Esthetic Molar Reconstruction with the Omnicam and e.max

Quadrant Beauty with a Proven Solution

E.MAX CAD FROM IVOCLAR HAS BEEN successfully used to restore teeth with the CEREC process for years. Fabricated from lithium disilicate crystals, the e.max restorations are milled in a blue state and crystallized to the final strength and color in a dental furnace. With a history of success, e.max has become one of the most popular dental restorative materials available.

This case study will outline the design and fabrication process of a case done with e.max blocks. This clinical showcase is meant to give an overview of the CEREC process from start to finish.

CASE STUDY

The patient presented was treated at the UCLA Esthetic Center for Esthetic Dentistry, a graduate residency program.

FIGURE 1: The patient presented to the clinic for restoration of the upper-left quadrant. The premolar area was awaiting final implant integration and healing. Tooth #14 had an existing PFM crown with recurrent decay, and #15 presented with a root-canalled tooth requiring full coverage. The teeth were prepared as conservatively as possible by one of the dental residents. #14 was restored with a conventional full-coverage preparation, and #15 was restored with a conservative full-coverage preparation that saved the cervical enamel of the teeth.
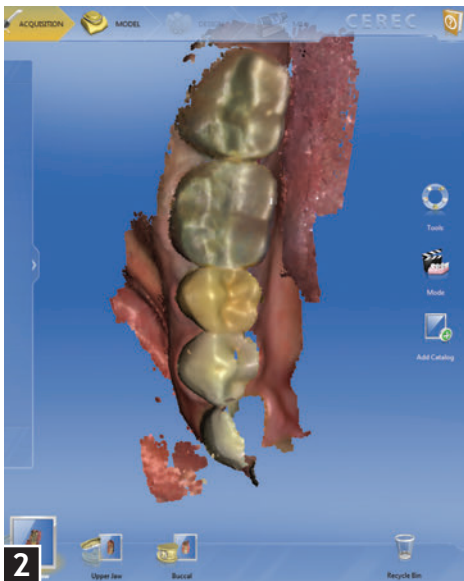

FIGURE 2: After preparing the teeth, the Omnicam was used to scan the opposing dentition. With the Omnicam, waving the camera over the desired areas that the operator wishes to capture can easily show all types of dentition restored and unrestored.

FIGURE 3: The cord was removed, and the preparations were scanned using the Omnicam. No reflective medium is required with the Omnicam, and the models that are rendered are in full color.
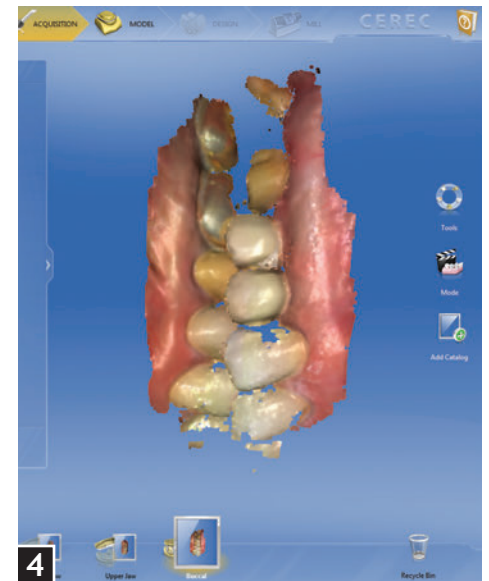
FIGURE 4: The patient was asked to close and a scan of the teeth articulating was taken. This Buccal Bite will help to stitch the upper and lower models together.

