SHORT COMMUNICATION

Aesthetic rehabilitation in a patient with tooth wear

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ABSTRACT

This case report sheds light upon the procedural treatment of aesthetic oral rehabilitation in patients with tooth wear so that not only a specialist but also a general dental practitioner can easily tackle cases of this caliber. In this case report, the treatment of a 58-year-old man with aesthetics concerns, tooth wear, and sensitivity in anterior teeth is discussed. The need for a stabilizing splint, crown lengthening, and the provisioning of partial dentures in the upper and lower arches were all part of the treatment protocol in this case. The prevalence of tooth wear and the aesthetic demands of patients have increased in our society nowadays. When both of these problems are encountered together in the dental practice, strict treatment planning is needed to achieve success.

Key words
Bruxism, occlusal vertical dimension, tooth wear

INTRODUCTION

Since the development of dentistry, there has been a mystery attached to what makes an esthetically pleasing dentition and what is deemed to be otherwise. The Egyptians, the Romans, and the Greeks were the fore-runners in the matter of aesthetics. They came up with various mathematical calculations so that beauty could be categorized, hence a war waged between what was mathematically appropriate absolute beauty and what was imperfect and numerically irregular subjective beauty. Their art and architecture still undoubtedly resonates their understanding of this subject.[1] When we talk about aesthetics in dentistry, we enter a whole new realm that deals with the color, form, lines, symmetry, unity, and harmony of the dentition.

In the 21st century, patients that come seeking for dental treatment bear high aesthetic understanding and expectations.[2] Nowadays, a treatment plan that endangers the esthetic condition of the patient is abstained from, unless it is of utmost importance.[3] A good esthetic procedure in dentistry should provide stability of the outcome over a long period of time. This is obtained by respecting the integrity of the dento-gingival junction and by creating harmony between the dental restoration and the surrounding tissues.[4]

Tooth wear is increasing in prevalence in our societies today.[5-7] It is rightfully a major culprit for diminishing the esthetic value of what a patient perceives to be a beautiful smile. The success of its treatment depends upon how well the underlying dental problems are countered and prevented. Tooth wear could either be pathological or physiological depending upon the age and condition of the patient.[8] When tooth wear causes a compromise in the biological, functional, or aesthetic aspects of a patient's dentition, treatment is indicated.[9]

There is established evidence that physical appearance is closely affiliated with self-esteem, and to look good means that you have to have an esthetically pleasing smile.[10,11] This article aims to create an understanding of how important it is to restore function and aesthetics in patients for whom both of these qualities are relatively distressed. The reader is taken step-by-step through to what could be a replicable clinical situation if the need arises.

CASE STUDY

In relation to what is mentioned above, a 58-year-old man was referred to the dental hospital with chief complains of compromised aesthetics, tooth wear, and sensitivity in anterior teeth. He had noticed the problem several years ago, but only paid heed to it when it worsened over the last 2 to 3 years. The complaint of sensitivity to cold had increased recently in the anterior region,

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especially the upper right lateral incisor. The patient also proclaimed that he had a habit of night grinding and was never provisioned a splint for this reason at any of his previous dental visits in which he had restorations, scaling, and polishing procedures performed on him. Upon questioning, it was found that the patient also consumed soft drinks, other carbonated beverages, fruit juices, and alcohol. The intra-oral examination revealed poor oral hygiene and generalized gingival recession of 3-5 mm.

His upper left central incisor and canine were root-treated, but their coronal restorations were lost. The patient wore an acrylic partial denture to replace the upper right canine, upper left lateral incisor, and upper left first premolar. Occlusally, class I was observed in the canines in inter-cuspal position, and the first contact in retruded contact position was seen between upper and lower left first premolars [Figure 1].

TREATMENT

Firstly, the provisioning of Michigan splint was achieved. Impressions of the upper and lower arch were taken for assessment. Then, a thorough analysis of the cast was performed, after which the facebow record and the retruded contact position were recorded. The patient was counseled on the effect of his diet and was advised to make changes. Oral hygiene instructions were also delivered to ensure a correct brushing technique. A splint was fabricated and inserted into the patient's mouth, after which the patient was reviewed on a couple of occasions for 8 weeks. The splint also helped to stabilize the mandibular position at an increased occlusal vertical dimension and retruded contact position. Increasing the OVD is a safe procedure, but it is always advisable to minimize the increase. In order to avoid negative consequences, an OVD increase of 4 mm at this stage was targeted initially. This was verified using callipers from maximal gingival contour of maxillary and mandibular teeth.

