Utilizing an Effective Protocol for Full-Mouth Reconstructions

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Upon successful completion of this CE activity 1 CE credit hour will be awarded
About the Author

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Introduction

In today’s society, it is imperative to meet the aesthetic and functional requests of the patient, especially in regards to full-mouth reconstruction. In fact, delivering a full-mouth reconstruction can be frustrating for the provider if there is no systemized approach to preparation, impression taking, and cementation. With the various new materials and techniques now available, a dental provider can consistently deliver a full-mouth reconstruction from start to finish efficiently and effectively with the proper training.

Case Report

Diagnosis and Treatment Planning

A woman in her mid-40s presented to the practice displeased with the appearance of her current smile. She commented that she felt that her existing teeth and restorations were unattractive because of size, shape, wear, and color. She also mentioned that she could feel some chips/cracks in her restorations. In addition, broken portions of tooth structure were causing occasional discomfort in the posterior region. She also said that she had already attempted whitening and bonding elsewhere with a different dental provider, but was not satisfied with the outcome.

We captured images of the patient smiling as well as retracted images of her teeth biting (Figure 1) and slightly open (Figure 2) with a Pentax ISD SLR camera. Focusing on areas of incisal chips, disharmony of the shape of the teeth, and discolor, we discussed options for correcting these issues. From the library of enhanced smiles performed in my office, an enhanced smile was selected that related the similar changes that would be accomplished by a maxillary and mandibular rehabilitation.

In order to design an appropriate smile that would complement the patient’s facial features and fulfill her aesthetic requests for the “ultimate” smile, I recommended a 3D White Wax-Up (Arrowhead Dental Lab). By doing this, the treatment necessary to enhance her smile would be identified. Once completed, the diagnostic wax-up would illustrate what the final case would look like aesthetically and functionally (Figure 3). Included with the 3D White Wax-Up, the laboratory team fabricates Sil-Tech (Ivoclar Vivadent) vinyl polysiloxane (VPS) putty matrices that provide a template to quickly and efficiently fabricate chairside temporaries. In addition, Clear Reduction Guides with holes on the facial and incisal surfaces for measuring are included with this service to ensure proper tooth reduction. This way, there is no guessing to the amount of
preparation needed for the best outcome.

With the patient’s approval, impressions were taken for a diagnostic 3D White Wax-Up to develop a treatment plan in order to establish proper form and function of the patient’s dentition.

It was determined from the information gathered at the cosmetic evaluation as well as the diagnostic wax-up that restoring the entire upper and lower arch at the same time would enhance aesthetics and function. Based on the present condition of the patient’s dentition, it would be best if the teeth were cleaned of any defective restorations, cored if necessary, and crowned. We reviewed all the risks, benefits, and alternatives to treatment with the patient. Once fully informed of the various treatment options, she decided to go forward with the proposed treatment.

The final treatment plan would consist of IPS e.max CAD (Ivoclar Vivadent) crown restorations from teeth Nos. 3 to 14 and teeth Nos. 19 to 30, with core restorations needed in teeth Nos. 3, 14, 19, and 30.

Materials
Combining modern processing technology with a high-performance material, the lithium disilicate glass-ceramic of the IPS e.max CAD was manufactured. The glass-ceramic was processed for the laboratory in a crystalline intermediate phase. In this “soft” state, the material exhibits its unusual “bluish” color and strength of approximately 160 MPa. While in this “blue” phase, the restorations can be manually adjusted or cut back in a fast and efficient fashion by the dental laboratory technician. IPS e.max CAD acquires its final strength of 360 MPa and the desired aesthetic characteristics, such as tooth color, translucency, and brightness, during a simple and quick crystallization process. For the dental provider, this means we can offer our patients an aesthetic and strong material that can be easily cemented without technique-sensitive procedures.

Tooth Preparation
Using a coarse grit chamfer diamond bur 856 (Axis|SybronEndo), the maxillary and mandibular teeth were prepared for the lithium disilicate crowns with a 1.0 to 1.5 mm axial reduction and a 1.5 to 2.0 mm incisal/occlusal reduction. Utilizing Expasyl (Kerr), we not only controlled sulcular fluids and bleeding, but we also achieved gingival retraction. After approximately 2 minutes in the sulcus, the Expasyl was rinsed off with copious amounts of water.

