



Anterior Esthetic Restorations Using Minimal Invasive Techniques

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Clinical Image

As Esthetic/cosmetic dentistry's popularity increases exponentially, patients (especially women) have started to visit dentists for more esthetically proportional anterior teeth. The highly development in dental ceramics and adhesives techniques has made the superior restorative procedures possible. The planned treatment has to be harmonious with the soft and hard tissue as well as aesthetic and functional. The idea of minimally invasive dental restorations is essential for successful esthetic restorations. In these restorations, an appropriate restorative planning must be conducted. Porcelain Laminate Veneers (PLV) is considered a conservative and minimal invasive solution for patients requiring improvement of the shape, color, or position of their anterior teeth [1-3]. Also patients with small or lingually positioned teeth should be considered ideal candidates for techniques involving no or minimal preparation. PLV have been extensively and successfully used to mask intrinsic staining, to give the appearance of straightening, and to correct minor malformations of anterior teeth without the removal or minimal amount of sound tooth substance. For these reasons PLV is becoming more popular day by day (Figure 1-3).

There are many significant advantages of conservation of tooth structure, including lack of need for anesthesia, absence of postoperative sensitivity, bonding to enamel, minimal flexing stress, longer-lasting restorations, potential for reversal, and higher levels of acceptance of treatment among patients [4,5]. PLV is usually a thin facing of about 0.3 mm to 0.7 mm thickness covering the labial aspects of anterior teeth and the buccal aspects of some bicuspid teeth. The final desired position, color, and shape of the restoration should be the main determinants of the level of reduction. Preparation is usually performed within the enamel. Ferrari et al. [6], reported the thickness of enamel layer for anterior teeth and showed that, the central incisors have 0.3 mm to 0.5 mm enamel on cervical, 0.6 mm to 1.0 mm enamel on middle and 1.0 mm to 2.1 mm on incisal part. The quantity of incisal reduction is determined by taking into consideration the recommended portion as 1.5 mm to 2 mm for esthetic in anterior laminate veneer restorations. The overall marginal adaptation of the laminate veneer restorations are not related with the depth of preparation. Our unpublished data showed that fracture resistance of laminate veneers with 0.5 mm preparation depth was greater than that of the 0.3 mm and 1 mm preparation depth and prepress laminate veneers and 0.5 mm preparation depth provides the optimum veneer thickness and bonding ability for clinical use.

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The veneer is attached to the surface by a combination of mechanical and chemical adhesives bonding. For adhesion there are many systems that have color-corrected, water soluble try-in gels; optimal viscosity levels; and color-stable resin cements, opaques, and color modifiers. Since the laminate veneers are cemented by resin cement, they become an integrated part of tooth and have to face with masticatory stress, thermal changes and hydrolytic effect of water and other chemicals. The mechanical attachment is achieved by etching the enamel and the porcelain. There are different characteristics of resin cements that make them clinically highly preferable luting agents. Resin cements should have high bond strengths both to tooth structure and PLV, high compressive and tensile strengths, and the lowest solubility. In fact, they have the highest strength of the cements currently in use [7-9]. The disadvantages of these type of resin cements are with their technique sensitivity and difficulty with clean-up. Resin cements may change shade during curing and can darken during their lifetime. Especially this is very important since esthetics is a particularly important characteristic for PLV [10]. The role of clinician is to choose right preparation design and restorative material to reach optimum marginal adaptation and fracture resistance for long term success beside esthetics criteria. The clinicians must be careful to follow all steps in proper order and with the recommended time for each step. For cementation of PLV, a light-curing luting composite (etc: Variolink Veneer, Variolink Esthetic LC (Ivoclar Vivadent Inc.); RelyX ARC (3M ESPE); Choice 2 (BISCO, Inc.); and Calibra® (DENTSPLY Caulk) is preferred. The composite is



Figure 1A and B: Before and after PLV.



Figure 2: (A) Maxillary central has dark color (B): Preparation for PLV (C): PLV (IPS e.max Press, Ivoclar Vivadent) cemented on tooth.



Figure 3: (A) Patient has minor incisal wear. (B): Restored her teeth's incisal length using PLV (IPS e.max Press, Ivoclar Vivadent).

then allowed to form a strong micromechanical bond similar to that achieved with enamel while an additional chemical attachment to the porcelain interface is accomplished by silane bonding. PLV is then cemented with preferable light cured composite resins to enamel surface. In the case of ceramic with a thickness of more than 0.7 mm, light-cured resin composites do not reach their maximum hardness. In these situations, a dual-cured luting composite is advisable [11]. The success of the porcelain veneer is greatly determined by the strength and durability of the bond formed between the three different components of the bonded veneer complex: the tooth surface, the porcelain veneer, and the luting composite. The success rate of PLV has been clinically evaluated and has shown a range from 18 months up to 20 years; the rate of success reported in these studies varies between 75% and 100% [12-14]. Minimal invasive PLV technique is one of the most conservative of treatment options, however some rules have to be followed. Such as, planning the case, conservative (enamel-saving) preparation of teeth, proper selection of ceramics, proper selection of the materials and methods of cementation, proper

finishing and polishing of the restorations, and proper planning for the continued maintenance of the restorations. The case has to be carefully selected and treatment planned. Tooth reduction for any restorative technique should be as minimum as possible, especially for PLV. No-preparation veneers are only indicated for selected cases and a larger number of cases require minimum of tooth modification for superior esthetics, patient satisfaction, and better color change without affecting the thickness and emergence profile of the veneer. In Patients has minor incisal wear owing to bruxism, it is often possible to restore the incisal length using PLVs. But, patients has severe parafunctional habits (heavy bruxist) should not be ideal candidates for PLVs. It is very important to evaluate the occlusal scheme and manage the occlusal forces before any treatment with PLVs is attempted. To prevent post operative ceramic fracture in these cases, an occlusal guard is recommended.

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