



Prosthodontic Management of Severely Proclined and Mobile Dentition with Spacing Using Digital Smile Designing: A Case Report

Ragul I¹, Prasad aravind², Jobin joy², Peter S², Shabana², Kanakamani³

^{1,2} Department Of Prosthodontics And Crown And Bridge , Mahe Institute Of Dental Sciences And Hospital , Mahe , India.

³ Department Of Conservative Dentistry And Endodontics , Mahe Institute Of Dental Sciences And Hospital , Mahe , India.

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ABSTRACT:

“A Captivating Smile Showing an even row of natural gleaming white teeth is a major factor in achieving that elusive dominant characteristic known as Personality – Dr. Charles Pincus”. An aesthetic smile has always been an attractive element and it plays a significant role in overall psychology and confidence level of an individual. The digital smile design (DSD) has been used as a tool for esthetic dentistry that improves predictability of rehabilitation procedures.

This case report aimed to present an integrated planning related to functional, esthetic and emotional requirements from the patients based on digital design parameters.

A 66 years old lady was presented with chief complaint of spacing in her upper and lower anterior teeth which were grade I mobile due to trauma from occlusion. A diagnostic scanning was done using fine intraoral scanner and digital smile designing was done using an Exocad software. Intentional RCT followed by tooth preparation from canine to canine both in maxillary and mandibular arch was done. Crown root ratio was changed to 1:1 to reduce the mobility and Group function occlusion was given on both the sides.

Final restoration was done using zirconia premium and cementation was done using resin cement.

1. Introduction

A beautiful smile and harmonic facial aesthetics are features that contribute to the well-being of any patient. Smile has always been an attractive element and it plays a significant role in overall psychology and confidence level of an individual. Smile aesthetics are prejudiced by the texture, form, color, and alignment of the anterior teeth as well as to intraoral soft tissues, facial esthetics and lips. The final outcome of an aesthetic procedure should be as close as to the patient's expectations, enhancing the patient's smile and facial aesthetics^{[1][2]}.

The digital smile design (DSD) has been utilized as a means for esthetic dentistry that enhances predictability of rehabilitation procedures. It is a digital planning tool for cosmetic dentistry that assesses the aesthetic link between the patient's teeth, smile, gingiva and face by

inserting lines and digital drawings onto facial and intraoral photographs. The practice of digital tools offers dentists and technicians a new viewpoint for diagnosis and treatment plan, that facilitate and improve the communication among dentist, technician, and patient^{[3][4]}.

2. Case Report

A 66-year-old female patient was reported with a chief complaint of spacing in her upper and lower anterior teeth. On intraoral examination, it was evident that 11,21,31 and 41 were having grade I mobility due to trauma from occlusion. There was diastema in maxillary and mandibular anterior teeth.



Figure 1: Preoperative Intraoral Digital Scanning



Figure 2: Preoperative Extra oral frontal profile of patient



Figure 3: Intraoral frontal view of patient



Figure 4: Right Lateral Occlusion



Figure 5: left lateral occlusion

The Golden Proportion is a mathematical ratio that signifies, harmony, beauty and balance in physical form. Over the centuries, this geometric constant has prejudiced biological systems, architecture, mathematics and art. This ratio is alleged to hold the key to the secret of beauty and finds its illustration in innumerable natural and manmade masterworks [5].



