

Taurodontism In Permanent Molars : A Case Report

Abstract

Taurodontism 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 cement 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. Presented in this case report is a case of bilateral taurodontism in permanent molars.

Key Words

Endodontic treatment, Enlarged pulp chamber, Syndrome, Taurodontism.

Introduction

The term taurodontism was first introduced by Sir Arthur Keith in 1913^[1]. The term taurodontism comes from the Latin term tauros, which means 'bull' and the Greek term odus, which means 'tooth' or 'bull tooth'^[1]. It refers to a tooth form characterized by an external block configuration with an elongated body tending to enlarge at the expense of the root. The taurodontic teeth are identified by elongated pulp chambers and apical displacement of bifurcation or trifurcation of the roots. Due to this, the chamber has a greater apicoocclusal height and lacks the constriction at the level of the CEJ giving it a rectangular shape. So the distance from the bifurcation of roots to the CEJ is greater than the occluso cervical distance^[2]. Etiology of taurodontism is failure of Hertwig's epithelial sheath diaphragm to invaginate at the proper horizontal level. Autosomal transmission of the trait has also been observed^{[3],[4]}. Taurodontism can occur alone limited to one or more teeth or it can be associated with various syndromes like Down's syndrome, Klinefelter's syndrome etc^[5]. Taurodontism may be unilateral or bilateral and affects permanent teeth more frequently than primary teeth. It is commonly observed among the Eskimos and Natives of Australia and Central America. Taurodontism can be classified as mild, moderate and severe (Hypo, Meso and Hyper respectively) based on the degree of apical displacement of the pulpal floor.^{[6],[7]}

Despite the clinical challenges in endodontic therapy, taurodontism has received a little attention from clinicians. In performing root canal treatment on such teeth, one should appreciate the complexity of the root canal system, canal obliteration and configuration, and the potential for additional root canal systems. Careful exploration of the grooves between all orifices particularly with magnification, use of ultrasonic irrigation; and a modified filling technique are of particular use. Presented in this article is a case of bilateral taurodontism.

Case Report

A 17 year old male patient reported to the dental clinic with the chief complaint of pain in lower left posterior and upper right region since one month. Patient's medical history was non contributory. Clinical examination showed normal soft tissue appearance. Lower and upper first molar had large carious lesion with pulpal involvement. Orthopantomograph revealed that both molars were with enlarged pulp chambers and short roots suggesting taurodontism (Fig.1.1). No other obvious anomalies were noticed on the Orthopantomograph. Intra oral



Fig 1.1 – Pre Operative Opg

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Periapical radiograph of both sides showed enlarged pulp chamber with short roots (Fig 1.2, 2.0). Based on the clinical and radiographic findings, a diagnosis of chronic pulpitis was made in



Fig 1.2 – Pre Operative IOPA Radiograph – 36



Fig 2.0 – Pre Operative IOPA Radiograph – 16

relation to maxillary right first molar and mandibular left first molar.

Endodontic Management

The tooth was anaesthetized, the access was opened under rubber dam .Pulp tissue was extirpated. The pulp was voluminous and to ensure complete removal, 3% of sodium hypochlorite was used as an irrigant to soften the pulp. Once the pulp was extirpated, further irrigation was done with normal saline. The pulp chamber was huge and the floor of the chamber could not be visualized, which on further exploration in the apical furcation area revealed two divisions one on the mesial side and one on the distal side. Three canal orifices were found: mesiobuccal, mesiolingual, and distal. A working length radiograph was taken with a #15 file in the canal and it was confirmed using radiograph (Fig.1.3.). Biomechanical preparation of pulp chamber was achieved by circumferential filing with ISO K files of size # 25 in all canals followed by further shaping using hero shapers files (25(6%) for distal canal and 20(6%) for mesial canals) . Canals were irrigated with 3% sodium hypochlorite and normal saline. After thorough cleaning, canals were dried using paper points. Master cone selection was done and was confirmed with IOPA radiograph (Fig.1.4.). AH plus root canal sealer (Dentsply, Malifer) was then applied using a # 20 reamer along the canal walls. Obturation of the canals were done using GP cones and AH plus sealer with lateral compaction technique in the mesial and distal canal (Fig.1.5.). After that, the elongated pulp chamber was obturated by thermo plasticized Gutta percha using OBTURA- 2 system (Sybron Endo).The final radiograph confirmed a well condensed filling of the canals (Fig.1.6.).

