A Perio-Restorative Solution to an Aesthetic Dilemma

by Jordan Soll, DDS

Abraham Maslow once said, " if your only solution is a hammer, then you tend to look at every problem as a nail." This quote can be applied to any discipline. If you look at a problem with a limited number of options in your "tool box", then the solutions you develop will have a limited number of viable outcomes. However, as new procedures and information become available on a routine basis, what were once rarely used techniques now become the stepping stones for more advanced treatments. Clinical success in aesthetic dentistry depends on a practitioner's ability to: a) carry a sufficient number of tools or options in his or her toolbox to approach the dilemma, and b) utilize these tools in combination to achieve the desired result.

Understanding the range of tools available to you is quite different from acquiring all the clinical skills you wish use to achieve a solution. I am not suggesting that you should become a specialist in every discipline. In fact, if you are set on performing all the required elements to bring the case to completion, then you may be disappointed with the outcome. Remember the old saying, "Jack of all trades, master of none." To achieve success, the cosmetic dentist should stick with his/her specialty — providing the final aesthetic restorations. In addition, the cosmetic dentist should take on the role of case coordinator and assemble a team of specialists that jointly can contribute to a successful case resolution. By bringing a range of skills and expertise together on one team you increase the potential for success. Just as a conductor leads a group of musicians to give a song new life, the cosmetic dentist can lead a team of dental professionals to give a patient a new smile.

The patient was a 36 year-old female whose chief complaint was that she did not like "the small front teeth, the excessive amount of gum tissue that showed and the worn edges." A medical history revealed that there were no contraindications to extensive dental treatment. To ensure that a proper treatment plan could be presented, we conducted a complete examination using the Strategic Esthetic Planning Guide9.[1] This guide is used to ensure that all pertinent information is gathered so that we can "identify the goals of the aesthetically conscious patient."[2]

This case presented a puzzle: how could we create a smile that appears to have a greater presence within the smile zone yet stay in balance to the rest of the face? In considering the aesthetic dilemma of this case, we had to draw upon a range of tools to arrive at a treatment plan that would support a



FIGURE 1 Full face pre-operative view.



FIGURE 2 Symmetry Facial Plane Relator in position.

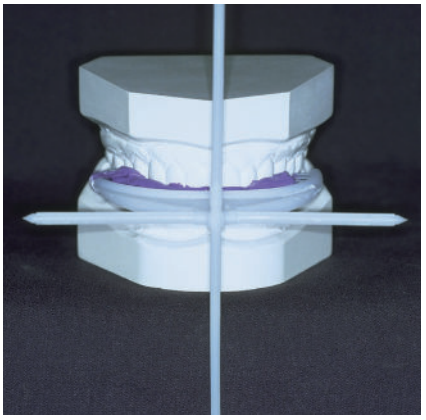


FIGURE 3 Transfer of information from Symmetry Facial Plane Relator to study model.



FIGURE 4 Close-up right view of smile.



FIGURE 5 Close-up centre view of smile.

favorable outcome. Using the discipline of Periodontics could solve many of the restorative dilemmas in this case. Moreover, the discipline of Cosmetic Dentistry helped to address many of the dilemmas that the periodontal solution would create. A combination of the two would solve the puzzle.

The clinical examination began with an overall facial evaluation (Fig. 1). This evaluation is important because it relies heavily on what science bases its principles of beauty.10[3] Research has shown that, as a species, we are attracted to the opposite sex when they exhibit facial characteristics that are evenly distributed on either side of a facial midline. It is this love of balance and symmetry that we find so attractive.10[4] In the examination, we observed that the ⅓ rule and right and left symmetry were within normal limits. The facial outline was square tapering, the facial profile was straight and the nasal labial angle was within normal limits. In addition, the incisal plane and occlusal plane were in harmony with the interpupillary plane.

Ensuring that the interpupillary line is parallel to the horizon is a critical principle in smile design because the interpupillary plane serves as a landmark for other facial and dental landmarks. The most effective way to record this information is by using the Symmetry Facial Plane Relator (Clinical Research, London Ontario).

The Symmetry Facial Plane Relator allows the clinician to record the bite registration, the facial midline, and the horizontal plane at one time and in relation to each other. These points of reference serve to determine if there is symmetry of the gingival tissues at the facial midline and if there is any canting of the maxilla (Fig. 2). Once the record is gathered, it is transferred to the diagnostic model to replicate the clinical realities (Fig. 3). For this patient, an overall review of the facial evaluation revealed no indication for plastic or oral surgery intervention.

The smile evaluation showed the lip type to be average and the lips together at rest. The relationship of the inferior border of the upper lip to the gingival crest of the central incisors was above 3mm, which resulted in the category of a high smile. The arch form was classified as straight.10[5] In full smile, we observed that 10 teeth were displayed and the dental midline was coincident with the facial midline (Figs. 4, 5, & 6).

