

# FULL MOUTH REHABILITATION BY HOBOTWIN STAGE PHILOSOPHY IN HYPOMATURATION TYPE AMELOGENESIS IMPERFECTA: A CASE REPORT

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## Abstract:

*Amelogenesis imperfecta is a hereditary disorder displaying a group of conditions which cause developmental alterations in the structure of enamel. The adverse effects it has on the oral health and quality of life of the individual warrants the identification of the contributing factors for the excessive wear and loss of vertical dimension. Extensive restorative treatment is imperative for the correction of such severely worn out dentition. Rehabilitation in such patients improves aesthetics, function and comfort. This case report presents a systematic approach in rehabilitating a case of hypomaturation type Amelogenesis Imperfecta (AI) following Hobo twin stage philosophy. Keywords: Full mouth rehabilitation, Amelogenesis imperfecta, Hobo's technique, Hobo's philosophy*

all the teeth in a more or less equal manner, and which may be associated with morphologic or biochemical changes elsewhere in the body. Hereditary brown enamel, hereditary enamel dysplasia, hereditary brown opalescent teeth are the other terminologies used for AI. The prevalence varies from 1:700 to 1:14000, according to population studies.<sup>2</sup> AI affects the entire ectodermal component. Amelogenesis Imperfecta trait can be either autosomal dominant, autosomal recessive or X-linked mode of inheritance.<sup>3</sup> AI affects both the primary and permanent dentitions. In the teeth affected by AI, the dentin and roots appear normal.

Depending upon enamel appearance, structural and developmental defects, AI is classified into 4 patterns: hypoplastic, hypomaturation, hypocalcified, and hypomaturation-hypoplastic. Hypoplastic form is characterized by the reduction in enamel matrix thickness with normal mineralization. Enamel has reduced thickness, appears normal and is less prone to attrition. The color appears normal with translucency of a yellow to dark brown color depending on the thickness of enamel and dentin.<sup>4</sup> Hypomaturation form shows defect in the mineralization process with normal matrix formation. Enamel has normal thickness,

## Introduction

Amelogenesis imperfect (AI) is a group of inherent disease that exhibit quantitative or qualitative enamel defect in the absence of systemic complication.<sup>1</sup> AI represents a group of conditions, genomic in origin, which affect the structure and clinical appearance of the enamel of all or nearly

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but hypomineralized and is prone to attrition. The color may be affected by staining from the oral environment. Teeth has a mottled appearance of yellow-brown or red-brown discoloration.<sup>4</sup> Hypocalcified form is characterized by defect in the quality of the mineralization process with normal quantity of matrix formation. Enamel has normal thickness with loss of translucency, hypomineralized, exhibits a soft cheesy consistency and easily breaks down. Color may be affected by staining from the oral environment and teeth appears dark.<sup>4</sup> In hypomaturation-hypoplastic cases, the enamel thickness is drastically reduced. The crowns show pitting and tend to have hypomineralized areas.<sup>4</sup>

This clinical report describes the prosthetic rehabilitation of a case of amelogenesis imperfecta following the Hobo twin stage philosophy. Following a thorough clinical and radiological examination, a

diagnosis of hypomaturation type of AI was made.

## Case report

A 43 year old women reported to the Department of Prosthodontics, Government Dental College, Thiruvananthapuram with the chief complaint of yellowish teeth and bilaterally missing lower back teeth. Extra oral examination revealed reduced lower facial height and absence of any symptoms of temporomandibular disorders due to the collapsed bite. Intra oral examination revealed presence of deciduous canines in the maxillary arch, missing 15, 13, 23, 37, 36, 33, 46 and 47, caries in relation to 14, 24, 25, discoloured 41, increased overbite, and most of the posterior teeth showed early stages of attrition (Figure 1).

Root canal treatment was indicated for 14, 24,



Figure 1. Pre-treatment view.



Figure 2. Single piece implants placed in relation to right and left mandibular first and second molars.

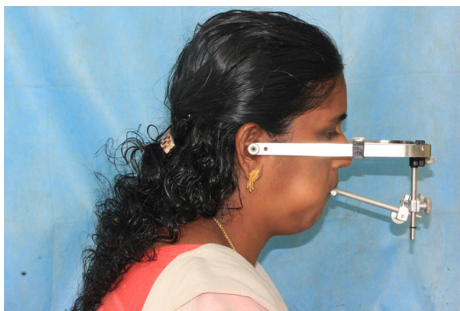


Figure 3. Facebow transfer.



Figure 4. Maxillary and mandibular teeth prepared.



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25 and the maxillary deciduous canines were extracted. Single piece implants were placed to replace the missing right and left mandibular first and second molars (Figure 2). Hobo twin stage philosophy was opted to rehabilitate this patient following the osseointegration of the implants.

Diagnostic casts were fabricated and the anterior segment of the maxillary cast was sectioned as a single unit from canine to canine and attached with dowel pins to facilitate the removal of this part during the wax up of the posterior teeth. A facebow transfer was done (Figure 3).

