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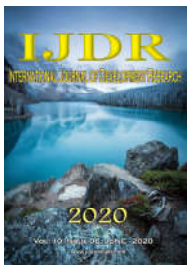

CASE REPORT OPEN ACCESS

ESTHETIC REHABILITATION WITH LITHIUM DISILICATE PORCELAIN VENEERS: CLINICAL REPORT

***Josué Junior Araujo Pierote, Priscila Regis Pedreira, Giselle Maria Marchi and Luis Alexandre Maffei Sartini Paulillo**

Department of Restorative Dentistry, Piracicaba Dental School, State University of Campinas, Piracicaba, SP, Brazil

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****Corresponding author:***
Josué Junior Araujo Pierote

ABSTRACT

This case report describes a treatment of replacing unsatisfactory and extensive composite restorations to improve anterior tooth shape, color and alignment, thereby reestablishing the esthetics and harmony of the patient's smile. Treatment possibilities with composite resin or ceramic veneers were discussed with the patient, as well as their advantages and limitations. Teeth whitening, following by diagnostic wax-up and mock up and finally, lithium disilicate porcelain veneers were done. With the result can conclude that Lithium disilicate glass ceramic is an excellent alternative in cases of anterior teeth with extensive restorations. Therefore, the clinical success of lithium disilicate porcelain veneers depends on the precise clinical protocol, correct indications and laboratory procedures.

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INTRODUCTION

The desire for possessing a perfect smile has increased substantially over the past few years. After dental esthetic treatment, the patient seems more confident and happy, which results in greater chances of being successful in job interviews and better personal relationships. The esthetic restoration of anterior teeth intends to provide a healthy and harmonious smile, solving the most esthetic problems for patients: the size, shape, and color of the anterior upper teeth. The options to solve these problems range from composite resins to ceramics, each of which has advantages and limitations (Martins *et al*., 2017; Pithon, 2014). For a long period, composite resin was the first option for cosmetic and conservative procedures, due to their conservation of tooth tissue, lower cost compared to ceramics, reversibility, and a relatively simple technique (Farias-Neto, 2015). However, such restorations have limited longevity, which compromises the long-term esthetic results (Federizzi *et al*., 2016). Therefore, the material of choice for patients with high esthetic expectations and seeking for a long lasting treatment have become the ceramics (Farias-Neto *et al*., 2015). The ceramics have several important characteristics, including color stability, translucency, reproduction of the optical properties of the dental structure, mechanical resistance, durability, adherence to the cementing agent and dental substrates, low plaque accumulation and biological compatibility (Farias-Neto, 2015; Marchionatti *et al*., 2017). Therefore, are indicated to increase tooth size and volume, reduce diastemas, and to correct shape, contour and discoloration (Marchionatti, 2017). Several ceramic materials and fabrication methods for laminate veneers are available. Lithium disilicate and zirconia are the most used, although zirconia has higher mechanical strength, the lithium disilicate has higher translucency. Additionally, improvements on physical properties and translucency for lithium disilicate ceramic have been made and a superior press ceramic material was introduced named as IPS e.max Press (Ivoclar Vivadent). The use of IPS e.max Press, relatively translucent high-strength monolithic ceramic material, is so widespread due to the increasing demand for esthetic restorations (Yang *et al*., 2016). The purpose of this paper is to present a case of replacing unsatisfactory extensive composite restorations to

improve anterior tooth shape, color and alignment, there by reestablishing the esthetics and harmony of the patient's smile, using lithium disilicate porcelain veneers.

CASE REPORT

A 26-year-old man, administrator, sought treatment for size, shape and pigmentation in some teeth, seeking to improve his appearance. In addition, patient signed the consent form for the dissemination of clinical data and images. After the clinical and radiographic evaluations, the patient showed the presence of upper anterior teeth with short crowns, gingival smile, unsatisfactory restorations in the upper central incisors and wear on lower incisors due to attrition (Figure 1a-d).

