Smile Designing Using DSD: A Case Report

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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. In Current day dental practice with increasing patient's aesthetic expectations, smile designing has evolved leaps and bounds in the past decade with the advent of new materials and technical improvement as well. One such recently evolved technique is the application of software in creating smiles using Digital smile Design Software. This case report enlightens about one such smile make over using Digital Smile Design Software .

Keywords: *Smile Designing, Digital Smile Design, Lithium disilicate veneers.*

Introduction

Confidence is an important aspect of one's personality and a confident smile makes the picture complete[1]. In modern day dental practice the amount of pupil seeking dental treatment for aesthetic purpose has significantly increased. The various factors that might affect the smile are Missing teeth, Discoloration, malformed teeth, malaligned teeth,reverse smile line, excessive gum exposure of gums, improper occlusal plane[2] ultimately leading to an unpleasant and unsatisfied smile which might have a huge impact on a person's confidence level. Fortunately, modern day dentistry provides a formidable solution for these clinical situations by means of customized smile makeover treatment plans.

The art of smile make over is dictated by the clinical situation with some clinical situation requiring a very minimal procedures while some other may demand a more comprehensive approach to achieve the desired result. An experienced, skilled dental practitioner will be able to provide the most conservative, less invasive procedures that, in combination, will yield the best possible results. With this objective, the treatment planning during smile make over aims for better predictability and support for the planned treatment. With the emergence of digital tools such as DSD software the former becomes more practically feasible. Digital Smile Design is a multiuse conceptual tool that offers the clinican a new avenue when combined with the 3D printing technique, facilitating and improving the communication among dentist, technician, and patient.[3,4] The combination of DSD and 3D printed model[5] allows for improved esthetic manipulation, providing a better predictability to support the treatment plan. This case report enlightens about one such case report where a digital smile design software is used for a smile makeover procedure.

Case report: A male patient of age 27 years reported to Department of Prosthodontics, Menakshi Ammal Dental college with the chief complaint of spacing present in the upper front tooth region. On Clinical examination patient had midline diastema, malformed lateral incisors leading to an unsatisfied smile (Figure 1).

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(a) **(b)** **(c)**

Figure 1 Pre operative photograph

Diagnostic Impression and study models were made and after initial evaluation it was decided to design a smile make over procedure using DSD software and the restorative material of choice was Lithium di silicate laminate veneers (emax empress). The patient was explained about the DSD procedure and the treatment plan was framed accordingly. The work flow involved in DSD treatment are :

(a) **(b)** **(c)**

Figure 2 Extra oral and INRA oral photographs for smile analysis

Step-1: Extra Oral and Intra Oral Photograph: The First step in the DSD protocol is the making of extra oral and intra oral photographs in different angles a shown in the (Fig.2) which is the most important step in digital smile designing.

Step-2: Smile analysis: Digital face bow analysis is done to evaluate the midline, cant in occlusal plane and smile analysis was done to evaluate the length, contour, size, shape of the teeth. On analysis it was found that the length of central and lateral incisors were short of the reference plane and also the mesiodistal width of the lateral incisors were less and hence that proportion has to be altered to attain a more esthetically pleasing smile.

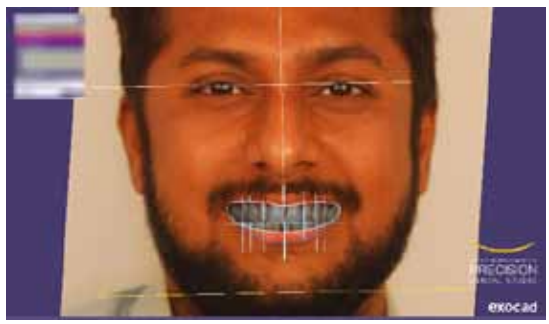


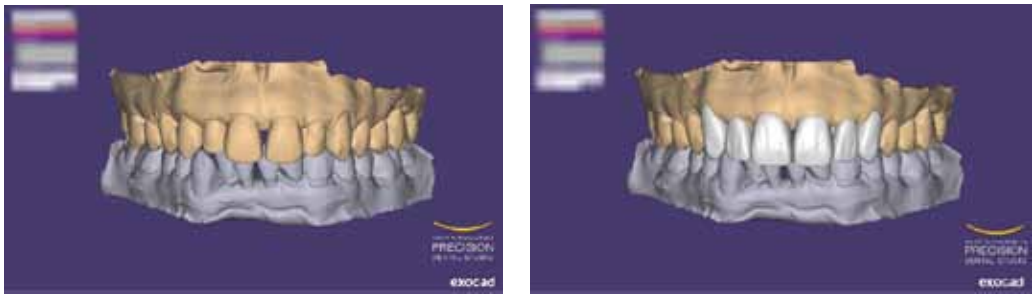
Figure 3 Smile Analysis

Step-3: Smile Simulation: New Smile simulation was designed by increasing the length of central and lateral incisors and also the mesiodistal width of the lateral incisors.

