META-ANALYSIS OPEN ACCESS

Clinical Effectiveness of Anterior Repositioning Splints in Treating Temporomandibular Joint Disc Displacement with Reduction: A Systematic Review and Meta-Analysis

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ABSTRACT

Background: The prevalent condition known as Temporomandibular joint disc displacement with reduction (DDwR) results in pain, together with joint sounds and problems related to the jaw structure. ARS treatment for DDwR was studied in this systematic review and meta-analysis to determine its effect on joint symptoms and pain intensity.

Methods: This systematic review and a meta-analysis applied the PRISMA 2020 guide. A search of literature was done in PubMed, Scopus, Web of Science, and Google Scholar till April 2025. Included studies were randomized controlled trials, any other clinical trial, and case series. Data was screened by two reviewers, and the quality assessment was carried out by using the GRADE approach, and the risk of bias was measured with the help of the Cochrane tool and ROBINS-I. The random-effects model was used to perform meta-analysis in RevMan 5.4.1.

Results: Nine clinical trials (n = 379) were incorporated to support the good performance of anterior repositioning splints (ARS) in cases of the temporomandibular joint disc displacement with reduction (DDWR). Sufficient and comparable data were available from four studies to generate the forest plot for TMJ pain outcomes. The heterogeneity showed that the results of ARS therapy were high in reducing TMJ pain with a pooled standardized mean difference (SMD) of -1.61 (95% CI: -3.19 -0.02 P < 0.05) when analyzing these studies.

Discussion: The application of ARS shows great potential when treating DDwR because it provides substantial advantages as a non-invasive conservative therapy, however, the current evidence is limited by variability in study designs and small sample sizes.

Keywords: Temporomandibular Joint Disorders, Occlusal Splints, Physical Therapy Modalities.

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INTRODUCTION

IThe temporomandibular joint (TMJ) is an extensive group of diseases that causes pain alongside functional problems, which reduces quality of life [1]. Disc displacement with reduction (DDWR) stands as a typical TMD diagnosis that shows disc misplacement when the jaw moves due to intermittent locking and joint sounds [2]. Clinical findings frequently demonstrate that DDWR is linked with audible joint clicking and temporary restrictions in mandibular movement [3]. This joint dysfunction creates serious oral health problems, which result in multiple symptoms, including pain, together with decreased mouth opening and discomfort of different intensities [4]. Patients commonly report functional limitations and TMJ tenderness that interfere with daily activities [5].

Old and new diagnostic imaging technologies, along with treatments, fail to solve the enduring difficulty in DDWR management [6]. The diagnosis of disc position through magnetic resonance imaging (MRI) is essential for clinical identification, yet fails to establish final therapeutic choices as well as future outcomes [7]. The field of treatment development incorporates fresh approaches in non-surgical care that work to reduce symptoms and enhance patient capabilities [8]. These novel therapies focus on stabilizing the disc-condyle relationship without surgical involvement [9].

The clinical practice includes the non-surgical therapy known as anterior repositioning splints (ARS) as one of its widely utilized approaches[10]. The purpose of these occlusal devices is to move the condyle and disc structures for functional joint improvement, together with decreased pain and enhanced mandibular mobility [11]. Research investigations demonstrate that ARS devices deliver effective symptom alleviation through their ability to minimize joint sounds in addition to reducing pain sensations. Numerous studies have shown contrasting effects of utilizing anterior repositioning splints as treatment for DDWR, although their effectiveness remains debatable [12]. However, variations in outcome measures and follow-up durations have led to inconclusive evidence in some reports [13].

This comprehensive research aims to assess the treatment performance of anterior repositioning splints as an intervention for temporomandibular joint disc displacement with reduction. This review combines data from randomized and controlled clinical trials to establish ARS therapeutic effects while recognizing clinical measurement indicators and their contribution to DDWR conservative treatment. Statistical analysis of the gathered data will enable us to evaluate ARS therapy's total effectiveness when paired with the impact it creates on pain reduction as well as joint clicking .and mandibular function.

METHODS

Study Design

The guidelines for Preferred Reporting Items for Systematic Review and Meta Analysis (PRISMA) 2020 were used in undertaking the systematic review and meta-regression [14].

