

# IPS-emax Press Ceramic Laminate Veneer Restoration

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**Abstract** Recently, laminate, veneer restorations, are used as a more esthetic and conservative treatment solutions for esthetic problems, in the fixed Prosthodontics field. IPS-emax press Ceramic is one of the important esthetic materials. These are durable, conservative tooth preparation ranging from 3 to 5 mm, mainly in enamel and achieve patient satisfaction in comparison to crowns. This case report to present a patient treated by IPS-emax press ceramic laminate veneers restoration on his maxillary six anterior teeth, and describes in detail the patient selection, teeth preparations, procedures and cementation of veneers on maxillary six anterior teeth. It was found that Lithium disilicate Ceramic veneers are one of the most important ceramic materials used to manage of esthetic problems to enhance aesthetic and function of the anterior teeth. The patient was instructed about the importance of oral hygiene measures and periodic follow up for maintenance and longstanding restorations.

**Keywords:** dental ceramic, laminate veneer, IPS-emax press Ceramic, esthetic materials, ceramic veneers

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## 1. Introduction

The rapid progress in the field of dentistry, whether in the ceramic materials or methods of adhesion with enamel layer, enable dentists to get long standing anterior restoration, with the best esthetic results, that satisfy the patient with less loss of tooth structure and maintenance of teeth safety. The use of laminate veneers becomes widespread and more preferable than the use of crowns that causes more loss of tooth structure.

The adhesive bond with enamel layer is the most durable bond presented, best conservative, slightest invasive, and Stronger. Some researchers said that it mimics the DEJ. [1]

Many types of ceramic materials were introduced for the improvement of the aesthetics of anterior teeth by ceramic laminate veneers. IPS-emax press ceramic is one of most ceramic materials used to fabricate ceramic laminate veneer for many purposes as: good mechanical properties, high bond strength, good tooth color and little laboratory price [2,3]

IPS e-max press (Ivoclar Vivadent) was presented in 2005, It is a lithium disilicate pressed glass, ceramic, improved physical properties, good translucency, the reactive index and crystalline volume are differing. [4,5]

## 2. Case Report

A 26 years old male patient came to the fixed Prosthodontics Department, College of Dentistry

Ain-Shams University, his main chief complaint was malformed, discolored all upper and lower anterior teeth. He needs a high aesthetic appearance.



Figure 1. Preoperative view of teeth, Facial view



Figure 2. Preoperative view of teeth in occlusion



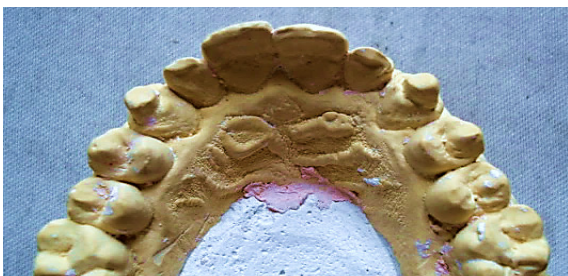
**Figure 3.** Preoperative view of teeth, lateral position

Medical and dental history were taken. There are no medical problems. The patient was non-smoker and in good general health. He had a history of continuous dental treatment over his lifetime with various dentists. The patient's chief complaint was the discoloration problem of the anterior upper and lower teeth with an apparent defect in tooth structure (Figure 1, Figure 2, Figure 3). He was very concerned about aesthetics. His main wish was to improve the health and appearance of his teeth. The patient said that his teeth problem was from the time of eruption and no family history that revealed his teeth problem. Also, he did not have any para-functional habit and brushing once a day using a soft tooth brush.

