

VISUALIZATION BEFORE FINALIZATION: A PREDICTABLE PROCEDURE FOR PORCELAIN LAMINATE VENEERS

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The success and acceptance of anterior aesthetic restorations is based on a shared common vision and understanding between the patient and the clinician. If each has a different perception of how the definitive restorations will appear, this may lead to disappointment and refusal of the final restorations by the patient. This article describes the treatment of six maxillary anterior teeth with porcelain veneers using a practical approach that allows the dentist and the patient to agree on the appearance of the final restorations prior to actual fabrication and fitting of the definitive veneers.

Learning Objectives:

This article discusses the significance of clinician-patient communication in envisioning restorations. Upon reading this article, the reader should:

- Understand the benefit of visualizing the final aesthetic result before the final restorations are fabricated.
- Realize the importance of presenting the patient with a provisional restoration prior to final cementation.

Key Words: porcelain laminate veneers, temporization, aesthetics, provisionalization

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The results of aesthetic dental treatment are subjective and what the clinician considers to be acceptable may not be acceptable to the patient. Subjective comments such as, "I am not happy with my smile," should be transformed to written objective statements such as, "my teeth are too small," and "I do not like worn incisal edges." The more precise these objectives are prior to treatment, the easier it will be to measure the success of the case at its conclusion. It is important for both the clinician and the patient to visualize and agree upon the final result prior to commencing treatment.¹ The patient also needs to be made aware that although every effort is made to demonstrate the appearance of the anticipated result prior to treatment, it is only once the teeth have been prepared and temporary restorations placed that the true appearance can be visualized.²

The ongoing and progressive visualization process starts in the treatment-planning stage and ends with final refinement of provisional restorations prior to impression making. Once this desired result has been agreed upon by the dentist and the patient, the information needs to be transferred to the laboratory technician for the fabrication of the definitive restorations.³

The visualization process can be divided into two distinct phases: prepreparation and postpreparation. Prepreparation visualization is reversible, and the patient and/or clinician have the option of withdrawing from treatment. Methods of conducting this evaluation include diagnostic waxups, computer imaging, intraoral composite mockups, and removable tooth facings. Of these, computer imaging seems to be increasingly well understood and accepted by patients.^{4,5} Dentists do, however, need to be wary of not being able to clinically replicate the computer images.⁶ Postpreparation visualization



Figure 2. Retracted facial view of the patient's smile reveals aesthetic compromises that will be treated with porcelain veneers.



Figure 3. A direct composite mockup was performed to permit previsualization of the intended result.

is irreversible and is based on the provisional restorations placed on the prepared teeth.

The following case presentation describes the processes and techniques involved in refining and visualizing the proposed result of six maxillary porcelain veneers prior to completion.

Case Presentation

Patient History and Chief Complaint

A 40-year-old healthy male patient presented with multiple cervical restorations on the labiobuccal and palatolingual surfaces of his teeth. Although extensive posterior restorative treatment was conducted as well, this article will focus only on the treatment performed on the maxillary anterior dentition. The patient was dissatisfied with the appearance of the existing cervical composite restorations and the overall appearance of his smile. He felt his front teeth were too short and too yellow.

Upon examination, the anterior teeth appeared to have been worn on their labial surfaces and incisal edges (Figures 1 and 2). The cervical composite restorations exhibited overhanging margins, marginal staining, and



Figure 1. Preoperative view of the patient's smile at the time of presentation.



Figure 4. A trial acrylic facing was fabricated and placed on the patient's teeth to allow evaluation.



Figure 5. The trial facing on the left side was modified to allow evaluation of different incisal form.

general discoloration. Prior to commencing treatment, the patient had his teeth bleached. Bleaching was performed approximately 2 weeks prior to placement of the porcelain veneers in order to allow the color of the teeth to stabilize and for the enamel bonding characteristics to return to normal.⁷

Treatment Planning and Diagnostics

During the treatment-planning phase, it was decided to increase the incisal length and labial thickness of the teeth. The patient had a Class III skeletal pattern and as such, despite lengthening the teeth, it would still not be possible to obtain good anterior and canine guidance. Based on the incisal wear pattern, it appeared that the patient functioned in a vertical manner, and despite a lack of anterior guidance, there was no evidence of excessive pathologic wear.

