Scholars Journal of Dental Sciences (SJDS) **ISSN 2394-496X (Online)**
Sch. J. Dent. Sci., 2017; 4(7):307-311 **ISSN 2394-4951 (Print)**
©Scholars Academic and Scientific Publisher
(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjds.2017.v04i07.001

Case Report

Multidiscipilinary Approach for Rehabilitation in Patient of Dentinogenesis Imperfecta: Case Report

Sikka Neha[1], Singh Pardeep[2], Bala Shashi[3], Sheoran Kirtika[4], Khatana Rachit[5]
[1]MDS, Demonstrator, Prosthodontics, Post Graduate Institute Of Dental Sciences Rohtak,Haryana
[2]Post graduate Student, Prosthodontics, Post Graduate Institute of Dental Sciences Rohtak, Haryana
[3]MDS, Senior Professor and HOD, Dept of Dental Materials, Post Graduate Institute Of Dental Sciences Rohtak, Haryana
[4]Post graduate student, Periodontics, Post Graduate Institute of Dental Sciences Rohtak, Haryana
[5]MDS, SGT Dental College and Hospital, Gurgaon, Haryana

***Corresponding author**
Pardeep Singh
Email: pradeepsheokand7@gmail.com

Abstract: Prosthetic treatment of patients with dentinogenesis imperfecta is a challenge for the dental practitioner because numerous factors have to be considered. Early diagnosis and treatment are essential for obtaining a favorable prognosis. Preservation of the existing tissues and rehabilitation of the function and esthetics with a multidisciplinary approach is of paramount importance. Here, described a case report of young patient having dentinogenesis imperfecta, received satisfactory esthetic and functional treatment.
Keywords: dentinogenesis imperfect, rehabilitation, Prosthetic treatment

INTRODUCTION

Dentinogenesis imperfecta is an inherited autosomal dominant developmental disorder of dentin with a reported incidence of from 1 in 6000 to 8000 [1]. This disorder can be broadly classified into three subtypes [2]: type I occurs as a dental manifestation of osteogenesis imperfecta; type II (DI-II) also known as classical hereditary opalescent dentin occurring in patients with dental abnormalities only; and type III ("Brandywine isolate") found in a triracial southern Maryland population [2]. Dentinogenesis is the process of dentin formation in which the odontoblasts lay down an organic matrix composed mainly of extracellular collagen fibers, which forms a scaffold for the deposition of hydroxyapatite crystals. Dentin Phosphoprotein (DPP) and Dentin Sialoprotein (DSP) [5] are noncollagenous matrix proteins (NCPs) produced by genes located at 4q12-21 are considered to play a vital role in dentin mineralization. Mutations in the genes causing disturbances in the secretion NCPs interfere with the proper shape and placement of the hydroxyapatite crystals in the dentin matrix which are clinically manifested as dentinogenesis imperfecta. Mutations in the gene encoding dentine sialophosphoprotein (DSPP), result in Type II and III of dentinogenesis imperfecta [5]. Clinical manifestations: The affected teeth have normal to amber, grey or brownish blue (opalescent) color [3], attributed to the pigments and minerals deposited in the dentinal tubules [4]. Radiological manifestations: The teeth have bulbous crowns, cervical constriction and short, thin roots. Obliteration of the dentinal tubules and pulp chambers due to increased odontoblastic activity. There are no radiologically visible abnormalities in the periodontium or alveolar bone [4]. The case report presents the management of a 20 year old patient with clinical and radiographic manifestations of dentinogenesis imperfecta type II.

CASE REPORT

A young patient reported with a complaint of poor aesthetics due to discolouration, occasional chipping and rapid wearing of teeth. The patient was experiencing problems with his teeth since childhood. No contributory medical or family history was found. The colour of the patient's teeth was amber with brown stains. The anterior teeth of the patient were in edge to edge occlusion. There was generalised wear of the posterior teeth, with canting of occlusal plane towards right side as there was greater attrition on this side. The patient was having a complete set of dentition except for mandibular first molar on the right side. Multiple teeth were decayed and/or fractured.(fig.1,2)

Fig-1: Lateral view from left side

Fig-2: lateral view from right side

Radiographic examination

The Orthopantomogram (figure 3) showed generalised attrition, cervical constrictions, and bulbous crowns, tapered and short roots and also obliterated root canal spaces. Obturated root canals with respect to left mandibular first molar right maxillary first molar and mandibular left central incisor, Posterior to anterior (PA) chest and PA skull were normal.

