Case Report

"Hypertaurodontism" an Endodontic Challenge: A Case Report and Brief Review of Literature

Shaktidar PR[1], Dandena Vinay Kumar[2], Akshata K. Rajagopal[3]

MDS [1]Conservative and Endodontics, [3]Periodontics, [2]Oral Pathology, Private Practitioner, Bangalore

Corresponding Author

Dr. Shaktidar PR

2821/B, 5th main,

Banashankari 2nd stage,

Bangalore, Karnataka, India

Pin code: 560070

E mail: shaktidar@gmail.com

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Abstract

Taurodontism is a morphological variation of a tooth that lacks constriction at the level of cementoenamel junction, floor of the pulp chamber and furcation area are situated more apically resulting in shortened roots and root canals. Endodontic treatment of a taurodont is challenging and requires meticulous handling to manage the altered anatomy of the tooth. This case report describes a rare case of non-syndromic hypertaurodontism requiring endodontic therapy.

Keywords: Taurodontism, Developmental anomaly, Enlarged pulp chamber

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Introduction

Changes in the morpho-anatomical variations of tooth from normal need special considerations during endodontic treatment. One such morpho-anatomical change in the shape of the tooth is seen in Taurodontism. The condition was first described by Gorjanovic-Kramberger in 1908 and Sir Arthur Keith in 1913 proposed the term taurodontism to describe the "bull-like" condition of the teeth.[1] The term "taurodontism" ('bull tooth') was coined from the Latin term "tauros", which means 'bull' and the Greek term "odus", which means 'tooth'.[2] The characteristic features include an enlarged pulp chamber, apical displacement of the pulpal floor, and no constriction at the level of the cementoenamel junction.[3]

The aetiology of taurodontism is unclear. The most accepted cause is by the failure of Hertwig's epithelial sheath diaphragm to invaginate at the proper horizontal level. Association between taurodontism, familial inheritance and genetic malformations have been reported in the recent studies.[4] Taurodontism is associated with several developmental syndromes and anomalies including amelogenesis imperfecta, Down's syndrome, ectodermal disturbance, Klinefelter syndrome, tricho-dento-osseous syndrome, Mohr syndrome, Wolf-Hirschhorn syndrome and Lowe syndrome.[5] The incidence of taurodontism has been reported to be from 2.5% to 5.6% in adult population

this range is accounted for by variations in race and differences in diagnostic criteria.[6] Taurodontism has been reported to have equal gender predisposition.[7,8] This trait can be seen in permanent and primary teeth, in a single tooth, or in several molars in the same quadrant, and can be unilateral or bilateral.[5,9] Based on severity and furcal displacement, taurodontism has been classified into mild (hypotaurodontism), moderate (mesotaurodontism), and severe (hypertaurodontism). Hypotaurodontism is the least pronounced form, in which the pulp chamber is enlarged; mesotaurodontism is the moderate form, in which the tooth roots are divided only at the middle third; and hypertaurodontism is the most severe form, in which bifurcation or trifurcation occurs near the root apices.[3] Tooth anomalies constitute a significant endodontic challenge during treatment. The irregular tooth morphology in taurodontism may disturb the location of the root orifices which can cause difficulty of instrumentation and obturation. Taurodontic tooth with 5 to 6 canals have also been reported in some studies.[1,9] Hence, proper knowledge of the anatomic variants and proper diagnosis are very essential for the success of the endodontic treatment of a taurodont tooth.

Case report

A 27 year old male patient referred to our office with a chief complaint of spontaneous pain in relation to his molar tooth (maxillary left first molar). The patient had no history of systemic diseases.

Clinical examinations revealed moderate oral hygiene; also there was a temporary restoration in tooth #26. Performing vitality test, irreversible pulpitis was diagnosed. Radiographic image (Figure 1) of the involved tooth revealed a complex root anatomy with a large pulp chamber with an elongated body of tooth, shortened roots and furcation located in the apical third.

Figure 1: IOPA radiograph showing large pulp chamber with an elongated body of tooth, shortened roots and furcation located in the apical third

Subsequent to the confirmatory diagnosis, a treatment plan was prepared for the involved tooth. After administration of local anaesthesia, the tooth was isolated using rubber dam. The temporary restoration was removed and access opening was modified with great attention using peaso reamers to approximate locations of the orifices of the root canals. On careful examination of the pulp chamber floor, three separate root canal orifices were detected. An apex locator was used to determine the working length which was later confirmed by a radiograph (Figure 2).

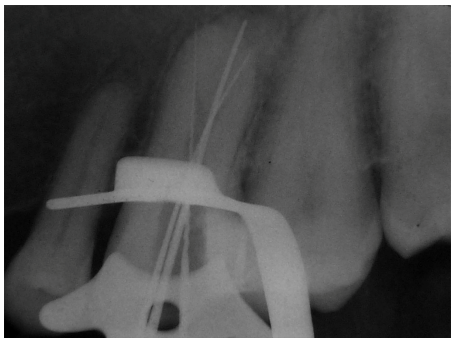

Figure 2: IOPA radiograph showing three root canal orifices where apex locator was used to determine the working length.

The canals were cleaned and shaped using rotary protaper files (Dentsply Maillefer;. Ballaigues, Switzerland) and finished to file F4 under copious irrigation with 5.25% sodium hypochlorite (Dentapro, Chandigarh, India) and 17% EDTA (Prime Dental Product). The root canals were then filled with calcium hydroxide paste and the access cavity was sealed with cavit (3M ESPE AG, Seefeld, Germany).

The patient was recalled after 1 week. The tooth was completely asymptomatic at this follow up. Calcium hydroxide paste was removed, and the root canals were obturated by cold lateral compaction apically and warm vertical compaction of gutta percha (Maillefer, Ballaiges, Switzerland) using AH-Plus sealer (Dentsply Detray, Konstanz, Germany). The access cavity was restored permanently using composite restorative material (3M ESPE AG, Seefeld, Germany) (Figure 3).

Figure 3: Radiograph showing access cavity restored permanently using composite restorative material

Discussion

Taurodontism is frequently seen associated with various syndromes and are most commonly seen in mandibular molars. In this case, maxillary bilateral first molars were seen affected and the patient was not known to be suffering from any disease or syndrome.

Treating taurodont tooth endodontically is a potent challenge to the endodontist. The apical placement of the pulpal floor should be kept in mind during access opening to prevent perforation. There is a great variability regarding the number of canals found in taurodont tooth, Hence, the clinician should search properly for the presence of extra canals. The grooves between the root canal orifices should be carefully noticed. Dentinal map proves to be very helpful in this search for canal orifices. The complexity of the irregular root canal system makes sufficient instrumentation difficult. Therefore, to improve cleaning of the root canals sodium hypochlorite can be used. Widerman and Setene recommended the use of 2.5% sodium hypochlorite for dissolving the remaining pulp tissues.[10] The variation in the pulpal anatomy with short roots and large pulp chambers require modified obturation technique; *i.e.* lateral compaction apically and warm vertical compaction or injection coronally.[1]

Conclusion: Endodontic treatment of taurodont teeth is challenging. Careful evaluation and meticulous management is essential due to the altered anatomy of the root.

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