# A practice-based clinical evaluation of SDI Aura Bulk Fill restorative

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## ABSTRACT

### Objective:

To evaluate the handling, by a group of practice-based researchers, of a recently introduced resin composite material, Aura Bulk Fill (SDI).

### Methods:

The twelve selected evaluators were sent explanatory letters, a pack of the material under investigation, with a request to use it, where indicated, for 10 weeks, and a questionnaire.

### Conclusions:

Handling wise, Aura Bulk Fill was well received, as indicated by the high number of evaluators who would both purchase the material and recommend it to colleagues.

## INTRODUCTION

### Practice based research

The value of practice-based research has been previously discussed[1], with the arena of general dental practice having been considered the ideal environment in which to carry out evaluations of the handling of dental materials and their clinical effectiveness. In this regard, a wide variety of research projects may be considered to be appropriate to general dental practice, including[1] assessment of materials, and techniques, clinical trials of materials, assessment of treatment trends and, patient satisfaction with treatment.

A UK-based group of practice based researchers is the PREP (Product Research and Evaluation by Practitioners) Panel. This group was established in 1993 with 6 general dental practitioners, and has grown to contain 33 dental practitioners located across the UK, with one in mainland Europe[2]. The group have completed over 70 projects – "handling" evaluations of materials & techniques, and more recently, clinical evaluations (n=8) of restorations placed under general dental practice conditions, with the restorations being followed for periods of one to five years[2].

### Resin composite/Bulk Fill materials

Resin composite materials are becoming increasingly used worldwide for restoration of posterior teeth[3], principally because of patient concerns about the poor appearance of amalgam restorations and anxieties with respect to the use of a mercury-containing filling material. Resin composite materials are presently considered to be the gold standard in terms of aesthetics and physical properties.

### Bulk Fill dental materials

The ideal dental material should produce good clinical results – a goal of importance not only to the manufacturer, but also to the clinician and the patient, but it should also be simple to handle, as it could be considered that a material which is simple to handle is one which will produce better results in the hands of the clinician[4]. This may also involve the speed by which a restoration utilising the material can be placed, given that clinicians generally consider that patients do not wish to sit in their dental chair for any longer than necessary! Resin composite restorations for posterior teeth require an incremental placement technique in order to overcome the problems associated with polymerisation shrinkage stress, this also being dependent upon the depth of cure of the material being used and the depth of the cavity. In addition, incremental placement may lead, as discussed by El-Safty and colleagues[5], to the incorporation of voids, a risk of contamination between layers and extended chair time. A dental material which fulfils the goals of clinical effectiveness, ease of placement and reduced time of placement might therefore be considered to be of value. These factors may be considered to have been facilitated the introduction of bulk-fill resin composite materials, these materials being defined as "composites that can be properly cured in a single layer of 4mm thickness"[6].

Bulk Fill resin composite materials have been classified into[7]:

- Bulk Fill base materials, which need a topping because their wear resistance is not sufficient for the

stresses of occlusion: Examples are SDR (Dentsply, Weybridge, UK) and Venus Bulk Fill (Hereaus Kulzer).

- Bulk Fill restorative materials, whose wear resistance is sufficient for occlusal loading. Examples of these are Filtek Bulk Fill Restorative (3M) and Tetric Evo Ceram Bulk Fill Restorative (Ivoclar-Vivadent). Sonic Fill from Kerr (Orange, CA, USA) is another Bulk Fill material with 4mm depth of cure: this is used with a handpiece which imparts sonic energy to the uncured material to make it less viscous when activated, increasing in viscosity when the sonic energy is removed.

