

Charisma Bulk Flow ONE

Depth of cure and translucency of bulk fill flowable composites – University of Alabama, Birmingham, AL, USA

Modern light-curing bulk fill materials are available since more than ten years. Hence, a couple of studies were done on this material class. A recent meta-analysis by an international research group did not find differences in the clinical performance of bulk fill and conventional composites¹.

As these materials are light curing, they need to allow a sufficient light transmission to the bottom of the bulk layer. This is achieved by a higher translucency compared to conventional composites. As a result, bulk fill restorations can become greyish in larger or extended cavities because they cannot block the show through of the dark oral cavity.

To overcome this issue, Kulzer has developed Charisma Bulk Flow ONE. On the one hand, it is a flowable composite which can be light cured in layers up to 4 mm. On the other hand, its Adaptive Light Matching effect adjusts the restoration to the shade of the surrounding tooth shade. To achieve this effect, its translucency and intrinsic colour by the fillers are well balanced. Its translucency allows the restoration picking up the shade of the surrounding tooth and enables safe curing, whereas its filler system creates a tooth-like shade which enables more aesthetic restorations for basic posterior restorations.

The following in vitro study by Dr. Nathaniel Lawson compares the depth of cure and translucency of Charisma Bulk Flow ONE to other bulk fill materials.

Giving a hand to oral health.



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¹Arbilo-Vega HI *et al.*: Clinical Effectiveness of Bulk-Fill and Conventional Resin Composite Restorations: Systematic Review and Meta-Analysis. *Polymers*, 2020, 12 (8): 1786.

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Objective

Comparison of the depth of cure and translucency of different bulk fill composites.

Materials & Methods

The tested composites including their shades and recommended curing times are indicated in the table below.

Brand name	Type of composite	Manufacturer	Shade	Curing time
Charisma Bulk Flow ONE	Bulk Fill Flowable	Kulzer	ONE	20 seconds
Surefil SDR Flow+	Bulk Fill Flowable	Dentsply Sirona	A3	40 seconds
Tetric PowerFill	Bulk Fill pasty composite	Ivoclar Vivadent	IVA	10 seconds
Filtek ONE Bulk Fill	Bulk Fill pasty composite	3M	A3	20 seconds

Depth of cure:

Seven specimens for each composite were prepared by inserting the composite in a single increment into a stainless-steel mold (10 mm height, 6 mm diameter) for depth of cure testing. The mold was placed on a white filter paper. After placement, the composite was covered by a Mylar strip. A glass slide was used to flush the composites with the mold surface. The composites were light cured (LC) from the top surface using an Elipar Deepcure (3M, irradiance of at least 1000 mW/cm²) after removal of the glass slide. The light curing times of each composite followed the recommendations in the respective instruction for use (see table above).

Afterwards the specimens were removed from the mold. The uncured composite material was manually scraped away by a plastic spatula. Then the maximum length of the remaining specimen was measured using digital calipers. The recorded value was divided in half to determine depth of cure.

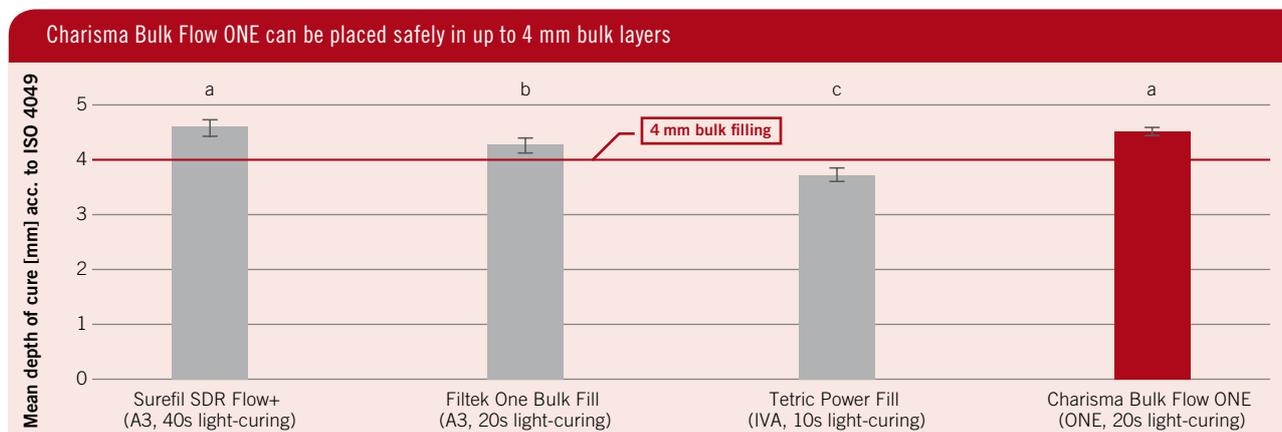
Translucency:

