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Research Article

Smile Designing Using Laminate Veneers – A Case Report

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Abstract

Aim: To describe a treatment plan that serves as a functional and aesthetic alternative to orthodontic treatment options that may be time-consuming, for mild crowding in anterior teeth wherein only aesthetics is of concern.

Background: Laminate veneers are a conservative alternative to full coverage crowns for improving the appearance of the anterior teeth. Adhesive technologies make it possible to bond the prosthesis whilst preserving the tooth structure.[3] Immediate results are achieved since the prosthesis could be delivered within a few days. Ceramics are aesthetic, biocompatible, wear- resistant, exhibit excellent colour stability, and present a thermal coefficient of expansion similar to enamel. Hence prove to be the most desired material for laminate veneers.

Case Description: Laser gingivoplasty was done on the maxillary anterior (13 to 23) to align the gingival zenith. Veneer preparation was done on the same teeth with minimal tooth reduction (0.5 mm) on the enamel only. All-ceramic veneers were bonded to the teeth with light cure resin cement to achieve the desired aesthetic results.

Conclusion: Smile aesthetics can be achieved only when there is harmony between the teeth and the gingival zenith. With proper diagnosis and treatment planning, a desirable aesthetic result was achieved.

Clinical Signification: Smile designing includes scientific and artistic principles, which helps in creating an aesthetic smile. These norms were found through the collection of data from patients, diagnostic casts, mock wax-ups, measurements, concepts of beauty, and golden proportions.

Keywords:

Smile design; Smile correction; Gingival zenith; Laminate Veneers; Laser dentistry;Gingivoplasty; All-ceramic restorations.

Introduction

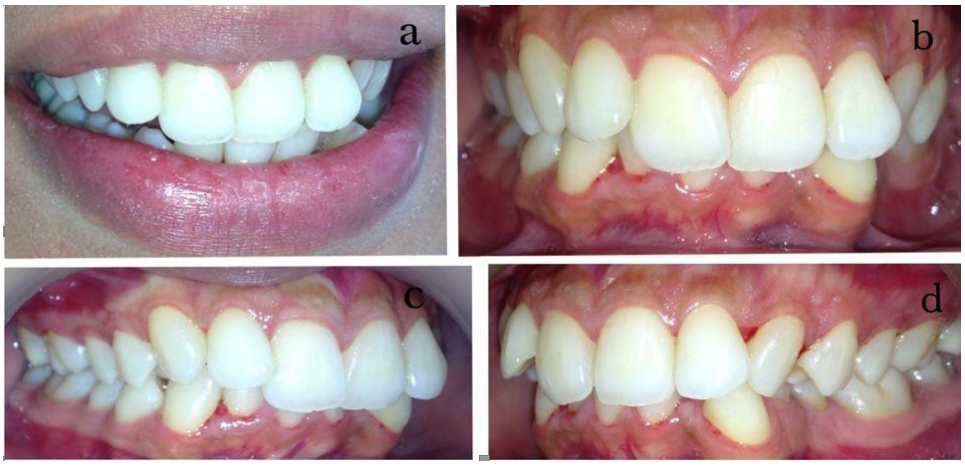
A smile is a person's greatest beauty asset. [2]. It plays a pivotal role in one's confidence and self-esteem, especially in social situations. We are all enamoured with the image of aligned white teeth, any advertisement, poster, social media, etc., we find models with bright smiles and aligned teeth. Everybody's teeth are unique in their own way; however, the real issue starts when in the midst of these unrealistic standards, someone's dental health or self-confidence suffers in the process. It may be due to a missing tooth/ decay/ crowding lifestyle, with unsatisfactory teeth can give a sense of helplessness. Thus, many people like to get their teeth aligned or corrected. However, a few do not have the time and patience for fixed/removable orthodontics and want immediate results; this usually is common for older patients. For such cases, minimally invasive porcelain laminate veneers serve as the best possible treatment modality.

Laminate veneers are a conservative alternative to full coverage crowns for improving the appearance of an anterior tooth. The use of adhesive technologies makes it possible to preserve the tooth structure while satisfying the patient's restorative needs and desires [3]. Ceramics are wear-resistant, exhibit excellent colour stability, and present a thermal coefficient of expansion similar to enamel. They also present good chemical stability in the oral environment and are described as one the most biocompatible and aesthetic [4]. A successful treatment outcome includes proper planning, conservative teeth preparation, and selection of proper materials, methods for cementation, and, finally good oral hygiene and maintenance[5].

