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**Case Report**

# An Aesthetic Overhaul With All Ceramic Crowns In Anterior Dentition With Deep Bite: A Case Report

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ABSTRACT

The smile constitutes an important component in the presentation of a human being favouring his or her social acceptance. The use of ceramic restorations in rehabilitation of anterior dentition has long been established for restoring their shape, texture, lustre and colour. Significant developments in all-ceramic materials have created wonderful opportunities for the fabrication of lifelike restorations that provide reliable, long-term results. Lithium-disilicate glass-ceramics are one of the newest generations of all-ceramic materials which along with optimum esthetics, offer the advantage of a relatively higher strength and the ability to be adhesively bonded. This article represents a clinical case involving the use of lithium-disilicate glass-ceramic (IPS e.max Press II) crowns and partial coverage restorations for a patient presenting with severe wear due to fluorosis and proclined anteriors with deep bite

## Introduction

Aesthetics in dentistry has increasingly become a major concern for the patients and often serves as a reason for seeking dental care. Ceramic is known as the most natural-looking synthetic replacement for missing teeth. A heat pressed monolithic glass ceramic material which consists of 65% lithium disilicate in the form of crystalline structures, was first described by Brodkin et al in 1998[1].

The following case report describes the rehabilitation of the anterior dentition with all ceramic crowns and partial coverage ceramic restoration using lithium-disilicate reinforced glass ceramic (IPS e.max Press II, Ivoclar, Vivadent).

**CLINICAL REPORT:**

A 25 year old male patient reported to Department of Prosthodontics for aesthetic rehabilitation of anterior teeth. Clinical examination revealed discoloration and wear of all anterior teeth with a Class-I occlusion and anterior deep bite (Fig.1). Radiographic examination revealed involvement of pulp in all anterior teeth except 43. It was determined based on the history (patient's address, family history, presence of stains since eruption of teeth) and intra-oral examination

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Figure 1: Pre operative frontal view of fluorosed anteriors in deep bite relation.

Figure 2: Diagnostic wax up

Figure 3: Completed teeth preparation in maxillary anteriors

(bilaterally symmetric brown stains involving cervical aspect of anteriors and chalky white spots on premolars and molars) that the patient's clinical condition resulted from fluorosis.

The patient was first advised for root canal treatment of all anterior teeth (except 43) followed by fibre posts restorations (FRC Postec Plus, Ivoclar Vivadent) and core build up with composite (Multicore Self Curing, Ivoclar Vivadent). After all treatment options were discussed with the patient, it was decided to restore the anterior teeth using all-ceramic restorations.

*Methodology:*

As a part of pre-treatment examination,diagnostic impressions were made and casts were articulated using a semi-adjustable articulator with a facebow transfer. A diagnostic wax-up was completed (Fig. 2),

Figure 4: Completed teeth preparation in mandibular anteriors

Figure 5: Cemented E-max crowns (frontal view)

Figure 6: Cemented E-max crowns (maxillary arch occlusal view)

Figure 7: Cemented all ceramic mandibular crowns (occlusal view)

working out the anterior guidance without increasing the VDO. Taking into consideration the presence of deep bite, full coverage restorations were planned for lower anteriors, while partial coverage restorations were planned for the six upper anteriors leaving out

the areas of cingulum where the lower centric stops were present.

To commence with tooth preparation, a cylindrical, tapered, round-end diamond bur was used to create three facial reduction grooves respecting the axial inclinations of the tooth. The grooves were subsequently evened. The final crown preparations were approximately 2.0 mm deep.

Next the incisal reduction was carried out. Because the silicone guide registered a pre-existing incisal space of approximately 1.5 mm according to the wax-up, an additional 1.5-mm reduction was performed with the cylindrical, tapered, round-end diamond bur to achieve a 3-mm incisal reduction. Hereafter the interproximal preparations were performed with a very thin and tapered diamond bur which was used to create a slit from the facial to palatal surfaces (Fig.3).