Literature Search

An effective search of databases was conducted in PubMed, Scopus, Web of Science, and Google Scholar. The literature, which emerged as far as 2025 and used published research to serve as a foundation for using the English language, was also considered during the review. Application of the keywords “temporomandibular joint an anterior repositioning splints” and “disc displacement with reduction” and “TMD treatment and splint therapy outcomes and non-invasive TMJ management”. A combination of Boolean operators and database filters was used to attempt to retrieve the most pertinent and acceptable articles.

Inclusion Criteria

Only those studies with well-stipulated inclusion criteria were selected. The clinical trials, such as randomized controlled trials, comparisons between clinical studies, and interventional case series, were deemed eligible. Research studies had to report quantitative clinical outcome measures that concern levels of pain. Moreover, a limited number of publications were taken into consideration, only those that were published in English. The studies needed to concentrate more on the efficacy of anterior repositioning splints (ARS) methodology in the treatment of disc displacement with reduction (DDWR) in human subjects.

Exclusion Criteria

The studies that were omitted were the ones that had results unassociated with those of TMJ disorder, the studies that were conducted on animals or under laboratory conditions, and also the review articles that lacked original or quantifiable clinical data.

Study Screening

It identified articles under three levels of search that included the title screening, abstract screening, and full reading. All the authors engaged in a separate or independent screening in each phase, using the inclusion criteria, and unanimously agreed. Any dispute that arose in the course of selection was to be solved after consulting and, in some cases, calling in a 3rd reviewer to arbitration.

Data Extraction

Two independent reviewers extracted the data using standardized forms and noted: sample size, demographics of the participants, any kind of splint/protocol types, follow-up period, and clinical outcomes reported. The type of TMJ disorder, intervention protocol, comparator treatments, and pain or functional assessments are also provided as information. When full numeric results were not given directly, they were estimated or statistically computed (e.g., standard error or SD).

Outcomes Studied

The primary outcome researched encompassed alleviation of pain (measured using scales such as VAS or VNRS). The secondary outcomes were the TMJ clicking/joint sounds, gain in maximum mouth opening (MMO), as well as disc recapture, which is detected with the help of MRI. All other outcomes occurred in the studies were collected in order to determine the effectiveness of ARS in the short and long term.

Assessment of Quality and Risk of Bias

The Cochrane Risk of Bias tool for clinical trials was used to detect risk of bias based on selection methods, comparability and blinding, and outcome data completeness. To assess methodological quality of the non-randomized studies (clinical trials without randomization, single-arm trials, and case reports), the Risk Of Bias In Non-randomized Studies - of Interventions (ROBINS-I) tool was applied. All the studies have been evaluated by two of the independent reviewers, and any point of difference was resolved by discussion or a third reviewer. The quality of the evidence of each of the included outcomes was determined according to the GRADE framework.

Data Synthesis

Nine studies overall were selected to undergo a final analysis, which include four randomized controlled trials , three clinical trials and two case reports[15,16,17,18,19,20,21,22,23]. The synthesis of data was performed with the help of Review Manager (RevMan) version 5.4.1. Variability in study population and design, as well as study outcome definitions, was accounted for using a random-effects model. The calculation of pooled odds ratios (ORs) with 95% confidence intervals (CIs) was done in the case of dichotomous outcomes. The results of continuous outcomes were given in standardized mean differences (SMDs) where the scales of measures were not common across studies.

All the extracted data were recorded in a standardized spreadsheet and cross-checked to be consistent. Authors were approached where possible in order to acquire any missing data. Analysis of heterogeneity was conducted through I2 statistic, where I2 levels greater than 50 percentage points to moderate to substantial heterogeneity.

Subgroup Analysis

Evaluating the possible effect modifiers was done through subgroup analyses. These were study of ARS vs. conventional splints, variation of duration of follow-up (greater or less than 6 months), and variation in diagnostic type (clinical vs. MRI-verified DDWR). Because of the number of studies being small in each subgroup, these were analyzed manually and described narratively. The stratification provided the ability to compare the outcomes of treatment by type and patient.

