One of the most challenging aspects of cosmetic dentistry is the ability to visualize the final result before the treatment is initiated. Often, teeth are prepared for cosmetic treatment without a clear understanding of how an occlusal scheme will be corrected or a smile enhanced. Communication between the laboratory ceramist and the cosmetic dentist has always been the key to obtaining a superior result in both aesthetic and functional aspects of restorative dentistry. One essential yet overlooked part of this communication is the role of the diagnostic wax-up.

The diagnostic wax-up, when used properly, can provide valuable information to the dentist, ceramist and patient in a three-dimensional manner. It might help dentists determine the amount of reduction necessary to achieve the final result, keeping preparations as conservative as possible.

Another important role of the diagnostic wax-up is in the fabrication of provisional restorations. An impression of the wax-up is taken with putty (Siltec, Ivoclar Vivadent) by the dental lab. A bis-acrylic material is then placed in the putty and on the prepared teeth by the dentist or assistant. In the mouth, the provisionals can be contoured and customized to the patient’s facial features. Occlusion and phonetics can also be evaluated, and when these – along with aesthetics – are deemed satisfactory, an alginate impression can be made to communicate the proper size, shape, length and form.

**Case Presentation**

A woman in her early 40s presented to the practice dissatisfied with the appearance of her smile (Fig. 1). She commented...
that she felt that her existing teeth and restorations were unattractive because of size, shape, wear and color (Fig. 2). She also mentioned that she could feel some chips in her restorations as well as broken portions of tooth structure causing occasional discomfort and a misaligned bite.

In order to illustrate the problems with her wear and bite, we simply took a picture of the patient smiling as well as a retracted image of her teeth. 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 our office, an enhanced smile was selected that related the similar changes that would be accomplished by a full-mouth makeover.

When reviewing this photo of an enhanced smile, the patient asked if we could in fact deliver this type of smile makeover for her. In response, I replied “absolutely,” but that we would like to render a 3D White Wax-up model (Arrowhead Dental Lab) to confirm the treatment necessary to enhance her smile due to the wear in her dentition. The diagnostic White Wax-Up would correspond with the cosmetic evaluation and show what the final case would look like aesthetically and functionally.

White Wax-Ups also include a Temporary Matrix that allows you to create beautiful chairside temps in 15 minutes, as well as a Clear Reduction Guide that makes it easy to ensure proper reduction. The clear reduction guide takes the guess work out of prepping a case and allows the dental provider the ability to work quickly and confidently knowing exactly how much to reduce each prep in order to get the optimal result.

Planning

To develop a treatment plan and determine if the vertical dimension could be increased, impressions were taken for a diagnostic White Wax-Up. Based on information gathered from the initial consult, it was determined that all the remaining teeth should be cleaned of any caries or defective restorations, cored if necessary and crowned. All risks, benefits and alternatives to various treatments were clearly reviewed with the patient.

As a result of the information gathered from the cosmetic evaluation, the diagnostic wax-up and the patient’s desires for treatment, it was determined that restoring the entire upper and lower dentition would enhance aesthetics and function (Fig. 3). The final treatment plan would consist of IPS e.max CAD (Ivoclar Vivadent) crown restorations from teeth #3-14 and teeth #19-30, with core restorations where needed.

IPS e.max CAD unites modern processing technology with a high-performance material. The lithium-disilicate glass ceramic is manufactured in an innovative technological process. The glass ceramic is processed for the laboratory in a crystalline intermediate phase. In this “soft” state, the material exhibits its unusual “bluish” color and strength of approximately 160MPa. In this “blue” phase, the restorations can be manually adjusted or cut-back in a fast and efficient fashion. IPS e.max CAD acquires its final strength of 360MPa and the desired aesthetic...
characteristics, such as tooth color, translucency and brightness, during a simple and quick crystallization process. Most importantly it combines great aesthetics with super strength!

**Preparation**

Using a coarse grit chamfer diamond bur 856 (Axis), the maxillary teeth were prepared for IPS e.max CAD crowns. Utilizing Expasyl (Kerr) we not only controlled hemorrhaging, but also achieved gingival retraction. After approximately two minutes in the sulcus, the Expasyl was rinsed off with copious amounts of water. Utilizing a full-arch tray (Pentron) and fast-set impression material (Take One Advance, Kerr) an impression was taken for the final restorations. The same materials and steps were utilized for the mandibular arch.