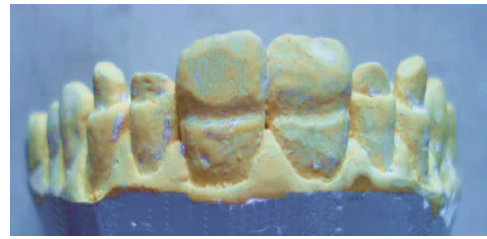
## 2.1. Diagnosis and Treatment Planning

On Intraoral examination, it was found that, the mandibular right and left first molars were extracted, yellowish discoloration with developmental malformation in both upper and lower 6 anterior teeth with deep hard horizontal patches on a labial and incisal surfaces of anterior teeth brown in color, there is no catch with probe and there is no tooth sensitivity. Chronic inflammation and calculus accumulation in all teeth were present. Occlusal examination revealed that the patient presented a Class I occlusion, an occlusion discrepancy between posterior lower molars, and cross bite between upper and lower canines. There was no TMJ or muscle discomfort. The lower arch was stable.

Diagnostic primary alginate impression, and study casts was prepared. Panoramic radiograph was selected and taken (Figure 4, Figure 5, Figure 6). After the examination and diagnoses were finished, a diagnosis of enamel hypoplasia due to moderate fluorosis was made. Smile Analysis and shade selection were completed.



**Figure 4.** Study cast



**Figure 5.** Study cast



**Figure 6.** Panoramic Radiograph

### 2.1.1. Treatment Plan

The treatment aims were to modify the contours and to treat the discoloration of his upper anterior teeth in most conservative method. IPS-emax press Ceramic laminate veneers were planned on the six maxillary anterior teeth. The patient was informed about the existing condition, Treatment options were discussed with the patient. Treatment procedure was explained and patient approval was taken.

Therefore IPS-emax press Ceramic laminate veneers were decided on the six upper anterior teeth. Many steps must be regarded before starting treatment. And shade was selected for the anterior laminates.

#### Treatment was carried out in the following steps:

1. Many photographs with different direction and positions
2. Smile analysis,
3. Diagnostic wax, template and mock-ups.
4. Laboratory possessing, temporary restorations
5. Taken final impressions
6. Try in and cementation of proper restorations.

Many parameters that will effect on the final result, such as smile, height, lip position, the buccal corridor, dental middle line, and individual characteristics of each tooth was evaluated to assist in making the diagnostic wax models.

### 2.1.2. Oral Hygiene Measures and Shade selection:

Oral hygiene improvement was done, calculus was removed ultrasonically and bleaching was done. The shade was selected by shade guide (VITA 3D master), in direct daylight and moisten teeth. (Figure 7)



**Figure 7.** After scaling and polishing

### 2.1.3. Diagnostic Wax, Vacuum Template and Mock-up:

A diagnostic white ivory wax was fabricated according to the analysis and all needed modifications was added (Figure 8, Figure 9, Figure 10, Figure 11). Then the diagnostic wax was discussed with the patient and the approval was taken.

A celluloid vacuum guide was designed and put under 2 atm of pressure to increase its accuracy (Figure 12, Figure 13, Figure 14). The guide was filled with a temporary crown composite material (Protemp 4, 3M ESPE, St. Paul, MN, US) and placed in the patient's mouth.

A slight modification was made in a mock-up, and according to the patient view. (Figure 15).

