

# Multidisciplinary Treatment of Anterior Misalignment and Diastemas



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In today's society, time is important not only because of financial reasons but also because of business and family obligations. Social stigma also plays a major role in how people seek and decide how to improve their appearance and smile. As dental professionals, we are often confronted with ideal treatment vs realistic treatment scenarios along with patient demands. I believe that we are obligated to inform

patients of all possible treatment modalities and associated advantages and disadvantages. However, the decision should be made by the patients as long as the chosen treatment option does not compromise the patient's health or violate basic restorative principles.

This article will discuss a way to improve a smile with esthetic crown lengthening and porcelain veneers instead of orthodontic treatment because the patient already had orthodontic treatment in the past and did not want to undergo it again. Traditionally, the indications for crown lengthening include caries that approach the periodontal attachment, fractures, endodontic perforations, cervical root resorption, retention of a prosthetic crown, and adequate access for an impression of a subgingival margin and enhancement esthetics in the case of short clinical crowns.<sup>1</sup> A crown lengthening procedure refers to the surgical alteration of the periodontium to facilitate definitive exposure of the dentition. This treatment often involves modification of the investing osseous structures.<sup>2</sup>

## Abstract

The public and the dental profession have been in search of a "simple" solution to esthetic problems. More often than not, an esthetic result cannot be achieved by using only 1 treatment modality such as direct or indirect veneering. As we understand more about the intimate relationship between hard and soft tissue of the periodontium, and how they can ultimately influence a dental treatment outcome, we must incorporate or seek proper referral sources for treatment techniques that will help us achieve a better final result for the patient. The following case presentation illustrates how a multidisciplinary treatment involving crown lengthening and porcelain veneers can complement each other.

## Learning Objectives

*After reading this article, the reader should be able to:*

- discuss ways to improve a patient's smile with esthetic crown lengthening and porcelain veneers.
- describe traditional and esthetic reasons for crown lengthening.
- explain how osseous architecture can influence the appearance of final restorations.

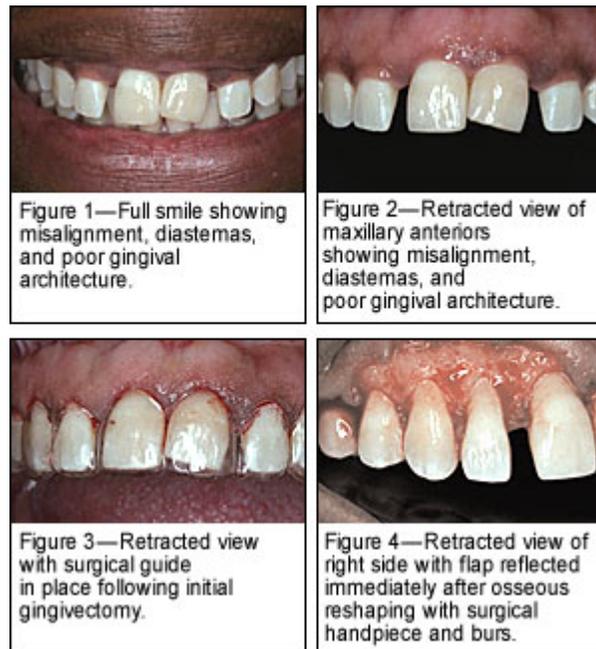
## Case Presentation

The patient is a 36-year-old woman in good health with no allergies. Her primary complaints were the spacing and misalignment of her maxillary incisors (Figures 1 and 2). The patient had orthodontic treatment about 20 years previously, which she did not want to repeat. A comprehensive examination with all necessary radiographs, pocket charting, digital photos, alginate impressions for study, and diagnostic models were obtained.

A treatment plan was developed incorporating periodontal plastic surgery and porcelain veneers. The treatment plan was presented to the patient along with a diagnostic model and surgical guide for the surgery phase. Also in this visit, a careful visual examination of the patient's frontal smile as well as profile was executed to determine how much lip support would be altered with the osseous surgery if reduction in facial bony contour was deemed necessary. In all probability, the thickness of the alveolar bone would need to be altered to achieve pleasant lip support and embrasure form. Once it was accepted, an appointment was made for bone sounding before any

surgery was scheduled. Bone sounding is used to determine the thickness of the soft-tissue layer and proximity of the alveolar bone during the planning stages of various surgical procedures.<sup>3</sup>

After this crucial diagnostic step, dates for review of surgical procedure, consent forms, prescriptions, and actual surgery were scheduled. On the day of the surgery, after reviewing consent forms and making sure that the patient had taken all the medications as instructed and rinsed with chlorhexidine 0.12%, the patient was draped and her head was covered. The surgical guide was inserted and the patient was asked to smile widely again to ascertain the fit and form of the guide before surgery commenced. Local anesthesia was then administered using prilocaine plain 4% (Citanest, AstraZeneca) and bupivacaine 0.5% (Marcaine, AstraZeneca) with 1: 200,000 epinephrine.



