INTRODUCTION
The patient who desires an aesthetically-enhanced smile oftentimes has difficulty expressing his or her idea of perfection to the
dental professional. Patients tend to think in terms of teeth alone. It's not uncommon for patients to divulge a list of celebrities they
would like to resemble or at least have a smile that does so. Sometimes they bring photographic images to help get their point
across. There are also a high percentage of patients who get their "aha" moment when they come into the office and point to a team
member or the clinician herself and say, "I want that smile!"

Although it has been reported that digital enhancement on a computer screen is an excellent method to ensure that the doctor and
patient are on the same page, the computer image does not necessarily represent an achievable reality. Presenting the patient with
a smile mockup on a model may be helpful in determining what can be done from a purely restorative aspect. However, expanding
the patient's knowledge beyond the size and shape of the teeth can have a significant positive effect on the aesthetic outcome of the
case. Following a dental cosmetic pyramid, as designed by the authors, provides a checklist of details that should be discussed with
the patient (Morgan J, Presley S, private practice, Midvale, Utah).

THE COSMETIC DENTAL PYRAMID
The cosmetic pyramid should build more confidence and predictability in the case and ensure that all bases have been covered.
Incidentally, the authors' dental cosmetic pyramid applies to patients with healthy dentition.

Tooth Whitening Via Bleaching
The very foundation of aesthetic dentistry is tooth whitening via tooth bleaching whenever possible. There are other methods of
whitening teeth, such as veneers, crowns, or dentures. However, with the exception of complete dentures, bleaching the teeth first
provides a more stable base shade on which to match the restorative materials to. Also, by bleaching the teeth first, it allows the
patient to do touch-up bleaching after the restorations are placed without the risk of creating a shade mismatch between restorations
and natural tooth structure (Figure 2). With veneer patients, stain can accumulate from the lingual of the tooth and give the composite
resin or porcelain veneer a dingy appearance. These patients can benefit from lingual bleaching in that the bleaching agent
penetrates the tooth from the lingual surface and removes the stain that causes discoloration of the restoration. Some patients may
accumulate stain along the margins of their veneers or along the proximal surfaces if the veneer preps did not break the
interproximal contact. These patients can also benefit from bleaching. The bleaching agents will not penetrate the porcelain or
composite resin but will readily penetrate natural tooth structure. Once the bleaching agent has penetrated natural tooth structure, the
bleaching molecules will go in all different directions. The key is to bleach first, and to match the new restorations to stain free
tooth structure, which then allows the patient to bleach periodically after the restorations are placed.¹,²

**Figure 2.** A patient who bleached after porcelain veneers were placed. Bleaching should have been done prior to choosing the shade for porcelain.

**Addressing Orthodontic Concerns**

The second step in the dental aesthetic pyramid is addressing orthodontic issues or options. Unfortunately, many general dentists do not include this as part of their approach to cosmetic dentistry because they don't know enough about it. Therefore, it is oftentimes glossed over or referenced with such trepidation, the patient is not comfortable with it either and does not see the benefit of pursuing any type of orthodontic treatment. The patient in Figure 3 is a prime example of why basic orthodontic knowledge is imperative in achieving not only optimal aesthetic results, but also an outcome that does not put the teeth in unnecessary peril for potential root canal therapy. Consider the preorthodontic positions of the upper centrals and upper left lateral (Nos. 8 to 10), and how much tooth structure would need to be removed from these teeth in prepping for veneers or crowns. An extensive amount of tooth structure would need to be removed from the incisals of Nos. 8 and 9, as well as the mesial-facial of tooth No. 10. There is also the gingival contour of Nos. 8 and 9 that will need to be addressed, which no doubt would involve exposing root structure in order to provide an aesthetic result. The integrity of the bond to root structure brings its own set of potential pitfalls.³ After a short 6 months of orthodontic treatment which was a combination of straight wire and removable appliances (DENTSPLY Raintree Essix), the deep bite and the unaesthetic gingival contour were remedied without compromising the long-term health of the teeth (Figure 4). Being able to provide orthodontic treatment for your patients can allow you to round out the arches, provide better lip and cheek support, align upper and lower midlines, provide space for a missing tooth/teeth, resolve a deep bite, correct the occlusion, etc. The patient in Figure 5 presented with Class II malocclusion, mild crowding in the upper arch, moderate crowding in the lower arch, constricted upper and lower arches, and midline discrepancy. Her initial request was to have porcelain veneers placed, but after discussing her options by following the dental cosmetic pyramid, she chose comprehensive straight wire orthodontic treatment to be included in her treatment plan. She bleached her teeth while going through orthodontic treatment, knowing that the crown on the upper left central (tooth No. 9) would need to be replaced to match her whitened smile. Bleaching can be done in the presence of orthodontic brackets by using an adaptable prefilled tray (Tres White Ortho [Ultradent Products]) or in-office bleaching (Figure 6).⁶,⁷ Notice the rounded arches which provide improved lip and cheek support, decrease or eliminate the dark buccal corridors, and provide a more prominent and youthful smile. The upper and lower midlines were also aligned to each other and to the patient's face, providing symmetry (Figure 7). Not every patient will want to employ comprehensive orthodontic treatment, but it's amazing how even short-term or limited orthodontics can improve a case. Considering there are many patients who can be treated with aesthetic removable aligners (Essix [DENTSPLY Raintree Essix]), there is one less roadblock in convincing the patient that minor tooth movement is in their best interest.

