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Case Report

Esthetic Rehabilitation in a patient of Enamel Hypoplasia Using CAD CAM technology

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ABSTRACT:

Introduction: Enamel hypoplasia is a quantitative enamel defect, having reduced thickness of enamel.[1] This becomes an important topic for esthetic dentistry as such conditions may jeopardize aesthetics, function, tissue biology and occlusal physiology, thus endangering tooth vitality and integrity. **Case Report:** In this case, endodontic treatment with lithium disilicate CAD CAM crowns has been given in a young male patient with enamel hypoplasia for maxillary anterior tooth. **Conclusion:** Out of the many treatment modalities for enamel hypoplasia, this techniquecan prove to be an effective and appropriate technique that meets all of the needs of dental professionals while also improving the patient's self-esteem and quality of life following dental treatment.

Keywords: Enamel Hypoplasia, Hypoplastic enamel, Permanent anterior teeth, Lithium disilicate CAD CAM crowns, CAD-CAM technology.

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INTRODUCTION

Enamel that is the hardest structure in the human body is produced by cells called ameloblasts. The life cycle of ameloblasts is divided into six stages that include morphogenetic, organizing, formative, maturative, protective, and desmolytic. Amelogenesis is the formation of enamel that occurs during the formative and maturative stages of the ameloblasts. Enamel matrix is secreted in the formative stage where as mineralization of the enamel matrix occurs in the maturation stage.[4]

Enamel hypoplasia occurs if there is a disturbance in matrix formation and may manifest as pitting, grooving or even total absence of enamel.Once the enamel has calcified no such defect can be produced. Commonly implicated factors for enamel hypoplasia are- deficiency of minerals like calcium, deficiency of vitamins, malnutrition; systemic illnesses like hypothyroidism, hypoparathyroidism and renal disease; drugs like tetracycline, environmental pollutants like fluoride, heavy metals, and several others. Also,disturbances in the development of the enamel of permanent teeth can result from trauma to the primary teeth because of the close proximity of the root of the primary teeth to their permanent successors. Although it can occur in any permanent tooth, the most commonly involved sites of hypoplasia are the permanent first molars and incisors.[3]

Such defects can be treated with several prosthetic restorations, one of them includes using Lithium Disilicate CAD CAM crowns which has been used in this case. CAD / CAM application in dentistry is the process by which is attained finished dental restoration through fine milling process of ready ceramic blocks. CAD / CAM is an acronym of english words Computer-Aided-Design (CAD) / Computer-Aided-Manufacture (CAM)

There are several advantages to using CAD/CAM in dentistry: new materials are more aesthetically pleasing and durable; laboratory processing is more efficient; restoration fabrication is faster; and quality control of restorations such as fit, mechanical durability, and predictability is improved. These advantages will benefit our patients in the long run.[5]

CASE PRESENTATION

A young male patient presented to the clinic with the chief complaint of yellowish discolouration in his upper front teeth(fig 1) Parents accompanying the patient were asked for prenatal and postnatal history.They revealed that discoloration was present

ever since the permanent teeth erupted in the oral cavity. He had displeasure with his present dental condition. No history of trauma was present.Medical history of the patient showed no concern.Patient's father revealed family history of having discoloured teeth, signifying hereditary association.

Fig 1: Yellowish discolouration and pitting seen.

Fig 2: Loss of tooth structure of canine and lateral incisor seen.

Intraoral examination revealed permanent dentition with loss of tooth structure (Fig 2) hypoplastic enamel, pitting on enamel surfaces, multiple carious lesions and yellowish discoloration (Fig 1, Fig 2) Carious lesions were seen on teeth 11,12,13,21,22,23. (Federation Dentaire Internationale [FDI] system).

The patient was informed that his lower anterior teeth also showed pitting with yellow discoloration. Since the patient did not complain about this aspect and only wanted treatment for his upper anterior teeth, no restorative treatment was performed for his lower teeth. Inspite of knowing the benefits, the patient reported satisfaction with treatment of his upper anterior teeth only.

After complete diagnosis a multistage treatment protocol was formulated and executed. Pulpectomy was suggested to the patient after taking multiple clinical photographs and radiographs. The complete treatment was explained to the patient, and Lithium Disilicate crowns were recommended to him, taking into account his aesthetic concerns.

Endodontic treatment was performed for 11,12,13,21,22,23. After successful completion of endodontic treatment, tooth preparation for the mentioned teeth was done according to guidelines given in literature.Putty wash impression with addition silicone material (Aquasil) was taken. Bite registration to articulate the patient's occlusion was done using Alu wax.

The impression was sent to the lab and temporary crowns were fabricated for the patient.Shade selection for the crowns was done using VITA3D Shade guide.