The second step of treatment called for the re-endodontic treatment of upper left central incisor, upper left canine, and upper right lateral incisor. The old root fillings were removed [Figure 2], and the teeth were obturated using the cold lateral condensation technique after cleaning and shaping of the root canals. Composite restorations were placed coronally on all the root-treated teeth, and significant improvement in the quality of root fillings was noticed in post-operative radiographs [Figure 3].

In the third stage of treatment, local anesthesia was administered and crown lengthening with osseous re-contouring on upper left central incisor, upper left canine, upper right central incisor, and upper right lateral incisor was carried out along with papillectomy on the palatal aspect of the same teeth [Figure 4].

In the fourth step of treatment, upper and lower partial dentures were fabricated. The impression for the upper and lower arch was taken, and a bite registration was performed. For the upper arch, an acrylic denture that replaced the upper right canine, upper right molars, upper left canine and upper left second premolar was fabricated. A stainless steel clasp was added on the upper right first premolar. For the lower arch, a cobalt chromium denture that replaced the lower right second premolar and first molar and lower left second premolar and molars was constructed. A sub-lingual bar was given as its connector. Gold clasps were placed on the lower right and left first premolars, and an occlusally approaching clasp was provisioned on the lower right second molar. As there was significant loss of tooth structure anteriorly, space was required so that crowns for the anterior teeth could be fabricated. Upon clinical examination, it was decided that an overall increase in the occlusal vertical dimension of about 3 mm should be gained, and the splint fabricated initially helped to achieve an increase. Following the splint therapy, an increase in occlusal vertical dimension was sustained by provision of an upper acrylic and lower Co/Cr partial denture. An upper acrylic partial denture was provided as a means of further allowing accommodation to the new occlusal vertical dimension and because crowns may be required in future, and it was kept in mind that adjustments might be required on the denture while fitting crowns.

As coronal tooth structure was already compromised, it was felt appropriate in this case to place posts in the root-treated teeth. The length of the fiber posts were determined to be 14.0 mm, 11.5 mm, and 11.0 mm in

Figure 1: (a) Pre-operative anterior view. (b) Pre-operative lower occlusal. (c) Pre-operative upper occlusal

the upper left canine, upper left central incisor, and upper right lateral incisor, respectively. The posts were cemented using Panavia (Kuraray Dental, USA), which is a dual-cured composite resin cement.

Lastly, metal ceramic crowns were fabricated. For metallic ceramic crowns, a shoulder margin was prepared on the labial aspect of upper left central incisor, upper left canine, upper right central incisor, and upper right lateral incisor. Champher margins were prepared on the palatal aspects of the same teeth [Figure 5].

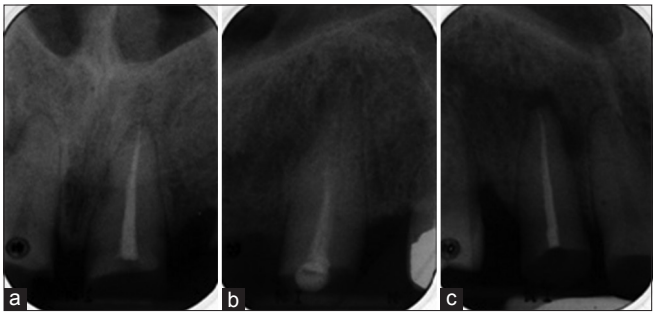

Figure 2: Pre-operative radiographs. (a) Upper left central incisor. (b) Upper left canine. (c) Upper right lateral incisor

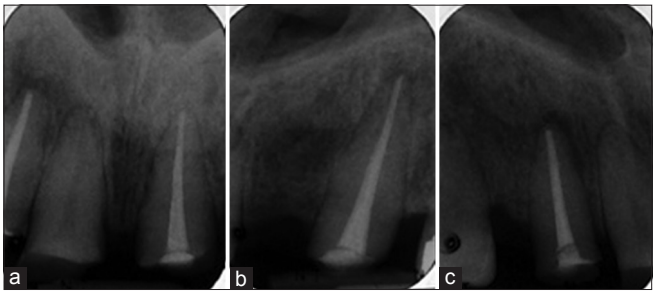

Figure 3: Post-operative radiographs. (a) Upper left central incisor. (b) Upper left canine. (c) Upper right lateral incisor

