

# Short root anomaly with cyst formation and defective phonetics: Diagnosis and treatment

Clinical Report

Rohit Kohli, Nidawani Prakash

## ABSTRACT

Generalized diminished root is a rare condition leading to early loss of teeth. This report describes the diagnosis and treatment of a 20-year-old short-stature male patient suffering from unusual generalized short roots associated with microdontia, taurodontism of the posterior teeth and multiple dens invaginatus, who had lost several teeth due to spontaneous exfoliation.

**KEY WORDS:** Dens invaginatus, dentinal dysplasia, microdontia, taurodontism

DOI: 10.4103/0972-4052.52865

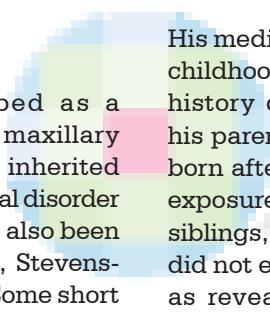
## INTRODUCTION

Short root anomaly has been described as a developmentally very short blunt root of maxillary incisor,<sup>[1]</sup> which may be due either to the inherited chromosomal anomaly/disorder, developmental disorder or idiopathic factors.<sup>[2,3]</sup> Shortness of root has also been observed in such disorders as scleroderma, Stevens-Johnson's syndrome and Downs syndrome. Some short stature syndromes that have been associated with short roots are Aarskog syndrome and dwarfism of Seckels.

Some of the patients undergoing orthodontic treatment are known to exhibit resorption of roots leading to short roots and the phenomenon is attributed to idiopathic factors. Children undergoing chemotherapy for various malignancies have also been reported to undergo developmental anomaly with short roots.

## CASE REPORT

A 20-year-old male presented himself with the chief complaint of missing lower anterior-teeth and wanted their replacement. There was no history of trauma to the teeth. The patient had lost several teeth due to spontaneous exfoliation over a period of 3-4 years, resulting in esthetic and phonetic problems [Figure 1].



His medical history was unremarkable with no serious childhood illness or systemic abnormality. The family history did not reveal consanguineous marriage of his parents. According to his mother, the patient was born after an uneventful, full-term pregnancy with no exposure to radiation. The patient's parents and his siblings, an 18-year-old sister and a 14-year-old brother, did not exhibit any similarity to the patient's dentition as revealed after thorough intra-oral radiographic examination.

On physical examination, the patient appeared short in height with well-proportioned body. His height (140 cm), weight (36 kg) and circumference of the head (45 cm) were all below the normal range for his age. Extra-oral examination showed no abnormalities. Intra-oral examination revealed 25 small caries-free permanent teeth with crowns of normal color and shape. The teeth were not in proper occlusion. Mandibular anterior-and maxillary-left first premolars were absent. Maxillary right-and mandibular-left first premolar exhibited grade III mobility which was extracted later, while the rest of the teeth showed grade I mobility. All the teeth were vital to thermal and electrical tests [Figure 2].

An orthopantomograph [Figure 3(a)] revealed short tapered roots with crown to root ratio of more than

Department of Prosthodontics, P.M.N.M. Dental College and Hospital, Dist: Bagalkot, Karnataka, India

**Address for correspondence:** Dr. Rohit Kohli, Department of Prosthodontics, Himachal Dental College and Hospital, Sundernagar, Distt: Mandi (H.P.) Himachal Pradesh - 174 401, India. E-mail: drrkohli@rediffmail.com

Kohli and Prakash: Generalized short root anomaly



Figure 1: Pre-operative photographs

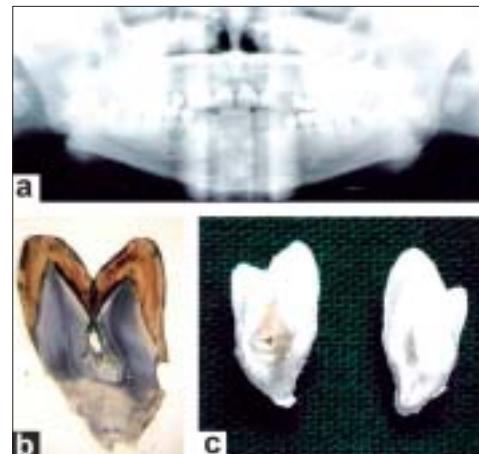


Figure 3: (a) Radiographic view (OPG), (b) Ground section, (c) Sagittal section



Figure 2: Intra-oral photographs



Figure 4: (a) Metal try-in (b) Post operative intraoral photographs



Figure 5: Post operative photographs

1:1 in all teeth except the molar teeth. There was an apical radiolucency associated with mandibular right first and second premolars. Peri-apical tissues were curetted and sent for histopathological evaluation. The mandibular right and left first molar appears to be taurodontic. A full mouth radiographic survey revealed dens invaginatus in maxillary lateral, maxillary right first premolar and mandibular left first premolar. Pulp chambers of all teeth, except molars, were partially obliterated and that of maxillary central were radiographically not appreciable. Remnants of root tips were visible in the anterior mandible. Based on these findings, a provisional diagnosis of dentinal dysplasia

type I (radicular variety) was arrived at.

