

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

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Commentary on

Batista K B S L, Thiruvengkatachari B, Harrison J E, O'Brien K D.

Orthodontic treatment for prominent upper front teeth (Class II malocclusion) in children and adolescents. *Cochrane Database Syst Rev* 2018; CD003452: DOI: 10.1002/14651858.CD003452.pub4.

Abstract

Data sources Numerous online databases were searched including; the Cochrane Central Register of Controlled Trials, the Cochrane Library, MEDLINE Ovid and Embase Ovid). The US National Institutes of Health Ongoing Trials Registry (ClinicalTrials.gov) and the World Health Organization International Clinical Trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

Study selection The review included only randomised clinical trials of orthodontic treatments to correct prominent upper front teeth (Class II malocclusion) in children and adolescents. The review selected studies that compared early treatment in children (two-phase) with any type of orthodontic braces (removable, fixed, functional) or head-braces/headgear versus late (one-phase) treatment in adolescents with any type of orthodontic braces or head-braces/headgear, and studies that compared any type of orthodontic braces or head-braces/headgear versus no treatment or another type of orthodontic brace/treatment or appliance (where treatment started at a similar age in the intervention groups).

The review excluded studies involving participants with craniofacial deformities/syndromes or a cleft lip or palate, and trials that recruited patients who had previously received surgical treatment for their Class II malocclusion.

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

Results Twenty-seven studies were included and analysed in the review. Out of the 27 trials, three trials (343 patients – low/moderate quality evidence) compared early/ two stage orthodontic treatment with functional appliances versus late two phases orthodontic treatment assessing all changes in overjet, cephalometric changes (antero-posterior relationship of the mandible to the maxilla or ANB angle) and incisal trauma in the upper anterior teeth.

Firstly the results showed a reduction in the overjet and ANB angle after phase one of early treatment in patients using functional appliances, before the other group had received any treatment; the results changed when both groups underwent treatment, resulting in

Practice point

- When deciding between one, or two, phase orthodontic treatment, practitioners need to consider all the relevant risks and benefits for each individual

a non-statistical difference between groups in final overjet (MD 0.21, 95% CI –0.10 to 0.51, $P = 0.18$; or ANB (MD –0.02, 95% CI –0.47 to 0.43).

Incidence of new incisal trauma: the results favoured initial or early treatment with functional appliances. The odds of incisal trauma using early functional appliances were reduced compared to late treatment: OR 0.56 (95% CI 0.33 to 0.95). The incidence of front teeth trauma was 30% in the participants of the late treatment group/ one phase compared to 19% in the participants who received the early/two phase orthodontic treatment (332 patients – moderate quality evidence).

Headgear versus late treatment: early (two-phase) treatment with headgear reduced roughly half the incidence of new front teeth trauma (OR 0.45, 95% CI 0.25 to 0.80) compared to the late treatment group. The use of headgear reduced overjet and ANB, however, when both groups finalised the treatment, there was no statistically significant difference between groups in overjet (MD –0.22, 95% CI –0.56 to 0.12; or ANB (MD –0.27°, 95% CI –0.80 to 0.26) (low quality evidence).

Fixed functional appliances versus no treatment (low quality evidence): the analysis of seven trials that compared late treatment with functional appliances versus no treatment concluded that there was a reduction in final overjet with fixed functional appliances (MD –5.46 mm, 95% CI –6.63 to –4.28).

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).

Removable functional appliances to reduce ANB compared to no treatment: the results (low quality evidence) showing a MD of –2.37° (95% CI –3.01 to –1.74), favouring the functional appliances.

Twin block appliance versus other appliances in adolescents: six studies found no difference in changes in overjet (0.08 mm, 95% CI –0.60 to 0.76). The reduction in ANB favoured treatment with a twin block (–0.56°, 95% CI –0.96 to –0.16).

Removable functional appliances versus fixed appliances: the data combination of three trials concluded that there is a reduction in overjet in favour of fixed appliances (0.74, 95% CI 0.15 to 1.33), and a reduction in ANB in favour of removable appliances (–1.04°, 95% CI –1.60 to –0.49).

Conclusions Evidence classified as low to moderate quality suggests that providing early orthodontic treatment/two stages for children with prominent upper front teeth is more effective for reducing the

GRADE rating



incidence of upper front teeth trauma (incisal trauma) than providing one course of orthodontic treatment in adolescence. However, it appears that there is no other benefit of providing early treatment when compared to late treatment. Low-quality evidence proposes 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 analysed 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 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 in the children or adolescent) has been unclear and a topic of debate for quite some time.

A questionnaire study among orthodontists was conducted to evaluate reasons for treatment selection for the early treatment modality. The orthodontists believed that it helps to improve patient self-esteem and brings increased satisfaction to their family. Other advantages mentioned were a reduction of risk of anterior teeth fracture, shorter orthodontic treatment during the second stage, and decreased need to extract bicuspid teeth).²

Regarding the current best evidence, the authors of the review quantified and assessed the quality of the evidence using the GRADE approach.³ They concluded that only moderate evidence from three randomised clinical trials (332 patients) favoured the use of early functional appliances in reducing the odds OR 0.56 95% CI (0.33-0.95) of incisal trauma compared with late functional appliances.

However, for all the 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 to be of low quality for this particular outcome.

An essential consideration in orthodontics is patient compliance. It is paramount for success and completion of treatment.

A recent systematic review concluded that compliance with removable orthodontic appliances and adjuncts is suboptimal, and patients routinely overestimate the duration of wear.⁴

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