Based on values previously obtained from bone sounding, photos, a diagnostic model, and surgical guide, osseous resection was anticipated. After the insertion of the surgical guide, multiple punctures with a periodontal probe were made along the outline of the surgical guide to serve as an incision guide for the soft-tissue portion of the crown lengthening procedure. The bleeding points were then joined cleanly with an internally beveled incision using a Bard-Parker blade #3C (Hu-Friedy) (Figure 3). A full-thickness flap was then reflected using a Bussey elevator.

The osseous contour was visually examined, the distance from the osseous crest to the cemento-enamel junction was measured, and a surgical handpiece was used to remove bone and shape the osseous architecture. This was done according to diagnostic criteria to complement the final restorative treatment as well as ensuring a distance of at least 4 mm between future restorative margins and the osseous crest. This assessment involves the size of the embrasure, the position of the tooth, and the biologic width hypothesis<sup>4,5</sup> (Figures 4 and 5).

To achieve a pleasing gingival architecture for future restorative treatment, the osseous architecture had to be visualized and shaped not only in an apicocoronal dimension, but also in a buccopalatal and mesiodistal dimension. With regard to the apicocoronal dimension, a minimum distance of 3 mm to 4 mm from the restorative margin to the osseous crest is necessary. In the buccopalatal and mesiodistal dimensions, proper osteoplasty will influence not only the overlying gingival tissue but also the emergence profile of the restorations, embrasure space, and shape. In fact, Rosenberg and colleagues recommended re-creating the scalloped appearance at a more apical level during crown lengthening procedures.<sup>2,6</sup>

The flap was then repositioned and secured with 5-0 Ethicon gut sutures (Hu-Friedy) and surgical methyl methacrylate was applied on suture knots (Figures 6 and 7). Saline-soaked gauze was pressed onto the flaps with gentle pressure for 15 minutes to promote coagulation and stabilization of the flap. Afterward, postoperative instructions were again reviewed including rinsing with chlorhexidine 0.12% twice a day and warm saltwater every 2 hours, and using a microbrush for brushing the surgical area instead of a toothbrush, until the patient returned for a postoperative appointment for suture removal in 7 days.

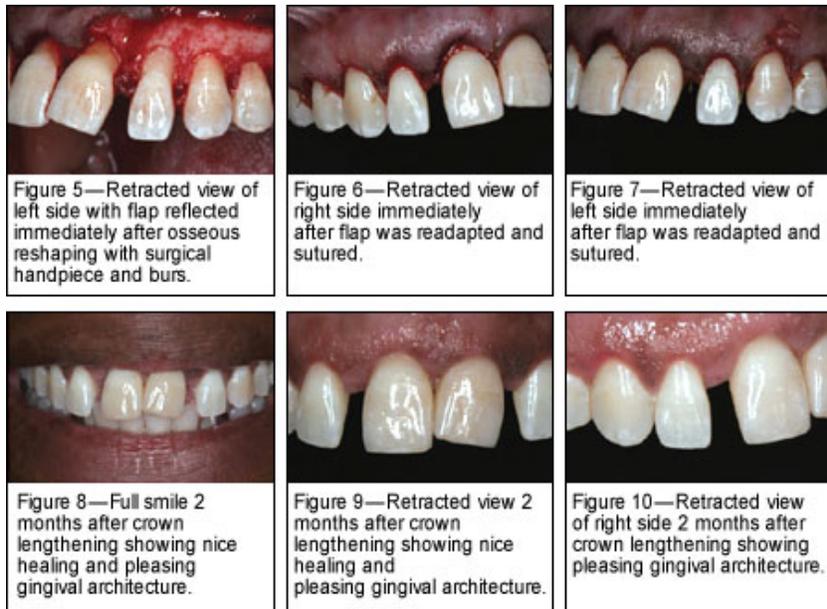


Figure 5—Retracted view of left side with flap reflected immediately after osseous reshaping with surgical handpiece and burs.

