A practice-based evaluation of the handling of Shofu Beautibond

F J Trevor Burke and Russell J Crisp present a report evaluating the handling of Shofu Beautibond, a seventh generation, self-etching, one component, light-cured adhesive.

Practice-based research
The importance of practice-based research has been emphasised by Mandel (1993), who considered that ‘research is not only the silent partner in dental practice, it is the very scaffolding on which we build and sustain a practice’.

A wide variety of research projects may be considered to be appropriate to general dental practice, including (Burke, McCord, 1993): assessment of materials and techniques, clinical trials of materials, assessment of treatment trends and, patient satisfaction with treatment.

In this regard, the volume of clinical material seen in general dental practice makes dental practice an area of fundamental importance in the assessment of new techniques and materials, as success of a material, device or technique could be considered to be its performance in everyday use in a particular dentist’s office. 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 restorative that handles easily will be more likely to produce an optimally performing restoration than one that is difficult to use. The assessment of the handling of a new material, or a revised version of an older one, is therefore of importance.

The performance of a restorative material by one operator is necessarily subjective, but when practitioners band together to form a group in order to assess the handling of new materials in dental practice, the results are likely to be more objective and generalisable. All of this is possible when practitioner-based research groups are teamed with the expertise available in academic institutions. 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 six general dental practitioners, and has grown to contain 33 dental practitioners located across the UK, with one in mainland Europe. The group have completed over 60 projects – ‘handling’ evaluations of materials and techniques, and more recently, clinical evaluations (n=6) of restorations placed under general dental practice conditions, with the restorations being followed for periods of one year and five years.

Bonding materials
Resin composite materials are the mainstay of direct-placement aesthetic materials for anterior and posterior teeth. However, these restorative materials do not have an innate bond to tooth substance and so a bonding agent must be used. Among the ideal properties of a bonding agent, they should have a bond strength to dentine that is similar to that to enamel, should minimise microleakage and should be biocompatible. They should also be easy to handle, a message not lost on the authors of this paper, since the first bonding agent that they used had five bottles!

It is therefore the aim of this paper to evaluate the in-practice handling and use of Shofu Beautibond, a self-etch light cured adhesive with two monomers for simultaneous etching of dentine and enamel. One component, etch prime and bond in less than 30 seconds.

Methods
Instructions to evaluators
Explanatory letters, questionnaires and packs of Beautiful Flow Plus (the subject of a subsequent paper) and Beautibond were distributed in September 2011. Also sent were full instructions and an explanatory document on Giomer technology for Beautiful Flow Plus. The practitioners were asked to use the materials and return the questionnaires.

The evaluators
Ten members, of average time since graduation 23 years (range 10 to 38 years), were selected at random from the PREP panel.
Clinical evaluation of Shofu Beautibond

All (100%) of the evaluators currently used a dentine/enamel bonding system, with the choice of their bonding system being influenced by ease of use and reliability. Other reasons included recommendation, good shelf life, no postoperative sensitivity and the bonding system came included in the composite kit.

The ease of use of the currently used bonding system was rated as follows:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Average score</th>
<th>Range</th>
<th>Overall rank</th>
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<tbody>
<tr>
<td>One component self-etching adhesive</td>
<td>2.6</td>
<td>1 - 8</td>
<td>2</td>
</tr>
<tr>
<td>Available in both bottle or single unit doses</td>
<td>5.4</td>
<td>2 - 8</td>
<td>6</td>
</tr>
<tr>
<td>Light cured seventh generation dual adhesive bonding to dentine and enamel</td>
<td>2.6</td>
<td>1 - 6</td>
<td>1</td>
</tr>
<tr>
<td>Hema free composition bonding durability &amp; less sensitivity</td>
<td>4.1</td>
<td>1 - 7</td>
<td>5</td>
</tr>
<tr>
<td>Single coat, 5 micron thickness, 3 restoration unit dose</td>
<td>3.3</td>
<td>1 - 6</td>
<td>4</td>
</tr>
<tr>
<td>Dental Advisor 5* rating</td>
<td>6.4</td>
<td>3 - 9</td>
<td>9</td>
</tr>
<tr>
<td>Ideal for MiCD</td>
<td>6.1</td>
<td>1 - 9</td>
<td>8</td>
</tr>
<tr>
<td>Competitive price</td>
<td>5.5</td>
<td>1 - 8</td>
<td>7</td>
</tr>
<tr>
<td>Ease of use</td>
<td>2.9</td>
<td>1 - 7</td>
<td>3</td>
</tr>
</tbody>
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The evaluators were asked to rank in importance (from most important = 1, to least important = 9) a number of attributes and benefits of a bonding system. The results are shown in the table below.

