Prefabricated Composite Anterior Veneers: Retrospective Clinical Evaluation with a Four Year Follow-up.

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Abstract

Aim
The purpose of four-year retrospective study was to assess the natural aesthetics of the anterior teeth after the application of prefabricated resin-based composite veneers in total respect of soft tissues.

Materials and Methods
A total of 20 patients, requiring an aesthetical treatment of anterior teeth in the upper jaw, were treated the application of 90 composite veneers during a one-year period, from March 2011 to December 2011, in a private practice and evaluated every 6 months, during a four year follow-up.

Results
Only four veneers presented small fractures in the distal incisal area, after 2 months from application. The composite fractures were easily repaired. At the last follow up, three patients were dropped out and a total of 98 veneers were revaluated. Adverse events such as colour change, tooth sensitivity, margin infiltration, gingival recession and plaque accumulation were not observed.

Conclusions
The use of composite veneers could be a suitable option for the treatment of maxillary anterior teeth.

KeyWords: Anterior teeth; composite; direct restorations; prefabricated veneers.

Introduction
The functional and aesthetic success of an oral rehabilitation depends on the understanding of the patient and on effective communication with him [1]; the active involvement of the patient in the decision-making process of the treatment plan is of paramount importance, especially when aesthetics is concerned [1].

Since many years ceramic veneers are the gold standard for aesthetic restorations, in adequate clinical conditions [2]. Controversy remains regarding the treatment planning criteria for young adult patients requiring aesthetic restorations. It is important to preserve much tooth structure in place and to retain natural teeth to maintain the architecture of soft tissue and thereby facilitate the tooth re-treatability [2]. All the improvement got in adhesive dentistry over the last 30 years, by direct composite or by composite veneers, allows clinicians to successfully add restorative materials to the tooth for a correction of un-aesthetic tooth forms, tooth positions, dimensions, and colours [3,4]. Adhesive dentistry has expanded the treatment possibilities of routine restorative dental practice; indeed, a tooth lesion can be not only restored conservatively, resulting from their adhesive properties, but these restorative materials can also be added to the tooth surface [3,4]. The use of composite resins in restorative dentistry became routine with the improvement of bonding systems, polymerization systems, and mechanical and physical properties of the resin systems [5]. Therefore, direct composite additions or direct composite veneers and the advent of micro hybrid and nano-hybrid composites, and the easily process of finishing and polishing of these restorations were often regarded as a more conservative alternative to porcelain [6,7]. In the last few years, the clinical use of direct veneers has been improved through composite renovation [8]. Essential proprieties needed to get an optimal aesthetical result are strongly linked to the composite features [8]. Dental composites are polymeric materials based on dimethacrylate resin monomers that create a three-dimensional polymer network when polymerized. The dispersed phase of these materials is composed of reinforcing inorganic filler particles of variable shape and size, which are dispersed within the polymer network and bonded to it by a surface coating of a bi-functional silane coupling agent [8,9].

Developments in filler technology have led to significant reductions in filler size and improvements in filler packing, reducing the wear and degradation associated with the polymer matrix and enhancing the clinical usefulness of these materials [8,9].
A recently introduced option is represented by prefabricated composite veneers, which are characterized by biological respect, aesthetic proprieties, colours stability and economical value [10,11].

The aim of this four-year retrospective study was to clinically evaluate the soft tissues response and the aesthetic outcome after the application of prefabricated, resin-based composite veneers.

**Materials and Methods**

**Study Design**

A total of 20 patients (male 7 and female 13), requiring an aesthetical treatment of anterior teeth in the maxilla, were treated with application of 98 prefabricated composite veneers (Edelweiss Composite Veneers, Novaxa, Milan, Italy) during a one-year time, from March 2011 to December 2011, in a private practice in Chieti, Italy. The patients included, ranged in age from 21 to 58 years at the time of veneers. The inclusion criteria were the dental hygiene level (the Plaque Index of Silness J & Loe (1964) [12] maximum 20%) and lack of occlusal interferences. All patients were informed about the possible complications, such as possible tooth sensibility or fracture risk of the composite, and they were fully advised of all the post treatments. They signed the private informed consent. Prior to treatment, detailed dental, medical, and social histories were obtained from each patient. The indications of this treatment were the following: multi-treatments substitutions, single spot, antibiotics spot, tooth traumatic lesions, tooth positions or shape (Table 1) [16].

**Technical Procedure**

In the initial step of preparation for prefabricated composite veneers, bleaching of neighbouring teeth and or antagonist arch, followed by replacement of all defective Class III, IV, and IV fillings were performed. The veneering treatment per se involves four main steps: tooth preparation, veneer adjustment, adhesive procedures (on tooth and veneers), followed by cementation. At the first visit, after the planning treatment, the clinician performed the pre-operative evaluations, concerning the colour and occlusion investigation (Fig 1). The total imprints by silicon rubber impression materials (Hydro rise Zhermack- Henry Schein - Italy ) or by red wax of the upper and lower jaw and an occlusion recording (Red Wax Tenatex - Henry Schein - Italy ) were performed.

The target of the impressions was to obtain study casts to evaluate the occlusion and to analyze each tooth shape, length, width, wear and depth the veneers were adapted on the study casts (Fig 2).

