

Management of an anomalous maxillary lateral incisor fused with a supernumerary tooth and a coronal dens invaginatus

LALIT KUMAR LIKHYANI, MONIKA CHOUDHARY¹, SUNEET KHANDELWAL², YOHAN CHACKO³

Department of Conservative Dentistry and Endodontics, RUHS College of Dental Sciences, Jaipur, ¹Department of Conservative Dentistry and Endodontics, Surendera Dental College and Research Institute, Sri Ganganagar, ²Department of Oral Pathology and Microbiology, Daswani Dental College and Research Centre, Kota, Rajasthan, ³Department of Conservative Dentistry and Endodontics, Asan Memorial Dental College, Chengalpattu, Tamil Nadu, India

ABSTRACT

An abnormal union of two or more tooth germs in the development process results in fusion of teeth. Such clinical situations present a diagnostic dilemma and a challenge in treatment planning. This article reports the endodontic and esthetic management of an atypical permanent maxillary lateral incisor fused with a supernumerary tooth and a coronal dens invaginatus. A 22-year-old female reported an abnormally large and discolored permanent maxillary left lateral incisor (#22). Cone-beam computed tomographic evaluation revealed a complex, labiolingually thin ribbon-shaped canal system in the central portion interconnected with two other canals along with a coronal dens invaginatus. A 2-year follow-up demonstrated satisfactory clinical and radiographic outcomes after the endodontic therapy and a veneer placement on the concerned tooth.

Keywords: Cone-beam computed tomography, dens invaginatus, incisor, supernumerary, tooth abnormalities

INTRODUCTION

Fusion is a developmental dental anomaly of shape, form, or morphology that occurs when two or more developing tooth germs unite at the dentinal level, yielding a single large tooth.^[1] Some physical force or pressure, trauma, inflammation, or local metabolic interferences during tooth bud differentiation may lead to the fusion of two tooth buds. As a result, the dental count decreases in fusion. Gemination is a similar dental anomaly that demonstrates two crowns or one large, partially separated crown, usually sharing a single root or root canal. The dental count is normal in gemination.^[2]

The incidence of gemination and fusion is more in the primary dentition, particularly in the incisor–canine region. The

incidence of fused teeth is about 0.5% and 0.1% in primary and permanent dentition, respectively.^[3,4]

Dens invaginatus results from the invagination of the enamel organ into the dental papilla before the calcification stage. As per Oehlers classification of dens invaginatus, the Type I category includes an enamel-lined minor form occurring within the crown not extending beyond the cemento-enamel junction. The most frequently affected teeth are permanent maxillary lateral incisors.^[1,5]

We report management of a rare case of a permanent maxillary lateral incisor fused with a supernumerary tooth and a Type I dens invaginatus.

Address for correspondence: Dr. Lalit Kumar Likhyani, Department of Conservative Dentistry and Endodontics, RUHS College of Dental Sciences, Subhash Nagar, Jaipur - 302 016, Rajasthan, India.
E-mail: drlalitlikhyani@gmail.com

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CASE REPORT

A 22-year-old female reported a chief complaint of an abnormally large and discolored upper left front tooth. Dental, medical, drug, and family history were insignificant. Intraoral evaluation revealed a dark yellow-colored permanent maxillary left lateral incisor (tooth #22), with an abnormal mesiodistal diameter and uneven corrugated labial surface [Figure 1a]. A deep invagination was evident distally on the palatal surface [Figure 1b]. The dental count was normal. The periodontal status of the tooth appeared satisfactory based on palpation and percussion tests. Cold testing elicited a negative response. The intraoral periapical radiograph [Figure 2a] revealed a mature bulbous lateral incisor with two separate enamel-like radiopaque crown portions and a small sac-shaped invagination confined to the crown portion distally. The radiograph also revealed a single sizeable root with a possibility of multiple canals, including a canal of dens invaginatus. In addition, a periapical radiolucency concerning tooth #22 was evident. Based on the above findings, we diagnosed tooth #22 associated anomaly as the fusion of a regular tooth bud with a supernumerary tooth bud and a Type I dens invaginatus. The anomalous tooth was associated with pulpal necrosis and asymptomatic

apical periodontitis. We planned for a nonsurgical root canal treatment followed by an all-ceramic veneer to ensure pleasing esthetics.

