

# Maxillary Anterior Dentition: Case Report on a Multi-Procedure Restoration



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## INTRODUCTION

Creating an ideal tooth replacement in the anterior esthetic zone has been one of the most difficult challenges I have encountered. Although most attention has been given to the hard tissue materials and restorative methods, the primary challenge usually lies within the soft tissue area. If a proper treatment plan is not developed, neither the patient nor the restorative team will be pleased with the result. However, with appropriate treatment planning and careful procedural follow through, the outcome can be more predictable. This article presents a case in which a combination of procedures was utilized in the esthetic anterior area to achieve the desired result.

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## CASE REPORT

A 35-year-old female presented at the restorative dentist's office unhappy with the appearance of the maxillary right lateral incisor (#7). The existing deciduous tooth had become discolored, and radiographs showed that the amount of bone support was inadequate for porcelain coverage. The patient



Figure 1: Full-smile view of the patient at presentation. Note deterioration of the maxillary right lateral incisor (tooth #7).



Figure 2: Close-up view of the deteriorating tooth #7 at presentation. Note the discoloration.

was also displeased with the diastema between teeth #10 and #11. Upon further consultation, porcelain veneers were suggested for teeth #8 and #9 as a way to improve the proportions of the overall smile.<sup>1</sup> With minimally prepared veneers and supragingival margin placement, the long-term health of the teeth can be maintained (Figs 1-3).

#### TREATMENT PLAN

The treatment plan consisted of the following elements:

- Extraction of tooth #7, due to extensive resorption, with immediate implant placement.
- Gingival recontouring on tooth #8 to match height of adjacent #9.
- Porcelain veneers on teeth #8, #9, and #10.
- Minor orthodontics to space the teeth more evenly and improve the alignment of the tissue levels.

#### TECHNIQUE

Upon extraction of tooth #7, a 3.5-mm dental implant (Astra Tech; Waltham, MA) was placed immediately in the extraction site. (A

composite Maryland bridge style temporary restoration had been pre-fabricated in the laboratory prior to the tooth removal.) The temporary was left slightly undercontoured to accommodate the anticipated swelling and molding of the gingival tissue. The temporary restoration was worn for approximately four months while the implant integrated into the arch and the soft tissue

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Following integration, a fixture level impression was taken for a screw-retained temporary crown. Special care was given to the contours of the temporary restoration. The bucco-gingival aspect was left undercontoured, as were the mesial and distal gingival areas. Care was taken to prevent excessive pressure on the tissue at the time of placement. The temporary restoration was placed and allowed to sculpt the tissue for six weeks (Fig 4). During this time, the patient elected to have an in-office bleaching procedure performed.

The preparation design for tooth #10 required careful planning and close communication with the dentist; it was critical that the preparation break through the distal contact point into the lingual. This preparation allowed the closing of the existing open contact while maintaining a proper emergence profile.<sup>2</sup> The veneers were prepared at the same time the impression was taken for the implant crown.

The impression technique used the patient's provisional restoration to create a custom impression coping. The temporary crown was tightened onto a laboratory implant replica and inserted into some impression material (3M ESPE; St. Paul, MN). Once the impression material set, the temporary was removed and the transfer coping was tightened onto the implant replica. The space left around the transfer coping was filled with a pattern resin, using a "salt-and-pepper" technique. This technique captured the tissue contours precisely (Figs 5A-5C).

#### MATERIALS

Once the model was poured with a soft-tissue cast, a decision was made



*Figure 3: Left lateral close-up view of the maxillaries. Note the slant of the left lateral incisor (tooth #10) and the wide diastema between teeth #10 and #11.*



*Figure 4: Seated temporary on the day of recovering.*

to use a cast custom abutment (Astra Tech) with porcelain applied to it, with a pressed ceramic restoration to fit over it (Fig 6). At the time this case was completed in the summer of 2006, there were no other options for abutment type (e.g. zirconia). A decision was made to press veneer units on teeth ##8-10. The implant crown was pressed in a higher opacity ingot (Authentic A1++ Jensen Industries; North Haven, CT), and the veneers in a more translucent ingot A1+. The higher opacity ingot on tooth #7 was used to compensate for the anticipated lower value from the implant abutment.

The layering process was begun with the lateral incisors. The first bake was an internal translucent zone of Enamel 57, Clear, and Opal bluish (Jensen) (Fig 7). After firing, the contours of the lateral incisors were compared to the contours of the central incisors, which were pressed in full contour. The lateral incisors were then overlaid with a mixture of Opal 1 and Super-Clear (Jensen) in a 50/50 mix. Opal 2 and Opal 3 were used on the distal lobes, also in a 50/50 mix (Fig 8).

Upon performing the cutback for the two central maxillary incisors, concerns had to be addressed regarding the amount of incisal reduction available to achieve proper translucency. The suggested amount of incisal reduction typically is 1.5 mm.<sup>2</sup> These preparations had only .8 mm of incisal reduction. Some internal stains of blue, orange, and white colors (Jensen) were added directly onto the pressed coping; the stain was fired at a low temperature to "set" the colors (Fig 9). This stain can sometimes mimic natural translucency. The second bake was an overlay of Opal 1 and Super-Clear, in a 50/50 mix. Opal 2 and Opal blue were also used in a 50/50 mix on the mesial and distal lobes.

