

Taurodontism in Pediatric Population: A Review

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ABSTRACT

Taurodontism is a rare dental anomaly in which the affected tooth has an enlarged and elongated body and pulp chamber with apical displacement of the pulpal floor. It has a very low incidence, and very fewer cases are reported in the literature in deciduous dentition. Treatment of a taurodont tooth is challenging and requires special handling because of the proximity and apical displacement of the roots.

KEYWORDS: Taurodontism, Anomaly, Developmental Disturbance

INTRODUCTION

Taurodontism is a developmental disturbance of a tooth that lacks cervical constriction at the level of the cemento-enamel junction (CEJ). It is distinguished by a vertically elongated pulp chamber, apical displacement of the pulpal floor and bifurcation or trifurcations of the roots (Jafarzadeh et al. 2008.).

History: Taurodontism was first described in 1908 by Gorjanovic-Kramberger¹ a 70,000-year old pre-Neanderthal fossil, discovered in Katrina, Croatia.² The term 'taurodontism' was however first specified by Sir Arthur Keith in 1913. The origin of this term is from Greek "Taurus" which means "Bull" and "odontoid" which means "Tooth".³ The literature contains reports of taurodontism with high frequency in Eskimos probably an adaptation from cutting hide.⁴ Shaw⁵ reported the incidence to be as high as 30% in hybrids of Australoids and the Bush people of South Africa. Taurodontism has been found in mongoloid and negroid populations.²

It seems taurodontism is a great deal more frequent than it was previously thought. Seow and Lai found that 38.4% of 66 patients with hypodontia had at least one mandibular first permanent molar that showed taurodontism compared with only 7.5% of a control group without hypodontia.⁶

ETIOLOGY AND PATHOGENESIS

Theories regarding the causes of taurodontism have been many. It has been suggested that the abnormality represents a primitive pattern, a mutation, a specialized or retrograde character, an atavistic feature, an X-linked trait, familial or an autosomal dominant trait. Although taurodontism has been reported in relation with certain syndromes and some genetic defects, its true significance

is still obscure.⁷

Taurodontism may be an isolated condition, but it has also been associated with various developmental syndromes and anomalies including amelogenesis imperfecta, Down's syndrome, ectodermal dysplasia, Klinefelter syndrome, trio-into-osseous syndrome, Mohr syndrome, Wolf-Hirschhorn syndrome and Lowe syndrome.⁸ Taurodontism has also been reported to present with other rare syndromes such as Smith-Magenis syndrome, Williams syndrome, McCune-Albright syndrome and Van der Woude syndrome.

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

CLASSIFICATION

In 1928 Shaw⁵ classified this condition as hypo taurodontism, meso taurodontism and hyper taurodontism based on the relative displacement of the floor of the pulp Chamber (figure no.1).

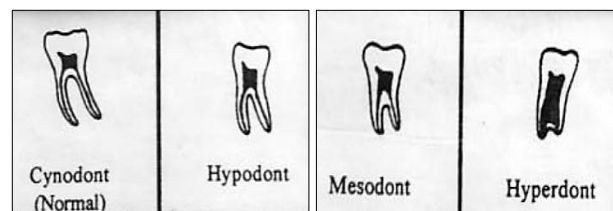


Figure no. 1 Types of Teeth.

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This subjective, random classification led normal teeth to be misdiagnosed as taurodontism.

In 1977, Leechfnger and Rosewall stated that the distance from the bifurcation or trifurcation of the root to the cemento-enamel junction should be greater than the occlusocervical distance for a taurodontism tooth (figure no.2).

Though there are many classification systems to determine the severeness of taurodontism, Shifman and Channel in 1978 proposed a new classification and is the widely used system till now.

Taurodontism index: vertical height of the pulp chamber distance between the lowest point of the roof of the pulp chamber to the apex of the longest root and the distance between the baseline connecting the two cemento-enamel junctions and the highest point on the floor of the pulp chamber. Establishment of a condition of taurodontism is made when $1/2$ multiplied by 100 is above 20, and 3 exceeds 2.5 mm: $(1/2) * 100 > 20$ and $3 > 2.5$ mm. Taurodontism index (TI) = $1/2 \times 100$. In this case TI= 61 and 3= 8 mm, clearly indicating hyper taurodontism

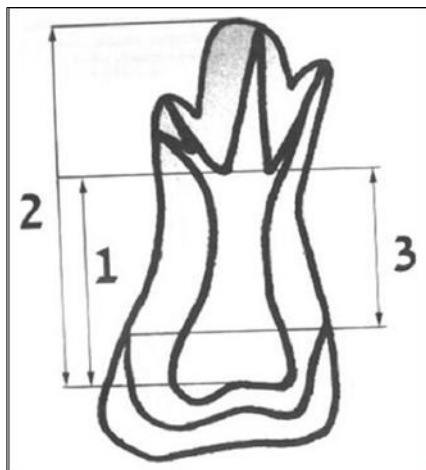


Figure no. 2: Taurodontism index

PREVALENCE

Review of the literature reveals a wide discrepancy in the prevalence of taurodontism in different populations. The prevalence of taurodontism in children was found to be 0.3%.¹⁰

RADIOGRAPHIC FEATURES

Identification of the condition can only be done by radiographic examination as the external morphology of the teeth is within normal configurations. The radiographic examination is the only way to visualize a rectangular configuration of the pulp chamber.

