cervical rehabilitation for coexisting neck impairment

Cervical rehabilitation may be considered when neck pain or cervical impairment accompanies TMD. Bednarczyk et al. identified seven randomised trials, five of which (n = 223) contributed to the pooled pain estimate, favouring cervical

rehabilitation (SMD −0.98, 95% CI −1.67 to −0.28). All pooled pain improvements were measured in the short term (less than five weeks). Substantial heterogeneity (I^2 = 79%) and differences in interventions and comparators warrant cautious interpretation (Bednarczyk et al., 2024).

A 2025 meta-analysis of 14 randomised trials reported benefits of neck-region manipulation and therapeutic exercise for pain and pressure-pain thresholds, but no significant overall improvement in maximal mouth opening. Subgroup findings suggested improvement in mouth opening when manipulation was combined with therapeutic exercise (Qu et al., 2025).

Oliveira-Souza et al. compared neck motor-control exercise with manual therapy and placebo in 54 women with chronic myofascial or mixed TMD. Pain outcomes favoured neck motor-control exercise over placebo at selected assessments, but did not differ significantly from manual therapy. Jaw-function outcomes favoured exercise over placebo at post-treatment and at the one- and three-month assessments; at three months, jaw function also favoured exercise over manual therapy. Oral health-related quality of life favoured exercise over both manual therapy and placebo at post-treatment and at the one- and three-month follow-ups. Maximum mouth opening did not differ significantly between groups. The small, all-female sample limits generalisability (Oliveira-Souza et al., 2024).

Calixtre et al. (2019) reported reduced orofacial pain and headache impact following upper cervical mobilisation and motor-control exercise in 61 women, without significant improvements in mandibular function or pressure-pain thresholds. Similarly, Reynolds et al. (2020) found no additional benefit of cervical thrust manipulation for pain intensity or maximum mouth opening when added to education, soft-tissue treatment and exercise, although some secondary outcomes favoured manipulation. The 2023 guideline conditionally recommends manipulation compared with sham or placebo, but this does not establish additional benefit when manipulation is added to active care (Busse et al., 2023).

A 2026 trial involving 58 women with chronic TMD found improvements in both groups receiving neck-specific exercises, with or without additional aerobic training. However, aerobic training provided no statistically significant additional benefit (Tavares et al., 2026).

3.3 Physiotherapy for intra-articular TMD

Evidence for physiotherapy in intra-articular TMD is less developed than for myogenous presentations, and findings should not be transferred between these groups without caution. In a systematic review of disc displacement without reduction, Al-Baghdadi et al. (2014) found insufficient high-quality evidence to favour one treatment; less invasive approaches were supported initially because more complex interventions had not consistently produced better outcomes.

The trial by Craane et al. directly examined whether adding physiotherapy benefited 49 patients with closed lock. Both groups received repeated information about oral habits, while the intervention group also attended nine physiotherapy sessions over six weeks. Although pain and function improved during the one-year follow-up, the additional programme did not significantly improve outcomes compared with the control condition (Craane et al., 2012b).

A 2026 systematic review of physiotherapy for intra-articular TMD included ten studies and 354 participants. The review focused on maximal mouth opening and concluded that physiotherapy might improve this outcome, although protocols varied substantially and the authors called for better-quality studies (Ferrillo et al., 2026b).

A 2026 study of 40 patients with disc displacement with reduction compared a four-week home exercise programme plus education with education alone. The exercise group improved more in most pain, mandibular range-of-motion and functional measures, although resting pain did not differ between groups (Korkmaz Üçüncü et al., 2026).

3.4 Adjunctive interventions: photobiomodulation, electrical stimulation and dry needling

Photobiomodulation (PBMT) has been investigated for pain relief and mandibular mobility. Farshidfar et al. (2023) found that seven of 15 studies reported improvements in maximum mouth opening compared with placebo, although treatment protocols varied considerably.

A 2026 network meta-analysis of 41 trials involving 2,021 adults with myogenous TMD ranked PBMT highest for short-term pain reduction (SUCRA 88.9%). However, risk-of-bias concerns and the absence of formal certainty assessment limit interpretation of this ranking (Zhang et al., 2026a). The 2023 guideline conditionally recommended against low-level laser

therapy for chronic TMD pain (Busse et al., 2023). Differences in populations and assessment methods should be considered when interpreting these findings.