(a) **(b)**

Figure 4. Smile Simulation

Step 4: Digital model: The New simulated smile from the photograph is then transferred to the digital model .



(a) **(b)**

Figure 5. Digital model fabrication with new simulated smile

Step 5 : Fabrication of 3d printed model : A 3D printed model is then fabricated using the digital data which will be facilitate in making the template for Test drive.

Figure 6. 3D Printed model

Step 6 : Test drive : A template was fabricated using Addition silicone impression material and test drive was done using Bis Acrylic composite resin and the patient was satisfied with the test drive and it was decided to restore both the central and lateral incisors (12,11,21,22) with laminate veneers then the clinical procedures were Performed.

Figure 7: Test drive

Step-7 : Tooth preparation : Teeth Preparation of 0.5 mm was done in the incisors for laminate veneers.

Figure 8 Teeth preparation

Step-8 : Retraction & impression

Figure 9.: Impression

Step 9: Fabrication of E Max crown : CAD CAM milled lithium disilicate (e Max) Veneers were fabricated based on the new digitalized smile design.

Figure 10. Veneer fabrication

Step 10: Veneer cementation: The prepared teeth were initially etched with 37% phosphoric acid and the intaglio surface of the veneers were etched with 9% hydrofluoric acid for enhancing micro mechanical retention . Then the Cemenatation was done using dual Cure Resin cement.

Figure 11. Etching of teeth surface

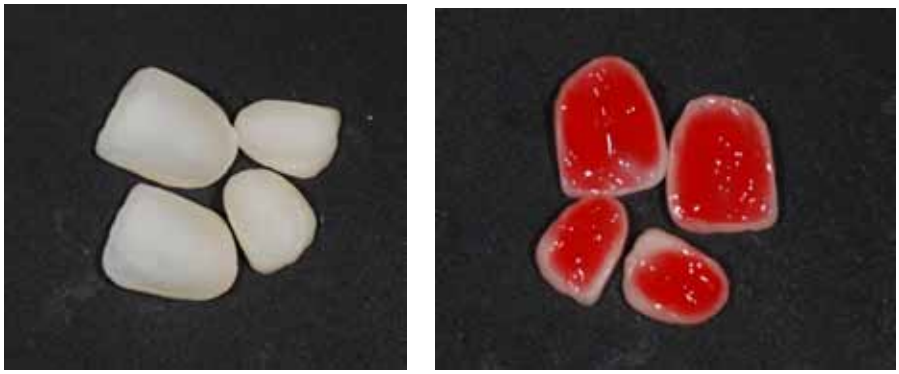


Figure 12: Etching of veneers

Figure 13. Cementation of veneers

Step 11: Post operative smile

Figure 14. Digitalised smile

Discussion

Digital smile designing aids us in designing better smiles, effective treatment plan, increased perceived value and greater acceptance from patient . Patients usually have apprehension regarding the end result of smile design treatment . In these cases DSD is a boon and aids in motivation and education through the display of end result even before the start of treatment [5]. It acts as a technical tool used to design and modify the patient's smile digitally and help them to visualize it beforehand by creating and presenting a digital mockup of their new smile design. It helps in visual communication and

involvement of patients in their own smile designing, thus ensuring predictable treatment outcome and increasing patient acceptance of treatment which in turn gives a higher level of confidence. [6,7,8]

In the present case report, a male patient walked into clinic with the complaint of midline diastema and malformed lateral incisors. 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 and for temporisation.

The DSD was done after the essential photographs and the diagnostic impressions were made. These photographs were then fed into the software were the virtual facebow analysis was done which includes the analysis of occlusal plane, cant of the occlusal plane and midline. This was then followed by smile analysis were the tooth size, shape, contour, colour and smile line was assessed and the appropriate alterations required were done. In this case, the length of the central incisors were increased and the width and length of the lateral incisors were increased. This was simulated and the 3D model was printed with resin. Eventually, tooth preparation followed by impression making, ceraming procedures, etching protocol for tooth and veneers and finally the cementation was done. Lithium di silicate was preferred because of its excellent esthetic properties. [9]

Excellence can never be achieved by chance, but using a consistent systematic approach for diagnosis, communication, treatment planning and eventually execution yields a perfect result and satisfication to the dentist and patient. Thus DSD is one such protocol aiding us in providing perfect and esthetic smile.

Conclusion

Digital smile design software not only serves as an aesthetic template but also, make the treatment phases more predictable for both patient and clinician, as the final design can be Visualised on the computer and be used by the patient during the Test drive Procedure. The Precise and proper application of DSD will enable us to create ideal and satisfying smile thereby enhancing the predictability of success in Smile Designing.

Ethical Clearance: Nil

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Conflict of Interest: Nil

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