After taking informed consent, two separate access openings were prepared for the central canal and the dens under dental dam isolation [Figure 1c and d]. While instrumenting the central canal, we realized that it had dentinal septa inside [Figure 1c], giving a feel of multiple canals. A closed dressing without any medicament was provided [Figure 2b], and the patient was advised for a cone-beam computed tomographic (CBCT) scan.

CBCT (Carestream CS 9300 imaging systems; Carestream Health, Inc., New York, USA) evaluation revealed a labiolingually thin ribbon-shaped canal system in the central portion along with two other canals. These three canals had connections throughout the entire length of the root [Figure 3a-d]. A coronal dens invaginatus (Type I) was also evident in the distal portion of the crown [Figure 3a and b]. In addition, periapical bone destruction was noticed toward the palatal aspect of the apical third of the root [Figure 3e and f].

A working length radiograph confirmed a complex canal system [Figure 2c]. The canals were shaped to

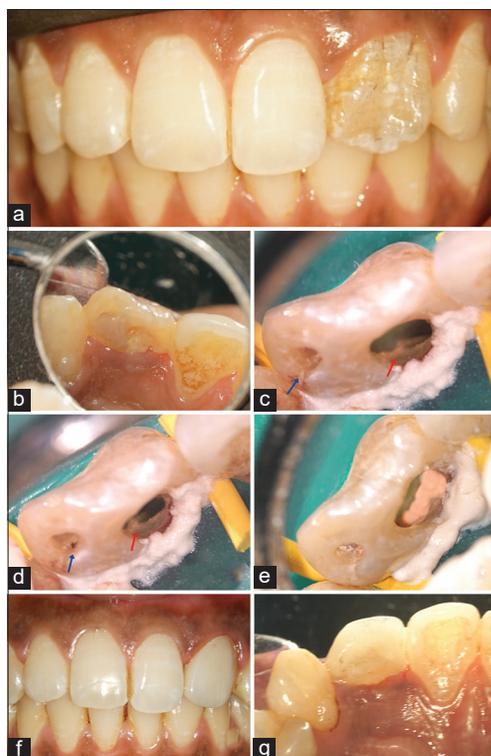


Figure 1: (a and b) Preoperative photograph showing labial and palatal view (tooth #22). (c and d) Intraoperative photograph showing septa in the main canal (red arrow) and a separate opening for the dens invaginatus (blue arrow). (e) Photograph after obturation. (f and g) Postoperative photograph: labial and palatal view revealing esthetic rehabilitation



Figure 2: (a) Preoperative radiograph (tooth #22). (b) Intraoperative radiograph. (c) Working length radiograph. (d) Master cone radiograph. (e) Postoperative radiograph. (f) A 2-year follow-up radiograph

the size ProTaper Next X3 file (Dentsply Maillefer, Switzerland) under copious irrigation with 5.25% sodium hypochlorite. The canal of the dens portion was shaped to K-file size 40/02 (Mani Inc., Tochigi, Japan). A master cone radiograph revealed five canals in total [Figure 2d]. Before obturation, 5.25% sodium hypochlorite was activated using endoactivator (Dentsply Maillefer, Switzerland) followed by 1 ml of 17% ethylene diamine tetra-acetic acid solution to achieve adequate debridement of complex pulp spaces.^[6] After drying with paper points, the canal system was obturated using AH Plus Sealer (Dentsply Maillefer, Switzerland) and a warm vertical compaction technique [Figure 1e]. The access cavity was restored using a universal composite resin [Figure 2d and e].

