

From Non-Esthetic to Esthetic Rehabilitation: A Case Report

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ABSTRACT

Aim: The aim of the present article was to compare the objective and subjective esthetic outcomes of two types of materials that is the porcelain fused to metal and the full ceramic, for the fabrication of the fixed partial denture in the anterior teeth.

Summary: All-ceramic systems can provide a better esthetic result for wider range of patients than can metal-ceramic systems, because wider range of translucency and opacity (value) can be achieved. All-ceramic systems have no metal framework to be masked or metal margins exposed that produce an unattractive appearance. Often, it is acceptable to leave margins of all-ceramic prostheses supragingival or at the gingival margin, resulting in more predictable and less traumatic impression-making. Emergence profiles are less likely to be overcontoured, as is often the result with metal-ceramic prostheses owing to efforts by laboratory technicians to provide a thicker layer of porcelain to mask the opaque-metal surface in areas that often are underprepared. This article discusses the advantages of full ceramic crown over the porcelain fused to metal crown in the anterior maxillary teeth.

Keywords: Black margins, esthetics, full ceramic crown, porcelain fused to metal,

INTRODUCTION

Dentistry has undergone a revolution in the last 30 years, not only with regard to the introduction of new materials and techniques, but also with regard to the scientific evidence supporting their clinical applications. As ceramic materials for dentistry evolve and as patient's demand for esthetic restorations increases, practitioners must keep up with the science as well as the demand of the patients.¹ Proper guidance to the practitioner is required in selecting the appropriate system for crowns as well as the knowledge of the optical properties of available ceramic systems which will enable the clinician to make appropriate choices when faced with the various esthetic challenges.

The material which looks very much similar to the natural tooth is the full ceramic as it is more translucent when compared to the porcelain fused to metal which has a more of opaque core. For the anterior, esthetic zone, all ceramic is best. The lab-work is certainly more delicate however the outcome is more esthetic. For a posterior area, one may consider porcelain fused to metal as forces of occlusion are far greater.

CASE REPORT

A patient aged 16 years old had come to the dental office with the chief complaint of blackish line near the gingival margin of her upper anterior replaced teeth. The patient also had a complaint that her replaced teeth were a little bulky and she was not satisfied with their appearance (Fig. 1). She had undergone treatment for missing upper left lateral incisor two years back in some dental clinic. There was a fixed partial denture (FPD) from 11 to 23 which was a porcelain fused to metal crown. The FPD was removed followed by thorough supragingival and subgingival scaling in relation to maxillary anterior region (Fig. 2). The patient was given oral hygiene instructions and was advised to use 0.2% chlorhexidine mouthwash twice daily for the next 7 days. After 7 days the inflammation had come down and the final tooth preparation was done.

When preparing a tooth for a crown, the preparation should, ideally, exist entirely in enamel. The amount of tooth structure required to be removed will depend on the material being used to restore the tooth. However, in this case as full ceramic material was being used so additional 0.5 mm of tooth



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Figure 1: Pre-operative view showing the anterior teeth of patient having the FPD made of porcelain fused to metal from 11 to 23. Patient was unhappy with the size of the FPD and the blackish line near the gingival margin of the replaced teeth.



Figure 2: After the removal of FPD followed by thorough scaling.



Figure 3: Post-operative view after the placement of full ceramic crowns.

reduction was done over the tooth structure which was already reduced to 1.5 mm in the previous treatment when PFM crowns were used.

The prepared tooth also needed a certain degree of taper to allow for the restoration to be properly placed on the tooth. The undercuts on the surface of the prepared tooth were removed. At the same time, too much taper will severely limit the grip that the crown has while on the prepared tooth, thus contributing to failure of the restoration. Generally, 6° of taper around the entire circumference of the prepared tooth, giving a combined taper of 12° at any given sagittal section through the prepared tooth, is appropriate to both allow the crown to fit yet provide enough grip.

The margins were smoothed, well-defined delineation so that the restoration, no matter how it is fabricated, can be properly adapted and not allow for any openings visible to the naked eye. Biologic width is the mandatory distance to be left between the height of the alveolar bone and the margin of the restoration, and if this distance is violated because the margin is placed too subgingivally, serious repercussions may follow. So care was taken not to violate the biologic width.

There are different types of margins that can be placed for restoration, like the chamfer and shoulder. In this case a shoulder preparation was done which usually increases the thickness of the material being used and a bevel was added. This served to effectively decrease the tooth-to-restoration distance upon final cementation of the restoration.

