

## Grandio – Repair

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**Grandio, the nano-hybrid composite, is characterised by its high stability and durability, which has already been proven in many clinical studies. Which treatment possibilities are available to the dentist for a defect in the restoration or the presence of secondary caries was examined in a study at the University of Groningen (The Netherlands).<sup>[1]</sup>**

The increment technique is employed when restoring a tooth with composite. The oxygen inhibition layer of the individual composite layers provides a firm chemical bond so that the interface between two layers is no longer recognizable after complete polymerisation. Such an inhibition layer, however, is not available for a partial revision of a composite restoration. One treatment option is the complete removal of the restoration followed by placing a new restoration, including the bonding procedure. This method, however, is time- and cost-intensive, so that it would be quite useful if the intact portion of the restoration could be left in place. Rinastiti et al. examined to what extent composite responds to a bond to previously polymerised material and the effect the different pre-treatments have.<sup>[1]</sup>

### Bond of composites

A total of four restoratives were examined: Grandio (VOCO), Tetric Evo Ceram (Ivoclar Vivadent), Filtek Supreme XT (3M ESPE) and Quadrant Anterior Shine (Cavex). 160 test specimens were fabricated, which were divided into four groups:

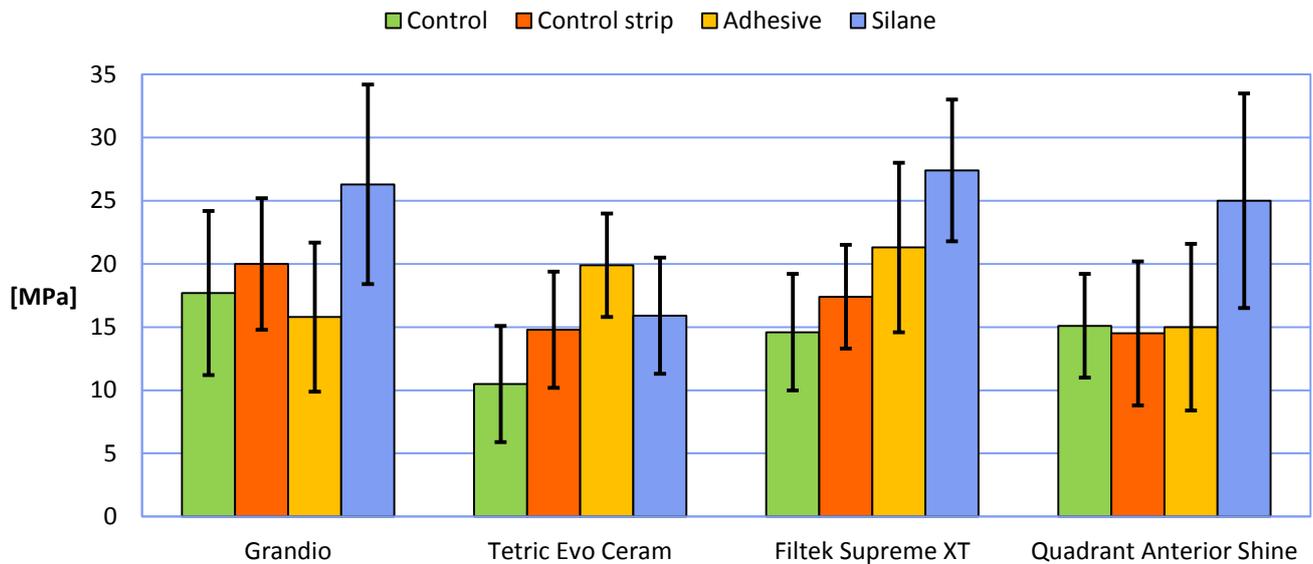
Positive control: Test specimens with inhibition layer

Negative control: Test specimens without inhibition layer (light-curing through Mylar strips)

Adhesive: Test specimens without inhibition layer using an adhesive system

Silane: Test specimens without inhibition layer, silicated (Cojet, 3M ESPE) with silane couple agent (ESPE-sil, 3M ESPE)

The following bonds were used in the "adhesive" group: Solobond Plus (Grandio), Multilink (Tetric Evo Ceram), Adper Scotchbond 1XT (Filtek Supreme XT) and Quadrant Unibond (Quadrant Anterior Shine). An additional layer of composite was applied to each of the prepared test specimens and subsequently light-cured. The adhesive bond was determined with a shear test. The results of the shear test measurement are shown in Figure 1. The results show that the type of pre-treatment in the different groups leads to different results. Silicating yielded the highest adhesive value in 3 groups. With Tetric Ceram, however, this pre-treatment led to worse results. The effect of pre-treatment with adhesives was positive in the group Tetric Evo Ceram and Filtek Supreme XT. A bond did not lead to an increase in the adhesive values for Grandio and Quadrant Anterior Shine. This shows that the optimal pre-treatment depends on the composite used. The result of the negative control is interesting with Grandio. The absence of the inhibition layer did not lead to a decline in the adhesive values.



**Figure 1:** Shear adhesion [MPa] after 24 h in dry storage

The high adhesive value in the negative control with Grandio is especially interesting. This value shows that repairing Grandio without a time-consuming pre-treatment leads to excellent results.

**Conclusion: Repairing Grandio even without pre-treatment exhibited an excellent adhesive bond between the old and new composite layer. The treatment procedure thus is considerably simplified in cases involving the repair of a restoration or revision.**

[1] M. Rinastiti, M. Özcan, W. Siswomihardjo, H. J. Busscher, *J. Dent.* **2010**, *38*, 29-38.