Full-arch impressions were taken using Instant Custom C&B Trays (Goodfit) which can be adapted and fitted in a matter of minutes in the mouth. These trays eliminate the
need for models, light-cure materials, monomers, and extra laboratory time in custom impression tray fabrication because they are made of a proprietary material (polymethyl methacrylate [PMMA]) that becomes adjustable when heated (Figure 4) and maintains its shape when cooled. Once molded and customized for the patient’s maxilla and mandible, full-arch impressions were taken using a VPS impression material (Take 1 Advanced [Kerr]) (Figures 5 and 6).

After the impressions were completed, a bite-relations jig fabricated on the 3D White Wax-Up models was tried in the mouth (Figure 7). Light-body impression material (Take 1 Advanced) was placed into the relations jig and seated into the patient’s mouth on to the prepared teeth. The patient was asked to bite into the relations jig until she reached the vertical stops and the material set. Instructions for the size, shape, and color of the final restorations was forwarded to the dental laboratory team at Arrowhead Dental Lab; this included sending the 3D White Wax-Up models back for use as a reference during case fabrication.

**Provisionalization**
Using the Sil-Tech impression of the 3D White Wax up, a temporary restoration was fabricated in the mouth (Figure 8). This would aid the clinician and the patient in determining the best size, shape, color, and position. The provisional material that was used in creating this temporary was Structur 3 (VOCO America); this material is comprised of a nanofilled composite material. Since there was very little excess material because of the form-fitting VPS template, little reduction or shaping was necessary to get the temporary to adequate form and shape. The temporaries were cemented using TempBond Clear (Kerr), and then the patient was instructed about the care and use of the temporaries when eating, speaking, and biting.

**Cementation**
The patient returned 3 weeks after the preparation appointment for the removal of her provisionals and placement of her definitive restorations.

After the patient was appropriately anesthetized, the provisional restorations were removed with an automatic tapping motion using the Pneumatic Crown Remover (Dent Corp). Any remaining temporary cement was removed and the teeth further cleaned with chlorhexidine 2% (Consepsis [Ultradent Products]) for 15 seconds to remove any
contamination during the temporary phase. In order to avoid any sensitivity, the preparations were desensitized with GLUMA (Heraeus Kulzer). Before cementation, the lithium disilicate restorations (Figure 9) were tried in to confirm marginal fit. Once in, the patient was shown her restorations for approval and final cementation. Since she was satisfied with the restorations, they were seated using a resin modified glass ionomer (Nexus RMGI [Kerr]) (Figure 10). During placement, it was important to start from the midline and work out distally to prevent any canting of the restorations (Figure 11). The chemical makeup of Nexus RMGI cement provides users with the convenience of a tack-cure option by incorporating a camphorquinone-based photo-initiator system. Using a curing light for 2 to 3 seconds, the cement reaches a gel state immediately, which helps speed up the cleanup process. By combining a gel state with the option to tack-cure on demand, Nexus RMGI cement allows dental providers an effective yet efficient approach to cementation of multiple restorations. According to the manufacturer, the unique self-adhering paste/paste system delivers outstanding bond strength to tooth structures and common substrates while offering a low film thickness and increased radiopacity (217% AL), so it may be clearly identified on a radiograph.

Excess cement was easily removed from the margins (Kerr describes this cement characteristic as “one-peel cleanup”) in a matter of minutes for the entire restored dentition. No finishing of the cement was necessary along the margins, and the overall health of the soft tissue and restorations was very good (Figure 12). The occlusion was checked and verified to ensure all the proper excursions.

The patient was very pleased with her new enhanced smile (Figure 13) and commented on how effectively and efficiently our staff worked together in delivering her treatment.

**CLOSING COMMENTS**

It is essential to have some type of protocol or systemized approach utilizing materials of choice when offering cosmetic dentistry and/or full-mouth reconstruction. By doing the treatment planning and clinical treatment in this way, the dental practitioner will have the opportunity to provide multiple restorations in a shorter amount of time without compromising the quality or precision of the overall case.

**ACKNOWLEDGEMENT**

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1. Full-mouth reconstruction can be frustrating for the provider if you do not have a systemized approach to preparation, impression taking and cementation.
   a. True   b. False

2. The diagnostic wax-up illustrates what the final case would look like aesthetically and functionally.
   a. True   b. False

3. Lithium disilicate glass-ceramic is processed for the laboratory in a crystalline intermediate phase.
   a. True   b. False

4. IPS e.max CAD strength is reported to be about 250 MPa.
   a. True   b. False

5. Any remaining temporary cement was removed and the teeth further cleaned with chlorhexidine 4% for 60 seconds to remove any contamination during the temporary phase.
   a. True   b. False

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ANSWER FORM: VOLUME 33 NO. 3 PAGE 100

Please check the correct box for each question below.

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2. ☐ a. True  ☐ b. False
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