Occlusal treatments in temporomandibular disorders: a qualitative systematic review of randomized controlled trials
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Authors' objectives
The authors aimed to assess the effectiveness of occlusal treatments for symptoms of temporomandibular disorder (TMD), and to determine whether current clinical practice agrees with the evidence.

Searching
MEDLINE and EMBASE were searched from 1966 to March 1999 for papers in any language; the search terms were stated. In addition, the Index of Dental Literature was handsearched from 1966 to 1980, the Cochrane Controlled Trials Register and DARE were searched, and the reference lists from identified reports and reviews were checked. Abstracts and unpublished reports were excluded.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion.

Specific interventions included in the review
Studies that compared occlusal splint or occlusal adjustment with placebo, no treatment or another intervention were eligible for inclusion. Studies that compared different types of splint were excluded. Studies of combinations of splint or occlusive adjustment with other treatments were subsequently excluded. The included studies used stabilisation (flat plane) splints, soft splints and anterior repositioning splint (for TM joint dislocation). The control treatments varied widely and included one or more of the following: biofeedback, ultrasound, relaxation training, movement feedback, acupuncture, transcutaneous electrical nerve stimulation, muscle exercise, palatal splint, different stomatognathic treatments, mock occlusal adjustment and waiting-list. Some studies permitted no other treatments for pain, while one study gave pain medication to all patients.

Participants included in the review
Studies of people seeking treatment for symptoms of TMD were eligible for inclusion. The included studies were of people referred for treatment and people recruited through newspaper advertisements. The participants in the included studies had mandibular dysfunction, myofacial pain dysfunction syndrome, pain and dysfunction of the masticatory system plus reciprocal clicking or disk displacement, masticatory muscle myalgia, facial muscular pain, craniofacial disorder, TM joint disk displacement without reduction, and TMD including TMD of arthrogenous origin.

Outcomes assessed in the review
The inclusion criteria were not explicitly defined in terms of the outcomes. The review assessed the difference between treatments in pain intensity, overall success rating, or any other outcomes measures used in the studies. In the included studies:

- pain was assessed using pain diary, pain visual analogue scale, pain severity scale, pain unpleasantness, verbal rating, pain frequency and a symptom severity index;
- overall success was assessed on the basis of success rating, improvement of subjective symptoms, subjective improvement, positive responders and change in severity; and
- other measures were assessed using subjective symptoms, reciprocal clicking, palpatory tenderness or palpation score, joint sounds, clicking, TMD questionnaire, Helkimo clinical index, Helkimo anamnestic index, activity of daily living, clinical variables, muscle pain palpation index, depression scale, quality of life, frequency and severity of complaints, symptom questionnaire, pressure algometer score, maximum pain free opening, subjective and clinical dysfunction.
score, prevalence of symptoms and clinical signs.

The duration of follow-up ranged from 10 days to 12 months. The review focused on the latest outcome assessment.

**How were decisions on the relevance of primary studies made?**
The authors independently read each identified paper and reached consensus on the studies selected for inclusion.

**Assessment of study quality**
Validity was assessed and scored using the validity criteria described by Antczac (see Other Publications of Related Interest). The criteria assessed included study protocol and the presentation and analysis of results. The maximum possible score was 1.00 when all criteria were met. Each of the authors independently assessed and scored the quality of each study according to the validity criteria, where applicable. The results were compared and consensus was reached by discussion.

**Data extraction**
The authors reached consensus about the overall outcome of each RCT. The tabulated information included patient characteristics and approximate number per treatment group, details of the intervention and control groups, duration of follow-up, and outcome measures.

The review considered a result was positive if the authors of the study reported a statistically-significant difference between the intervention and control.

**Methods of synthesis**

**How were the studies combined?**
The characteristics of the included studies were summarised in the text of the review. The studies were grouped according to the type of intervention (splints and occlusal adjustment) and results were presented for pain, overall success and other measures. The results for intervention versus specified control for each outcome from the individual studies were then defined as positive, comparable or inferior, and tabulated.

**How were differences between studies investigated?**
Differences between the studies, in terms of study characteristics and quality, were discussed in the text of the review.

**Results of the review**
Eighteen RCTs were included in the review: 14 RCTs (approximately 850 people) of splints and 4 RCTs (approximately 170 people) of occlusal adjustment.

Overall, the quality of the studies was poor with the quality scores ranging from 0.12 to 0.78 (mean 0.43) out of a potential 1.0. There were several methodological problems: inadequate blinding; small sample sizes; short follow-up periods; the use of a wide variety of outcomes measures and control treatments; the number of visits and/or times of treatment varied between the intervention and control groups; the credibility of the intervention and control treatment was not tested; compliance was not assessed; the randomisation method was not described; the treatment groups were not comparable at baseline and there was no adjustment for this in the analysis; violations of randomisation; and inadequate reporting of the results. Three RCTs were rated excellent for the quality of the statistical analysis and interpretation of the results. One study was rated as poor for the statistical analysis.

The authors stated that the results below are suggestive in view of the problems highlighted.

Splint therapy was superior to 3 control treatments (ultrasound, palliative treatment and palatal splint), comparable to 12 control treatments, and superior to 4 passive controls.

Occlusal adjustment was comparable to control treatments in 2 RCTs, worse than control treatment in one RCT, and comparable to passive control in one RCT.
Authors’ conclusions
The authors concluded that, because of methodological limitations in the included studies, the conclusions are suggestive rather than definitive. They stated that treatment with occlusal splints may be of some benefit to people with TMD, but there is no evidence about the use of occlusal adjustment.

CRD commentary
The review question was clear in terms of the study design, intervention and participants. The inclusion criteria were not explicitly defined in terms of the outcomes, but the outcomes assessed in the review were stated clearly. Several relevant sources were searched, the search terms were stated, and studies published in any language were eligible. However, no attempt was made to locate unpublished studies, thus raising the possibility of publication bias. More than one author independently selected the studies, assessed validity and reviewed the results from each study; this reduces the potential for bias and errors. Validity was assessed and scored using validated criteria, the results were tabulated, and methodological limitations of the included studies were discussed in the text of the review.

Relevant information on the included studies was tabulated. The methods used to combine the studies were appropriate given the variety of outcome measures and control treatments. The evidence presented appears to support the authors’ conclusions.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that there is a need for well-designed controlled studies to examine treatments for TMD.

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Other publications of related interest

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.