The aesthetic harmony of upper incisors

In our continuing series on aesthetic dentistry, Melbourne practitioner Geoffrey M. Knight, looks at a common problem in clinical practice, harmonising upper central incisors.

Aesthetic harmony of upper central incisors presents a real challenge to dentistry. There are, however, techniques available that enable practitioners to provide clinical solutions that will be acceptable to even the most fastidious of patients.

The symmetry of anatomical form around the mid line is an essential component of aesthetics. Thus, central incisors must appear as mirror images of each other in order to achieve harmony in a smile. Apart from the obvious factors such as the dimensions of height and width there are other important parameters to consider such as the emergence profile of the mesial and distal borders, incisal embrasures, gingival contour, peripheral contour and the facial contour of the laminates. *Figure 1* demonstrates some of the parameters around which symmetry should be achieved.

The contour of gingival margins can often compromise the aesthetics of a laminate veneer. *Figure 2* shows such a case that was corrected by gingival contouring around the upper left central incisor (*Figure 3*). Practitioners should be aware of the problems that can be caused by encroaching upon the biological width of the gingival tissues with such recontouring, and consultation with a periodontist is advisable if any doubts exist about this procedure.

The facial emergence profile was once thought to be a physiological consideration in so far as it affected the removal of plaque. However, it is now generally regarded as an aesthetic factor, as good oral hygiene alone is responsible for the removal of

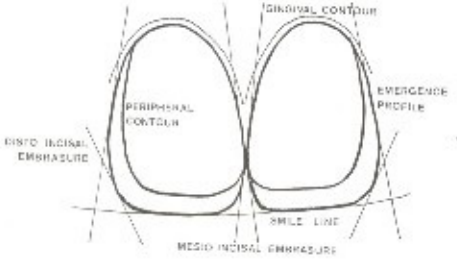


Figure 1

plaque from facial tooth surfaces. Notwithstanding this, the placing of direct laminates using minimal intervention techniques still requires minimising the bulk of material on the facial surfaces.

Any stain can be masked out by first placing a thin layer of white opaque material (not tooth colour) in order to reflect as much light as possible back through the laminate. Over the opaquer, a thin layer of P50Y (3M) shade should then be placed. Using this technique even the darkest of stains can be masked within half a millimetre thickness of resin (*Figures 4 and 5*).

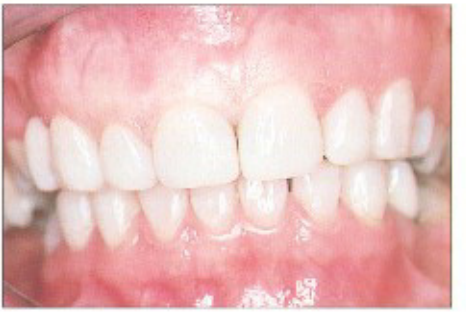


Figure 2

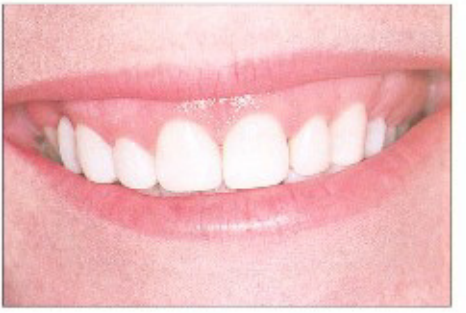


Figure 3

Figure 4

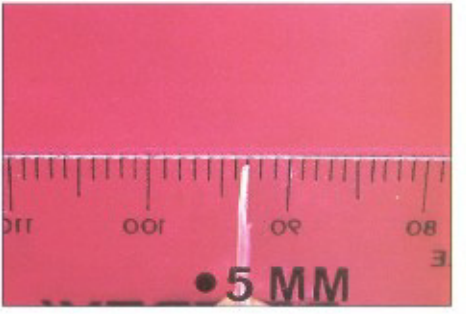


Figure 5

Considerations of colour

Colour is an entity that can be structured into three key components:

- Hue is the actual wavelength of light that distinguishes the part of the visible spectrum.
- Chroma is the intensity of hue in a colour. As the chroma increases the saturation of colour increases similar to adding drops of dye into a glass of water.
- Value is the degree of brightness (black to white) in a colour. Increasing the white in a colour increases the value. Many opaquers use intense white pigments that have the effect of reducing the saturation (chroma) of a colour as the brightness increases.

As enamel thins towards the cervical margin, the colour of a tooth is affected by a decrease in value as the high chroma yellow of the dentine becomes evident.

Similarly, as enamel thickens towards the incisal third and proximal regions of a tooth, the brightness increases and the chroma is reduced producing the opalescent effects associated with enamel in these regions.

