

Full Mouth Rehabilitation of a Patient with Enamel Hypoplasia – A Case Report

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Abstract

Oral rehabilitation is a process of restoring the functional integrity of the oral structures using various means of the prosthesis. Planning and rendering the restorative rehabilitation is a complex and challenging procedure. Treating a case with enamel hypoplasia is even more challenging as there is a defect of the teeth in which the enamel is hard but thin and deficient in amount caused by defective enamel matrix formation. This article presents a case report on full mouth rehabilitation of a patient with enamel hypoplasia. There are various techniques for rehabilitating the oral cavity like Pankey Mann Schuyler's technique, Hobo's technique and so on. In this article the patient is treated using Pankey Mann Schuyler's technique of full mouth rehabilitation.

Keywords: Enamel hypoplasia; Rehabilitation; Broadrick's occlusal plane analyser

Introduction

Enamel hypoplasia is a condition in which there is a defect in the teeth, especially in the enamel. Here enamel is hard but thin and deficient in amount. It could be due to defective enamel matrix formation. Usually, it involves part of the tooth showing pits on it. In some cases, there might be a hole in the crown of the natural enamel and in extreme cases; the tooth has no enamel thus exposing the dentin [1].

Full mouth rehabilitation procedure is a complex procedure which restores the tooth to its natural form, function, and esthetics while maintaining the functional integrity of the adjacent hard and soft tissues for the oral health and welfare of the patient.

Pankey Mann Schuyler's technique is a technique of determining the correct occlusal plane to fulfill the requirements of an optimal occlusion [2]. In order to accomplish these goals, the following sequence is advocated by the PMS philosophy:

Part I - Examination, diagnosis, treatment planning, prognosis.

Part II - Harmonization of the anterior guidance for best possible esthetics, function, and comfort.

Part III - Selection of an acceptable occlusal plane and restoration of the lower posterior occlusion in harmony with the anterior guidance in a manner that will not interfere with condylar guidance

Part IV - Restoration of the upper posterior occlusion in harmony with the anterior guidance and Condylar guidance [2].

This article presents a case report of a patient with enamel hypoplasia being treated using Pankey Mann Schuyler's technique of oral rehabilitation.

Case History

Case presentation

A 21-year-old boy came to the Department of Prosthodontics, DAPM R V dental college, Bangalore with the chief complaint of sensitivity in lower teeth and missing upper and lower back teeth. He also complained that his teeth were not esthetically good and wanted treatment for the same (Figure 1).

On clinical examination patient had undergone extraction of 24, 26, 27, 46, 47 due to caries. Had a metal crown wrt 36. He also had laminates wrt his upper and lower anterior but the laminates wrt 31,41,42,43

teeth had dislodged. There was blackish discoloration of 14 and 16 on the occlusal and lingual surfaces. Neither the medical history nor the family history was significant. All the teeth were relatively small in size with yellow discoloration.

Treatment plan

The diagnostic impression of maxillary and mandibular arches was made using irreversible hydrocolloid and the casts were poured using type III gypsum product (dental stone). The Facebow transfer was done and the casts were mounted on a semi-adjustable articulator.

Diagnostic wax-up was done on the articulator. The occlusal plane analysis was done using a Broadrick's occlusal plane analyzer and found that all the teeth were below the ideal occlusal plane except 38. It was also found that there were no alterations in the vertical dimension. So, the treatment plan was developed aiming at improving the occlusion, restoring the masticatory efficiency and the appearance of the patient while treating the sensitivity of the lower anterior (Figure 2).

The treatment plan was discussed with the patient which included the placement of porcelain crown wrt all the teeth present except 38 as it was at the acceptable occlusal plane. A bridge with a non-rigid connector was planned wrt 23, 24, 25, 26, 27 as 25 was a pier abutment. Also, a bridge wrt 44, 45, 46, 47,48 was planned.

Treatment procedure

Oral rehabilitation procedure was carried out according to Pankey Mann Schuyler's philosophy. As the Anterior teeth were already prepared for laminates, minimal preparation of the teeth was required. The teeth were prepared so as to receive porcelain fused to metal crowns. Using the diagnostic wax-up as guide the anterior guidance was established in the temporaries. Occlusal interferences were checked in all centric and eccentric relations. Once the temporaries were verified in all excursions, they were cemented using zinc oxide eugenol cement (Figure 1).

