Case Report

Bilateral Taurodontism in Permanent Maxillary First Molar

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Abstract

Taurodontism is a dental anomaly caused due to the failure of Hertwig's epithelial sheath to invaginate at the proper horizontal level. A huge pulp chamber, displacement of the pulpal floor apically, and no constriction at the level of the cementoenamel junction are the key features representing a taurodontic tooth. This condition is most commonly associated with permanent molars. This clinical entity occurs in the form of an isolated, singular trait in majority of the cases. However, seldom, it may be associated with syndromes or ectodermal anomalies. The large and deep pulp chamber makes instrumentation of canals difficult, thereby challenging an endodontist. This case report describes the endodontic challenge faced in cases of taurodontism as well as the clinical steps involved in its successful endodontic management. Furthermore, it shows the typical presence of bilateral hypertaurodontism with respect to the maxillary first molar.

Keywords: *Endodontic treatment, maxillary molar, pulp chamber, taurodontism*

Introduction

The term taurodontism, also called as bull tooth, is derived traditionally from the Latin word tauros, meaning "bull" and the Greek word odus, meaning "tooth."[1] This term was coined by Sir Arthur Keith in 1913. This clinical entity is believed to be a developmental disorder caused by the failure of Hertwig's epithelial sheath diaphragm to invaginate at the proper horizontal level.[2] The characteristic features of taurodontism include a wide and deepened pulp chamber, displacement of the pulpal floor apically, short roots, and no constriction at the level of the cementoenamel junction (CEJ).

Literature has shown the association of this entity with both permanent and deciduous dentition; however, permanent molar teeth are most commonly affected. In vast majority of the cases, this disorder represents itself as an isolated anomaly; however, one cannot rule out its association with syndromes such as hypophosphatasia or alteration of sex chromosomes such as Klinefelter's syndrome, Trisomy 21, or Down's syndrome.[3] According to the studies conducted, the prevalence rate of taurodontism among human population ranges from 2.5% to 11.5%.[1] In the year 1928, Shaw[4] classified this anomaly as hypotaurodontism, mesotaurodontism, and hypertaurodontism. According to Feichtinger and Rosiwall,[5] a tooth may be called a taurodont only if the distance from the furcation of the root to the CEJ is greater than the occlusocervical distance.

With respect to endodontics, taurodontism presents a challenge in nonsurgical root canal treatment owing to the large and deep pulp chamber which makes it difficult to locate, instrument, and obturate the canal. Despite these challenges faced in root canal therapy, taurodontism has unfortunately received less attention from clinicians till date. This article describes the endodontic management of taurodontism associated with permanent maxillary first molar.

Case Report

A 28-year-old male patient reported to the department of conservative dentistry and endodontics in our institution with a chief complaint of pain in maxillary right posterior region for 2 weeks. On clinical examination, deep proximal caries with respect to 16 was seen and the tooth was tender on percussion. The preoperative radiograph revealed a large pulp chamber and short roots, indicating taurodontism. Furthermore, deep caries involving the pulp and periapical radiolucency was seen with respect to 16 [Figure 1]. There was no relevant medical and family history which confirmed that taurodontism in this case was not associated

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with any other syndromes or diseases. Literature states that bilateral taurodontism is more frequent than the unilateral one, and the incidence of bilateral taurodontism is more commonly seen with maxillary first molars. A radiograph of the contralateral first molar was taken to check for bilateral taurodontism. Radiograph revealed the presence of bilateral hypertaurodontism with respect to the maxillary first molar [Figures 1 and 2]. The patient had previously undergone root canal treatment and was asymptomatic with respect to the contralateral first molar and it revealed no signs of treatment failure. Hence, no treatment was planned with respect to 26. A diagnosis of acute irreversible pulpitis with associated apical periodontitis was made with respect to 16 based on the radiographic findings. The tooth was indicated for a nonsurgical root canal treatment, the patient was explained about the treatment plan, and he was willing for endodontic treatment.

