A Tale of Four Incisors, Part 3

By Lynn Bertand, DDS

The key players in the smile zone are the four maxillary incisors. Their position, length, width, and alignment are crucial to the success of the aesthetic case. New techniques and materials have given us the tools to correct aesthetic problems in this difficult region more conservatively and predictably than ever before. However, despite these advances in technology, the very nature of cosmetic dentistry makes it essential to determine the goals and/or expectations of the patient before starting any case. I accomplish this by showing every patient how they could appear with an improved smile using cosmetic imaging.[1] They can tell me if they are interested in making any changes to their smile, and give input on what specific changes they find desirable based on their digitally enhanced image. No more guessing, hoping, or wasting anyone's time.

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Once a case is under way, I can check to verify that I am on track by using a hard/soft matrix and autocure bis-acrylic for transitionals. This allows me to key my results to the cosmetic image, make provisionals in the mouth in just minutes, and verify the aesthetics before proceeding with the case. That way I am sure that the final restorations will be satisfactory to my patient. If not, I can make changes as necessary. In effect, I have transferred the responsibility for the case outcome from me to the patient, and this is where it belongs.

Ten years ago, I first saw a young lawyer for emergency endodontic treatment on tooth No. 8. After that initial visit, he became a regular patient and a good referral source. However, he never seemed interested in making his smile look better (Figures 1 and 2). This article discusses how modern technology helped change his mind, and the clinical techniques used to create a beautiful smile.

Figure 1. Pre-op full face.

Figure 2. Pre-op close-up.

Figure 3. Digital image simulating four porcelain veneers.

Figure 4. Preoperative model with wax-up of accurate flattening digital image.

Figure 5. Preparation goals and hard/soft matrix for provisionals.

Figure 6. Shofu Shade/Lab shade comparator.

Figure 7. Post and core added.

Figure 8. The Shofu Contemporary Cutting Kit.

Figure 9. Gingival tissue after round-end preparations.

Figure 10. Final conservative preparations.

Figure 11. Hard/soft matrix seated on preparations with auto-cure bis-acrylic material.

Figure 12. Removing matrix to reveal polished resin provisionals.

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Figure 13. Provisionals in place.

Figure 14. The Shofu Contemporary Finishing Kit.

Figure 15. Final shot up.

Figure 16. Final full face.

TREATMENT PLANNING

Last year, when the patient came in for his regular check-up, we took his full-face picture with our digital camera and immediately started the smile makeover using our in-office digital imaging system, Digital Dentist (Digident). While he got his teeth cleaned, my assistant imported his smile through the simulation of whitened teeth and with the Lorin Library Smile Design No. 6 (square central, square mesial bevel) for his maxillary incisors (Figure 3). The Lorin Library can be personalized with the name of the doctor or laboratory. At the end of his appointment, my assistant came in with the successfully enhanced smile printed on photo-quality Kodak paper.[2] The image generated instant interest and excitement. We wanted specific answers to his questions.[3] Most important, how soft when could he get started? We agreed to whiten his teeth, place a bonded post in his endodontically treated tooth, and veneer the four maxillary incisors.

Most cosmetic cases, especially those utilizing porcelain, begin with whitening. By using an in-office whitening system, you can initiate any cosmetic case that very day by achieving an average nine shades whiter in less than 2 hours. We first protected his soft tissues with a liquid rubber dam, Rembrandt Virtuoso whitening gel was then applied to the teeth, and the Sapphire light (Den-Mat) was positioned over the teeth to activate the gel. This process was repeated for seven passes—5 seconds on each tooth—to complete the whitening phase. In one appointment, his teeth had whitened from A-4 to A-1 cervical and B-1 incisal. Even teeth No. 8 lightened up quite a bit. We were ready to continue.

The preoperative models were sent to the lab for the fabrication of wax-ups according to the approved simulated pictures. The incisors were lengthened and reshaped in wax, as directed by the imaged pictures. The wax-up was then duplicated to facilitate the manufacture of a preparation guide and a hard/soft matrix (Figures 4 and 5).

CUSTOM COLOR AND SHADEEYE-EX

The ShadeEye-Ex (Shofu) (Figure 6) is a highly accurate electronic shade-taking device designed to interact with the operator to identify the most precise, aesthetic shade match possible, and communicate this information to the laboratory for duplication.[4] In this case we looked at the untreated maxillary cuspids and lower incisors. Once we established the base shade, we chose to go half a shade lighter. Further modification can be accomplished through the choice of resin cements. Along with the prescription, I like to send a digital photograph of the shade tabs in the gateway placed next to the unprepared and prepared teeth, to capture the natural incisal characteristics and translucent qualities of the teeth to be duplicated.