Central to good performance of dental materials are, not only, their physical properties, but also their ease of use, since it could be suggested that a device or material which handles easily will be more likely to produce an optimally performing restoration than one which is difficult to use[3]. The assessment of the handling of a recently introduced dental material, Aura Bulk Fill from SDI (Melbourne) may therefore be considered to be of relevance to dental clinical practice. In this material, the opacity of Aura Bulk Fill is a function of the refractive index of the filler and the resin, with this process having been described by Shortall et al.[8] These workers considered that, since "composites become more opaque or translucent on curing", that optimising the filler/resin refractive index mismatch would provide increased curing depth. Accordingly, in Aura Bulk Fill, the curing process alters the refractive index of the resin marginally, to match the refractive index of the filler. This lowers the opacity temporarily, allowing deeper light penetration for a high depth of cure. After curing, the indices move apart again to give an ideal opacity.

It is therefore the aim of this short article to describe how a group of practice–based researchers considered the handling of Aura Bulk Fill.

## METHODS

### Selection of participants

All 33 members of the practice-based research group, the PREP Panel, were sent an email communication asking if they would be prepared to be involved in the "handling" evaluation of a recently-introduced Bulk Fill resin composite material. Of those who agreed to participate, twelve were selected at random.

### Questionnaire design

A questionnaire was designed by the PREP Panel co-ordinators and the manufacturers of the material under evaluation in order to provide background information on the ease of use of composite materials previously by the participating practitioners for restoration of posterior teeth and to compare the ease of use of these with the material Aura Bulk Fill. The majority of answers were made on visual analogue scales (VAS).

### Instructions to evaluators

Explanatory letters, questionnaires and a pack of Aura Bulk Fill were sent to the evaluators in July 2016, along with the instructions for use. The practitioners were asked to use the material, where indicated, for ten weeks and return the questionnaire for analysis. The data from the returned questionnaires were collated as below.

## RESULTS

Thirteen members of the PREP Panel (two of whom were female), of average time since graduation 28 years (range 21 to 45 years), participated in the evaluation.

A variety of techniques was used by the evaluators used for the placement of posterior composite restorations, with all but three of the evaluators placing more than five posterior composite restorations per week. The techniques the evaluators used for the placement of these restorations were, principally the use of a dentine bonding agent and/or a flowable composite base.

The number of posterior composite restorations placed by the evaluators in a typical week was as follows:

| Number of restorations | Number of respondents |
|---|---|
| <5 | 1 |
| 5-10 | 5 |
| >10 | 7 |

Of these the proportions were:

| | |
|---|---|
| Occlusal | 17% |
| Class II | 53% |
| MOD | 30% |

When asked about the technique used

for posterior composite restorations, 77% (n=10) used a dentine bonding agent, with 31% (n=4) using a glass ionomer base/sandwich and 54% (n=7) using a flowable composite base layer. Other techniques were, RMGI lining, SDR Bulk Fill (Dentsply) plus composite, and, Biodentine (Septodont) plus composite.

A wide range of composite materials for posterior teeth was used by the respondents prior to this study, with the principal reasons for the choice of these materials being ease of use, good aesthetics, good results, and 'familiarity'. Other reasons reported were "Easy to place in large increments" (2 similar), and "less shrinkage with Bulk Fill" and "less post-operative sensitivity".

All (100%) of the evaluators used their present material in compule form and one evaluator also used materials in syringe form.

All (100%) of the evaluators felt that minimal shrinkage stress would be advantageous.

The total number of restorations placed using SDI Aura Bulk Fill during the evaluation was 41, comprised as follows:

| | |
|---|---|
| Class 1 | 30% |
| Class II | 15% |
| MOD | 54% |
| Core build-ups | 1% |

All the evaluators (100%) stated they were satisfied with Aura Bulk Fill, and 90% (n=9) stated they encountered no post-operative sensitivity.

The rating for ease was as follows:


The rating for ease of use for dispensing and placement for Aura Bulk Fill was as follows:


80% (n=8) of the evaluators did not experience any difficulty with Aura Bulk Fill sticking to instruments.

**Comment:**

"Very slight – not really a problem"

All (100%) of the evaluators stated that the viscosity of Aura Bulk Fill was satisfactory and rated it as follows:


The working time of Aura Bulk Fill was rated as follows:


The ease of finishing and polishing using the usually used system was rated as follows:


The evaluators rated the overall aesthetic quality of the restorations in Aura Bulk Fill as follows:


The one shade of Aura Bulk Fill was stated by 56% of the evaluators to be adequate.

