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PREPARATION GUIDE MODEL

# Key to High Esthetics

This case exemplifies the esthetic possibilities of treatment planning, buy-in, and teamwork among the dentist, technician, and patient.

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Specializing in fixed restorations, Kahng provides personalized custom cosmetic work. He stresses education, communication, and a team approach to patient care.

A male patient, age 42, complained of stained teeth and old composites. His malpositioned teeth lacked the proper canine rise, which resulted in premature posterior and anterior wear (Fig. 1). X-rays revealed normal bony apertature. The preoperative tissue was inflamed with no pocketing. The patient's mandibular anterior teeth were crowded and overlapped (Fig. 2). Natural teeth may be similar in appearance, but no two are exactly the same (Fig 3).

## The problem



A 42-year-old man with stained malpositioned teeth and old composites.



Mandibular teeth were stained, crowded, and overlapped.



Similar in nature, all teeth express differences in structure and appearance.

Photo (top left): Bert Ganzon; all others: Luke Kahng.

Study model impressions were taken by the clinician and constructed for treatment planning with the dental technician. After a consultation with the dental technician and patient, the dentist decided to utilize GC Initial pressed crowns using the veneering technique on the six mandibular anterior teeth.

The dental technician duplicated and evaluated the models. The study models were marked on the facial with pencil for proper reduction. The room requirements would obviously be different for each tooth since the alignment of the teeth was being corrected. The facial view of the study models showed that reduction would need to be between 0.5 to 1.3 mm depending on the alignment (Fig. 4). The reduction needed for each tooth would depend upon the tooth's alignment, along with the contour and emergence profile of each tooth.

**CREATING THE PREP MODEL**

Preparation started with tooth #27. It was prepared completely (Fig. 5). Using carbide burs, depth guides were cut only on the facial aspect of the tooth (Fig. 6), which allowed for checking reduction thickness. In this way, contact with the teeth being prepared will not be broken (Fig. 7). Afterwards complete preparation began of each of the other teeth, finishing the preparation on #23, #25, and #27 (Fig 8).

“With proper treatment planning and using a guide model, predictability, esthetics, and function were achieved.”

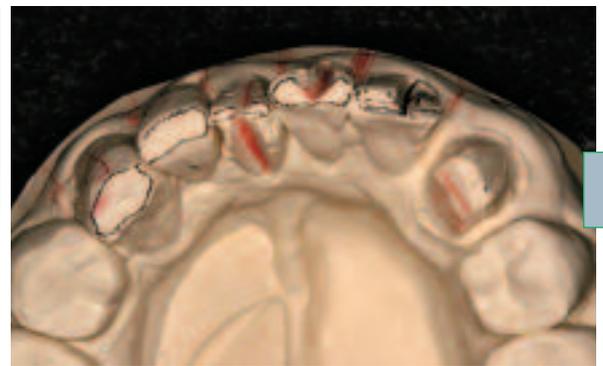
The treatment plan waxup started with tooth #25 before breaking the interproximal contact walls (Fig 9). Since all of the teeth were not prepared at that time, the waxup was checked against the width marks on the model from the existing teeth (Fig 10). The waxup was completed for each of the other teeth and double-checked. The incisal view was checked showing the alignment and contour (Fig 11). The facial view showed the thickness and emergence profile (Fig 12). The three waxups for teeth #23, #25, and #27 were checked for centric stops, using the opposing articulated model (Fig 13). The model had the rest of the preparations completed and waxed to completion. The crowding and overlapping of the anterior teeth was thereby corrected in the waxup with minimal tooth reduction.

From the final waxup (Fig 14), a clear stent (Fig. 15) was made of the waxup and used as a prep

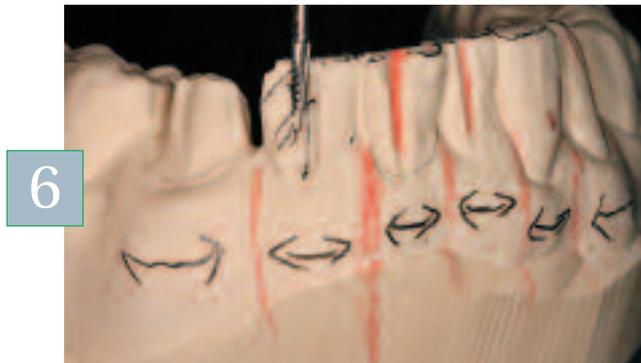
Creating the prep guide model



4 Facial view of study model showed that reduction needed to be between 0.5 to 1.3 mm.



5 Tooth #27 was prepared completely.



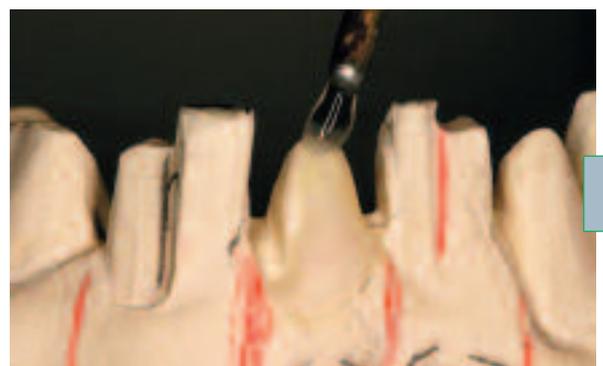
6 Depth guides were cut only on the facial aspect of tooth #27.