**Figure 3.** A 15-year-old with a deep bite and irregular gingival contour.

**Figure 4.** Same patient as Figure 3, after 6 months of limited orthodontic treatment.

**Figure 5.** A 38-year-old patient desiring aesthetic enhancement. *Note how the teeth are tipped lingually, compromising cheek and lip support.*

**Figure 6.** Patient bleaching around orthodontic brackets.
Addressing Periodontal Concerns

Periodontal issues follow the orthodontic tier in the dental aesthetic pyramid. This is one of the aspects of aesthetic dentistry about which most patients are clueless. They have no idea how important the gingival contour is in achieving their aesthetic smile goals. Something as simple as gingival recontouring, via gingivectomy, to the more complex crown lengthening, or gingival grafting, can have a huge impact on the success of the case. Before relying on pink-colored restorative materials to camouflage a gingival defect, the patient should at least be informed of other options if they are available.

And Finally, Taking Care of Restorative Needs

After reviewing the bleaching, orthodontic, and periodontal needs of the patient, the restorative needs are addressed. It's the final piece to the dental aesthetic puzzle. Whether the decision is to go with porcelain or composite resin, this phase of the case is much easier and more predictable having followed the pyramid.

CASE REPORT

Diagnosis and Treatment Planning

A 25-year-old female patient presented for smile enhancement. As Miss Utah USA, she had a busy schedule as a motivational speaker, as well as preparing for the Miss USA pageant. Upon examination, there were no major distractions in the appearance of her teeth (Figure 8). However, there was room for improvement of the upper arch.

When the treatment options of bleaching, limited orthodontics, gingival recontouring, and composite resin veneers were presented to the patient, she agreed with everything except the gingival recontouring.

Treatment Protocol

The patient's teeth were whitened using an in-office power bleach (Boost 40% hydrogen peroxide [Ultradent Products]). There are other reputable bleaching systems available that do not require heat or light for activation (eg, Nupro White Gold 36% hydrogen peroxide [DENTSPLY Caulk]). It is imperative to wait at least 7 days between bleaching and bonding to ensure the bond strengths are not compromised from the bleaching.11 The patient returned to our office 5 days later to begin the orthodontic phase of her treatment. The minor tooth movement that was planned for this patient would take approximately 2 days to complete, meaning the bonding would take place 7 days after bleaching had been finished.

To create the small spaces that were needed to add width to the patient's centrals and laterals, white orthodontic separators (DENTSPLY Raintree Essix) were placed between the right central and lateral and the left central and lateral (Figure 9). Two days later, patient returned for the bonding procedure.

The orthodontic separator is fairly aggressive in moving teeth. The space it creates is very temporary unless some form of retention is integrated quickly after its removal. To prevent loss of space, the composite resin shade selection was made prior to removal of the orthodontic separators. There are several excellent microhybrid/nanohybrid composite resin systems available (eg, EsthetX [DENTSPLY Caulk], Vit-l-escence [Ultradent Products], Filtek Supreme Ultra [3M ESPE], Empress Direct [Ivoclar Vivadent], ENA HRi [Micerium], etc). The composite resin (Vit-l-escence) and shade (Opaque Snow) were chosen for this case. Since the patient had had
such success with bleaching, Opaque Snow was the only shade needed to complete the case.

Using an explorer, the right separator was removed (Figure 10). Not only did it give the space needed to add width to the central and lateral, it also blunted the papilla, creating a clear visual pathway between the teeth (Figure 11). This blunting effect allowed easier development of the proper emergence profile.