Figure 6: digital smile designing according to golden proportion

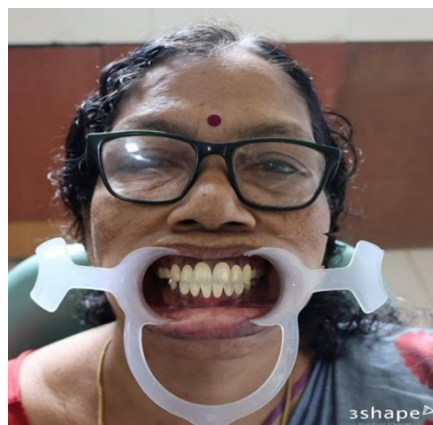


Figure 7: After Digital Smile Designing

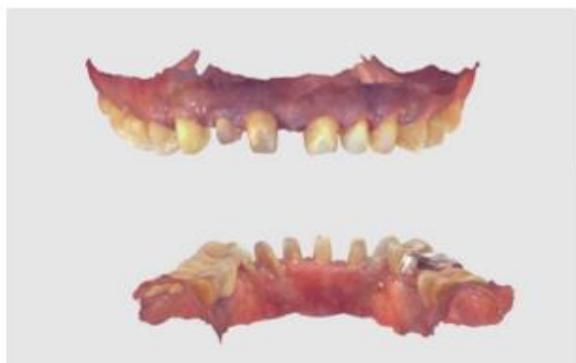


Figure 8: Tooth Preparation And Digital Scanning

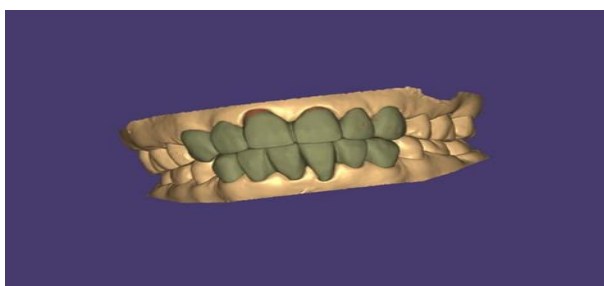


Figure 9: computer aided design

With the initial examination, the patient was recommended orthodontic treatment for diastema closure. However, she was reluctant for orthodontic treatment and wanted early outcomes. Hence, a prosthetic plan was framed to treat diastema and mobility simultaneously. Following preliminary analysis digital impressions were made and it was decided to use Digital smile designing software (Exocad) for a smile makeover. The DSD process was explained to the patient, and the treatment plan was created in accordance. Digital smile designing and virtual mock-up were done on “Exocad software” using patient’s “smiling” and “lip retracted” photographs to envisage the expected results of treatment.

The appearance of a smile was shown to the patient for consent. It was finalized to restore the patient with intentional RCT followed by zirconia premium plus from canine to canine in both maxillary and mandibular arch. Group function occlusion was given on both sides. This digital mock-up was superimposed on the scanned cast of the maxillary and mandibular arches to get the 3D-printed mock-up. Postoperatively, the smile and esthetics of the patient were enhanced. She was highly satisfied with the esthetic outcome.

3. Discussion

Digital smile designing is an advanced tool in esthetic dentistry which permits us to predict the outcome of treatment to the satisfaction of patients [6]. The major necessities for this procedure are patient’s cheek retracted and smiling photographs from the same distance and angle. These images provide exposure of teeth hidden behind the lip and then designing the smile on Exocad software. Several forms of teeth are available in the virtual library of the software, and the form which is best-matched is applied to the designed smile. This software aligns the smile as per golden proportion which needs to be accustomed as per the patient’s requirement. After this, approval of smile from the patient is taken. Correlating it with the 3D scans of the patient’s maxillary and mandibular casts by comparing the dimension of the tooth, the gingival zenith, etc., will provide data for 3D printing of virtual mock-up. Designing the patient’s smile by using the patient’s photographs and then merging these data to the virtual cast to get 3D-printed mock-up help to



Figure 10: Postoperative intraoral profile after cementation of zirconia premium.



Figure 11: Postoperative extraoral profile of patient.



Designing a smile is more of an applied art than a highly specialised method. Every prosthodontic restoration technique necessitates the application of numerous aspects of the science behind smile design and aesthetic treatment planning. The rehabilitation techniques help to establish functional aesthetics by establishing aesthetics, function, and balances [7].

In the present case, a female patient was presented with the chief complaint of unesthetic smile because of midline diastema. The patient was explained about the DSD and the patient gave consent to the digital smile designing protocol due to the above advantages. The designing was performed in the exocad software, and the major advantage was the 3D printed model, which gave a greater reliability to patient on the dentist, and it was also useful for the test drive before the preparation. Accurate photography methodology is necessary for proper digital planning. The photographs taken using this approach provides crucial data for the planning of the aesthetic. The reference image may be distorted by poor photography, which could lead to inaccurate diagnosis and planning [8].

4. Conclusion

A beautiful smile has always been an attractive element and it plays an important role in overall psychology and enhancing the confidence level of an individual. Digital smile design software not only acts as an aesthetic template but also increases predictability for both patients and clinicians during the treatment phases. The precise and appropriate application of DSD will allow us to design a smile that is optimal and gratifying, increasing the predictability of success.

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