THE ROLE OF A REFLECTYS CUSTOMISED SHADE GUIDE IN PRODUCING A SUCCESSFUL ANTERIOR COMPOSITE

Shade selection is a daily challenge for the dental practitioner. It is an important, if not decisive, stage responsible for the final aesthetic result of a restoration. At present, we aim to follow the Vitapan Classical shade guide, which represents the gold standard, as closely as possible. In this context, our aims were:
- firstly, to propose a customised shade guide for the Reflectys (ITENA Clinical) collection studied;
- secondly, to study the correlation between the different shades of composite resin obtained and the Vitapan Classical shade guide.
This enabled us to present the enamel-dentine combinations resulting from this correlation and thus offer combinations that any practitioner could use. To illustrate this approach, we present a clinical case with reference to the combinations of the customised Reflectys (ITENA Clinical) shade guide used.

Colour selection in the dental surgery is a crucial stage in producing a successful composite resin restoration. We often speak of tooth shade matching. But given the three-dimensional nature of colour described by Munsell [1-3] and the various dimensions shown on the Vanini chromatic chart [4, 5], it is clear that this term is too limited to fully cover the task [6]. We should therefore speak of matching the colour of a tooth rather than its shade. This stage is generally carried out using shade guides, and thus becomes "operator-dependent". In addition, the stage is influenced by the background, which is responsible for its reproducibility and translation.
Further still, there is no universal agreement on standard shade matching techniques. Dental practitioners in fact refer to shade guides on a daily basis without ensuring they are familiar with the resin collection they are using. Furthermore, the tooth to be restored has two different aspects - enamel and dentine - but the shade guide does not show the combination of the two. Most dental surgeries use the Vitapan Classical shade guide for colour selection. This is the gold standard for colour selection.
In this context, we experienced the following issues:
- We use the Vitapan Classical shade guide, in ceramic. The materials matched to it are not therefore of the same kind. We wanted to restore the tooth (enamel-dentine) with composite resin by matching that of the ceramics.
- At present, there is no reliable and reproducible correlation between the Vita shade guide and the (enamel-dentine) masses used in specific composite resin collections, except for the 3M matches developed by Style Italiano, which are specific to the Z350 resin.

<table>
<thead>
<tr>
<th>Composite resin collection: brandname</th>
<th>Classification</th>
<th>Enamel shades: 2</th>
<th>Dentine shades: 13</th>
<th>Translucent shades</th>
<th>Incisal shades: 1</th>
<th>Mass effects: 0</th>
<th>Total shades</th>
<th>Presence of a shade guide</th>
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<tr>
<td>Itena Reflectys</td>
<td>Universal</td>
<td>E, P</td>
<td>A1, A2, A3, A3.5, A4, B1, B2, B3, C2, C3, D3, A20, A30</td>
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<td>1</td>
<td>0</td>
<td>32</td>
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<table>
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<th>Composite resin collection</th>
<th>Number of enamel shades</th>
<th>Enamel shades</th>
<th>Number of dentine shades</th>
<th>Enamel shades</th>
<th>Number of enamel-dentine combinations</th>
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</thead>
<tbody>
<tr>
<td>Reflectys</td>
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<td>E, P</td>
<td>13</td>
<td>A1, A2, A3, A3.5, A4, B1, B2, B3, C2, C3, D3, A20, A30</td>
<td>26</td>
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</table>

<table>
<thead>
<tr>
<th>Enamel</th>
<th>Dentine</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A3.5</th>
<th>A4</th>
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<tr>
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<td>EA2</td>
<td>EA3</td>
<td>EA3.5</td>
<td>EA4</td>
<td>EA20</td>
<td>EA30</td>
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<tr>
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<td>PA1</td>
<td>PA2</td>
<td>PA3</td>
<td>PA3.5</td>
<td>PA</td>
<td>PA20</td>
<td>PA30</td>
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</tr>
</tbody>
</table>

Number of samples 14
Understanding and better capturing colour is by no means easy. How is it possible to use a simplified methodology to translate a perception of colour, which is a subjective physical sensation, into reliable and reproducible scientific data? How can we make colour matching a reproducible and predictable stage?

The aim of this article is to:
- propose a customised shade guide created from different (enamel-dentine) combinations for the Reflectys composite resin collection produced by ITENA Clinical;
- identify any correlation between this customised shade guide and the Vitapan Classical guide (tables 1 to 3, fig. 1);
- suggest (if there is any correlation) combinations of enamel-dentine shades for the collection studied;
- illustrate, using a clinical case, the stages of an anterior layering restoration using the combinations produced for the customised Reflectys shade guide as a basis for colour selection.

Clinical case

A 27-year-old female patient, in good general health, came to us for restoration of tooth 21, which had been fractured fifteen years earlier following an accident.