**Table 1: Mean age of the patients and composite veneers indications.**

<table>
<thead>
<tr>
<th>Mean Age</th>
<th>Composite Veneers</th>
<th>Discoloured composite restorations, Single spot, Antibiotics spot</th>
<th>Restoration of worn teeth veeers</th>
<th>Replacement of existing veeers</th>
<th>Masking discoloured or malformed and/or misaligned teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>34,9</td>
<td>Maxilla</td>
<td>42</td>
<td>10</td>
<td>8</td>
<td>38</td>
</tr>
</tbody>
</table>

The same technique was adopted for all the patients and performed by the same clinician (M.R.) local infiltration of 4% articaine with 1:100000 adrenaline (Ubistesin 4% - Espe Dental AG, Seefeld, Germany).
The clinical adaptation of the composite veneers included two additional steps: the veneers and the tooth treatment.

**Veneers:** The inner part was roughened with a bur; after cleaning composite veneer with Ultra-Etch for 5 seconds. Rinse and dry. The inner surface received a dedicated bonding agent (Peak Universal Bond on composite veneer and gently agitate for 10 seconds. Blow air using half pressure to thin and remove solvent) that was light cured for 20 seconds.

**Tooth:** The tooth was polished with a brush and thickness between 0.3 and 0.5 mm of the tooth surface was removed with a fine-grained diamond bur (Cod. 8852; Komet srl, Milan, Italy).

Prior to veneer looting, two transparent strips were placed in the interproximal spaces of the tooth and stabilized by interdentally wedges. Tooth conditioning was performed with a 37% phosphoric acid agent (Ultra-Etch – Edelweiss) for 60sec on untouched enamel surfaces, 30sec on ground enamel surfaces, and for 15sec on dentin surfaces. After adequate rinsing, primer was applied (Universal Bond – Edelweiss) on tooth and gently agitate for 10 seconds. Blow air using half pressure to thin and remove solvent, and a 20sec light curing

A 1cm composite resin (Dispense Amelogen’ Plus - Edelweiss) was applied both on the tooth surface and on the treated inner portion of the veneer. After veneer placement, composite excess was removed with a thin instrument and light curing was performed for 40 seconds for each tooth side. Thin diamond burs, polishing disks and rubber tips were used for proximal refining when necessary (Cod. 8852 Komet S.R.L. Milan Italy) and Polish marginal areas of veneer using Jiffy’ polishing cups starting with coarse green cups and ending with fine blue cups were used (Fig 4). After completion of the treatment, the patients were recalled at six-month intervals. The last follow-up was performed 4 years after restoration delivery.

**Clinical Evaluation**

The following parameters were evaluated: marginal seal maintenance; veneer integrity, colour stability, tooth sensibility and soft tissues healthy. The gingival margin level was recorded and photographed to evaluate the soft tissue stability.

Recalls were performed every six months, with a follow up between 16 and 24 months (mean: 20 months).

**Results**

At the last follow up, seventeen patients were examined; therefore, the patient’s dropout was 15% and the veneers dropout was 11%. Four veneers presented small fractures in the distal incisal area, 2 months since their application. The composite fractures were easily repaired with the help of a fine grit diamond bur. In a single case composite paste was added to improve the aesthetic result.

At the last follow up, all the restorations under follow up were fixed in place and no discoloration, marginal infiltration, gingival recession, increased plaque index and tooth sensibility were observed. Secondary caries and endodontic complications were also absent. Therefore, the overall success rate of the prefabricated composites veneers was 95.6% (Table 2).

**Table 2:** Distribution of composite veneers by region, dropout and failures

<table>
<thead>
<tr>
<th>Region</th>
<th>Veneers</th>
<th>Follow up 1 (6mo)</th>
<th>Follow up 2 (12mo)</th>
<th>Follow up 3 (18mo)</th>
<th>Follow up 4 (24mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central incisor</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Lateral Incisor</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Canine</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td>TOTAL</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>82</td>
<td>82</td>
</tr>
</tbody>
</table>
Discussion

Indirect laboratory processed composite resin systems are capable of aesthetic results that may also reinforce tooth structure [13]. The adhesive luting procedure strengthens the tooth and provides additional support for tooth structure, so more conservative preparation designs can be utilized. These systems restore mechanical and biological function while achieving optimal aesthetic results, with minimal resin cement shrinkage and limited tooth reduction [13].

Gresnigt et al [13] showed that the quality of indirect composite materials is highly influenced by the finishing and polishing method that could also influence their clinical longevity; their colour stability or opacity is dictated by the degree of conversion of such composites. On the other hand laminate composite veneers do not need the finishing and polishing of the buckle surface thanks to controlled surface smoothness. Zorba et al [13] demonstrated that the use of resin-based composite laminate veneers with adhesive bonding systems provide an aesthetic alternative to metal-ceramic or all-ceramic crowns for the rehabilitation of anterior teeth, irrespective of the age of the patient.

The main risks associated with the use of direct composite veneers are: tooth sensibility, or composite fractures. Tooth sensibility is a possible rare complication associated with increased tooth structure removal, such as in case of tooth discoloration [13]. A thorough evaluation of hue, chrome, value, translucency, opalescence, and opacity can help to avoid this kind of problem [14, 15, 16].

In the present study, four prefabricated veneers showed composite fracture in incisal area that were easily restored by the direct adhesive composite, allowed a fast and complete rebuilding.

In a fatigue evaluation of prefabricated veneers after four years of simulated function, interfacial stability was confirmed at the tooth - cement interface and at the restoration - cement interface. Further studies with increased follow-up may confirm the reliability of this kind of rehabilitation over time.

Conclusion

The clinical data of the present retrospective study showed that the use of composite veneers seem be an attractive and suitable option to treatment of anterior teeth in the upper jaw. Allowing treatment simplification and cost reduction. Further studies are needed to verify restoration stability with long term follow-up.

References