



## Partial Porcelain Veneer Restoring Maxillary Incisor with Class II Cavity

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### Abstract

**Background:** The restoration of the class II cavity is very challenged for clinicians. Several treatment modalities have been used. For many years, composite resin was the preferred treatment with either direct or indirect technique, since it was considered as a conservative clinical solution, which provide predictable esthetic outcomes. Recently, with the progress in adhesive technologies and ceramic material porcelain partial veneer restoration was proposed in some case report studies as a therapeutic option for fractured and decayed teeth, it showed a high survival rate comparing with indirect resin restoration and it maintains its esthetic and gloss appearance for a long time.

**Case Presentation:** A 24 years old female patient with unremarkable medical history, presented to the department of fixed prosthodontics with aesthetic demand. Her chief complaint was to regain her smile and to restore the two maxillary incisors # 11, 12. The decision to make a zirconia crown on the 12 and a partial porcelain veneer on the 11 was retained.

**Conclusions:** Considerable advantages, such as ultra minimally invasive properties and excellent esthetic appearances, are inborn to porcelain partial veneers. The success depends on a combination of sound adhesive principles, adequate design of the restoration, laboratory experience, and bonding techniques.

**Keywords:** Dental Veneers; Minimally Invasive; Dental Bonding

### Background

The restoration of the class II cavity is one of the most difficult challenges for clinicians. In fact, he must obtain a perfect adaptation of the restoration to the margins and internal walls of the cavity.

Several therapeutic options are available to restore maxillary incisor with Class II cavity [1].

For many years, composite resin was the preferred treatment since it was considered as a conservative clinical solution, which provide a predictable esthetic, and immediate outcomes [2,3].

In the long term, and for large class II cavity, full-coverage crowns or full veneers [4] were indicated to overcome the disadvantages of composite resin and to achieve a permanent esthetic result.

Nowadays, those treatment options are considered invasive because of the need to remove tissue. Progress in adhesive technologies and ceramic material along with the increasing patient demand for conservative restorations have made possible a variety of more conservative restoration techniques [1,5]. Ceramic par-

tial veneers may be a suitable solution that completely preserves healthy tooth structure and provide an esthetic result with good biocompatibility [6-9].

This article presents a detailed clinical case of maxillary incisor with Class II cavity, which was restored by a partial ceramic veneer.

### Case presentation

A 24 years old female patient with unremarkable medical history, presented to the department of fixed prosthodontics with aesthetic demand. Her chief complaint was to regain her smile and to restore the two maxillary incisors # 11,12.

During the first appointment, complete history of the patient along with preoperative photograph was taken (Figures 1,2). Extra oral examination showed an ovoid face with a convex profile.

Clinical examination showed good hygiene, gummy and large smile, the 12 and the 11 present a direct restoration by composite resin, which was discolored with the inflammation of the papilla between the two teeth.



**Figure 1:** The initial smile.



**Figure 2:** The initial situation.

The radiological examination showed a composite restoration on the 11 at a distance from the pulp, with a satisfactory endodontic treatment on the 12 (Figure 3).



**Figure 3:** Retro alveolar radio.

The decision to make a zirconia crown on the 12 and a partial porcelain veneer on the 11 was retained.

The defective composite on the 12 was removed and the tooth was prepared. Thereafter, a glass fiber post was placed. The esthetic core was built up with composite resin and bonded with self-adhesive resin luting cement (Figures 4,5).



**Figure 4:** Preparation of the 12.



**Figure 5:** Fiber post reconstruction.

The preparation of the central incisor was the least invasive with maximal preservation of enamel tissue (Figure 6). In addition, like all the partial ceramic restoration, there are some guidelines of preparation were respected:

- All the angles had to be rounded.
- The divergence of the internal walls should not be too limited ( $\geq 10^\circ$ ).
- The cavo-superficial boundaries shall be sharp, without bevel.
- Occlusal areas should not be located at the tooth restoration interface.



**Figure 6:** Preparation of the 11 a: buccal view; b: occlusal view.

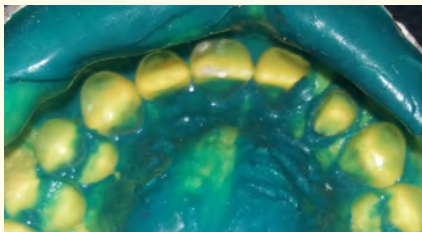
Tooth preparation can generate significant dentin exposures. These freshly cut dentin surfaces were sealed with a dentin-bonding agent (immediate dentin sealing) immediately following tooth preparation and before taking impression.

Temporary prosthesis were cemented in order to improve the esthetic appearance of the patient's smile (Figure 7).



**Figure 7:** Temporary prosthesis.

After double gingival cord retractions, an impression was made using light and heavy silicon C (Figure 8). The shade selection was done using both the classic and the digital shade guide (Figure 9).



**Figure 8:** Double silicone impression with high magnification of the preparation limits.

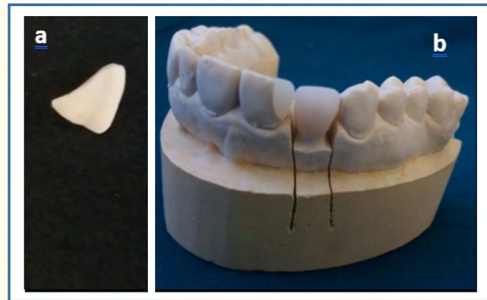


**Figure 9:** Color selection a: the use of a classic shade guide; b: the use of a digital shade guide.

In the laboratory, the first step was scanning the model, then the virtual restoration has been designed and the final restoration has been milled according to the corresponding color matching (Figures 10,11).



