

# Fluorescent-dyed composites for easy removal of orthodontic brackets.

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## Background

Previous studies described several advantages for the process of debonding by the use of a fluorescent dye solution with adhesives used for orthodontic purposes<sup>[1;2]</sup>.

Fluorescent dyes seem to offer a consistent reduction in the time needed for debonding and to help the operator to reduce the Adhesive Remnant Index (A.R.I) with no reduction on mechanical proprieties.

The fluorescent solution is easily detectable under UV light (Ultra-Violet) during debonding and so it prevents unwanted damages of the dentine. After orthodontic treatment, the mineralization of the enamel surface may be affected or even present defects, therefore the process of debonding is to be carried out carefully to restore functional and aesthetic characteristic of the tooth surface.

## Clinical case presentation

A patient with crowding of upper and inferior dental arches with absence of third molars was enlisted for fixed orthodontic therapy. The teeth were etched for 30 seconds with 35% phosphoric acid gel (Vococid, VOCO GmbH, Cuxhaven, Germany), rinsed with water and air-dried for another 30 seconds. A Primer (BrackFix, VOCO GmbH, Cuxhaven) was thoroughly applied to the conditioned areas for 20 seconds and subsequently air-dried. The fluorescent composite BrackFix (VOCO GmbH, Cuxhaven) was used for bonding the orthodontic Brackets (Leone S.p.A., Firenze, Italy), which were applied to the teeth by a single operator and cured with a polymerisation lamp (Celalux 3, VOCO GmbH, Cuxhaven), each bracket 10 sec from mesially and 10 sec from distally.

After conclusion of the orthodontic therapy, brackets were removed with debonding pliers. The removal of composite residuals was carefully carried out with the use of 12-flute

tungsten carbide burs. A UV light (360-370 nm, minimum of 20 mW/cm<sup>2</sup>) was kept at a maximum distance of 50 cm with the help of an assistant during all the debonding process (fig. 1; 2).

## Clinical Results

The removal of fluorescent composite residues from the enamel surface on one hand preserves the tooth hard substance, on the other hand provides a quicker debonding. The surface of the enamel structure can be considered undamaged and does not show visible defects (fig. 3; 4).

## Conclusions

During debonding, fluorescent composites are detectable under UV light and so represent a simple visual method that helps in the removal of composite remnants. In orthodontics, fluorescent bonding systems are a strategy for easy removal of brackets and subsequently provide a significant simplification of the daily clinical practice.

Further studies are needed for verification with Scanning Electron Microscopy.



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## References

- [1] Namura Y., Tsuruoka T., Ryu C., Kaketani M., Shimizu N.. Usefulness of orthodontic adhesive-containing fluorescent dye. *European Journal of Orthodontics*, 2010, 32(6):620–626.
- [2] Van Waes H., Matter, T., Krejci, I.. Three-dimensional measurement of enamel loss caused by bonding and debonding of orthodontic brackets. *American Journal of Orthodontics and Dentofacial Orthopedics*, 1997, 112(6):666-669.

## Pictures



Fig. 1 & 2: Removal of composite residues with a tungsten carbide drill, using a UV light source (wavelength of 360-370 nm, intensity of at least 20 mW/cm<sup>2</sup>) and a distance of 50 cm.

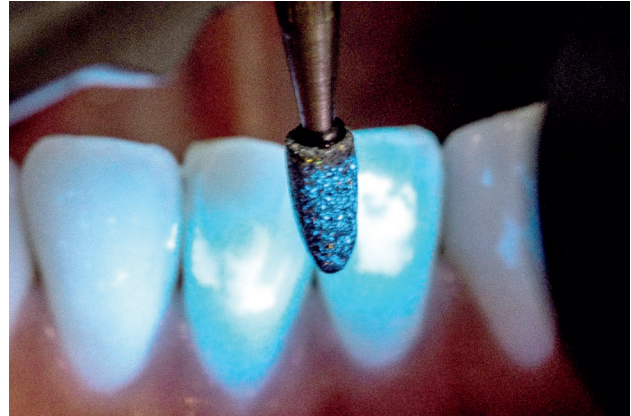


Fig. 2: The tungsten carbide drill at a closer look.



Fig. 3 & 4: Intact tooth surface and without defects after treatment.



Fig. 4: Intact tooth surface at a closer look.