

Laboratory Realities

ENHANCING NATURAL AESTHETICS VIA PORCELAIN LAMINATE VENEERS

Sang K. Jun, CDT*
Steven McConnell, DDS†

In recent years, dental manufacturers have developed many innovative restorative materials for use in aesthetic dentistry. Pressable ceramics have long been an alternative to porcelain-fused-to-metal when completing restorations. Alumina-based ceramics have been used for many years in clinical dentistry, but are now giving way to zirconia frameworks with layering ceramics. The continued evolution of these materials, as well as advancements in restorative techniques and laboratory fabrication procedures, has yielded the necessary tools for dental professionals to treat patients requiring either tooth replacement or enhancement.

While some materials may have inherent advantages over others, it is ultimately the dental professional's responsibility to choose the most appropriate materials for the restorations. When porcelain laminate veneers (PLVs) are selected for aesthetic enhancement of the anterior dentition, the clinician and dental technician must balance various factors in order to achieve an aesthetic outcome. While PLVs can be fabricated from numerous ceramic systems, the goals of the case and the color of the

underlying tooth structure (particularly when dark substrates must be concealed) can significantly influence ceramic material selection and laboratory technique—as demonstrated in the following case presentation.

Case Presentation

A 35-year-old male patient presented with worn dentition due to an unstable bite and parafunctional habit. The loss of incisal length resulted in insufficient anterior guidance as well as compromised aesthetics. Limited cuspid disclusion, with balancing and working interferences, was apparent for both left and right lateral excursions. The treatment plan was to orthodontically position the teeth for optimum bite stability and to establish cuspid disclusion. The incisors would be positioned with the expectation of using PLVs to establish ideal aesthetics, gingival contours, and proper anterior function. Following completion of orthodontic treatment, equilibrium was achieved and provisional restorations were placed to obtain aesthetics as well as to establish proper anterior contact for muscle balance and anterior protective disclusion.



Figure 1A. Preoperative view of the patient's worn maxillary and mandibular dentition; centric relation/central occlusion discrepancy was 1 mm.

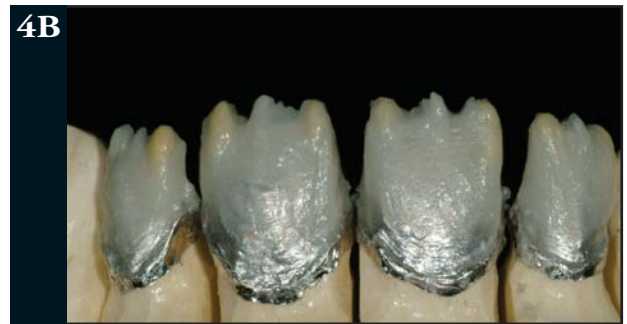
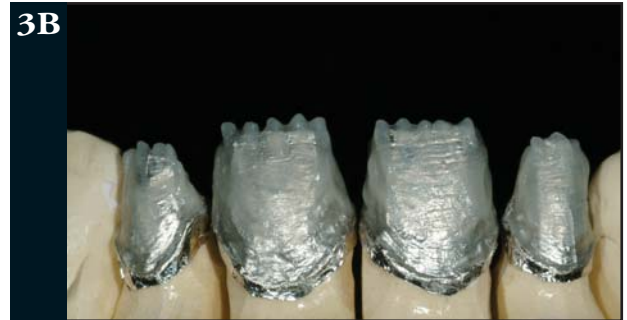
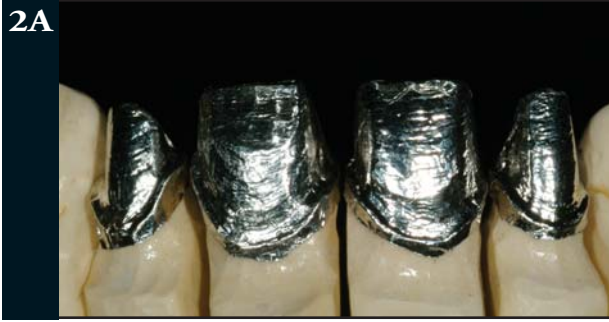


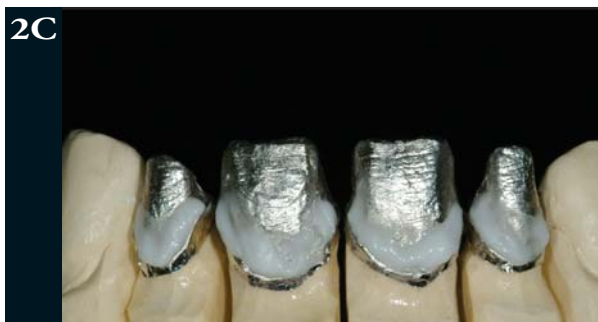
Figure 1B. Postoperative view demonstrating aesthetic enhancement achieved via the successful placement of porcelain laminate veneers.

*Private practice, Monterey, CA.

†Private practice, Navato, CA.

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Figures 2A,B,C. Following tooth preparation of 0.5 mm to 0.7 mm, provisional restorations were placed to permit evaluation of shape and shade by the patient and the restorative team. Function and other aspects of clinical evaluations were performed by the clinician. In the dental laboratory, models were poured from impressions and sectioned into individual dies. Platinum foil was then swaged onto the master dies. A thin layer of translucent-shaded porcelain (ie, Creation, Jensen Industries, Inc, North Haven, CT) was applied over the body of the restoration once the initial layer was fired at a temperature of 910°C and held for one minute.

Figures 3A,B,C. A clear translucent shade of ceramic was applied on the gingival third and faded upward to create a contact lens effect. A thin layer of dentin was applied to the body of the veneers, then a 1:1 mixture of opacous and incisal dentin was placed on the incisal edge to prevent a demarcation line in the definitive restorations.

Figures 4A,B,C. Upon firing the preliminary layer, the dentin layer was built up to full length and contour. A porcelain cut-back was performed to create structural mamelons and space for the enamel layer, translucent shades, and other aesthetic details. At that stage, internal characterizations could be performed and fired to preserve them in place. The spaces between the mamelons and interproximal contacts were filled in with the desired translucent shade, and the length of the PLVs was increased to compensate for firing shrinkage.

Figures 5A,B,C. The line angles and high value zone were highlighted with bright or white enamel. The incisal two thirds of the veneers were covered with different-colored enamel porcelains to create the illusion of depth. While applying the translucent layer, the line angles were accentuated with a lighter translucent shade. Many different shades of translucency could have been used depending on the individual characteristics and thickness of the restorations.

Figures 6A,B,C. Once firing was completed, additional internal characterization and staining could be performed and fired with or without a vacuum at 820°C. The completed restorations were bonded using a total-etch technique with a dentin primer (ie, Clearfil Photo Bond, Kuraray America, New York, NY) and bonding agent (ie, Illusion Clear Resin, Bisco, Inc, Schaumburg, IL). The restorations were light cured for 30 seconds both buccally and lingually. The recent improvement of many restorative materials may indicate that some products have an advantage over others, but, in the end, the most advantageous factor in aesthetic dentistry is proper team communication.

**Address correspondence to: Sang K. Jun, CDT,
Bay Dental Laboratory, 484 Lighthouse Avenue,
Suite 201, Monterey, CA 93940
Tel: 831-375-7338 • E-mail: sang@baydentallab.com**