**Figure 10:** Scanning step and design in the Cerec system.



**Figure 11:** Final restorations.

With the translucent partial veneer, it is important to control the color of the restorations with a try-in paste; the white bonding resin was selected to match the restoration and the tooth, to ensure an invisible margin (Figures 12,13).



**Figure 12:** Control the colour of the restorations with a try-in paste.



**Figure 13:** The white bonding resin was selected.

Bonding procedures were carried out by treatment of the inner surface of the partial veneer with hydrofluoric acid at 5 % for 1 min, rinsed with water, air-dried and then it is treated with an ultrasonic bath for 4 minutes in alcohol. After that, a silane agent is applied for 60 seconds to the surface (Figure 14).



**Figure 14:** Treatment of the inner prosthetic surface.

After isolation of the prepared tooth with light cure rubber dam, the tooth surfaces were etched with 37% phosphoric acid for 30 s (enamel) and 15 s (dentin), rinsed with tap water for 15 seconds. A thin layer of an adhesive system was applied without pre-curing it (Figure 15).



**Figure 15:** Treatment of the dental surface.

Bonding resin was applied in the tooth surface and in the inner surface of the partial veneer. Then the restoration was placed and excesses of resin removed with a suitable curette. A light-polymerization from the buccal and palatal directions was done with a LED curing unit (Figure 16).



**Figure 16:** Light-polymerization.

The margins were finished with silicon points and polished with sequential diamond polishing pastes.

In our case, the patient presents an anterior open bite with absence of incisive contact. Thus, the interface tooth-restoration is at distance from the occlusion, which may improve the prognosis of the partial veneer (Figure 17).



**Figure 17:** Anterior open bite.

The patient was satisfied with the result and has not reported any problem, any color changes during one-year follow-up (Figure 18).



**Figure 18:** Final esthetic smile.

## Discussion

Several treatment modalities have been suggested for the management of carious lesions in the anterior dentition. Composite can be used to restore decayed teeth with either direct or indirect technique [10].

The direct restoration is the most commonly applied method. It provides a means of delivering esthetic, conservative, bonded restorations with the merits of lower relative cost and time [11].

However, placement protocols require practitioner skills to achieve superior esthetic morphology.

Furthermore, having a patent inter-proximal contacts and the consequences of polymerization shrinkage are commonly cited problems with direct restoration [11].

Therefore, the indirect technique may be suggested as it results in better occlusal and proximal contacts and better wear [10].

In addition, indirect restoration have many other advantages

- It can enhance mechanical properties through extensive 3-dimensional light curing.
- A pre-cured restoration avoids problems associated with polymerization shrinkage stress.
- More precise control of morphology and occlusion.
- Isolation only required for final bonding of the restoration.
- Tight seal and good adaption.

It is fabricated extra-orally without the challenges of salivary contamination, and patient co-operation [11].

Recently, porcelain partial veneer restoration was proposed in some case report studies as a therapeutic option for decayed teeth, and it showed a high survival rate comparing with indirect resin restoration [8,10].

According to the study of Meijering AC., et al. the survival rates for veneer restorations were 94% for porcelain restorations, 90% for indirect composite restorations and 74% for direct composite restorations[12].



Moreover, the use of porcelain material is required to achieve the ultimate esthetic outcome, because ceramic restorations are less prone to discoloration and wear than resin composites. In particular, staining may be a problem in cases of partial restoration where the difference in color will be remarkable between the tooth surface and the restoration. Staining caused by food could be diminished with the use of ceramic restorations, since this material maintains its esthetic and gloss appearance for a long time [1].

The best material is the lithium disilicate reinforced glass ceramic, which has good properties such as relatively high strength, marginal integrity and good esthetics. Additionally, this material provide a more reliable bonding by dint of his etchability [13].

The systematic review of Sailer showed that the 12 studies reporting a lithium disilicate reinforced glass ceramics restorations presented an estimated 5- year survival rate of 96,6 % which was similar to the survival rate of metal ceramic restorations [14].

Esthetic treatments with ceramic partial veneer should be performed with an appropriate treatment planning using a mock-up for preoperative evaluation and as a diagnostic aid for the final result [15].

Moreover, a high priority should be given to the examination of the patient's occlusion, as in the present case, the anterior open bite was favorable for the indication of this type of restoration. Therefore, it is important to select the biomechanical principles and the appropriate occlusal context that can optimize the final outcome.

The major esthetic disadvantage of ceramic partial veneers was to position the restoration/natural tooth transition in the visible area, so any difference in color will be remarkable and the transition line can be visible [9].

In addition, ceramic partial veneers are ideally thin and relatively translucent. The color of tooth substrate or bonding composites might potentially influence the final shade of veneer restorations [16].

These problems can be overcome by the choice of the corresponding preliminary color matching using a digital shade guide, and taking advantage of optical properties of adhesive materials.

Before bonding procedure, the partial restoration should be checked intraorally with a try-in pastes, which were used as indicators of the final shade and as a guide to choose an appropriate color of the bonding composites [17].

## Conclusion

Considerable advantages, such as ultra minimally invasive properties and excellent esthetic appearances, are inborn to porcelain partial veneers. The success depends on a combination of sound adhesive principles, adequate design of the restoration, laboratory experience, and bonding techniques.

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