Predictable Restoration of Esthetically Challenged Maxillary Anterior with Porcelain Laminates by a Comprehensive Approach – A Case Report with 3 Years of Follow Up

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Abstract

Laminate veneers are the most conservative way to repair or enhance the appearance of the teeth and holds an important place in aesthetic dentistry. The long lasting thin porcelain shells that are bonded to the front of the teeth provide maximum esthetics in the patient's mouth. It involves very little tooth reduction so that the healthy tissues of the teeth are secured. Porcelain veneers have been considered to bio-mimetically restore the mechanical behavior of the crowns of teeth on which they are placed, i.e. they mimic or recover the biomechanics of the original tooth by means of the restorative material & technique. As a consequence, besides achieving natural appearance of the smile, the stress distribution in a tooth is also restored with porcelain veneers similar to that of a sound tooth.

Keywords: Porcelain; Laminates; Esthetics

Introduction

Porcelain laminate veneers are among the most esthetic means of creating a more pleasing and beautiful smile. Porcelain veneers within reason allow for the alteration of tooth position, shape, size and color. They require a minimal amount of tooth preparation, approximately 0.5 mm to 0.7mm of surface enamel reduction. Therefore it is considered as more conservative restoration than a crown, which requires significant removal of sound tooth structure [1,2]. Although not the only alternative for all esthetic abnormalities, they are truly a remarkable restoration when they are the treatment of choice. This article presents a case report with 5 years of follow up of a patient with dental fluorosis along with midline diastema.

Case report

A 23 year old patient reported with the chief complains of dental fluorosis along with midline diastema. Intraoral examination revealed a small diastema between the maxillary central incisors. The clinical examination also showed small lateral incisors and cervical staining among most of the teeth caused by dental fluorosis (Picture 1). A treatment plan was devised to restore the appearance of the patient's smile, with preparation/installation of porcelain laminate veneers on the maxillary anterior affected teeth.

Diagnostic impressions of the maxillary and mandibular arches were made. Diagnostic maxillary and mandibular primary casts were mounted using face bow transfer and mock preparation followed by diagnostic wax-up was carried out in the prosthetic laboratory (Picture 2). Clinical baseline photographs of the teeth were also taken to help in final contouring of the porcelain laminates.

Tooth preparations for maxillary anterior teeth were done (Picture 3) and addition silicone impression (Elite, Zermack, Italy) was taken. A double-cord technique was used for deflection of the soft tissues, using 0 and 00 cords (Ultrapak, Ultradent, South Jorda and USA). The 0 cord was removed from the gingival sulcus, and the 00 cord remained in place during impression. The master casts were mounted on the semi adjustable articulator using face bow
transfer (Picture 4 & 5). Provisional restoration was fabricated and cemented on the prepared tooth to prevent the pulpal sensitivity.

Wax patterns were fabricated followed by the porcelain laminate veneers fabrication (Picture 6) using the IPS Empress Esthetic Ingots (Ivoclar Vivadent, Amherst, USA). Laminates were applied to the teeth using a try-in paste (Variolink Veneer Try-in, Ivoclar Vivadent, Amherst, USA) that simulates the final shade of restorations. Porcelain laminate veneers were positioned using an appropriate applicator (Vivastick, Ivoclar Vivadent, Amherst and USA). A small amount of paste was applied on the restoration and carefully set on the tooth remnant, without pressure. Excess material was removed and the final shade was analyzed. After completion of the try-in stage and determination of the cement color, the internal areas of the veneers were etched with 4% hydrofluoric acid for 60 seconds, rinsed thoroughly with water and air dried. The Relyx silane-based ceramic primer (3M ESPE, St. Paul, USA) was then applied to the inner surfaces of the restorations for 60 seconds. Subsequently, the surfaces were dried using oil/moisture-free air for 5 seconds, and the Scotch bond Multi Purpose Plus adhesive system (3M ESPE, St. Paul, USA) was applied to the internal areas of the veneers [3-5].

Prophylaxis was performed using pumice paste and a rubber cup, prior to veneer placement.

Before luting, 37% phosphoric acid was applied to the surface of the prepared tooth and allowed to react for 30 seconds. Thorough rinsing of the surface with water for 60 seconds was followed by application of the primer and bonding agents (Scotch bond Multi Purpose System, 3M ESPE, St. Paul, USA). Luting procedures were performed individually, as follows: hybridization, light curing for 20 seconds, and removal of excess material to minimize the risk of laminate fracture. Resin cements (Medium Value, Variolink Veneer, Ivoclar, Vivadent, Amherst and USA) were light-cured for 60 seconds (Figures 7 and 8). Porcelain laminate veneers allowed to successfully restore dental function and esthetics, resulting in a natural and esthetically pleasing smile.

Approximately one week after the placement of your laminates, patient was asked to return to the dental clinic for a treatment evaluation. The placement of the laminates and the gum tissue response were evaluated. Regular maintenance and dental check-ups were recommended so that veneers and oral health can be reviewed periodically.
Discussion

Since their introduction by Pincus in 1930, porcelain laminate veneers have become a popular dental procedure. Porcelain veneers have been considered to biomimetically restore the mechanical behavior of the crowns of teeth on which they are placed, i.e. they mimic or recover the biomechanics of the original tooth by means of the restorative material/technique. As a consequence, besides achieving natural appearance of the smile, the stress distribution in a tooth restored with porcelain veneers are similar to that of a sound tooth. It is impossible to differentiate porcelain veneers from the natural teeth due to their light through feature.

The ceramic systems currently available have important esthetic qualities and great resistance, once they are reinforced with leucite and lithium disilicate. These properties allow the performance of minimally invasive procedures with porcelain laminate veneers. In the tooth veneering technique, thin porcelain laminates (0.1 to 0.7 mm thick) are applied to the dental structure with minimal reduction/wear. Porcelain veneers replace the visible portion of enamel, and they are strongly bonded to the dental surface [6,7]. Porcelain veneers are prepared with a reinforced resistance against fractures and their esthetic feature is maximum. They can be prepared as a thin layer (IPS Empress III) and are easily adhered to the front surface of the teeth [8-10].

While porcelain veneers are a great treatment modality for many patients, they need to be considered as part of a differential diagnosis in which traditional orthodontics, direct bonding, esthetic reconstructing and bleaching are considered as options. Since they require approximately 0.5 mm of tooth reduction, porcelain veneers are not considered a reversible form of treatment. Occasionally, the preparation of a porcelain laminate veneer does not necessitate the use of a local anesthetic. However, for those patients that are particularly sensitive or anxious, a local anesthetic is advisable. Some sensitivity can be present due to hot and cold. This is normal and is due to the removal of a small portion of the tooth’s enamel covering. This sensitivity should disappear a few days after the placement of the veneers. The insertion or cementation visit is usually longer in length. The laminates are placed with a light-sensitive resin hardened with the use of a white light, effectively bonding them to the teeth. Once placed, laminate veneers are very strong and will resist most of the forces placed upon them by a normal diet. Porcelain is a glass and like glass it is strong, but brittle. Therefore, patient should avoid anything that will tend to stress the laminate veneer such as opening pistachio nuts, chewing on bones, candy or apples.

Conclusion

Dental porcelains in the right place can make for spectacular tooth imitations by mimicking tooth enamel perfectly. Properties associated with porcelain are high strength, hardness, glassiness, high durability, translucence and high resistance to chemical attack. This is also a testament to the artistic skill of the laboratory technicians with whom the dentist partners in producing life-like precision veneers to create enhanced smile.

References