A 2026 network meta-analysis of 22 trials involving 987 participants reported short-term pain reduction with TENS compared with control (MD −1.34 cm, 95% CI −2.04 to −0.63). However, high risk of bias and substantial heterogeneity limit confidence in the findings and their applicability to comparisons with active treatments (Zhang et al., 2026b). A separate review comparing PBMT and TENS found no conclusive evidence of superiority of either modality because of methodological limitations and heterogeneity (Alves et al., 2026).

Dry needling was included in the multimodal intervention studied by Patra et al. (2025), but inconsistent reporting of treatment dose and the combination of interventions prevent assessment of its independent effect. A 2024 systematic review of 24 RCTs involving 1,318 patients with orofacial pain found no clear benefit of dry needling added to usual care (SMD −1.89, 95% CI −5.81 to 2.02), with very-low-certainty evidence (Kuzdzal et al., 2024). These findings are indirect for TMD-specific treatment.

3.5 Integration of physiotherapy with dental management

Romeo et al. randomised 62 participants with chronic myogenous TMD to education and occlusal splint therapy, with or without physiotherapy. Combined treatment favoured pain reduction and mouth opening (mean difference 4.61 mm, 95% CI 0.93–8.30), suggesting a possible additional benefit from physiotherapy (Romeo et al., 2024).

In a randomised trial involving 181 participants, adding a stabilisation splint to multimodal conservative treatment did not provide significant overall additional benefits for pain, mouth-opening limitation or joint sounds (Nagata et al., 2015). Although a subgroup analysis identified a difference in pain among participants with degenerative joint disease, the authors noted that this reflected a baseline imbalance and should not be interpreted as evidence of a treatment effect. A pilot trial involving 27 patients reported favourable outcomes when a splint was added to education and physiotherapy, although the small sample limits interpretation (Ferrillo et al., 2026a).

A 2024 meta-analysis of nine studies involving 426 participants found advantages for manual therapy in disability and maximum mouth opening, but no clear overall differences in pain or oral health-related quality of life. In the myogenous subgroup, splint therapy favoured pain reduction at treatment completion (SMD 0.65, 95% CI 0.02–1.28; positive values favour occlusal splint therapy) (Villar-Aragón-Berzosa et al., 2024).

Michelotti et al. (2012) found a small advantage of education over occlusal splint therapy for spontaneous muscle pain at three months, with no significant differences in other assessed outcomes. Consistent with these findings, the 2023 guideline conditionally recommended against reversible occlusal splints and strongly recommended against irreversible splints for chronic TMD pain (Busse et al., 2023).

3.6 Synthesis and clinical implications

3.6.1 Comparative effectiveness and added value

The evidence does not support treating physiotherapy as a single intervention or establishing a definitive ranking of its components. Its benefits vary according to clinical presentation, intervention characteristics and comparator. Improvements compared with sham or minimal care do not necessarily demonstrate additional benefit over active conservative treatment. A broader systematic review and meta-analysis reported an overall benefit of physiotherapy for pain, but no significant effect on active mouth opening (Paço et al., 2016). Table 1 summarises representative randomised trials and their main findings. The trials illustrate this distinction. Craane et al. (2012a) found no additional benefit of physiotherapy over education, while adding aerobic training or ischaemic compression to existing exercise programmes did not produce consistent additional improvements (Şahin et al., 2021; Tavares et al., 2026). Conversely, Aguiar et al. (2023) and Romeo et al. (2024) reported benefits in selected outcomes when additional interventions were incorporated into established treatment programmes. Findings from splint-addition trials were also inconsistent, with no overall additional benefit in one trial and preliminary favourable results in a small pilot study (Ferrillo et al., 2026a; Nagata et al., 2015). These differences reflect the interventions and comparisons examined. Network meta-analyses also require cautious interpretation because differences in populations, interventions and outcomes may affect indirect comparisons. Accordingly, SUCRA rankings indicate relative treatment ordering within a specific network rather than established clinical superiority (Zhang et al., 2026a; Zhang et al., 2026b). Clinical decisions should therefore consider the magnitude and clinical relevance of expected benefits, evidence certainty, treatment burden and patient preferences.