Case Report

A 27-year-old female patient presented for aesthetic treatment of irregularly placed front teeth. She was concerned about her smile and wanted all her front teeth to look uniform and straight within a short period without orthodontic correction. Pre–operative photographs were taken (Figures 1a, 1b,1c and 1d).

Figure 1: Pre-operative smile 1b: frontal view 1c: right lateral 1: left lateral.



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The smile line and the gingival zenith line were assessed. The correct proportions of the teeth were measured with a calliper. A mock preparation and mock wax up were done on the duplicated cast of the patient (Figure 2).

Figure 2: Mock – Wax Up.

The mock preparation was done to analyse how much tooth structure was to be reduced in a particular area whereas, the mock wax up was done to visualize the outcome.

The first procedure to be done was the gingival zenith correction. The height of the zenith was maximum in relation to 12, hence, the gingival zenith was altered by gingivoplasty in relation to 11,21,22,23 at the same level of 12. This was done with the help of laser (Picasso (diode) laser unit). Once the zenith was altered, minimal teeth preparations were done on the same appointment in relation to all the maxillary anteriors from canine to canine. Care was taken such that the preparations were made only on the enamel surface (0.5mm) sub gingival finish lines were prepared (Figure 3a, 3b, 3c, 3d).

A fibre reinforced fixed partial denture was indicated for this patient and GC ever stick C&B FRC material was used(Figure 3).

Figure 3:3a: Laser gingivoplasty using Picasso diode laser. 3b: Gingivoplasty and veneer preparation done- frontal view 3c: Gingivoplasty and veneer preparation done- left lateral view 3d: Gingivoplasty and veneer preparation done- frontal view.

Since the preparations lie on the enamel, the bond strength with the resin cement is more than that of dentin. After the preparations were done, master impressions were made with an elastomeric impression material.

Temporary veneers were fabricated with the help of temporary crown and bridge material (DMG, Luxatemp) and was cemented with the help of flowable composite after spot etching (Fgure 4).

Figure 4: Temporary Veneers.

The tooth shade was matched with vita classic shade guide and the shade was determined as A2. The master impressions were then sent to a dental laboratory for fabrication of e-max all ceramic veneers. After the final veneer prosthesis was ready (Figure 5a) it was then seated and checked for its fit, aesthetics and patient satisfaction.

The teeth to receive the prosthesis were etched with 37%orthophosphoric acid for 45 seconds. Bonding agent was then applied and cured for 15 seconds. The inner surface of the laminates was etched with hydrofluoric acid for 30 seconds and washed (Figure 5b), silane coupling agent was then applied and dried(Figure 5c). The laminates were then cemented using variolink clear resin cement (light cure) and cured for 1 minute for each tooth. The excess cement was flossed and cleaned (Figure 5d).

Figure 5: Final Prosthesis 5b: Ceramic etched with hydrofluoric acid 5c: Silane coupling agent applied 5d: Final prosthesis luted with variolink (resin cement).

Recall

Recall appointments were carried out after 3 months, 6 months, 1 year and 3 years. The patient maintained her prosthesis by regular brushing and flossing. During the appointments scaling and polishing was done to remove the surface plaque/ sub-gingival deposits if present. The gingiva was coral pink in colour and was completely healed and showed no signs of bleeding on probing with 1 mm sulcus depth. Since the dentin was intact the patient had no sensitivity and associated discomfort (Figure 6a, 6b).

