

Meeting Demands of Today's Society



Ara Nazarian, DDS
Private Practice
Premier Dental Center
Troy, Michigan
Phone: 248.457.0500
Fax: 248.457.0501
Email:
ara20002@comcast.net

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Improving anterior esthetics has always been and will continue to be a challenge to the restorative dentist. Increased demand for esthetic restorative treatment has challenged the dentist, laboratory technician, and manufacturer to develop techniques and materials to satisfy the discerning patient. Using these modern materials and following principles of smile design, the restorative team can succeed in restoring a smile to proper form, function, and health. The case presented in this article demonstrates the significance of smile design and material selection in the esthetic zone.

CASE PRESENTATION

A woman in her late 40s presented to the practice dissatisfied with the appearance of her smile and overall look of her mouth (Figures 1 and 2). She felt that her existing restorations were unattractive because of size, shape, and color and that these restorations were making her look much older than her actual age.

Initial diagnostic evaluation consisted of a series of 35-mm slides with study casts, a centric

relation bite record, and a face-bow transfer. The patient had porcelain-fused-to-metal (PFM) restorations present on her maxillary anterior teeth Nos. 6 through 11 (Figure 3) with teeth Nos. 8 and 9 having metal posts and previous root canal therapy. Overall vitality and translucency appeared to be compromised with these restorations. Also, the patient was dissatisfied with the size and shape of her existing PFM restorations. The Smile Guide Book (Discus Dental®, Inc) was used to complete the smile analysis necessary for pre-designing the case. The size and shape of her existing PFM restorations were too short, flat, and square. The patient preferred a softer, more feminine look. To achieve this, the shape selected would be rounder, and the embrasures between the teeth would be larger. The lip line edge vs the incisal edge of the teeth suggested that the patient could tolerate lengthening the incisal edges. Because the patient's complaint was extreme dissatisfaction with the whole appearance of her smile and the previously placed restorations, it was decided to incorporate a highly esthetic material (IPS Empress®, Ivoclar Vivadent®, Inc) in the restoration of her maxillary anterior teeth.

Preparation

When informed consent was obtained from the patient, treatment was initiated. A composite mock-up (Figure 4) was first

performed as a blueprint for the final restorations incorporating principles of the Golden Proportion. The most desirable width-to-length ratio is from 75% to 80%. Using the laterals as a unit of 1, the central should be 1.6 times as wide. The visual part of the cuspid from the anterior should be 0.6 times as wide. With this patient, the evaluation revealed that her centrals were too short and needed to be lengthened. Midline canting and axial inclination appeared to be within acceptable limits. The incisal edge in reference to the patient's lip line was then examined and should follow the basic curve of the lower lip. [QA. Edit okay?] It should not be flat or reversed. This ages the smile tremendously. The patient's incisal edges did not follow her lip very well. Phonetics were also checked to see if the patient could tolerate the proposed length.

Gingival symmetry, heights, and contours were also evaluated. The gingival tissue exhibited a nonsymmetrical look. To correct this, the gingival heights would be arranged where the centrals and canines were equal and the laterals about 1 mm incisal to this line. A properly placed gingival zenith would add proper symmetry to the entire gingival system.

After anesthetic was administered, an electrosurgical unit (Sensimatic™ 600SE, Parkell, Inc) was used for contouring the

gingival height and zenith over teeth Nos. 7 and 10 (Figure 5) to create the more symmetrical gingival height. A crown-removing bur was then used to remove the maxillary anterior restorations (Figure 6) from teeth Nos. 6 through 11. Using a crown spreader hand instrument, the existing crowns were removed with a rotation to dislodge the metal from the underlying tooth. Because the patient requested a more complete smile, teeth Nos. 4, 5, 12, and 13 were also prepared to eliminate "negative" buccal corridor space. In other words, the "negative" buccal space would cause there to be no width to the smile and the teeth would look as if they sink, in lingually. Most of these teeth had large composite restorations that were suffering from microleakage, so full coverage restorations were recommended. On reviewing her radiographs, teeth Nos. 8 and 9 had metal posts that appeared very stable but required some type of block-out to prevent potential darkening of the final restorations. A composite material (Tetric® Ceram, Ivoclar Vivadent®, Inc) was used to match the preparations of Nos. 8 and 9 to the other preparations' stump shade. Because the patient had a sensitive gag reflex, a quickset impression material was selected (Take 1® Super Fast, Kerr Corporation) to take the impression. A stump shade (Ivoclar Vivadent®, Inc) was selected for each tooth to assist the laboratory

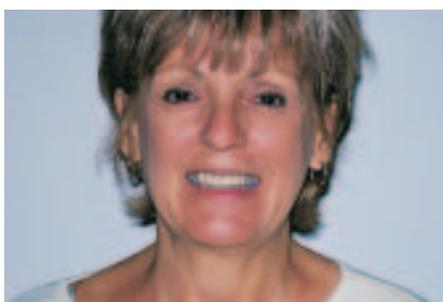


Figure 1—Preoperative full-face view of patient.



Figure 2—Preoperative smile view.



Figure 3—Preoperative retracted view.



Figure 4—Composite mock-up of proposed size and length.



Figure 5—Contouring of gingival tissue for more symmetrical appearance.



Figure 6—Sectioning existing crowns during removal process.



Figure 7—Retracted view of provisional restorations.

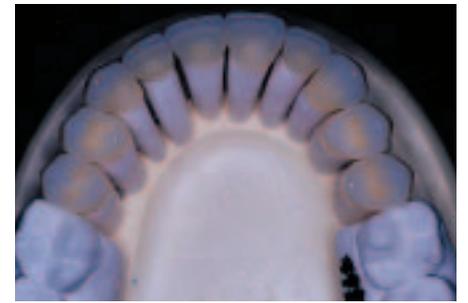


Figure 8—IPS Empress® restorations on model.

technician in creating natural-looking restorations.