Firstly, the patient was given a block injection of lidocaine with 1:80,000 epinephrine. Isolation is one of the keys to success of endodontic therapy. Before starting with the access cavity preparation, the tooth was isolated with rubber dam. Following this, the access cavity preparation was done. The pulp chamber as expected was large and root canal detection with naked eye looked difficult because of which an operating microscope (SERWELL MEDI-EQUIPMENTS PVT., LTD., Tamil Nadu, India) was used for exploring and locating the canal orifices. Three canal orifices were tracked and all of them were located quite deep into the pulp chamber. Electronic working length was first determined using an electronic apex locator (J. Morita Mfg Corp, Japan). To confirm the apex locator readings, a working length radiograph was taken [Figure 3]. Three root canals were confirmed, namely mesiobuccal, distobuccal, and large palatal canal. Canal instrumentation was then performed using ProTaper rotary Ni-Ti files (Dentsply-Maillefer, Ballagius, Switzerland). Mesiobuccal and distobuccal canals were prepared till F2 while the large palatal canal was prepared till F3 and a master cone radiograph was taken [Figure 4]. Irrigation was done using 2.5% sodium hypochlorite. Calcium hydroxide paste was used in the form of an intracanal medicament, and the cavity was sealed using a temporary filling material. The patient was recalled after 10 days for the second appointment. The patient was asymptomatic in this visit. Sodium hypochlorite was used to flush out the medicament from the canals. The canals were then dried using paper points. Obturation was then done using a combination of cold lateral condensation technique for the apical portion and warm vertical compaction technique for the coronal portion of canal and the deep pulp chamber. AH-26 sealer (Dentsply DeTrey, Konstanz, Germany) was used for obturation. The postobturation restoration was done using composite [Figure 5]. The patient was kept under observation. Six-month follow-up radiograph showed that the periapical radiolucency had reduced [Figure 6] and clinically the patient was totally asymptomatic.

Figure 1: Preoperative radiograph of 16 indicating taurodontism

Figure 2: Previously root canal treated 26 showing taurodontism

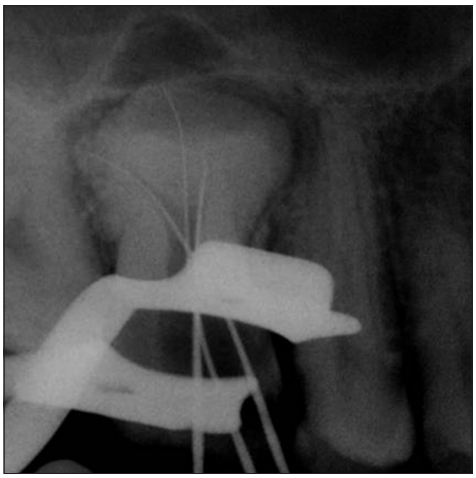

Figure 3: Working length radiograph of 16

Discussion

Taurodontism, also known as bull tooth, is a dental anomaly most commonly associated with permanent multi-rooted teeth. The characteristic radiographic feature which helps in confirming the diagnosis of this anomaly

Figure 4: Master cone image of 16

Figure 5: Final postoperative radiograph of 16

Figure 6: Six-month follow-up of 16 – the patient was asymptomatic and radiolucency had reduced

is enlargement or vertical deepening of the pulp chamber and short roots. This vertical deepening of pulp cavity usually takes place at the expense of roots.[3] The etiology of taurodontism, however, is not clear. The reports have stated that taurodontism is mainly caused by the failure of Hertwig's epithelial root sheath diaphragm to invaginate at the proper horizontal level.[2,6] As discussed before, in vast majority of the cases, this disorder represents itself as an isolated anomaly. However, rarely, it may be associated with certain developmental syndromes and disorders such as amelogenesis imperfecta, Klinefelter's syndrome, Down's syndrome, Mohr syndrome, tricho-dento-osseous syndrome, Lowe syndrome, and Wolf-Hirschhorn syndrome.[1] The tooth most commonly associated with taurodontism is the permanent mandibular molar; however, it may rarely be seen in association with deciduous dentition as well.[1] Bilateral involvement of maxillary first molars with taurodontism have been reported. Radiographic assessment in the current case has also revealed the presence of bilateral hypertaurodontism with maxillary first molars.

In the year 1928, Shaw[4] classified taurodontism as hypotaurodontism, mesotaurodontism, and hypertaurodontism. Shaw[4] classified the taurodontic tooth on the basis of displacement of the pulp chamber floor. According to the studies conducted by Feichtinger and Rosiwall, a tooth can be termed as taurodontic only if the distance from the furcation of the root to the CEJ is greater than the occlusocervical distance.[5] Shifman and Chanannel[7] in the year 1978 introduced another classification for taurodontism. This classification is most widely used till date.