Sensitivity Analyses

To test the robustness of the meta-analysis, a sensitivity analysis was performed. Research was divided into predetermined methods of cross-referencing and impact estimates. Those studies held a high risk of bias were eliminated to establish the stability of pooled SMDs and ORs through the repetition of the analysis. Where means, SDs were reported, or could be estimated based on other values, variance, and effect-size estimates were estimated. I2 in combination with Q-statistic and p-values was adopted to investigate homogeneity among studies. The determination of the effect weights was done based on calculations using the inverse variances. No automation tools were used.

Data Visualization

Summary Table **(Table 1)** was constructed to record sample sizes, interventions, outcome measures, and important results of all the included studies. Data on where they were not available was approximated, or the authors were consulted. Besides, forest plots were created to illustrate the graphical representation of pooled outcomes.

RESULTS

A comprehensive search across four major databases (PubMed, Scopus, Web of Science, and Google Scholar) yielded a total of 114 articles. After removing 22 duplicates, 92 records were screened based on titles and abstracts. Of these, 30 articles were excluded for being unrelated to temporomandibular joint disc displacement with reduction (DDwR) or for not using anterior repositioning splints (ARS) as an intervention. The remaining full-text articles were assessed for eligibility. Further studies were excluded due to reasons such as non-clinical design, lack of measurable outcome data, absence of ARS therapy, or use of non-human models.

Ultimately, the research used nine clinical studies from multiple peer-reviewed articles found in electronic academic databases during screening. The research evaluated several types of splints for treating TMJ disorders that presented with disc displacement with reduction, together with TMJ clicking and accompanying pain symptoms. Research involving patients with both unilateral and bilateral TMJ disc displacement made up most of the studies, and additional analysis included subjects with skeletal malocclusion or muscular contracture comorbidities. **Figure 1** outlines the flowchart used for study selection.

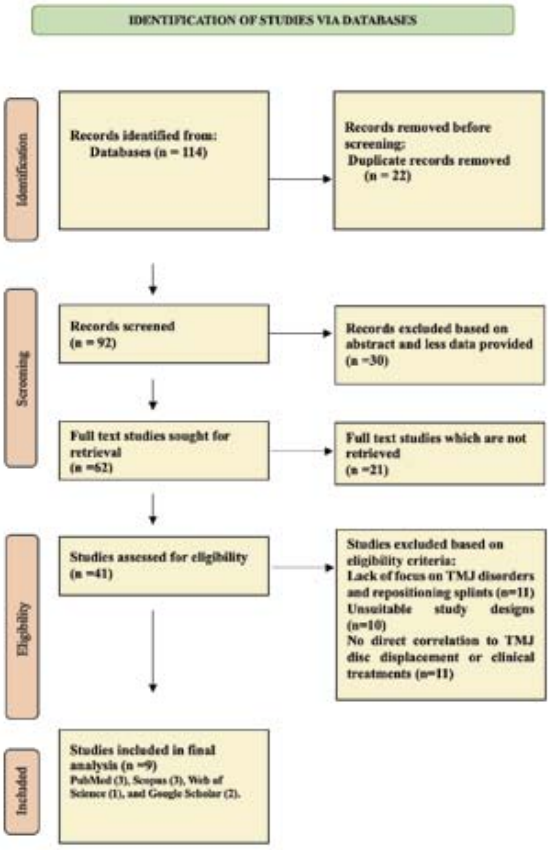

Figure 1: PRISMA Flow Diagram for Study Selection. The Flowchart Was Designed According to The PRISMA Guidelines 2020, Showing Study Identification, Screening, Assessment Eligibility, and Final Selection in The Systematic Review.

Characteristics of Studies

The studies included focused on the assessment of the therapeutic potential of the anterior repositioning splints (ARS), among the patients with temporomandibular joint disc displacement with reduction (DDWR), including 379 people. The majority of the studies were in the shape of a randomized controlled trial (RCT), with two clinical trials and two case reports. Among nine studies, four used well-characterized control groups, whereas the other five were single-armed or uncontrolled studies, or case reports in focus. Most of the research was done on adult groups of people with symptomatic TMJ diseases.

