Case Report

Esthetic and functional rehabilitation of mutilated dentition and loss of vertical dimension due to amelogenesis imperfecta

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INTRODUCTION

Amelogenesis imperfecta (AI) is a complex group of heterogeneous inherited disorder that disturbs the formation of enamel in both the primary and permanent dentition without systemic involvement. AI manifest clinically as poorly developed, discolored (yellow, brown or gray), grooved, pitted or complete absence of the enamel of the teeth. The affected teeth are more prone to rapid wear and breakage.[1] This anomaly can be classified as hypoplastic, hypocalcified, or hypomaturation type based on clinical, radiographic findings and hereditary criteria.[2] In the hypoplastic type, the enamel has one-eighth to one-fourth of the normal thickness. The enamel thickness in hypomaturation and hypocalcified type is normal. However, the enamel in hypomaturation type is softer, whereas the enamel in hypocalcified type is very friable.[3] This case report describes esthetic and functional rehabilitation of a young patient with hypocalcified amelogenesis imperfecta.

CASE REPORT

Chief complaint, clinical examination and diagnosis

A 22-year-old female patient reported with chief complaint of esthetic and functional inadequacy of teeth. Patient complains of discolored, irregular front teeth and carious teeth [Figures 1 and 2]. The patient gave a history of gradual wearing away of teeth and increased sensitivity in his back teeth. During last couple of months she had to undergo multiple fillings in many posterior and anterior teeth due to attrition and carious fracturing. There was no history of loosening of teeth or any other systemic problem.

Extraoral examination revealed an obvious overclosure from the frontal aspect indicative of reduced vertical dimensions. Intraoral examination revealed a full complement of the permanent dentition. The upper and lower front teeth had undergone gradual attrition and fractured over a period of time. Incisal aspects of mandibular anteriors were completely worn away exposing the pulp chambers [Figure 2]. Faulty veneering was present in upper anteriors [Figure 1]. The occlusal aspects of all the posterior teeth were also severely worn away.

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worn. Loss of vertical height was to an extent that lower anterior teeth were touching the upper palate. Multiple restorations were present in posterior teeth. Examination of the periodontium revealed the presence of chronic, generalized, marginal, and papillary gingivitis, with calculus deposition and unsatisfactory oral hygiene.

The enamel of all teeth was hypocalcified and yellow brown in color. The surfaces of the teeth were rough, and the enamel was either not visible or easily friable. The dentin, where it was exposed, was brown and hypersensitive. Cervical and proximal enamel was found to be normal. The attrition of the molars resulted in a decrease of the vertical dimension of occlusion. The interocclusal distance at physiologic rest position was 7.3 mm. Centric occlusion position was coincident with the maximum intercuspal position. Orthopantomograph (Figure 3) revealed normal dentition where the radiodensity of enamel appeared to have the same as dentin and had normal pulp morphology. The patient was questioned about the family history for the presence of similar abnormalities in her family and she stated that her father had such an appearance of his teeth. Therefore, the patient was diagnosed “Mutilated dentition with reduced vertical dimensions due to severe attrition associated with hereditary hypocalcified amelogenesis imperfecta”.

Treatment planning
One of the most demanding aspects of such cases involves the development of sufficient restorative space, while simultaneously fulfilling esthetic, occlusal, and functional parameters essential to long-term success. As pitted enamel surface may predispose AI teeth to plaque accumulation, oral hygiene has to be maintained at a high level if a favorable long-term prognosis for restorative procedures is to be achieved. Hence, an integrated approach was planned comprising of the following phases:

- Periodontal phase: Institution of immaculate oral hygiene measures coupled with periodic recall and review.
- Restorative phase: Restoration of carious teeth, endodontic treatment of teeth with periapical infection.
- Surgical phase: Surgical crown lengthening to add length and volume to teeth.
- Endodontic and prosthodontic phases: Endodontic treatment wherever indicated; fabrication of foundation restorations (post and core); fabrication of interim prosthetic restorations for a transitional phase to regain vertical dimensions; fabrication of fixed dental prostheses on semi adjustable articulator.

