

A Case of Dentinogenesis Imperfecta Treated with Submerged Root Technique

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ABSTRACT

Dentinogenesis imperfecta (DGI), an autosomal dominant trait, is one of the most common hereditary disorders affecting both the formation and mineralization of dentin. Either or both primary and permanent dentition is affected by it. Here, we present a case report of a 13-year-old female patient affected with DGI who had undergone prosthetic rehabilitation with submerged root technique.

Keywords: Defective dentin, Dentition, Hereditary opalescent dentin

CASE REPORT

A 13-year-old female patient reported to the Department of Oral Medicine with a chief complaint of discoloured and wearing off all teeth. Patient gave history of similar discolouration and wearing off all the deciduous teeth, which had exfoliated in due course. The parents expressed concern that there was delay in the eruption of permanent teeth and change in color of the same during the time of eruption. Patient's past medical and family history was non-contributory. There was no history of any unusual bone brittleness or unexplained hearing loss in the family, or any other systemic illness or drug usage in the present or past. She had visited a dentist a year before with the same complaint but was not provided with any treatment. No abnormality was detected on general physical examination. Extraoral examination showed decrease in vertical dimension of the face. Intraoral examination revealed complete attrition of all the teeth in both the arches upto the level of gingiva. Teeth were missing in relation to 36, 46 which had exfoliated [Table/Fig-1].



[Table/Fig-1]: Intraoral view showing complete attrition of teeth

On radiographic evaluation, Orthopantomogram revealed root stumps in both the arches and obliteration of the pulp chamber and root canals in both maxillary and mandibular anterior and premolar teeth. Maxillary right



[Table/Fig-2]: OPG showing root stumps and obliteration of the pulp chamber and root canals in both arches

first molar, maxillary left second molar and mandibular right third molar teeth showed periapical lesions, maxillary left third molar was impacted [Table/Fig-2], thus all were extracted and were sent for histopathological analysis.

The photomicrograph (ground section) revealed a tubular amorphous dentin with few irregular haphazardly arranged dentinal tubules obliterating the pulp canals. Cellular cementum is present on the medial aspect of both roots [Table/Fig-3].

Based on the history, clinical, radiological and histopathological investigations, dentinogenesis imperfecta was considered as the final diagnosis.

The patient was referred to the Department of Prosthetics for rehabilitation. Submerged root technique was planned for both the maxillary and mandibular arches in order to preserve the residual alveolar ridges for fabrication of the prosthesis. Endodontic treatment was not indicated before prosthesis in this case in view of the fact that all the pulp chambers were obliterated. On the day of surgery, informed consent was taken from the patient. Local anaesthesia



[Table/Fig-3]: Photomicrograph under 40 X magnification

was administered following which, a sulcular incision was given on the facial and buccal surfaces all teeth respectively at the free gingival margin and extended upto the alveolar crest. Hence, complete decoronation of the teeth was done upto a level below 2-3 mm of alveolar ridge. Furthermore, facial and buccal flaps were raised and the sharp edges of the remaining roots were smoothed using a round bur and straight hand piece under continuous irrigation. This was followed by the approximation of the flaps, sutures were placed and haemostasis obtained [Table/Fig-4]. Postoperatively, the patient was prescribed oral antibiotics and analgesics (Cap Amoxicillin 500 mg TDS, Tab Metronidazole 400 mg TDS, Tab Paracetamol 650 mg TDS for 3 days).

The patient was recalled after 24 hours initially for a checkup. After 1 week, suture removal was done and the healing was found to be uneventful. Postoperative panoramic radiograph after 1 month, revealed no abnormality [Table/Fig-5]. The patient was followed up regularly for a period of 8 weeks. After complete healing was ensured, fabrication of the complete denture on both the arches was planned. The standardized procedure was carried out by recording preliminary impressions with alginate, border moulding with special tray preparation and taking final/wash impression with zinc oxide eugenol. Jaw relations were recorded for balanced occlusion and all the teeth arranged in neutral zone. Try in was done to ensure proper occlusion and after the occlusal corrections made; denture was delivered to the patient. Post-insertion instructions were given and the patient was recalled after a week to check the retention of the denture [Table/Fig-6].

After a period of 6 months, radiographic evaluation was done again. Orthopantomogram revealed no evidence of periapical pathology [Table/Fig-7]. The patient was aesthetically pleased and completely satisfied with the treatment performed.

DISCUSSION

Dentinogenesis imperfecta (DGI) is one of the most common hereditary condition of dentin formation wherein the dental papilla of either or both the primary and secondary dentition is found to be abnormal [1,2]. Treatment of both the dentitions is exigent and often demands a multidisciplinary approach to prevent psychological morbidity to the patient [3].

Submerged root technique is one such method of prosthetic rehabilitation wherein mucosal coverage of roots is performed in



[Table/Fig-4]: Submerged root technique of maxillary and mandibular arches



[Table/Fig-5]: Postoperative OPG view after 1 month [Table/Fig-6]: Prosthetic rehabilitation after 8 weeks

order to preserve the residual alveolar ridge. It is a sound clinical method for those patients where overdenture is not possible and might be a viable alternative to complete extractions. The advantage of preserving the retained roots is that it reduces loss of alveolar bone and increases stability of the overdenture [4]. In the present case, we had obtained a similar approach. Only the teeth with periapical pathology and those impacted were extracted to prevent further dentoalveolar infection.

The success of this procedure is dependent upon proper surgical procedure leading to proper closure of mucosa over the retained roots. Although residual ridge resorption is an irreversible process, the resorption can be minimised or reduced with the help of vital root retention, which aids in preserving the residual ridge to some extent and is obviously preferable to the totally edentulous ridge. Vertical dimension of occlusion is also maintained [4,5].

There are few limitations of this treatment such as development of periapical pathology mostly in cases of vital retained roots. This approach also depends on the systemic health of the patient as it is an invasive surgical procedure. The aesthetics may be compromised as the prosthesis gives a stretched appearance of the lips [5].

In 1961, intentional root submersion was first reported by Bjorn [6]. Howell reported a similar clinical study of submerged endodontically

treated roots which had been kept under regular follow up for a period of 10 years [7]. Bowers GM et al., has successfully performed this technique to submerge 150 vital roots of periodontally involved teeth with intrabony defects [8]. Sharma A et al., tested the value of submerging vital roots for the preservation of residual ridges in 10 patients [9]. Shankar RY et al., also presented 2 case reports of prosthetic treatment of submerged root technique with vital and non vital roots. The phonetics and the functionality of the patients were well maintained with a little compromised aesthetics [5].

CONCLUSION

Being the most common hereditary disorder affecting the dental hard tissues, intervention and treatment of the patients with dentinogenesis imperfecta at the earliest greatly improves function, aesthetics and proves to be great psychological boost to the patient's well being.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Feb 04, 2015**
Date of Peer Review: **May 06, 2015**
Date of Acceptance: **Jul 03, 2015**
Date of Publishing: **Sep 01, 2015**