The palatal surface below the cingulum portion was then reduced with the aid of a spherical diamond bur. Next, a cylindrical, tapered, round-end diamond bur was applied parallel to the tooth long axis on the palatal surface below the cingulum. Extra-fine finishing diamonds with decreasing coarseness were used along with rubber points to obtain a well refined preparation and working cast. For the lower dentition tooth preparation of the anterior sextant was performed from all aspects for receiving full coverage all ceramic restoration (Fig. 4). Base Shade matching was carried out using the 3-D Master (Vita) shade guide in conjunction with digital photography.

Provisionalization was carried out using bis-acryl restorations (Protemp 4, 3M ESPE). After 10 days, the provisional restorations were assessed for function, phonetics and esthetics and a transfer impression with provisionals was made with patient's approval.

For fabrication of definitive restorations, a double-cord technique was used for gingival deflection (no. 00 and no. 0, Ultrapak, Ultradent, for compression and deflection respectively) and polyvinyl siloxane (Affinis Precious, Coltene/Whaledent) one-step-double-mix impression technique was used for making impressions.

The IPS e-max monolithic crowns were fabricated with a thickness of 1 to 1.5 mm (IPS e-max Press MT). Trial insertion of the definitive restoration was completed to verify the marginal fit, internal adaptation, overall aesthetics and gauge patient's satisfaction. After adjustments, the restorations were sent to laboratory for sintering, glazing and polishing.

At the definitive insertion appointment, the restorations were tried in with the use of a tooth-coloured glycerine gel (Variolink try-in paste, Ivoclar Vivadent). Internal surfaces of the restorations were etched with 5% hydrofluoric acid for 20 seconds and washed with an air water spray and air dried. A silane coupling agent (Monobond Plus,Ivoclar Vivadent) was then applied to internal surfaces of restoration for 60 seconds and air dried.

The prepared teeth were etched using 37% Phosphoric Acid (N-etch, IvoclarVivadent) for 15 seconds. After rinsing and air drying, bonding agent (Tetric N Bond, Ivoclarvivadent) was applied & light cured for 10 seconds. Dual curing luting composite (Variolink N, Transparent low viscosity as catalyst and White A1 as base, IvoclarVivadent) was used for cementation. While handling the crowns in place, crowns were spot cured for 5 seconds initially and excess resin cement

was carefully removed. Subsequently a prolonged light curing was performed at facial, incisal, and palatal sides for 90 seconds each (Bluephase, IvoclarVivadent). Following photopolymerization, residual remnants of cement were removed with the help of a surgical blade no.15 and flossing was performed at the interproximal areas.

On completion of the cementation procedure (Fig.5, Fig.6, Fig.7) the occlusion was checked in centric and eccentric positions for interferences and the high points were removed. Follow up visits were scheduled after 7 days, 1 month and then every 3 months intervals. During the follow up visits, patient expressed his satisfaction with the aesthetics achieved and did not report any notable complaint. The restorations have been functioning well for 2 years.

**DISCUSSION:**

This case report describes the treatment of a patient who showed a collapsed anterior dentition due to severe wear resulting from fluorosis and deep bite. Fluorosis is an endemic disease prevalent in India. Severe fluorosis can lead to hypomineralized fragile enamel that may undergo surface damage due to mastication. The patient had relatively intact posterior dentition; hence the treatment plan involved rehabilitation of the fluorosed worn anterior teeth with all ceramic crowns following endodontic treatment.

The amount and quality of remaining tooth tissue is an essential factor when choosing between all-ceramic crowns and veneers. In the present case, a darkened substrate due to fluorosis, non-vital teeth with significant loss of enamel, underlying composite restoration and a high possibility of occlusal loading (deep bite), all negated the use of veneers [2, 3]. It was determined that in case of upper anteriors, the retentive advantage of an all-ceramic crown restoration would be offset by the excessive tooth reduction required to gain sufficient inter-incisal clearance. Hence partial restorations[4] were planned for upper anteriors leaving the palatal cingular surfaces intact.

