DIGITAL SMILE DESIGN – A CASE REPORT

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Abstract

The smile has always been an alluring element to playing a significant role in overall psychology and confidence level of an individual.Increased patients aesthetic expectations has led to the evolution of smile design with the advent of new materials and technical improvement as well. A new perspective is brought to daily clinical activities with the help of utilizing digital tools. This digital information serves as a starting point for the treatment plan and is also known to be anefficient communication tool among dentist, patient, and technician. This case report of anterior rehabilitation demonstrates esthetic planning with the digital smile design (DSD) system.

Keywords: Smile design, Zirconia, aesthetics, Digital Smile Design.

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1. Introduction

A beautiful smile and harmonic facial aestheticsare features that contribute to the well-being of any patient. Smile aesthetics are influenced by the form, texture, color, and alignment of the anterior teeth as well as to intraoral soft tissues, lips, and facial esthetics. The end outcome of an aesthetic procedure should be as close as to the patient's expectations, enhancing the patient's facial aesthetics and smile.[1,2]

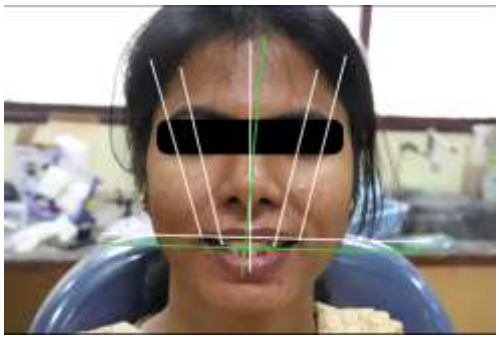
The digital smile design (DSD) is a digital planning tool for cosmetic dentistry that evaluates the aesthetic link between the patient's teeth, gingiva, smile, and face by inserting lines and digital drawings onto intraoral and facial photos. The use of digital tools offers dentists and technicians a new perspective for diagnosis and treatment plan, facilitating and improving the communication among dentist, technician, and patient.[3,4]

The mock-up technique is still regarded as an objective and effective tool in treatment planning communication and used to confirm the treatment plan before the final preparations and evaluate final restorations within the constraints of biological and functional considerations, even though DSD offers many advantages over more traditional treatment planning methods.[5]

Case report

A 34 year old patient reported with a chief complaint of an unesthetic smile. The facial features, smile harmony, gingival shape, and dental characteristics were assessed during the clinical examination. The patient presented with splinted metal ceramic crowns (11,21) with improper shade. The facial and the dental midline did not coincide.The occlusal plane did not coincide with the interpupillary line. (Figure 1).

Evaluation of the parallelism and resulting synergy in the various facial features as they relate to the patient utilising a full-face analysis was done. (Figure 3).



The treatment plan was to use Digital Smile Design to assess the probable treatment outcome and to motivate the patient. This is followed by tooth preparations in upper and lower anteriors. Impressions made digitally. The provisionalization is done using Protemp. The final planned restorations are layered zirconia.

Following preliminary analysis digital impressions were made and it was decided to use DSD software for a smile makeover. The DSD process was described to the patient, and the treatment plan was created in accordance. (Figure.3)

1. The First step in the DSD protocol is the making of extra oral and intra oral photographs in different angles a shown in thewhich is the most important step in digital smile designing. (Figure 4)

2. New Smile simulation was designed by increasing the length of central and lateral incisors and the mesiodistal width of the lateral incisors.
3. The digital model is then given the new simulated smile from the photograph.
4. A 3D printed model is then fabricated using the digital data which will be facilitate in making the template for provisionalization.
5. The old crowns (11,21) were sectioned and removed followed by tooth preparation of the maxillary anteriors (13,12,11,21,22,23). The tooth preparation of the lower anteriors (33,32,31,41,42,43) were done subsequently. (Figure 5)

6. A retraction cord was inserted, and a digital intraoral impressions and occlusion was recorded using the 3 shape trios. (Figure 6)

7. Provisionalization was done using Protemp(3M ESPE). (Figure 7)

8. CAD CAM milled layered zirconia crowns were fabricated based on the new digitalized smile design. (Figure 8)

9. The prepared teeth were etched using ortho-phosphoric acid for 30 seconds and rinsed thoroughly for 15 seconds. Bonding agent was then applied and cured for 20 seconds. The restoration was conditioned using silane coupling agent. The crowns were then luted using Multilink dual cure resin cement.

10. The final result immediately after cementation can be seen, in which it is possible to observe that the esthetic parameters were established satisfying the expectations of the patient. (Figure 9)

11. Marginal integrity, absence of chipping and good gingival health status was observed at a 1-year follow-up. The patient had a very positive experience with the rehabilitation plan that was chosen. (figure 10)

2. Discussion

Patients usually have apprehension regarding the result of smile design treatment.Better smiles, effective treatment plans, more patient acceptability and perceived value are all aided by digital smile design.

Digital smile design 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]

Designing a smile is more of an applied art than a highly specialised method. Every prosthodontic restoration technique entails 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 function, aesthetics, and balances. While technological improvements are important and advantageous, they also have a significant impact on the basics, which cannot be ignored.[8]

In the present case report, a female patient reported with a complaint of an unesthetic smile. 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 temporization.

DSD is an effective marketing technique as well. Therefore, 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.[9]

3. Conclusion

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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