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Maxillary arch

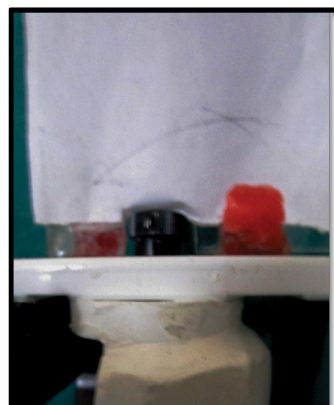


Mandibular arch

Figure 1: Intra-oral picture.



Left side



Right side

Figure 2: Occlusal plane analysis.



Figure 3: Provisionalization.

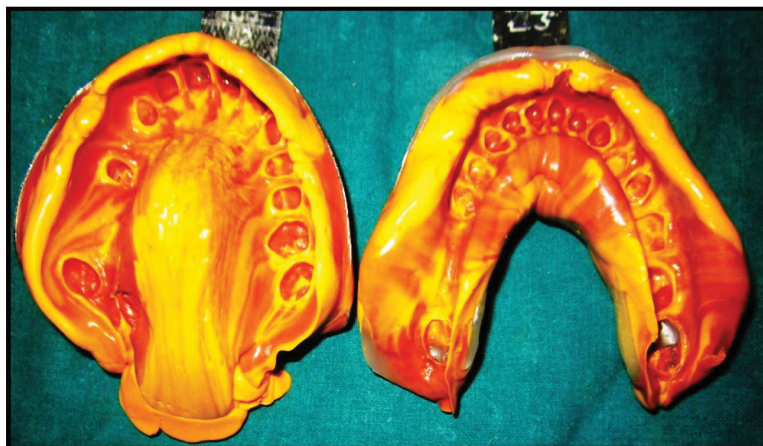


Figure 4: Final impression.



Figure 5: Metal copings in patient.



Figure 6: Final prosthesis.

Once the anterior guidance was established the lower posterior teeth were prepared except 38 as it had an ideal occlusal plane. Due to the decrease in the clinical crown size of the teeth and as the teeth were below the ideal occlusal plane, the occlusal surfaces were not prepared but only the axial surface was prepared. Temporaries were fabricated using tooth-colored acrylic resin according to the diagnostic wax-up which followed the correct occlusal plane and the compensating curves. Occlusal interferences were checked and later the temporary crowns were cemented (Figure 2). Finally, the tooth preparation was completed with the preparation of upper posterior teeth. The minimal preparation was carried out. Temporary crowns were fabricated, verified in all excursions and were cemented (Figure 3).

Once all the tooth preparation was complete and temporized, the patient was recalled, and final impression was made using polyvinyl siloxane impression material. Interocclusal records were made. The casts were poured in type IV dental stone. The casts were articulated on a semi-adjustable articulator using the interocclusal records (Figure 4).

Wax patterns were made on the dies and were cast according to the conventional procedure. A non-rigid connector was planned wrt 23,24,25,26,27. Rest seat was prepared on the disto-occlusal surface of the second premolar. The metal copings were verified on the dies and were later checked in patient's mouth for clearance. This was carried out sequentially. Metal coping in the Anterior region was verified while the temporaries were still on the posterior teeth (Figure 5). Once all the adjustments were made and verified the anterior metal coping was removed and was replaced by the existing temporaries. Later the same procedure of verifying the posterior metal coping was performed one side at a time.

Once all the metal copings were verified, they were placed back on the articulator and sent to the lab for porcelain build-up. Now, the porcelain fused to metal crowns were checked on the articulator for any interferences. Later, the crowns were tried in patient's mouth. All excursive movements were carried out to check any interferences. Group function occlusion was given. As the crowns were verified, they were sent back to the lab for glazing. The crowns were carefully cemented in the patient's mouth using type II glass ionomer cement (Figure 6). Two-year follow-up showed no failure of the prosthesis with intact margin. There was no attrition reported.

