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The anatomy of direct laminate veneers

The removal of healthy tooth structure to achieve a temporary change in aesthetics falls uncomfortably within the concepts of minimal intervention dentistry. Direct laminate veneers empowers clinicians to improve aesthetics with minimal tooth removal and create superb results using the new composite resins currently available to the dental profession.

Even though the basic chemical ingredients of resin and filler particles remains unchanged, ongoing developments in the nature and size of filler particles has lead to significant improvements in the physical and optical properties of these materials.

While no single type of resin is able to mimic the optical properties of natural tooth structure, combinations of micro/nano hybrid and micro fill resins have given dentists the ability to closely reproduce them.

When ambient light falls upon a natural tooth some is absorbed into

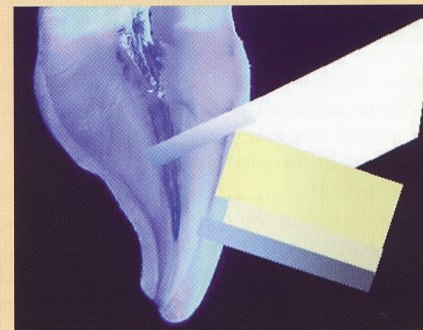
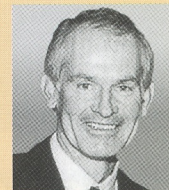


Fig 1. When ambient light hits a natural tooth some is absorbed and the remainder is reflected as either diffuse or mirror reflection.

the tooth and the rest is reflected back out again either from within the tooth as diffuse reflection or from the surface as mirror reflection. Ambient light further stimulates a tooth to emit fluorescence which adds to the overall colour spectrum of light reflected from the tooth (Fig 1).



The creation of a natural looking direct laminate requires that the optical properties exhibited by a tooth are closely mimicked by the overlying laminate, particularly if a shade change is envisaged that will partially opaque out the tooth underneath.

Surface preparation of the tooth requires removal of plaque and pellicle, particularly at the cervical margins. The use of a fine, slow speed diamond point may be used to slightly roughen the cervical and proximal margins to assure the maximum potential of the bonding agent.

As dentine is often exposed at the cervical margins, a preferred dentine bonding system should be applied over the full surface of the tooth according to the manufacturer's instructions.

Next, a thin layer of opaque white tint is applied over the entire surface of the tooth. Application of a tint has the benefit of both masking the tooth surface and reflecting most of the light back out through the overlying resin, enhancing the brightness of

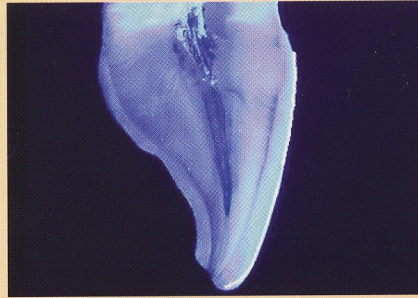


Fig 2. A thin layer of white tint masks discoloration, reduces absorption and enhances brightness.

the laminate veneer (Fig 2). Tooth coloured tints should be avoided as all but tooth coloured shades are absorbed into the tint, reducing the brightness of the reflected light.

Following this, a new generation micro hybrid or nano hybrid resin is applied that will substantially contribute to the hue, chroma and colour of the laminate as well as emit a suitable fluorescence. These materials generally have interesting optical properties in that they are good masking agents as well as exhibiting a degree of translucence

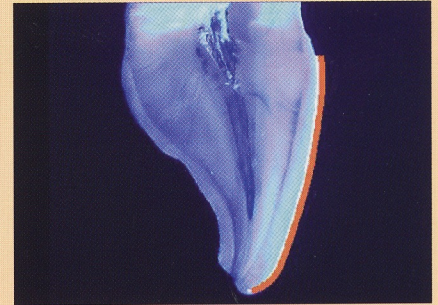


Fig 3. A thin layer of micro/nano hybrid composite resin contributes to the hue, chroma and value of the laminate as well as providing fluorescence to the laminate.

that gives the observer an impression of depth even though the layer may be less than 0.5 mm. It is within this layer that most of the optical properties, including fluorescence emission, of the laminates are generated (Fig 3).