Figure 1. Pretreatment aspect, close-up smile views (a-c) and intraoral view of maximum intercuspation (d). Diagnostic wax-up (e). Diagnostic mock-up for a guide to tooth preparation (f)

After the treatment modalities were discussed with the patient, the decision was made to prepare the teeth with lithium disilicate to restore the size and shape of the teeth and gingivaplasty was not performed due to patient refusal. To initiate treatment, the adequacy of oral was performed by supra-gingival scaling of calculi with periodontal curettes and root plantation with rubber cups in low rotation and water paste/pumice. The dental arches were cast with alginate (Hydrogum, Zhermack Clinical, Italy) to obtain the dental template (Herodent type III, Coltene, Rio de Janeiro, Brazil). The impressions with Silicone (Zetaplus, Zhermack, Labordental, São Paulo, Brazil) were obtained and were used for temporary restorations (Figure 1e). The removal of the dental structure for dental preparation was carried out with conical trunk diamond pullets (KG Sorensen, São Paulo,

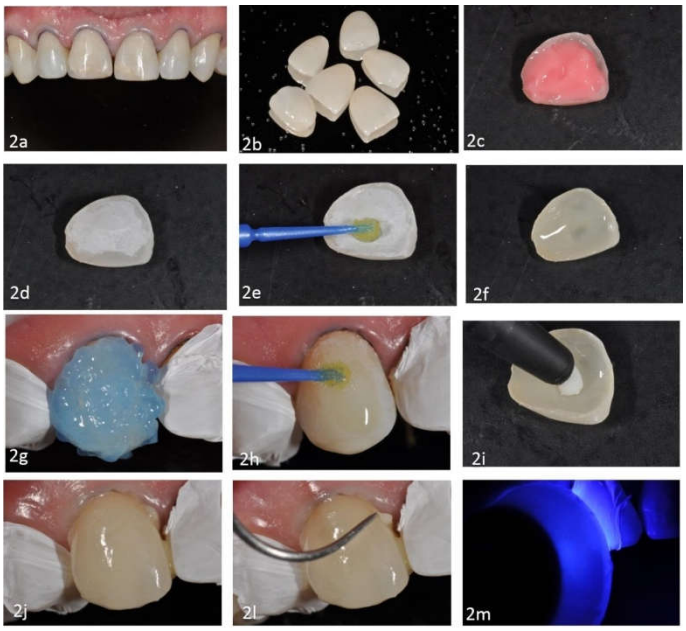

Figure 2. Teeth aspect after the preparation for ceramic veneers and with retraction cables (a). Porcelain laminate veneers (b). Conditioning of the internal surface of the ceramic veneer with application of hydrofluoric acid (c), aspect of the ceramic veneer after etch (d) and application of silane ceramic primer (f). Conditioning of the tooth with application of phosphoric acid (g) and application of the adhesive system (h). Application of resin cement in the ceramic veneer (i). Veneer in position (j). Removal of excess luting agent (l). Light activation (m)

Brazil). Metal sandpaper (KG Sorensen) was used to separate the teeth on the proximal area, in order to assist the definition of the proximal margin. Finally, all angles were rounded, and an extra-thin, round conical burr (KG Sorensen) was used to smooth the prepared surface. For the printing technique, two retraction cables (Ultrapack, Ultradent Products, São Paulo, Brazil) of different diameters were placed in the gingival sulcus and a complete impression with double visibility polyvinyl siloxane material was made after removal of the second cord (Figure 2a). Finally, temporary restorations were performed with an acrylic resin (Vipi, Dental Vipi, Pirassununga, Brazil) (Fig. 1f). The maxillary and mandibular molds were sent to the dental technician to pour, create matrices and manufacture of lithium disilicate (Emax Esthetic, Ivoclar Vivadent, São Paulo, Brazil) (Figure 2b). Once the veneers were received from the technician, they were carefully positioned to check the marginal fit, alignment, shape and color, with completely satisfactory results. After, prophylaxis with pumice stone and rubber cup, rinsing and thorough washing were performed. The internal conditioning of the restorations was carried out by applying 10% hydrofluoric acid for one minute (Condac Porcelana, FGM Products) (Figure 2c) and washing under running water and air drying (Figure 2d). Subsequently, bonding system (Single Bond, 3M ESPE) (Figure 2e) was applied and the surface was gently air dried (Figure 2f). The shrinkage of the veneers was performed for each tooth individually, following the same sequence for each one. After isolation of the gingiva and the prepared tooth, was made the teeth conditioning with 37% phosphoric acid (Condac 37, FGM Products) for 30 seconds (Figure 2g), rinsing, and careful drying. Next, a one-bottle bonding system (Single Bond, 3M ESPE) was applied, and the surface was gently air-dried and polymerized for 40 seconds (Figure 2h). The cementing agent used in this case was Relyx Veneer B1 resin cement (3M ESPE, São Paulo, Brazil). It was applied to the inner surface of the veneer (Figure 2i), and then the veneer

