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Endodontic management of hypertaurodontism

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Abstract:

Taurodontism is a morphological developmental abnormality of a tooth in which the body of the tooth is enlarged at the expense of roots. The condition complicates nonsurgical root canal therapy because of the complexities within the root canal system, variable canal configurations, and expecting additional root canals. The present case report describes a case of bilateral hypertaurodontism and the endodontic therapy of right mandibular hypertaurodont second molar.

Key words: Bull teeth, enlarged pulp chamber, endodontic treatment, taurodontism

The term taurodontism comes from the Latin term *tauros*, which means "bull" and the Greek term odus, which means "tooth" or "bull tooth".[1,2] Sir Keith introduced the term to describe molar teeth resembling those of ungulates, particularly bulls.[1] The tooth lacks the usual constriction at the level of the cement-enamel junction (CEJ) and is characterized by enlargement of pulp chambers, apical displacement of the pulpal floor, and bifurcation or trifurcation of the roots.[2] The bifurcation or trifurcation may be only a few millimeters above the apices of the roots.[3]

Shaw classified taurodontism based on the relative displacement of the floor of the pulp chamber as hypotaurodontism (least pronounced), mesotaurodontism (moderate), and hypertaurodontism (most severe).[4-6]

The etiology of taurodontism remains unknown, although it is believed to be caused by failure of the diaphragm of Hertwig's epithelial sheath to invaginate at the appropriate horizontal level, resulting in a tooth with short roots, elongated body, an enlarged pulp, and normal dentin.[2,5,7,8] Interference in the epithelia-mesenchymateuse induction has also been proposed as a possible etiology.[2,9]

Both the permanent and deciduous dentition are affected by the condition, unilaterally or bilaterally or in any combinations.[8,10] Maxillary molars are the most commonly involved.[11] Shifman and Channanel reportedthat mandibular second molar was found to be the most prone tooth, being involved in two thirds of all cases of taurodontism.[12] This case report describes hypertaurodontism in mandibular second molars.

Case Report

A 32-year-old male patient presented to the clinic with the chief complaint of severe and continuous pain and sensitivity to hot and cold in right mandibular second molar. The patient's medical history was noncontributory. Intra-oral examination revealed deep disto-proximal carious lesion in the right mandibular second molar. The tooth was tender on percussion and responded with severe and lingering pain to cold thermal test. Periodontal probing and mobility tests were within normal range.

A periapical radiograph revealed distoproximal caries and widening of the apical periodontal ligament space confirming the diagnosis of symptomatic apical periodontitis. The pulp chamber was elongated and divided at the apical thirds, indicating hypertaurodontism [Figure 1].

Based on the clinical and radiographic findings of the patient, a diagnosis of symptomatic apical

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periodontitis with irreversible pulpitis was made. Therefore, nonsurgical root canal treatment was initiated.

The tooth was anesthetized and medium thickness rubber dam (Hygienic, coltene whaledent, Altstätten/Switzerland) was placed to isolate the tooth. The access cavity was prepared using round diamond bur. Dental operating microscope (Global Surgical, USA) was used throughout the procedure to facilitate visualization. Careful probing along the tooth walls with a precurved file was done to reveal the complex anatomy. The tooth was instrumented to the furcation area and three canal orifices were found. An electronic apex locator (Root ZX, Morita, Japan) was used to determine the initial working length, which was later confirmed with radiograph [Figure 2]. Cleaning and shaping was done using rotary Hyflex CM files, coltene whaledent , Altstätten/Switzerland after establishing a glide path manually with K-files.

All the canals were instrumented to an apical size and taper of 40/0.04. Copious irrigation was done using 5% sodium hypochlorite, 17% ethylenediaminetetraacetic acid, and normal saline during the instrumentation. Passive ultrasonic activation of irrigants using Irrisafe files was done. Obturation was done using Ah plus (AH Plus sealer (Dentsply Maillefer,) by a hybrid technique combining cold lateral condensation and continuous wave of compaction technique followed by backfill using Calamas dual obturation unit(entsply Maillefer, Ballaigues, Swit-Zerland) [Figure 3]. A panoramic radiograph was taken which revealed bilateral hypertaurodontism [Figure 4]. The patient was kept on follow-up after 6 months, and the radiograph revealed normal findings [Figure 5].

Discussion

A taurodont tooth shows wide variations in the size and shape of the pulp chamber.[2] Clinically, the crowns appear normal; therefore, taurodontism is best recognized radiologically.[3] The CEJ constriction is less marked than that of the normal tooth, giving the taurodont a rectangular shape.[2,3] The pulp chamber is extremely large with a much greater apico-occlusal height than normal[2,3,13] extending apical to the CEJ.[1,14]

Endodontic treatment in taurodont teeth demands special attention because of the impact of the morphology on the location of orifices and instrumentation and obturation.[5] Though radiographic features of a taurodont tooth are characteristic, they provide little information about the root canal system.[2,13] The results of pulp testing contribute little information about the effect of a large pulp chamber on tooth sensitivity[2,15]

Shifman and Buchner suggested that it was easy to gain access to the root canal orifices as reactional dentin formation cannot affect the pulp chamber floor as in normal teeth.[2,12] However, Durr *et al.* on the contrary argued that morphology could hamper the identification of the orifices, thus creating difficulty in instrumentation and obturation.[5,15] However, since the roots

Figure 1: Preoperative radiograph showing hypertaurodontism in right second molar

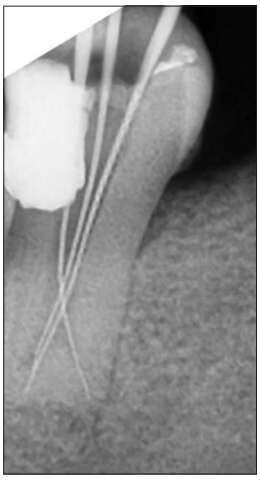

Figure 2: Radiograph for working length determination

Figure 3: Postobturation radiograph

Figure 4: Panoramic radiograph showing hypertaurodontism on contralateral side

Figure 5: Follow-up radiograph

are short, and the pulpal floor is placed apically, it is important to avoid perforation.[8,11]

Because of the voluminous pulp of and unpredictability of adequate instrumentation of the irregular root canal system, 2.5% sodium hypochlorite is used as an irrigant to ensure complete removal of the pulp.[16,17] Passive ultrasonic irrigation may act as an adjunct to ensure complete pulp removal.[8,16]

A filling technique combining lateral compaction in the apical region with warm vertical compaction of the elongated pulp chamber, using the system B-device has been documented for obturation of such teeth.[2,5] Postplacement has been contraindicated for restoration.[5]

Taurodontism is frequently associated with several syndromes and hereditary or genetic malformations.[2,8] However, in this case, it was an anatomic variance[12] that occurred in a normal individual.

Conclusion

Several difficulties are encountered during endodontic procedures on hypertaurodont teeth. However, the use of magnification for the location of canal orifices, use of ultrasonic irrigation for complete pulp removal, and a hybrid obturation technique for three-dimensional sealing ensures predictable success.

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Conflicts of interest

There are no conflicts of interest.

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