

Mastering the art of individualised aesthetics

Advances in dental technology and dental material properties, as well as a better understanding of the optical properties of natural teeth, have helped dental professionals create life-like restorations that have depth and vitality. Apart from the external form and functionality, the shade of the artificial restoration plays an important role in patient acceptance. One of the most challenging aspects of cosmetic dentistry is to harmonise the shade of the restoration with natural teeth.

Though ceramics have a universal appeal, indirect composite restorations are gaining popularity for an array of clinical applications that range from crowns, bridges, veneers, inlays, onlays to precision attachments, combination cases and implant supported restorations.

Dental technicians have consistently relied on the art of staining to individualise aesthetic ceramic restorations. Natural characterisation of resin based indirect restorations is now possible with the development of innovative light cured stains like “Lite Art”.

These vibrant stains easily emulate shade variances seen in natural teeth (Fig. 1) and can be applied in thin, even layers in a similar manner to porcelain stains. Novel multifunctional monomers and photo initiators in “Lite Art” assure optimal surface polymerisation and stability of the stains when applied for internal staining of indirect composite, acrylic, PMMA and other resin-based restorations (Fig.2).



Figure1: Simulating nature with Lite Art.

Natural characterisation of resin based indirect restorations is now possible with the development of innovative light cured stains like “Lite Art”.

Resin stains cover a wide spectrum of indications:

- Individual characterisation of metal-reinforced and metal-free indirect composite restorations such as crowns, bridges, veneers, inlays, onlays, etc.
- Shade modification of artificial teeth
- Individualisation of denture bases including partial and complete dentures, gingival aspect of telescopic and implant supported restorations
- Customised red-white aesthetic balance between the dental and gingival elements of provisional frameworks as well as long-term temporaries

PREDICTABLE STEPS TO INDIVIDUAL CHARACTERISATION

The following illustration demonstrates the simplicity of the system; and how the desired shade effects can be efficiently accomplished in Veracia artificial teeth within a short span of time.

The shade concept

The colour spectrum of Lite Art is impressive as these stains are able to effortlessly replicate the various nuances and characteristics of natural tooth even under different lighting conditions (Fig. 4&5). They come in fifteen vivid colours, which can be applied alone or intermixed, to achieve the desired shade (Fig. 3).

The twelve pre-mixed shades are suitable for internal characterisation. There are three primary colours (cyan, magenta and yellow), which can either be used alone or intermixed, to simulate any of the thirty one shades of the Vintage Art porcelain stain system, for customised staining of the dental or gingival element.

Surface preparation

The surface of the artificial tooth is roughened by sandblasting with aluminium oxide granules (approximately 50-110 μm) at 2 – 3 bar pressure (Fig. 6). Rotary instruments should be used to abrade the tooth surface for cases where intense features are to be crafted onto the restoration (Fig. 7).

Blasting imparts a clean surface and improves wettability. The roughened tooth surface should be cleaned only with oil-free compressed air or a clean brush. Any contact with water should be avoided.

Secure bonding

A secure bond for subsequent staining is obtained with the help of CRB system (CeraResin Bond) from Shofu. It promotes a strong and durable bond between composites and ceramics or different types of resin materials.

First, the CeraResin Bond 1 is applied to prime the dry restoration surface. After 10 seconds, the second bonding component – CeraResin bond 2 is applied and light cured in the indirect light curing unit (Fig. 8) to ensure reliable adhesion of the additive layers.

Internal staining

Lite Art stains possess a micro-fine particle structure that assures ease of surface application and excellent coverage. Their low flow nature prevents running of these stains during and after application.



Figure 2: Perfect adaptation to resin restorations.



Figure 3: Spectrum of Lite Art Stains



Figure 4: Natural fluorescence under UV light

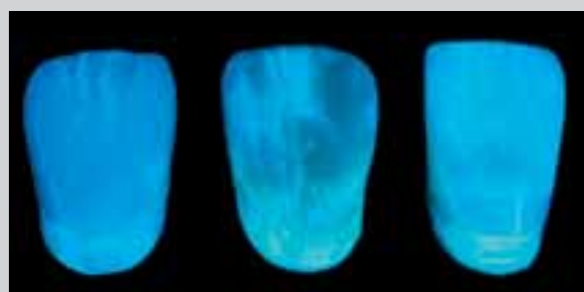


Figure 5: Natural fluorescence seen in artificial teeth stained with Lite Art.



Figure 6: Surface Preparation



Figure 7: Surface abraded for intense characterisation.



Figure 8: Surface abraded for intense characterisation.



Figure 9: Surface Preparation.