Histopathological examination of curetted tissue from the area of apical radiolucency revealed features suggestive of an infected cyst. The extracted teeth exhibited a crown to root ratio of 1.4:1 (?). Sagittal section of mandibular left first premolar showed obliteration of pulp chamber with presence of dens invaginatus [Figure 3(b)]. Ground section examination of this tooth revealed normal enamel structure, normal tubular pattern of dentin with cementum covering the shortened irregular root [Figure 3(c)]. Based on these findings, the earlier provisional diagnosis of dentinal dysplasia type I was, therefore, ruled out and a final diagnosis of generalized short root anomaly was concluded.

From the prosthodontic viewpoint, the area covering the missing anterior mandibular teeth and the extracted mandibular right first premolar was replaced with an interim partial denture. This would also allow us to evaluate the prognosis of the patient, including improvement in esthetics and phonetics. Keeping in mind the anatomy, morphology of tooth and the patient's normal oral hygiene, a cast partial denture for mandibular arch was advised.

A preliminary alginate impression of maxillary and mandibular arch was made. Casts of stone were prepared from these impressions. Lower cast was surveyed and designed. Another impression with alginate of mandibular arch was made. A second cast of stone was prepared from it. Spacer wax was adapted on the arch and a special tray of autopolymerizing acrylic resin was fabricated.

The teeth were prepared accordingly, with proper rest seats and modified contours. Tray extensions were properly adjusted and a tray adhesive was applied on it. After 5 minutes, an impression was made with medium body elastomeric impression material. A master cast of stone was obtained from the impression and sent to the dental laboratory for fabrication of prosthesis.

Fabricated cast partial framework was tried in the patient's mouth and bite was registered with bite registration wax [Figure 4(a)]. The upper and lower casts were mounted on the articulator. The teeth were arranged and try-in was done. After a successful try-in, prosthesis was acrylized and delivered to the patient [Figure 4 (b)]. The patient was instructed and advised

follow-up [Figure 5].

## DISCUSSION

This case exhibits a peculiar combination of all traits associated with short root anomaly. In a single patient, it included generalized microdontia, taurodontism, multiple dens invaginatus, peri-apical radiolucency, obliteration of pulp chambers, increased tooth mobility leading to spontaneous exfoliation and microcephalic dwarfism.

Idiopathic generalized short root anomaly is extremely rare. Seven cases of generalized short root have been reported, of which two exhibited familial tendency with autosomal dominant pattern of inheritance<sup>[3]</sup> and the rest were sporadic cases.<sup>[4-7]</sup> In the present case, none of the family members exhibited similarly affected peri-apical radiolucencies caused by external root resorption. The present study is not only unique but rare as well in that unlike the previously reported cases, this patient manifested cyst formation as an additional feature.

The strategy adopted by us for the treatment of this patient included restoration of the patient's mastication, esthetics and phonetics. Since the cases of short root associated with dentinal dysplasia type I reported earlier by others had caries, excessive mobile and partially erupted teeth<sup>[8]</sup> with long span of edentulous arch, they were treated with over denture<sup>[8,9]</sup> and the possibility of endo-osseous implants<sup>[9]</sup> was not ruled out. But in our present study, wherein the teeth showed normal enamel and dentin, grade I mobility and a crown to root ratio of 1:1, tooth supported with cast partial denture was advised. This would have an added advantage of distributing the masticatory load to maximum abutments, thereby allowing proper maintenance of oral hygiene after removing the prosthesis. The span of the edentulous arch was also not very long; such a prosthesis allows splinting and restoring of the edentulous arch.

## CONCLUSION

The clinical report presented in this study describes the use of cast partial denture to restore the short root anomaly of a patient, an approach that boosted the self-confidence of the patient leading to improved esthetics, increased masticatory ability and proper phonetics.

## REFERENCES

1. Lind V. Short root anomaly. Scand J Dent Res 1972;80:85-93.
2. Apajalahti S, Holtta P, Turtola L, Pirinen S. Prevalence of short- root anomaly in healthy young adults. Acta Odontol Scand 2002;60:56-9.
3. Witkop CJ Jr, Jasper MT. Teeth with short, thin, dilacerated root in patients with short stature: A dominantly inherited trait. Oral Surg

Kohli and Prakash: Generalized short root anomaly

- Oral Med Oral Pathol 1982;54:553-9.
- 4. Leonard M. Diminished root formation. *Oral Surg Oral Med Oral Pathol* 1972;34:205-8.
  - 5. Sauk JJ Jr, Delaney JR. Taurodontism, diminished root formation and microcephalic dwarfism. *Oral Surg Oral Med Oral Pathol* 1973;36:231-5.
  - 6. Gradner DG, Gigis SS. Taurodontism, short root and external resorption, associated with short stature and a small head. *Oral Surg Oral Med Oral Pathol* 1977;44:271-3.
  - 7. Bazopoulou-Kyrkanidou E, Dacou-Voutetakis D, Nassi H, Tosios K, Kyrkanides S, Damoli M. Microdontia, hypodontia, short bulbous root and root canals with strabismus, short stature, and borderline mentality. *Oral Surg Oral Med Oral Pathol* 1992;74:93-5.
  - 8. Ozer L, Karaso H, Aras K. Dentia Dysplaid type I: Report of atypical cases in the permanent and missed dentition. *Oral Surg Oral Med Oral Pathol Oral Radio Endod* 2004;98:85-90.
  - 9. Shankly PE, Mackie IC, Sloan P. Dental dysplasia type-I Report of case. *Int J Paediatr Dentist* 1999;9:37-42.

