

Taurodontism: A challenging anomaly

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ABSTRACT:

Taurodontism, a dental anomaly is defined as a change in tooth shape caused by the failure of Hertwig's epithelial root sheath to invaginate at the proper horizontal level. Enlarged and elongated pulp chamber, apically shifted pulpal floor, and lack of constriction at the level of the cemento-enamel junction are the characteristic features. In performing root canal treatment on such teeth, one should appreciate the complexity of the root canal system, canal obliteration, configuration, and the potential for additional root canal systems. Careful exploration of the all orifices with the help of magnification, ultrasonics and a modified filling technique are useful for its better management.

Keywords: Bull tooth, Dental anomalies, Endodontic treatment, Taurodontism.

INTRODUCTION

Dental anomalies are defects caused by genetic disturbances during tooth morphogenesis. Taurodontism is one of the important dental morphological anomalies. The term taurodontism comes from the Latin term tauros, which means 'bull' and the Greek term odus, which means 'tooth'. It was first described by Gorjanovic-Kramberger in 1908.¹ This abnormality is a disturbance of a tooth during its developmental phase, which lacks constriction at the level of the cemento-enamel junction (CEJ) and is characterized by a large pulp chamber, apically placed pulpal floor and furcation of the roots. The prevalence of taurodontism is reported to range from 2.5-11.3% of the human population.² Shifman et al reported the highest incidence of taurodontism in the mandibular second molar.³

AETIOLOGY

Taurodontism is caused by the failure of Hertwig's epithelial sheath diaphragm to invaginate at the proper horizontal level. Encroachment during the induction of

epitheliomesenchymatose has also been proposed as a possible aetiology.⁴ Some reports suggest that taurodontism may be genetically transmitted, and could be associated with an increased number of X chromosomes (Gage 1978). While genetic transmission is demonstrated in most cases, other external factors like high-dose chemotherapy and transplantation of bone marrow is also able to disturb a developing dental structures in children and adolescents. Nowadays, taurodontism is considered as an morphological variation that can occur in a normal healthy population.

CLASSIFICATION

Shaw JC. in 1928 classified the taurodontism according to its severity as⁵ :

- Hypotaurodontism (least pronounced)
- Mesotaurodontism (moderate)
- Hypertaurodontism (most severe)

ANATOMIC CHARACTERISTICS

In taurodontism, the pulp chamber is enlarged and elongated with much increased Occlusoapical height than normal and thus it

extends apically below the cemento-enamel junction. Taurodont appears rectangular in shape because the CEJ constriction is less marked than that of the normal tooth. The furcation is also displaced apically, making shorter roots while enlarging the crown of the tooth.

CLINICAL/RADIOGRAPHIC CHARACTERISTICS

Clinically, a taurodont seems like a typical tooth. Because the neck and the roots of a taurodont lie below the crest of the alveolar bone, its determining features cannot be recognized clinically. Therefore, the diagnosis of taurodontism is usually made from diagnostic radiographs.

The radiographic features of taurodont are: The rectangular and elongated pulp chamber, shortened roots and root canals and bifurcation or trifurcation near the root apices. Sometimes taurodontism may be masked by wear-induced secondary dentine. So in heavily worn molars interpretation of diagnostic radiographs should be done carefully.

CONDITIONS ASSOCIATED WITH TAURODONTISM

In most of the cases taurodontism appears as an isolated anomaly. However, its association with other syndromes and abnormalities has also been reported.

Down syndrome, Klinefelter syndrome, Lowe syndrome, Tricho-dento-osseous syndrome, Williams syndrome, Wolf-Hirschhorn syndrome, Cleft lip or palate and Thalassaemia major are some of them.⁶

Many of these syndromes have oral manifestations, which can be recognized during intra oral and radiographic examination as alterations in the anatomy or chemical formulation of the teeth. Thus, dentists might be the first to diagnose them.

CASE REPORT

A 21-year-old female patient presented at the department of Conservative dentistry & Endodontics for completion of endodontic

treatment in lower left back tooth. Patient's medical history was noncontributory.

