Bleaching and simple aesthetic dentistry

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Linda Greenwall offers a simple step-by-step guide to combining bleaching and aesthetic dentistry

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Linda lectures internationally on all aspects of combining bleaching with aesthetic and restorative dentistry.

Bleaching procedures are becoming more popular among patients than ever before. Many patients request further forms of aesthetic dentistry after undergoing whitening treatments. These aesthetic treatments range from replacements of stained composite restorations, replacing an old mismatched crown, re-making an existing bridge in an aesthetic zone, to a full arch reconstruction. Before embarking on any form of aesthetic dentistry or restorative dentistry, bleaching treatments should be discussed with the patient. Normally bleaching treatments should be undertaken first, followed by the rest of the treatment. This article will discuss how to combine bleaching treatments with aesthetic dentistry.

Why bleaching and tooth whitening?

When a patient requests changes to the appearance of their teeth, dentists need to understand whether the patient wishes just to change the colour, or whether the patient is unhappy with the form, shape contour or position of the teeth. Often the patient may say that they are aware that the colour is yellow, but that they are happy with the shape of the teeth. Thus the patient is requesting tooth whitening. Bleaching is simple to undertake, and a discussion about which type of bleaching the patient would like to undertake can follow. The treatment options for bleaching vary. Home bleaching treatments involves making custom trays for a patient. The patient places the bleaching material in the tray and this is normally worn overnight. Other options, which some patients prefer, include in-surgery power whitening procedures.

Treatment planning

Planning treatment for bleaching and aesthetic dentistry has to be carefully considered. The aims and objectives of the treatment need to be evaluated first in order to include all procedures into the correct sequence of the patient's treatment. Bleaching can easily be incorporated into a restorative treatment plan, regardless of the age of the patient. Interdisciplinary approaches may be necessary and need to be carefully planned to integrate treatment in a well-ordered manner; should bleaching be used before, during or after restorative dentistry? This often depends on the case, the complexity, the time that it will take, and the patient's needs and wishes. Some dentists may consider the bleached colour as the base-line from which to start all restorative dentistry. It is often preferable to bleach the teeth prior to commencing advanced restorative dentistry. Bleaching prior to restorative dentistry is undertaken when a change in tooth morphology is required in addition to a shift in shade (Small, 1998).

Ask the patient if they are happy with the colour of the teeth at their initial evaluation appointment. Often patients will express a desire to have lighter teeth, and, with this information, bleaching treatment can be added into the correct stage of treatment. It is not appropriate to undertake bleaching treatment during the definitive stage of treatment. It is better to place bleaching at the beginning of a treatment plan as, immediately prior to cementing a definitive porcelain crown, the patient may say: 'I really wish I could have all the teeth lighter, but I suppose there is nothing you can do about it?' These days there is something that can be done about it. In this case, it should be explained to the patient that bleaching treatment can be undertaken, and a provisional crown may be fitted. The porcelain would have to be stripped from the existing crown and new porcelain placed. Another option is for the definitive restoration to be cemented with provisional cement while bleaching is undertaken, and the teeth are lightened.

It is always best to wait a month after bleaching to let the shade 'settle' prior to selecting the new shade of the teeth. Careful pre-planning would eliminate this costly crisis from occurring.

Shade matching the bleached dentition with the indirect restorations

The process of matching fixed

restorations to the bleached dentition can be complicated, because sometimes the shade changes so dramatically that it is whiter than the lightest shade referenced on the prosthetic shade guide. It can be difficult for the dentist to accurately communicate shade selection to the dental technician. Manufacturers have produced bleaching shade guides, and bleaching shades of composite in much lighter shades than before to help with matching restorations after bleaching. It is important to inform the technician that the teeth have been bleached so that lighter shades can be incorporated into the ceramic restoration.

The key to successful aesthetic enhancement requires dental harmony to be maintained when multiple restorative modalities are used (Schwartz, 1998).

Building and layering porcelain restorations is more challenging, as the optical properties of the adjacent bleached enamel and dentine have to be incorporated into the restoration. External layers of porcelain, which provide light scattering depth potential to the definitive crown restorations, need to be built in correctly. When fabricating porcelain restorations with a bleached enamel appearance, an assortment of external porcelain layers can be utilised to predictably match the shade of the existing enamel (Schwartz, 1998). Altering the external surface with the porcelain layers enables development of transparent zones to give a more natural appearance. While these powders are capable of imparting a bright opalescent colour in porcelain, they do not increase its opacity. By using this porcelain building technique, the six upper anterior teeth can be built up in restorations to give the appearance of bleached enamel in the laboratory.