After removal of the separator, Teflon tape was quickly wrapped around Nos. 6 and 8 to isolate them from the bonding procedure. The right lateral was etched for 15 seconds with 35% phosphoric acid, then thoroughly rinsed and lightly dried (Figure 12). Bonding agent was brushed on to the etched tooth, air-thinned, and then light-cured for 10 seconds (Figure 13). The clinician’s gloved fingers had been cleaned with alcohol to avoid any contamination of the composite resin, which allowed placement of the gloved index finger on the lingual of tooth No. 7. Shade Opaque Snow was added to the periphery of tooth No. 7 first, and then feathered and blended onto the facial surface until the transition between natural tooth and composite resin was undetectable (Figure 14). Once the composite resin was light-cured, the Teflon tape was removed and the veneer was adjusted.

EP polishing discs (Brasseler USA) were used to adjust the incisal edge, followed by the 48L finishing bur (Brasseler USA) to adjust contour and anatomy (Figures 15 and 16). A serrated strip was used to remove any tags of res in interproximally, followed by an ultrafine diamond polishing strip (VisionFlex [Brasseler USA]). The objective at this point was to open a tiny space between Nos. 7 and 8 that would allow addition of composite to the distal of a No. 8. A high shine was placed on the proximal walls of tooth No. 7, using Epitex polishing strips (GC America). The remaining finishing and polishing was done after all the veneers were placed.
Follow the Cosmetic Pyramid for Optimal Aesthetic Results

Nos. 7 and 8. Tooth No. 8 was etched for 15 seconds, making sure that the acid gel was also in contact with the distal proximal wall. The tooth was then thoroughly rinsed and lightly dried. All the water was removed from the matrix strip prior to applying bonding agent.

The bonding agent was brushed onto the etched tooth to include the distal proximal wall of tooth No. 8. The bonding agent was air-thinned and light-cured for 10 seconds. The celluloid matrix strip was replaced with a clean one. A drop of wetting resin was placed on the facial extension of the polishing strip facing tooth No. 8 (Figure 17). A roll of Opaque Snow was placed against the strip the entire vertical height of the central incisor (Figure 18). The strip was then pressed against the facial of tooth No. 8 with one hand while the other hand was used to slowly pull the strip through the contact toward the lingual (Figure 19). The dry strip will drag the resin into the small space interproximally, and when the unfilled resin comes in contact with the Opaque Snow resin, a release occurs. This therefore allows resin to be pulled into the contact, and fill the hairline space. After shaping, the resin was cured, trimmed, and finished as discussed earlier. Figure 20 shows the right side finished except for final polishing. The left side was then restored using the same technique, and the midline dark triangle was eliminated using the pull-through method just described.

Figure 17. Celluloid strip in place between teeth Nos. 7 and 8 with wetting resin being placed.

Figure 18. Composite resin being placed along the celluloid strip.

Figure 19. Celluloid strip being manipulated to pull composite interproximally.

Figure 20. The composite resin veneers placed on the right side. The orthodontic separator is still in place on the left.

Figure 21. Direct bond composite resin veneers in place (teeth Nos. 7 to 10) before gingival recontouring.

Figure 22. Immediately after gingival recontouring (Ellman DentoSurge 90 FFP [Ellman International]).

Final polishing generally consists of 3 steps: the use of the 48L bur, the 48LF bur, followed by a Jiffy Brush (Ultradent Products). This provides a high shine with surface texture. On teeth with a glasslike finish and no texture, additional steps include using the medium and fine grit Jiffy Polishers (Ultradent Products) following the 48L bur and the high shine provided by the Jiffy Brush as the final step (Figure 21).

At the follow-up visit when final touch-ups were performed on the veneers, the patient said that she was reconsidering having the gingival recontouring performed. It was decided that this procedure could be performed following the veneering without any detrimental results. The gingival recontouring was performed on the upper arch from the right second premolar to the left second premolar. The Ellman DentoSurge 90 FFP (Ellman International) was used on the cut/coagulate mode as a reliable and easy means of tissue removal. The technique was performed under short-acting anesthetic. Before the patient was dismissed, the gingival margins were cleaned of debris using an antimicrobial agent (Consepsis) (Figure 22).

CLOSING COMMENTS

The dental cosmetic pyramid is a reliable method to ensure that patients are well informed regarding their options, and provides the doctor an easy way to go through the details that will lead to an optimal aesthetic result.
The patient in this case originally declined the gingival recontouring, but because she was informed about the aesthetic benefits, she was able to think it over and she changed her mind. It should be said that if porcelain veneers had been placed instead of direct bond composite resin veneers, there could have been deleterious effects performing the gingivectomy after placing the veneers (eg, exposed margins). User-friendly and forgiving composite resin allows the addition of composite if there would have been exposed margins or other aesthetic challenges. In this patient's case, no additional bonding or adjustment to the veneers was necessary (Figures 23 and 24).

References

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Disclosure: Drs. Morgan and Presley consult for several dental manufacturing companies, including Ultradent Products.