**Comments:**

"A range of shades would allow me to use this routinely"

"One shade OK but I then added final correct shade in normal composite" (2 similar)

89% (n=8) of the evaluators) stated that Aura Bulk Fill maintained its shape prior to curing.

Finally, 78% of the evaluators (n=7) stated they would purchase Aura Bulk Fill if available at average price, while eight of the evaluators (89%) would also recommend Aura Bulk Fill to colleagues.

**Comments:**

"No better than current Bulk Fill but no worse"

"Like its feel and would be happy to use"

Further comments made regarding the performance /handling/acceptability of Aura Bulk Fill included:

"Simple system, useful for basic restorations when aesthetics not important"

"Comparable, if not better, than SDR"

The fact that any adhesive system could

be used was seen as an advantage by all the evaluators.

## DISCUSSION AND CONCLUSION

Aura Bulk Fill scored well in all the handling criteria and has been well received, as evidenced by the high numbers of evaluators who would both purchase the material and recommend it to colleagues. A majority of evaluators were content with the one shade that was provided.

## MANUFACTURER'S COMMENTS

SDI would like to thank the PREP Panel for their efforts in evaluating and sharing the feedback around our recently introduced Aura Bulkfill restorative material. We are extremely pleased with the responses received and it continues to validate SDI's ongoing commitment to R&D within the dental restorative area.

Feedback received from this evaluation will help drive ongoing improvements to the product range.

All of SDI's products are manufactured in Victoria, a state in the south east region of Australia. SDI's products are sold through distributors and retailers in over 100 countries throughout the world. SDI has offices and warehouses in Chicago, USA; Cologne, Germany; and Sao Paulo, Brazil.

## ACKNOWLEDGMENTS

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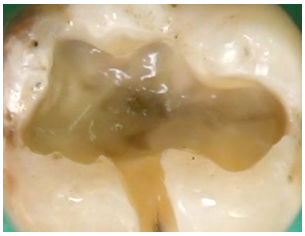

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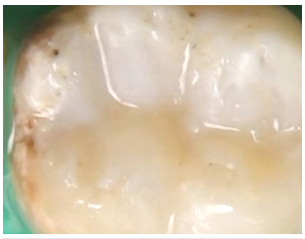

After

Dr. Gregor Thomas (Germany)

## CONFLICT OF INTEREST

The authors do not have any financial interest in the company whose material was included in this study.

## REFERENCES

1. Burke FJT, McCord JF. Research in dental practice – problems and solutions. Br.Dent.J.1993:175:396-398.
2. Burke FJT, Crisp RJ. Twenty years of handling evaluations and practice-based research by the PREP Panel. Dent.Update. 2013:40:339-341.
3. Burke F.J.T. Amalgam to tooth-coloured materials – implications for clinical practice and dental education: governmental restrictions and amalgam-usage survey results. J.Dent.2004:32:343-350.
4. Burke FJT, Liebler M, Eliades G, Randall RC. Ease of use versus clinical effectiveness of restorative materials. Quintessence Int.2001:32:239-242.
5. El-Safty S, Silikas N, Watts DC. Creep deformation of restorative resin-composites intended for bulk-fill placement. Dent. Mater.2012:28:928-935.
6. Li X, Pongprueska P, Van Meerbeck B, De Munck J. Curing profile of bulk-fill resin-based composites. J.Dent.2015.43:664-672.
7. Burke FJT, Crisp RJ., Panchal D, Redfearn P, Sands P. A practice-based evaluation of a bulk fill restorative material. Eur. J. Prosthodont. Rest. Dent.2016:24:152-157.
8. Shortall ACC, Palin WM, Burtscher P. Refractive index mismatch and monomer reactivity influence composite curing depth. J.Dent. Res.2008:87:84-88.