

Handling evaluation

Trevor Burke, Russell Crisp and **Peter Sands** present a handling evaluation of the new 3M Filtek Universal Restorative by the PREP Panel.

The aim of the study was to evaluate the handling, by a group of practice-based researchers (the PREP Panel), of a recently introduced resin composite material, 3M Filtek Universal Restorative.

The 12 selected evaluators were sent explanatory letters, a pack of the material under investigation, with a request to use the composite material in anterior and posterior cavities, where indicated, for 10 weeks, and complete a questionnaire on their views on the properties of the material under evaluation.

Following the evaluation of Filtek Universal, 90 per cent of the evaluators (n=9) reported that they would purchase the material and recommend it to colleagues.

Resin composite systems

Patients are increasingly moving away from amalgam restorations in their posterior teeth, some because of aesthetic preference and some because of anxieties concerning amalgam, this having been given added impetus by the Minamata Agreement by which the use of amalgam has been banned, from July 1, 2018, in children 15 years and younger and pregnant and nursing women. Accordingly, dental practitioners have had to use an alternative material, the most appropriate of which may be considered to be resin composite. In this regard, practice-based clinical evaluations of this material have indicated positive results.

Selection of participants

All 31 members of the practice-based research group, the PREP Panel, were sent an email asking if they



would be prepared to be involved in the 'handling evaluation' of a new 'universal' resin composite system. Of those who agreed to participate, 12 were selected at random.

A questionnaire was designed jointly by the PREP Panel co-ordinators and the sponsors of the project in order to seek information on the handling of the material, which is now known as Filtek Universal Restorative.

Explanatory letters, questionnaires, and the kit comprised of Filtek Universal Restorative capsules, a capsule dispenser gun, 3M Scotchbond Universal Adhesive, the

Sof-Lex Diamond Polishing System, and a shade selection guide were distributed in late November 2018. The practitioners were asked to use the material until mid-February 2019 and return the questionnaire for analysis. At the request of 3M, the evaluation period was shortened by two weeks.

Regarding the evaluators, two were unable to complete the evaluation, one because he was involved in a serious road traffic accident. The report is therefore based on 10 replies. Two of the evaluators were female, and the average time since graduation was 33 years, with a range of 22 to 40 years. ➔

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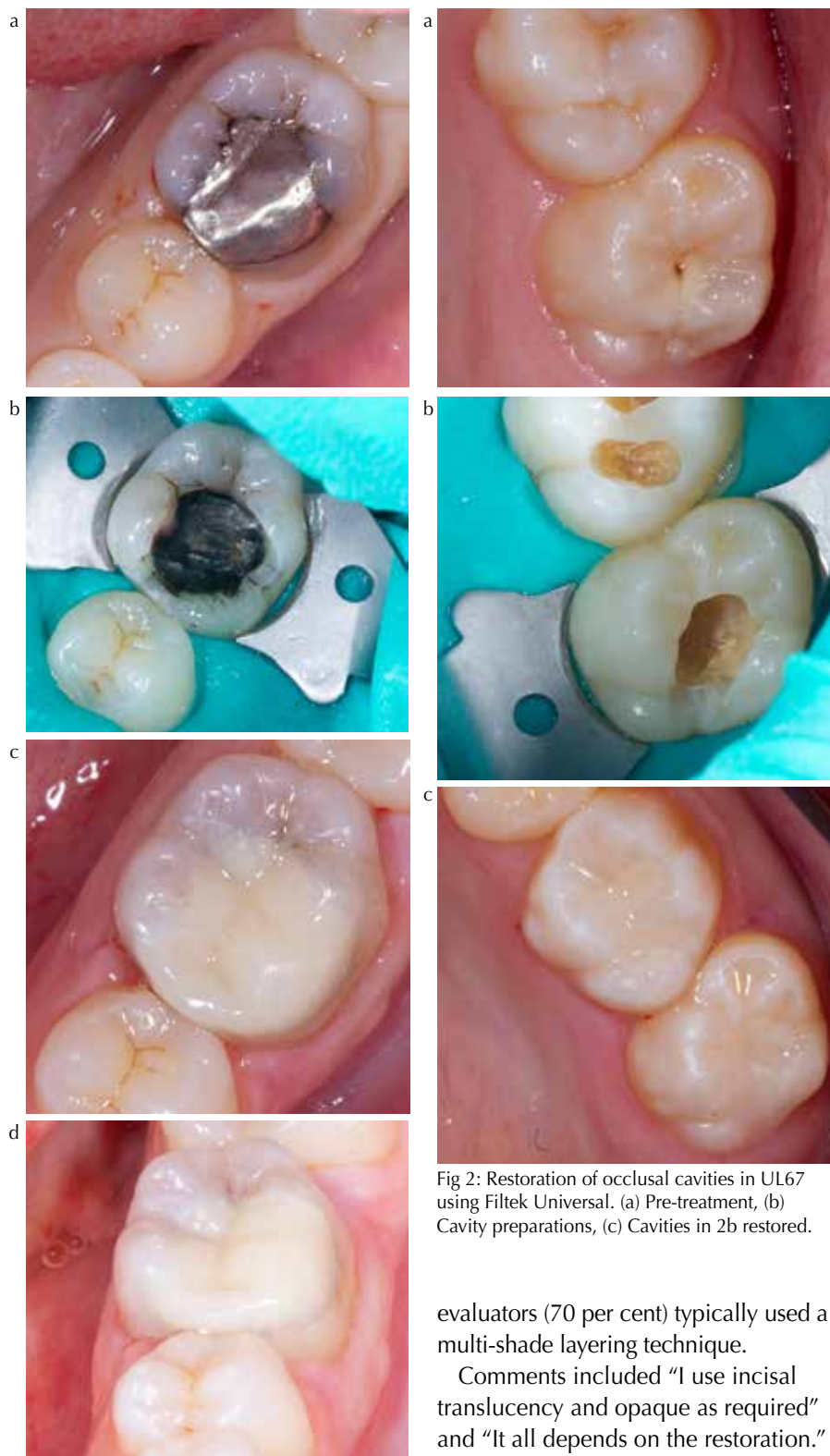


