Gingival Response to Crowns: A Counterpoint

Omar El-Mowafy, *BDS, PhD, FADM*

Contact Author

Dr. El-Mowafy
Email: *Omar.El-Mowafy@dentistry.utoronto.ca*

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I thank Dr. Tony Pensak for his interest and comments on my article on gingival response to crowns.[1,2] Dr. Pensak is suggesting that the poor gingival response of the 2 maxillary central incisors to the metal-ceramic crowns (**Fig. 1**) had more to do with the metallic content of these crowns than their marginal fit and contour.

The literature is rich with evidence of long-term success and longevity of metal-ceramic crowns for as much as 23 years, even when they were made by undergraduate students.[3–7] Therefore, I am unable to completely agree with Dr. Pensak's suggestion, as I have no doubt that, in the case I presented, the major cause of the undesirable gingival response following placement of metal-ceramic crowns had more to do with their marginal fit and contour than their metallic content.

However, I must agree with Dr. Pensak that the type of metal alloy used for fabrication of metal-ceramic crowns may influence the gingival response to varying degrees. When prescribing metal-ceramic crowns to their patients, dentists are faced with a number of choices of alloys, ranging from high noble alloys with a noble metal content of 60% or higher, to noble alloys with a noble metal content not less than 25%, to base metal alloys. Some base-metal alloys contain nickel, an element with a relatively high sensitivity rate of 4.5% in the general population and considerably higher in females.[8]

Ideally, metal-ceramic crowns should be fabricated using high-noble or noble metal alloys. If the dentist uses a base-metal alloy to reduce the overall cost of the crown to the patient, the potential for an allergic or sensitivity reaction will be high. This may manifest itself in the form of mild marginal to moderate gingivitis similar to that seen in the clinical cases that Dr. Pensak kindly shared with us. Therefore, although I am sure that in the clinical case I presented, the major causes of the undesirable gingival response were the poor marginal fit of the crowns along with less-than-ideal gingival contour, I am unable to rule out the possibility of this reaction being compounded by an allergic response to some of the constituents of the metal alloy used in

Figure 1: Facial view of the anterior teeth shows 2 porcelain-fused-to-metal crowns on the maxillary central incisors. The crowns had undergone incisal wear, which revealed the metal backing. Partial loss of the glaze layer resulted in a granular surface texture. The 2 crowns did not match in terms of either height or width. The gingival tissues were inflamed and hyperplastic because of the ill-fitting margins.

Figure 2: Postoperative view 3 years after placement of the porcelain crowns. There was better healing of the gingival tissues and proper shaping of the interdental papilla between teeth 11 and 21.

their fabrication. As I was not the one who provided these metal-ceramic crowns to the patient, I have no means to determine their exact metallic content. Nevertheless, even if there was some allergic reaction to the metallic content of the crowns, its contribution to the overall response was minor and definitely not the main culprit (**Fig. 2**).

In the future, I think use of metal-ceramic crowns in anterior teeth will decline. This is because porcelain crowns are currently fabricated using digital automation (computer-aided design and manufacture) which is less technician dependent, and their clinical performance is reported to be satisfactory as evidenced in the literature by superior esthetics.

In commenting on another clinical case that Dr. Pensak presented, which involved the use of diode laser to conduct gingivectomy that left underlying bone with only 0.5 mm of soft tissue coverage, thus violating the biologic width, he stated anecdotally, "If this situation were unusual, it would not be noteworthy. However, tissue response to this type of invasion of the theoretical biologic width is consistent and, in my experience with hundreds of examples, has never resulted in gingival complications, as long as metal-free prosthetics were provided."[1]

According to Ingber and colleagues,[9] a combined dimension of connective and epithelial tissue attachment of 2.04 mm, on average, represents the ideal biologic width. Values less than this average may result in clinically satisfactory outcomes; however, an extreme value of only 0.5 mm is beyond the limits and renders outcomes of such treatment unpredictable.

I also think that the material from which the crown is made, metal-ceramic versus all-ceramic, has little to do with the outcome of such surgical procedures as long as an appropriate alloy is used in the case of metal-ceramic crowns.

THE AUTHOR

Dr. El-Mowafy *is a professor in the department of clinical sciences, faculty of dentistry, University of Toronto, Toronto, Ontario.*

Correspondence to: *Dr. El-Mowafy, Department of clinical sciences, Faculty of dentistry, University of Toronto, 124 Edward St., Toronto ON M5G 1G6.*

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