Clinically, a tooth affected by this anomaly may appear normal. As we all know, clinically only the crown portion of a tooth is visible and the crown of a taurodontic tooth may appear normal. The defect lies within the body and roots, both of which are not visible clinically and embedded below the alveolar margin. This is the reason why a taurodontic tooth cannot always be identified clinically. Therefore, we need to rely on radiographs for diagnosis of a tooth with taurodontism.[8] Such a case typically presents an extremely large and deep pulp chamber. This deep chamber extends apically below the CEJ, and the height (apicoocclusal) of the chamber is much greater when compared to that of a normal tooth.[9,10] Also, when compared to a normal tooth, the CEJ constriction of a taurodontic tooth is less marked. The furcation is seen nearer to the root apex, which results in an enlarged body of the tooth at the expense of roots.[11] Enlarged body of the tooth and shorter roots give the appearance of a bull tooth.

The large, deep pulp chamber in a taurodontic tooth makes it difficult to locate, instrument, and obturate the canal. Such cases can be successfully managed only with the help of magnification aids such as loupes and operating microscope for locating the canal orifices. Furthermore, many of the times, a taurodont tooth may have an extraordinary root canal which can be tracked

only with the help of loupes or microscope. 2.5% sodium hypochlorite was used initially as an irrigant to completely extirpate and digest the pulp tissue.[12] The concentration of the irrigant used was 2.5%, rather than 5.25%, as it is safer to use hypochlorite at a lesser concentration to avoid destruction of periradicular tissues by irrigant extrusion which leads to sodium hypochlorite accident. ProTaper rotary files were used for canal instrumentation in the present study as they are suitable and are meant for use in curved and constricted canal preparation. In the present case, the taurodontic maxillary molar depicted a typical internal anatomy. Both the mesiobuccal and distobuccal canals were narrow and close to each other, and the characteristic taurodontism feature of all the canal orifices being placed deep inside the pulp chamber was seen. This was the reason behind using a combination of both cold lateral condensation and warm vertical compaction techniques of obturation to achieve a void free three dimensional fluid tight seal.

Thus, the endodontic treatment of a taurodontic tooth is difficult due to the complex internal anatomy and chances of presence of extraordinary root canals. The successful management of a taurodontic molar in the present case can be attributed to the use of operating microscope which helped in locating the deep canal orifices and also made the canal instrumentation convenient and easy and the combined obturation technique which helped in achieving the best possible result in this case.

Conclusion

Teeth associated with taurodontism show a wide variety of features such as large and deep pulp chambers, varying degrees of canal obliteration and complex internal anatomy, canal orifices which are deep inside the chamber, and the possibility of an extra canal. It is very important for all the clinicians to have sufficient knowledge about this entity and its complex root canal system to successfully manage taurodontic teeth endodontically. Literature says that the endodontic management of a taurodontic tooth is challenging and often associated with complications if not handled properly. This case report describes the clinical considerations and steps involved in the successful endodontic treatment of a taurodontic maxillary molar.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

References

1. Bharti R, Chandra A, Tikku AP, Wadhwani KK. "Taurodontism" an endodontic challenge: A case report. J Oral Sci 2009;51:471-4.
2. Yeh SC, Hsu TY. Endodontic treatment in taurodontism with Klinefelter's syndrome: A case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1999;88:612-5.
3. Sahu YR, Jain A. Endodontic management of taurodontism in maxillary molar: A case report. Int J Sci Stud 2016;4:271-4.
4. Shaw JC. Taurodont teeth in South African races. J Anat 1928;62:476-98.1.
5. Feichtinger C, Rosiwall B. Taurodontism in human sex chromosome aneuploidy. Arch Oral Biol 1977;22:327-9.
6. Baranwal AK. Taurodontism: An anatomical challenge to clinical endodontics. Ann Prosthodont Restor Dent 2016;2:105-9.
7. Shifman A, Chanannel I. Prevalence of taurodontism found in radiographic dental examination of 1,200 young adult Israeli patients. Community Dent Oral Epidemiol 1978;6:200-3.
8. Manjunatha BS, Kovvuru SK. Taurodontism – A review on its etiology, prevalence and clinical considerations. J Clin Exp Dent 2010;2:e187-90.
9. Kulkarni G, Rajeev KG, Ambalavanan P, Kidiyoor KH. Successful endodontic management of hypo, meso and hypertaurodontism: Two case reports. Contemp Clin Dent 2012;3:S253-6.
10. Tsesis I, Shifman A, Kaufman AY. Taurodontism: An endodontic challenge. Report of a case. J Endod 2003;29:353-5.
11. Joseph M. Endodontic treatment in three taurodontic teeth associated with 48, XXXY Klinefelter syndrome: A review and case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2008;105:670-7.
12. Prakash R, Vishnu C, Suma B, Velmurugan N, Kandaswamy D. Endodontic management of taurodontic teeth. Indian J Dent Res 2005;16:177-81.