AESTHETICS IN FOCUS

TAKING AESTHETICS TO A NEW LEVEL

Professor Didier Dietschi, renowned researcher in composite technology and co-developer of the Direct Venear & Composite System, discusses its key features and clinical applications

Composite resins nowadays occupy a paramount position among restorative materials because they offer excellent aesthetic potential and acceptable longevity with a significantly lower cost than equivalent ceramic restorations for the treatment of both anterior and posterior teeth. In addition, composite restorations allow for minimally invasive preparations or no preparation at all when replacing decayed or missing tissue. This approach is part of a new concept termed bio-aesthetics that gives priority to non-restorative or additive procedures, such as bleaching, micro-abrasion, enamel recontouring, direct composite resins, bonded bridges, and implants, in the case of missing dental units or cases that are more complex. These many procedures merit further attention because they offer tremendous improvements in practicability, efficiency and predictability. Altogether, bio-aesthetics undoubtedly move aesthetic and restorative dentistry to a new level; one that can be described as comprehensive and conservative smile design.

For quite some time, the creation of perfect direct restorations has been an elusive goal because of the imperfect optical properties of composite resins and perfectible clinical procedures. The attempt to mimic the shades and layering techniques developed for ceramic restorations led to complicated application methods, controllable only by highly skilled practitioners. For years, this has limited the number of patients who could benefit from the tremendous advantage of freehand bonding. The use of the natural tooth as a model and the identification of respective dentine and enamel optical characteristics (tritimulus L*a*b* colour measurements and contrast ratio) have been essential in developing better direct tooth-coloured materials.

Numerous composite systems exist in the marketplace, in which highly aesthetic results can be achieved using the so-called 'freehand' layering technique. In everyday practice, however, only a few dentists are able to achieve perfect results in a timely and efficient manner using this technique. The Direct Venear & Composite System from edelweiss dentistry has been developed to address this problem.

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THE DIRECT VENEAR & COMPOSITE SYSTEM

The Direct Venear & Composite System is state of the art for a modern and minimally invasive approach towards the creation of highly aesthetic anterior and posterior restorations. it is now possible to work with prefabricated veneers made from patented nano-hybrid

Figure 1: Preoperative clinical situation

Figure 2: Postoperative clinical situation (upper)

Figure 3: Postoperative clinical situation (lower)

Figure 4: Prefabricated Composite Venear

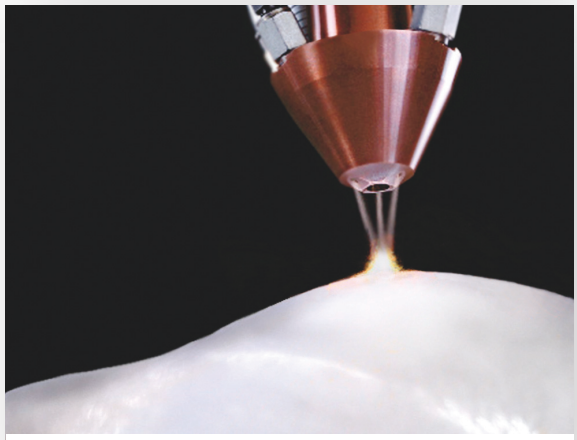

Figure 5: Direct Venear laser vitrified process

composite, using modern laser technology to create the natural shape and youthful luminance of a tooth in only one appointment (Figures 1-3).

Direct Venears are polymerised, prefabricated, laser-machined, radiopaque, highly-filled nano-hybrid composite enamel shells with an inorganic surface (Figure 4). The facially-anatomical thin composite shell makes direct veneering of single and multiple unit anterior teeth easier than ever before. Cementation is performed using the same material that they are made from to create a stable monoblock restoration (between the dentin/enamel + restorative composite + Direct Venear). Final reconstruction takes place quickly and effortlessly with functional and high quality aesthetic results.

SIZING CONCEPT

After studying all shape and size variations of natural tooth anatomy, Direct Venears were developed in one universal, prefabricated, contourable shape, available in different sizes for the upper and lower arch to provide an optimal anatomical basis for single units or complete reconstruction in the anterior region. A total of 18 different sizes (6 each - small, medium, large) are available for the anterior upper arch; and 12 sizes are available in the anterior lower arch (6 each – small, medium).

LASER VITRIFIED PROCESS

The laser treated process combines the best of both worlds: a homogenous, inorganic, and high gloss surface fused together with a thermally-tempered and dynamic composite core produces an optimal integration between function and aesthetics (Figures 5 and 6). This unique manufacturing technology was tested at the University of Geneva.