Discussion

Enamel hypoplasia is an incomplete or definitive formation of the organic matrix of enamel and in certain areas, they are susceptible to decay [1,2]. These developmental defects can range from mild alteration in enamel mineralization leading to simple yellow-brown discoloration, to crown dilaceration, crown duplication, root dilacerations, odontome-like malformations, partial or complete arrest of root formation, sequestration of the permanent tooth germ or disturbances in the eruption of permanent teeth [3,4].

Using a specific index that distinguishes the extent of hypoplasia (0 - no hypoplasia; I - hypoplasia with aplastic defect of the enamel; II - hypoplasia with aplastic defect involving enamel and dentin; III - hypoplasia with irregularity of the crown of the tooth) and discoloration (a - no discoloration; b - white opacities of the enamel; c - yellow-brownish discoloration. Amelogenesis imperfecta on other hand is a complex hereditary enamel defect which is not associated with any of the systemic diseases [5].

The irregularities in enamel lead to plaque accumulation, carious lesion which progresses deep involving dentin and pulp. Enamel

hypoplasia is triggered by diseases, systemic disorders, trauma and infections in the pulp. Various treatment may be performed based on the severity of the lesion and its involvement. The main goal of enamel hypoplasia is to re-establish the harmony with occlusion, function, and esthetics as well as to restore the patient's self-esteem, promote social and psychological behaviour [6,7]. While evaluating the esthetics, minimally invasive restorative techniques have shown to provide restoration with conservative approach. Full mouth rehabilitation involves the preparation of all the teeth, making impressions, provisionalization, master cast fabrication and final reconstruction of the oral cavity [8].

A variety of techniques are used for this simultaneous final reconstruction of the oral cavity. Among them the most popular and widely used techniques for restoring full mouth rehabilitation are the Pankey Mann Schuyler's technique, Hobo's twin stage technique. Among various techniques, the preparation of one quadrant followed by the other offers various advantages as compared to preparation of full arch preparation. With this we will be able to restore the occlusion without altering the vertical dimension [9].

In this article, Pankey Mann Schuyler's technique (PMS) is followed to re-establish the occlusion. In this, the anterior guidance is established first followed by lower posteriors and then the upper posteriors [10,11]. Here canine guided occlusion is established. There's a definitive co-relation between the incisal guidance, condylar guidance and the curve of Spee. This leads to harmony in steepness or flatness of the cusp height, fossa depth and occlusal tooth form of the posterior teeth. Lateral guidance is established by canine guided, group function and bilateral balanced occlusion. Canine guided occlusion is supposed to be superior to other types as it reduces lateral stresses on the posterior teeth and ridges. In 1960, Pankey Mann gave an organized clinical approach to full mouth rehabilitation. This was based on the occlusion principles given by Schuyler [10-12]. According to Dawson, the most common advantage of PMS philosophy is latitude it permits. It is advantageous due to incorporation of freedom from centric, sequential preparation of the teeth quadrant wise [13].

In PMS technique, the incisal guidance was established to satisfy the esthetic and functional requirements. The optimal occlusal plane is established based on the curve of Spee. Posterior teeth are restored in harmony with anterior guidance using functionally generated path technique (FGP). FGP provides elimination of the occlusal interferences and establishes functional form of occlusal surfaces of the restoration. The definitive restorations were adjusted in centric and eccentric relations. The durability of laminates is often affected by chipping and open margins as the patient had already got the laminates for the anterior teeth and had chipped off full veneer porcelain fused to metal crowns were given. It has an advantage of providing strengthening effect to the weak hypoplastic teeth. For this patient normal margin design or cement choice were not necessary because of the limited change in the quality of the enamel. Alterations in technique depend specifically on the clinical condition of the tooth [14].

Conclusion

Oral rehabilitation is a procedure carried out based on the knowledge of various philosophies available and clinical skills of the clinician. This clinical report describes the oral rehabilitation of a patient with enamel hypoplasia. Although several techniques are available for the rehabilitation, Pankey Mann Schuyler's technique is employed as it is the most reliable technique with the ease of fabrication. Occlusion and esthetics are the most important features to be considered while

restoring such conditions. Ultimately clinician should evaluate the clinical condition and use appropriate technique for the rehabilitation.

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