Fig 1: Restoration of defective amalgam in LL6 using Filtek Universal. (a) Defective amalgam, (b) Amalgam removed, (c-d) Restoration in Filtek Universal.

☛ The evaluation

All the evaluators currently used a resin composite material. Six evaluators placed fewer than 10 anterior composite restorations per week, while four placed 11 to 25 restorations. Seven

evaluators (70 per cent) typically used a multi-shade layering technique.

Comments included "I use incisal translucency and opaque as required" and "It all depends on the restoration."

All evaluators stated that they normally placed composite restorations in posterior teeth, with five evaluators placing five to ten per week, one placing fewer than one, and four placing more than 10. These restorations were comprised of (on average) class I 25 per cent, class II 44 per cent and MOD 31 per cent. The majority (n=8) used a dentine bonding agent during placement,

with a flowable composite base: one evaluator used a glass ionomer sandwich technique. The reasons given for the use of these materials were principally ease of use and good aesthetics, with comments being made including, "Works for most situations", and "Ideal handling when warmed & excellent aesthetics for both anterior and posterior restorations."

Eighty per cent of the evaluators used these materials in compule form.

The ease of use of the currently used composite restorative was stated to be (on a VAS where 5 = easy to use and 1 = difficult to use) as follows:



A wide variety of bonding agents and curing light units was found to be used.

The evaluators stated their preference for the composite material to be supplied in shades as follows:

- a) Manufacturer's shades: 2 evaluators
- b) Vita shades: 8 evaluators

When the evaluators were asked to rate the overall aesthetic quality of the current anterior composite material (on a VAS where 1 = poor and 5 = excellent), the result was as follows:



Responses following use of the material under evaluation

All (100 per cent) of the evaluators stated they found the 3M to Vita Classical shade guide conversion chart helpful.

The total number of restorations placed was 368, comprised as follows:

Class V	48
Class III	78
Class IV	55
Posterior	187

When asked to give details of the placement techniques used the evaluators stated they a) used a mixture of freehand and matrix systems for class V, III and IV b) freehand for class I restorations and c) matrix systems for class II restorations. ☛

☛ The assessment of the dispensing and placement of the material by the evaluators and their dental nurses was as follows:

a) Anterior



b) Posterior



Comments included, "Nurse didn't like the fit of the compules in the gun" (2 similar).

Four evaluators (40 per cent) experienced difficulty with the material sticking to instruments, while two evaluators (20 per cent) stated the material slumped on freehand placement.

Ninety per cent (n=9) of the evaluators stated the viscosity of the material was satisfactory. Two evaluators (20%) stated that the working time was insufficient, giving comments such as, "Very light sensitive – needed orange filter all the time."

Eighty per cent of evaluators (n=8) stated the restoration margins were visually satisfactory. All evaluators stated the nine shades of Filtek Universal met their needs, with comments such as, "No obvious 'underlap' between shades."

Four evaluators (40 per cent) used the Pink opaquer, with two evaluators in this group preferring it over the opaquer currently used.

Comments included, "Equally as good", "Would be better as a flowable and it was exceptionally light sensitive", and "I loved it – great for masking amalgam stain in particular."