The next layer to be applied is a micro or nano fill enamel shade resin layer. The particle size within these materials is below the minimum wavelength of visible light, 400 nanometers, enabling a

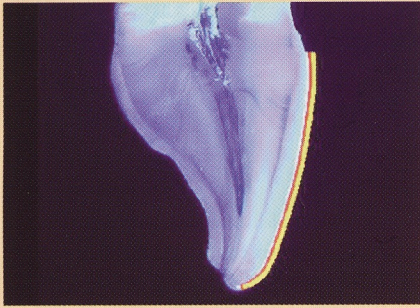


Fig 4. An outer shade of micro fill, nano fill composite resin provides a long lasting surface gloss, adds to the brightness of the laminate and creates Raleigh scattering.

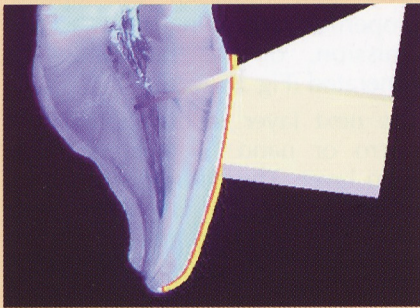


Fig 5. Reflected light from an appropriate layered composite resin laminate closely mimics that from a natural tooth.

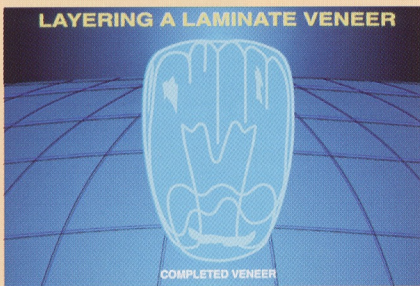


Fig 6. A layering technique of various shades of composite resin are required to mimic a natural tooth.



Fig 7. Layering micro/nano hybrid resin followed by a uniform outer layer of enamel shade micro fill resin.

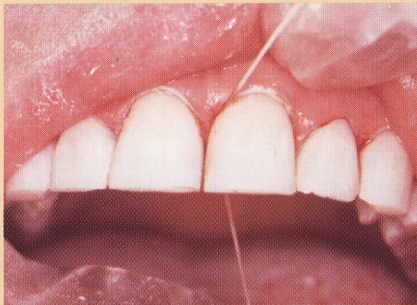


Fig 8. Placing a monochrome layer of micro/nano hybrid resin followed by layering micro fill resins of varying shades.



Fig 9. Direct laminates created using a layering technique of micro/nano hybrid resin followed by an outer layer of micro fill resin.



Fig 10. Direct laminates using a monochrome base of micro/hybrid resin and layering micro fill resin.

high and long lasting polish to be achieved as well as exhibiting Raleigh scattering that gives an unusual sparkling effect to reflected light. Furthermore, it is preferable to choose an enamel shade with a high value that will further enhance the

brightness of the laminate veneer (Fig 4).

The overall effect of this layering technique is to closely mimic the light reflection exhibited by natural tooth structure (Fig 5).

The chromogenic diversity of the laminate is created by layering various shades of composite resin to achieve the effects as observed in natural teeth (Fig 6).

This effect can be achieved by either layering with the micro/nano hybrid resin then applying an enamel shade of micro fill over the full laminate surface (Fig 7) or layering the micro fill resin after first placing a single shade of micro/ nano hybrid over the entire laminate surface (Fig 8). The technique using a base shade of micro/nano hybrid is indicated when a significant change in colour of the laminate compared with that of the tooth is required.

Either way it is possible to achieve good long lasting aesthetics with

minimal removal of tooth structure (Fig 9 and 10). To quote John McLean 'Micro fill composite resins create the best aesthetics available in dentistry'. □