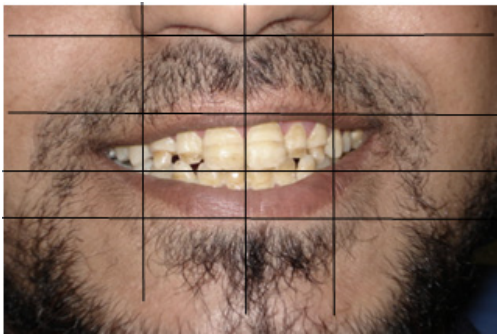


Figure 8. Smile analysis



Figure 9. A diagnostic white ivory wax. labial view



Figure 10. A diagnostic white ivory wax. labial view

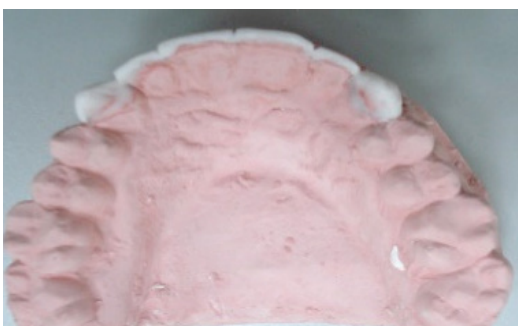


Figure 11. A diagnostic white ivory wax .palatal view



Figure 12. Modified cast



Figure 13. Celluloid vacuum guide



Figure 14. Celluloid vacuum guide and the cast

## 2.2. Teeth Preparation

The amount of tooth reduction was guided by temporary composite mock up. (Figure 15). A minimal invasive tooth preparations within the enamel with a chamfer finish line to which the technician can work was done using depth cutting diamond stone and tapered round end diamond stone.



Figure 15. Mock-up



**Figure 16.** After teeth preparation

The depth of labial surface reduction 0.3mm at the gingival margin, and 0.5mm for the bulk was adjusted by using 0.3mm and 0.5mm gold in color, Coarse Grit, depth cutting diamond stones (FG#834. 016, #834. 021 Depth marking, Alpen) The preparation was done in two plain to mimic the natural curvature of the teeth and provide enough thickness of ceramic material. Round end Coarse Grit tapered diamond gold in color stone (FG #850. 018, Alpen) was used to remove the remaining tooth structure between the prepared depth orientation grooves and to accentuate 0.3 mm cervical and proximal chamfer finish line. Mesial and distal reduction were kept just short of breaking the contact. 0.1mm Incisal overlap reduction was done to increase ceramic translucency. The palatal finish line was made with Round end, Coarse Grit, tapered diamond, gold in color stone (FG #850. 018, Alpen), and 1mm away from palatal centric contacts to increase the surface area for bonding and mechanical retention of the veneers. The horizontal stained defects which present on the labial surface was slightly removed with Pear Shaped, Coarse Grit, Diamond, gold in color stone (FG #830. 012, Alpen). And all the internal line and point angles were rounded and smoothed to avoid stress concentration in the margins of the veneers. (Figure 16).

### 2.3. Final Impression Procedure

After finishing and polishing of the prepared teeth, (No.000) Retraction cord was used in the facial gingival sulcus for 5 min. Then in two step technique addition silicone heavy and light impression was taken using anatomical stainless steel stock tray. Light and heavy body, Aquasil Dentsply, polyvinyl siloxane rubber base impression material.

### 2.4. Laboratory Procedure

The taken impression was poured using the refractory material and was allowed to set for 30 minutes. After separation of the refractory cast, the construction of IPS-emax press Ceramic laminate veneers with selected shade was made according to manufacturer's instructions.

### 2.5. Try-in and Final Cementation

#### 2.5.1. Try-in

The teeth were cleaned carefully and dried prior to the trial. The quality of fit, adaption, contour, gingival and

incisal extensions and color match of the veneer was examined.

#### 2.5.2. Final Cementation

Cementation was done according to manufacturer's instructions, Cement-it universal c&b resin cement (Pentron Clinical Technologies, LLC 53 North Plains Industrial Wallingford Road, CT 06492 U.S.A) was used. The cementation system kit consists of: Cement-It A2 4ml/7gm syringe, Cement-It Opaque white 4ml/7gm syringe, Bond-1 primer/adhesive 6ml bottle, PrepEze desensitize 5ml/5gm bottle, 37% etch gel 3ml/4gm syringe, Silane 3ml/2.5GM bottle (Figure 17).



**Figure 17.** Cement-it universal c&b resin cement

The constructed laminate veneers were cemented to well isolated, prepared, cleaned enamel with the resin cement as follows:

Before cementation, the prepared teeth were etched with orthophosphoric acid gel 37%. Each tooth was etched for 20 seconds, rinsed and lightly air-dried and then left slightly moist. Bond-1 C&B primer/adhesive was coated within 20 seconds, then residual ethanol solvent using a gentle stream of air for 10-15 seconds. The tooth had a shiny appearance, then light curing for 10 seconds.

