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# SMILE DESIGN WITH VENEERS USING DIGITAL PRECISION: A CASE REPORT

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**Abstract**

Aesthetic correction of the anterior teeth is a difficulty in dentistry, especially when there is a gap between the teeth. This might lead to a lack of confidence and harm a person's self-esteem. Smiling is an important part of everyday living, and a confident grin can have a significant impact on an individual's self-esteem. Laminate veneers are a cosmetic dentistry technique that involves bonding a thin layer of porcelain or resin composite material to the surface of a tooth. It is a conservative treatment for unappealing anterior teeth. The on-going development of dental ceramics provides clinicians with numerous possibilities for constructing a highly beautiful smile.

Compared to traditional methods, digital smile design technology allows for higher precision and efficiency when applying laminate veneers. Computerized templates control the tooth preparation process, ensuring that the minimum tooth structure is removed and that the veneers fit accurately. The current report shows a 23-year-old patient with space in the maxillary anterior spacing was rectified using a minimally invasive procedure including laminate veneers and a fully digital process with lithium disilicate. The use of this material improves the aesthetics of the patient's smile by requiring a minimum tooth reduction while maintaining a natural appearance. The report also has a nine-month follow-up. Incorporating digital technology into the production and placement of laminate veneers has various advantages, including increased accuracy, a shorter turnaround time, and the possibility for patients to preview their better smile. The maxillary anterior spacing was rectified using a minimally invasive procedure, including laminate veneers and a fully digital

process with lithium disilicate. This material improves the look of the patient's smile and requires minimum tooth reduction.

**Keywords** : Aesthetic dentistry, Dental Aesthetic, Digital smile design, Lithium disilicate, Veneers.

## Introduction

Smiling offers significant benefits to overall human health, including the boost of happiness through the release of endorphins and the reduction of stress and blood pressure. It relies on crucial elements such as the color and proportion of the teeth, the structure of the gingival tissue, and the framing of the lips [1]. An unsatisfactory smile can profoundly impact a patient's self-esteem. Among the commonly voiced concerns is the alteration of tooth color, which plays a pivotal role in achieving the ideal smile. The unsightly smile can be improved by employing full-coverage crowns. The primary drawbacks associated with full-coverage crowns involve the significant removal of healthy tooth structure and potential harm to neighbouring soft tissues. The aim of all dental products and procedures is to provide effective treatment while preserving as much of the natural tooth structure as possible and achieving pleasing aesthetics. Consequently, the popularity of laminate veneers has surged in recent times due to their superior aesthetics and minimal impact on the teeth [2].

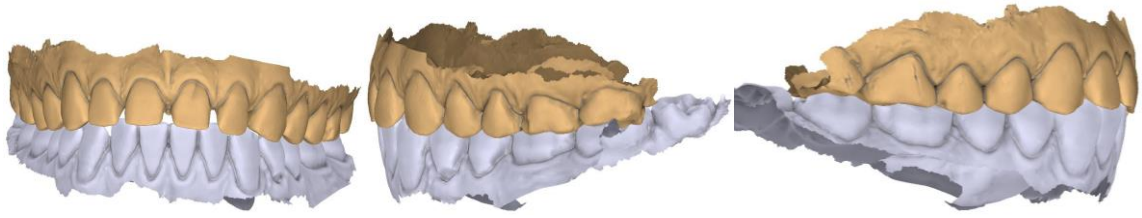
Dental veneers are frequently utilized to enhance both the appearance and protection of teeth. Their applications encompass addressing various issues, such as discoloured teeth stemming from factors like tetracycline staining, fluorosis, amelogenesis imperfecta, aging, and others. Additionally, they serve in the restoration of fractured or worn teeth, correcting abnormal tooth shapes, addressing minor misalignments, and facilitating intra-oral repair of fractured crown and bridge facings [3].Para functional habits like bruxism, edge-to-edge bite relations, subpar oral hygiene, and inadequate enamel are contraindications for laminate veneers [4].

## Case report

A healthy 23-year-old male patient reported to the department of Conservative and Endodontics with a chief complaint of anterior teeth spacing and a desire to close the gaps. Medical history was non-contributory and there was no history of any past dental treatment. Extra-orally, face was symmetrical and there was no anomaly in the mandibular range of motion. Intraoral examination revealed that all teeth were vital and had no hypersensitivity. An overjet of 2 mm and an overbite of 2 mm existed. These clinical findings led to the diagnosis of localized spacing in the maxillary anterior region. The treatment strategy warranted minimal invasiveness and great cosmetic quality, so the proposed treatment plan involved a veneers procedure for teeth 12, 11, 21, and 22.The clinical case was planned in digital smile design and continued in steps.

### *Pre-op Digital Scan.*

A comprehensive digital scan of the intraoral region was conducted, facilitating the conversion of actual dental structures into virtual representations. Subsequently, an occlusal analysis was conducted utilizing the intraoral digital scanner. Moreover, the same digital scan was employed for planning purposes. (Figure 1A, 1B, 1C).



(A) (B) (C)

**Figure 1** (A) Occlusal analysis using the digital intraoral scan (B) Left side (c) Right side.

***Digital smile planning.***

It requires the inclusion of two images for planning: a frontal facial full smile photograph and a close view of the smile Figure 2(A), 2(B) The planning began with facial analysis using the frontal facial full smile photograph. Reference lines were then defined Figure 2(C): (1) the horizontal plane and (2) the facial midline. For the study of the horizontal plane, inter-comissural and inter-pupillary lines were used as references. The facial midline was defined using the glabella and philtrum as references. The intraoral digital scanning file was then superimposed on the facial photograph for proportionality analysis of the upper anterior teeth.

