TAURODONTISM OF MULTIPLE TEETH – A CASE REPORT

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Abstract

Taurodontism is a rare dental anomaly affecting primarily the molars and are usually found in association with other anomalies or as a part of syndrome. This anomaly which was considered as a feature of primitive man is also reported in modern man with less prevalence rate. In this article we are reporting rare case of a fifteen year old male patient presented with taurodontism involving all the developed molars of all four quadrants, which was not associated with any other anomalies or syndromes.

Key words – Taurodontism, bull's tooth, permanent molars, diagnosis

Introduction

Taurodontism is considered as a variation in tooth morphology that occurs more often in molars and occasionally in premolars. This anomaly is characterized by enlarged pulp chamber with more apical positioning of floor of pulp chamber and furcation of root. Witkop defined Taurodontism as "teeth with large pulp chambers in which the bifurcation or trifurcation are displaced apically, so that the chamber has greater apico-occlusal height than in normal teeth and lacks the constriction at the level of cemento-enamel junction (CEJ). The distance from the trifurcation or bifurcation of the root to the CEJ is greater than the occluso-cervical distance"[1].

This anomaly was first reported in the remnants of prehistoric hominids by de Terra in 1903 and by Gorjanovic – Kramberger and Aldoff in 1907[2]. Pickerill in 1909[3] noted this in modern man. However the term "taurodontism" was first used by Sir Arthur Keith in 1913[4] to describe the teeth of prehistoric people, the Neanderthals and Heidelberg. He coined this term from the Latin Word *tauro* (for bull) and Greek term *dont* (for tooth) because of the morphological resemblance of affected tooth to the tooth of ungulates, especially bulls.

Taurodontism has been reported by several authors to be a primitive pattern. Witkop suggested that, this anomaly is more often found in populations in which the teeth are used as tools[1]. Contradicting Witkop's observation Mena had suggested that this anomaly cannot be considered as a racial trait because it has been found in different races, and in widely separated areas[5]. Although few, the number of reports in the literature show that taurodontism is no more to be considered as a feature observed in Neanderthal man, rather also seen in present day man. Reports of taurodontism involving permanent dentition[6,7,8], deciduous dentition[9] or both [10,5] are found in the literature.

Etiology of taurodontism is diverse commonly attributed to the failure of invagination of the epithelial root sheath sufficiently early to form the cynodont. Although the exact mode of genetic transmission is not understood, the hereditary tendency of taurodontism is well established. Shaw (1928)[11] claimed that the trait is inherited as an autosomal recessive disorder. Dominant inheritance was suggested by the 2-generation pedigrees reported by Goldstein and Gottlieb(1973)[12] and Gramer and Zusman (1967).[13] Witkop and Rao(1971)[14] found no affected parents in 8 cases they investigated. Jaspers and Witkop(1980)[15] and J. Varrela et al (1990)[16] pointed out association of taurodontism with X-chromosome aneuploidy. Blumberg & co workers[17] studied the trait and ascribed taurodontism to a polygenic system and described the anomaly as a continuous trait without discrete mode of expression. Reichart and Quast[18] had reported a case of taurodontism in which a long term osteomyelitis occurred during periods of tooth formation, interfered with dental development and resulted in Taurodontism

and suggested that the influence of external factors also should be considered.

Taurodontism often occur with other anomalies although many isolated cases have been reported. It has been found to occur as a part of several well known syndromes such as Klienfelter's syndrome[19-21] Down's syndrome[22-24], trichodento-Osseous syndromes[25,] orofacial digital syndrome or Mohr Syndrome[26], ectodermal dysplasia,[27,28] and many other less common syndromes. Taurodontism has also been reported associated with Dwarfism[29], Cleft palate[30] and other dental anomalies such as hypodontia[31-33], microdontia and dens invaginatus[34], amelogenesis imperfecta [35-37]etc.

The incidence of taurodontism has been reported to be highly variable in modern man. The prevalence of taurodontism was reported to be 0.57–3.2% of white Americans[17,21], 8% of Jordanian,[38] and 46.4% of young adult Chinese[39], 5.6% in Israeli people[40], 9.9% in normal Dutch[31]and 33–41% of certain Africans.[41]

Taurodontism primarily affect the molar teeth and rarely premolars[42,43]. Only few cases are reported, where multiple teeth are affected by taurodontism[44, 45.]

In this article, we are presenting a rare case in which patient presented with multiple taurodontism involving the molars of all four quadrants. In contrast to most of the reports found in literature, this patient did not have positive family history or any associated disorders or features of syndromes.

Case report

A 15 year old boy reported to the dental clinic for treatment of painful ulcer on left cheek mucosa. On examination it was observed that patient was undergoing orthodontic treatment to correct the malaligned teeth. An ulcer was found on the left buccal mucosa measuring 0.5X 0.5cm with irregular margins, opposite to upper first molar. The molar band of fixed orthodontic appliance was found to be impinging on the ulcer. Clinically the lesion was diagnosed as traumatic ulcer.

To evaluate the status of orthodontic treatment and periodontal condition, panoramic radiograph was taken. The radiograph (Fig.1) revealed that permanent first and second molars of all four quadrants were with enlarged pulp chambers without cervical constriction and short root, suggestive of taurodontism.

The old dental records of the patient submitted, also had Intraoral periapical radiographs of maxillary and mandibular posterior region which were taken before starting orthodontic treatment. Those radiographs (Fig 2(A&B) and 3(A&B) clearly revealed that the floor of pulp chamber of all molar teeth was displaced apically. To confirm the diagnosis of Taurodontism, we have applied the mathematical criteria put forward by Shiffman and Chanannel[40](Fig. 4).