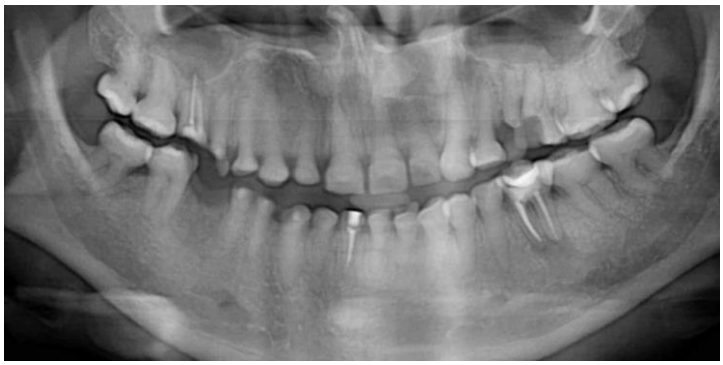

Fig.3: orthopantomogram

Pathological investigations

Badly destructed maxillary second premolar and maxillary first molar were extracted and sent for histopathological examination. Normal enamel rods were present with irregular calcified dentinal tubules, pulp chambers and root canals were obliterated.

Diagnosis

After clinical, histopathological and radiographic examination the diagnosis of dentinogenesis imperfecta (Type-II) was made.

Treatment plan

A multidisciplinary approach involving endodontist, prosthodontist, periodontist and implantologist is required for the management of these individuals. The treatment plan mandates immediate relief of pain and removal of sources of infection with appropriate restorations and endodontic therapy followed by placement of full coverage crowns and FDPs with a reorganised occlusal plane.

Step by step Procedure

Diagnostic records (Diagnostic impressions), facebow transfer (Fig 4), diagnostic mounting was done on semi-adjustable articulator (Fig 5), centric relation and protrusive records of the patient were made. Occlusal plane analysis using a custom made broadrick plane analyzer was done (Fig 6). The diagnostic wax up was done in accordance to the newly determined occlusal plane (fig.7) and effort was made to provide class I incisor relationship instead of replicating the already existing edge to edge relationship. Crown lengthening was advised (with respect of maxillary and mandibular posteriors on right and left side as well as lateral incisors) as the clinical crown length of the teeth was not sufficient for retention. This was followed by tooth preparation in the maxillary and mandibular posterior teeth. Provisional crowns (fabricated in accordance to the diagnostic wax up) were cemented for a period of 6 weeks to monitor the patient's response to the raised vertical dimensions. The patient was monitored during this period for any signs in muscles and TMJ related to the raised vertical dimensions of occlusion. The patient experienced minimal discomfort. The provisional crowns were replaced by Porcelain Fused to metal crowns and FDPs. This was followed by the preparation of maxillary and mandibular anteriors (fig.8,fig.9).