Final impression was then taken, after the placement of gingival retraction cord, for the fabrication of FPD for missing tooth with the full ceramic crown. Proper shade matching and smile designing was done. The final FPD was made from 11 to 23 which was cemented with Type II GIC luting cement (Fig. 3). The patient was satisfied with her new smile and did not complain of the blackish line near the gingival margin, she was also happy with the size and form of her new replaced upper anterior teeth, in the follow up visits.

DISCUSSION

The size, form and appearance of the maxillary anterior teeth are important not only to dental esthetics but also to facial esthetics. The goal is to restore the maxillary anterior teeth in harmony with the adjacent tissues as well as the facial appearance. However, there is little scientific data in the dental literature to use as a guide for defining the proper size and shape of anterior teeth or determining normal relationships for them and the adjacent tissue.² According to Young “it is apparent that beauty, harmony, naturalness, and individuality are major qualities” of esthetics.³

So far various materials have been used for the replacement of missing tooth in the anterior region like the full gold restorations, full ceramic crowns, porcelain-fused to metal (PFM), leucite reinforced, alumina, zirconia and others. In the present case the difference could be made between the PFM crowns and the full ceramic crowns in the anterior esthetic zone and what satisfies the patient more.

PFM crowns can be color matched to the teeth and are the most common type of crowns used. These crowns are very strong, have a good appearance, and are very reasonably priced. All types of alloys are used. Porcelain can be fused to a standard alloy base which can be comprised of metals such as nickel or chromium, or they can be fused to precious metals such as platinum, silver, or gold. The precious metals cost more than standard alloys. However, in full natural light, the metal base can show through as a shadow in the tooth, especially for front teeth. Also, over time, if the gums recede from the crown, the metal base can be seen as a dark line that will show where the crown meets the gingiva.

On the other hand, full porcelain or full ceramic crowns provide the best natural appearance and are also an excellent choice for patients who have metal allergies. They are most commonly used for anterior teeth, as they have an excellent natural appearance. However, they are not as strong as PFM crowns, are more expensive, and can be prone to chipping or cracking. As such, they are not typically used for rear teeth.

Nevertheless, to use all-ceramic systems successfully, the clinician must have a high level of knowledge both to maximize the esthetic result and to choose materials appropriately for structural longevity, while metal-ceramic systems are well enough developed that little special knowledge is required for their routine use. Many practitioners may be unaware of the metal-ceramic systems their laboratories use, but any system generally will be as suitable for anterior single-unit restorations as it is for posterior multi-unit prostheses. This forgiving restorative system has survival rates of about 74 % at 15 years, and 53% of metal-ceramic restorations have been reported to be in service at 30 years.^{4,5} Long-lived esthetics and bio-compatibility are the promise of all-ceramic systems. All-ceramic systems are no longer experimental or suitable only for specialty practices. Clinical data and years of experience form the basis of this article, which helps to provide interested clinicians with the background to begin integrating all-ceramic restorations into their routine practice.⁶

With the availability of a variety of metal-free restorations, clinicians have to be aware of their various properties in order to ensure that they select the right restoration for a given case. For anterior full coverage restorations, where aesthetics is the prime concern, all ceramic crowns with a translucent core are an excellent choice. Although crowns with translucent core are good in aesthetics, they are poor in strength, so they are recommended for anterior teeth with dentin that are not heavily discolored. In heavily discolored teeth a temporary crown is a useful guide,⁷ to know if its shade is influenced by the underlying substrate, in which case a crown with an

opaque core can be used. While using translucent crowns tooth preparation with an equigingival margin is recommended.⁷ They will require resin cement for cementation, which will enhance the strength of the crown through bonding. It is advisable to use light cured resin luting agents, as they are more color stable compared to dual cure resin cements, which may discolor due to the release of amines, over a period of time.

Full ceramic crowns with opaque cores are superior in strength, with good aesthetics, and can be used for posterior teeth as well as for the anterior teeth with heavy discoloration. Crowns with the Zirconia core are recommended for fixed partial dentures. One can use resin or conventional luting agents for cementation as the color of the cement will not affect the shade of the crown. When restoring anterior teeth with these crowns it is advisable to end the margin subgingivally, as there could be a mismatch in shade between the tooth margin and the restoration. The strength of these restorations is dependent on the ceramic material used, the Core-Veneer bond strength, the crown thickness, and the design of restoration.⁷ However metal-free restorations are not recommended in subjects who have heavy bruxism.

CONCLUSION

Happiness is a state of mind. It is brought about by a feeling of well-being, security and confidence in one's self. The dentist should render the patient, the confidence that none of these fine senses will be in jeopardy. The development of a pleasing oral and facial expression for the patient depends upon the dentist ability to replace the missing teeth, both in contour and color especially for the anterior teeth.

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