The second phase consisted of esthetic rehabilitation to correct the excessive mesiodistal width and discoloration. A lithium di-silicate (E-Max, Ivoclar Vivadent AG, Liechtenstein) veneer with some changes in the line angles, darker shade, and gingival ceramic on the distal half of the veneer created an illusion of a narrow tooth [Figure 1f and g].

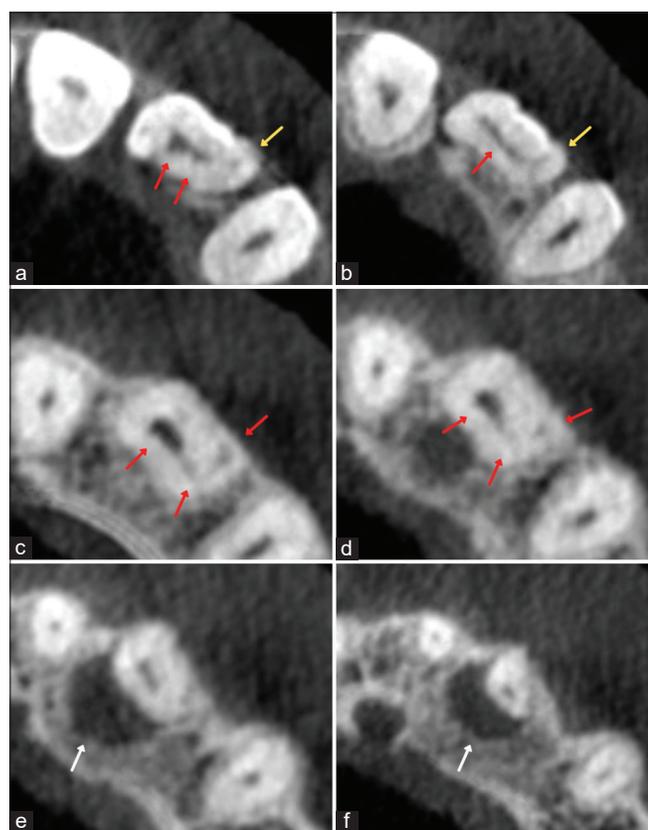


Figure 3: Cone-beam computed tomography serial axial sections concerning tooth #22: (a and b) Coronal one third. (c and d) Middle one third. (e and f) Apical one third. (Yellow arrow) Type I dens invaginatus in the distal portion of the crown. (Red arrows) A labiolingually thin ribbon-shaped canal system in the central portion along with interconnected two canals. (White arrow) Periapical bone destruction around the apical third of the root

A 2-year follow-up demonstrated satisfactory clinical and radiographic outcomes [Figure 2f].

DISCUSSION

The dental formula makes the clinical diagnosis of fusion and gemination. It is challenging and sometimes impossible to differentiate fusion and gemination when the supernumerary tooth bud unites with the adjacent normal one.^[7] In such situations, a radiographic examination and a CBCT evaluation are necessary to obtain a correct diagnosis. Dentinal union is always there in cases of true fusion, which can vary from partial to complete fusion of both roots and crowns. Consequently, pulp chambers may be separated or common to both fused teeth. In some instances, the pulp chamber may be continuous with one wide and single root canal, but sometimes, the root canals may be completely separated.^[2]

In the present case, the dental count was normal in the maxillary arch after considering the fused tooth as one unit, and it is possible only when there is a fusion of the lateral incisor with a supernumerary tooth bud.

Fused teeth can be associated with various clinical manifestations such as poor esthetics, higher degree of caries, and periodontal problems due to the deep grooves present in the tooth.^[7] A CBCT scan in such cases provides accurate three-dimensional information and helps in optimum treatment planning.^[8] The treatment depends on the patient's requirement, the teeth involved, and the degree of involvement. Fusion and gemination may require a multidisciplinary approach to restore the function and esthetics.^[7,9]

CONCLUSION

A combination of fusion anomaly and dens invaginatus can create challenges in the management at multiple levels. Therefore, a comprehensive treatment plan utilizing all the technological advancements is necessary for successful treatment outcomes in such cases.

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Conflicts of interest

There are no conflicts of interest.

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