Extraoral impression of the patient's cast was taken with aCeramilMap 400 Amman Girrbach extraoral scanner to fabricate Lithium Disilicate Crowns (Fig 3,4,5)

Fig 3, 4, 5: Stereolithographic file of model for designing crowns

Fig 3

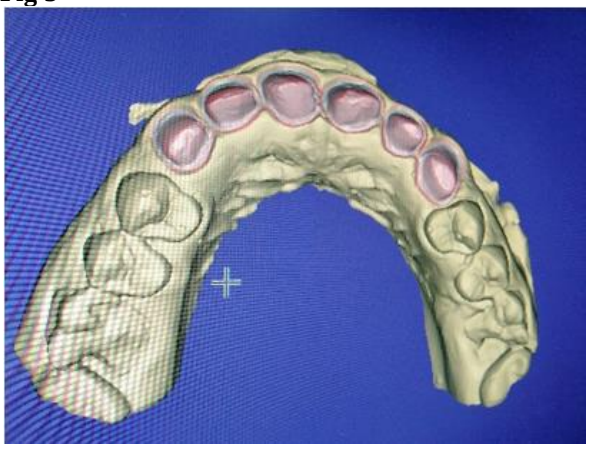


Fig 4

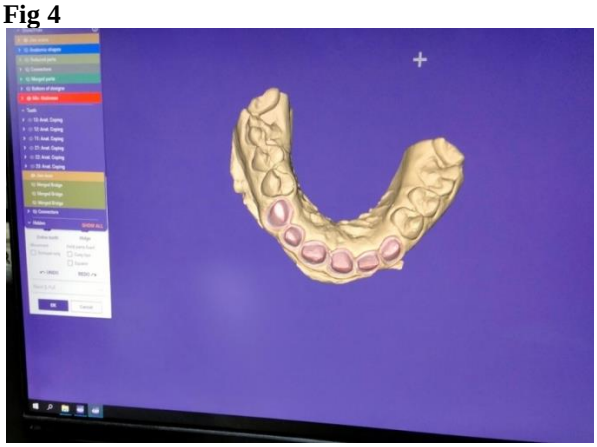
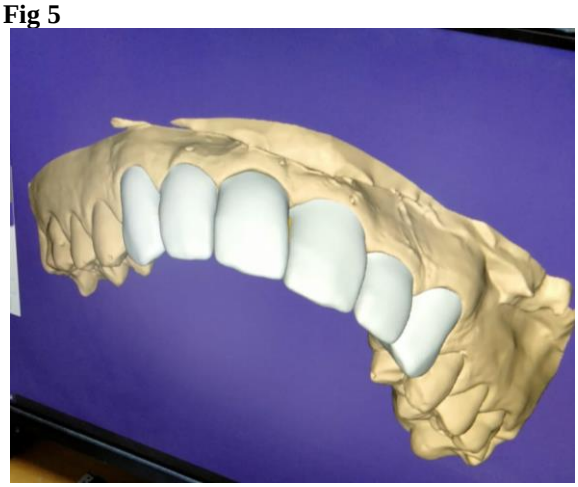


Fig 5



The crowns were fabricated and delivered to the patient the next day (fig 6) The crowns were cemented with resin modified glass ionomer cement (XtraLute).The patient was very satisfied with the final result and appearance of his smile.

Fig 6: Fabricated Lithium Disilicate CAD CAM crowns

DISCUSSION

The improvement in self-esteem, quality of life, and social acceptance are important factors that induce the patient seeking aesthetic dental treatment. In this case presentation, we reported a predictable plan treatment to transform the discoloured and carious teeth to achieve satisfactory and harmonious design according to the patient's face and gender. Regarding the dental aesthetic principles, tooth size, shape, and proportion between height and width of crowns are the most easy perceptible factors in the smile.

Moreover, dental morphology should be harmonious with the gender characteristics to make a more natural smile. The masculine teeth are more angular and have straight lines, giving them an aspect of force and greater aggressiveness.[2]

Endodontic treatment performed with crowns showed advantages. It is emphasized that, in spite of being a simple technique, it depends on adequate treatment planning including knowledge of tooth morphology and dental/dentofacial aesthetic principles.

After treatment, the lateral incisors and canine showed adequate volume and depth. The central incisors appeared more square shaped giving them the appearance as desired by the patient.

Also, the longevity and success of indirect restorations are influenced by patient and operator. The patient dictates oral hygiene, diet and functional habits. The operator manages tooth preparation, impression and cementation. Cementation is a crucial step in the process of ensuring the retention, marginal seal and durability of indirect restorations. In this case we used resin modified Glass Ionomer Cement which provides better strength to the fixed prosthesis.

CONCLUSION

Enamel Hypoplasia is a very serious problem that can result in a compromised oral health. It causes physiological and psychological disturbances. Prompt treatment aims to relieve pain or tooth sensitivity, to maintain masticatory function and last but not the least to improve the appearance. Coordinated Orthodontic, Prosthodontic and restorative treatments with careful consideration of patient's expectations are critical for a successful outcome and achieving patient's satisfaction.

The patient's choice of treatment options is fundamental for the success of any procedure and it must be respected since it involves their psychological, physical, and financial aspects. In this case the patient was only concerned with discoloured teeth and multiple carious lesions which were deep. Hence endodontic treatment with lithium disilicate CAD CAM crowns was considered as the most effective treatment option for the patient.

At the end of the procedure, the patient's satisfaction with the harmony obtained in his smile was achieved and undoubtedly functioned as an important instrument in the final evaluation of the result obtained.

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