The evaluators were asked to rate Filtek Universal Restorative properties (where 1 = very dissatisfied and 5 = very satisfied) with the following results:

	Score	Range
Overall satisfaction	4.3	3-5
Overall aesthetics	4.1	3-5
Initial polish	4.2	3-5
Shade blend with surrounding tooth	4.2	3-5
Opacity	4.2	2-5
Range of shades	4.6	3-5
Overall ease of use	4.2	2-5

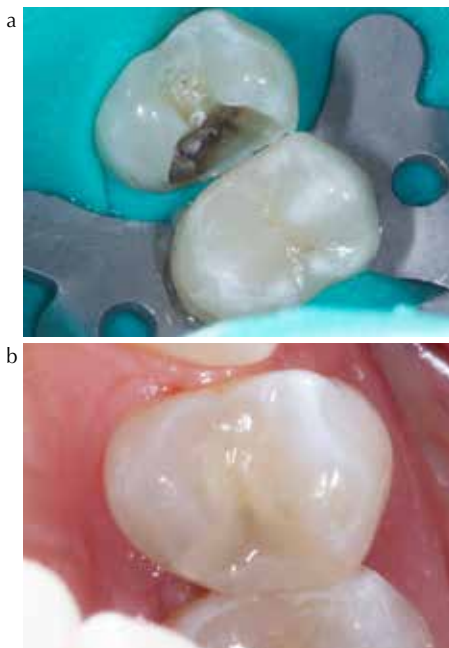


Fig 3: Restoration of class II caries lesion using Filtek Universal. (a) Cavity preparation illustrating wide interproximal box, (b) Cavity in 3a restored with Filtek Universal.

The evaluators stated that there were no reports of post-operative sensitivity.

The ease of polishing of Filtek Universal was rated as follows:



Nine evaluators (90 per cent) stated they would purchase Filtek Universal, and the same number would recommend it to colleagues.

Final comments included, "Very impressed with this material." "The unset material is matte in appearance, and doesn't stick to instruments. "It's softer than my current composite so was easier to spread where I wanted it." "Since receiving this kit I have only used this system which tells you how pleased I am with it!"

"Good handling but too light sensitive. Excellent polish. It didn't slump and, to date, no sensitivity. A flowable opaquer would be useful."

"Useful for placing restorations over screw retained implant crown access cavities." "Colour and opacity masked access cavities well." "Needed to use the dedicated compule gun as other guns' plungers stuck in the material. Warming the capsule did help improve

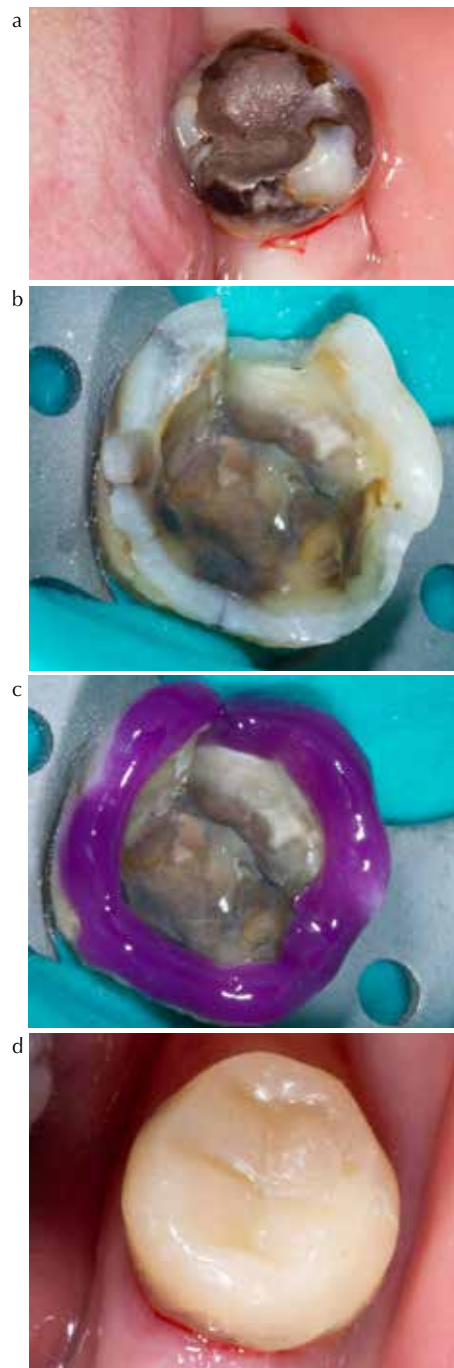


Fig 4: Restoration of large multi-surface cavity using Filtek Universal. (a) Defective amalgam restoration, (b) Amalgam in 4a removed, (c) Enamel margins selectively etched, Restoration in Filtek Universal placed.

the viscosity issue."

"Comparison shade guide very useful."

"Not a quantum leap forward but it is what I expect from 3M."