All (100%) of the evaluators stated that the illustrations provided sufficient information. Eighty-nine percent (n=8) of the evaluators stated that the bottle dispenser was easy to use. Regarding the single unit dose packaging, 89% (n= 8) of the evaluators stated it was easy to use.

The total number of restorations placed utilising Beautibond was 420, comprised as follows:

- Class I: 111
- Class II: 99
- Class III: 69
- Class IV: 40
- Class V: 101

The evaluators stated that they used Beautibond for other applications, such as treatment of dentinal hypersensitivity (four evaluators).

All (100%) of the evaluators stated that the dispenser worked satisfactorily, the resin liquid easily wetted the tooth surface, and 89% (n=8) agreed that the bond was easily visible on the tooth surface.

When the evaluators, and their dental nurses, were asked to assess the dispensing and handling of Beautibond liquid, the result was as follows:

- Inconvenient
- Convenient

The viscosity of the bonding liquid was rated by the evaluators as follows:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Average score</th>
<th>Range</th>
<th>Overall rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too thin</td>
<td>2.6</td>
<td>1 - 8</td>
<td>2</td>
</tr>
<tr>
<td>Too viscous</td>
<td>5.4</td>
<td>2 - 8</td>
<td>6</td>
</tr>
</tbody>
</table>

Eighty-nine percent (n=8) of the evaluators stated that the Beautibond liquid stayed in place on the tooth surface, and 89% (n=8) agreed that the bond was easily visible on the tooth surface.

When the evaluators were asked to compare the application of Beautibond liquid with the application of other bonding adhesives previously used, six stated it was better, two evaluators thought it was similar, four agreed it was less messy. None of the evaluators thought it was worse or more messy than other bonding adhesives previously used. All (100%) of the evaluators stated that their dental nurse did not experience any difficulties with Beautibond.

When the evaluators were asked to compare the one-component aspect of Beautibond was an advantage over other systems. Seven evaluators (78%) felt that Beautibond was faster than the evaluator’s usual bonding system. The remaining evaluators felt it was the same.
Materials and equipment

All (100%) of the evaluators stated that they would purchase Beautibond if it were available at an average price. When the evaluators were asked if there were any changes they considered essential to the acceptability of the material, the following comments were made:

‘None – this is a near-perfect system’ (three similar)
‘No – liked the single dose dispensers shape and design’.

The ease of use of Beautibond was rated as follows:

<table>
<thead>
<tr>
<th>Difficult to use</th>
<th>Easy to use</th>
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<tr>
<td></td>
<td>5.0</td>
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Final comments included:
‘I would be interested in looking at the long-term success of the restorations I have place with this system’ (two evaluators)
‘The bond turned my Ketac pink on applying over base!’
‘Very good system – would recommend to other dentists’
‘Probably the best bond I have used’.

Discussion
The Shofu Beautibond light-cured self-etch adhesive system has been subjected to an extensive evaluation in clinical practice, in which 420 restorations were placed by members of the PREP panel.

The presentation of the material and the instructions scored extremely highly (4.8 and 5.0) on a visual analogue scale (VAS) (where 5 = excellent and 1 = poor). Beautibond achieved a maximum rating of 5.0 by the evaluators for ease of use when compared with the normally used resin-based cementation system, which scored 4.2 (on a VAS where 5 = easy to use and 1 = difficult to use). The viscosity of Beautibond was also rated as ideal (3.0 on a VAS where 1 = too thin and 5 = too viscous).

In addition to the maximum scores already mentioned for the instructions and ease of use, a further maximum score was achieved for the assessment by the evaluators and their dental nurses of the dispensing and placement of Beautibond. This number of maximum scores is unprecedented over many years of PREP panel evaluations.

Conclusion
The excellent reception of the Shofu Beautibond was underlined by high scores achieved and the fact that all the evaluators would purchase the material if available at average cost. 

References

Manufacturer’s comments
Shofu wishes to thank the PREP panel for its comprehensive evaluation of Shofu Beautibond and is delighted to note the highly favourable reception that the material achieved. This evaluation confirms the response from clinicians worldwide to this single component product, containing two monomers for simultaneous etching of both dentine and enamel.

Manufacturer’s details: Shofu UK, Riverside House, River Lawn Road, Tonbridge, Kent TN9 1EP. For further details, please call 01732 783580.