**Provisionalization**

A provisional restoration, which would aid in determining the best size, shape, color and position was made from a Siltec (Ivoclar Vivadent) impression of the diagnostic wax-up. Using Structur 3 (VOCO America) temporary material, the Siltec mold was quickly filled and placed on the patient's prepared dentition (Fig. 4). Within minutes, the temporary was fabricated and effortlessly trimmed with trimming burs and discs (Axis).

Provisional restorations need to be strong and stable especially when treating a patient with a past history of occlusal wear for a full-mouth reconstruction. It is the provisional’s task to protect the prepared teeth and to ensure that masticatory functions are not impaired. In addition, the material needs to withstand masticatory loads throughout the entire wear time. This also applies to delicate structures of the restoration, such as crown margins which thin toward the edge. I have personally found that Structur 3 meets these demanding requirements for a provisional restoration. Its compressive strength of more than 500MPa and very high fracture strength make Structur 3 the basis for lastingly strong and stable temporaries. Furthermore, the smooth surface of
this material provides little opportunity for particles (coffee, tea, nicotine...) to adhere to it causing discoloration.

The next day, the patient returned for evaluation of aesthetics, phonetics and bite. Already, the patient exhibited excitement and confidence with her provisional restorations; however, she selected a whiter shade (020 Bleach Shade on Ivoclar Vivadent Chromascope) for her final restorations. Information was recorded and the patient was informed to rinse with Oris (Dentsply) chlorhexidine gluconate rinse to keep her gingival tissues healthy.

Cementation

Before try-in of the definitive IPS e.max CAD (Ivoclar Vivadent) restorations (Fig. 5) to verify fit and shade, the provisional restorations were removed sequentially starting from the maxillary anterior region. Any remaining cement was cleaned off the prepared teeth and bleeding from the gingival tissues controlled with Expasyl (Kerr) paste. After the patient was shown the retracted view for acceptance, the cementation process was initiated. The prepared dentition was cleaned with chlorohexidine 2% (Consepsis, Ultradent Products, Inc.) for 15 seconds and rinsed to remove any contamination during the temporary phase. The preparations were then desensitized (Gluma, Heraeus Kulzer), and the final IPS e.max CAD crown restorations were tried in to verify marginal fit, contour, contacts, shade and accuracy. The patient was very satisfied with the look of her new restorations and approved them for final cementation. The crown restorations were seated utilizing a resin modified glass ionomer cement (Nexus RMGI, Kerr) (Fig. 6). Excess cement was easily removed from the margins and accomplished within a short amount of time. No finishing of the cement was necessary along the margins. Any adjustments to the occlusion were achieved using the Zir-Cut Polishing Set (Axis Dental). The overall health and structure of the soft tissue and restorations was very good (Fig. 7). The patient was very pleased with the restorations and her new enhanced smile (Fig. 8).

Conclusion

In today’s economy, it is getting more and more challenging to present the benefits of full-mouth reconstruction to patients in order to restore their dentition to proper form and function. Having additional technology and materials within your practice to accurately display the benefits will help your practice immensely. In addition, having a systemized approach to delivering efficient, effective and predictable full-mouth dentistry can also be very helpful technically.

* Special thanks to the technicians at Arrowhead Dental Lab for these Elite Restorations.

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**Author’s Bio**

**Dr. Ara Nazarian** maintains a private practice in Troy, Michigan, with an emphasis on comprehensive and restorative care. He is a diplomate in the International Congress of Oral Implantologists (ICOI). His articles have been published in many of today’s popular dental publications. Dr. Nazarian is the director of the Reconstructive Dentistry Institute. He has conducted lectures and hands-on workshops on aesthetic materials and dental implants throughout the United States, Europe, New Zealand and Australia. Dr. Nazarian is also the creator of the DemoDent patient education model system. He can be reached at 248-457-0500 or at the website wwwaranazariandds.com.