The Synergistic Approach to Treatment Planning and Product Selection

by Pinhas Adar M.D.T., C.D.T.
Atlanta, GA
www.oral-design.com

Treatment Planning

The advances that have been made in both laboratory techniques and ceramic materials make restorative options for reaching patient expectations an easy task. The key is to understand each option. Clinical mastery depends mainly on the expertise of the dental team, as well as on the restorative materials chosen. Esthetics is not about a particular product but, rather, about using the product with the same degree of success whether the case involves a single crown, multiple crowns, or a combination of veneers and crowns (Figs 1 & 2).[1] To achieve this kind of success all members of the restorative team must work together, using the same set of guidelines and protocols. In an ideal situation the entire dental team—the restorative dentist, the specialist, and the dental technician—should be able to evaluate the patient during the treatment-planning phase. This can be done either in person or by video conferencing. However, if neither of these situations is possible, a very detailed protocol for communication is the next best thing.

In an ideal situation the entire dental team—the restorative dentist, the specialist, and the dental technician—should be able to evaluate the patient during the treatment-planning phase.

The patient in Figure 3 presented with an old porcelain-fused-to-metal (PFM) crown that was opaque and unnatural in appearance. The soft tissue around the margin also was inflamed. In this case, the foundation was inadequate and, no matter who the ceramist was or what type of ceramic was used, the case would fail.

Erupting the tooth by orthodontics, however, allowed the bone to erupt with the soft tissue subsequently following, to create better harmony (Fig 4). After the foundation was enhanced, a single all-ceramic crown was fabricated with a much better degree of success (Fig 5).

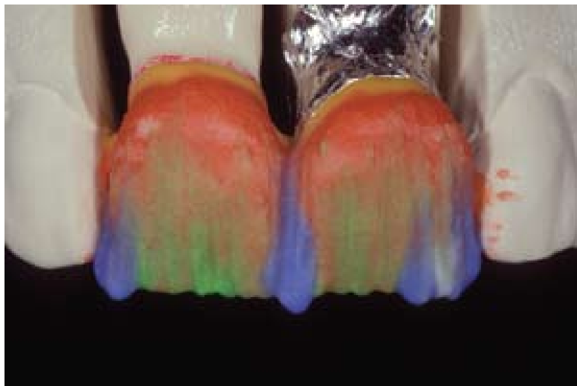

Figure 1: Ceramic buildup of one veneer (#8) and one crown (#9).

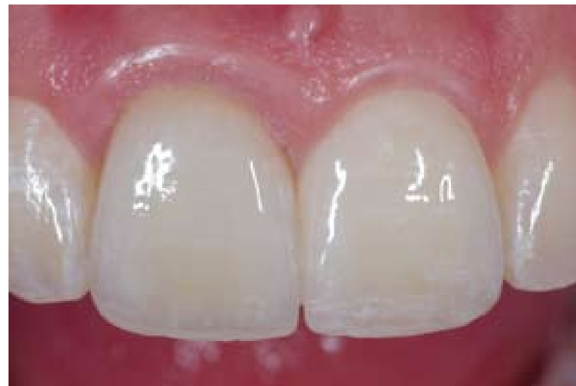

Figure 2: Final of combination case, one veneer (#8) and one crown (#9).

Wax-ups as a communication tool

One of the most essential things for communication is to understand the patient's preconceived ideas and expectations. The patient shown in Figure 6 did not like her smile; she felt that her teeth were too short, that the length and soft tissue lacked symmetry, and that the color was too yellow. In a case such as this, the ceramist should create a wax-up of their vision of what the final outcome of the case should be. This is an extremely important first step to ensure success of the case. The dentist can test the wax-up with an acrylic mock-up or removable trial smile (Fig 7) to ensure that the patient approves of the ceramist's vision of the final outcome. The patient should always be involved and should approved the outcome prior to tooth preparation. Once the wax-up is approved, the dentist can prepare the teeth minimally to ensure the preservation of as much enamel as possible, thereby maximizing the bonding strength of the porcelain veneers (Fig 8).[2,3]

Other important communication tools

Other important communication tools include study models, as well as digital photographs of the patient in the following views: Retracted, smile, smile at rest, profile, full face, shade guide next to the teeth (Fig 9), as well as next to the prepared teeth (Fig 10). It is incredibly important for the technician to know the shade of the prepared teeth so that the correct ceramic system can be chosen. And last—but certainly not least—three excellent impressions are needed. The reason for three impressions is that certain distortions are very smooth and unrecognizable, but it would be very difficult to have the same type of distortion in three impressions. This way, the technician can check the restorations in all three models for accuracy, thereby allowing for the best fit of the restoration and minimal chair time at the seat appointment for the dentist.