Diagnosis of taurodontism has been based on the subjective radiographic evaluation. The appearance of the taurodont tooth is very characteristic, and the unusual

nature of this condition is best visualized on the radiograph. Involved teeth assume a rectangular shape preferably than tapering towards the roots. The pulp chamber is extremely large with a greater apical-occlusal height than normal and lacks the usual constriction at the cervical region of the teeth with exceedingly short roots. The bifurcation or trifurcation may be only a few millimetres (mm) above the apices of the roots.¹¹

CLINICAL CONSIDERATIONS

The clinical implication of taurodontism has potentially a increased risk of pulp exposure because of decay and dental procedures. Taurodontism may complicate orthodontic and/or prosthetic treatment planning. Taurodontism, although not very common has to be considered due to its influence on various dental treatments.

Endodontic considerations: A taurodont tooth shows wide dissimilarity in the size and shape of the pulp chamber, varying degrees of obliteration and canal configuration, apically positioned canal orifices, and the potential for additional root canal systems.¹²

From an Endodontist's view, taurodontism presents a challenge during negotiation, instrumentation and obturation in root canal treatment. Because of the difficulty of the root canal, anatomy and proximity of buccal orifices complete filling of the root canal system in taurodont teeth are 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.¹³

Recently, a case report highlights the use of high-end diagnostic imaging modalities such as spiral computerized tomography in making a valid diagnosis of the multiple morphologic abnormalities such as taurodontism, dens invaginations, pyramidal cusps of the premolars, dens evaginatus.¹⁴

The selection of endodontic therapy in these situations will be conservative. Therefore, root canal treatment becomes a difficult. Though taurodontism is of rare occurrence, the clinician should be aware of the complex canal system for its successful endodontic treatment.

Surgical considerations: The extraction of a taurodont tooth is usually difficult because of the shift in the furcation to apical third.¹⁵ In contrast, it has also been hypothesized that the large body with a little surface area of a taurodont tooth is deeply rooted in the alveolus. This feature would make extraction less difficult as long as the roots are not widely differing.¹² It is reported that extraction of such teeth may not be a problem unless the roots are not widely differing. However, some authors believe that hyper taurodents may pose some problem during extraction because of apical shift of furcation and also due to difficulty in positioning of forceps beaks. The authors believe that this problem can be resolved by proper usage of surgical tooth elevators.

Prosthetic considerations: For the prosthetic treatment of a taurodont tooth, it has been advocated that post placement is avoided for tooth reconstruction.¹²

Because less surface area of the tooth is embedded in the alveolus, a taurodont tooth may not have as much strength as a cynodont when used as an abutment for either prosthetic or orthodontic purposes¹³. Since the placement of the stainless steel, crown is considered the ultimate extra coronal restoration in pediatric dentistry, the lack of a cervical constriction tends to deprive the tooth of the buttressing effect of excessive loading of the crown.

Periodontal considerations: From a periodontal stand point, taurodont teeth may, in specific cases, provides the favourable prognosis. Where periodontal pocketing or gingival recession occurs, the chances of furcation involvement are very much less than those in normal teeth because taurodont teeth have to demonstrate significant periodontal destruction before furcation involvement occurs.¹¹

CONCLUSION

Taurodontism is a morpho-anatomical developmental anomaly that usually appears in the form of multi-rooted teeth. Taurodontism is a dental rarity. A thorough knowledge of etiology, anatomic and radiographic features and its association with other syndromes of dental rarity should be well understood. From this review, we conclude, it is very important for a pediatric dentist to be well known with taurodontism not only with regards to clinical complications but also its management. Taurodontism also provides a valuable clue in detecting its relation with many syndromes and other systemic conditions.

REFERENCES

- Gorjanovic-Kramberger K. Über prismatische Molarwurzeln rezenterund diluvaler Menschen. Anat Anz. 1908;32:401-13.
- Prakash R, Vishnu C, Suma B, Velmurugan N. Endodontic management of taurodontic teeth. Indian J Dent Res. 2005;16:177-81.
- Witkop CJ. Clinical aspects of dental anomalies. Int Dent J. 1976;26:378-90.
- Goldstein E, Gottlieb MA. Taurodontism: familial tendencies demonstrated in eleven of fourteen case reports. Oral Surg Oral Med Oral Pathol. 1973;36:131-44.
- Shaw JC. Taurodont Teeth in South African Races. J Anat. 1928;62:476-498.1
- Seow WK, Lai PY. Association of taurodontism with hypodontia: a controlled study. Pediatr Dent. 1989;11:214-9.
- Bhat SS, Sargod S, Mohammed SV. Taurodontism in deciduous molars - A case report. J Indian Soc Pedod Prev Dent. 2004;22:193-6.
- Joseph M. Endodontic treatment in three taurodontic teeth associated with 48, XXXY Klinefilter syndrome: a review and case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2008;105:670-7.
- Witkop CJ Jr, Keenan KM, Cervenka J, Jaspers MT. Taurodontism: an anomaly of teeth reflecting disruptive developmental homeostasis. Am J Med Genet Suppl. 1988;4:85-97.
- Bäckman B, Wahlin YB. Variations in number and morphology of permanent teeth in 7-year-old Swedish children. Int J Paediatr Dent. 2001;11:11-7.
- Shifman A, Buchner A. Taurodontism. Report of sixteen cases in Israel. Oral Surg Oral Med Oral Pathol. 1976;41:400-5.
- Durr DP, Campos CA, Ayers CS. Clinical significance of Taurodontism. J Am Dent Assoc. 1980;100:378-81.
- Tsesis I, Shifman A, Kaufman AY. Taurodontism: an endodontic challenge: report of a case. J Endod. 2003;29:353-5.
- Bharti R, Chandra A, Tikku AP, Wadhvani KK. "Taurodontism" an endodontic challenge: a case report. J Oral Sci. 2009;51:471-4.
- Metgud S, Metgud R, Rani K. Management of a patient with a taurodont, single-rooted molars associated with multiple dental anomalies: a spiral computerized tomography evaluation. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;108:e81-6.

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