2mm flat composite specimens were made from all tested composite materials (n = 10). A mylar strip and glass slide were pressed against the uncured material surfaces. The samples were light cured following the above-described manufacturer recommendations. The specimens were polished using a 600 grit SC paper. After cleaning the L*a*b values were determined by a spectrophotometer (CM-700d, Konica) against a black and white background and DeltaE was calculated for each material.

For statistical analysis an ANOVA followed by Tukey HSD test was used for both tests (p = 0.05).

Results

Depth of cure:



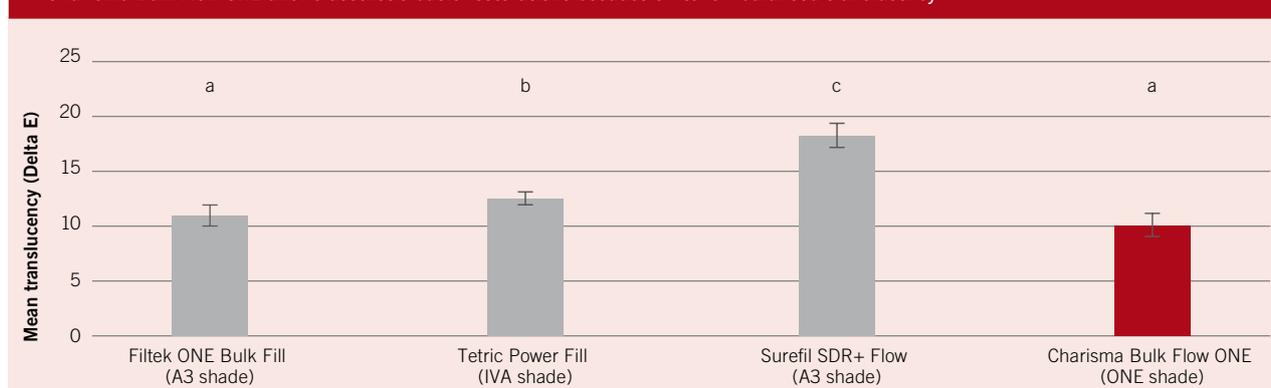
No statistical significant differences were found between composites with same lower letters.

Statistically significant differences were found between the tested materials (p = 0,000).

Translucency:



Charisma Bulk Flow ONE allows aesthetic basic restorations because of its low balanced translucency



No statistical significant differences were found between composites with same lower letters.

Statistically significant differences were found between the tested materials ($p < 0,001$).

Conclusion

Charisma Bulk Flow ONE demonstrated a depth of cure of 4.53 mm, which was greater than Tetric PowerFill and Filtek ONE Bulk Fill similar to Surefil SDR Flow+. Charisma Bulk Flow ONE produced similar translucency as Filtek ONE Bulk Fill and less than Tetric PowerFill or Surefil SDR Flow+. Achieving a deeper depth of cure while maintaining relative opacity provides a clinical advantage to Charisma Bulk Flow ONE.

Comment

Charisma Bulk Flow ONE was one of the materials which showed the highest depth of cure and at the same time the lowest translucency of the tested bulk fills. Of course, bulk fill materials in general need to possess a higher translucency than body shades of conventional composites to enable curing of the bulk increments. So, on one hand Charisma Bulk Flow ONE can be safely cured in bulk layers up to 4mm in 20 s. On the other hand, its translucency is balanced to allow also aesthetically sufficient restorations of cavities being slightly extended into the buccal aspect without being so greyish as more translucent bulk fill composites. Further, its ONE-shade adapts to the surrounding tooth shade and the restoration becomes invisible by blending into any surrounding dentition. Therefore, a shade selection is not needed. Even it is a flowable material, it can be used without the need of capping by a conventional pasty composite. To conclude, Charisma Bulk Flow ONE supports the dentist efficiently in restoring smaller basic posterior cavities.

Source

Lawson N, University of Alabama at Birmingham, AL, USA.: Depth of cure and translucency of bulk fill flowable composites. Test report May 2022. Unpublished data. Data on file.

The study was abbreviated, summarised and commented and all diagrams and titles have been established by Kulzer.