Product Evaluation

A practice-based handling evaluation of 3M Espe Filtek Silorane

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SINCE the ability to bond to enamel was first described by Buonocore in 1955, this has become an integral part of restorative dentistry alongside the development of resin composite materials, with these materials becoming increasingly used worldwide.

The majority of these materials shrink up to 3% on polymerisation, resulting in stresses at the (bonded) restoration margin, or within the restorative material itself. The magnitude of these stresses also depends on the modulus of elasticity of the material, the coefficient of is placed.

It is obvious that one solution involved the use of a low shrink resin and, ideally, that shrinkage should be balanced by the uptake of a similar % volume of moisture and the resultant expansion in the mouth. The first material to fulfil these characteristics is 3M Espe Filtek Silorane, which has a polymerisation contraction of 1%.

Given the novel nature of this new material, it would seem appropriate that an assessment of its handling in the hands of general dental practitioners is carried out. This study will therefore evaluate the in-practice ease of use and performance of Filtek Silorane by the group of UK-based general dental practitioners who comprise the PREP Panel.

Materials and methods

The product under evaluation is a low-shrink (<1% volumetric shrinkage tested by bonded-disc method) posterior composite restorative material; 15 members of the PREP panel were selected at random to conduct the evaluation, of which two evaluators were female. The average time since graduation was 22 years, with a range of eight to 32 years.

Packs of the new material (in four shades) were sent to these 15 practitioners in December 2007 with a request that they use the material, where indicated, for 10 weeks.

They were also sent a questionnaire to evaluate their current posterior composite usage, and the presentation, instructions, handling, aesthetic quality and post-operative sensitivity of the new composite. Most responses to the questionnaire were given on a visual analogue scale.

Results

Background information

All the evaluators normally placed composite restorations in posterior teeth, and the number of posterior composite restorations being placed by them in a typical week was:

>10 5 (33%)

Of these, the mean proportions of restorations placed were: Class I, 40%; Class II, 37%; and MOD restorations made up 23%.

When the evaluators were asked about techniques used, the results were as follows:

(a) Dentine bonding agent (13)
(b) Glass-ionomer base/sandwich (6)
(c) Flowable composite base layer + bonding agent (11)
(d) Other (1)

A wide range of posterior composite materials were used by the respondents prior to the evaluation, with four respondents using more than one material. The principal reasons for the choice of these materials were good aesthetics, ease of use, wear resistance, good results and familiarity. Other reasons reported were good results in clinical trials, trusted manufacturer, and compatibility with a favoured bonding system. Fourteen (93%) used their present material in compule form.

When the evaluators were asked to rate the ease of use of their current posterior composite material, the result was:

Difficult to use — Easy to use
1 — 5
3.9

When the evaluators were asked to rate the ease of use of their current dentine/bonding system, the result was:

Difficult to use — Easy to use
1 — 5
4.6

The evaluators were asked to rate the aesthetic quality of restorations placed in posterior teeth using their current composite material with the following result:

Poor — Excellent
1 — 5
4.0

When the evaluators were asked to rate the illustrated technique guide/instructions for Filtek Supreme, the result was:

Poor — Excellent
1 — 5
4.7

The total number of restorations placed during the evaluation was 266, comprised of: Class 1 – 47%, Class – II 35%, and MOD – 18%.

When the evaluators were asked if they were satisfied with the Filtek Silorane System (i.e. Silorane plus the Silorane adhesive system), 67% (n= 10) stated that they were.

Fourteen (93%) stated that they had encountered no post-operative sensitivity with Filtek Silorane. The remaining evaluator encountered sensitivity in two of his 25 cases, making a total for the evaluation of two from 266 restorations, or 0.7% overall. Overall, 87% (n=13) stated opacities they used for one posterior restoration, on average the result was two shades and one opacity. 87% stated that the current composite used for posterior restorations had sufficient number of shades, with a mean number of shades provided being eight (range: 1-20).

A third (n= 5) stated that they knew the percentage shrinkage of the composite currently used and the mean value provided was 2.4%. A composite with minimal shrinkage was stated by all evaluators to be an advantage. Reasons stated were: "reduced post-operative sensitivity" (10), "less cuspal stress" (nine), "reduced microleakage" (seven), "less stress on bonding agents" (four), and "better box adaptation" (one).

Evaluation of Filtek Silorane

Evaluators rated the presentation of the kit as follows:

Poor — Excellent
1 — 5
4.0

Difficult to use — Easy to use
1 — 5
4.0

Twelve (80%) of the evaluators stated that the viscosity of Filtek Silorane was satisfactory and when they were asked to rate the viscosity of the material the result was:

Not viscous enough — Too viscous
1 — 5
3.5

All the evaluators stated that the material had sufficient working time in clinical use. One stated that the material started to "dry up" in his headlight, so he turned it off.

Eighty per cent (n=12) of the evaluators stated that the restorations were easily finished using their normal polishing system, though three commented "harder to achieve 'gloss' finish" and one evaluator stated it "took longer". The overall aesthetic quality of restorations of Filtek Silorane was assessed as:

Poor — Excellent
1 — 5
3.7

Nine evaluators (60%) thought the number of shades provided was adequate, with the following