

# An Esthetic Alternative in Full-Coverage Restorations



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All too often, restorative dentists are faced with the dilemma of not being able to provide the ceramist the optimal space for maximum esthetics. The reasons are numerous, yet the problem still remains. The dental industry, along with the dental laboratory industry, has developed numerous full-coverage restorative options to obtain maximum esthetics. These include, but are not limited to, feldspathic porcelain crowns or porcelain jacket crowns, In-Ceram (Vita Zahnfabrik; Distributor, Vident) and its derivatives, Procera (Nobel Biocare USA, Inc), IPS Empress I & II (Ivoclar Vivadent, Inc), and the old standard, porcelain-fused-to-metal. Understanding the advantages and disadvantages of each product or technique intertwined with the patient's esthetic dilemma and desires will help the dentist make the correct decision to achieve the desired goal. Regardless of the technique or materials used, an evaluation of the patient's occlusion can help

determine the restoration's success or failure. Two main techniques are available to retain full-coverage restorations (ie, cemented or bonded). Each one has inherent advantages and disadvantages such as ease of cementation and/or retentive strength.

The **Captek (Captek: A Division of Precious Chemicals, Inc)** crown has emerged as a unique porcelain-fused-to-high-gold restoration, which enhances the vitality of baked-on porcelains yielding a pleasant esthetic result. These restorations do not require as much tooth reduction as is necessary for all-ceramic restorations. Additionally, it is important to note the Captek crown offers favorable biocompatibility for the soft tissue as well as a reinforced gold-platinum-palladium coping for strength, while using conventional cementation techniques.<sup>1-3</sup>

Ceramic systems offer esthetic advantages such as a nonmetal substructure coping and display and an excellent marginal fit. However, a core with sufficient strength requires a more aggressive tooth preparation than is necessary for a conventional crown, beginning with a tooth with no sharp edges. Empress can be too translucent of a choice because of susceptibility to chemically assisted, slow-crack growth induced by moisture, thus making the system strength insufficient to resist high-occlusal stresses occurring in cyclic fatigue loading in the molar region.<sup>4,5</sup>

The Zirconia-based systems offer exceptional strength, but its opacity can create some masking problems in attempting to achieve the desired esthetics and translucency, especially when space is

limited. Although porcelain laminates are significantly more conservative and reinforce the tooth, the quality and quantity of the remaining enamel and dentin that will support these restorations and the occlusal loading forces they will be under must be considered in determining if they are to withstand them long term.

## CASE STUDY

A 74-year-old man presented with advanced wear on the buccal incisal and middle third of the lower incisors as a result of occlusal problems with posterior restorations, as well as a bulky opposing central incisor crown (Figures 1 through 3). With a class II occlusion and a moderate overbite, it was determined to only restore the lower incisors because the canines were relatively healthy and were presented with slight incisal wear. The lower left canine showed more considerable wear. Considering the patient's age as well as the canines' wear pattern, it was established the patient was not a grinder, but had a vertical chewing pattern. At this time, the patient only wanted to correct the esthetic problem with as conservative an approach as possible without compromising longevity.

## Treatment Planning

The upper central incisor crown eventually would be replaced; however, because this was not the patient's priority, it was adjusted on its lingual surface to obtain a more favorable lingual contour. This adjustment would additionally provide for the appropriate

guidance for the incisal edges of the lower anterior restorations. To fulfill the patient's wishes as well as obtain biocompatibility, durability, ease of cementation, and predictable long-term results, the Captek crown was selected. Study models were made and mounted on an articulator. A diagnostic wax-up was done to establish the contours for the provisional restorations, which allowed the authors to determine if the new anterior guidance was acceptable to the patient. It was understood the lower incisors might need root canal therapy and crown lengthening to provide adequate reduction and the necessary foundation required by the final restorations; however, it was not necessary in this case.

## Preparation

The teeth were prepared with a definitive 360° margin (Figure 4). A polyether final impression (**Impregum and Permadyne, 3M ESPE**) was made using the double cord technique, allowing for accurate reproduction of the margins in the impression material and the master model (Figures 5 and 6).

## Provisionalization

The provisional restoration was fabricated by using the diagnostic wax-up. A clear, vinyl polysiloxane **Affinity (Clinician's Choice Dental Products, Inc)** index was made from the diagnostic wax-up, extending one tooth beyond the prepared teeth. A "V"-shape cut was created in the polysiloxane index allowing for the escape of excess material as well as air (Figure 7). **EliteFlo Translucent (Bisco, Inc)** was used on



Figure 1—Anterior view of overbite.



Figure 2—Anterior view of upper and lower anterior teeth.



Figure 3—Anterior view of lower incisors showing advanced wear.



Figure 4—Lower anterior teeth prepared.