The centric relation was recorded using aluwax and the casts were mounted in a semi adjustable articulator using the facebow transfer and the centric relation record. The vertical dimension of occlusion had to be increased by 4 mm. The incisal pin was adjusted to fabricate an occlusal splint of 4 mm thickness and it was then delivered to the patient. The patient was instructed to wear the splint for 12 weeks. At the end of twelve weeks, the patient had no pain in the temporomandibular joint and she could well tolerate the increased vertical dimension.

The diagnostic wax up was completed which helped the patient to visualize the final outcome of the treatment and also aided in the fabrication of temporary crowns to be cemented after the crown preparation. The diagnostic wax up was fabricated following condition 1 for posterior teeth wax up and

condition 2 for anterior teeth wax up. A lucia jig was made on the maxillary central incisors such that the vertical dimension was increased by 4 mm. Maxillary and mandibular posterior teeth were prepared first and the inter-occlusal clearance was confirmed by placing the lucia jig on the anterior teeth. Temporary crowns were fabricated and positioned on the posterior teeth and these crowns helps to determine the interincisal clearance while preparing the anterior teeth. Following this, the maxillary and mandibular anterior teeth were prepared (Figure 4).

The posterior temporary crowns were removed, gingival retraction was done and a two stage putty and light body impression was made for both the arches. Temporary crowns were then cemented with zinc oxide eugenol cement. Metal copings were fabricated for the anterior as well as posterior teeth and try in was done (Figure 5).

A centric relation record was made with the metal copings in situ. During the phase of ceramic layering, the articulator was set to condition 1, maxillary anterior segment was removed and ceramic layering of the posterior teeth was done followed by ceramic layering of anterior teeth when the articulator was set to condition 2 and maxillary anterior segment re-attached. A group function occlusion was achieved after the final contouring and adjustment. A bisque trial was carried out where necessary adjustments were done. Following this, the final restoration was cemented with



Figure 5. Metal coping try-in.



Figure 6. Final crowns cemented.



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glass ionomer cement (Figure 6). The patient was recalled for routine examination at one, three and six months after the final cementation. She was satisfied with her appearance and functional improvements as well. She exhibited no signs of TMJ pain.

## Discussion

Early gnathological concepts focused primarily on the condylar path as it was theorized to be a constant through adulthood. McCollum and Stuart concluded from a study conducted on 10 patients that condylar guidance is dependent on the anterior guidance.<sup>5</sup> Anterior guidance was considered to be at the discretion of the dentist. In prosthodontics, the condylar path has been considered the main determinant of occlusion. According to the twin-table technique by Hobo, the cusp shape factor and the angle of hinge rotation are derived from the condylar path.<sup>5</sup> These factors contribute to the determination of an ideal anterior guidance. However, in the twin-stage procedure, the cusp angle was considered as the most reliable determinant of occlusion. This was according to the proven data from studies that the cusp angle was four times more reliable than condylar and incisal paths.<sup>6</sup> In the twin-stage procedure, to provide disocclusion, the cusp angle should be shallower than the condylar path. To make a shallower cusp angle in a prosthesis, it is important to wax the occlusal morphology to produce balanced occlusion or articulation so that the cusp angle becomes parallel to the cusp path of opposing teeth during eccentric movements.<sup>7</sup> Since anterior teeth help to produce disocclusion, the anterior portion of the working cast becomes an obstacle. Also, when fabricating the anterior teeth to produce disocclusion, some guidance should be incorporated. In this conditional approach described by Hobo, a cast with a removable anterior segment is fabricated. Reproduction of the occlusal morphology of the posterior teeth is done without the anterior segment and a cusp

angle coincident with the standard values of effective cusp angle is produced (referred to as "condition 1").<sup>8</sup> Second, reproduction of the anterior morphology with the anterior segment is done and anterior guidance which produces a standard amount of disocclusion is provided (referred to as "condition 2").<sup>8</sup>

Measurement of the condylar path is not necessary in hobo twin stage philosophy, hence complicated instruments such as the pantograph and fully adjustable articulator are not required. Therefore, this procedure is much simpler than the standard gnathological procedure, yet it follows gnathological principles. This technique is suitable for restorative work for patients with temporomandibular disorders and splint therapy as the condylar path is not considered as the main determinant of occlusion. This procedure can also be incorporated easily with commonly used clinical techniques such as face-bow transfer, various centric recording methods, and the cusp-fossa waxing. The contraindications of this technique are abnormal curve of Spee, abnormal curve of Wilson, abnormally rotated teeth, and abnormally inclined teeth.

## Conclusion

The principles and concepts involved in oral rehabilitation using the Hobo twin-stage procedure have been discussed. The amount of disocclusion of teeth is significantly controlled by the condylar and incisal guidance and disregards the role of measured condylar guidance. The average calibrations of condylar, lateral and incisal guidance and cusp angle provide an easy approach of management with lesser skills needed.

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