Smile rehabilitation with lithium disilicate veneers: a case report

There is an increasing demand of patients for a beautiful smile, combining perfect teeth alignment to a natural shade. Different materials and techniques are available on the market, but in terms of longevity and patient satisfaction, the results are not similar. When compared to indirect porcelain veneers, direct composite veneers, and prefabricated veneers, showed a lower survival rate, with several shortcomings and high risk failures such as veneers debonding and overcontouring[1].

Porcelain laminate veneers made with lithium disilicate remain the gold standard technique in terms of longevity and survival rate[2]. The main advantages of pressed porcelain are that the resulting veneers have a high level of accuracy and minimal internal structural defects[3].

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The following paper reports the case of Serena, a 25-year-old patient that complains about her unpleasing smile due to wear and erosions on the upper laterals and incisors (Fig. 1). After a thorough clinical examination and smile analysis, in order to optimise the result, it was agreed to place four laminate veneers made with lithium disilicate (Initial LiSi Press, GC).

Fig. 1: Preoperative view of the patient smile (upper anterior teeth)

An alginate impression was taken, and a diagnostic wax up was made on the four anterior teeth (Fig. 2). A silicone tray was made on the wax-up using Exafast (GC), a polyvinyl siloxane (PVS) and left during three minutes for setting. Then the mock up was made using Tempsmart DC (Shade A1), a dual-cure resin based composite (Fig. 3).

Fig. 2: Wax up of the four upper incisors

Fig. 3: Mock up on the upper incisors made using Tempsmart DC (A1)

In the following session, the teeth were minimally prepared using diamond burs from the SKIV Kit (Simple Kit for Inlay and Veneers, Komet, Fig. 4) ensuring finishing contour within enamel with equi-gingival limits (Fig. 4a). The preparation phase consisted of three steps : buccal, incisal and proximal reduction.
The incisal preparation was carried over the incisal edge from buccal to palatal, with an incisal reduction of 1.5-2 mm. Palatally, the teeth were finished with an overlap, for a better seating of the veneers (Fig. 4b), and an enhanced translucency of the incisal edge[4].

Fig. 4: Simple Kit for Inlay and Veneers, for veneers preparation

Fig. 4a: Minimal teeth preparation for Porcelain Laminate Veneers : buccal view

Fig. 4b: Palatal view of the prepared teeth

Fig. 5a: Lithium disilicate veneers (Initial LiSi Press)

Fig. 5b: Application of hydrofluoric acid (9%) during 20 sec

Fig. 5c: Application of silane (Ceramic Primer II) during 2 min

The second session was dedicated to veneers placement. After removal of the temporaries and cleaning of the teeth, the four veneers received from the laboratory were tried in (Fig. 5a). For an optimal adhesive procedure, the working field was isolated using a rubber dam, and ligatures were made around the teeth with waxed dental floss, to avoid any gingival fluid contamination.
The inner parts of the veneers were prepared as follows; sandblasting using alumina oxide, (usually carried out by the lab), then conditioning using hydrofluoric acid (9%) for 20 seconds (Fig. 5b), then thorough rinsing, and finally a layer of silane, the Ceramic Primer II, was applied and left undisturbed for 2 minutes (Fig. 5c), than dried to remove any existing excess.

Teeth preparation consisted of etching all the surfaces with orthophosphoric acid with a concentration of 37% during 20 seconds (Fig. 6a). Then, the teeth were thoroughly rinsed and gently dried, and the universal adhesive G-Premio BOND (GC) was applied with a microbrush (Fig. 6b), gently dried and air thinned, then polymerised for 20 seconds (Fig. 6c).

