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CASE REPORT: TAURODONTISM, AN INCIDENTAL FINDING

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ABSTRACT
Taurodontism also called as Bull tooth can be defined as a change in tooth shape caused by the failure of Hertwig's epithelial sheath diaphragm to invaginate at the proper horizontal level. An enlarged pulp chamber, apical displacement of the pulpal floor, and no constriction at the level of the cemento-enamel junction are the characteristic features. Although permanent molar teeth are most commonly affected, this change can also be seen in both the permanent and deciduous dentition, unilaterally or bilaterally, and in any combination of teeth or quadrants. Whilst it appears most frequently as an isolated anomaly, its association with several syndromes and abnormalities has also been reported. Taurodontism although not common, a preoperative radiograph serve as an important tool for diagnosing the taurodontic condition and helps in preventing unexpected challenges while performing successful endodontic therapy. This case report presents a case of taurodontism in permanent maxillary molars and their successful endodontic treatment.

KEYWORDS: Bull tooth, karyotype, taurodontism, Hertwig's root epithelial sheath, enlarged pulp chamber.

CASE REPORT
A 23-year-old male patient was referred to the clinic for the treatment of upper right and left first molar teeth. Intra-oral examination revealed fractured palatal cusps of tooth #16 and buccal cusp fracture of tooth # 26 [Figure 1] with normal shaped crown. The teeth were asymptomatic at the time of examination. The teeth were not sensitive to percussion or palpation. Periodontal probing was within the normal range. Patient's medical history was unremarkable. Upon vitality testing, 26 showed positive response to thermal and electric pulp testing, while tooth #16 showed no response to thermal and electric pulp testing indicating necrotic pulp. Intra-oral peri-apical radiograph of 16 showed huge pulp chamber extending beyond the cervical area reaching the furcation in the apical third region [Figure 2]. Three short roots were seen at the furcation area in the apical third indicating hypertaurodontism. The intra-oral peri-apical radiograph of contralateral 26 revealed similar findings [Figure 3]. The diagnosis of hypertaurodontism for the present case was made based on the radiographic finding.

Figure 1: Palatal cusp fracture in relation to 16 and buccal cusp fracture in relation to 26.

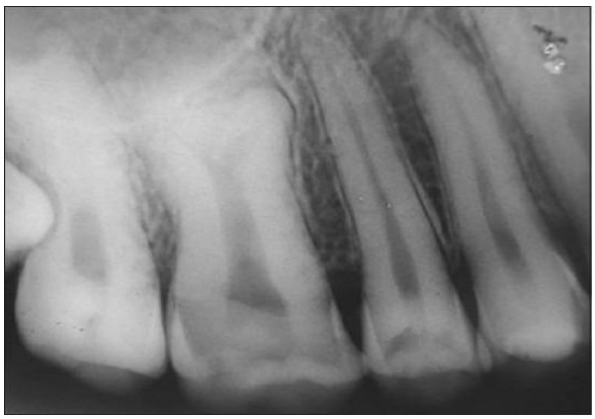

Figure 2: preoperative radiograph of maxillary right first molar.

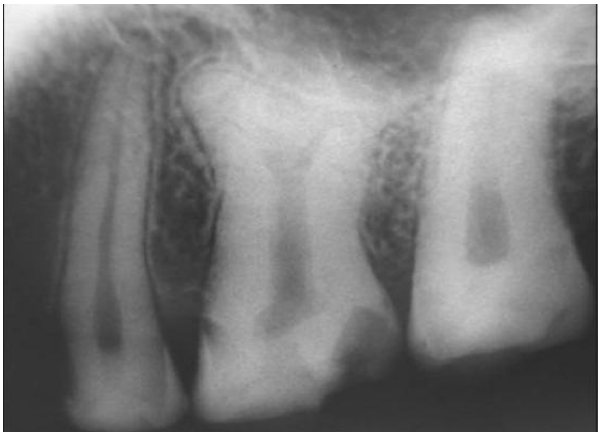

Figure 3: preoperative radiograph of maxillary left first molar.

TREATMENT GIVEN

The tooth was anesthetized with lidocaine 2% and epinephrine 1:1, 00,000 (Lignox 2% A Warren India). Magnifying loupes (Carl Zeiss, India) were used throughout the procedure to facilitate visualization. The tooth was isolated and access cavity prepared. The pulp tissue which was voluminous was extirpated. A total of 2.5% of sodium hypochlorite was used as irrigating solution. The furcation area was situated in the apical third region and three canal orifices were located at the furcation area; palatal, mesiobuccal and distobuccal.