FIGURE 5: Once the data is captured, the software creates a virtual model of the scanned arch. Occasionally, items such as the lips, cheeks, cotton rolls are visible as the camera can inadvertently capture other areas.
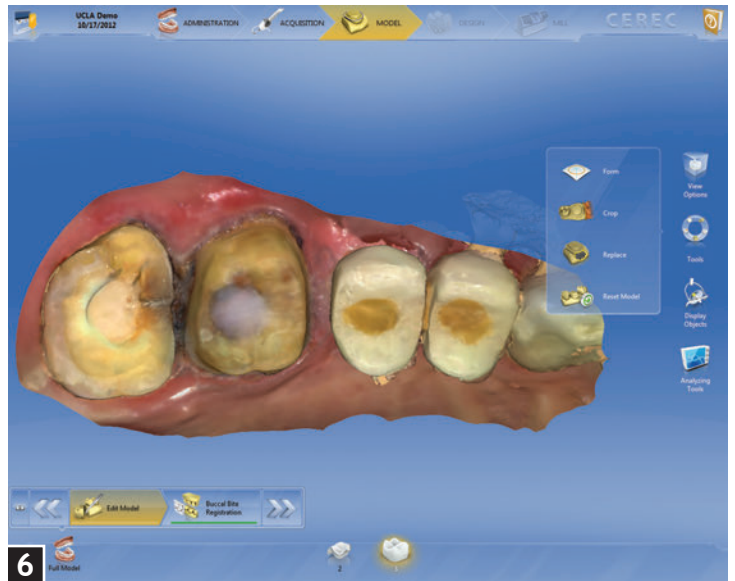

FIGURE 6: The Edit tool in the CEREC 4.0 software can be used to remove any areas that were captured and might interfere in the design of the final restorations. Figure 6 shows how the buccal mucosa was removed using the Edit tool.

FIGURE 7: The same Edit tool was used to remove bits of the buccal vestibule on the lower jaw. You can see how accurately the Omnicam scanned the natural teeth as well as the existing gold crowns on the patient.
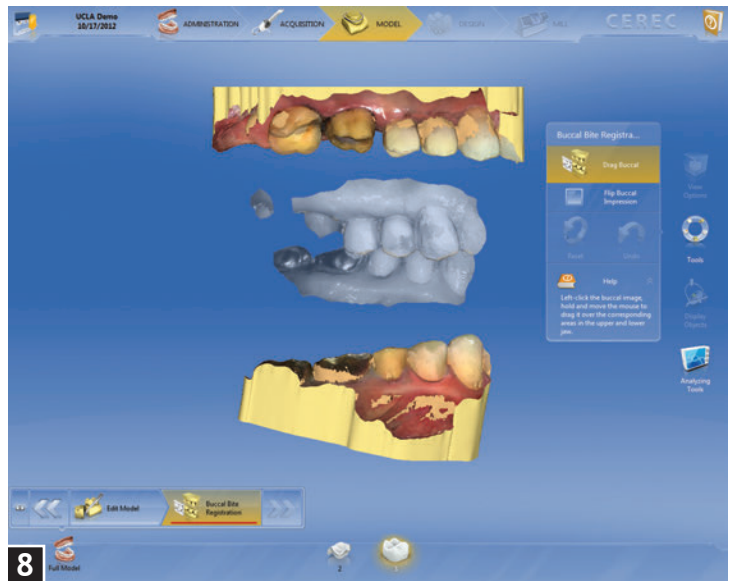

FIGURE 8: Once the model artifacts are removed, the upper and lower jaws are stitched together using the Buccal Bite that was captured previously. All the user needs to do is to move the gray buccal bite to each model, lining up similar areas (e.g., cusp tips, cervical contours, portions of the prep, etc.) and the software does the rest.

FIGURE 9: The final models have been mounted using the Buccal Bite. At this point, the clinician can assess if the models have stitched together properly as well as determine if there was adequate occlusal reduction that occurred.


FIGURE 10: After model articulation, the individual preparations are marginated with the software. At the bottom of the screen is the Dock Bar. Whichever restoration is highlighted in the Dock Bar is the one the clinician should marginate. Figure 10 shows the margin being drawn around the conventional preparation of #14.

FIGURE 11: Once the first tooth has been marginated, the same process is completed with tooth #15. After setting both margins, the Insertion Axis for each case is determined. To set the Insertion Axis, use the visual cues on the right and left side of the screen, and adjust the model accordingly to line up the mesial and distal of the model with the visual cues.