Table 1. Selected randomised controlled trials of conservative rehabilitation for TMD: treatment comparisons and outcomes

Study and population	Treatment comparison	Treatment duration and assessment	Main between-group findings
Aguiar et al. (2023); n = 148 adults with chronic painful TMD	Manual therapy and exercise, with or without two additional pain science education sessions.	Six weeks; assessments post-treatment and at 10 and 18 weeks.	Additional education improved disability at treatment completion (6.1 points; 95% CI 3.3–8.8), but not pain. Follow-up analyses favoured education for pain and disability.
Craane et al. (2012a); n = 53 with masticatory muscle pain	Education, stretching and exercises plus homework versus education alone.	Six weeks; follow-up at 3, 6, 12, 26 and 52 weeks.	Both groups improved, with no additional benefit from physiotherapy over one year.
Kraaijenga et al. (2014); n = 96 randomised (79 treated); myogenous TMD	TheraBite jaw-motion device versus standard physiotherapy exercises.	Six weeks; three-month follow-up.	TheraBite improved MFIQ more at six weeks; pain and mouth opening did not differ. Outcomes were similar by three months.
Gikić et al. (2021); n = 45 with chronic TMD	Physiotherapy versus stabilisation splint versus control.	Six-month follow-up.	Physiotherapy reduced characteristic pain more than splint or control. Physiotherapy and splint both improved pain-free opening versus control.
de Negreiros et al. (2025); n = 32 with TMD	Mandibular exercises versus splint therapy and counselling.	Three-month intervention.	Both approaches reduced palpatory pain; exercises produced greater improvement in pain-free unassisted opening.
Kalamir et al. (2013); n = 46 with chronic myogenous TMD	Intra-oral myofascial therapy versus education, self-care and jaw exercises.	Twice weekly for five weeks; assessment at six weeks.	Pain was lower with myofascial therapy, but mean differences were below the two-point clinical threshold. Responder analysis favoured therapy; mouth opening did not differ.
Patra et al. (2025); n = 156 randomised (146 analysed); TMD with restricted opening	Multimodal stabilisation exercises and manual treatment versus home cervical and TMJ mobility exercises.	Four weeks; post-treatment assessment only.	Pain, pressure-pain thresholds and active opening favoured multimodal care. Inconsistent reporting, combined components and no long-term follow-up limit interpretation.
Şahin et al. (2021); n = 50 with TMD	Rocabado and postural exercises with versus without masseter ischaemic compression.	Four weeks; assessments at weeks 1 and 4.	Combined treatment improved painless and assisted opening at week 1, but not pain, pressure-pain threshold or function at week 4.

Study and population	Treatment comparison	Treatment duration and assessment	Main between-group findings
Oliveira-Souza et al. (2024); n = 54 women with chronic myofascial or mixed TMD	Neck motor-control exercise versus neck manual therapy versus inactive ultrasound.	Eight weeks; assessments post-treatment and at 1 and 3 months.	Pain outcomes favoured exercise over inactive ultrasound at selected assessments but did not differ significantly from manual therapy. Jaw-function outcomes favoured exercise over inactive ultrasound at post-treatment and at 1 and 3 months; at 3 months, jaw function also favoured exercise over manual therapy. Oral health-related quality of life favoured exercise over both comparators at post-treatment and at 1- and 3-month follow-up. Maximum mouth opening did not differ significantly between groups.
Reynolds et al. (2020); n = 50 with TMD-associated myalgia	Cervical thrust manipulation versus sham; both groups received education, soft-tissue treatment and home exercise.	Four visits over four weeks; assessments immediately, at 1 and 4 weeks.	No additional benefit for pain or maximum opening. Some secondary outcomes favoured manipulation, including jaw function at week 1, movement-related fear at week 4 and global improvement.
Tavares et al. (2026); n = 58 women with chronic TMD	Neck-specific exercises versus the same exercises plus moderate-intensity aerobic training.	Eight weeks; post-treatment assessment.	Both groups improved, with no between-group differences; aerobic training added no measurable benefit.
Craane et al. (2012b); n = 49 with disc displacement without reduction	Oral-habit education versus the same education plus nine physiotherapy sessions.	Six weeks; follow-up at 3, 6, 12, 26 and 52 weeks.	Pain and function improved in both groups; physiotherapy provided no additional benefit over one year.
Romeo et al. (2024); n = 62 with chronic myogenous TMD	Education and occlusal splint, with or without additional physiotherapy.	Three-month treatment; post-treatment and three-month follow-up.	Additional physiotherapy favoured pain outcomes and maximum opening (between-group difference 4.61 mm; 95% CI 0.93–8.30).
Nagata et al. (2015); n = 181 with TMD	Non-splint multimodal care versus the same care plus a stabilisation splint.	Repeated assessments; diagnostic subgroup analyses.	No overall differences in pain, opening limitation or joint sounds. A degenerative-joint subgroup finding reflected baseline imbalance, not a treatment effect.
Ferrillo et al. (2026a); n = 27 with myogenous TMD	Education and physiotherapy versus the same treatment plus an occlusal splint.	End of physiotherapy and six-month follow-up.	At six months, the splint add-on favoured pain, neck disability and quality of life. Findings are preliminary because of the small pilot sample.