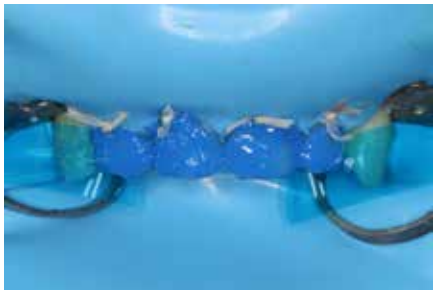

Fig. 6a: Application of orthophosphoric acid 37% during 20s on the prepared teeth

Fig. 6b: Application of G-Premio Bond adhesive

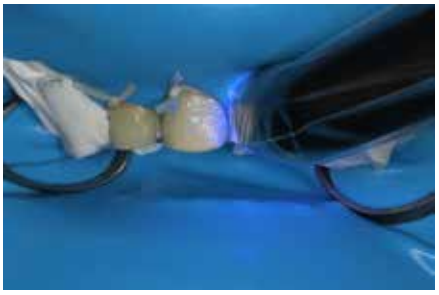

Fig. 6c: Light curing of the bonding during 20 sec

After applying G-CEM Veneer cement at the inner side of the porcelain restorations, the two centrals were seated first (Fig. 7), then the two laterals. Excesses of cement were removed using a brush, then tack-cured for 3 seconds out using a LED unit, and interproximal excess were gently removed using dental floss. Polymerisation was completed during 40 seconds from each side using the same light-curing unit. Careful removal of excesses reduces the finishing procedure and ensures a better finishing and polishing of the porcelain veneers.

Fig. 7: Application of the G-Cem Veneer (Translucent shade)

Light-curing resin cements are preferred for veneers cementation as they have a longer working time, allowing the placement of several veneers. The setting time is controlled by the operator. Additionally, G-CEM Veneer cement has an optimal consistency that avoids excess displacement in the interproximal areas, making their removal much easier. The final polymerisation is achieved through a layer of glycerin gel placed on all the veneers, in order to avoid the formation of an oxygen inhibited layer (Fig. 8).

Fig. 8: After veneers placement, a layer of glycerin is applied for a better polymerisation.

Fig. 9: Silicone point used for final polishing

The occlusion was carefully checked using articulating paper in centric occlusion followed by excursive and laterality movements. Rugby-shaped fine diamonds were used with water spray to adjust the occlusion; then rubber points were used to polish the surfaces.

The use of diamond burs on the buccal surface of the veneers, is not recommended, in order to preserve the surface gloss. Buccal excesses can be removed using a blade N° 12. A silicone cup was used for polishing (Fig. 9)

and finally a small quantity of diamond paste was used on a low speed for the final lustre and polishing using a goat brush wheel.

Figures 10 a and b show the postoperative buccal and palatal views of the veneers 6 months after their placement in the mouth.

Porcelain laminate veneers are considered a very conservative technique in aesthetic dentistry. Their longevity depends on many factors that can be summarised into a careful case selection, a healthy gingival tissue and periodontal environment and an excellent laboratory. When those criteria are respected, the survival rate of porcelain laminate veneers at 15 years, is close to 85%[6]. Layton and Walton reported the longevity of feldspathic porcelain veneers as up to 12 years; at 5 years, the survival rate was 96%, dropping to 93% at 10 years and to 91% at 12 years[7] (Layton and Walton, 2007).

Fig. 10a and 10b: Postoperative buccal and palatal views of the veneers after 6 months

References

1. Shetty A, et al., Survival rates of porcelain laminate restoration based on different incisal preparation designs: An analysis. J Conserv Dent. 2011 ;14 (1):10-5.
2. Arif R et al., Retrospective evaluation of the clinical performance and longevity of porcelain laminate veneers 7 to 14 years after cementation. J Prosthet Dent, 2019 : 122 (1) : 31-37.
3. Mormann WH. The evolution of CEREC system. JADA. 2006; 137 (Suppl) : 7S–13S.
4. Magne P, Belser U. Bonded porcelain restorations in the anterior dentition: A Biomimetic Approach. Germany: Quintessence, 2003.
5. Gresnigt MM et al., Randomized clinical trial on indirect resin composite and ceramic laminate veneers: Up to 10-year findings. J Dent, 2019; 86 : 102-109.
6. Morimoto S et al., Main Clinical Outcomes of Feldspathic Porcelain and Glass-Ceramic Laminate Veneers: A Systematic Review and Meta-Analysis of Survival and Complication Rates. Int J Prosthodont 2016 ; 29 (1) : 38-49.
7. Layton D and Walton T. An up to 16-year prospective study of 304 porcelain veneers. Int J Prosthodont. 2007;20:389–396.