As, in this case reduced tooth structure was present, lithium disilicate based ceramic system (IPS e.max) was used to fabricate crowns of 1.0-1.5 mm thickness. Lithium disilicate has gained popularity for anterior and posterior single crowns and partial coverage restorations because unlike feldspathic or leucite reinforced ceramic system, it has higher flexural strength (360-400 MPa) and can be used where bonding is limited[5], It has excellent translucency and responds better chromatically to small thicknesses than does leucite glass-ceramic in cases with discolored abutment teeth[6]. In a study by Niuet al[7], 2 mm thick specimen of A1 LT e max was capable of achieving shade matches below the threshold of clinical acceptability on all foundation materials tested.

Although the long term survival of lithium disilicate FDPs is discouraging[8], lithium-disilicate single crowns exhibit excellent survival rate (2 year CSRl of 100% and a 5 year CSR of 97.8%), especially in the anterior region [9].

Despite glass ceramics exhibiting lower mechanical strength than oxide ceramics, the fracture resistance has been shown to increase with resin cementation [10]. An adhesive technique utilizing dual cure resin cement was used to bond the restorations is a minimally invasive approach for replacement of lost tooth tissue.

**CONCLUSION:**

A clinical report describing anterior rehabilitation of patient with severe wear, discoloration and deep bite

using lithium-disilicate restorations has been presented. Today the newest generation of lithium disilicate materials (IPS e.max Press, IPS e.max CAD, IvoclarVivadent) offer multiple translucencies and opacities as well as the capacity of surface staining and glazing to meet specific and precise characterization demands. When associated with adequate bonding they can provide functional adequacies as well. No biological and mechanical complications have been reported after 2 years.

**REFERENCES:**

1. Brodkin D, Panzera C, Panzera P. Pressable lithium disilicate glass ceramics, United States patent # 6455451 B1, 2002.
2. Peumans M, De Munck J, Fieuws S, Lambrechts P, Vanherle G, Van Meerbeek B. A prospective ten-year clinical trial of porcelain veneers. J Adhes Dent 2004;6:65–76.
3. Lim CC. Case selection of porcelain veneers. Quintessence Int 1995;26:311-5.
4. Daniel Alexandre, MenzesPedrosa Malta, JussarakarinaBernardon, Jose Carlos Romanini, Luiz NarcisoBaratieri.Partial Ceramic Restorations in Anterior Dentition: Case Report of a 10-Year-Old Patient.
5. Höland W, Schweiger M, Frank M, Rheinberger V. A comparison of the microstructure and properties of the IPS Empress 2 and the IPS Empress glass-ceramics. J Biomed Mater Res 2000;53:297-303.
6. Almeida JS, Rolla JN, Edelhoff J, Araujo E, Baratieri LN. All-ceramic crowns and extended veneers in anterior dentition: a case report with critical discussion. Am J Esthet Dent 2011;1:60-81.
7. Niu E, Agustin M, Douglas RD. Color match of machinable lithium disilicate ceramics: effects of foundation restoration. J Prosthet Dent 2013;110:501-9.
8. Sola-Ruiz MF, Lagos-Flores E, Roman-Rodriguez JL, Highsmith Jdel R, Fons-Font A, Granell-Ruiz M. Survival rates of a lithium disilicate-based core ceramic for three-unit esthetic fixed partial dentures: a 10-year prospective study. Int J Prosthodont 2013;26: 175-80.
9. Pieger S, Salman A, Bidra AS. Clinical outcomes of lithium disilicate single crowns and partial fixed dental prostheses: A systematic review. J Prosthet Dent 2014;112:22-30.
10. Pagniano RP, Seghi RR, Rosenstiel SF, Wang R, Katsube N. The effect of a layer of resin luting agent on the biaxial flexure strength of two all-ceramic systems. J prosthet Dent 2005;93:459-66.