Shade maintenance of the porcelain restorations with adjacent bleached enamel

It is best not to select a porcelain shade that is too light compared to the surrounding teeth. It is preferable to wait for the shade to settle and to build in different shades into the restoration that will blend in even if the teeth darken a little. The issues with shade rebound are not well understood (Kugel et al, 2005). However, to maintain the natural appearance of the bleached dentition with the well-matched porcelain restorations, it has been suggested that once per month the teeth are maintenance bleached. To remove the accumulation of topical stains and maintain the desired tooth colour, the patient is instructed to bleach the dentition at maintenance intervals. A new mouth-guard is constructed over the porcelain restorations and the patient is advised to bleach with 16% carbamide peroxide gel for two hours once per month. Following the bleaching regime, a one-minute sodium fluoride rinse is prescribed to re-mineralise the enamel. This may not always be necessary and depends on patient compliance.

Patients who need simple aesthetic dentistry

• Defective restorations

Large defective restorations, such as large open carious cavities, should be repaired prior to bleaching treatment to prevent unwanted penetration of the bleaching agent through the open margins, which may exacerbate sensitivity during bleaching treatment. The carbamide peroxide bleaching material does not have any detrimental effect on the existing tooth decay. In fact, it may act as a chemical-cleansing agent. Small marginal defects can be repaired temporarily by acid-etching the margins and applying a flowable composite into the defective margins. Broken fillings can be repaired.

Table 1: Bleaching options for patients:

- Home bleaching
- Power bleaching
- Combination bleaching: power bleaching first followed by home bleaching
- Home bleaching and power bleaching after prolonged bleaching (deep bleaching).

Table 2: Bleaching and aesthetic dentistry: quick hints

- Bleaching first
- Wait at least six weeks for the shade to settle prior to shade matching for anterior crowns
- Wait at least two weeks to replace composite restorations to a new, lighter shade
- Wait at least six-eight weeks to place veneers, as bond strength could be weakened
- Place glass ionomer over access cavity for internal bleaching until bleaching is complete, as the composite bond strength is weakened

• Replacement restorations and bond strength

If the entire restoration needs to be replaced, it is better to wait until after bleaching treatment is completed, as a composite shade lighter than the existing dentition can be selected. If the definitive tooth-coloured restoration is placed prior to bleaching, the patient should be told that the selected shade is an estimate and that the shade may need to be modified after bleaching. Temporary or provisional fillings can be placed using the standard materials available, such as zinc oxide eugenol dressings or glass ionomer. The immediate placement of composite resin on bleached teeth has been controversial (Kugel, 2005). It has been recommended that it is best to wait at least two weeks prior to the replacement of composite restorations (Shinohara et al, 2005).

It appears that the enamel bond strength is weakened, as there is so much oxygen still inside the tooth. This is particularly the case with home bleaching. The bond strength may not be as severely affected in teeth that have undergone power bleaching or ozone power bleaching. Spryides et al (2000) found that teeth bleached with 35% hydrogen peroxide resulted in the highest bond strength, while teeth bleached with 10% carbamide peroxide resulted in the lowest bond strength. They found that delaying bonding allowed for a 35% increase in bond strength.

• Porcelain veneers

Porcelain veneers are an excellent, clinically proven method for correcting severe discolouration and problems with shape, size and alignment of teeth (Calamia, 1982). They are used when the defects on the facial/buccal surfaces are generalised and the majority of the facial surface is defective. Bleaching can be attempted first to assess the potential for whitening. If bleaching is successful, porcelain veneers may not be necessary.

Case study 1

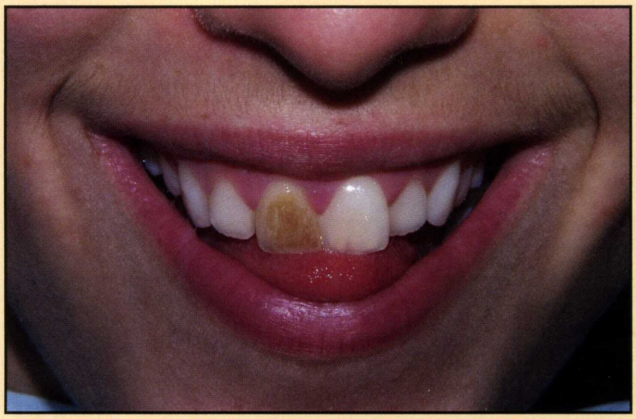

Figure 1a. This patient has a discoloured non-vital tooth that has extrinsic staining