Provisionalization

A provisional restoration, which was significant to the overall treatment because it eliminated the guesswork of what the final restoration would look like, was made from an impression of the composite mock-up. Using Systemp® [QA. Seems there are several variations of Systemp, please clarify which one you used.] (Ivoclar Vivadent®, Inc), this mold was quickly filled and placed on the patient's prepared dentition. Within minutes the

temporary was fabricated and the patient was released with her new smile (Figure 7). Final trimming of the margins was accomplished with fine diamond burs. The next day, the patient returned for evaluation of size, shape, color, and bite. The patient already exhibited excitement and confidence with her provisional restorations. Information was recorded and the patient was informed to apply, stimulate, and rinse a tissue conditioner (Under-the-Gum Irrigant, Dental Herb Company USA) while her provisionals were in to aid the healing process of the tissue. By using this material, the

protocol for bonding during the cementation process would be met because of the health of her gums, and the temporaries would not be discolored.

Laboratory Considerations

Color photographs and diagnostic data were also obtained and forwarded to the laboratory for the fabrication of the final restorations. During the laboratory phase, the full arch vinyl polysiloxane impressions were used to create a master model on which the restorations would be based (Figure 8). The master model was segmented into individual dies that were trimmed and pinned to determine the manner by which the final restorations would integrate with the existing soft tissue. A silicone incisal matrix of the provisionals was created to guide the placement of incisal effects and edge position in the subsequent ceramic build-up. Additionally, comprehensive color mapping ensured that the definitive esthetic result of the IPS Empress® restorations would meet the patient's expectations.

Cementation

Before try-in of the definitive restorations to verify fit and shade, the provisional restorations were removed and any remaining cement was cleaned off the prepared dentition. After the patient was shown the retracted view for acceptance, the cementation process was initiated. The restorations were treated with phosphoric acid (37%) for 20 seconds, rinsed, silanated, and air-dried for 1 minute. The prepared dentition was cleaned with chlorhexidine 2% (Consepsis®, Ultradent Products, Inc) for 15 seconds and

rinsed to remove any contamination during the temporary phase. The preparations were etched for 10 seconds and rinsed thoroughly. A wetting agent was placed on the dentition to lightly dampen the dentin.

Two coats of dental adhesive (Exite®, Ivoclar Vivadent®, Inc) were placed on the preparations and high-speed suction was used to ensure that the material had evaporated. The adhesive was light-cured for 10 seconds per tooth with an L.E. Demetron I (Kerr Corporation) curing light. A coat of adhesive was also applied to the internal aspects of the restorations.

Variolink® II Universal Base (Ivoclar Vivadent®, Inc) was applied to the restorations. The restorations were then placed on the preparations, and, while firmly holding the restorations in place, a rubber tip applicator removed all excess luting cement from the margins. A thin layer of glycerin was then applied to the margins to prevent an oxygen-inhibiting layer from forming. The restorations were tacked at the gingival margin.

While the restorations were still firmly held in place, the restored dentition was flossed and any excess luting cement was carefully removed. When most of the excess cement was removed, the restored dentition was completely light-cured from both facial and lingual sides. Any residual cement was removed with a No. 15 scalpel or finished with a fine diamond and polishing points. After complete polymerization of the restorations, the occlusion was verified and adjusted (Figure 9). The overall health and structure of the soft tissue and restorations were very good (Figures 10 and 11). The



Figure 9—Occlusal view of final restorations.



Figure 10—Postoperative retracted view of the final restorations.



Figure 11—Postoperative close-up view demonstrating ideal esthetics.



Figure 12—Postoperative view of patient's smile.



Figure 13—Postoperative full-face view demonstrating a more youthful appearance.

patient was extremely satisfied with the definitive results (Figures 12 and 13).

CONCLUSION

If the challenges of cases such as this are carefully diagnosed and analyzed and a treatment plan is designed, they can be addressed successfully even with the esthetic demands of today's society. The key to the process is to understand what the patient wants and to know the most appropriate, durable, and predictable restorative materials to facilitate the case. All patients deserve to feel understood. By following certain guidelines in smile analysis, material selection, and laboratory instruction, the dental provider can achieve any esthetic goal. ○

REFERENCES

1. Nash RW. Treatment planning with modern materials. *Compend Contin Educ Dent*. 1997;18(11):1064-1071.
2. McLaren EA. All-ceramic alternatives to conventional metal-ceramic restorations. *Compend Contin Educ Dent*. 1998;19(3):307-326.
3. Kois JC. Altering gingival levels; the restorative connection, part I: biologic variables. *J Esthet Dent*. 1994;6(1):3-9.
4. Kois JC. New paradigms for anterior tooth preparation. Rationale and technique. *Oral Health*. 1998;88(4):19-30.
5. van Dijken JW. All-ceramic restorations; classification and clinical evaluations. *Compend Contin Educ Dent*. 1999;20(12):1115-1134.
6. Vence BS. Sequential tooth preparation for aesthetic porcelain full-coverage crown restorations. *Pract Periodontics Aesthet Dent*. 2000;12(1):77-84.
7. Delopez TE. Predictable pressed ceramic anterior restorations. Clinical observations. *Dent Today*. 2002;21(4):68-73.
8. Chiche GJ, Pinault A. *Esthetics of Anterior Fixed Prosthodontics*. Quintessence Publishing Co; Chicago, IL, 1994:108.

Quick Tips continued

9. Dwan A, Yaman P, Razzoog ME, et al. Effect of cement on fracture resistance of all-ceramic crowns. *J Dent Res.* [abstract] 1996;75(special issue):284. Abstract 2136.