FIGURE 12: After setting the insertion axis, the next step is for the software to calculate the proposal. With the CEREC 4.0 software, anytime a user is treating adjacent restorations, it's recommended for the best results that both restorations be proposed simultaneously. To accomplish this, the margin must be drawn and insertion axis must be set for both restorations prior to proceeding.
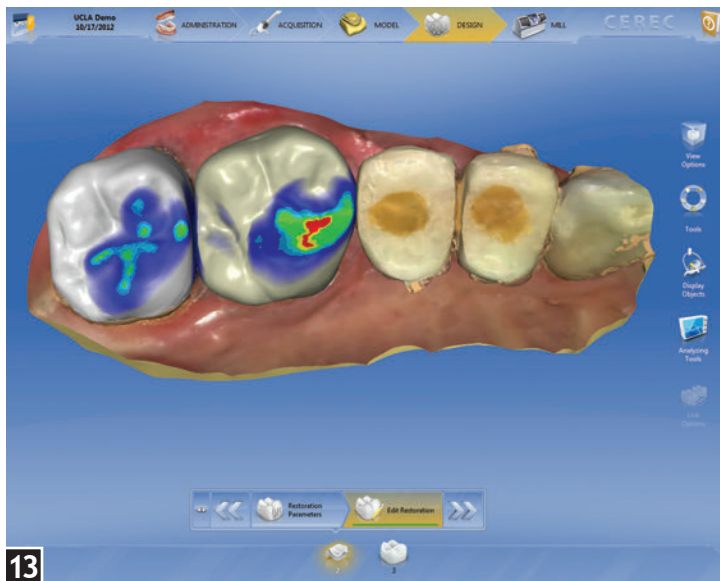
FIGURE 13: The initial proposals are determined by the Biogeneric process. This is a patented process that looks at the adjacent dentition to determine the occlusal morphology of the restorations. Once the restorations are proposed, the CEREC 4.0 software has tools that allow the user to make any necessary changes to the restorations.
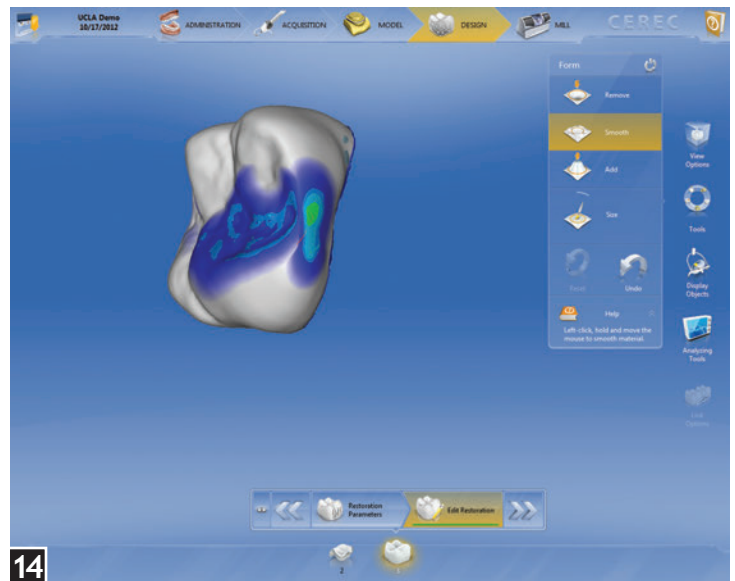

