In 2004, I authored a paper outlining a cosmetic case where the maxillary arch was restored comprehensively with hard and soft tissue adjustments and a mixture of pressed porcelain veneers and Captek™ crowns of various coping designs. The paper entitled “Periodontal Compatibility of Intracrevicular Captek™ Restorative Margins”; A Case Report, was published in the journal Contemporary Esthetics and the Restorative Practice. For me personally, the case was a major challenge to the prosthodontic principles that I have learned, practiced and taught throughout the years. In fact, in the article, we specifically identified a calculated risk in placing a margin in the esthetic zone deep within the sulcus due to the esthetic demands of the case and that the patients left central incisor was ankolyosed and in buccal version. Interestingly, the basic principles we applied in this case provide good guidance for balancing ideal margin placement, margin design and coping design for our daily restorative challenges as well.

Margin placement, margin design and coping design principles applied in 2004 published Captek™ case.

**Figure 1:** Case marked for potential corrective adjustments and to visualize and measure esthetic outcomes.

**Figure 2 and 3:** Notice #9 is longer from insisal edge to margin edge due to contour adjustment necessary with the ankolyosed mal-aligned tooth. A 360° metal collar was placed to accommodate the conservative margin design, placed in the bottom half of the sulcus, so as to idealize restoration contour and to minimize presence of harmful bacteria. Porcelain margins were placed on other Captek™ restoration with equigingival or slightly subgingival margins designed prepared with shoulders.

**Figure 4:** 3 year post op

**Figure 5:** Stable and healthy probe depths surrounding #9 with Captek™ subgingival metal collar placed in the bottom half of the sulcus.
In hindsight we made many good clinical decisions in regards to margin placement, margin design and coping design. Having the Captek™ material in our arsenal along with a skilled lab made the case come together. We were very pleased with the esthetic outcome for the patient but even more excited about the biological health. Now after the six year mark, this case has become very helpful to articulate the versatility of the Captek™ material. The versatility of the material enables clinicians like me to balance what I believe the optimal margin placement should be, with my desired margin design, largely because the coping design can easily be altered. The versatile coping design is a fundamental benefit of the unique Captek™ system, and is needed to achieve outstanding esthetic and biological results in a wide variety of clinical situations. Of course there are many factors to consider regarding restorative dentistry, but for this series I will break down topics into small pieces and just hone in on them individually. So, please don't think I forgot about biological width and porcelain smoothness just because I am writing about coping design. In this web series, I will share my thoughts and sequencing on many restorative topics. It will not be hard to see the important role the new and improved Captek™ system plays in solving some of the challenges we face as clinicians. The labs that I work with, and especially the team at DAL, have seen and documented the important esthetic and biological results that can be attained with the Captek™ material when we are on the same page. It is so nice to have a thin, nicely colored coping that repels harmful bacterial plaque. In Poker, it is important to know when to hold em and know when to fold em. For Captek™ it is important to know when to extend the metal to the margin edge, expose a metal collar and/or cut back the metal for an all ceramic margin. As in the case I showed earlier, it is really easy to see the potential of this material when the doctor and lab are on the same page in knowing how to handle the margin edge.

**Margin Placement:**

It is widely believed that the best biological place for a restorative margin is supragingival. And, the surface most compatible with the periodontium is the natural tooth or root interface. However, due to dental disease and/or aesthetic demands, it is not always possible or desirable to leave restorative margins “high and dry”. As we enter the gingival sulcus with the restorative margin, there is potential to create an unhealthy gingival environment unless we pay close attention to detail. Yet, when restoring teeth that are 1) dark, or endodontically treated, and 2) short cervico-incisal and in need of more length for retention purposes, 3) have contacts that need to be lengthen apically to avoid dark triangles, 4) or for patients at risk for periodontal concerns, sulcular margin placement must be considered.

A good rule of thumb that I use clinically is the “50% rule”. Due to the increased degree of accessibility and visibility, I will try to keep the margin edge in the top half of the gingival sulcus. Criteria such as soft tissue management, impressioning, and cement clean up are easier to manage if the margin placement is in the UPPER 50% of the gingival sulcus.

Yet, a common mistake made by many dentists, in my opinion, is not placing the margin deeper in the sulcus when it is needed. For darker underlying tooth structure and when doing corrective contouring, placing the margin in the bottom 50% of the sulcus many times will give the best esthetics and profiles. Yet, as I said, we need to be sure that a margin placed in the bottom 50% of the sulcus is in balance with the appropriate margin and coping design.