A dental evaluation examines the proportion of the central incisors to themselves and the patient's facial size. The location of the central incisors is the corner stone of smile design. For a smile to be well balanced and pleasing to the eye, the width/length ratio of the central incisors should be approximately 75 per cent.10

In this case, the width of the central incisor was 8.0 mm and the length was 7.5 mm. As a result, the



FIGURE 6 Close-up left view of smile.

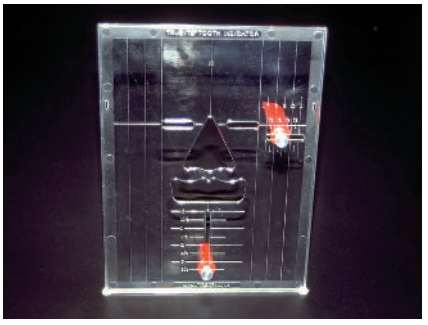


FIGURE 7 Trubyte Tooth Indicator assists in establishing height of ideal centre incisors.

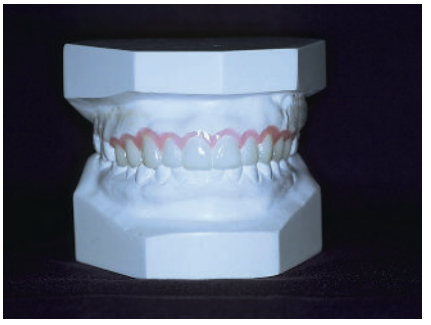


FIGURE 8 Wax-up establishes template for new gingival heights of contour.





FIGURES 9A & B The periodontist establishes ideal gingival contours.



FIGURE 10 A flap is raised to place the bone at the correct biological level.

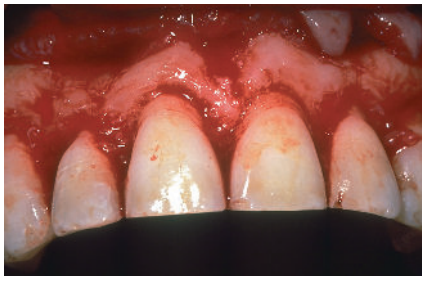


FIGURE 11 Repositioning of the gingival tissue.



FIGURE 12 One-month post-operative healing.



FIGURE 13 12-week evaluation of gingival surgery. Patient is now ready for phase two.

width/length ratio of the central incisors was greater than 100 per cent. This ratio serves to place the central incisors in proportion with the rest of the arch and the face. By using the Trubyte Tooth Indicator (Dentsply Corporation), we were able to determine the ideal width and length of the central incisor that would be in harmony with the patient's face. This concept is based on the 16:1 ratio. It states the length of the central incisor is 1/16 the distance from the pupil of the eye to the inferior border of the chin and the width of the central incisor is 1/16 the distance from the zygomatic arch to the facial midline (Fig. 7).[7]

Once the ideal width and length are derived, then the cosmetic dentist can establish the ideal golden proportion for the new smile.13[8] Keep in mind that the golden proportion is only an ideal and not always attainable. Also, the measurements should be derived from a two-dimensional photograph of the three-dimensional object.13[9]

When the dental evaluation was completed, we began the process of visualizing the objectives to meeting the patient's expectations. These objectives were:

- Establish dominance of the central incisors;
- Create symmetry with the gingival tissues at the dental midline; and,
- Reposition the maxillary arch form so that there is a convex smile line.

At this point in case planning, take the time to visualize where you want the case to proceed. Stephen Covey's second habit, "Begin with the end in mind," from his now famous book The Seven Habits of Highly Effective People supports this concept of visualization. The ability to visualize the end result will greatly assist the cosmetic dentist in determining the successful path to follow.

Use of the diagnostic wax up is one of the most effective modalities you can use to visualize the end result.13[10] In addition, the diagnostic wax-up serves as a template for re-establishment of the gingival contours during periodontal surgery (Fig.8).

Once all the diagnostic records were assembled, our team was assisted by a periodontist to achieve the above stated objectives. After conducting a clinical examination of the patient and reviewing radiographs and the diagnostic wax model, he concluded that with a flap procedure and osseous re-contouring he could re-create ideal proportions of the central incisors and corresponding harmony of the gingival tissues. As the patient displayed 10 teeth in full smile, the gingival tissues would be repositioned from the right 2nd premolar to the left 2nd premolar.

To overcome the aesthetic compromise once the gingival surgery was complete, 10 fortress porcelain veneers were to be placed. The patient was advised of the treatment plan and agreed to proceed.

In keeping with the philosophy "Begin with the end in mind", the periodontist set out to place the gingival tissues in an ideal position that would highlight dominance of the central incisors and balance with the remaining 8 teeth to be treated (Figs. 9a, 9b).