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With all four maxillary anterior units layered, the contouring process began. Contacts and form were adjusted, using slow hand-piece 842R 11 018 diamonds (Brasseler; Savannah, GA). Facial anatomy and

texture were created with tapered diamonds 850 11 016 and 849 11 010 (Brasseler). After texturing, Meister Cones (Noritake; Aichi, Japan) were used for the final step—the surface texture. These cones create a smooth surface on the heights of contour without losing texture. Glazing was achieved with Glaze paste (Microstar; Lawrenceville, GA), and the final polishing was done with felt wheels and diamond paste (Vident; Brea, CA). All units were sandblasted with 50 $\mu$  aluminum oxide and acid-etched with 10% hydrofluoric acid for 30 seconds. The custom abutment was treated in the same manner.

#### CRISIS MANAGEMENT

Upon try in at the seating appointment, the appearance of the two central incisors was not quite what I had wanted to achieve—the translucency was lacking in the texture of the central incisors, and the supragingival margins were too noticeable as well. A decision was made to seat the two lateral incisors and refabricate the central incisors, using the feldspathic porcelain technique. The feldspathic technique was selected because I believe that it



Figure 5a: Modified impression coping to capture tissue contours.



Figure 5b: Another view of the coping.



Figure 5c: Impression coping in situ.

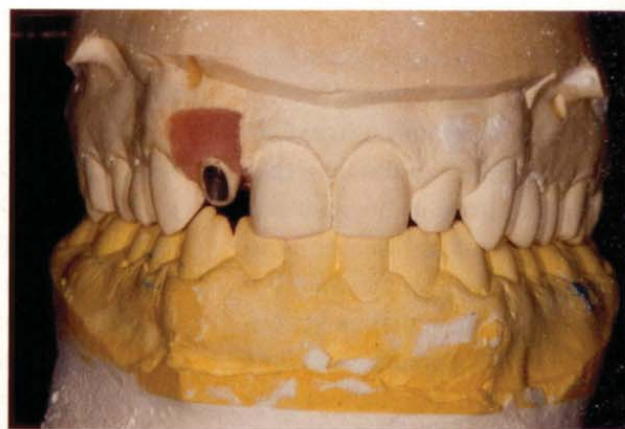


Figure 6: Cast with custom abutment on tooth #7, with porcelain applied to it.



Figure 7: Internal transluents on teeth #7 and #10 on cast.



Figure 8: Translucent overlay on teeth #7 and #10 on cast.



Figure 9: Internal stain set onto teeth #8 and #9 on cast.

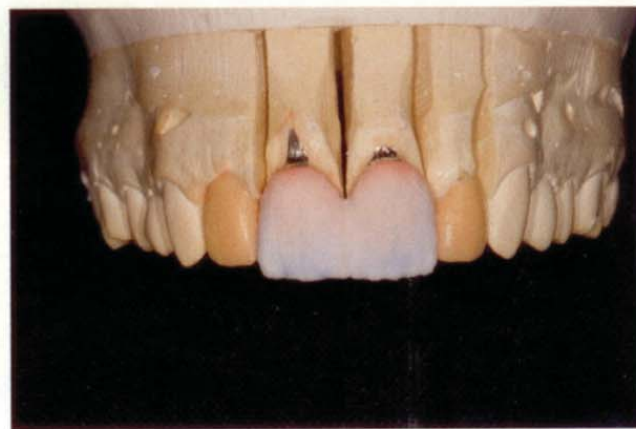


Figure 10: Feldspathic buildup of teeth #8 and #9 on cast.



Figure 11: Translucent overlay on teeth #8 and #9 on cast.



Figure 12: Postoperative right lateral view of teeth #7-9.

provides an improved control over the translucency. Under normal circumstances, a suggestion would have been made to the restorative dentist to repeat the impressions for the veneers on both central incisors, teeth #8 and #9. In this case, we did not want to disturb the tissue any more than necessary. I elected to wax-up the contours of teeth #7 and #10 and build the veneers from the original model.

The first bake utilized a "contact lens" area at the gingival line, with a 50/50 mix of dentin and medium clear (Noritake). The body bake

consisted of A1 dentin with 15% NWO.5B (Noritake). The internal translucents used were Enamel 1, Clear, and T-blue (Noritake) (Fig 10). After firing, the second layer was performed with LT1, an opal translucent (Noritake) (Fig 11). Contouring was performed in the same manner as for the pressed crowns, using a natural glaze technique (no glaze powder). After glazing, the surface was finalized with gray rubber wheels (Edenta AG; St. Gallen, Switzerland) and diamond polishing paste (Vident). The porcelain veneers were sandblasted with 50 $\mu$

aluminum oxide and acid-etched with 10% hydrofluoric acid for 90 seconds.<sup>2</sup>

## CONCLUSION

With careful and appropriate treatment planning—and, perhaps, just a little luck—optimal tooth replacement can be achieved. Although challenges may present themselves while attempting to achieve excellence, with appropriate treatment planning and careful follow through the outcome can be predictable and repeatable (Figs 12-15).



Figure 13: Postoperative close-up view of all four maxillary incisors. Note the alignment, closure of diastema, and the overall esthetic appearance.



Figure 14: Postoperative left lateral view of the maxillaries; observe closure of the diastema.



Figure 15: Full-smile postoperative frontal view.

### Acknowledgments

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