Obviously, we understand that the farther the margin is placed toward the base of the sulcus, or beyond that “50%” point, the closer we are to the attachment. The closer I am to the attachment the more I am thinking about making sure the material I use is Captek™. In the case I showed earlier, the margin placed on #9 was a very conservative, soft chamfer. The coping design was metal to the edge shaped as a collar (Figure 2 and 3). If there is enough room, the coping design can be formed without a collar, yet when in the sulcus I look to make sure only one material is at that edge and it is the Captek™ metal. Exposing the Captek™ material, even if it is just ever so slightly, will seal and protect the prepared tooth, and inhibit colonization of harmful bacteria.
Something else to remember, the deeper in the sulcus a margin is placed, the more difficult it is to get that “cuff” around the margin that we like to see in our final impressions. That cuff is very important to direct the technician in their contour and profile management during restoration shaping. And as we know, poor contours can cause irritation too. So more care must be given, when placing this margin and during impressioning. For these types of cases I use a two cord impression technique (00 or 000 at the sulcus base and a 1 or 2 adjacent to the restorative margin). There still should be a small cuff beyond the margin edge but extra direction from the clinician to the technician is always helpful. Without the hard guidance from the model or direction from the dentists, it would be hard for the technician to determine root alignment for emergence angles.

Captek™ is classified as a metal composite material. This unique metal is known to be associated with lower bacterial plaque attraction. Research determined that there is significantly lower bacterial plaque surrounding Captek™ restorations over time. This has become visible to me in the form of healthy looking, stable gums. So, for clinical situations that necessitate subgingival margin placement, Captek™ is the obvious choice, particularly with patients that have less than ideal gingival health, or are at risk for caries, periodontal disease, have dry mouth, cardiovascular disease, arthritis, diabetes, or are on medications. It is not surprising that most of the cases we treat happen to fall into one or more of these categories.

Below are a few cases that might help explain the esthetic, contour and biological benefits that one can attain with Captek™ when the margin placement, margin design and coping design are in balance.

**Case 1**

Case review entitled “An Esthetic Alternative in Full Coverage Restorations”; published in Nov. 2004 Contemporary Esthetics and the Restorative Practice. (Rubinstein, Sa, Nidetz, Z.)

**Figure 7:** 74 year old patient with advanced wear.

**Figure 8:** The teeth prepared with a definitive 360° margin. Notice the buccal margin appears to be in the top 50% of the sulcus to even equigingival whereas the proximal margins appear to be deeper to accommodate ideal contours.

**Figure 9:** Captek™ copings designed with metal extended to edge proximally and on lingual for margin seal, and health benefits. The metal was cut back on facials to accommodate butt margins and transparency.

**Figure 10:** Esthetic and healthy final result.

**Case 2**

**Figure 11** and **12:** Single central restored with Captek™. Underlying tooth structure was ideally colored; margin placement could be placed equigingivally without effecting contour. Patient was not at risk periodontally. Margin design was a 360° shoulder. Coping design with metal cut back from margin edge was chosen. Notice the vibrant esthetics of the restored central. (Figures on page 3)
All too often on posterior crowns, balance between margin placement, margin design, and coping design are not maintained. Many times we see this out of balance on the buccal (Case 3), but don't forget that the lingual (Case 4), is important as well, especially for patients at risk. (Referencing Figures 13-19)

**Case 3**

![Figure 13: Middle aged female presented with traditional PFM where margin placement, margin design and coping design were out of balance.](image1)

![Figure 14: A detailed shade map was provided to the lab. Crown was removed and case re-prepared. Margins were placed in top 50% of sulcus. Margin design was a definitive Chamfer. Coping design was metal to the edge. Two week recall.](image2)

![Figure 15: 5 year recall. Dentistry by Dr. John Gammichia, (Apopka Florida)](image3)

**Case 4**

![Figure 16 and 17: Pre-op buccal and lingual view of middle age female patient with lower 1st molar to be restored.](image4)

![Figure 18: Seating appointment. Notice lingual margin placement is super gingival.](image5)

![Figure 19: One month follow up. Preferably, with patients at risk, intracrevicular margin placement should be considered, with Captek™ metal extended to edge. Leaving metal supergingivally in this case may not offer any biological protection from harmful bacteria.](image6)

**Conclusion**

The Captek™ material was named by Dr. Neil Gottehrer in the May issue of Dentistry Today as the PerioEsthetic™ restoration. Before we had a name for it, myself and many others have been prescribing Captek™ in order to minimize harmful sulcular bacteria that could put our restorations at risk. When one understands the versatility this material offers in accommodating various margin placement, preparations designs and coping designs, one can maximize optimal treatment for all patients in all situations.

Thank you for joining me on this project. I hope you enjoy the information as much as I enjoy thinking back on the cases and people that have taught me these lessons. Please reach out to the fine folks at DAL or to me directly at any time. We value your feedback.