Similar procedure was done for right maxillary first molar. After access opening and thorough cleaning at the furcation area, three canal orifices were found: mesiobuccal, distobuccal, and palatal. A working length radiograph was taken with a #15 file in the canal and it was confirmed using radiograph (Fig.2.1). Biomechanical preparation of pulp chamber was achieved by circumferential filing with ISO K files of size # 25 in all canals followed by further shaping using protaper files (F4 for distal canal and F3 for mesial canals). Canals were irrigated with 2.5% sodium

hypochlorite and normal saline. After thorough cleaning, canals were dried using paper points. Master cone selection was done and was confirmed with IOPA radiograph (Fig.2.2.). AH plus root canal sealer (Dentsply, Malifer) was then applied using a # 20 reamer along the canal walls. Obturation of the canals were done using GP cones and AH plus sealer with conventional lateral compaction technique. After that, the elongated pulp chamber was obturated by thermo plasticized Gutta percha using OBTURA- 2(Sybron Endo) (Fig.2.3).

The final radiograph confirmed a well condensed filling of the canals (Fig.2.4).

Discussion

Taurodontism is a dental anomaly characterized by large pulp chambers and short roots. Roots often bifurcate or trifurcate at a low level. They are thought to result from failure of the Hertwig's epithelial root sheath to invaginate at the



Fig 1.3 - Working Length Radiograph - 36



Fig 1.4 - Master Cone Radiograph - 36

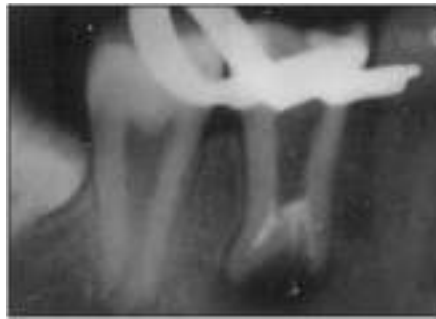


Fig 1.5 - Lateral Compaction Radiograph - 36



Fig 1.6 - Final Obturation Radiograph - 36



Fig 2.1 - Working Length Radiograph - 16



Fig 2.2 - Master Cone Radiograph - 16



Fig 2.3 - Lateral Compaction Radiograph - 16



Fig 2.4 - Final Obturation Radiograph - 16

proper time[8]. The most frequently affected teeth are the molars. Clinically the taurodont crown has normal form, structure, color and texture; so can only be diagnosed by radiographs. Taurodontism is predominantly found in molars but also has been seen in premolars, mandibular canines and incisors^{[9],[10]}.

In 1928, Shaw classified the subtypes of this condition as hypotaurodontism, mesotaurodontism and hypertaurodontism based on the relative displacement of the floor of the pulp chamber. This subjective, arbitrary classification led normal teeth to be misdiagnosed as taurodontism. Shifman and Chanannel proposed an index to calculate the degree of taurodontism. According to this index, taurodontism is present if the distance from the lowest point at the occlusal end of pulp chamber to highest point at the apical end of the chamber divided by distance from occlusal end of pulp chamber to the apex and multiplied by 100 is 20 or above (Hypotaurodontism TI 20-30, Mesotaurodontism TI 30-40 and Hypertaurodontism TI 40-75). Taurodontism can also be determined if the distance from the highest point of the pulp chamber floor to the cemento enamel junction is more than 2.5 mm.^{[6],[7]}

A taurodont tooth shows wide variation in the size of the pulp chamber, varying degrees of obliteration and canal configuration, apically positioned canal orifices.

Therefore, root canal treatment becomes a challenge.^{[11],[12]} 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 Lowes syndrome.^[5]

Endodontic treatment in taurodontism

teeth has been described as a complex and difficult procedure. Pulp therapy for taurodonts is a challenging treatment, with increased incidence of hemorrhage during access opening which may be mistaken for perforation. 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.^[11]

Another endodontic challenge related to taurodont teeth is intentional replantation. The extraction of a taurodont tooth is usually complicated because of the dilation of the roots in the apical third.^[13] In contrast; it is also believed that because of its large body, little surface area of a taurodont tooth is embedded in the alveolus. This feature would make extraction less difficult as long as the roots are not widely divergent.^[14]

Conclusion

Although taurodontism are of rare occurrence, clinicians should be aware of the complex canal system for its successful endodontic treatment. Sometimes its discovery may help to disclose systemic conditions as well.

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