

## A Prosthodontic Approach to Enhance Esthetics in a Patient with Malaligned Upper Anterior Teeth

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### Abstract

**Introduction:** This clinical report describes a prosthodontic treatment alternative to orthodontic treatment to obtain a desirable esthetic outcome.

**Clinical case report:** The patient was unwilling to receive orthodontic treatment to correct the chief complaint of a flared anterior tooth. However, this case presented a favorable situation, as an existing crown preparation allowed room to adjust the malalignment of the area of concern for the patient to achieve aesthetic results.

**Conclusion:** The prosthodontic approach can be beneficial in obtaining desirable outcomes in selected cases and should be presented as a treatment plan option with adequate patient education.

### Introduction

Dental esthetics can have a significant impact on the psychosocial well-being of people. It has been demonstrated that dental esthetics can negatively affect others' perceptions of one's social competence, intelligence, and personality. [1,3] This can create a disadvantage in everyday social situations for those who struggle with dental esthetics. A poor perception of dental esthetics can also affect how one views oneself and one's level of confidence in their appearance. [4,5] These concerns may arise later in a patient's life and should receive attention to ensure improved well-being. [6] Those with increased severity of malocclusion have decreased self-confidence,

decreased dental self-confidence and increased psychosocial impacts.

[4]

In the case of severe malocclusion, orthodontic treatment is the ideal treatment plan. However, not all patients may accept orthodontic treatment, even when the patient is well informed of the advantages of orthodontic treatment over restorative treatment and the limitations of this treatment. A camouflaging prosthodontic approach can be beneficial in obtaining desirable outcomes in selected cases and should be presented as a treatment plan option with adequate patient education.

### Clinical Case Report

A 67-year-old male patient reported to the undergraduate dental clinic of the Schulich School of Medicine and Dentistry at Western University with the chief complaint of a flared anterior tooth and was seeking cosmetic rehabilitation. Informed consent to document the case report was obtained from the patient.

#### Treatment Planning Process

The patient was presented with a ceramic crown on tooth 21, cemented in 1976. He felt that the crown was bulky and too prominent.

He stated that his friends constantly made him uncomfortable about it. He was seeking to have the crown replaced, and the alignment improved. The patient has canine guidance on lateral excursions. Finances were not a concern for the patient. Upon clinical examination and radiographic interpretation, the crown was found to be defective, with an open margin on the mesial surface and caries on the lingual of tooth 21. Pre-treatment radiographs were taken as part of the comprehensive exam (Figure 1,2).



**Figure 1:** Periapical radiograph of tooth 21 showing defective mesial crown margin.



**Figure 2:** Panoramic radiograph showing patient's dentition.

Since the patient's tooth 21 was observed to be buccally positioned, a pre-prosthetic orthodontic treatment was proposed, as simply replacing the crown may not result in a satisfactory esthetic outcome. We expressed that we would prefer the patient to have pre-prosthetic orthodontic treatment followed by replacement of the existing defective crown, as this would be the most conservative treatment option. We discussed both the benefits and limitations of this option. After a discussion with the patient and allowing him time to think about the proposed plan, the patient decided not to pursue orthodontic treatment for his chief complaint at his age.

Several alternative treatment options were also proposed. One alternative option was to replace the existing crown on tooth 21 with a new all-ceramic crown (ACC) that would have a more esthetic contour and be a better match in terms of shade. Another alternative was performing pre-prosthetic root canal treatment (RCT) on tooth 21 and over the reduction of tooth 21 to achieve better alignment with the adjacent teeth to improve the esthetics further. Wax-ups of these options and benefits and risks were presented to the patient. After a discussion, the patient recognized the benefits of preserving the vitality of tooth 21 and opted out of having RCT on tooth 21 to improve esthetics.

A third treatment option consisted of replacing the existing crown on tooth 21 and adding ceramic veneers to tooth 11 and tooth 21 with minimal tooth preparation to camouflage the malalignment concerning the patient. A wax-up of tooth 21 with the crown and the two veneers on teeth 11 and 21 were presented to the patient along

with the treatment option like other operators did for a similar case. [7] As the defective crown on tooth 21 was planned to be replaced with an ACC, space would be created for ceramic build-ups on the adjacent teeth 11 and 22 to camouflage the existing malalignment. This was possible because heavy occlusal forces were not involved with the teeth in question from teeth 11 to 22, as the patient had canine guidance on both right and left lateral excursions and no contacts on teeth 11 and 22 in protrusion. We noted limited space between the distal incisal corners of tooth 22 and tooth 32 on a left lateral excursion; therefore, an enameloplasty on the distal incisal corner of tooth 32 would be beneficial to create adequate space for a veneer. We spoke with the patient about the limitations of veneers when the option was presented and allowed time for the patient to think about the proposed treatment plan.