Firstly, an aesthetic treatment plan was developed. Taking an in-depth patient history enabled us to identify the nature and means of the tooth structure loss as well as the patient’s aesthetic requirements (fig. 2): loss of dentine and enamel without pulp exposure in tooth 21 for the last fifteen years. No history of pain in tooth 21 was reported. Pulp vitality tests were positive, with a normal response similar to adjacent teeth. The radiological examination showed that the fracture was away from the pulp, with no signs of enlargement of the desmodontal space or periapical appearance.

Restoration of the tooth structure loss using composite resin was undertaken after confirming the initial treatment plan and motivation with the patient, who had smoked for five years (fig. 3).

Colour selection is a crucial stage in producing a successful composite resin restoration [7], and constitutes the most important factor after shape [8] for the success of any restoration. This stage was achieved using the customised shade guide (fig. 1), which consisted of as many enamel-dentine combinations as possible using the Reflectys collection (Itena Clinical). Once the colour was confirmed (fig. 3), the composite itself was assembled using the simple layering technique [9, 10] and using the enamel shade and dentine shade confirmed in advance, using the customised shade guide.

The Dietschi technique, simplified by Style Italiano, was used [11-16]. The special feature of this technique is the control of thickness, which is a crucial factor in the reliability and reproducibility of results [17].

Managing thickness is crucial for producing predictable, repeated, reliable and reproducible results. Once the composite was in place and the enamel composite layer had been layered and calibrated using a special tool, the restoration finishing stage was carried out using a rigorous finishing and polishing protocol to achieve biological and aesthetic integration of the restoration, thus ensuring lasting results [18-20].
6. Assembling the palatal wall: checking the fit of the silicone key (a), tracing the fracture line margin by scraping the silicone key with the tip of the probe (b), view of the palatal wall from three different angles (c, d, e, f).

7. Placing the proximal surface.

8. Assembling the dentine composite.

9. Applying the enamel composite.

10. Finishing and restoration with reference to the adjacent and antagonist teeth. From left to right: roughing, contouring the restoration and correcting the contour shape, tracing the transition lines, opening up the cervical embrasures.
11. Interproximal finishing of the incisal embrasures and correcting the transition and free margin angles.

12. Reproduction of the vertical texture (macrogeography) and horizontal texture (microgeography) from left to right and top to bottom: the macrotexure were highlighted using a pencil and the microtextures using articulating paper; then, they were created using 60 μm fine (red ring) or 28 μm ultra-fine (yellow ring) burs.

13. Polishing the restoration to produce a perfect surface finish: aluminium oxide-based polishing paste with two different grains using dental brushes with bristles (natural, nylon, goat hair, cotton, cashmere, chamois or woollen felt, etc.) (a), non-coloured rubber cups (b).
Discussion and conclusion

The results of this clinical case shows exact imitation and perfect harmony of the restored tooth with the adjacent tooth, demonstrating the role played by the customised shade guide for the Reflectys (ITENA Clinical) collection in a successful anterior composite.

Our analysis produced the following observations:

- Studying the various possible enamel-dentine combinations gave us a broad palette of colours within a customised shade guide. Taking into account the different colour nuances identified, we were able to work with this palette. This enabled us, firstly, to choose the right colours and produce aesthetic restorations that blended in perfectly and were validated in that the colour selected was the colour produced. Secondly, we wanted to narrow down this colour palette and simplify it by identifying any correlation with the Vita shade guide.
- We were unable to identify a match for all the shades in group A of the Vita shade guide, as the Reflectys collection correlated only to shade A1.
- Shade A1 matched PA3, EA3.5, EA4 and EA3O. As the difference between PA3 and EA3.5 was not statistically significant and was clinically acceptable, dental practitioners might choose to purchase only two enamel syringes, E and P, and two dentine syringes, A3 and A3.5. If syringes are unavailable, PA3 could be replaced with: EA4 or EA3O. This is also the case for EA3.5, but PA3 cannot be replaced with EA3.5. This applies only to a Vita A1 shade.

The refractive index is a very important factor. It is primarily dependent on the thickness of the vestibular enamel, which requires adjustment to regulate luminosity. The refractive index of the Reflectys collection used was 1.58, which is reasonably close to that of enamel. For our results to be reproducible, this layer must be calibrated by 0.5 mm to match the calibration of the customised shade guide.

Finally, before using the composite resin collection, practitioners are encouraged to familiarise themselves with the shades they use by producing customised shade guides from the various masses in these collections.
However, they must also have access to a calibrator in order to check the thickness of vestibular enamel for results to be reproducible. Finally, the results presented are valid only for the Reflectys (Itena) collection and cannot be applied to other composite resins.

**Bibliography**

20. Mopper KW. Contouring, ﬁnishing, and polishing anterior composites: The key to beauty and biologic integrity of longterm restorations lies in the final steps of the procedure. Inside Dentistry 2011; 7 (3).