"Have used Filtek materials before and this was quite similar. The restorations placed looked very good on review"

Examples of restorations in Filtek Universal Restorative are presented in figures 1 to 4. ☛

Discussion

The 3M Filtek Universal Restorative system has been subjected to an extensive evaluation in which a total of 368 restorations were placed.

Based on this, the following conclusions may be made:

- The conversion chart from 3M shades to Vita Classical was well received.
- Regarding the dispensing and placement of the material, the material scored well for both anterior and posterior use (4.2 on a VAS scale where 1 = inconvenient and 5 = convenient) but comment was made by two evaluators (20 per cent) and their nurses regarding the fit of the compules in the gun provided.
- Two evaluators (20 per cent) stated that the working time was insufficient and the material had a tendency to set under ambient light.
- The range of shades was well received, and when the evaluators were asked to rate a variety of properties of Filtek Universal all the scores in the range 4-5 (where 1 = very dissatisfied and 5 = very satisfied).

In addition, it may be of interest to note that no evaluators reported post-operative sensitivity, this being a problem seen following placement of composite restorations in posterior teeth. The resin used in Filtek Universal is similar to that used in Filtek One: this employs a resin with an "addition-fragmentation" polymerisation system, and this has been demonstrated by Palin and Watts to have low shrinkage stress, thereby producing less polymerisation shrinkage stress and therefore less potential (among other factors) for post-operative sensitivity, an important factor when placing composite restorations in loadbearing situations in posterior teeth.

The potential for this new material, Filtek Universal, is illustrated by the fact that 90 per cent of the evaluators (n=9) would both purchase the material and recommend it to colleagues.

Conclusion

The good reception for this restorative material is indicated by the high number of evaluators stating they

would both buy and recommend the system to colleagues.

Acknowledgments

The authors thank the members of the PREP Panel for completing the feedback forms and thank 3M for providing the material and funding this evaluation. The restorations presented in the illustrations were placed by Peter Sands.

Manufacturer's comments

3M Oral Care would like to thank the members of the PREP Panel for evaluating and sharing their feedback on our newly introduced, and universally simpler, Filtek Universal Restorative.

In response to comments made by evaluators, 3M Oral Care wish to add the following comments:

3M Oral Care is proud to announce the introduction of a new Filtek Restoratives Dispenser (shown below), which should overcome the problems mentioned by the PREP Panel. Dental professionals have confirmed that 3M composite capsules snap into place and remain secure throughout dispensing, the extrusion force required to dispense 3M composites is less, and the rotatable capsules' holder is beneficial. The dispenser was also designed to be used with composite capsule warming devices (Bioclear HeatSync Composite Warmer).

Regarding warming Filtek Universal Restorative Capsules, after extensive testing, 3M has found that:

- The physical properties are unchanged when warmed.
- Warming lowers capsule extrusion force by 75-80 per cent.
- Warmed composite transfers minimal heat to the pulp.
- It is safe to warm capsules up to 70°C/158°F for one hour.
- It is biocompatible according to ISO 10993 1:2018 based on review by a board-certified toxicologist.

Since the conclusion of the Prep Panel Evaluation, 3M has created an additional shade selection guide which further illustrates

the coverage that Filtek Universal Restorative provides to the VITA Classical and Bleach Shade Guide with the goal of making shade selection faster and easier.

Regarding ambient light stability for Filtek Universal Restorative, as with all photocurable composites, it is important to protect the material from ambient light during the restorative procedure. Exposure to direct light may cause premature polymerisation. The use of composite filters (on loupes and operatory lighting) may help reduce the chance of premature polymerisation when placing Filtek Universal Restorative which, based on in-vitro studies, has the same light stability as 3M Filtek Z250 Restorative and 3M Filtek One Bulk Fill Restorative.

Regarding the handling of Filtek Universal restorative, it is interesting to note that the results of the PREP Panel evaluation concur with a field evaluation where more than 10,000 restorations were placed. In this, our customers agreed that the handling of Filtek Universal Restorative could be described as "creamy". In that same evaluation, 89 per cent of respondents (N=125) were either "Satisfied" or "Very Satisfied" with the anterior handling and 92 per cent when used in the posterior. Having said that, handling is subjective and what one dentist considers "sticky" another would consider "creamy" or "easy to adapt".

Lastly, readers may question why 3M Oral Care is introducing a new universal restorative in addition to 3M Filtek Supreme XTE Universal Restorative. 3M Filtek Universal Restorative is a simpler system with creamier handling. The physical properties are very similar to 3M Filtek Supreme XTE Universal Restorative due to the use of 3M nanocomposite technology. However, the new resin has lower polymerisation stress and the filler system offers improved radiopacity. In addition, Filtek Universal Restorative features NaturalMatch Technology and offers an even whiter shade of Extra White (XW) and a new Pink Opaquer(PO) for masking metal and dark dentin. And, Filtek Universal Restorative capsules can be safely warmed (See instructions for use).