All treatments were based on ARS therapy with different durations of monitoring between 4! weeks and 6 months. Commonly controlled confounders were baseline levels of TMJ pain, duration of symptoms, and compliance with splint therapy. Out of comers were considered and based on clinical measures, including (MMO) maximal mouth opening, pain scores intensity (VAS, or VNRS), and by means of disc-condyle relationship with MRI.

Outcomes Studied

Across the nine included studies, three were randomized controlled trials (RCTs), four were non-randomized clinical trials, and two were case reports. The primary outcome assessed was reduction in temporomandibular joint (TMJ) pain.

TMJ pain was reported in six studies, using validated scales such as the Visual Analog Scale (VAS) and Verbal Numerical Rating Scale (VNRS). All studies demonstrated statistically significant pain reduction after anterior repositioning splint (ARS) therapy. Although five studies mentioned improvements in joint clicking or noise, only one study provided sufficient quantitative data suitable for meta-analysis. Therefore, this outcome was considered secondary and described narratively. Other secondary outcomes included improvements in maximum mouth opening (MMO), mandibular movement, and MRI-verified disc-condylar realignment.

Effect sizes for pain and clicking outcomes were expressed as standardized mean differences (SMDs). **Table 1** summarizes critical characteristics along with primary clinical outcomes pertaining to ARS treatment for TMJ disc displacement with reduction.

Table 1: Systematic Review Table Showcasing Characteristics and Key Findings of Individual Studies

Sr No.	Author & Year	Sample Size	Experimental Group	Control group	Study Design	Outcomes Measured	Secondary outcomes	Key Findings
1.	Haggag & Askar, 2022	50	25	25	Randomized clinical trial	TMJ clicking (opening/closing sounds) over 6 months	Range of mandibular movement, disc-condylar relationship (MRI)	Significantly greater and more stable reduction in TMJ clicking at 6 months.
2.	Pihut et al., 2018	112	56	56	Randomized Controlled Trial (RCT)	Pain intensity (measured with VNRS)	Not explicitly reported	Reduced pain compared to the control group.
3.	Ma et al., 2019	72	*NR*	*NR*	Single-arm Clinical Trial	TMJ pain, TMJ noises	Range of mandibular movement	Reduced TMJ pain and clicking.
4.	Pang et al., 2025	30	*NR*	*NR*	Clinical trial	TMJ noises	Maximum mouth opening (MMO), condylar position, mandibular border movement	Statistically significant improvement in MMO
5.	Liu et al., 2025	1	*NR*	*NR*	Case Report	Symptom remission (jaw pain, joint snapping, audible clicking)	Masticatory function	Complete symptom remission with FARS therapy.
6.	Lee Mui Lee et al., 2024	31	15	16	Clinical trial	Pain (VAS)	Maximum Mouth Opening (MMO), Disc-condyle relationship on MRI	Significant reduction in pain and increase in MMO.

7.	Minervini et al., 2020	3	*NR*	*NR*	Case reports	Clinical outcomes (pain, clicking, mouth opening)	MRI findings (disc position, retrodiscal tissue changes)	ARS treatment led to disc recapture and the formation of a pseudo disc.
8.	Altaweel et al., 2021	32	24	08	Randomized controlled trial	Joint pain (VAS),	Joint function (mouth opening), MRI for disc recapture	Significant improvements in mouth opening, joint palpation, and pain.
9.	Prati et al., 2024	48	16	16	Randomized controlled trial (RCT)	Pain (VAS)	TMJ locking episodes, MRI morphology, and intra-articular function	Better outcomes with less clicking of the TMJ.

NR: Not reported

The study systematically gathers clinical data about anterior repositioning splints (ARS) effectiveness when used for treating temporomandibular joint disorders (TMD). Patients who used ARS showed substantial decreases and stable reductions in TMJ clicking during a six-month observation period. The research demonstrated significant pain reduction within patients who were treated with splints, especially when they exhibited masticatory muscle contracture. Patients with skeletal Class II malocclusion experienced improved MRI markers of TMJ pain and disc-condyle relationships, along with reduced joint noises following treatment with splints. Others documented heightened condylar height together with new bone tissue development, which helped address dentofacial deformities. A variety of studies reported important improvements in joint noise and mouth opening function and pain reduction.