Figure 6—Retracted view of right side immediately after flap was readapted and sutured.

Figure 7—Retracted view of left side immediately after flap was readapted and sutured.



Figure 8—Full smile 2 months after crown lengthening showing nice healing and pleasing gingival architecture.



Figure 9—Retracted view 2 months after crown lengthening showing nice healing and pleasing gingival architecture.



Figure 10—Retracted view of right side 2 months after crown lengthening showing pleasing gingival architecture.

After all necessary postoperative visits and a waiting period of 2 months for wound healing, the patient was scheduled for veneer preparation for teeth Nos. 5 to 12 (Figures 8 through 11). During this visit, additional gingivoplasty with a diode laser was performed to properly contour the interdental embrasure area and to allow for an esthetic emergence profile of the provisional restorations (Luxatemp Fluorescence, Zenith/ DMG) at this time and of the final porcelain veneers later (Figure 12). After follow-up visits during the next 30 days, the patient was ready for preparation refinement, final impression with polyvinylsiloxane, face-bow record, bite registration, and another set of provisionals.

Once the patient and I were satisfied with the form and contour of the provisionals (Figures 13 through 15), photos, shade, and impressions of the provisionals and opposing teeth were taken with Status Blue (Zenith/ DMG). The patient was then appointed for the delivery of the final porcelain veneers.



Figure 11—Retracted view of left side 2 months after crown lengthening showing pleasing gingival architecture.

Figure 12—Retracted view of wrap-around veneer preparations with gingival interdental embrasure recontouring performed with a diode soft-tissue laser.

Figure 13—Full-smile view of provisionals showing harmonious form, alignment, and absence of diastemas.



Figure 14—Retracted view of provisionals on right side.



Figure 15—Retracted view of provisionals on left side.



Figure 16—Full-smile view of final porcelain veneers showing harmonious form.



Figure 17—Retracted view of final porcelain veneers showing harmonious dento-gingival architecture.



Figure 18—Retracted view of right side of final porcelain veneers showing harmonious dento-gingival architecture.



Figure 19—Retracted view of left side of final porcelain veneers showing harmonious dento-gingival architecture.

During this visit, after all necessary local anesthesia, rubber-dam isolation, and retraction cord packing, the provisional restorations were removed and the veneers were tried in with Vitique try-in gel (Zenith/ DMG) for the patient's final approval before bonding. The preparations were then cleaned with Tubulicid Red (Global Dental), etched with 37.5% phosphoric acid (Gel Etchant, Kerr Corporation), rinsed, and Optibond Solo Plus (Kerr Corporation) was painted on. The ceramic veneers were then etched with hydrofluoric acid (Ultradent Porcelain Etch, Ultradent) for 2 minutes, rinsed, dried, and silanated (Silane Primer, Kerr Corporation) before Optibond Solo Plus adhesive was brushed on. The ceramic restorations were luted with Vitique resin (Zenith/DMG) and light-cured.

After cleanup, adjustment, and polishing, the marginal areas were re-etched with 37.5% phosphoric acid, and Optibond Solo Plus was reapplied and light-cured for 40 seconds. Retraction cords and the rubber dam were removed, and the occlusion was checked and finalized with the patient seated. The patient was rescheduled for a postdelivery check during which new impressions, centric relation record, and bite registration were taken for a splint that would be delivered at the next visit when final photos would be taken (Figures 16 to 19).

### **Conclusion**

Esthetic dental problems are often multifactorial and may not be satisfactorily resolved by restorative treatment alone. An interdisciplinary approach to these situations offers the greatest potential for an outstanding treatment result.<sup>7</sup> The appearance of the gingival tissues surrounding the teeth plays a crucial role in the esthetics of the anterior maxillary region of the mouth. Abnormalities in symmetry and contour can significantly affect the harmonious appearance of the natural or prosthetic dentition. Today's patients have a greater desire for more esthetic results, which may influence treatment choice.<sup>8</sup>

Because of the ever-increasing growth of esthetic dentistry, patients have become more informed and demanding at the same time. Consequently, the ideal waiting time of 20 weeks after surgery<sup>9,10</sup> for proper maturation and stabilization of marginal tissue is often compromised. While it is crucial to have a clear mutual understanding of perceived desire and expected outcome before any treatment is rendered, dentists on the cutting edge of the esthetic frontier must offer solutions to satisfy their patients' demands. Indeed, dentists today are the plastic surgeons of the smile.<sup>11</sup>