CASE STUDY

Eight-Handed Dentistry: An Interdisciplinary Approach to Full-Mouth Rehabilitation

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Now is a great time to be in dentistry. Never before have patients' esthetic demands been met with such consistency; this is due in large part to materials and technique advancements made in the last decade through the collaborative efforts of dental professionals, laboratories, and material manufacturers. In this time of high esthetic expectations, companies that deliver the functional and esthetic products we need enable us to collectively provide restorations that offer strength and durability and, most of all, a lifelike appearance.

As a result, the dental experience is now more rewarding for both the dentist and the patient. Pressed ceramic restorations (IPS Empress®, Ivoclar Vivadent, Inc.), fabricated by the laboratory according to specific instructions communicated by the dentist, can create the smile and functional enhancements patients desire. Simultaneously, for dentists who feel unable to make the plunge into all-ceramic restorations, recently introduced porcelain-fused-to-metal (PFM) alternatives (IPS d.SIGN®, Ivoclar Vivadent, Inc.) offer the security and predictability of a PFM restoration that still meets the high esthetic demands placed upon them by their patients.

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A great deal of restorative success, however, is dependent on a collaborative team approach to the patient's overall dental care. Many general dentists and prosthodontists have been fortunate to align themselves with specialists in their area who have taken the time and specialized training to become more in touch with what materials and techniques can be used to ultimately deliver the desired restorative outcome. Unlike before, dental professionals no longer need to adjust their restorative plans to compensate for deficiencies in soft and hard tissues. Rather, by coming together as a team, clinicians, specialists, and laboratory technicians have minimized those factors that compromise the treatment process and are achieving far more superior results.

The following case presentation details the manner in which a collaborative approach among dental specialists and the laboratory, as well as the selection of the most appropriately indicated restorative materials, can produce a comprehensive and involved full-mouth rehabilitation for a patient with a severely compromised smile.

Case Presentation

A 40-year-old woman presented with one request: a more pleasing smile (Figure 1). She stated that she had undergone orthodontic treatment but had since completely relapsed. She was also unhappy with the gray hue throughout her dentition from light tetracycline staining. After a complete examination, it was determined that ideal treatment would involve orthognathic surgery and orthodontic treatment.

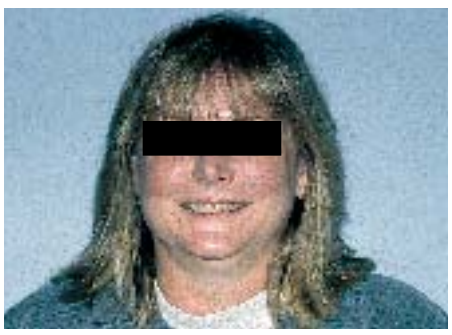

Figure 1—Preoperative full-face view. Notice the short appearance of the teeth.

Figure 2—Smile exhibiting vertical maxillary excess.

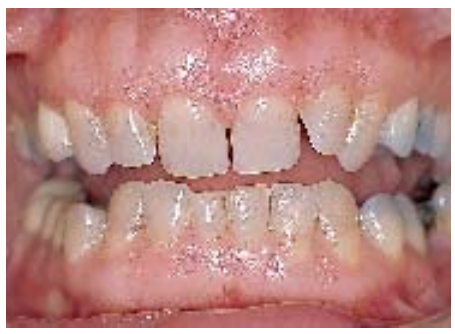

Figure 3—Teeth exhibiting Class II, Division II malocclusion.

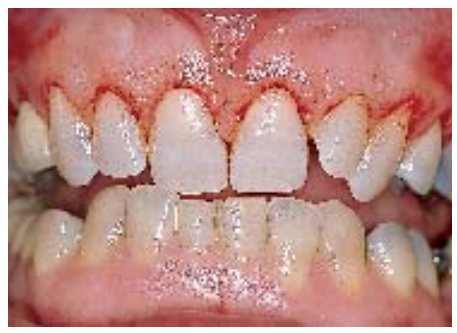

Figure 4—Maxillary crown lengthening and gingivectomy provided ideal tissue height.