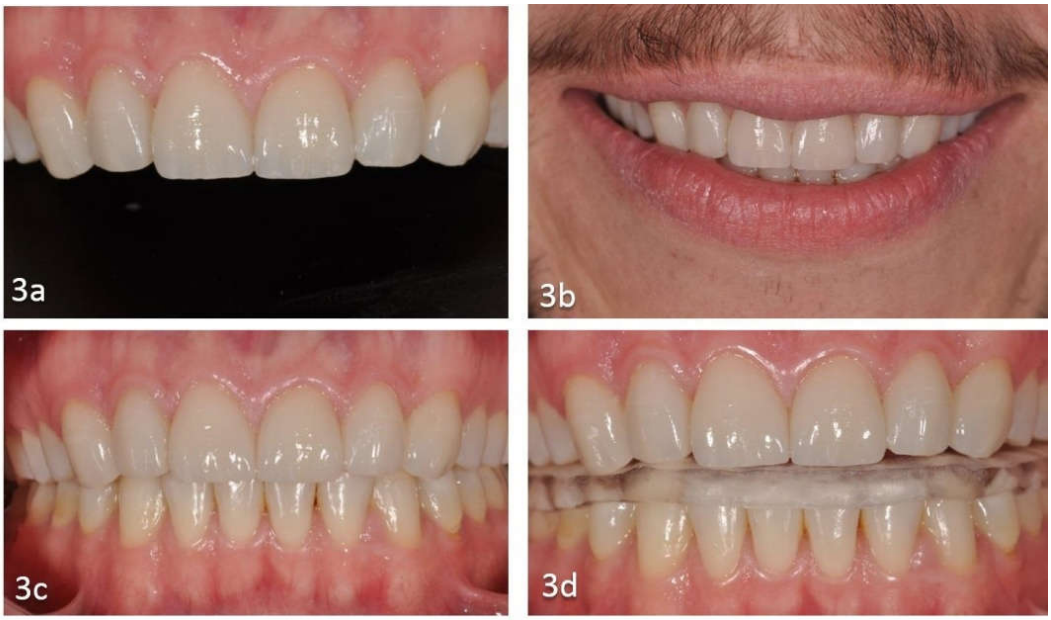

Figure 3. Final aspect immediately after the cementation of the veneers (a) and final aspect of the clinical follow-up after 1month (b-d)

was positioned (Figure 2j). After light curing for five seconds, excess cement was removed using hand instruments (Figure 2l), and the veneer was again light cured for 40 seconds on the facial and lingual sides(Figure 2m). After placing the entire veneer, the cervical margins were checked and the excess cement was removed with sandpaper strips. The finishing and polishing of the cement line were performed with silicone rubber (Resin Finish, Microdont) and silicon carbide brush (Jiffy Brush, Ultradent). The final result couldbe seen immediately (Figure 3a) and in a 1-month clinical follow-up with intra-oral aspects of the patient using myorelaxant plaque to prevent tooth wear (Figure 3b-d).

