Esthetic Rehabilitation with Combined All-Ceramic Applications: A Case Report

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Abstract: The first choice for anterior rehabilitation has been metal-free materials due to their successful esthetic results. Dentists and dental technicians today require materials that offer high strength, outstanding esthetics and efficient productivity. IPS e-max lithium disilicate can now be processed with CAD/CAM technology or traditionally pressed or contemporarily. Thus, its strength and versatility, the material used for the following practice anterior/posterior crowns, anterior three-unit bridgework (press only), inlays/onlays, veneers, thin veneers, implant restorations, telescopic crowns. The case presented in this report illustrates the rehabilitation of maxillary anterior teeth with IPS e-max press ceramic bridge and laminate veneers.

Keywords: Dental ceramics, laminate veneers, fixed partial denture.

1. INTRODUCTION

All-ceramic restorations, which have been developed as an alternative to porcelain fused to metal restoration, have come to the forefront with increased esthetic demand. Despite the success of fused to metal restorations, the metal framework may lead to an unpleasant appearance in gray, especially in the restoration margins. Contrary to minimally invasive techniques in metal-assisted and all-ceramic fixed partial dentures, an amount of tooth preparation is required to ensure resistance and stability [1]. In recent years, parallel to the developments in adhesive technology, it is possible to make adequate restoration with minimum reduction of dental tissue.

The first choice for anterior rehabilitation has been metal-free materials, due to their successful esthetic outcomes. Today, dentists and dental technicians need materials that provide superior esthetics, high strength, and productivity [2]. In this case, a plurality of all ceramic materials have been introduced for prosthetic applications [3]. Presently, lithium disilicate and zirconia restorations are the most popular all ceramic systems among clinicians. Lithium disilicate is more translucent than zirconia, but it shows lower mechanical strength compare to the latter. Both of them can be applied as monolithic restoration or core material under veneered layer [4].

Lithium disilicate (IPS Empress 2, Ivoclar Vivadent) was introduced as a dental restorative material in 1998. Nowadays, it has been updated and advanced, and also called as the IPS e.max Press system [5]. Mainly, this system includes two phases, phase I has homogeneously distributing lithium disilicate crystals ($Li_2O{\cdot}SiO_2$) and lithium orthophosphate, in a glass matrix constitutes phase II [6]. Presence of these crystals in the structure at high ratio increase the mechanical properties of the material [7]. Despite the fact that the content of the system is formed by lithium disilicate like the Empress II system, the physical properties and aesthetics of the system have been increased thanks to the different firing technique used [8].

Thin veneers, inlay and onlay restorations, conventional and implant supported crowns and bridges with three units are recommended to apply by manufacturer. Lithium disilicate-reinforced glass ceramics are widely used clinically due to their aesthetic properties. However, their use in the posterior region is limited, because of insufficient mechanical properties [6]. So that, zirconia reinforced CAD system is offered to restore posterior region.

Original form and biomechanics of tooth are preserved by ceramic laminate veneer and it is more conservative treatment modality than crowns [10]. Therefore, this procedure is widely used in dental applications. Indications of ceramic laminate veneers now includes [11]; shape or position correction of the irregular tooth, morphological perfection of microdontias or transposed teeth, diastemas or weak incisal embrasures, mend of incisal fractures, wide anterior dental restorations, enamel alterations (abrasion, attrition, abfraction), alteration in tooth color, anterior guidance. However, all this broad clinical application of all ceramics does not give the desired results. Accurate selection of ceramic material is key factor to gain successful laminate veneer restorations [12].

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This case report describes the alternative esthetic rehabilitation of crowded maxillary incisors of 34-years old female patient using lithium disilicate-ceramic restorations and porcelain laminate veneers.

2. CASE REPORT

2.1. Treatment Planning

The patient, a 34-year-old woman, presented to the Faculity of Dentistry Gazi University Ankara, displeased with her smile. She had crowned maxillary incisors and her left canine tooth, but had satisfactory occlusion and overjet (Figure **1**). After clinical examination, radiographs, photographs, study casts were performed. Periodontal conditions, presence of caries, occlusal interferences, smile esthetics, and facial symmetry were evaluated. Based on our evaluation, we decided on a conservative treatment approach using indirect lithium disilicate veneers and a bridge restoration.

