Presentation and Chief Complaint
A 57-year-old woman presented with extensive anterior and posterior restorations. Her chief complaint was tooth sensitivity, mainly around the maxillary anterior teeth but also on several other teeth. In addition, she expressed dissatisfaction with the esthetics and perceived poor fit of the anterior veneer restorations placed many years previously (Figure 1). There was no other relevant medical or dental history.

Previous to this presentation of the case, the author had temporized teeth Nos. 4 through 6 and 11 through 13 with provisional acrylic restorations, which were fabricated chairside. This had been done in order to define the final outcome of the case and to ensure efficient final conclusion of the case with very little time delay.

Examination and Principal Findings
Teeth Nos. 7 through 10 showed some degree of gingival recession, which created unevenness in the level of the gingival margins of the upper incisors. It should be noted that gingival recession is a predisposing factor for hypersensitivity. At this time, 2 mm to 3 mm of exposed root dentin could be seen apical to the veneer margins.

The porcelain veneers did not extend well enough into the interproximal embrasures, contributing to a less than optimal esthetic result. When the patient turned her head, the margin between the veneer and the natural tooth was obvious. Over time, some increase in the shade of the natural tooth
substance had occurred, which was probably due to generalized staining, but perhaps could have been a result of an increase in dentin mineralization, as caries had been ruled out as a possible cause.

Cases with this sort of presentation should be considered interdisciplinary challenges, with the potential to integrate periodontics and restorative dentistry. Also, with respect to the sensitivity, the gingival recession was clearly a major factor due to the exposed dentin; however, dietary factors, too, needed to be considered, as acid erosion also exposes dentin, particularly in the area close to the gingival margin, where the enamel is naturally very thin. For dentin hypersensitivity to occur, not only must the dentin be exposed, but also the protective smear layer of precipitated salivary glyco-proteins and minerals—which normally occlude the tubules—must be removed, leaving the tubules open to the oral cavity. Acidic foods and beverages, as well as some acidic mouthrinses, can remove the smear layer, leaving the tubules of the exposed dentin open to the mouth and thus susceptible to triggers for dentin sensitivity, such as cold, osmotic, tactile, or hot stimulus.

**FIGURE 1**—Note the gingival recession at the veneer margins and the poor interproximal esthetics.
Consideration of Treatment Plan
The patient declined the recommended periodontal plastic surgery, which was proposed to improve the position of the gingival margins and the contour of the papillae. Therefore, a treatment plan was developed to concentrate on the tooth sensitivity and a restorative solution to replace the veneers. The diagnostic wax-up is shown in Figure 2.

Case Management
The first line of treatment was to provide immediate relief for the sensitivity. A gentle prophylaxis was performed using an arginine-calcium carbonate paste (Colgate Sensitive Pro-Relief® Desensitizing Paste) (Figure 3). This formulation of the amino acid arginine (which is naturally found in saliva) and calcium carbonate forms a deposit that effectively blocks the open tubules. Treatment was followed by plaque control instruction and the recommendation to change to a potassium nitrate–containing toothpaste (Colgate Sensitive Pro-Relief® Toothpaste) to provide ongoing relief. The patient’s diet was assessed and she was advised to reduce consumption of acidic foods and beverages to further reduce her risk of erosion.

Next the veneers were removed. The poor quality of fit and marginal adaptation contributed not only to the poor esthetics but are very likely to have been significant contributory factors to the recession and dentin hypersensitivity.

FIGURE 2—The diagnostic wax-up.

FIGURE 3—Application of Colgate Sensitive Pro-Relief® Desensitizing Paste to the exposed dentin above the veneer margins provided instantaneous relief for the patient.

Images courtesy of Elian and Kim.
Immediately prior to removal of the veneers, Colgate Sensitive Pro-Relief® Desensitizing Paste was applied directly with a polishing cup as a prophylaxis to reduce sensitivity, with care taken to reach into the interproximal spaces. An ultrasonic scaler (Cavitron®) was used to remove all calculus and excess material from the sulcus. The veneers were then removed with diamond burs in an effort to avoid further reduction of the natural tooth; not knowing the thickness of the original veneers, which had been in place for many years, made this removal without reduction of further tooth substance challenging. After the veneers were removed, the exposed original preparations were modified and extended interproximally to improve the esthetic outcome, as well as cervically to improve esthetics and cover the dentin exposed as a result of the gingival recession caused by the inadequate margins (Figure 4). Impressions were taken following gingival retraction with packed cord. Provisional restorations were designed to establish the optimal incisal edge positions.

A follow-up visit was arranged 2 days later for evaluation of the provisionals and the fit of the final veneers. At this stage, it was imperative to determine if the esthetic outcome had been achieved, if the chief complaint had been addressed, and if the preparations had extended fully into the area of the gingival recession. The provisionals were removed without administration of local anesthesia, so that on try-in of the new veneers, the incisal edge placement could be perfected.

Immediately prior to etching with 37% phosphoric acid, the arginine calcium-carbonate desensitizing paste was applied to the preparations with a prophy cup (Figure 5) to ensure that the chief complaint of sensitivity would be fully addressed. An advantage of the Colgate Sensitive Pro-Relief® formulation is that it has been shown to have no effect on final bond strength, unlike other desensitizing agents and their delivery systems.

**FIGURE 4**—The preparations for the replacement veneers. Note the extension interproximally.

**FIGURE 5**—Prior to etching and cementation, Colgate Sensitive Pro-Relief® Desensitizing Paste was applied to the preparations.

Images courtesy of Elian and Kim.
Cementation followed, with careful seating of the veneers to ensure correct contact, incisal position, and cervical and gingival adaptation and symmetry; all excess cement was removed. The replacement veneers were then cured.

Before the patient was dismissed, instructions about tooth sensitivity and oral hygiene were reinforced. These instructions included gentle but thorough brushing with a soft toothbrush and a potassium nitrate desensitizing toothpaste (Colgate Sensitive Pro-Relief® Toothpaste) ensuring that all tooth surfaces were covered. Instructions also emphasized the importance of removal of biofilm.

Posttreatment Evaluation and Review
The patient was evaluated one last time to verify that her chief complaints had been addressed. In addition, her phonetics were tested and found to be satisfactory. The patient was fully satisfied, expressed no further concerns, and was discharged (Figure 6 and Figure 7). She was advised to return if any further sensitivity symptoms were encountered.

**FIGURE 6**—Final restorations.

**FIGURE 7**—The overall result.
Discussion

Colgate Sensitive Pro-Relief® Desensitizing Paste was chosen as the treatment of choice to address the sensitivity, as its novel technology enabled instant relief of symptoms. The traditional method of blocking dentin tubules has involved the use of at-home, high-concentration fluoride compounds, which offer relief over time. Similarly, nerve-blocking agents, such as potassium nitrate delivered via toothpaste, require a time period of 4 or more weeks to bring noticeable relief.

In clinical trials of the arginine calcium-carbonate technology, 28-day and immediate relief was shown to occur after a single application (84% of the subjects demonstrated relief to tactile stimulus and 72% demonstrated relief to cold air stimulus). For this patient, treatment required highly effective, consistent relief for sensitivity.

REFERENCES


Dr. Elian has received financial/material support from Colgate-Palmolive.