Product Selection

Zirconia

Zirconia materials are a practical ceramic option for metal-free restorations. They are ideal for light transmission in certain clinical situations. Studies by the University of Goettingen-Huels and the University of Zurich-Haemmerle have affirmed the strength and longevity of restorations using zirconia frameworks.[4-6] Fixed partial denture frameworks made from zirconia can now span up to 14 units.

However, until now, adhesion to the zirconia copings has been a cause for concern. The Venus porcelain system (Heraeus Kulzer; Armonk, NY) has a special adhesive paste specifically for zirconia. It is called ZR adhesive paste and is applied to the zirconia framework (Fig 11). The pigments in the adhesive allow you to manage the application and burn out without leaving residues. It provides a bond to the zirconia coping and enhances the fluorescent quality of the framework.

To reshape the emergence profile in the substructure of the custom abutment, Venus shoulder porcelain can be used and then trimmed with the NSK Presto Aqua high-speed handpiece and zirconia finishing system (Brasseler; Savannah, GA), making sure to use water to prevent micro cracks in the framework (Fig 12). ZR adhesive and the shoulder porcelain both have fluorescing abilities, as shown in Figure 13.

The fabrication process for an all-ceramic restoration using a zirconia

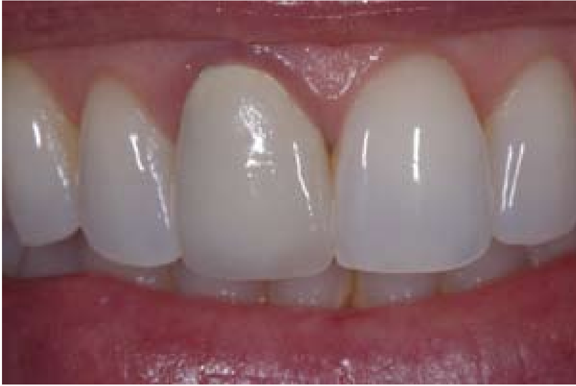

Figure 3: Old PFM crown with inflamed soft tissue.

Figure 4: Orthodontic eruption of central to bring bone and soft tissue down to create a better foundation.

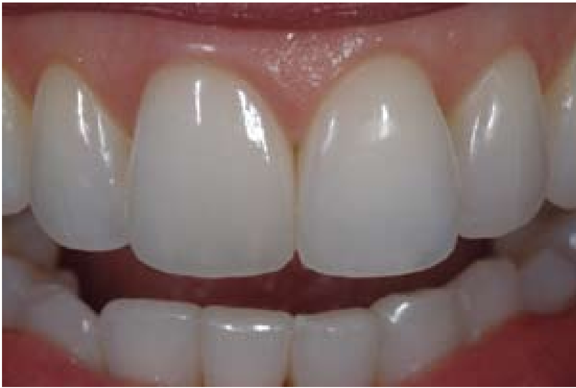

Figure 5: Final crown (#8).

Figure 6: Preoperative view of patient.

Figure 7: Mock-up of wax-up before tooth preparation.

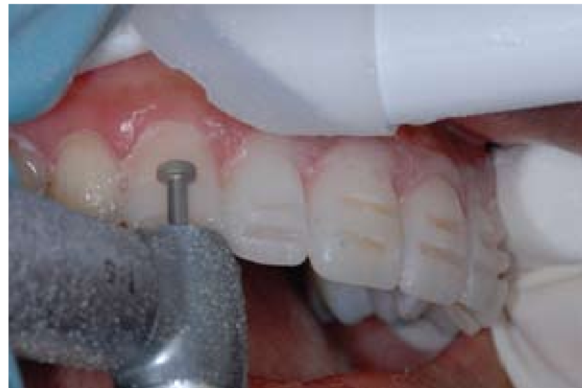

Figure 8: Tooth preparation for veneers with the mock-up in place.