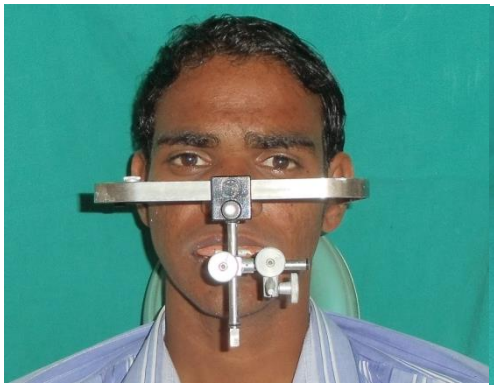

Fig-4: facebow transfer

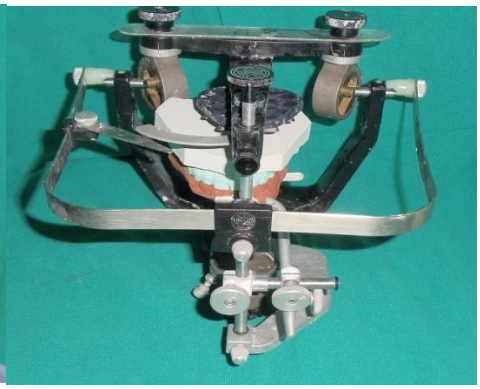

Fig-5: diagnostic mounting

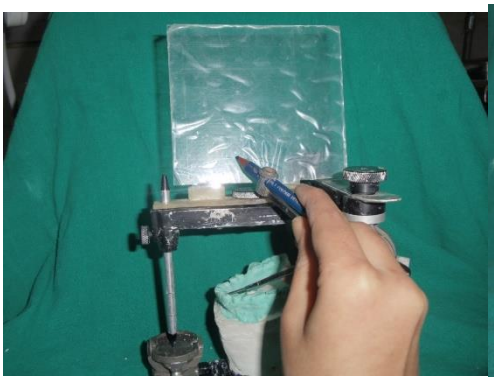

Fig-6: Occlusal plane analysis

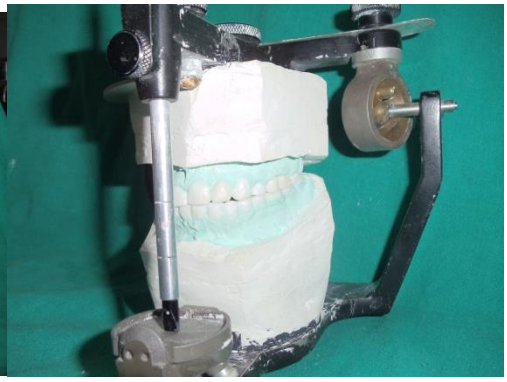

Fig-7: diagnostic wax up

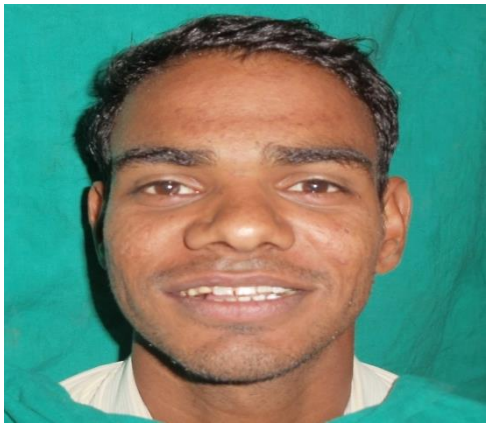

Fig-8: pre operative view

Fig-9: postoperative view

DISCUSSION

One of the greatest challenges for the prosthodontist is to provide adequate treatment to achieve functional and esthetic restoration in cases of diseases like dentinogenesis imperfect [DI]. Early diagnosis and treatment are essential for obtaining a favourable prognosis. Preservation of the existing tissues and rehabilitation of the function and esthetics with a multidisciplinary approach is of paramount importance. Prosthodontic rehabilitation of this kind greatly improves function, esthetics and proves to be great psychological boost to the patient's well-being. In advanced stages of dentinogenesis imperfecta, patients can benefit from full-mouth rehabilitation where the deteriorated – yet still present – teeth can be used as abutments for a fixed, temporary restoration throughout the stages of treatment. Detailed pretreatment planning of how much bone and soft tissue are to be removed and an accurate determination of where the implants should be placed must be considered. The aim of this report is to describe the chronology and problems encountered in the rehabilitation of a patient with DI and severe attrition [5]. The current treatment option is not specific for DI, but rather a correction of problems caused by the previous dental treatment that was completely inadequate. The treatment goal was focused on restablishing function and esthetics. Factors that have to be taken into account are age and systemic health of the patient, as well as the prognosis of the remaining teeth and edentulous areas. There are several treatment alternatives for patients with severe tooth structure loss. If sufficient tooth structure remains, veneers, crowns, or FDPs can be used [6]. In cases involving extensive attrition, root canal therapy combined with post and cores is required. However, implant-supported fixed or removable prostheses should be considered as the superior alternative today. Placement of implants for missing teeth followed by crown placement on the remaining teeth should be the first line of treatment. But our patient was not economically sound. So implant placement was not done. In summary, thorough and comprehensive treatment planning and patient information were crucial in this case. The multi disciplinary approach including optimal communication between prosthodontist and periodontist enabled the positive outcome.