Enamel becomes more translucent with age, causing reductions in brightness and an increase in chroma as the dentine shade becomes more apparent within the tooth. It is for this reason that placing a thin layer of

Figure 6

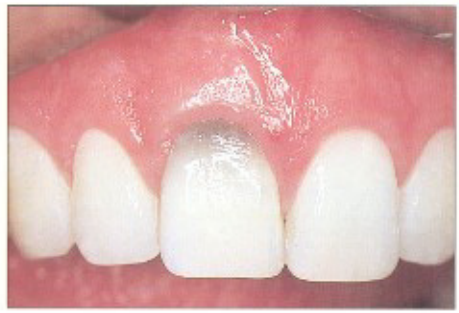


Figure 7

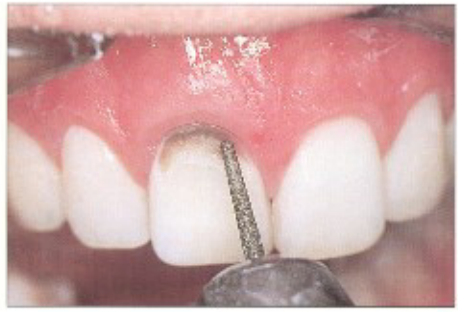


Figure 8

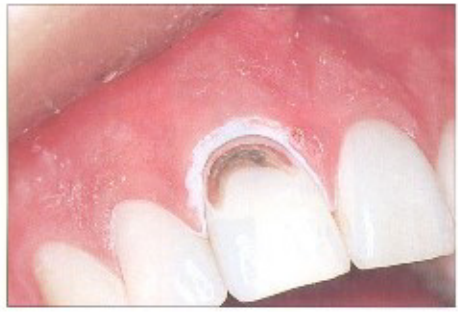
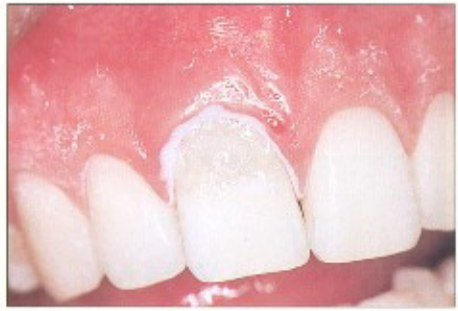


Figure 9



opaquer on mature enamel has a rejuvenating effect upon a veneer.

Tints and opaquers may be further applied to create areas of enamel hypoplasia and thin craze lines within the tooth surface. The operator does have to be careful though to restrict the desire to be too 'creative' as there is a tendency to overdo such modifications which may well detract from the completed laminate.

Laminates and crowns

Crowns are the traditional method used to correct stained incisors although more recently porcelain laminates have become popular. Both techniques require extensive tooth preparation and often fail to solve the remaining problem of darkened gingivae at the cervical margin due to staining within the root.

The following technique provides a simple and predictable solution to this dilemma which requires minimal tooth preparation, yet solves the problems associated with gingival darkening at the cervical margins.

Figure 6 shows an upper right central incisor with severe staining at the cervical margin resulting from a previous endodontic procedure. While internal bleaching is an option, the technique is time consuming and the results unpredictable. Furthermore, there is anecdotal evidence that internally bleached teeth become brittle and are prone to fracture.

Tooth preparation requires that a thin groove be made with a pointed diamond bur at the cervical margin, just above the dentine-enamel junction. The grove should be prepared as closely as possible to the long axis of the tooth, (*Figure 7*) extending across the cervical surface and penetrating to a depth about 1 mm below the gingival margin. Trichloroacetic acid may be used to control crevicular exudate around the preparation (*Figure 8*).

The enamel and dentine are etched for 10 seconds with a 37 per cent phosphoric acid gel, before being washed and dried with oil free air. A universal bonding system is then used to gain adhesion to enamel and

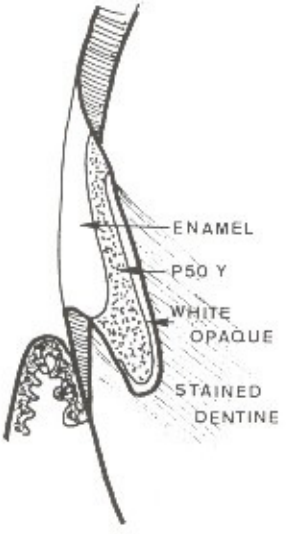


Figure 10

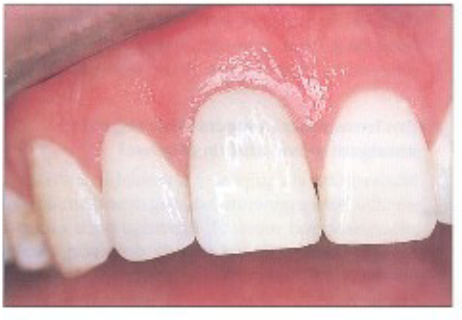


Figure 11

dentine surfaces.

A thin layer of white opaquer is then placed over the exposed dentine surfaces and cured. This is followed by layering a thin covering of P50Y (3M) over the white opaquer so that the staining is just obliterated (*Figure 9*). Finally, after matching the shade of an adjacent incisor (canines are often a shade darker at the cervical margins) sufficient microfill resin is placed to enable contouring (*Figure 10*).

Anatomical contouring and surface texturing are then applied prior to the final polishing.

In the case illustrated, the patient was recalled one week later for final polishing and review. The close approximation of the anatomy and colour to the adjacent central incisor can be seen in *Figure 11*.

Finally, 'persistence' is a key word for these procedures and a little experience with this technique will have a dramatic effect upon achieving predictable and successful results.

One of the keynote symposia at this year's FDI Annual World Dental Congress in Hong Kong, is

Aesthetic Restorations – Quality Guaranteed?

Presentations will be made by

- Gordon Christensen (USA)
  What is quality?
- James Ironside (Australia)
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