Fatigue behaviour for composite Direct Venears: A recent in vitro study demonstrated that prefabricated composite Direct Venears

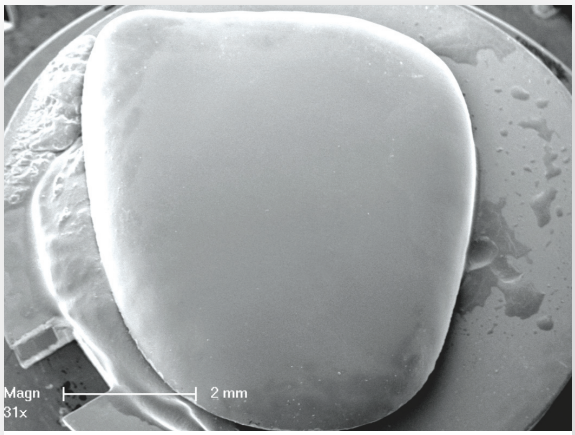

Figure 6: Smooth inorganic surface (without visible composite structure)

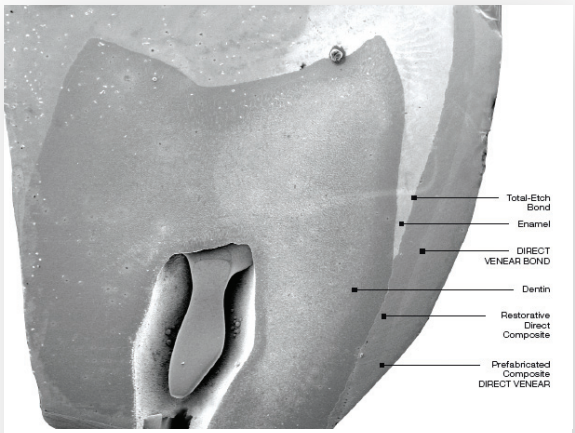

Figure 7: View of a sectioned extracted human molar with a cemented prefabricated composite Direct Venear bonded to half of the enamel surface and the other half to the dentin surface.

cemented onto the enamel and dentin surface of molars, effectively resisted simulated functional fatigue and load testing. Virtually no defects were observed at both the enamel and dentin margins, either before or after loading, which typically represents the most vulnerable area of a restoration (Figure 7).

The most relevant observation made was obtained upon the evaluation of the inner adaptation of the restoration. No defects were visible at the interface of the enamel or in between the restorative Direct Composite and the Direct Venear, which confirmed the excellent bond strength and stability at both interfaces (dentin/enamel to composite, composite to Direct Venear).

SHADING CONCEPT

The use of the natural tooth as a model was a logical development of direct restorative materials that led to the simplified shading and layering concept, the Natural Layering Technique. It is based on the identification of true dentine and enamel optical characteristics using tritimulus L*a*b* colour and contrast ratio.

The Direct Venear & Composite System restructures teeth using two toothlike masses that are comparable to dentin and enamel to create restorations with natural looking results. The Dentin Body Intensity, available in eight shades, was developed in a single opacity and same hue with different chroma levels and fluorescence, ranging from Body Intensity 0, for the restoration of bleached teeth, to Body Intensity 7 for cervical restorations of darker teeth for elderly patients. Five Enamel Skin shades exist in different degrees of translucency, which increase the true opalescence for all optical variations found in natural dentition.

Using the Edelweiss Body & Skin Shade Guide, each combination of dentine and enamel shade can be evaluated and compared to reference teeth, so that the risk of incorrect shade selection and aesthetic outcome is minimised. The quality of the final restoration depends upon the correct shade evaluation.

Figure 8: Shade selection using the Body & Skin Shade Guide from edelweiss dentistry

TABLE 1:
Indications for the Direct Venear & Composite System

- Caries
- Old restorations
- Lengthening of the incisal edge
- Misaligned teeth
- Tooth fractures
- Tooth discoloration
- Incorrect chromaticity
- Anatomical deformities
- Diastemas
- Attrition
- Abrasion
- Erosion
- Cosmetic corrections

Selection of the dentine intensity using the Body Shade Guide takes place in the cervical area, where the enamel is the thinnest (Figure 8). Selection of the enamel tint and translucency is performed in the incisal area using the Skin Shade Guide. The Body core is positioned inside the Skin shell to determine the optimal shade.

The prefabricated Direct Venear shells are only available in the Skin Bleached shade, since they are cemented using the dentine and enamel shades selected above.

For substrates that are severely broken down or discoloured, a dentin shade is recommended to provide a homogenous shade. For shaping or simple shade corrections, an enamel shade can be used (SB, SW, ST, SN, SI). Note, however, that too much enamel can make the restoration grey and too transparent.

A NEW ARRAY OF INDICATIONS

Aside from direct veneering of single or multiple unit anterior restorations, several other classical indications, such as Class III, IV and V cavities and other aesthetic or functional problems can be addressed via direct composite restorations using the system (Table 1).

Figure 9 : Direct Venear & Composite System Toolbox from edelweiss dentistry

CONCLUSION

Traditional restorative objectives have not changed over time; rather, the implementation of restoratives has been based on the aesthetic demands of an increasing number of patients. Composite resins, which require a strictly conservative approach, have thus become the materials of choice for young and adult patients compared to ceramic restorations.

The contemporary practitioner is ultimately challenged to replace the missing tissue or eventually modify its configuration, by applying artificial material to the patient's teeth, which has to simulate the appearance of natural tissue. The Direct Venear & Composite System (Figure 9) has enabled this objective to be achieved in a predictable manner, by incorporating newly acquired knowledge about natural tissue optical properties into contemporary composite systems. This advance can be regarded as a milestone in operative dentistry, as it will contribute tremendously to direct composite application, helping a larger number of our patients to receive aesthetic restorations that are more conservative.

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