Meta-Analysis

A random effects model was used, and an inverse variance method to calculate the odds ratio and 95 % CIs in RevMan 5.4.1. I^2 statistics were employed in measuring heterogeneity. Forest plots were created to visualize effect sizes. The robustness of the findings was tested by a sensitivity analysis.

Figure 2 demonstrates the forest plot showing SMD of pain comparing ARS and control groups. In total, four studies comprising 111 participants in the experimental group and 96 in the control group were included in this analysis. ARS group resulted in more pronounced improvement with overall SMD -1.61 (95% CI: -3.19 to -0.02) significantly reducing pain ($Z > 1.96$, $p < 0.05$). The included studies showed substantial heterogeneity ($p < 0.01$) with an I^2 value of 91%, suggesting that the majority of the variation stemmed from differences in study-specific factors rather than random variance. This indicates some discordance among studies regarding consistency across direction and effect size.

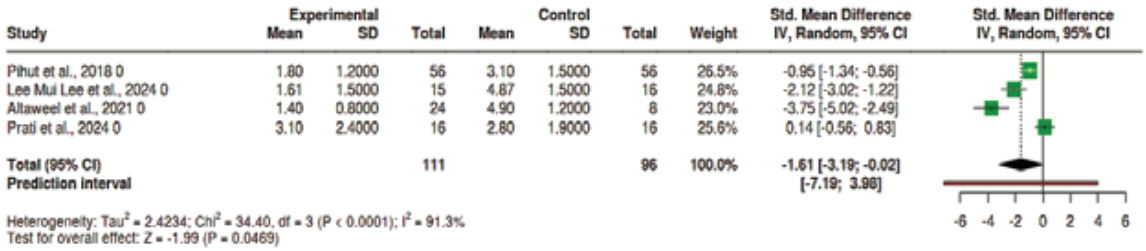

Figure 2: Forest Plot Depicting the Standardized Mean Differences (SMDS) In TMJ Pain Intensity Between Patients Treated with Anterior Repositioning Splints (ARS) And Those Receiving Control Therapy. Values To the Left of The Null Line (SMD < 0) Indicate A Greater Reduction in Pain Favoring the ARS Group, While Values to The Right (SMD > 0) Suggest A Relative Advantage for The Control Group.

Although five studies evaluated TMJ clicking or joint noise, only one study provided extractable quantitative data suitable for meta-analysis. Therefore, a pooled analysis for joint clicking was not feasible. However, descriptively, that study reported a significant reduction in joint clicking in the ARS group compared to controls (SMD: -2.66; 95% CI: -3.44 to -1.88). These findings support the potential of ARS as an effective conservative therapy for managing both pain and joint-related symptoms in DDwR.

Subgroup Analyses

There were two other subgroups formed based on symptom type: pain and joint clicking for which further stratifications evaluated clinical efficacy of anterior repositioning splints (ARS) for temporomandibular joint disc displacement with reduction TMJ DDWR, clicking versus stabbing pain. As a consequence of very small study numbers, the description became narrative.

The subgroup investigating pain as an outcome of interest comprised four randomized controlled trials (RCTs) with 207 subjects total, 111 in ARS group and 96 in the control group. The combined effect indicated a significant improvement in pain for the ARS group's participants, with an SMD of -1.61 [95% CI: -3.19, -0.02], ($p < 0.05$).

These results for subgroups suggest that there is graded efficacy of ARS therapy depending on clinical symptom profile, more reliably improving joint clicking and moderately to strongly reducing pain; however, more studies are needed to establish external validity for these findings on clicking performance outcomes.

Sensitivity Analyses

Sensitivity analyses were conducted to gauge how much the results obtained as a consequence of ARS treatment would vary. These analyses looked at TMJ-related pain and clicking and sought to determine whether any of the individual studies had an undue influence on the consolidated outcomes.