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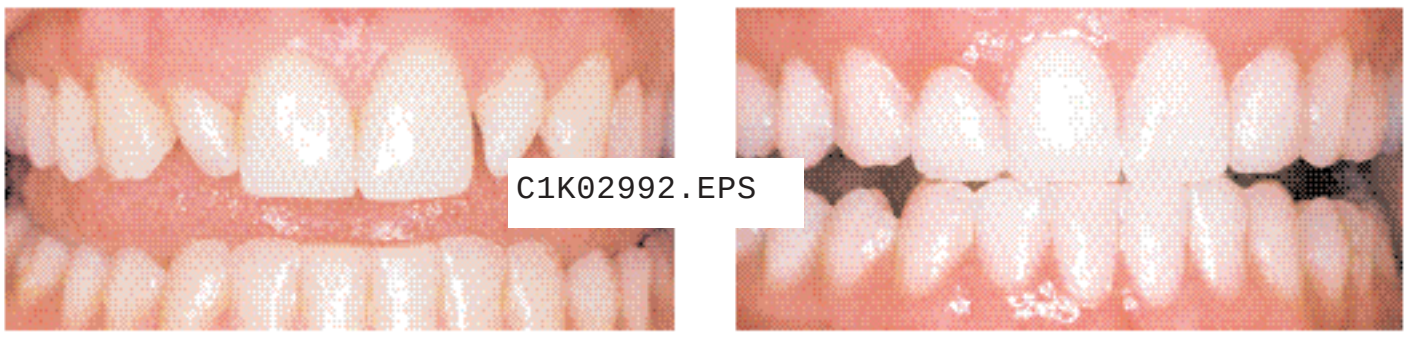

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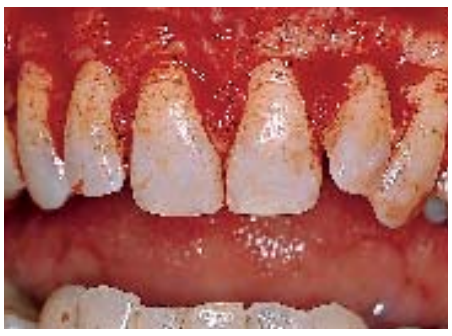
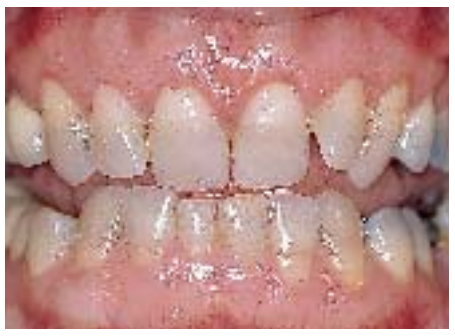


Figure 5—A full-thickness flap was raised to expose osseous structure for recontouring.



Figures 6 and 7—Healing of maxilla at 8 weeks.

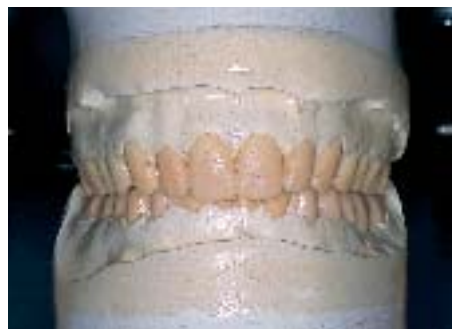


Figure 8—Full contour wax-up mounted on a Stratos® 200 articulator.

Interdisciplinary Perspective

The patient consulted specialists in both areas and found that, while surgery and 1 to 2 years of orthodontic braces would correct occlusal disharmonies, she would still have an unattractive smile. Therefore, it was incumbent upon all dental professionals involved to identify a solution that would provide the esthetics the patient desired and an occlusal pattern that would function successfully, long-term.