PREPARATION AND IMPRESSIONS

Anesthesia was administered locally. Nitrous oxide sedation was used to reduce any anxiety. The old resin was removed from the endodontic access of tooth No. 8, and gutta-percha was removed to at least a length equal to the clinical crown. A minimum of 4 mm of gutta-percha was left at the apex to protect the apical seal. The Bisco Light-Post translucent fiber post system was chosen to reinforce the tooth. The preliminary preparation was completed using the end cutting Pre Shaping Drill. This instrument determines the final depth of the post. The final preparation was made using the side cutting Finishing Drill, allowing sufficient space for the post and adhesive cement.

The canal was treated with Uni-Etch (Bisco) to simultaneously condition and disinfect the tooth. This was then rinsed and blotted dry with a large paper point. Two coats of One Step (Bisco) were applied to the canal and post. One Step requires no mixing, and saves time by incorporating primer and bonding resin in a bottle. After lightly air-drying, a large paper point was again used to prevent pooling. The post and canal were light cured for 10 seconds. Duo-Link (Bisco) base and catalyst were mixed into a uniform paste and syringed into the canal. The post was then seated gently under firm pressure for 10 seconds, and the excess cement was removed before curing. The cement was cured by placing the light tip directly on the post (Figure 7). After completing the core buildup, Renew microhybrid (Bisco) filled the access cavity. After finishing, the resin and enamel were re-etched and Fortify (Bisco) sealed the margins.

Next, the incisors were prepared using diamond burs from the Shofu Contemporary Cutting Kit (Figure 8). A small round diamond (0872-1) was used to outline the preparations. The depth cutter (0881-1) was run across the facial surfaces of the four incisors. A coarse tapered diamond (0850M-1) connected the facial grooves and contoured the conservative preparations (Figure 9). A superfine tapered point (0280V1) polished the preps. The fine flame-shaped diamond (0859-1) reduced the post and incisal/lingual line angles to complete the preparations.

Adequate reduction was ensured using the Preparation Guide. The thin transparent Preparation Guide, made from an image-inspired wax-up, is the ideal way to ensure adequate tooth preparation when mere tenths of a millimeter are crucial to obtaining an excellent result. The Preparation Guide is an excellent insurance policy against errors, and will enhance your success by a substantial margin.

The teeth were prepared in a conservative manner to preserve tooth structure (Figure 10). The restorations cannot really be classified as veneers or crowns, but rather little pieces of porcelain that complete the jigsaw puzzle to create an attractive smile. When the reduction was sufficient, Impregum Soft (ESPE) polyether impressions were taken. Because polyether is hydrophilic, the teeth were not desiccated, and the set around the preps and in the tray resulted in even better "setting" for improved adaptation to the abutments.

TEMPORIZATION

Today, temporization is required in most cosmetic cases. Few patients are willing to "make do" with an ugly smile, even for a few days. It is vitally important that following the preparation appointment, patients leave your office looking better than when they came in. At that stage, they have little tolerance for lame excuses from the dentist. They don't want to hear, "It's only a temporary." How can they take such a leap of faith, hoping the final product will be better? They want and expect to see something that looks good. Think about it from the patient's point of view. They have invested a substantial sum of time, money, and body. They have just subjected themselves to shots, needles, and drills. Now they have to go home and explain the process to others. If you can make them look good at this stage, it's almost guaranteed satisfaction. You're more than halfway there! If you don't, you have just taken a big step backward. I have personally found that attractive temporaries are crucial to success, and extremely important to building referrals.[5]

A hard/soft matrix created from the wax-up of the simulated result can help solve these temporization problems. This allows you to produce results that look just like the imaged picture in just a few minutes. The double layer of soft and hard construction and superb adaptation of the matrix yield autocure bis-acrylic provisionals that have correct incisal position and tooth contours, fine margins, and nearly ideal occlusion. Excess is minimal and takes only seconds to trim. You can adjust and polish with a bur or disc—no more hours wasted bonding and reshaping and polishing. The sequence of steps using a hard/soft matrix is as follows:

(1) Insert the soft inner lining into the hard outer shell and try it over the prepared teeth to verify fit.

(2) Coat the teeth with enamel bonding agent and/or desensitizer.

(3) Fill the matrix with auto-cure bis-acrylic temporary crown and bridge material.

(4) Place the hard and soft matrix over the teeth.

(5) Apply pressure. Allow the resin to cure on the teeth (Figure 11).

(6) Remove the hard matrix (the soft matrix will usually remain on the teeth).

(7) Peel off the soft matrix to reveal a polished resin surface (it will not stick to the resin, and can be reused if necessary) (Figure 12).