The premolars also showed widened pulp chamber and root canal. The status of third molars could not be assessed because they were in the developing stages. IOPA radiograph of mandibular right region also revealed root canal treated mandibular first molar.

No other remarkable dental findings were observed clinically or radiographically. Past medical history was non contributory. General physical examination did not reveal any significant findings. Patient's physical and mental development was within normal rates for his age.

Topical anesthetic, antiseptic gel was prescribed to reduce the symptoms and to promote healing of ulcer on buccal mucosa.

Fig. 1- Panoramic radiograph showing multiple Taurodonts (first and second permanent molars of all four quadrants).

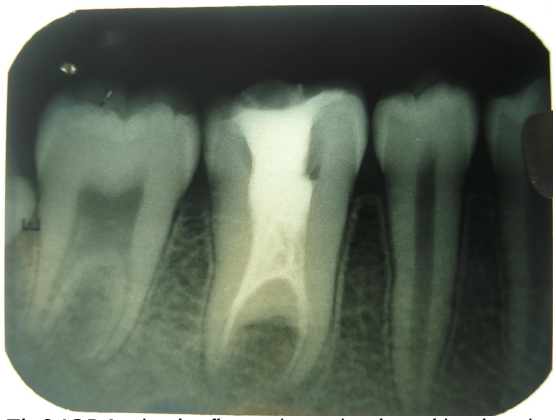

Fig 2:IOPA showing first and second molars with enlarged

pulp chamber and apically shifted floor of pulp chamber.

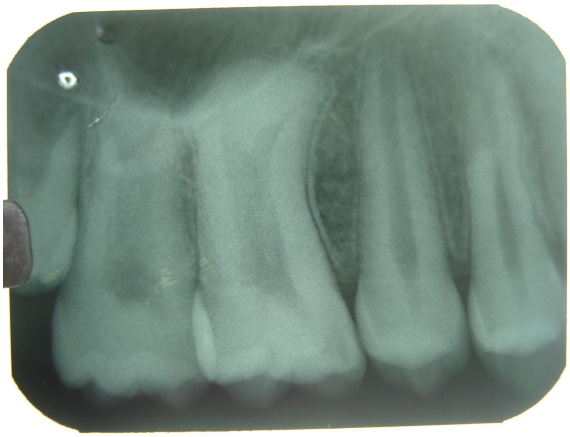

Fig 3: IOPA showing first and second molars with typical features of Taurodontism and widened pulp canals of Premolars.

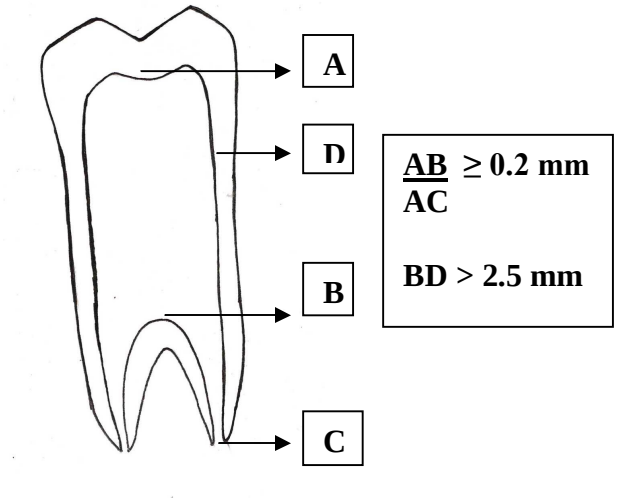

***Fig 4** – Illustration showing Shiffman and Chanannel's criteria for diagnosing Taurodontism.*

Discussion

Taurodontism is an anomaly of multi rooted teeth with enlargement of pulp chamber at the expense of root. A taurodont does not exhibit any unique morphologic clinical characteristics which may aid in its recognition. Diagnosis of taurodont is usually made in a radiograph. In a radiograph taurodont shows a long rectangular body with short roots, the pulp chamber is elongated in the apico- occlusal direction and lacks constriction at the cervix. The apico-occlusal height of the pulp chamber varies depending upon the type of taurodontism.

Various diagnostic approaches were adopted by authors who have reported cases of taurodontism. In 1928 Shaw[41] classified taurodontism arbitrarily, based on relative degree of apical displacement of floor of pulp chamber into hypotaurodontism, meso and hypertaurodontism. The pulp chamber may extend to the apex of the tooth in hypertaurodontism and in that case the pulpal floor appears as a shelf in close proximity to the apices. The apical extension may be mild to moderate in hypo- or mesotaurodontism.

A more effective approach for assessing taurodontism was put forward by Feichtinger and Rossiwall[46]. They suggested that a tooth can be considered as a taurodont only if the distance from the furcation of the root to the CEJ is greater than the cervico-occlusal distance. Later in 1978 Shiffman and Chanannel[40] established mathematical criteria which are adopted by various authors for assessing their cases. According to this criteria, a tooth is considered as a taurodont if the distance from the lowest point of roof of the pulp chamber (A) to the highest point of the floor (B), divided by the distance from A to the root apex (C) is equal to or greater than 0.2 mm, and when the distance from B to the CEJ (D) is greater than 2.5 mm. (Fig 4)

Only little information is available about the clinical significance of taurodontism. According to Widerman and Serene[47] unusual shape of the root canals in taurodonts may cause difficulty in endodontic treatment. Sathyanarayana and Carounanidy reported a case of Taurodontism involving mandibular left first and second molars in which they have performed conventional endodontic treatment. According to them endodontic treatment in taurodont was challenging. Even in our case we have observed an endodontically treated first molar which was clinically and radiographically symptom free.

Since the available data on prevalence of Taurodontism is limited, we opine that detailed larger scale studies have to be carried out to assess its prevalence in the general population and to compare it with other ethnic groups.

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