Treatment proper
In the periodontal phase thorough supra and subgingival scaling was carried out and immaculate oral hygiene maintenance measures were instituted to obtain an
excellent oral hygiene and health of teeth. Endodontic treatment was carried out in 31, 32, 33, 41, 42 and all upper anterior teeth. Surgical crown lengthening was done in lower anterior to increase length of clinical crowns [Figure 4]. Gingival hypertrophy was observed in palatal aspect of upper anterior due to continuous irritation from lower teeth [Figure 5]. Electrosurgery was used for gingivectomy. Tissue recontoured to expose root surfaces for adequate preparation of margins [Figure 6]. The surgical site was allowed to heal for three months. Finally, increase of crown height by approximately 2 mm was achieved. Fiber post were placed in 31, 32, 42 and prefabricated metal post were placed in 33, 42, 11, 12, 13, 21, 22, 23 [Figure 7].

Diagnostic casts were fabricated and mounted on a semiadjustable articulator. A diagnostic wax up was done to analyze the need of altering the vertical dimension of occlusion, occlusal plane, tooth contours, position and esthetics. This helped in an approximate visualization of the final prosthetic restoration. Clinical analysis showed a freeway space of 7.3 mm. Therefore, a 3 mm increase of vertical dimension was planned. In present case composite was overlaid in increments on the occlusal surfaces of upper and lower posterior teeth so that there is 3 mm increase in vertical dimension as planned [Figure 8]. The composite was added in such a way to offer bilateral contacts of all posterior teeth in centric relation. The new vertical dimensions were observed for 2 months to allow the muscle and Temporomandibular joint (TMJ) to accommodate to the new vertical dimensions and there after traditional crown was made. Crown cutting was performed in posterior teeth without occlusal reduction [Figure 9 (composite filling removed)]. Full arch impressions were taken with a polyvinyl siloxane impression material and an occlusal registration was made using Type II modeling wax so that anterior bite raised by 3 mm [Figures 10 and 11]. Temporary acrylic crowns were delivered [Figures 12 and 13]. The patient was again kept on an interim phase of about 6 weeks with regular review to check for any subjective symptoms. Patient’s esthetics and phonetics were checked. The final prosthetic phase commenced after 6 weeks. Elastomeric impressions (ESPE-3Maddition poly-silicon) were made and multiple dies fabricated. Orientation relation was recorded and transferred to a semi-adjustable articulator (Hanau- H2) with the help of a spring face bow transfer. Mounting of casts was done followed by protrusive and lateral records. To regain the vertical dimension of occlusion the incisal pin was dropped by 3 mm, as planned, and wax patterns
fabricated accordingly. The final porcelain used to metal restorations were cemented with luting glass ionomer cement [Figures 14 and 15]. The patient was educated about the maintenance of oral hygiene.

**DISCUSSION**

Clinical management of AI can range from preventive interventions to complete rehabilitation depending on severity of the case.\(^4\)-\(^7\) The different materials and methods for restorative procedures currently available have made it both exciting and confusing for dental practitioners. It should be pointed out limitations exist, and the application of techniques are not universal.\(^8\) In present case occlusal surface of all standing teeth were overlaid with composite to new vertical dimensions to provide sufficient space for anterior restoration. Increase in vertical dimension have traditionally being achieved in stages by using a bite raising appliance to access
the patient tolerance and thereafter restoring the teeth with crowns. However, the splints are often poorly tolerated and there is question as to how much the vertical dimensions to be increased. Most patients will accept increases in the occlusal vertical dimensions in the order of 2 mm-4 mm. [9] An advantage of using composites is that, if the increase is too large, the occlusion can be adjusted until a comfortable position is achieved. In this case, the patient was carefully monitored for 2 months to evaluate the adaptation to the composite restorations. Also, the patient’s adaptation to the provisional restoration was monitored for 6 weeks. Depending on the patient’s situation and adaptation ability, the interim period can be modified, and the careful evaluation and monitoring may shorten the overall treatment duration.

CONCLUSION

In this clinical report, raising vertical dimension of occlusion using direct composites and following fixed provisional based on accurate diagnosis showed successful full mouth rehabilitation for severely worn down dentition.

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