Initially, the orange shade is used to emphasise the cervical areas; followed by intermediate curing with Sublite V for approximately 10 sec (Fig 9). Then the A shade stain is used in the interproximal region to intensify the basic shade (Fig.10). The pure white shade can be applied to highlight lighter horizontal bands or even the demineralised areas (Fig. 11).

The pure white stain can also be mixed with yellow to obtain a creamy vanilla shade (Fig. 12). The highly transparent 'clear liquid' is used to modify the colour intensity or dilute the stains when required. The addition of diluted blue grey colour to the clear liquid gives a spatial depth in the incisal area and a chromatic backup in the transparent zones (Fig. 13).

Additive layering

Ceramage 59 or Opal T is used for additional build-up at the centre of the incisal area. Ceramage Opal Occlusal shade is recommended to emphasise the marginal ridges in the interproximal areas (Fig . 14). T-glass or Cervical-Trans can be used in the cervical areas depending on the required chroma intensity (Fig. 15). The surface texture and contours of the additive layers can be enhanced with a flat brush (Fig. 16). The additional materials are optimally cured for 5 minutes in the Solidilite V.

Anatomical contouring

Initial surface contouring is done with Dura-Green stone. After the external contours have been established, the vertical surface grooves are created, followed by carving of fine horizontal grooves that mimic the perikymata rings or imbrications furrows of natural teeth (Fig. 18 & 19).

The composite surface is carefully smoothed with the aid of the Soft Cut PB silicone polisher, without hampering the surface texture (Fig. 19 & 20). Fine hairline surface cracks can be created

Figure 10:
Basic shade in
interproximal area
intensified with 'A'
shade stain.



Figure 11: Dilution of Blue-grey stain to create an illusion of depth.



Figure 12: A creamy vanilla shade highlights lighter horizontal bonds.



Figure 13: Intense chromatic back up for transparent zones.

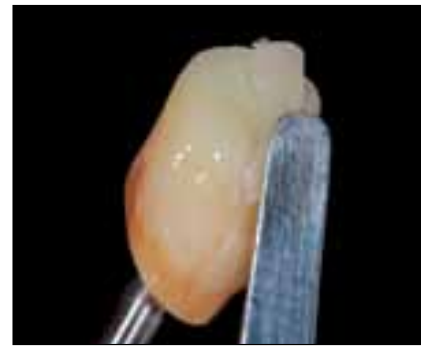


Figure 14: Addition of Indirect composite – Ceramage Opal 59 or Opal T.

with the Fissure Carbide bur (at a speed of 5000 rpm) for a three dimensional visual effect. Robinsons brush is used with the 'Dura-Polish' alumina polishing paste for pre-polishing, that takes away all the surface roughness while retaining the anatomical details (Fig. 21). The final high gloss polish is achieved in as little as 20 - 30 seconds with the 'Dura Polish Dia' diamond polishing paste (Fig. 22), to provide restorations that mimic the natural tooth colour and contour (Fig. 23 - 25).

It is interesting to see the extent to which the natural effects for all age groups can be achieved with more experience with Lite Art (Fig. 27).

Conclusion


Versatile resin stains like SHOFU Lite Art inspire the user to effortlessly simulate the intricacies of natural teeth even in composite restorations, which was possible earlier only with ceramics. Such novel tools and techniques are vital today to meet the rising demand for individualised red-white aesthetics in fixed, as well as removal prostheses. 



Figure 15: Surface texture and contours enhanced with a flat brush.



Figure 16: Addition of Cervical - Trans or T-Glass in Cervical area.



Figure 17: Vertical grooves created with Dura Green Stone.



Figure 18: Horizontal grooves carved with Dura Green Stone.



Figure 19: Surface smoothed with Soft Cut PB.



Figure 20: Fine hairline cracks created with Fissure Carbide bur.

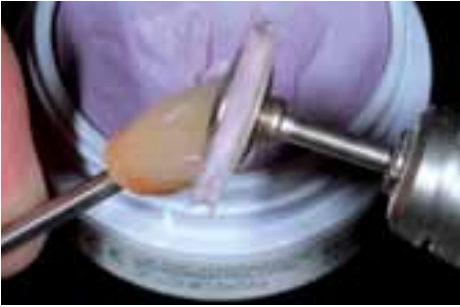


Figure 21: Pre-polishing with Dura Polish and Robinsons brush.



Figure 22: High gloss polishing with Dura Polish Dia.



Figure 23: Individualised artificial tooth after staining and surface contouring.



Figure 24: Individual characterisation in the palatal aspect optimises aesthetic results.



Figure 25: Optimised natural aesthetics.



Figure 26: Age specific characterisation with Lite Art.



Figure 27: Pre-fabricated artificial teeth compared with customised restoration.



Figure 30: Customised dentures.



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