Working length determination was performed using electronic apex locator Propex II (Dentsply Maillefer, Switzerland, USA) and was confirmed with a radiograph [Figure 4]. After working length determination the instrumentation of the canals was done to size 40 for the palatal canal and up to size 30 for the mesial canals using RC prep (Premier, Ultradent, USA) as a lubricanting agent.

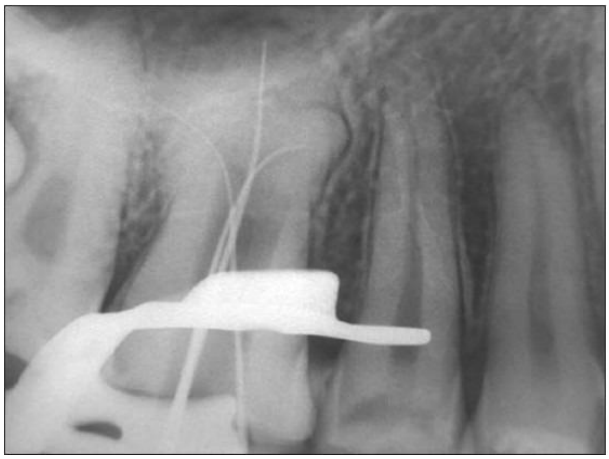

Figure 4: working length radiograph.

A modified obturation technique was used because of complexity of inner root canal anatomy. This consisted of combined lateral condensation of the gutta percha in the apical part with vertical compaction of the remaining pulp chamber. AH-plus (Dentsply, Switzerland, USA) was used as a root canal sealer. The final radiograph confirmed well-obturated root canal system [Figure 5].

Figure 5: obturation radiograph.

DISCUSSION

Taurodontism is characterized by enlargement of the pulp chamber, which may approximate the root apex, with the body of the tooth enlarged at the expense of the roots and apically displaced furcation areas.[1] The bifurcation may be only a few millimeters above the apices of the roots. The literature contains reports of taurodontism with high frequency in Eskimos. It seems taurodontism is a great deal more prevalent than it was previously thought. Seow and Lai found that 38.4% of 66 patients with hypodontia had atleast one mandibular first permanent molar that showed taurodontism compared with only 7.5% of a control group without hypodontia.[2]

Taurodontism appears most frequently as an isolated anomaly, but it has also been associated with several developmental syndromes and anomalies including amelogenesis imperfecta, Down's syndrome, ectodermal dysplasia, Klinefelter syndrome, tricho-dento-osseous syndrome, Mohr syndrome, Wolf-Hirschhorn syndrome and Lowe syndrome.[3] Taurodontism has also been reported to present with other rare syndromes such as Smith-Magenis syndrome[4], Williams syndrome[5], McCune-Albright syndrome[6] and Van der Woude syndrome.

Dental rarit Varrela et al.[7] supported the concept that prevalence of taurodontism increases as the number of X-chromosomes increases and also indicate that expression of the triat and the number of X-chromosomes may be positively correlated. They have further suggested that X-chromosomal gene influencing development of enamel may also be involved in the development of taurodontism.[7]

Gardner and Girgis recommend that patients with meso- or hypertaurodontic teeth who do not have a syndrome known to be associated with taurodontic teeth should be consulted for chromosome analysis, as there is a high

association of taurodontic teeth with X-chromosome aneuploidy syndromes.[8]

Theories concerning the pathogenesis of taurodontic root formation are also varied: an unusual developmental pattern, a delay in the calcification of pulpal chamber, an odontoblastic deficiency, an alteration in Hertwig's epithelial root sheath.[9] According to some authors, taurodontism is most likely the result of disrupted developmental homeostasis.[10]

From an Endodontist's view, taurodontism presents a challenge during negotiation, instrumentation and obturation in root canal therapy. Because of the complexity of the root canal anatomy and proximity of buccal orifices, complete filling of the root canal system in taurodont teeth is challenging. A modified filling technique, which consists of combined lateral compaction in the apical region with vertical compaction of the elongated pulp chamber, has been proposed. In addition to the difficulty of the endodontic procedure, a recent case report suggests the possibility of taurodont teeth having an extraordinary root canal system which is challenging for endodontists.

In the present case also success in the root canal treatment was mainly attributed to use of magnifying loops for better visualization, use of 2.5% of sodium hypochlorite to dissolve the pulp tissue and was followed by modified obturation technique to achieve three-dimensional obturation of root canal system.

CONCLUSION

Although taurodontism is a dental rarity, this unusual radicular form showed merit circumspect consideration in treatment planning. The thorough knowledge of etiology, anatomic and radiographic features and its association with other syndromes of the dental rarity should be well understood. Also, important consideration in performing endodontic treatment of such rarity is mandatory due to complexity of the root canal system.

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