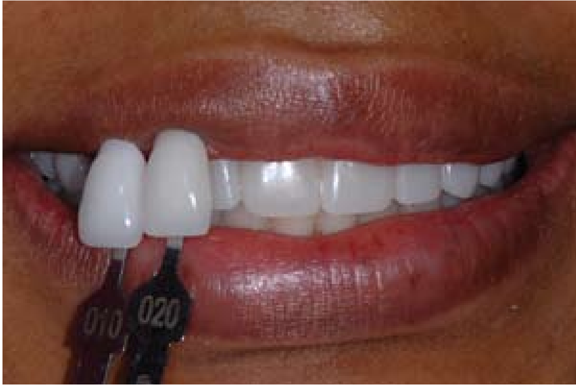

Figure 9: Shade guide next to the teeth.

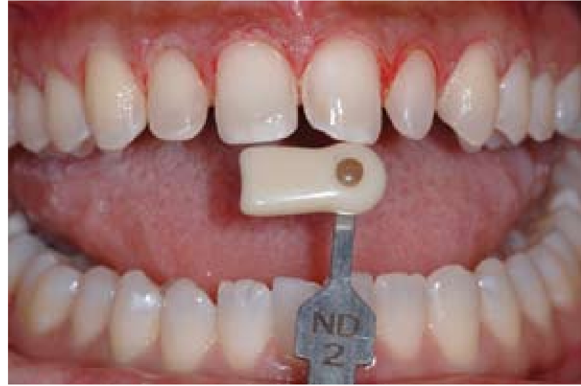

Figure 10: Shade guide tab next to the prepared teeth using the natural die material.

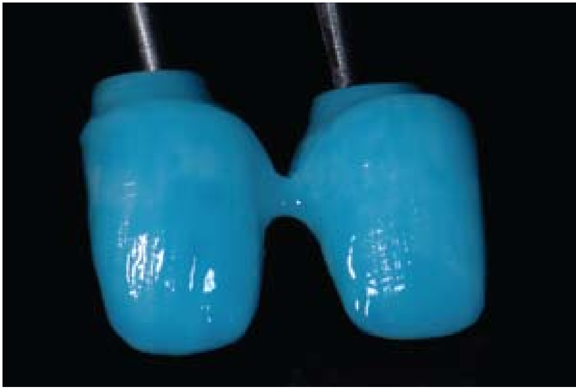

Figure 11: Adhesive paste is applied to the zirconia framework.

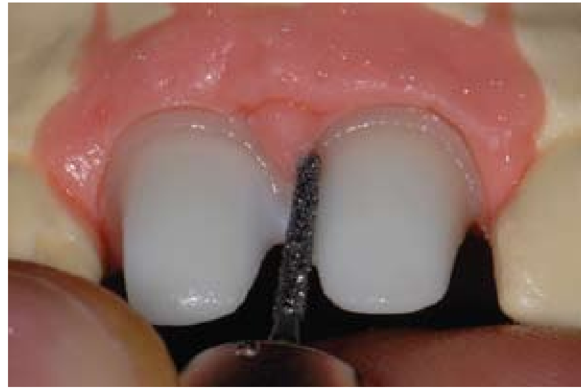

Figure 12: Customizing the substructure shape of the custom abutment.

core is similar to the process used for PFM restorations.

Zirconia options allow for well-integrated margins, as well as the ability to create lifelike restorations with surface characteristics for optimal results. The use of this material also allows the technician to easily create a lifelike layer and brilliant surface characteristics with simple straightforwardness.

Keys to Achieving Clinical Success

There are certain things that are important in achieving clinical success no matter what type of restoration you choose.

- Know your powders. With any ceramic, you must experiment and bake simple tabs or crowns for practice to ensure that you know and like the outcome.
- When fabricating combination cases of veneers and crowns, it is crucial to know the preparation color, and to use the same type of ceramic system for both restorations for a consistent blend in colors between the restorations.
- When fabricating crowns and veneers, it is crucial to build the initial crown coping with the same color as the prepared tooth of the veneer (Fig 1). The initial crown coping must bake separately so that it has shrunk and is the size of the prepared tooth of the veneer. Once the backgrounds are established, simultaneous application of ceramic can then be done on both the crowns and veneers with the same layering technique.
- Make sure that you let the patient be involved and approve each step of the process (Figs 6-10), the diagnostic wax-up, the provisional, and especially the final outcome before permanent cementation.