A direct composite bonding mockup was conducted (Figure 3) and, based on this guide, a diagnostic waxup was made and discussed with the patient. Because alteration of the teeth was to be mainly additive, it was possible to fabricate a removable acrylic resin facing to

enable both the clinician and the patient to visualize the overall effect of increasing the length and thickness of the teeth (Figure 4).⁸ An alginate impression and multiple photographs were taken of the trial facing in place. The patient was then dismissed with the removable trial facing to allow himself and others time to assess the proposed appearance of the veneers.

At this time, stone casts and photographs of intra-oral situations were extremely beneficial to the clinician in demonstrating aspects that could have gone unnoticed in the mouth. This removed time constraints from the case and made it possible for the patient and the restorative team to view the casts from positions and angles that were not possible in the mouth.

It was agreed upon by the dentist and patient that the acrylic facing made the teeth too protrusive and long. Consequently, the acrylic facing was reshaped to improve the desired end result (Figure 5). Following this, the patient gave full informed consent to proceed with the irreversible and invasive stage of treatment: tooth preparation.

A prefabricated acrylic shell based on trial acrylic facing was made in the laboratory. This shell would be relined and used for the provisional veneers after the teeth were prepared and the impressions were made (Figure 6). The shell was fabricated from acrylic resin cured under heat and pressure. A seating index was made to allow the acrylic shell to be correctly oriented in the mouth during the relining procedure.

Tooth Preparation

The first stage of tooth preparation involved removing the existing composite restorations, assessing the underlying teeth, and placing new restorations. As the cervical restorations were fairly large, it was decided to replace



Figure 6. An acrylic provisional shell was fabricated based on the trial acrylic facing.



Figure 7. A silicone tooth-reduction guide permitted the clinician to prepare the dentition as conservatively as possible.



Figure 8. Facial view of the final tooth preparations with completed cervical restorations.

them at a separate earlier appointment. This stage would allow the teeth to be evenly reduced and the porcelain veneers to maintain a uniform thickness over the natural tooth and underlying cervical restorations.

The next stage of the procedure involved the preparation of the teeth and the placement of the provisional restoration. Guides for tooth reduction, based on the trial acrylic facings, were made from silicone putty (Figure 7). Unlike fixed-depth, veneer preparation burs designed to create a uniform and generalized reduction of the tooth, customized reduction guides allowed the clinician to perform more specific and conservative tooth preparation based on the proposed shape of the definitive restorations (Figure 8).⁹

After tooth preparation, the acrylic shell temporary was seated with the seating jig and relined intraorally with acrylic resin (Figures 9 and 10). The temporary was trimmed and cemented in place with a clear noneugenol-containing cement (ie, TempBond Clear, Kerr/Sybron, Orange, CA).

In keeping with the philosophy of visualization before finalization, alginate impressions were made and photographs were taken of the cemented provisional restoration. The patient was then dismissed and asked to verify his approval of the temporary before coming in for the final impression 1 week later. In addition to aesthetic approval, it was important to ensure the patient could tolerate the increased incisal length from a functional and phonetic aspect.

Impressions

At the follow-up appointment, it was only necessary to make minor modifications to the provisional restoration and the underlying teeth. A light-cured, blocked-out resin (ie, Block-Out Resin, Ultradent Products, South Jordan, UT) was used palatally in the interproximal embrasures



Figure 9. The provisional restorations were relined in preparation for seating.



Figure 10. Retracted facial view of the provisional restorations approved by the patient.

in order to prevent tearing of the impression material on removal (Figure 11).¹⁰

Although the preparation margins were equigingival, a retraction cord was used to allow the technician to establish the correct emergence profile based on visualization of the subgingival tooth surface (Figure 12).¹¹ Two maxillary impressions and one mandibular impression were made using a polyvinylsiloxane material



Figure 11. The interproximal embrasures were blocked out with resin prior to making the impression.



Figure 12. Retracted view of the preparations ready for the final impression.



Figure 13. View of the six definitive feldspathic veneers on the model.

(ie, Imprint II, 3M Espe, St. Paul, MN) in custom trays. These impressions, a study cast of the provisional restoration in place, and multiple photographs were sent to the technician for fabrication of the final feldspathic porcelain veneers (ie, Vintage Halo Porcelain, Shofu, San Marcos, CA) (Figure 13).

The provisional restoration was recemented, and the patient was asked to return 4 weeks later for seating



Figure 14. Buccofacial view demonstrates removal of the uncured marginal excess resin.

and cementation of the definitive porcelain laminate veneers. The well-fitting, stable, and aesthetically pleasing temporary veneers allowed adequate time for the laboratory technician to fabricate the final restorations without pressure from the clinician or patient.