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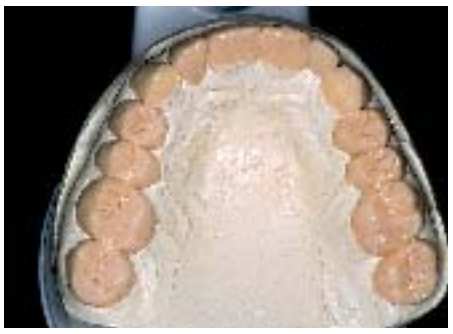
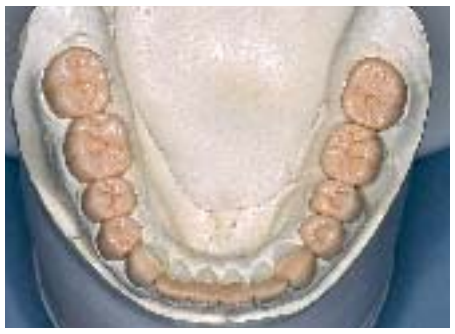
The first concern was the patient's high smile line. Her short clinical crowns left her with the appearance of a "gummy" smile (Figure 2). After periodontal probing of the entire dentition, it was determined that periodontal crown lengthening was required in the maxillary arch (Figure 3). The periodontist first performed a gingivectomy to achieve the correct height-to-length ratios (Figure 4). Once these were verified, the tissue was raised to remove the necessary osseous structure, so the final restorations would not invade the biologic width (Figure 5). The patient healed for approximately 4 to 6 weeks (Figure 6). The final result was a





Figures 9 and 10—Occlusal views of the wax-up show proper arch form and occlusal anatomy for full intercuspation.

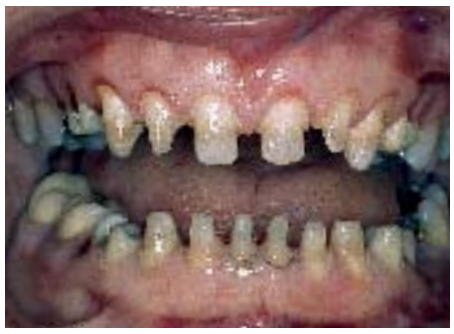


Figure 11—Preparation of the maxillary and mandibular anterior 20 teeth to ideal depths for pressed ceramic restorations.

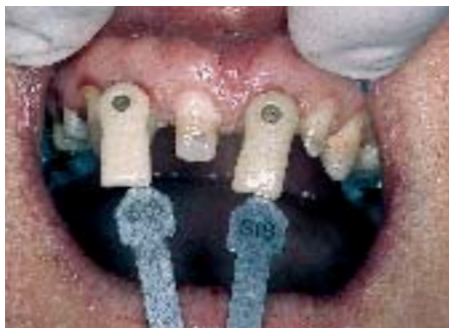


Figure 12—Stump shades taken of underlying dentin to communicate to the laboratory ceramist.

more pleasing architecture on which to begin placing the restorations (Figure 7).

Comprehensive Restorative Technique

A technique commonly used in the western part of the United States to help determine correct facial esthetics is to measure from the cemento-enamel junction (CEJ) of the maxillary central incisors to the CEJ of the mandibular central incisors. As a starting point, the ideal measurement is 17 mm to 18 mm. In this case, the patient's measurement was approximately 15 mm. Taking this measurement into consideration along with the lower third face height, it was determined that opening the vertical dimension in the anterior by 2 mm would provide better esthetics, rather than leaving the patient with a slightly overclosed look. The patient was bimanually manipulated, and a centric relation bite registration was obtained. Models were mounted and evaluated for occlusal discrepancies. During the patient's next visit, an occlusal equilibration was performed, to make centric relation equal with centric occlusion.[1,2]

To accurately acquire the desired measurement of 17 mm, a ball of composite was placed on the mandibular central incisors. The patient was again manipulated and slowly closed onto the composite ball. Once the lower incisors pressed up against the maxillary centrals, the ball and the CEJs measured 17 mm, and the ball was cured to "lock" the desired vertical dimension. After waiting 5 minutes for the condyles to fully seat, bite registrations were taken. The patient

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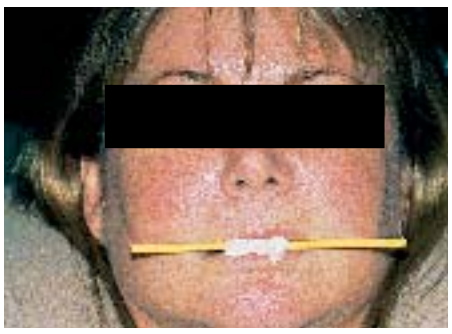

Figure 13—A stick bite was used to transfer the interpupillary line and help facilitate proper mounting of casts.