For the SMD-based pain outcome, two out of the four participants' studies showed stronger effect sizes, which drove participation analysis more than was warranted. The pooled SMD met criteria for sub-statistical analysis with -1.61 (95% CI: -3.19, -0.02) contributing to considerable heterogeneity ($I^2 = 91\%$, $Q = 34.09$, $df = 3$, $p < 0.01$). After excluding the study which had the largest weight (43.2%) , the recalculated pooled SMD was -1.12 [95% CI: -2.02, -0.21], with reduced heterogeneity ($I^2 = 84\%$). This indicates that while the effect remained statistically significant, one study contributed notably to the overall heterogeneity.

Study weight was distributed revealed sharp inequality where one study contributed 43.2% while the rest of the three fell in at a range between 13.6% to 28.4%. Even within this moderate imbalance, it was clear that removal of any one study did not greatly disturb the direction of pooled impact suggesting in fact that ARS therapy has quite consistent effects on pain reduction.

In conclusion, the sensitivity analyses provided indicate that there are stable findings concerning pain outcomes, albeit with variation across study sizes, and strong evidence, albeit underpowered for joint clicking, suggesting the need for additional randomized controlled trials to confirm this effect.

Risk of Bias

Table 2: Risk of Bias Assessment of Individual RCTs

Study	Sequence Generation	Selection Bias	Allocation Sequence Concealment	Blinding of Participants and Personnel (Performance Bias)	Blinding of Outcome Assessment (Detection Bias)	Incomplete Outcome Data	Selective Outcome Reporting	Other Bias
Haggag & Askar, 2021	+	+	-	-	-	+	+	-
Pihut et al., 2018	+	+	±	±	±	+	+	±
Altaweel et al., 2020	+	+	+	±	±	+	±	+
Prati et al., 2024	+	+	+	+	±	+	±	+

"+" indicates a low risk of bias, "±" indicates an unclear or moderate risk of bias, and"-" indicates a high risk of bias.

Table 3: ROBINS-I Risk of Bias Assessment (for Non-Randomized Studies)

Study	Bias due to Confounding	Bias in Selection of Participants	Bias in Classification of Interventions	Bias due to Deviations from Intended Interventions	Bias due to Missing Data	Bias in Measurement of Outcomes	Bias in Selection of the Reported Result	Overall Risk of Bias
Ma et al., 2019	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Pang et al., 2025	Serious	Moderate	Low	Moderate	Low	Moderate	Moderate	Serious
Lee Mui Lee et al., 2024	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Minervini et al., 2020	Serious	Serious	Moderate	Moderate	Moderate	Serious	Moderate	Serious
Liu et al., 2025	Critical	Serious	Moderate	Serious	Serious	Serious	Critical	Critical

Low = Low risk of bias, Moderate = Some concerns, Serious = Substantial risk of bias, Critical = Very high risk; study likely unreliable.

Risk of bias was assessed separately for RCTs using the Cochrane Risk of Bias tool, while non-randomized studies (including clinical trials and case reports) were evaluated using ROBINS-I Risk of Bias Assessment for key limitations. **Table 2 and 3** present the findings separately by study design.

The risk of bias within included studies differed. Most of the randomized trials appeared to have adequate sequence generation and a low risk of selection bias; however, blinding of participants and outcome assessors was frequently unclear or not done in older or non-randomized studies. Small case reports and larger studies showed much greater uncertainty across multiple domains. There were low-risk results from incomplete outcome data and selective reporting combined across all studies.

As a whole, the methodology quality was moderate to high which alongside the GRADE assessment showing moderate confidence in ARS effectiveness in TMJ disc displacement with reduction provided robust study findings.

DISCUSSION

The systematic review provided a clinical assessment of anterior repositioning splints (ARS) treatment for temporomandibular joint disc displacement with reduction (DDwR) through analysis of nine related studies. Temporomandibular joint disorders, particularly disc displacement with reduction (DDwR), are commonly associated with pain, joint noises, and functional impairment [24]. Conservative management approaches, including splint therapy, have gained prominence due to their non-invasive nature and potential to alleviate symptoms and improve joint mechanics [25,26].

ARS therapy achieves essential treatment objectives such as better pain management as well as enhanced joint noise reduction and mandibular function which validates ARS as a non-invasive option for DDwR treatment [27]. ARS demonstrates sustained positive outcomes in distinct research that proves its potential status as a primary therapeutic technique for DDwR management due to its ability to address functional limitation and symptomatic manifestations among patients suffering from DDwR's associated discomfort and impaired functionality together with degraded life quality [28,29].