Initially, the patient wished to begin removing the crown on tooth 21 and would decide about having veneers once that was completed. We proceeded with the crown removal and placed a provisional crown made of bis-acryl composite temporary crown and bridge material on tooth 21 (Figure 3). The provisional crown was used for a diagnostic purpose to evaluate esthetics, function, and phonetics as described by other operators. [8] After the patient had a better visualization of the contour of the replacement crown in his mouth, he wished to seek a more esthetic outcome. The patient decided on the third proposed treatment option (replacing the existing crown with an ACC crown and ceramic veneers on teeth 11 and 22).



**Figure 3:** Frontal picture of the patient's teeth with a provisional crown on tooth 21

### Treatment

Veneer preparation for teeth 11 and 22 was minimal to establish a 0.3 mm margin with 014 chamfer diamond burs (**Figure 4**). Reduction of the buccal surfaces (excluding the gingival margin) was unnecessary, as the veneers would be build-ups and have adequate thickness without buccal reduction of the teeth. The incisal edges and mesial interproximal surfaces of teeth 11 and 22 were reduced by 1.5.

mm. A butt joint incisal preparation design created a uniform stress distribution within the veneer-tooth system.[8] Tooth reductions were checked with PVS putty cut-back guides and a periodontal probe. Enameloplasty of the distal incisal corner of tooth 32 was done using a medium grit contouring and polishing disc to allow for adequate clearance between teeth 22 and 32 during the left lateral excursion.



**Figure 4:** Veneer preparations on teeth 11 and 22 and ACC preparation on previously prepared tooth 21

The gingival retraction was achieved using a two-cord technique with size 000 and 00 retraction cords soaked in aluminum chloride 5%. A final impression was taken using the one-step technique, dispensing a light body PVS material directly onto the prepared teeth and applying a heavy body PVS material to the impression tray for simultaneous setting.

A three-unit provisional restoration from tooth 11 to 22 was fabricated from bis-acryl composite temporary crown and bridge material. This provisional restoration was cemented with non-eugenol temporary dental cement for tooth 21. For teeth 11 and 22, a spot etch and bond technique was performed with flowable composite (3M, St. Paul, MN, USA) as dental cement material.

The shade ND2 was chosen for the stump shade of the crown for tooth 21 from the IPS Natural Die Material shade guide (Ivoclar Vivadent Inc.). The shade 2M1 was selected for tooth 21 ACC and ceramic veneers using the Tooth guide 3D-Master shade guide (VITA, Yorba Linda, CA, USA) and was matched to tooth 12.

The IPS e.max lithium disilicate crown (Ivoclar Vivadent Inc.) for tooth 21 and the veneers for teeth 11 and 22 were tried in for fit and

adaptation to the preparation margins. Interproximal contacts and occlusion were checked with floss and articulation paper, and no chair-side adjustment was needed. After the shade and contour of the restorations were reviewed and approved by the patient, the final cementation procedure for lithium disilicate crowns was carried out. The intaglio surfaces of the restorations were treated with Monobond Etch and Prime (Ivoclar Vivadent Inc.), and cementation was completed using RelyX™ Ultimate Cement (3M, St. Paul, MN, USA) per the manufacturer's instructions. [9,10] A 24-hour check was conducted to check the marginal seals, interproximal contacts and occlusion (**Figure 5,6**). The patient reported no issues with the cemented restorations and no adjustment was deemed necessary. The patient was seen for 5 months follow-up appointment, and both I/O&E/O pictures were taken for documentation (**Figure 6,7**). Marginal seals, proximal contacts, MI contacts, and excursive contacts were checked. Based on our examination at 5-month follow-up appointment, no changes have been observed since the cementation appointment. The patient was pleased with the outcome

and noted continued compliments on his smile. He also noted improved feelings about his anterior teeth and increased self-esteem in social interactions.



**Figure 5:** Cemented restorations on teeth 11, 21 and 22



**Figure 6:** Enhanced esthetics of the patient's smile 24 hours after the treatment



**Figure 7:** Frontal picture of the patient's teeth at 5 months follow-up appointment



**Figure 8:** Enhanced esthetics of the patient's smile at 5 months follow-up appointment

## Conclusion

There is importance in considering a prosthodontic approach alternative to orthodontic treatment for malalignment cases to obtain a desirable outcome. This case is an example of a patient presenting with a targeted area of esthetic concern with no interest in receiving orthodontic treatment. The patient self-identified how his esthetic problem impacted his life and wished to seek a solution. By

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