Once the outline was complete, the periodontist set out to ensure that the osseous crest was positioned 3mm from the gingival crest. If the margins of the aesthetic restorations are placed at the height of the gingival crest, then this will yield optimal health of the dento-gingival complex. Raising a continuous flap from #16 to #26 the osseous crest was re-contoured and scalloped to mirror the new height of gingival contour14 [11] (Fig. 10). On completion of the osseous surgery, the tissues were repositioned (Fig. 11). Before the patient left, she was instructed on proper oral hygiene techniques to encourage healing.

The one-month postoperative visit showed signs of excellent healing beginning to take place (Fig. 12). At this stage of treatment, the periodontist's work is complete with active therapy. He requested that at least 12 weeks pass before embarking on the aesthetic restorations. Moreover, if, at the end of this period, there is not a probable sulcus, then the healing time must be extended until a probable sulcus develops.

During the healing phase, the patient attended for periodic examinations. This "down time" was an ideal opportunity to replace the existing amalgam restorations and to whiten the lower arch. The patient had requested both modalities. After the 12-week period there was a sound probable sulcus and the patient was ready to proceed with the last phase of treatment (Fig. 13).

The patient was anaesthetized and teeth #15 to #25 were prepared for porcelain veneers. The preparations were done so that 0.5 mm- 0.75 mm of tooth structure were removed to allow adequate room for the ceramists to place opaquers. This would ensure that the restorations would not appear bulky and guarantee an acceptable emergence profile. By placing the margins at the gingival crest and not into the sulcus, we were able to encourage a healthy periodontium. The contacts were lightly separated with a sandpaper strip so that the impression material would flow easily and capture the full profile of the preparation (Fig. 14). We prefer to place a "000" non-impregnated cord lightly into the sulcus just prior to the impression. The impression was taken with a premium polyvinyl siloxane impression medium and sent to the lab along with a complete prescription form. The prescription form included the desired colour, shape, contour of the veneers; photographs of the post-surgery gingival position; and, the diagnostic wax-up which the patient had approved.

Before the patient was dismissed, we fabricated temporary restorations. As the teeth were aggressively prepared and there were 10 teeth in treatment, temporary coverage was required during the intra-treatment phase. The temporaries were made of a celluloid matrix that was fabricated from the diagnostic wax-up. The celluloid was filled on the buccal surface with Phasetemp (Kerr Corporation, Orange, California) and placed over the prepared teeth that were coated with a separating medium. We found that with the number of teeth involved there was greater clinical success when the temporaries were fabricated in two sections with the



FIGURE 14 Completed veneer preparations prior to impression.



FIGURE 15 Fabrication of 10 temporary veneers in two sections.



FIGURE 16 Temporary veneers in place.



FIGURE 17 Isolation of prepared teeth for bonding procedure.



FIGURE 18 Right views of completed case.



FIGURE 19 Centre views of completed case.



FIGURE 20 Left views of completed case.

division at the midline (Fig. 15). The temporaries were adjusted and then polished and cemented with non-eugenol temporary cement (Fig. 16).

After the veneers were returned from the laboratory, we inspected them for any abnormalities, then placed them on the model to confirm fit and contour. At the insertion appointment, the patient was anaesthetized and the temporary restorations were removed. We cleaned the preparations with a pumice and sodium hypochlorite mixture and rinsed. We tried in the restorations with try-in paste and let the patient see the results for approval.

Once the patient approved the final restorations, we isolated the arch and began the insertion regime (Fig. 17). The teeth were bonded into position using Nexus (Kerr Corporation, Orange, California) and following the "2x2 technique" that is advocated by Hornbrook.15[12] After the bonding process was complete, we inspected the margins for residual resin tags. The occlusion was adjusted in all excursions. Final polishing was achieved with the Top Finishers (Cosmedent, Chicago, Illinois).

The patient attended one-week post insertion for a final evaluation. At this point we can make any adjustments that may not have been obvious on the day of insertion. Inspection of the gingival tissues did not reveal any abnormalities and the patient was free of sensitivity. Final photographs were also taken at this time (Figs. 18, 19, 20, & 21).

In an aesthetic case, the willingness to examine a number of approaches as a means to an end result can be the practitioner's greatest strength. This case illustrates that when two disciplines were brought together, the result achieved was greater than the sum of its parts. By forming an interdisciplinary partnership when approaching an aesthetic case, the clinician will have a greater chance of success and, ultimately, increase patient satisfaction.



FIGURE 21 Full-face picture of completed case.

Dr. Soll conceived and developed the Strategic Esthetic Planning Guide as well as the Achieve Maximum Altitude One-Day Program. He is principal of Aesthetics in Dentistry, a group practice which emphasizes appearance-related dentistry. He also sits on Oral Health's editorial board as Cosmetic Dentistry Consultant.

Oral Health welcomes this original article.

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