FIGURE 14: To modify the adjacent contacts, the model is removed, which allows the clinician to visualize the proximal contacts. The operator can use a number of tools to modify the contacts as needed. Here the Smooth tool is being used modify the proximal surface.
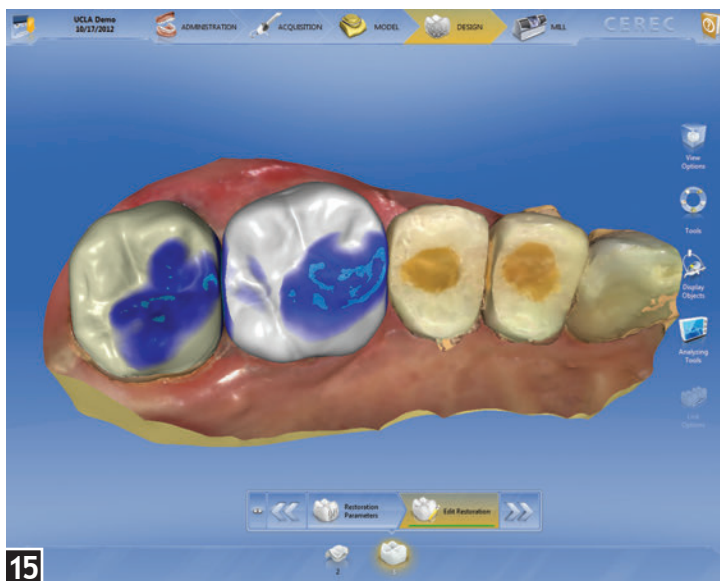
FIGURE 15: The final proposals are designed, the contacts adjusted and the occlusion adjusted. You can visualize the final designs on the virtual model. The premolars are provisional restorations waiting for final implant integration before being restored.
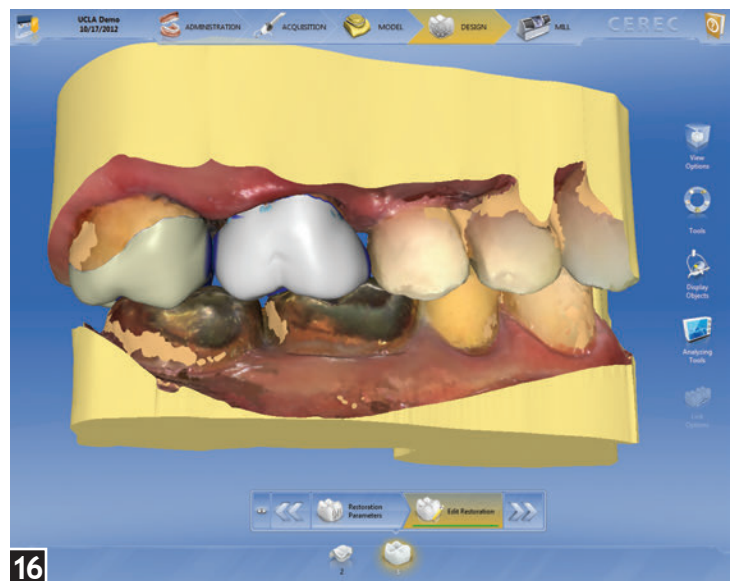
FIGURE 16: The opposing arch can be turned on so that the operator can see the teeth in occlusion and make any modifications that may be required.
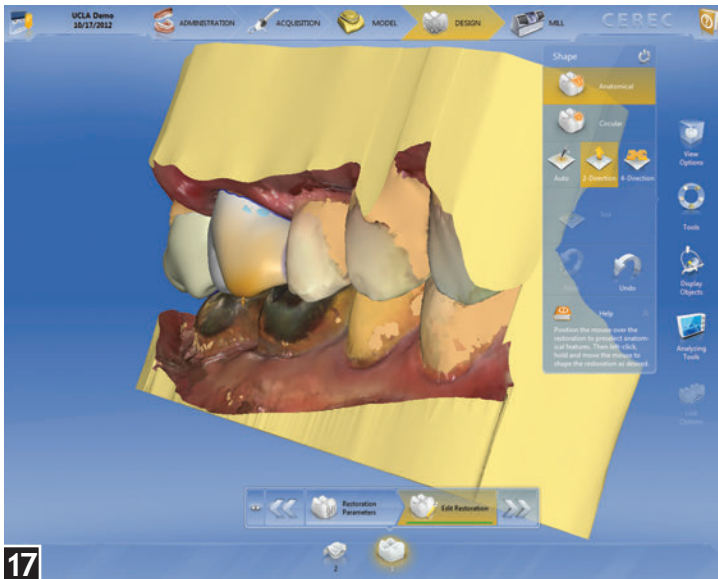
FIGURE 17: The models were moved around, and it was determined that the mesial buccal cusp of #14 was in need of modification. The Shape tool was used to manipulate the buccal cusp.
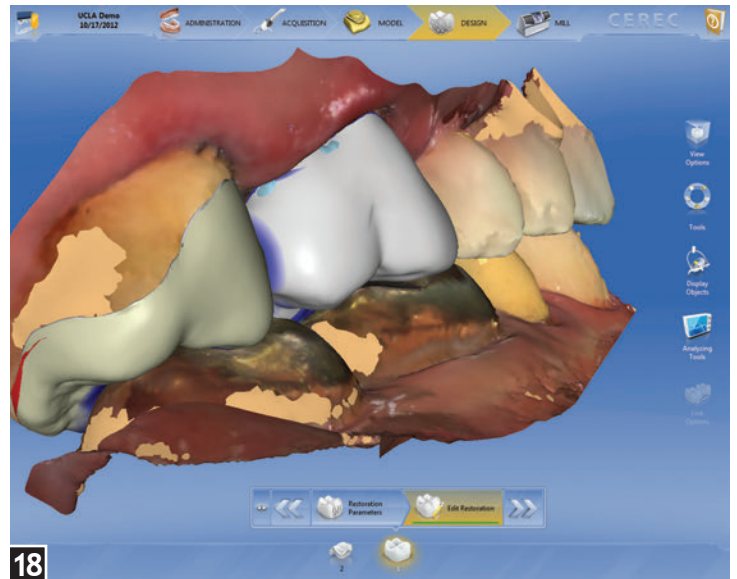