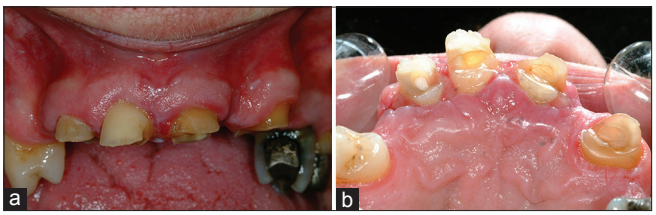

Figure 4: (a) Post-operative crown lengthening - Anterior. (b) Post-operative crown lengthening - upper palatal

DISCUSSION

The technique presented is simple and cost-effective. Alternate routes to treatment were presented to the patient in this case study. It included the provision of an upper over denture (that would have retained the roots as the over denture abutments) and a lower partial denture. This did not appeal as much to the patient. The other treatment option was implant therapy, but since patient had a habit of smoking and alcohol, it did not seem to be a feasible option at that time. Also, patient could not afford the cost of implants.

Night grinding or bruxism is a common cause of tooth wear.[12-14] Usually, the worn surfaces exhibit a uniform pattern of wear, particularly on the incisal aspect of the anterior teeth. The patient exhibited severe attrition on both upper and lower arches, and there were clear signs of erosion on the palatal aspect of the upper teeth. Erosion is an irreversible loss of dental hard tissues, and gastro-esophageal reflux is one of the chief causes of this condition.[15] Millward *et al.* exclaims that a greater degree of tooth surface loss is associated with the consumption of soft drinks, particularly carbonated beverages.[16] A combination of attrition and erosion caused severe loss of dental hard tissues and that contributed to the patient's unpleasant aesthetics.

An occlusal splint is indicated to reduce para-functional activity, re-program the oral musculature by disengaging an occlusion, and/or increase vertical dimension. Michigan splint was provided to the patient as it helps in stabilization for patients who exhibit tooth wear related to bruxism and those suffering from TMD problems.[17] After fitting the splint, the patient was reviewed, and it was noticed that that the tooth wear was not getting any worse. The splint usually covers most of the teeth present in the dental arch and is effective in the initial prosthetic treatment. It eliminates TMD symptoms and realizes self-positioning of the mandible in a new position. Deterioration of the tooth wear was one reason why the splint was provided to the patient. The splint also helped to stabilize the mandibular position in the retruded contact position (RCP) and at an increased OVD (occlusal vertical dimension). A gain of 3 mm of OVD was achieved using the splint.

Figure 5: (a) Post-operative - anterior view. (b) Post-operative lower occlusal view. (c) Post-operative upper occlusal view

The maxillary anterior tooth structure was almost lost coronally, and it was necessary to gain some coronal tooth tissue in order to enhance the retention of the future restorations and thus, surgical crown lengthening was performed. Crown lengthening surgery is categorized as either aesthetic or functional. Crown lengthening for anterior quadrant is presented in the context of aesthetic surgery. It also facilitates caries removal and helps in the establishment of biological width.[18] As coronal tooth structure was already compromised, it was felt appropriate in this case to place posts in the root-treated teeth as the composite restorations alone had failed. Posts were necessary for the retention of the core, and Para posts (Fiber Lux, Coltene Whaledent) were chosen for that purpose. Para posts have a diamond-shaped retention pattern and during function, the Para post uniformly distributes the stress to the supporting tooth structure, while the cement layer acts as a buffer. Para posts were placed in the UR2, UL1, and UL3 after determining the length of the posts by radiographs. The posts were cemented using Panavia, which is a dual-cured composite resin. Panavia offers high compressive and high tensile strength as compared to other conventional cements and is also resistant to water and acid dissolution.

In this particular case, an acrylic upper denture was fabricated for the patient, because it was important to see if the patient was able to observe adequate oral hygiene measures and control his social habits over a long period of time so that implant therapy could be provided in future.

CONCLUSION

The treatment that was performed on the patient should only be carried out once the oral hygiene and the periodontal status reach satisfactory standards. Aesthetic rehabilitation of patients with tooth wear should be within the capabilities of a specialist. The most likely specialist to perform this procedure is a restorative dentist. However, there is no reason why general practitioners who are comfortable with the treatment cannot perform the procedure single-handedly in their dental practices.

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