Most investigated studies demonstrated that ARS provided superior results in comparison to alternative splint approaches and treatment methods lacking splints. [30]. ARS decreased TMJ clicking by 92% whereas stabilization splints only improved the condition by 48%. Similarly, 94.6% of patients experienced resolution of pain symptoms when using ARS compared to 62.5% with laser therapy controls [31]. The assessed findings support biomechanical theories by demonstrating that ARS positions the condyle-disc complex in a new position which creates reduced mechanical tension for improved tissue adaptation. The proper positioning of the condyle next to the articular disc after ARS treatment brings back the original structural relation between these structures [32].

ARS create conditions that enhance recovery while lessening contact stress on the joint and this combination could contribute to the reduction of symptoms [33]. The implementation of ARS encountered multiple hurdles during its application. Cross-study evaluations became complicated by differences between splint creation methods, like CAD/CAM, compared to conventional techniques and protocols prescribing splint wear times between 16 and 24 hours per day. The clinical effectiveness of CAD/CAM splints led to complete symptom resolution in specific cases, but their high expense hinders accessibility, mainly in locations without proper resources or when extended use is needed [34–36]. The findings about condylar remodeling alongside dentofacial improvements must undergo extended assessment for proper clinical evaluations[37]. Studies need to dedicate time to better understand the long-term effects of these aspects to better assess their impact on TMJ health and the potential worsening of joint degeneration, together with structural abnormalities [38].

Several methodological constraints limit the solidity of the study findings, even though positive outcomes were recorded. The assessment of risk bias indicated significant biases studies, mainly because blinding procedures were inadequate, and most studies had small sample sizes. The conclusion reliability declines because of these factors which bring uncertainty to ARS's actual impact. Multiple methods of scoring outcomes, such as VAS and VNRS for pain measurement, restricted combined analysis for specific endpoints, thus rendering it unfeasible to precisely determine effect sizes. The GRADE framework evaluated the total evidence body with a "moderate" quality yet specifies that upcoming clinical trials ought to standardize their protocols to achieve result consistency and comparability.

The evidence shows ARS brings promising results for treating DDwR by accomplishing pain reduction and functional improvement but more comprehensive research is necessary to expand the field [39,40]. Publication bias may exist due to exclusion of non-English studies. Scientists should continue research by executing multicenter randomized controlled trials for standardizing ARS designs and treatment protocols and choosing appropriate outcome measures to boost study generalizability and reduce bias. Research must examine how ARS affects joint structures throughout time and how it modifies condyles as well as how it affects patients' quality of life because these long-term assessments verify sustainable benefits. The development of evidence-based guidelines aimed at ARS use will give clinicians confidence to adopt these treatments in daily practice for DDwR patients and will generate optimal outcomes.

CONCLUSIONS

Conclusively, anterior repositioning splints produce significant clinical advantages during DDwR treatment by addressing pain symptoms and joint sounds. Strong interpretation should be exercised due to evidence quality issues stemming from conflicting methodologies and bias risks. Standardized splints and dedicated outcome measures should be included in larger multicenter RCTs because these components will help validate already established findings.

Including anterior repositioning splints within TMD management protocols would result in superior patient results through non-surgical symptom minimization methods. Future studies need to investigate economical manufacturing processes together with the best usage times and long-term joint changes to achieve ARS solid status as a primary treatment method for DDwR.

LIST OF ABBREVIATIONS

ARS - Anterior Repositioning Splint(s)
DDwR - Disc Displacement with Reduction
TMJ - Temporomandibular Joint
TMD - Temporomandibular Disorder
MRI - Magnetic Resonance Imaging
CAD/CAM -Computer-Aided Design/Computer-Aided Manufacturing
VAS - Visual Analog Scale (pain measurement)
VNRS - Verbal Numeric Rating Scale (pain measurement)
CBCT - Cone Beam Computed Tomography

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None

CONFLICT OF INTEREST

None

AUTHORS' CONTRIBUTIONS

All Authors participated equally as per ICMJE.

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