The greatest challenges faced in the treatment of patients with DI were extreme fragility of the teeth, doubtful retention of the esthetically sound restorations. Such patients usually present with the complaint of unesthetic teeth, pain, chronic dental abscess, and/or decreased vertical height. Early diagnosis and treatment intervention helps in better prognosis and rehabilitation in such cases. According to Wei, stainless steel crowns are commonly used to prevent the attrition of the deciduous teeth and young permanent teeth [6]. The use of potentially abrasive materials in opposition to unrestored tooth surfaces should be avoided. The importance of implementation of early preventive measures in order to avoid pulpal pathology from occurring has been demonstrated, as any necessary ensuing endodontic therapy would be difficult to execute and any endodontic treatment provided has a poor prognosis.

Depending upon the economic status of the parents, composite veneers or celluloid crowns can be chosen. In a study by Harley and Ibbetson [8], the longevity of adhesive castings in patients affected by amelogenesis and dentinogenesis imperfecta was examined .It was found that despite the abnormally formed tooth structure in these patients only one casting was lost out of a total of sixty four which had been placed in at time period of between ten and fifty four months.

The permanent teeth can be restored with porcelain jacket crowns, fixed or removable prosthesis, overdentures or implants. Shafer *et al.* emphasize on the doubtful retention of restorations due to diminished quantity and quality of dentin present [9].

Owing to risk of enamel fracture, intracoronal restorations are contraindicated. The shortened root length means that crown lengthening procedures should be avoided or performed with caution.

CONCLUSION

In this case the authors aimed at providing treatment, along with preventive measures, to achieve a good esthetic result and restore the function. Reconstruction of teeth with dentinogenesis imperfecta is a difficult process [7]. Following the current procedures with composite materials does not guarantee a lasting restoration of the lost tissues [2, 6]. Conventional adhesive systems are incapable of creating a true hybrid layer in the different histologically structured dentin found in DI-II [8].

REFERENCES

1. Farge P, Ajacques JC, Dallane L, Magloire H. Manuel de genetique buccodentaire. Paris: MassonGenetique du syst&me dentaire, 1992:37-
2. Shields ED, Bixler D, El-Katrawy AM. A proposed classification for heritable human dentine defects with a description of a new entity. Arch Oral Biol. 1973; 18(4): 543.
3. Kim JW, Simmer JP: Hereditary dentin defects. J Dent Res 2007, 86:392-399.
4. Hart PS, Hart TC: Disorders of human dentin. *Cells Tissues Organs* 2007, 186:70-77.
5. Witkop Jr CJ, MacLean CJ, Schmidt PJ, Henry JL. Medical and dental findings in the Brandywine isolate. The Alabama journal of medical sciences. 1966 Oct;3(4):382.
6. Burgess JB, Hennon DK Using laminate veneers to restore teeth affected with

dentinogenesis imperfecta. J Dent Child 1982;49: 173-5.

7. Knezevic A, Tarle Z, Panduric V. Esthetic reconstruction of teeth in patient with dentinogenesis imperfecta — a case report. *Coll Antropol.* 2006;30:231–234.
8. Henke DA, Fridrich TA, Aquilino SA. Occlusal rehabilitation of a patient with dentinogenesis imperfecta: a clinical report. Journal of Prosthetic Dentistry. 1999 May 1;81(5):503-6.
9. Bouvier D, Duprez JP, Morrier JJ, Bois D. Strategies for rehabilitation in the treatment of dentinogenesis imperfecta in a child: a clinical report. The Journal of prosthetic dentistry. 1996 Mar 1;75(3):238-41.
10. Coke JM, Del Rosso G, Remeikis N, Van Cura JE. Dentinal dysplasia, Type I. Report of a case with endodontic therapy. Oral Surg Oral Med Oral Pathol. 1979; 48: 262– 268.
11. Geurs NC, Wang IC, Shulman LB, Jeffcoat MK. Retrospective radiographic analysis of sinus graft and implant placement procedures from the Academy of Osseointegration Consensus Conference on Sinus Grafts. Int J Periodont Restor Dent 2001; 21(5): 517–523.
12. Boyne PJ, James RA. Grafting of the maxillary sinus floor with autogenous marrow and bone. J Oral Surg 1980; 38: 613–616.
13. Valentini P, Abensur DJ. Maxillary sinus grafting with anorganic bovine bone: a clinical report of long-term results. Int J Oral Maxillofac Implants 2003; 18(4): 556–560.
14. Valentini P, Abensur D, Wenz B, Peetz M, Schenk R. Sinus grafting with porous bone mineral (Bio-Oss) for implant placement: a 5-year study on 15 patients. Int J Periodont Restor Dent 2000; 20(3): 245–253.