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[Intervention Review]

Orthodontic treatment for posterior crossbites

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ABSTRACT

Background

A posterior crossbite occurs when the top back teeth bite inside the bottom back teeth. When it affects one side of the mouth, the lower jaw may have to move to one side to allow the back teeth to meet together. Several treatments have been recommended to correct this problem. Some treatments widen the upper teeth while others are directed at treating the cause of the posterior crossbite (e.g. breathing problems or sucking habits). Most treatments have been used at each stage of dental development. This is an update of a Cochrane review first published in 2001.

Objectives

To assess the effects of orthodontic treatment for posterior crossbites.

Search methods

We searched the following electronic databases: the Cochrane Oral Health Group's Trials Register (to 21 January 2014), the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2014, Issue 1), MEDLINE via OVID (1946 to 21 January 2014), and EMBASE via OVID (1980 to 21 January 2014). We searched the US National Institutes of Health Trials Register and the World Health Organization (WHO) Clinical Trials Registry Platform for ongoing trials. We placed no restrictions on the language or date of publication when searching the electronic databases.

Selection criteria

Randomised controlled trials (RCTs) of orthodontic treatment for posterior crossbites in children and adults.

Data collection and analysis

Two review authors, independently and in duplicate, screened the results of the electronic searches, and extracted data and assessed the risk of bias of the included studies. We attempted to contact the first named authors of the included studies for missing data and for clarification. We used risk ratios (RR) and 95% confidence intervals (CIs) to summarise dichotomous (event) data, and mean differences (MD) with 95% CIs to summarise continuous data. We performed meta-analyses using fixed-effect models (we would have used random-effects models if we had included four or more studies in a meta-analysis) when comparisons and outcomes were sufficiently similar.

Main results

We included 15 studies, of which two were at low risk of bias, seven were at high risk of bias and six were unclear.

Fixed appliances with mid-palatal expansion

Nine studies tested fixed appliances with mid-palatal expansion against each other. No study reported a difference between any type of appliance.

Fixed versus removable appliances

Fixed quad-helix appliances may be 20% more likely to correct crossbites than removable expansion plates (RR 1.20; 95% CI 1.04 to 1.37; two studies; 96 participants; low-quality evidence).

Quad-helix appliances may achieve 1.15 mm more molar expansion than expansion plates (MD 1.15 mm; 95% CI 0.40 to 1.90; two studies; 96 participants; moderate-quality evidence).

There was insufficient evidence of a difference in canine expansion or the stability of crossbite correction.

Very limited evidence showed that both fixed quad-helix appliances and removable expansion plates were superior to composite onlays in terms of crossbite correction, molar and canine expansion.

Other comparisons

Very limited evidence showed that treatments were superior to no treatment, but there was insufficient evidence of a difference between any active treatments.

Authors' conclusions

There is a very small body of low- to moderate-quality evidence to suggest that the quad-helix appliance may be more successful than removable expansion plates at correcting posterior crossbites and expanding the inter-molar width for children in the early mixed dentition (aged eight to 10 years). The remaining evidence we found was of very low quality and was insufficient to allow the conclusion that any one intervention is better than another for any of the outcomes in this review.

PLAIN LANGUAGE SUMMARY

Orthodontic treatment for posterior crossbites

Review question

We conducted this review to assess the effects of different orthodontic treatments for correcting posterior crossbites.

Background

Posterior crossbite is when the top back teeth bite down inside the bottom back teeth. It occurs when the top teeth or jaw are narrower than the bottom teeth and can happen on one or both sides of the mouth. The condition affects between 1% and 16% of children who only have their baby teeth. Most posterior crossbites (50% to 90%) remain even when the permanent teeth erupt. In a minority of children, the problem self corrects.

In order to obtain a more comfortable bite, the lower jaw shifts to one side into a position that allows more teeth to come into contact. However, this shifting of the lower jaw may lead to tooth grinding, and this may lead to other dental problems including the tooth surface being worn away, abnormal growth and development of the teeth and jaws, and jaw joint problems.

Therefore, we need to find safe and effective treatments to correct posterior crossbites or expand the top back teeth, or both. One way of doing this is using orthodontic treatments. This can be more effective in children because the two halves of the roof of the mouth have not fully joined yet, so the top back teeth can be expanded more easily. Orthodontic treatments can also be used to treat posterior crossbites in adults, but they are more likely to need surgical treatments, which are not the focus of this review.

Study characteristics

Authors from the Cochrane Oral Health Group carried out this review update of existing studies and the evidence is current up to 21 January 2014. It includes 15 studies published from 1984 to 2013. Nine of these studies compared fixed (always in the mouth)

appliances either against different fixed appliances, or against the same fixed appliance but comparing different rates of expansion. Two studies compared a fixed appliance with a removable appliance. The remaining four studies evaluated other comparisons that were more difficult to classify.

Key results

There is some evidence to suggest that the quad-helix (fixed) appliance may be more successful than removable expansion plates at correcting posterior crossbites and expanding the top back teeth for children with a mixture of baby and adult teeth (aged eight to 10 years). The remaining evidence we found did not allow the conclusion that any one treatment is better than another.

Quality of the evidence

The evidence presented is mostly of low to very low quality due to the small amount of available studies and issues with the way in which they were conducted.