The inner surface of the veneers was etched using 30% Hydrofluoric gel, rinsed, then were coated with a silane coupling agent. One coat of Bond-1 C&B primer/adhesive was applied to the selected surface of the porcelain laminate veneers. Excess and residual ethanol were removed with a jet of air for approximately 10-15 seconds.



**Figure 18.** Proper seated and cemented laminate veneers



**Figure 19.** Proper seated and cemented laminate veneers

The laminate veneers for the two central incisors were first cemented, followed by maxillary lateral veneers, then veneers for two maxillary canines. Cement-It Universal C&B cement mixture was placed on the inner surface of the porcelain laminate veneers. The working time of 1.5 minutes. The ceramic laminate veneers were seated and even figure pressure was applied, allowing excess cement to vent. Before polymerization, excess was removed with a small cotton brush. Once excess was removed, the luting resin was cured using the visible light activation unit for 40 seconds each (LED light-curing nit, Ivoclar-Vivadent). Finally, Veneers were finished using rotating abrasive disks (Soflex discs). (Figure 18, Figure 19)

## 2.6. Home Care Instruction

After proper cementation of veneers restorations, the patient was given advices for preservation and safe guarding of the restoration and a program for follow-up was planned.

## 3. Discussion

One of the most common problems facing the dentist and the patient is esthetic problems. Therefore, the selection of treatment option should be to achieve the patient's wishes.

In this case report, the patient is young age, with normal over jet, overbite, midline and smile line. no par functional habits and his teeth with sufficient thickness of enamel. This condition made the most acceptable conservative method of treatment option was indirect ceramic laminate veneer restoration. Therefore, performing this type of treatment only in patients who have indications for such treatments has a significant effect on the success of this type of permanent prosthetic restorations.

Ceramic, laminate veneer restorations are widely used, have a lot of advantages as: conservative materials and need minimal tooth preparation mainly in enamel, chemically stable therefore biologically satisfactory, lesser risk of causing irritation or sensitivity because lower cytotoxicity. These restorations exhibit reduced plaque build-up and it's easy to remove due to their smoothly glazed surface [6,7,8].

IPS-emax press Ceramic materials are widely selected for laminate veneers restorations because have many advantages: material with high-strength, have many options for cementation (Adhesive, self-adhesive, or conventional) cementation according to the indication. In addition, natural esthetics appearance, irrespective of the shade of the prepared tooth, Polychromatic Multi ingots

for utmost efficiency. Many dentists prefer to use it in cases of esthetic problems because it has different levels of translucency, more flexible, slightly invasive, precisely adapted restorations.

Laminate veneers are very thin layer of ceramic (0.3-0.5mm), so, it is more liable to fracture. Adhesive resin luting bonding cement and a silane coupling agent, makes a strong chemical, mechanical bond between etched enamel surface and etched internal surface of the ceramic. This type of union provides a long-standing Laminate veneers restoration [6,7,9,10].

Many authors reported that a tooth restored with a ceramic laminate veneer improves to a high % of its stiffness when it is exposed to forces postero-anteriorly like a healthy tooth. also, they reported that Ceramic laminate veneers have many advantages as resistance, hardness, and resilience. [11,12,13,14].

Cytotoxicity is one of the disadvantages of resin materials, but some researchers said that this become a problem only when contact directly with living tissue as pulp. A recent publication has reported after a 3-years follow-up of ceramic veneers; no significant change was recorded [15,16,17].

## 4. Conclusion

Lithium disilicate Ceramic veneers, are one of the most important ceramic materials, used to manage of esthetic problems, to enhance aesthetic and function of the anterior teeth. The patient must be instructed about the importance of oral hygiene measures and periodic follow up for maintenance and longstanding restorations.

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