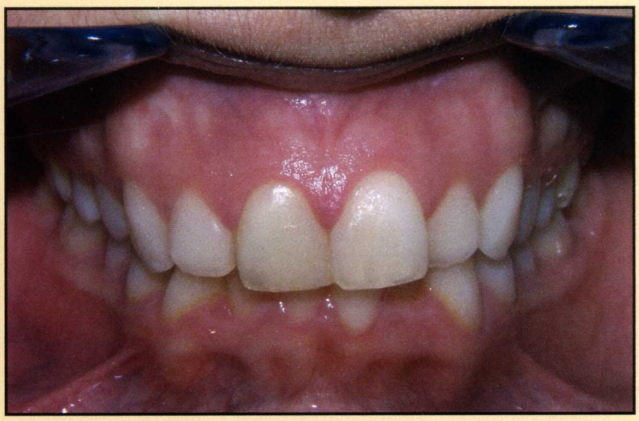

Figure 1b: This extrinsic was removed with prophy paste only. This was acceptable to the patient. The discoloured tooth was later lightened using the inside outside bleaching method

Bleaching may result in a partial success, in that the colour may be lightened slightly. However, this may eliminate the need for opaque porcelains or opaque cements in the final restoration. This would improve the appearance of the veneer and would give a more natural translucent appearance.

Nevertheless, bleaching is a simple and relatively inexpensive technique to try first. If it is unsuccessful, porcelain veneers are the next treatment option and appropriate for the case.

If veneered teeth become darker over time, due to colour regression, they can be lightened from the palatal aspect using a bleaching material placed palatally in a night-guard. This procedure is effective because peroxide is able to diffuse freely through the tooth to the un-restored areas. However, it may be necessary to undertake prolonged bleaching to achieve much lighter effect and th patient should be informed tha this procedure will take muc longer. This would be a situatio where bleaching was undertak en after restorative dentistry.

Mandibular teeth are mor difficult to veneer due to thei

Case study 2

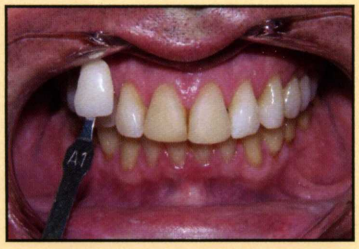

Figure 2a

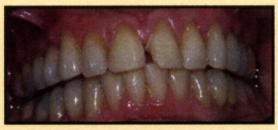

Figure 2b: Showing the patient following veneer preparation

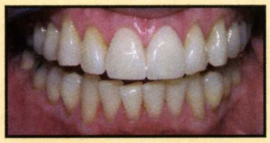

Figure 2c: Showing the completed veneers on the two central incisors

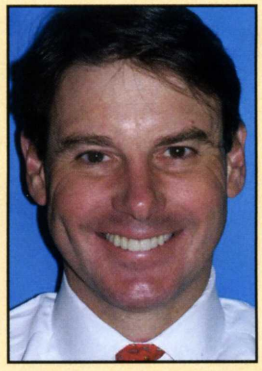

Figure 2d: A portrait view of the patient after completed veneers

The patient is shown in Figure 2a after bleaching upper teeth only.

Note the appearance of the two central incisors that had existing composite veneers placed 20 years previously. These do not whiten during the bleaching procedure. The upper teeth are normally always whitened first because this take occurs more quickly than with the lower teeth, thus giving the patient a colour comparison. Also, it appears that the patient experiences less sensitivity during the upper bleaching than that of the lower teeth

Case study 3

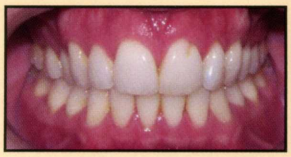

Figure 3a

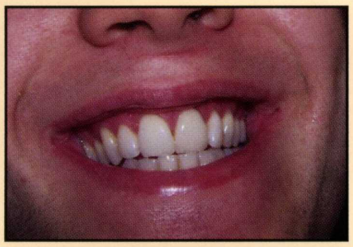

Figure 3b: Showing the tooth following composite bonding to close the enamel cleft

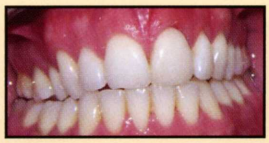

Figure 3c: An intraoral view of the closure of the enamel cleft on the upper left central incisor

Figure 3d: The portrait smile of the patient before closure of the enamel cleft of the upper left central incisor

This patient requested whitening procedures as he had discoloured teeth from numerous courses of antibiotics as a young child (Figure 3a). The teeth were originally shade A4. A course of prolonged bleaching was undertaken over a two month period and significant shade lightening was achieved from shade A4 to shade A1. Figure 3d displays the appearance of the teeth after bleaching. The patient did not like the appearance of the enamel cleft on the upper left central incisor