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[Intervention Review]

# Adhesives for bonded molar tubes during fixed brace treatment

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## ABSTRACT

### Background

Orthodontic treatment involves using fixed or removable appliances (dental braces) to correct the positions of teeth. The success of a fixed appliance depends partly on the metal attachments (brackets and bands) being glued to the teeth so that they do not become detached during treatment. Brackets (metal squares) are usually attached to teeth other than molars, where bands (metal rings that go round each tooth) are more commonly used. Orthodontic tubes (stainless steel tubes that allow wires to pass through them), are typically welded to bands but they may also be glued directly (bonded) to molars. Failure of brackets, bands and bonded molar tubes slows down the progress of treatment with a fixed appliance. It can also be costly in terms of clinical time, materials and time lost from education/work for the patient. This is an update of the Cochrane review first published in 2011. A new full search was conducted on 15 February 2017 but no new studies were identified. We have only updated the search methods section in this new version. The conclusions of this Cochrane review remain the same.

### Objectives

To evaluate the effectiveness of the adhesives used to attach bonded molar tubes, and the relative effectiveness of the adhesives used to attach bonded molar tubes versus adhesives used to attach bands, during fixed appliance treatment, in terms of: (1) how often the tubes (or bands) come off during treatment; and (2) whether they protect the bonded (or banded) teeth against decay.

### Search methods

The following electronic databases were searched: Cochrane Oral Health's Trials Register (to 15 February 2017), the Cochrane Central Register of Controlled Trials (CENTRAL; 2017, Issue 1) in the Cochrane Library (searched 15 February 2017), MEDLINE Ovid (1946 to 15 February 2017), and Embase Ovid (1980 to 15 February 2017). We searched [ClinicalTrials.gov](http://ClinicalTrials.gov) and the [World Health Organization International Clinical Trials Registry Platform](http://WorldHealthOrganization.org) for ongoing trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

### Selection criteria

Randomised controlled trials of participants with full arch fixed orthodontic appliance(s) with molar tubes, bonded to first or second permanent molars. Trials which compared any type of adhesive used to bond molar tubes (stainless steel or titanium) with any other adhesive, were included.

Trials were also included where:

- (1) a tube was bonded to a molar tooth on one side of an arch and a band cemented to the same tooth type on the opposite side of the same arch;
- (2) molar tubes had been allocated to one tooth type in one patient group and molar bands to the same tooth type in another patient group.

### **Data collection and analysis**

The selection of papers, decision about eligibility and data extraction were carried out independently and in duplicate without blinding to the authors, adhesives used or results obtained. All disagreements were resolved by discussion.

### **Main results**

Two trials (n = 190), at low risk of bias, were included in the review and both presented data on first time failure at the tooth level. Pooling of the data showed a statistically significant difference in favour of molar bands, with a hazard ratio of 2.92 (95% confidence intervals (CI) 1.80 to 4.72). No statistically significant heterogeneity was shown between the two studies. Data on first time failure at the patient level were also available and showed statistically different difference in favour of molar bands (risk ratio 2.30; 95% CI 1.56 to 3.41) (risk of event for molar tubes = 57%; risk of event for molar bands 25%).

One trial presented data on decalcification again showing a statistically significant difference in favour of molar bands. No other adverse events identified.

### **Authors' conclusions**

From the two well-designed and low risk of bias trials included in this review it was shown that the failure of molar tubes bonded with either a chemically-cured or light-cured adhesive was considerably higher than that of molar bands cemented with glass ionomer cement. One trial indicated that there was less decalcification with molar bands cemented with glass ionomer cement than with bonded molar tubes cemented with a light-cured adhesive. However, given there are limited data for this outcome, further evidence is required to draw more robust conclusions.

## **PLAIN LANGUAGE SUMMARY**

### **Adhesives for bonded molar tubes during fixed brace treatment**

#### **Background**

Orthodontic treatment involves using fixed or removable dental braces to correct the positions of teeth. The success of dental braces depends partly on the metal attachments (brackets and bands) being glued to the teeth so that they do not become detached during treatment. Brackets (metal squares) are usually attached to teeth other than molars, where bands (metal rings that go round each tooth) are more commonly used. Orthodontic tubes (stainless steel tubes that allow wires to pass through them), are typically welded to bands but they may also be glued directly (bonded) to molars. Failure of brackets, bands and bonded molar tubes slows down the progress of treatment with a dental brace.

#### **Study characteristics**

The evidence in this review, which was carried out together with Cochrane Oral Health, is up-to-date as of 15 February 2017. We included two studies that evaluated 190 participants. Both trials were conducted in the UK and both compared bonded molar tubes with molar bands.

#### **Key results**

From the limited data of two studies at low risk of bias, it would appear that bonded molar tubes are associated with a higher failure rate than with molar bands.