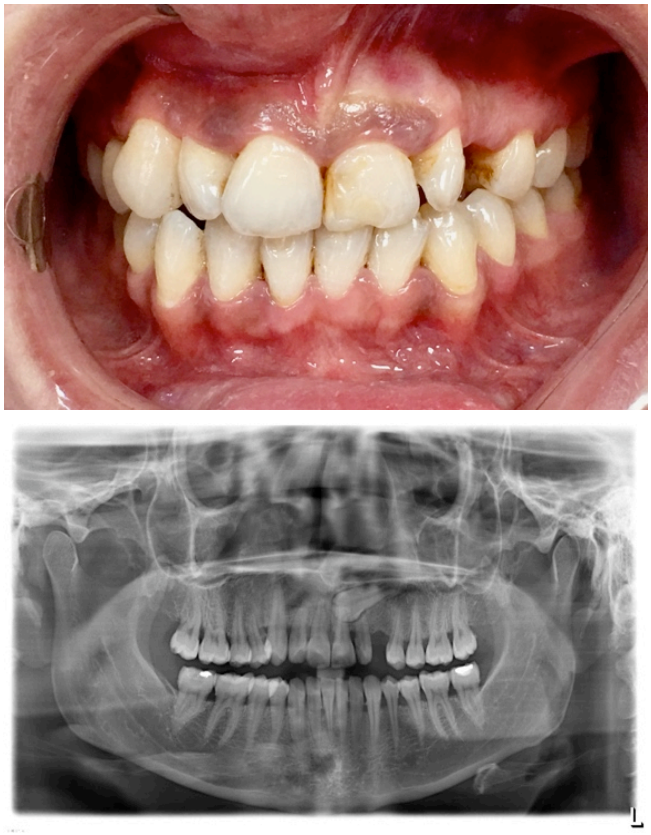

Figure 1: Preliminary intraoral image of the case. (Patient had crowned maxillary incisors and her left canine tooth).

2.2. Teeth Preparations

The laminate veneer preparations are limited only at enamel boundaries. Preparation of bridge was done with 2mm occlusal/incisal clearance and axial reduction (Figure **2**) with a chamfer edge diamond bur. Indirect provisional restorations was fabricated with acrylic resin and temporary cemented on prepared teeth.

Figure 2: Intraoral image after the preparation. (Preparation of bridge was done with 2mm occlusal/incisal clearance and axial reduction).

2.3. Fabrication and Cementation of Restorations

Lithium disilicate-based ceramic was used to provide ideal esthetics. All the prostheses were produced with IPS e.max Press. Restorations were etched with hydrofluoric acid and concentration 9.5% and silane was applied to them. The teeth were etched with 37% orthophosphoric acid and rinsed with distilled water and dried with air. Then the restorations were cemented with a dual-cure resin cement, Panavia F 2.0 (Kuraray). The patient was followed up clinically for one year. During this time, the marginal seal of the restorations was examined and periodontal tissues were found healthy. The restorations showed high esthetic results for one year (Figure **3-4**).

Figure 3: Final image of the laminate veneers and the fixed partial denture. (The restorations had been showing successfully esthetic throughout the one year).

Figure 4: Natural looking smile after one year.

3. DISCUSSION

The elevated expectation of patients and dentists for esthetic restorations has resulted in a trend to substitute porcelain fused to metal restorations with all-ceramic restorations [13]. The ceramic systems offer improved esthetics, biocompatibility, and long-lasting restorations and are an excellent alternative for the rehabilitation of anterior teeth, having been increasingly used with high success rates [14]. Today, many different ceramic systems are used to accomplish high esthetic results. These include porcelain fused to metal with porcelain margins, Dicor, In-Ceram, Cerestore, Hi-Ceram, IPS-Empress, Cerapearl, Optec, and CAD/CAM ceramics. While porcelain fused to metal fixed partial dentures have been used for decades, the search for a material that reflects light similar to a natural tooth has been the subject of many researches [15].

E-max crowns have several important superiorities over porcelain fused to metal crowns and they have the most similar structure to our own teeth. They have no metal alloy in the structure so there is no risk of metal reflection on the gum line.

They are durable, and it is less likely to presence crack or fracture than many other types of restoratıons. They are at less risk of chipping compared to zirconia crowns. The success of porcelain restorations, as in all stages of dentistry, depends on the well-understood and implemented manufacturing and application procedures. However, when these procedures are applied to each patient, they make sure of the factors that determined the success of the treatment, such as smile design, marginal adjustment, material, shade selection [16].

CONCLUSIONS

This case report describes the alternative rehabilitation of maxillary anterior teeth. The restorations were followed up for one year without any functional or esthetic problems. There were no reports of postoperative sensitivity for any of the crowns or laminate veneers at the one year recall visits. The pressable lithium disilicate glass ceramic (IPS e.max Press) restorations are reliable and predictable treatment option for functional and esthetic rehabilitation of especially in the anterior region.

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