Intraoral examination revealed a normal shaped crown with an occlusal temporary filling in lower left second molar. The tooth was not sensitive to percussion or palpation. Periodontal probing was within normal range.

A periapical radiograph (Figure 1) of the affected tooth showed the occlusal radiolucency involving enamel, dentin and pulp; widened PDL space.



Figure 1: Pre-Operative Radiograph

Elongated pulp chamber, extending below the cervical area and two short roots were seen, indicating mesotaurodontism according to Shifman and Chanannel's index.

Diagnosis of incomplete root canal treatment in relation to tooth #37 was made and root canal treatment was planned. The tooth #37 was anaesthetized and isolated using rubber dam.

Access cavity was prepared (Figure 2) with a round diamond bur in a high speed air-rotor hand piece. A sharp DG16 instrument was used to locate the canal orifices, and the access was modified accordingly.



Figure 2: Access opening

Working length was determined using propex-II apex locator and was confirmed by

radiograph (Figure 3). Cleaning and shaping of the canals were performed using Protaper universal instruments under copious irrigation with 3% NaOCl and saline in between each instrument.



Figure 3: Working length radiograph

Master cones were selected & radiograph was taken (Figure 4). Obturation was done using guttapercha cones and zinc oxide eugenol sealer. Post endodontic restoration was done (Figure 5).

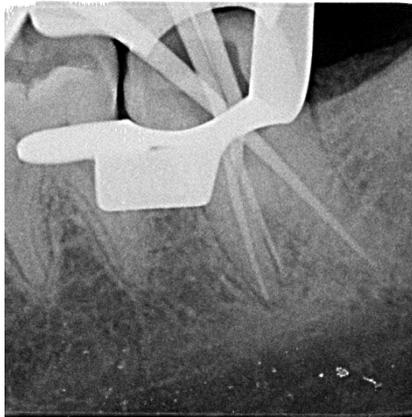


Figure 4: Master cone radiograph



Figure 5: Post-operative radiograph

DISCUSSION

A taurodont shows much variation in the height of the pulp chamber, canal morphology, location of canal orifices, and the chances for additional root canal systems.

Moreover, while the radiographic feature of a taurodont tooth is characteristic, pre-treatment radiographs reveals little information about the root canal system.

There are different opinions for access cavity preparation and design: Shifman et al. reported that access to the root canal orifices are easy to obtain in taurodont because the floor of the pulp chamber is affected by the formation of reactionary dentin as in normal teeth.³ In contrast, Durr et al. (1980) argued that apically migrated pulpal floor could create difficulty in location of the orifices, instrumentation and obturation.⁷

Therefore, careful exploration of the grooves between all orifices, especially with magnification, has been recommended to reveal additional orifices and canals. Because the pulp of a taurodont is usually large in volume, it has been suggested that 2.5% sodium hypochlorite should be used for digestion and complete removal of pulp tissue and necrotic debris.

Because of the complex root canal anatomy and the proximity of the buccal orifices, obturation of the root canal system is challenging in taurodontism. A modified filling technique has been proposed, which includes cold lateral compaction in the apical region of root canal and warm vertical compaction in elongated pulp chamber region.⁸

Finally, it should be noted that in cases of hypertaurodont vital pulpotomy may be considered as the treatment of choice instead of routine pulpectomy.⁹

For the prosthetic treatment of a taurodont tooth, it has been recommended that post-placement be avoided for tooth reconstruction. From a periodontal point of view, taurodont teeth may offer favourable prognosis in specific cases. Because when periodontal pocket or gingival recession occurs, the

chances of furcation involvement are markedly less than those in normal teeth because before furcation involvement occurs, taurodont have to demonstrate significant periodontal destruction.

CONCLUSION

Taurodont are not common, but they do pose a number of diagnostic, management, and prognostic challenges to dental practitioners. The presence of a taurodont must be identified before treatment, and this can be achieved by a thorough clinical and radiographic examination. Once identified, the effect of the defect on the endodontic and restorative dental management of the tooth can be more fully assessed.

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