FIGURE 18: The final designs show harmony with the opposing arch as well as the adjacent teeth. The final design tweak that needs to occur as visible from this view is to make the mesial buccal contour on #14 more prominent.

FIGURE 19: After the design, the set of restorations were milled out. The three models shown here are e.max B1 HT and LT, as well as the e.max Impulse blocks Value 1 shade. The final shade that was milled was A2 LT.

FIGURE 20: After milling and trying in the different shades, the A2 LT blocks were selected for the final cementation of the restorations. e.max is milled in the softer "blue" state, after which it undergoes a crystallization process to achieve the final color and strength. In the blue state, the strength of the material is roughly one-third of what it will be after full crystallization.
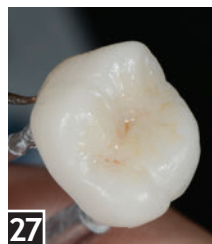
FIGURE 21: The restorations are tried intraorally to verify fit and contours. The provisional restorations on the implant abutments were removed for the try in.

FIGURE 22: The intraoral try in of the A2–LT blocks. The buccal view shows synergy with the opposing dentition.

FIGURE 23: As part of the demonstration at UCLA, the restorations were crystallized in an Ivoclar furnace. For most CEREC users, the crystallization, stain and glaze are all accomplished in one step. However, in this case, the procedure was done in multiple steps. In this first step, the e.max restorations were crystallized without glaze to get the final shade and esthetics. When finishing e.max in multiple steps, the restorations are crystallized first and then, in subsequent firings, the stain and glaze is applied.

FIGURE 24: After crystallization, the stain was applied. The shades used are up to the judgment of the clinician, but typically a brown shade is

painted in the occlusal grooves.

FIGURE 25: The stain is dispersed using a thin brush along the grooves of the restoration. Excessive stain can be painted away by dipping the brush into glaze and wiping away the excess.

FIGURE 26: Other stains such as blue can be painted on the incisal area to give the appearance of translucency. White can be painted on the cusp tips and marginal ridges to give a hypocalcification appearance. The colors should be subtle and not overbearing.

FIGURE 27: A color such as an A1 stain can be painted to the cervical portion of the restoration to give it a gradual color transition and to avoid a monochromatic appearance. Once all the stains are placed, the restoration is fired one more time in the oven so that the stains are fixed to the restoration.

FIGURE 28: The final step after the firing of the stains is to apply the glaze over the entire restoration and fire one more time. As mentioned previously, the crystallization, stain setting and glazing are all done in one step in a typical CEREC appointment. However, due to the fact that this was a teaching case, the steps were done individually. Obviously, doing it this way requires more time, but it does ensure that the final restoration has more depth with regards to esthetics.

FIGURE 29: The restorations after final stain and glaze were tried in and ready for cementation. As you can see, by applying the stains and glaze, we are able to take relatively monochromatic-looking restorations (as seen in Figure 24) to lifelike and vibrant restorations that mimic the teeth.

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e.max has been a successful material in the hands of the CEREC clinician. While there are some steps required to fabricate the restoration, the end result will be one that the patient and clinician can expect to last a long time.

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