**Figure 2:(**A) Frontal facial full smile photograph,(B) Close view of the smile. (C) Reference lines (1) the horizontal plane and (2) the facial midline.

***Tooth Preparation***

The incisal overlap preparation plan was chosen to lengthen the teeth and create a strong stop for the restorative material. Initially, orientation grooves were made for labial reduction using depth-cutting burs. These burs provided a depth of around 0.3 mm near the gingival margin and 0.5 mm on the incisal surface. Using a round-end tapered diamond bur, two-plane face reduction was conducted to guarantee equal thickness of the restorative material and to match the tooth's natural curvature. The chamfer finish line was formed at the gingival crest level, and all internal line angles were smoothed and softened. To protect the interproximal enamel, the tooth preparation was extended to include the contact area ( Figure 3).

**Figure 3.**Veneers tooth preparation.

***Digital wax-up and mock-up***

After explaining the procedure, a wax-up was created, incorporating the patient’s inputs and suggestions to enhance the anatomy of teeth 12, 11, 21, and 22. To maintain smile harmony and proportionality, the mesio-distal dimensions of these teeth were enlarged, and the vertical height was increased by 1 mm. (Figure 4 A and B).

The veneers were fabricated using press-able Lithium disilicate.

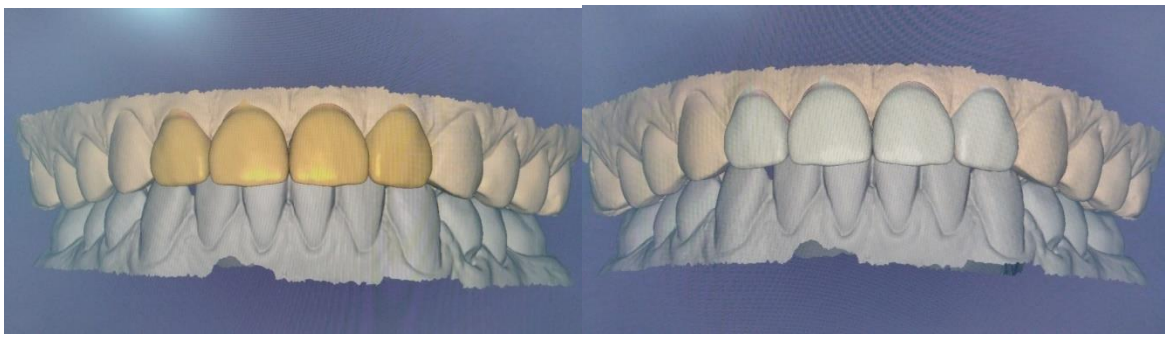


**Figure 4**(A), (B) Digital wax-up and mock-up.

**Figure 5.** (A) Final aspect of the tooth preparation for ceramic laminate veneers. (B) Color communication with the dental technician.

***Cementation of veneers*.**

*Preparation of veneers for bonding*: The steps followed in order to prepare the restoration for final bonding are as below. Intaglio surface of veneers was etched with 10% Hydrofluoric acid for 10 seconds, then, rinsed with water and air dried. A layer of Silane Coupling Agent was applied for 60 seconds, dried with a stream of air and left the veneers in light proof box till ready for bonding.

*Preparation of teeth for bonding*: After isolation, tooth surface was etched using 37% Phosphoric acid for 15 seconds and air dried. Bonding agent was applied and light cured for 10 seconds.

*Cementation procedure*: Veneer cementation was performed individually for each tooth. Dual cure resin cement was used for cementation. The veneer was then placed over the prepared surface while applying gradual, gentle pressure to let the extra material drain away and prevent the creation of air bubbles and veneer lifting. The initial spot curing was done for 5 seconds. After removing extra cement using an explorer, complete curing was performed for 20 seconds. Thus following the same protocol, final cementation of all the veneers was done. The interproximal area between the teeth was checked using the dental floss. The patient was well satisfied with the final outcome.

**Figure 6 (A)** Final cementation of veneers

## Discussion

Digital smile design is a modern tool for the clinician to alter the teeth size, morphology and final outcome, this allows satisfaction in treatment planning and accepting the desired cosmetic outcomes with minimum invasive dental method..

Lithium disilicate glass ceramics are often chosen due to their optical features, including various levels of translucency and opacity, as well as their ability to adhere well to the natural tooth structure [4]. Moreover, this type of ceramic exhibits slower crack propagation, enhanced resistance, and higher biaxial strength and fracture resistance [5]. While conventional Feld spathic ceramics offer excellent optical properties, they can achieve optimal aesthetic outcomes when handled by a skilled technician [6].Several materials exist in the market for addressing aesthetic and functional issues through tooth veneering; among them, porcelain and resin composite are the most frequently used options. According to Meijering *et al.*, the survival rate for porcelain veneers is 94%, whereas survival rates for indirect and direct composite veneers are 90% and 74%, respectively [7].

## Conclusion

Incorporating digital technology into the production and placement of laminate veneers has various advantages, including increased accuracy, a shorter turnaround time, and the possibility for patients to preview their better smile.

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