

# Bracket removal: quick and gentle removal of adhesive residue

Bonding system with fluorescent adhesive makes the invisible visible

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## Abstract

The adhesion of brackets onto the tooth's enamel surface using light-curing adhesive has changed practices around the world. This method facilitates quicker orthodontic treatments and simplifies the clinical working steps.

However, removal using traditional methods can result in fissures and considerable damage to the tooth enamel.

This is why it is particularly important that the adhesive residue is removed from the tooth surface in such a way that the enamel is not damaged and that the surface is restored, as far as possible, to its state prior to treatment. Bracket bonding systems with fluorescent adhesive, such as BrackFix from VOCO, provide an efficient means of removing any residue.

**Keywords:** Adhesive for orthodontics, bracket attachment

## Introduction

The bonding of brackets on tooth enamel is a clinical procedure which can be performed directly. To this end, the bracket is either placed directly on the tooth surface or indirectly in two phases: a laboratory and a clinical phase. The method of adhering brackets with composites on the surface of the enamel for orthodontics began back in 1955 with the examinations by Buonocore. This technique both accelerated and simplified the clinical working steps. The further development of products for the adhesion of brackets marked a clear step away from the banding technique. After all, the advantages of direct bracket bonding on the tooth enamel compared to banding are many and varied:

- less time spent in the dental chair
- less discomfort for the patient
- more rapid placement of the appliance (simplification of the technique)
- improved aesthetics

- easier oral hygiene and, as a result, fewer decalcification spots and a reduced risk of caries
- no remaining gaps between the teeth at the end of the multiband treatment

The undesired loosening of brackets is an unfortunate aspect of orthodontic treatments and results in an extension of the treatment time as well as increased material requirements and costs. According to Pinto, the causes of bracket loss can be traced back to errors in the adhesion technique, in the poor retention capacity of certain bracket bases and the influence of masticatory forces.

The literature also states that the use of ceramic brackets causes iatrogenic enamel damage during removal due to the strong bond between the composite and bracket. Moreover, the fact that these cannot be deformed leads to a high level of tension at the contact surface between the enamel and adhesive and, if traditional methods are used for removal, this can cause fissures and considerable damage to the enamel.

After the brackets have been taken off, it is vital that any bracket or composite residue is removed from the tooth surface in a way that does not damage the enamel and, as far as possible, restores the tooth surface to its state prior to treatment.

To this end various bracket removal techniques are recommended:

- Bracket removal forceps no. 347
- How forceps
- Band removal forceps
- Ligature cutters
- Forceps recommended by the manufacturer
- Removal gun
- Electrothermal removal
- The use of ultrasound and laser

Various techniques can be applied to remove adhesive residue:

- The use of band removal forceps or a tooth cleaning instrument
- Milling machines or finishing burs made of carbide
- Grinding bur made of aluminium oxide
- Finishing with finishing burs to supplement the removal of composite near the enamel

These techniques can also be combined.

#### Description of the new adhesive for orthodontics

The safe adhesion of brackets is a central element in orthodontics. A large spectrum of the materials available on the market offer favourable physical properties as well as simple handling and application for adhering brackets. However, in addition to these properties, it is also very important to remove all adhesive residue from the tooth surface when the brackets are finally removed. With BrackFix, VOCO has now developed a bracket bonding system with fluorescent adhesive which not only offers the above properties but which also boasts fluorescent properties which facilitate the efficient removal of adhesive residue when brackets are finally taken off.

BrackFix is a bracket bonding system with light-curing adhesive, with which metal and ceramic brackets can be adhered reliably and permanently. The adhesion between the bracket and tooth has been developed in order, on the one hand, to withstand the day-to-day loads and, on the other hand, to allow the brackets to be simply and safely removed at a later date. BrackFix consists of an adhesive and a primer which is available as an etch & rinse or self-etch primer.

The adhesive contains a dye which fluoresces blue when exposed to UVA light (365 nm +/-5 nm). This makes it easier to identify and safely remove any adhesive residue after brackets are taken off.

#### Clinical case

In order to remedy tooth displacement, the patient was provided with a fixed orthodontic appliance for the upper jaw.

At the start of treatment and before the brackets were adhered, the upper teeth were cleaned and polished (Fig. 1). The enamel surfaces onto which the brackets were to be adhered were then treated with etching gel (Fig. 2). Prior to application of the primer (BrackFix, VOCO) (Fig. 3), the working area was dried using a cheek retractor and cotton rolls.

The brackets were prepared in the next step. The adhesive (BrackFix, VOCO) was applied to each bracket (Fig. 4) which was then positioned on the tooth. Any excess adhesive which was visible under UVA light was removed (Fig. 5 and 6). Polymerisation was performed in the next step.

The orthodontic treatment phase with the desired corrective result was successfully concluded after several months.

The individual brackets were detached from the teeth using special forceps, the adhesive residue was removed using a specially designed milling attachment. A UVA light was used to render all residue visible and thus ensure controlled removal (Fig. 7 and 8). The final control with UVA light showed that there was no adhesive residue left on the enamel surfaces (Fig. 10).

The treatment result was stabilised in the subsequent retention phase.

#### Conclusion

This examination presented a new bracket bonding system with fluorescent adhesive which facilitates efficient elimination of adhesive residue following removal of brackets without damaging the tooth enamel.

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Clinical case



Fig. 1: The teeth were cleaned at the start of treatment.



Fig. 2: Etching gel was applied to the enamel surface.



Fig. 3: The BrackFix primer was applied in the next step.



Fig. 4: The Figure shows the simple application of the adhesive to the bracket.



Fig. 5: Tooth 11 prior to polymerisation and the removal of excess adhesive.



Fig. 6: Tooth 11 under UVA light.



Fig. 7: Illumination with UVA light following removal of the brackets.



Fig. 8: Controlled removal of the BrackFix residue.



Fig. 9: Final result following removal of the brackets and the adhesive residue.



Fig. 10: Final inspection with UVA light: no adhesive residue remains.