



Rehabilitation Case with CAD/CAM Design and

Excellent Results



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Introduction

Our female patient presented with a number of issues regarding her smile that she was interested in solving. During a diagnostic appointment with her dentist she requested help with the situation. Upon examination, he diagnosed the following:

- #4 and 5 had failing crowns with caries at the margins
- #6 had a large abfraction lesion and caries on the distal
- #7 had a periapical abscess and was nonrestorable
- #8 and 9 had failing composites and poor aesthetics
- #11 and 13 had advanced caries and were nonrestorable.

The treatment plan would involve implants on #7, 11 and 13, with a zirconia abutment on #7 and 11 and a titanium abutment on #13. Tooth #12 was missing and would serve as the pontic for the bridge between #11 and 13. All other indicated teeth would be prepped for single-unit crowns.

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Case study

A preoperative photograph illustrates the above outlined areas of concern (Fig. 1), most noticeably the old composites and discoloration on the centrals 8 and 9. Teeth #7, 11 and 13 had been extracted and NobelActive implants placed with healing abutments. Once healing had been completed postsurgery, the dentist took an impression and ordered a wax-up as a guide for treatment to repair the occlusion and aesthetics.

Once that had been accomplished during the preparation visit, crowns on #4 and 5 were sectioned off, and teeth #4-10 were prepared for all-ceramic crowns. The dentist photographed a retracted



Fig. 1, Preoperative



Fig. 2, Post-preparation, retracted



Fig. 3, Occlusion view

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view after the patient was fully prepped for implant and single-unit zirconia with layered porcelain crowns on #4, 5, 6, 8, 9 and 10, as well as a bridge for #11-13 (Fig. 2). An occlusion view of the model, showing preparation from bicuspid to bicuspid, with zirconia implants on #7 and 11, and a custom titanium implant abutment on #13, follows (Fig. 3). The patient left the office with provisionals from #4-10.

The model was scanned digitally (Fig. 4) via CAD/CAM, DOF Freedom Scanner. After the scan and design process was completed, seven zirconia (Fig. 5) single copings and one three-unit bridge were milled, using the Amann Girrbach Ceramill Motion 2 milling machine, in-house. The zirconia-frame design stage is an important step in this process, especially with a multi-unit case. The lingual occlusal area has to be well-supported in order for it to function properly, with longevity in mind. The full-contour single unit and three-unit bridge copings were then placed on the model after sintering for a fit and appearance check (Fig. 6). Multiple colors are possible within the product offering range, as shown in this image. After firing at 1,450°C for approximately four to six hours, the copings then needed to cool for another two to three hours.

The bridge, polished and finished, was next tried on the model (Figs. 7 & 8) and photographed. Number 7, an



Fig. 4, CAD/CAM scan and design/
Freedom Scanner



Fig. 5, Post-milling, copings



Fig. 6, Fit and appearance check



Figs. 7, 8, Implant bridge try-on the model



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implant crown with a custom zirconia abutment with titanium connection, was partially tried on the model (Fig. 9) and then fully seated (Fig. 10) to check the fit. The completed restorations were photographed on the model (Figs. 11 & 12), before a retracted view was taken in the mouth (Fig. 13). Abutments were torqued to 30Ncm and sealed with Teflon/Fermit.

Please note the Golden Proportion of teeth with a perfect match both vertically and horizontally in the premolar buccal corridor. The symmetry is perfectly



Fig. 9, Partial try-in, number 7

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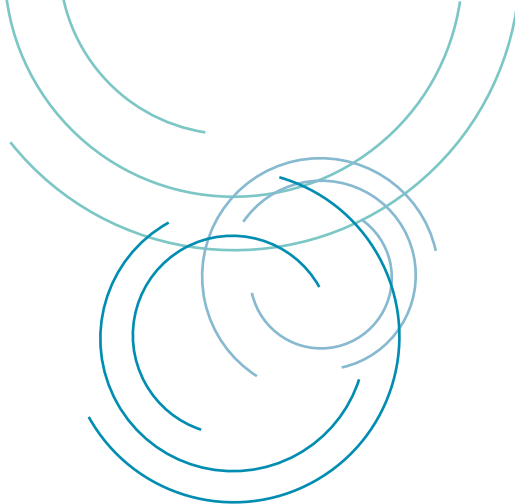


Fig. 10, Seated



Figs. 11, 12, Finished restorations, on the model



Fig. 12



Fig. 13, Retracted



Fig. 14, Post-cementation, natural smile



Fig. 15, Rest position

aligned between teeth #4 and 5 as well as #12 and 13.

Next we have an immediate natural smile view post-cementation (Fig. 14) as well as a rest position image (Fig. 15). The patient was pleased with the final results.

Conclusion

From the authors' viewpoint, we must evaluate and improve the patient's smile pre-operatively during the planning stage. That is where the knowledge and expertise combined between the dentist and the technician will work together to deliver the best possible results to the patient. We can consider the color, size and shape of teeth by checking our frame design for full support and building it with porcelain in a way that will enhance the patient's appearance. Our knowledge of occlusion will help us create a bright smile to rehabilitate the patient's overall function and appearance. When we work together in this way, the dentist, patient and technician can all be happy with the results we achieve. ■

Questions for the authors? Comment online at www.dentaltown.com/Dentaltown/magazine.aspx

Author Bio



Luke S. Kahng, CDT, is a world-renowned master ceramist, as well as owner and operating director of LSK121 Oral Prosthetics. He lectures nationally up to 10 times per year, and has published more than 100 educational articles in professional dental journals, written six hardcover books, and created approximately 55 instructional YouTube videos involving dental cases. He serves as a board member for Spectrum Dialogue, Teamwork, Inside Dental Technology and Dental Lab Products.



Dr. Abraham E. Stein received his dental degree from Southern Illinois University School of Dental Medicine. He went on to complete his prosthodontic residency training at The Ohio State University. He has a passion for dentistry and delivering the highest-quality care to all of his patients. Dr. Stein is a prosthodontist, one of the nine specialties recognized by the American Dental Association. He has special training in restorative, implant, and esthetic dentistry. He was the recipient of the American Academy of Esthetic Dentistry and the American College of Prosthodontist awards. He lectures nationally and is published in the International Journal of Oral and Maxillofacial Implants.