Figure 14—Final smile, exhibiting natural appearance and contours.

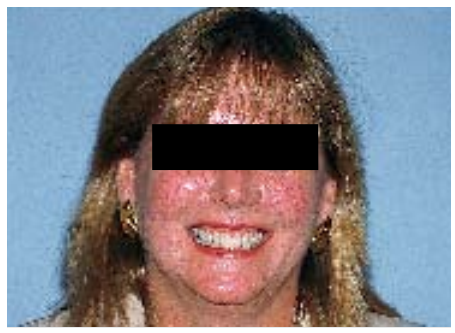

Figure 15—Final full-face view. Note increased lower third of face height.

was returned to an upright position to evaluate lower face height, which was determined to be acceptable.[3] A mock-up using flowable resin on the anterior four maxillary incisors was recorded with a vanilla bite registration material (Discus Dental) to help the ceramist place the incisal edges in space in the wax-up. These registrations were sent with maxillary and mandibular vinyl polysiloxane impressions to the laboratory for fabrication of the diagnostic wax-ups (Figures 8 through 10).

We owe it to ourselves to collaborate and remain associated with dental specialists and laboratories.

To maintain the original vertical dimension as a point of reference, it was decided to prepare the 10 maxillary teeth (Nos. 4 through 13) and 10 mandibular teeth (Nos. 20 through 29) (Figure 11). Upon completion of the preparations, stump shades were taken to determine the underlying dentin shades (Figure 12). Additionally, a face-bow transfer (Stratos® 200, Ivoclar Vivadent, Inc.) and stick bite were also given to the laboratory (Figure 13). Using a silitech putty matrix fabricated from the laboratory wax-ups, the patient was given temporaries for both arches (Luxatemp®, Zenith/DMG Foremost). After occlusal adjustments were made, the patient was sent home to function in the new vertical dimension for 4 to 6 weeks.

Pressed ceramic crown restorations (IPS Empress®) were selected to restore the entire dentition. All units were placed with Excite® adhesive and transparent base Variolink® II (Ivoclar Vivadent). When all 20 units were placed and the occlusion verified, the remaining 8 teeth (Nos. 2, 3, 14, 15, 18, 19, 30, and 31) were prepared and temporized. The patient left the office with a new, completely stabilized vertical dimension of occlusion. Three weeks later, she returned for placement of the 8 remaining units and, for the first time in her life, had the smile she always wanted (Figures 14 and 15).

Conclusion

The esthetic demands of the general public grow stronger each day and, we owe it to our patients to constantly stay abreast of the latest techniques and materials available. In addition, we owe it to ourselves to collaborate and remain associated with dental specialists and laboratories that strive to deliver the best quality and service available for our patients. ◯

References

1. Becker CM, Kaiser DA, Schwalm C: Mandibular centricity: centric relation. *J Prosthet Dent* 83(2):158-160, 2000.
2. Dawson PE: *Evaluation, Diagnosis, and Treatment of Occlusal Problems.* St. Louis: Mosby Books, pp 41-55, 1989.
3. Dahl BL: The face height in adult dentate humans. A discussion of physiological and prosthodontic principles illustrated through a case report. *J Oral Rehabil* 22(8):565-569, 1995.

Product References

Product: IPS Empress®, IPS d.SIGN®, Stratos® 200, Excite®, Variolink® II
Manufacturer: Ivoclar Vivadent, Inc.
Address: 175 Pineview Drive, Amherst, NY 14228
Phone: 800.533.6825
Fax: 716.691.2285

Product: Vanilla bite registration material
Manufacturer: Discus Dental
Address: 8550 Higuera Street, Culver City, CA 90232
Phone: 800.422.9448
Fax: 310.845.1537

Product: Luxatemp®
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