DISCUSSION

In this case report, the patient's main complaint wasabout the size, color and shape of his upper anterior teeth. Treatment possibilities with composite resin or ceramic veneers to replace the unsatisfactory composite resins restorations were shared with the patient, as well as their advantages and limitations. The patient chose the ceramic veneers treatment since he had already had to substitute the resin composite twice before because of their short-term color stability and their low resistance to wear, and now, he aimed a long-lasting result. Diagnostics are essential for a predictable treatment outcome in esthetics dentistry. Therefore, a diagnostic wax up was done in order to have a better communication between patient, clinician, and technician. This procedure allows the dentist to perform the mock up technique that is useful to the patients for visualizing their smile, integration the gum, lips, and face. Thereafter the patient was able to evaluate the expected results, express his opinion, and approve the final shape of his smile (Federizzi *et al*., 2016; Rotoli *et al*., 2013). Porcelain veneers, when made in combination with a precise clinical protocol and correct indications, offer excellent longevity and esthetic (Farias-Neto, 2015). Veneers exhibit natural fluorescence and absorb, reflect, and transmit light exactly as seems natural tooth (Viswambaran, 2015). According to Meijering *et al*, survival rates for veneer restorations were 94% for porcelain restorations, 90% for indirect composite restorations, and 74% for direct composite restorations (Rotoli *et al*., 2013). The survival rate for bonded porcelain laminate veneer restorations is more than 90% over 10 years of clinical service in other previous studies (Rotoli *et al*., 2013). In another study, Beier and collegues evaluated 318 anterior veneers made of silicate glass ceramic cemented with different cements in 84 patients, and observed an approximately 93.5% survival rate over 10 years (Farias-Neto, 2015). A very important step to achieve clinical success is the selection of an appropriate ceramic material for each case. There are many types of ceramics and each one is different in function of brand, and also on thickness, color, translucency, opalescence, fluorescence, surface texture, and shape (Hernandes *et al*., 2016). Lithium disilicate glass ceramic is composed of 65% lithium disilicate in the form of crystalline structures, which results in relatively strong ceramic with high flexural strength of about 400 MPa, a fracture toughness of 3.3 MPa m0.5, and both values are approximately higher than those of IPS empress 2 (Yang *et al*., 2016; Zandinejad *et al*., 2015). In a study, seventy-four anterior crowns and twenty posterior crowns made with lithium disilicate framework material (IPS-e.max) were evaluated and had a cumulative survival rate of 97.4% after 5 years and 94.8% after 8 years of clinical service (Zarone, 2016). The preservation of enamel is essential for a predictable long term success of bonded restorations since enamel bond strength is higher and more predictable than with dentin bonding (Federizzi, 2016; Kurtzman, 2016). Prepare only the portions of the tooth that require some reduction, leaving the remaining tooth unprepared (Kurtzman, 2016). Yet, various factors can influence the long-term prognosis of ceramic veneer such as surface treatment, ceramic thickness, type of cement used, remaining tooth (enamel/dentin) and geometry of the preparation. In addition, occlusal factors and features related to the tooth/cement/ceramic interface can negatively affect in the prognosis of porcelain veneer with marginal discoloration, postoperative sensitivity, fracture and debonding (Alavi *et al*., 2017). For a durable bond between the tooth and the restoration are essential that have a chemical composition of the adhesive agent and luting agent and surface treatment of the laminates and the tooth (Lambade *et al*., 2015). Tabassom Hooshmand *et al*., concluded that the surface treatment and the type of luting agent affect the interfacial fracture toughness for

the lithium disilicate glass ceramic system (Hooshmand, 2015). Composite resin bonded to etched porcelain both with silane alone or silane with dentin adhesive produced high shear bond strengths according to Stangel *et al*., (2015). The hydrofluoric acid-etched pretreatment and silanated of lithium disilicate ceramics are responsible to increase bond strength to the luting resin composite, showing favorable results on adhesion durability (Viswambaran *et al*., 2015). Dual-polymerizing resin cements contain aromatic tertiary amine and their oxidation could compromise the color stability of the cemented restorations. Then, in vitro studies have indicated that light-polymerizing cements has excellent color stability due to the absence of this amine, besides these cements have longer working time, compared to chemically and dual cured cements which makes it easier to remove any excess material before light-curing (Marchionatti *et al*., 2017). Lithium disilicate glass ceramic is an excellent alternative in cases of anterior teeth with extensive restorations. Treatment success depends on the detailed planning, communication between patient, clinician, dental technician and the correct selection of dental materials. Veneers exhibit natural fluorescence and absorb, reflect, and transmit light exactly as seems natural tooth.

Conflicts of interest: The authors do not have any financial interest in the companies whose materials are included in this article.

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