

One phase or two phases orthodontic treatment for Class II division 1 malocclusion?

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A Commentary on

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Abstract

Data sources Cochrane Oral Health's Information Specialist searched the following databases: Cochrane Oral Health's Trials Register (to 27 September 2017), the Cochrane Central Register of Controlled Trials (CENTRAL) (the Cochrane Library, 2017, Issue 8), MEDLINE Ovid (1946 to 27 September 2017), and Embase Ovid (1980 to 27 September 2017). The US National Institutes of Health Ongoing Trials Registry (ClinicalTrials.gov) and the World Health Organization International Clinical Trials Registry Platform were searched for ongoing trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

Study selection Randomised controlled trials of orthodontic treatments to correct prominent upper front teeth (Class II malocclusion) in children and adolescents. The review included trials that compared early treatment in children (two-phase) with any type of orthodontic braces (removable, fixed, functional) or head-braces versus late treatment in adolescents (one-phase) with any type of orthodontic braces or head-braces, and trials that compared any type of orthodontic braces or head-braces versus no treatment or another type of orthodontic brace or appliance (where treatment started at a similar age in the intervention groups). The review excluded trials involving participants with a cleft lip or palate, or other craniofacial deformity/syndrome, and trials that recruited patients who had previously received surgical treatment for their Class II malocclusion.

Data extraction and synthesis Review authors screened the search results, extracted data and assessed risk of bias independently. They used odds ratios (ORs) and 95% confidence intervals (CIs) for dichotomous outcomes, and mean differences (MDs) and 95% CIs for continuous outcomes.

Results From the 27 studies included in the review: Three trials compared early treatment with a functional appliance versus late treatment for overjet, ANB and incisal trauma. After phase one of early treatment (i.e. before the other group had received any intervention), there was a reduction in overjet and ANB reduction favouring treatment with a functional appliance; however, when both

Practice point

Early use of functional appliance may reduce incisal trauma but does not seem to provide any other advantages

groups had completed treatment, there was no difference between groups in final overjet (MD 0.21, 95% CI -0.10 to 0.51, $P = 0.18$; 343 participants) (low-quality evidence) or ANB (MD -0.02, 95% CI -0.47 to 0.43; 347 participants) (moderate-quality evidence). Early treatment with functional appliances reduced the incidence of incisal trauma compared to late treatment (OR 0.56, 95% CI 0.33 to 0.95; 332 participants) (moderate-quality evidence). The difference in the incidence of incisal trauma was clinically important with 30% (51/171) of participants reporting new trauma in the late treatment group compared to only 19% (31/161) of participants who had received early treatment. Two trials compared early treatment using headgear versus late treatment. After phase one of early treatment, headgear had reduced overjet and ANB; however, when both groups had completed treatment, there was no evidence of a difference between groups in overjet (MD -0.22, 95% CI -0.56 to 0.12; 238 participants) (low-quality evidence) or ANB (MD -0.27, 95% CI -0.80 to 0.26; 231 participants) (low-quality evidence). Early (two-phase) treatment with headgear reduced the incidence of incisal trauma (OR 0.45, 95% CI 0.25 to 0.80; 237 participants) (low-quality evidence), with almost half the incidence of new incisal trauma (24/117) compared to the late treatment group (44/120). Seven trials compared late treatment with functional appliances versus no treatment. There was a reduction in final overjet with both fixed functional appliances (MD -5.46 mm, 95% CI -6.63 to -4.28; 2 trials, 61 participants) and removable functional appliances (MD -4.62, 95% CI -5.33 to -3.92; 3 trials, 122 participants) (low-quality evidence). There was no evidence of a difference in final ANB between fixed functional appliances and no treatment (MD -0.53°, 95% CI -1.27 to -0.22; 3 trials, 89 participants) (low quality evidence), but removable functional appliances seemed to reduce ANB compared to no treatment (MD -2.37°, 95% CI -3.01 to -1.74; 2 trials, 99 participants) (low-quality evidence). Six trials compared orthodontic treatment for adolescents with Twin Block versus other appliances and found no difference in overjet (0.08 mm, 95% CI -0.60 to 0.76; 4 trials, 259 participants) (low-quality evidence). The reduction in ANB favoured treatment with a Twin Block (-0.56°, 95% CI -0.96 to -0.16; 6 trials, 320 participants) (low-quality evidence). Three trials compared orthodontic treatment for adolescents with removable functional appliances

GRADE rating



versus fixed functional appliances and found a reduction in overjet in favour of fixed appliances (0.74, 95% CI 0.15 to 1.33; two trials, 154 participants) (low-quality evidence), and a reduction in ANB in favour of removable appliances (-1.04° , 95% CI -1.60 to -0.49 ; 3 trials, 185 participants) (low-quality evidence).

Conclusions Evidence of low to moderate quality suggests that providing early orthodontic treatment for children with prominent upper front teeth is more effective for reducing the incidence of incisal trauma than providing one course of orthodontic treatment in adolescence. There appear to be no other advantages of providing early treatment when compared to late treatment. Low-quality evidence suggests that, compared to no treatment, late treatment in adolescence with functional appliances, is effective for reducing the prominence of upper front teeth

Commentary

The well-conducted Cochrane systematic review analyzed the evidence of early compared to late treatment in children or adolescents with Class II division 1 malocclusion. Class II division 1 patients typically present with severe overjet and proclined incisors that markedly affect the aesthetics of the patients. Mandibular retrusion from Class II malocclusion also has a strong impact on the perception of facial attractiveness. The aesthetics of the lateral profile in children with severe mandibular retrusion is improved with orthodontic treatment.¹

The difference in the timing of treatments (whether to start treatment early or in adolescence) has been unclear and a topic of debate for quite sometime.

A questionnaire conducted among orthodontists to evaluate reasons for treatment selection for the early treatment modality concluded that one of the main reasons for the selection of two-phase treatment is because it helps to improve patient self-esteem and brings satisfaction to the family. Other advantages mentioned were a reduction of risk of anterior teeth fracture (as the conclusion of the current review along with shorter orthodontic treatment during the second stage as well as reduction of extraction of bicuspid teeth.²

Regarding the current best evidence, the authors of the review quantified and assessed the quality of the evidence using the GRADE approach³ They concluded that only moderate evidence from 3 randomised clinical trials (332 patients) is favouring the use of early functional appliance as it reduces the OR 0.56, 95% CI (0.33-0.95) of incisal trauma compared with late functional appliances.

However, for all other outcomes, there seem to be no other advantages for providing a two-phase treatment in children compared to one-phase in adolescence.

Orthodontic treatment with functional appliances in adolescents with prominent upper front teeth appears to reduce the protrusion of the upper teeth when compared to adolescents who are not treated but the evidence was considered low for the particular outcome.

A recent systematic review concluded that compliance with removable orthodontic appliances and adjuncts is suboptimal, and patients routinely overestimate the duration of wear.³

An essential consideration in orthodontics is patient compliance, which is paramount for success and completion of the treatment.⁴

In order to decide whether or not to pursue one treatment modality or the other, clinicians will need to consider all individual risks and benefits for selecting the best treatment.

References

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