Abbreviations: CI, confidence interval; MFIQ, Mandibular Function Impairment Questionnaire; TMD, temporomandibular disorders; TMJ, temporomandibular joint. n indicates the number of randomised participants unless otherwise stated. The findings describe comparisons within each trial; a non-significant difference should not be interpreted as proof that the treatments are equivalent.

3.6.2 Clinical application, outcome assessment and durability

Treatment should be tailored to the patient's main symptoms and functional limitations. Restricted mouth opening may warrant graded mobility exercises, while chewing difficulties may require gradual progression of functional loading. Manual or cervical interventions may be considered when relevant impairments are identified during examination. Disc-related disorders and the use of oral splints require diagnosis-specific clinical reasoning (Shaffer and Naze, 2023a; Shaffer and Naze, 2023b). Outcome assessment should include pain intensity, jaw mobility and functional limitation, as these represent different aspects of recovery. Interpretation should consider baseline severity, between-group differences and clinical relevance. Within-group improvement alone does not establish treatment efficacy. The Jaw Functional Limitation Scale (JFLS) (Schiffman et al., 2014), together with standardised mouth-opening measures and quality-of-life assessments, may provide a broader evaluation of treatment outcomes. Follow-up should use consistent outcome measures and functional goals established at baseline and continue beyond supervised treatment to assess the maintenance of improvement. When progress is limited, diagnosis, treatment dose, adherence and associated conditions should be reassessed. Longer-term evaluation should also consider changes in medication, additional treatments and adverse events. Worsening symptoms, new locking or atypical features warrant further assessment and referral where appropriate. Discharge advice should support independent management and indicate when further evaluation may be needed (Shaffer and Naze, 2023a; Shaffer and Naze, 2023b).

4. CONCLUSIONS

Physiotherapy may have a role in the conservative management of painful temporomandibular disorders, particularly through exercise-based rehabilitation and selected manual therapy techniques. However, treatment effects vary according to the clinical presentation, intervention and comparator, and improvements observed against sham or minimal care do not necessarily indicate additional benefit over active conservative treatment.

Cervical rehabilitation may be beneficial in selected patients with associated neck symptoms or cervical impairment, whereas evidence for intra-articular TMD and adjunctive modalities, including photobiomodulation, transcutaneous electrical nerve stimulation and dry needling, remains less conclusive. Further high-quality research is needed to establish which interventions provide clinically meaningful and sustained improvements in pain and mandibular function, and whether adding these treatments to active rehabilitation offers additional benefits.

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AUTHOR CONTRIBUTIONS

Neada Hysenaj: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing.

Edlira Mulo: Conceptualization, Supervision, Writing – review & editing.

Edit Xhajanka: Investigation, Data curation, Writing – review & editing.

Vergjini Mulo: Methodology, Validation, Supervision, Writing – review & editing.

Belisa Kaleci: Investigation, Data curation, Formal analysis, Writing – review & editing.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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ETHICS STATEMENT

Ethical approval was not applicable because this narrative review synthesises previously published literature and does not report new research involving human participants or animals.

DATA AVAILABILITY STATEMENT

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