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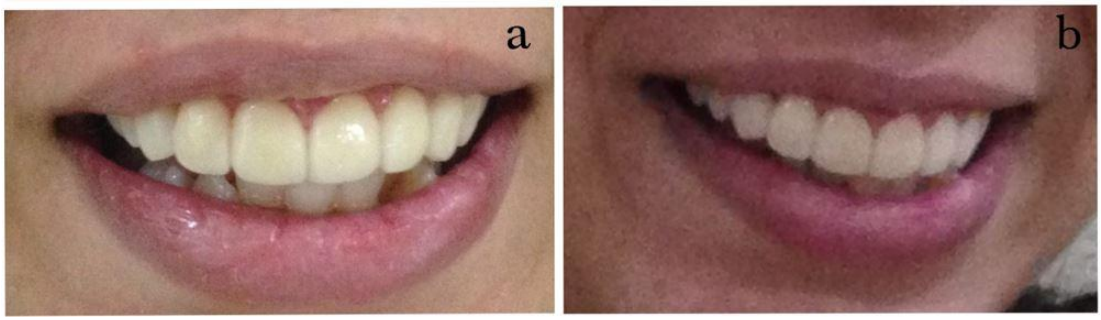
Figure 6: 6a: 1-year recall. 6b: 3-year recall.



Discussion

Aesthetics has become increasingly important in the practice of modern dentistry. This treatment procedure's ultimate goal is to form a stable system where the muscles, tissues, teeth, and skeletal system are all functional and in harmony. Aesthetic demand and society usually motivate one to get their dental treatment done. This is also influenced by ethnicity, culture, and personal preferences [1].

To attain an aesthetic equilibrium, it is mandatory to consider the gingival zenith's architecture and altering it accordingly. Gingivoplasty is carried out to alter the gingival zenith according to anatomical and aesthetic limits. This can be done with a scalpel blade or laser. Gingivoplasty with the help of a scalpel is usually not preferred as it causes bleeding and takes more time to heal hence, delaying the treatment time.

There are various concepts for tooth preparation for laminate veneers that are constantly updated. In this case, about 0.5 mm of enamel was removed during the preparation process. An ideal preparation should not reach the dentin since the bond strength with the luting cement is lesser with dentin than that of the enamel.

Veneer preparation differs mostly at the incisal edge of a tooth. At the cervical third, the gingival margin of the veneer must be located at the same level as the gingival crest or lightly subgingival for the anterior teeth. At the cervical region, it is challenging to obtain a preparation with adequate depth and also preserve the enamel. Hence, in this region, preparation of 0.3mm is adequate. In the middle third, the preparation may achieve 0.5-0.8mm[4,9]. The tooth preparation is modified at the incisal third, and a reduction of 1.5 – 2 mm is necessary to obtain translucency and colour properties. This is also possible with the 'overlap preparation.'

Four basic incisal preparations exist for full veneers

(a) Intra-enamel preparation or 'window'- Preparation terminates 1mm above the incisal edge.

(b) Feather incisal edge -Preparation terminates at the Inciso-facial line angle.

(c) Incisal bevel – a bevel is placed at the Bucco-palatal incisal edge of the tooth.

(d) Overlapped incisal edge - Veneer overlaps the incisal edge terminating on the lingual surface[8].

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The proximal region's preparation must follow the contours of the gingival papilla and extend up to the contact point[9,10]. If by chance the dentin is exposed during tooth preparation, it must be sealed with a dental bonding agent as soon as the preparation is done, before the master impression is made[10,11].

The clinician must choose the type of restorative material based on the requirements/necessities to improve aesthetics and function[8]. Improved aesthetics for veneers is usually provided by sintered feldspathic porcelain and pressable ceramics. They are highly translucent and can be made at a smaller thickness and also be milled using CAD-CAM [6,7].

When deciding whether to use feldspathic veneers, it is also necessary to undertake a flexural risk assessment. Flexural risk often tends to be greater when bonding to a greater dentin expansion because dentin often tends to be a lot more versatile than enamelIn clinical situations with a higher risk, glass ceramics are preferred. The thickness for the restoration may compensate for this problem since increased thickness results in an increase in the strength of this material [9]. In this case, Emax ceramic (lithium disilicate) was used.

The porcelain veneers are then bound to the enamel with resin cement to ensure adequate bond strength. The 'resin-coating technique' produces an increased bond strength and a reduction of crack formation, microleakage, bacterial infiltrations, post-operative sensitivity. It consists of interposing a thin layer of low viscosity resin cement between the substrate and luting cement[10].

Etching the surface of the ceramic with hydrofluoric acid and bonding with a silane coupling agent is an effective step for successful bonding of the ceramic restorations/direct repair. A major advantage of light-curing luting cement is that it allows for a longer working time compared with dual-cure or chemically curing materials[12].

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