(8) Trim the excess.

(9) Adjust occlusion, polish, brush on Fortify, and cure.

(10) Leave the patient with a smile (Figure 12).

(11) Send the case to the lab with instructions to copy the wax-up.

(12) Contact the patient the next day to verify the aesthetics.

(13) If the patient is not totally satisfied, hold off on the lab work, get the patient into the office, and alter the temporary until the patient is satisfied.

(14) Take an impression of the altered temporary (which the patient likes) and send it to the lab so it may be copied in the final case.

LABORATORY PHASE

At the lab, all preoperative models were mounted using a facebow transfer on a Ka'Vo articulator. The custom incisal guide table was fabricated, and models were mounted one at a time using centric bite records. It is always important to have a proper mounting to ensure proper occlusion and aesthetic considerations.

The wax-up of the four maxillary anteriors that was fabricated according to the cosmetic image was sent to the lab. A putty matrix was made capturing the incisal edge and incisal third of the facial. The wax was taken off the die and platinum foil adapted. Shofu Vintage Halo porcelain was stacked, with A1 + Bright Value Dentin shade at the cervical half blending to a B1 + Bright Value Dentin at the incisal half. Shofu Vintage Halo Porcelain was selected because of its reduced potential for abrading the opposing dentition, and the wear characteristics of Shofu Vintage Halo Porcelain closely imitate those of natural enamel. Shofu Vintage Halo Porcelain is opalescent (absorbs yellow/red and reflects blue/green), has a low leucite content, small crystal size, and can easily be polished chairside.

Cuspid rise and anterior protrusive guidances were carefully maintained, any lateral interferences were eliminated, and the lateral protrusive was adjusted. Long-term success of these cases depends on sound occlusion and function. After the veneers were baked and the function, contour, and surface texture were refined, they were glazed, etched, and internally silanated.

In 1 week, the resin was sectioned and popped off with a spoon excavator. Prior to bonding, any residual resin was removed with gentle air abrasion (Airdent, Air Techniques). Care was taken to avoid traumatizing the gingiva. Illusions (Bisco) try-in pastes were used to determine the proper color prior to final cementation. Because the Illusions try-in paste is water soluble and cosmetic, try-ins can be accomplished without risk. In this case, we chose clear. To control bleeding, Expasyl (Kerr) was expressed into the gingival margin. After 3 minutes, it was thoroughly rinsed and dried. The abutments were etched with 34% phosphoric acid for less than 15 seconds before being thoroughly rinsed and dried. Hemaseal & Cide desensitizer (Advantage Dental Products) was applied as a wetting agent. It contains hydroxyl ethyl methacrylate and chlorhexidine to increase bond strength,[6] acts as a bacteriostatic agent, and reduces sensitivity.

One Step Universal Dental Adhesive (Bisco) was applied generously according to the manufacturer's instructions. One coat of this low-viscosity primer/adhesive infiltrates porous dentin and enamel for a better bond. The teeth were painted until they had a uniform glossy appearance, and the excess was blown off. This was cured with the Sapphire pack light (Den-Mat). The Illusions clear resin cement (Bisco) was syringed on the teeth to prevent air bubbles. The porcelain was then filled with more luting agent, and seated on the abutments with gentle pressure. First, I seat the centrals, and then the laterals to prevent misalignment.

The centrals were flossed and excess resin was removed with a sable brush. This allows for less mess and easier cleanup. The restorations were then cured using a Sapphire pack light. When polymerization was complete, the gingival marginal flash was flicked off with a Hard Parker No. 12. A Shofu Contemporary Polishing Kit (Figure 14), which included six shapes of fine and superfine F and F diamonds, and six coventor cups and points (from pre- to ultra-polish) (Figure 14), was used to smooth the lingual/incisal margins and interproximals in a gingival/incisal direction. The C-Spacer (Westbrook and Associates) opened the contacts, which were then verified with floss. The margins were finished and polished with cups and points. The lingual margins were re-etched and reinforced with Fortify (Bisco). The patient was instructed on the use of his personalized complimentary Rembrandt soft toothbrush to avoid mouthwashes containing alcohol.

Cosmetic dentistry is a lot more fun when you can foresee the four incisors, and actually make that vision a reality.

CONCLUSION

The result of this case was a beautiful smile, from initial diagnosis, treatment planning, preparation, temporization, to the final restorations (Figures 15 and 16). Cosmetic dentistry is a lot more fun when you can foresee the four incisors, and actually make that vision a reality.★

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Disclosure: Dr. Bertand is the developer of the Lorin Library. For more information, please consult www.digident.com.