7 Depth guides help ensure contact with teeth being prepared will not be broken.



8 Preparation was finished on teeth #23, #25, and #27.



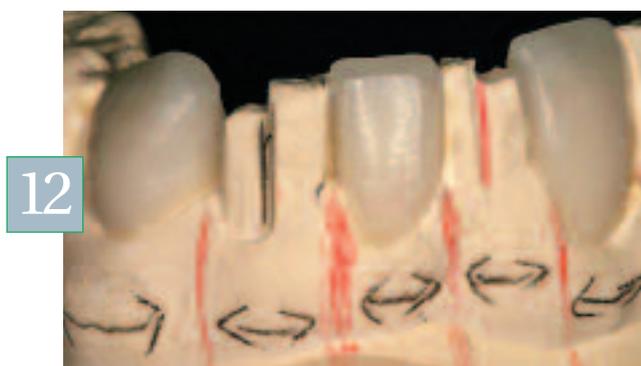
9 Treatment plan waxup began with tooth #25 before breaking the interproximal contact walls.



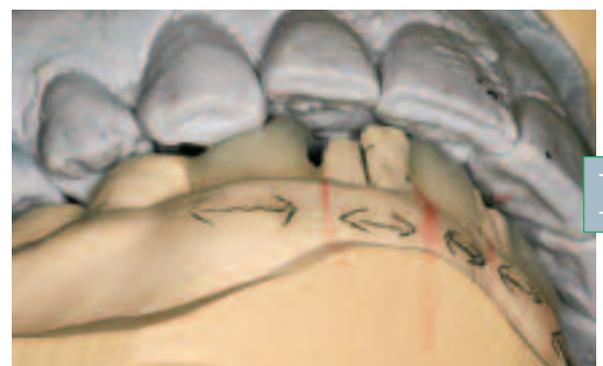
10 The waxup is checked against the width marks on the model from the existing teeth.



11 The incisal view was checked showing the alignment and contour.



12 The facial view showed the thickness and emergence profile.



13 The three waxups for teeth #23, #25, and #27 were checked for centric stops.

guide for the clinician and as a template for the temporaries. Finally, the impression and a master cast were made.

**LABORATORY PROCEDURE:**

Approximately 0.5 mm of die spacer was needed to allow room for the cement. It was not advisable to put any die spacer on the shoulder at the margins (Fig. 16). The restoration was waxed to full contour, and the waxup was cut back for the layering porcelain. Ideally, the cut back of the full-contour waxup should have a minimum thickness of 0.8 mm. For pressed restorations, a common practice is that 70% of the full-contour restoration be a pressed coping. Before investing, the copings were weighed, and the number of pellets was calculated for the size of investment ring used.

Sprues were attached at the incisal edge of the wax coping to allow a direct flow of the pressed ceramic material, and the sprues were attached to the sprue former base at a 45° angle. The angulation allowed the same flow direction and assured that the distance between copings was a minimum 3 mm.

The powder/liquid investment was hand mixed to a uniform consistency and then was placed in the vacuum mixer. Vacuum mixing avoids internal and external bubbles in the copings. The intaginal of the wax copings were filled with investment using an instrument or brush and then were vibrated. Next, the investment ring was filled with a steady stream of vibrated investment (Fig. 17).

After the investment set, the sprue base was removed, and the ring was slid off. A plaster knife was used to smooth the underside of the ring to ensure it sat flush. It is very important not to have any investment residue enter the sprues, as this will go into the pressed ceramic material. The ring was then placed in the burnout furnace and then was pressed.

The rings were carefully divested (Fig. 18), and the sprues were cut off with a diamond disc. The pressed copings fit the dies perfectly, but you may need to make minor adjustments.

The porcelain application was a four-layer build-up technique (Fig. 19). Although the patient's teeth were crooked and discolored, the dentist, dental technician, and patient worked together, and highly esthetic restorations were completed. At the insertion appointment, the patient was anesthetized, temporaries were removed, and preparations were cleaned. Restorations were tried in individually to evaluate margins and then together to evaluate proximal contacts. After patient approval of the shade and contour, the preparations were isolated, etched, and prepared for cementation (Fig. 20). With proper treatment planning and by using a guide model, predictability, esthetics, function, and longevity were achieved. The patient was very happy with the final restorations (Fig. 21).

lab

## Creating the prep guide model

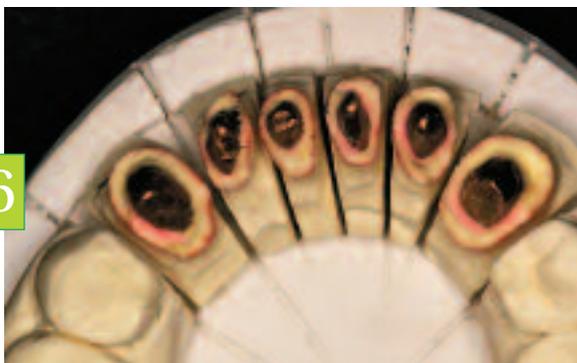


The final waxup of the proposed treatment.



A clear stent was created from the waxup and used as a prep guide for the clinician.

## The final outcome



Approximately 0.5 mm of die spacer left room for the cement. It was not advisable to use die spacer on the shoulder at the margins.



The investment ring was filled with a steady stream of vibrated investment.



The rings were carefully divested and the sprues cut off with a diamond disc.



Porcelain application was a four-layer build-up.



After patient approval of the shade and contour, the restorations were ready for cementation.



The final restorations in the mouth.