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**Case Study continued**



**Figure 5**—Buccal view of model work showing well-defined margins.



**Figure 6**—Incisal view of model work with sufficient tooth reduction for the fabrication of the final crowns.



**Figure 7**—Untrimmed provisional in the mouth.



**Figure 8**—Completed and polished provisional in the mouth.

3M SPREAD



*Figure 9—Captek coping.*



*Figures 10 through 12—Anterior, right, and left views of the final restorations.*

3M SPREAD

## Case Study continued

the buccal incisal third of the index. The teeth were air dried and lightly lubricated with petroleum jelly. **PerfectTemp (Discus Dental, Inc)** was syringed on the teeth as well as into the index. The index was slowly placed in the mouth and after 1 minute, it was light-cured to polymerize the flowable composite. The provisional restoration was removed from the mouth. The excess material was trimmed, final contours were established, and

the occlusion was adjusted as necessary verifying centric occlusion, protrusive, and lateroprotrusive movements. The provisional restoration was polished and readied for temporary cementation. The gingival areas were lubricated with petroleum jelly to help facilitate in the removal of the temporary cement (Figure 8). An alginate impression was taken to aid the laboratory technician on what contours can be created with the final restorations.

### Laboratory Fabrication

The Captek copings were fabricated and cut back before porcelain application (Figure 9).

### Restoration Seating

The provisional restoration was removed, and the preparations were disinfected with **Cavity Cleanser (Bisco, Inc)**, lightly dried, and the final restorations were cemented with **GC Fuji Plus (GC America Inc)**. The occlusion

was verified to confirm occlusal load distributed along with the natural teeth and the final crowns (Figures 10 through 12).

### DISCUSSION

The patient's wear on the lower incisors was created by parafunctional habits in conjunction with an inadequate occlusion. Considering his wishes and age, it was agreed the upper central crown would be replaced after the completion of the four lower crowns. The patient admitted grinding his teeth in the past but had not done so for several years; therefore, a nightguard was not fabricated. This allowed for the improvement of an anterior guidance, while correcting the esthetic problem the patient presented with. A consideration for full/limited occlusal adjustment was presented to the patient, but it was declined.

### CONCLUSION

## Product References

**Product:** In-Ceram  
**Manufacturer:** Vita Zahnfabrik  
**Distributor:** Vident  
**Address:** 3150 East Birch Street  
Brea, California 92821  
**Phone:** 800.828.3839  
**Fax:** 800.848.2726

**Product:** Procera  
**Manufacturer:** Nobel Biocare USA, Inc  
**Address:** 22715 Savi Ranch Parkway  
Yorba Linda, California 92887  
**Phone:** 800.322.5001  
**Fax:** 714.998.9236

**Product:** IPS Empress I & II  
**Manufacturer:** Ivoclar Vivadent, Inc  
**Address:** 175 Pineview Drive  
Amherst, New York 14228  
**Phone:** 800.533.6825  
**Fax:** 716.691.2254

**Products:** Impregum, Permadyne  
**Manufacturer:** 3M ESPE  
**Address:** 3M Center  
Building 275-2SE-03  
Maplewood, Minnesota 55144  
**Phone:** 800.634.2249  
**Fax:** 800.782.0956

**Product:** Affinity  
**Manufacturer:** Clinician's Choice Dental  
Products, Inc  
**Address:** P.O. Box 1706  
New Milford, Connecticut  
06776  
**Phone:** 800.265.3444  
**Fax:** 800.719.3292

**Products:** ÆliteFlo Translucent, Cavity  
Cleanser  
**Manufacturer:** Bisco, Inc  
**Address:** 1100 West Irving Park Road  
Schaumburg, Illinois 60193  
**Phone:** 800.247.3368  
**Fax:** 847.891.5043

**Product:** Perfect Temp  
**Manufacturer:** Discus Dental, Inc  
**Address:** 8550 Higuera Street  
Culver City, California 90232  
**Phone:** 800.422.9448  
**Fax:** 310.815.5161

**Product:** GC Fuji Plus  
**Manufacturer:** GC America Inc  
**Address:** 3737 West 127th Street  
Alsip, Illinois 60803  
**Phone:** 800.323.7063  
**Fax:** 708.371.5103

**Product:** Captek  
**Manufacturer:** Captek: A Division of Precious  
Chemicals, Inc  
**Address:** 250 Altamonte Commerce  
Boulevard  
Altamonte Spring, Florida 32714  
**Phone:** 800.921.2227  
**Fax:** 407.889.8893



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## Case Study continued

The dental profession continues to make tremendous strides in full coverage esthetics, the one factor that holds fast is that the ceramist requires sufficient room to work his magic with porcelain. The Captek crown is a restoration that can aid dentists in cases in which they are limited in the amount of space they can provide the ceramist. ○

## REFERENCES

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3. Zappala C, Shoher I, Battaini P. Microstructural aspects of the Captek alloy for porcelain-fused-to-metal restorations. *J Esthet Dent.* 1996;8(4):151-156.
4. Sorensen JA: The Lava All-Ceramic System: Leading the Way into the New Millennium with Digital Dentistry. *Synergy in Dentistry.* 2002;1(2):10.
5. Sorensen JA, Berge HX, Edelhoff D: Effect of storage media and fatigue loading on ceramic strength [abstract]. *J Dent Res.* 2000;79:271. Abstract 1017.