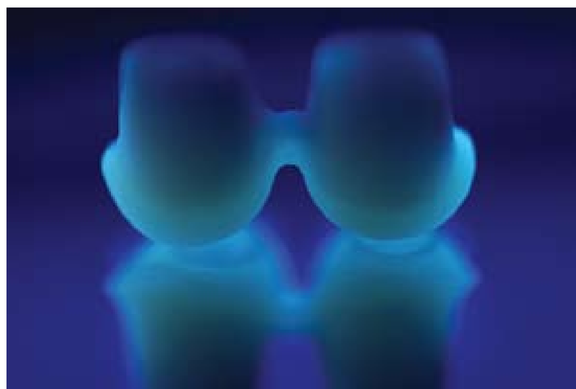

Figure 13: Fluorescing abilities of ZR adhesive and shoulder porcelain.

Summary

There is not one single product on the market today that can solve every restorative case. That is why material selection is so critical to reach success. You must consider the type of foundation that is used to have the optimal end result. As restorative materials continue to progress, technicians will be able to create improved harmony, which will directly increase overall patient satisfaction with the definitive end result. With all of these facts in mind, we also need to remember that "No man is an island." Each specialty needs each other to achieve the ultimate in dentistry. No aspect of dentistry can survive this esthetic "rush" if we think we can do it on our own. We must learn to communicate better and, most of all, to respect the professions of our colleagues.

References

1. Chiche G, Aoshima H. *A Guide for Clinician, Ceramist, and Patient*. Hanover Park, IL: Quintessence Pub.; 2006.
2. Gurel G. *The Science and Art of Porcelain Laminate Veneers*. Hanover Park, IL: Quintessence Pub.; 2004.
3. Magne P, Belser U. *Bonded Porcelain Restorations in the Anterior Dentition: A Biomimetic Approach*. Hanover Park, IL: Quintessence Pub.; 2002.
4. Blatz MB, Chiche G, Holst S, Sadan A. Influence of surface treatment and simulated aging on bond strengths of luting agents to zirconia. *Quintessence Int* 38(9):745-753, 2007.
5. Pjetursson BE, Sailer I, Zwahlen M, Hammerle CHF. A systematic review of the survival and complication rates of all-ceramic and metal-ceramic reconstructions after an observation period of at least 3 years. Part I: Single crowns. *Clin Oral Impl Res* 18(suppl. 3):73-85, 2007.
6. Sailer I, Pjetursson BE, Zwahlen M, Hammerle CHF. A systematic review of the survival and complication rates of all-ceramic and metal-ceramic reconstructions after an observation period of at least 3 years. Part II: Fixed dental prostheses. *Clin Oral Impl Res* 18(suppl. 3):73-85, 2007.

Sources

Adar P. Communication: The ultimate in synergy. 2. *Spectrum Dialogue* 6(5):16-22, 2007.

Adar P. Communication: The ultimate in synergy. *Inside Dent* 1:82-83, 2005.

Adar P. Proper material selection. In Romano R. *The Art of the Smile: Integrating Prosthodontics, Orthodontics, Periodontics, Dental Technology, and Plastic Surgery in Esthetic Dental Treatment*. Hanover Park, IL: Quintessence Pub.; 2005.

Dentistry credits

Figure 2: Dr. Avishai Sadan, Cleveland, OH. Figures 3 through 5: Dr. David Garber, Atlanta, GA. Figures 6 through 10: Dr. Debra King, Atlanta, GA.

❖

Conventional to Contemporary

by November 1, 2008

In keeping with advancements in technology and image quality, the American Board of Cosmetic Dentistry and the Accreditation Committee will be moving to an entirely digital format for Accreditation clinical case submissions beginning in 2009. **Any remaining slide submissions must be submitted by November 1, 2008.** To learn more about Accreditation, visit ***www.aacd.com*** or call ***(800) 543-9220***.