Try-In and Cementation

After the provisional restoration was removed, the teeth were cleaned and pumiced. No anaesthetic was required, which helped the dentist and patient to assess the final result with full upper lip control and movement. The veneers were tried in with a clear fluoride gel, and contact points were checked and adjusted to allow simultaneous seating of all six veneers. The veneers were then cleaned and simultaneously cemented in place with a clear, light-cured veneer cement (ie, Rely X Veneer Cement, 3M Espe, St. Paul, MN). Each veneer was spot cured for 10 seconds with a narrow-diameter light beam in the midlabial area. The narrow-diameter light beam was made by forming a cone with a small opening using the lead foil from an intraoral x-ray film. This cone was then attached to the end of a conventional large-diameter light tip. Once all six veneers had been spot cured in place, the excess, uncured, marginal, and interproximal cement was removed with microbrushes and ultra-fine dental floss (Figure 14). The lead foil cone was then removed and final curing was completed. This simultaneous curing technique ensured that there were no seating discrepancies as each subsequent veneer was cemented. The definitive restorations required minimal finishing (Figures 15 through 17).

Discussion

Bis-acryl-based provisional restorations are more brittle and often break during removal and or relining.¹² In addition, bis-acryl does not reline as well as acrylic resin.¹³ As opposed to provisional veneers that are made of



Figure 15. Lingual view of the veneers and marginal integrity post-cementation.



Figure 16. Facial view of patient's smile following the seating, finishing, and polishing of the veneers.



Figure 17. Postoperative facial view of the feldspathic porcelain restorations. Note the aesthetics achieved.

bis-acryl and lock into place without cement, temporary veneers that are made of acrylic resin are cemented temporarily in place and can be removed without breakage. This allows for adjustment and modification of the provisional restoration and underlying teeth if needed.

Conclusion

The patient is often the final judge of restorations in aesthetically driven treatment. If the clinician and patient do not have the same results in mind, there is the possibility that the patient will not approve of the definitive restorations. Such occurrences can be both frustrating and costly to the clinician, who must have the restorations remade or face the disapproval of the patient. It is therefore important to ensure that the patient approves of the proposed final result prior to fabrication of the definitive restorations. The most important facility that allows for this prior approval is the provisional restoration.

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CONTINUING EDUCATION (CE) EXERCISE No. X



To submit your CE Exercise answers, please use the answer sheet found within the CE Editorial Section of this issue and complete as follows: 1) Identify the article; 2) Place an X in the appropriate box for each question of each exercise; 3) Clip answer sheet from the page and mail it to the CE Department at Montage Media Corporation. For further instructions, please refer to the CE Editorial Section.

The 10 multiple-choice questions for this Continuing Education (CE) exercise are based on the article, "Visualization before finalization: A predictable procedure for porcelain laminate veneers," by Basil Mizrahi, BDS, MSc, MEd. This article is on pages 000-000.

1. The final aesthetic result should be achieved using input from:
 - a. The dentist only.
 - b. The patient only.
 - c. The technician only.
 - d. All of the above.
2. Subjective comments should be transformed to objective statements
 - a. True.
 - b. False.
3. At which stage does the visualization process start?
 - a. Treatment planning stage.
 - b. Temporary restoration stage.
 - c. Ceramic try-in stage.
 - d. Final cementation stage.
4. Which of the following is NOT a method of preparation visualization?
 - a. Diagnostic waxup.
 - b. Computer imaging.
 - c. Intraoral composite.
 - d. Temporary restorations.
5. The visualization process is divided into how many phases?
 - a. One.
 - b. Two.
 - c. Three.
 - d. Four.
6. How many weeks should one wait after bleaching prior to carrying out adhesive dentistry?
 - a. 1 week.
 - b. 2 weeks.
 - c. 3 weeks.
 - d. 4 weeks.
7. Which is the preferred type of tooth reduction guide?
 - a. Depth cutting burs.
 - b. Silicone putty matrices.
 - c. Freehand estimation.
 - d. The lesser the better.
8. During cementation, for how long is the mid-labial surface of each veneer spot cured?
 - a. 10 seconds.
 - b. 20 seconds.
 - c. 30 seconds.
 - d. 40 seconds.
9. Name a disadvantage of bis-acry-based temporaries.
 - a. They are brittle.
 - b. They often break during removal.
 - c. They do not reline as well as acrylic resin.
 - d. All of the above.
10. The clinician and patient should have the same aesthetic result in mind.
 - a. True.
 - b. False.