

# TAURODONTISM - REVIEW ARTICLE

<sup>1</sup>Dr Puja Bansal, <sup>2</sup>Nistha Singh, <sup>3</sup>Kashvi Srivastava, <sup>4</sup>Jyoti Ray

<sup>1</sup>Professor, <sup>2,3,4</sup>BDS Student  
Department of Oral Pathology and Microbiology  
School of Dental Sciences  
Sharda University, Greater Noida, India

**Abstract:** Taurodontism is a morpho-anatomical change in the shape of the tooth. It is recognized as a clinical entity for almost a century. It appears as an isolated anomaly and its association with several symptoms and abnormalities has been reported. Despite all these clinical challenges taurodontism has received attention from clinicians. Due to its prevalence in modern dentitions and its critical need for its diagnosis and management. The most commonly affected teeth are permanent molars, this change can also be seen in both the permanent and deciduous dentition, unilaterally or bilaterally, and in any combination of teeth or quadrants.

This review article addresses the etiology, pathogenesis, clinical features, and radiographic features of taurodontism and its association with different syndromes.

## INTRODUCTION

Taurodontism occurs when the body of a tooth enlarges and the root's size is reduced. This alteration in the shape of the tooth's root has been referred to as a clinical entity it is caused by the failure of Hertwig's epithelial sheath diaphragm to invaginate at the proper horizontal level [1]. It is characterized by enlargement of the pulp chamber, which may approximate the root apex, with the body of the tooth enlarged at the expense of the roots and apically displaced furcation areas [2]. This condition appears to be genetically controlled and familial in nature. The term "taurodontism" comes from the Latin term tauros, which means 'bull', and the Greek term odus, which means 'tooth' or 'bull tooth' [2]. It was first used by Sir Arthur Keith in 1913 however it was first described by Gorjanovic-Kramberger. It is characterized by enlargement of the pulp chamber of a multirrooted tooth with the consequent apical displacement of the floor of the pulp as well as the bifurcation of the root. It may occur either unilaterally or bilaterally or may exhibit any combination of quadrant involvement and affect permanent teeth more often than primary teeth although permanent molar teeth are more commonly affected [3].

## ETIOLOGY AND PATHOGENESIS

There are many theories regarding the etiology of taurodontism they are commonly ascribed to the failure of invagination of the epithelial root sheath sufficiently early to form cynodont [2]. Taurodontism appears to be an isolated anomaly but it has been related to several developmental syndromes such as [4]: -

Amelogenesis imperfecta Down's syndrome Klinefelter syndrome Ectodermal dysplasia  
Tricho-dento-osseous syndrome

Identification of taurodontism may lead to early recognition of Klinefelter syndrome and could improve quality of life. There are a variety of possible causes of taurodontism which involve a specialized or retrograde character, a primitive pattern, a Mendelian recessive trait, and a mutation resulting from odontoblastic deficiency during dentin genesis of the roots [4].

The pathogenesis of taurodontism is attributed to a disturbance in Hertwig's epithelial root sheath, which forms the initial outline for the root's morphology [5]

Theories related to the pathogenesis of taurodontic root formation revolves around several theories such as

An unusual developmental pattern, a delay in the calcification of pulp chamber [5]

An odontoblastic deficiency and an alteration in Hertwig's epithelial root sheath [5]

Some believe that taurodontism is most likely the result of disrupted developmental homeostasis [6].

## PREVALENCE

Taurodontism is of historical interest as it has been found commonly in fossils hominids, especially in the neanderthal man, with a very high prevalence during the Neolithic period [7]. At one time it was thought to be confined to these early populations but is now known to be widespread in many modern races [7].

Taurodontism affects primarily molars and premolars in both the deciduous and permanent dentition most commonly affected patients are of age from 13 to 38 years with a mean age of 21 years [8]. It is more common in the maxilla than in the mandible and the maxillary second molar is the most commonly involved tooth followed by the mandibular second molar [8]. The prevalence of taurodontism in children was found in 0.3%. It is seen both in permanent and deciduous dentition, unilaterally or bilaterally, and in any combination of teeth or quadrants. The degree of taurodontism increases from the first to the third molar. Taurodontism is occasionally observed in mandibular premolars and even maxillary premolars 'incisors and mandibular canine. There is no significant difference between the two sexes. The most prevalent taurodont is Hypotaurodontism followed by mesotaurodontism Hypotaurodontism are the least common [9]. Taurodontism is not uncommon in the Indian population and it might be associated

with other conditions such as pyramidal molars and impaction [3].

### CLASSIFICATION

It was first classified by Shaw in 1928 based on the relative displacement of the floor of the pulp chamber as Mild (Hypotaurodontism)

Moderate (Mesotaurodontism) Severe (Hypotaurodontism)

Hypotaurodontism is a moderate enlargement of the pulp chamber at the cost of the roots and bifurcation is slightly apical to normal. In mesotaurodontism there is a shortening of roots but roots are still separated with relatively enlarged pulps and bifurcation in the midline of the root. Hypotaurodontism refers to pulp chambers that nearly reach the apex of the tooth and then divides into different conically shaped roots and bifurcation at the apical one third [10]

Feichtinger and Rossiwall in 1977 stated that the distance from the cemento-enamel junction to the bifurcation or trifurcation of the root should be greater than the occluso-cervical distance for a taurodontic tooth [11]

In 1978 Shifman and Chanannel proposed a new classification that is widely used until now.[7]

### CLINICAL CONSIDERATION

The clinical involvement of taurodontism has potentially increased the chance of pulp exposure [3]. It may complicate prosthetic and orthodontic treatment from an endodontist's view, taurodontism presents a challenge during instrumentation and in root canal therapy because of the root canal anatomy complete filling of the root canal system in taurodont teeth is challenging [13]. The complex anatomy of a root causes a challenge for the complete filling of the root canal system [4]. The extraction of a taurodont tooth is usually complicated because of a shift in the furcation area down to the apical third with the roots becoming shorter and thinner [15]. From a periodontal standpoint, taurodont teeth may, in specific cases, offer a favorable prognosis. However, this different morphology affects the gingival line, relative to the neighboring normal teeth. These irregular gingival lining may create difficulties in maintaining oral hygiene and cause gingival inflammation and the risk of periodontal breakdown [13].

For the prosthetic treatment of taurodont teeth, it has been recommended that post-placement be avoided for tooth reconstruction because the tooth has less surface area embedded in the alveolus, a taurodont tooth may not have as much stability as a cynodont when used as a support for either prosthetic or orthodontic treatment [14].

The taurodont teeth as compared to normal teeth occupy a smaller space in the alveolar bone which may affect their stability following their reduced ability to withstand normal occlusal wear forces [15]. A dentist needs to be familiar with taurodontism not only concerning clinical complications but also its management.

### RADIOGRAPHIC FEATURES

Taurodontism can be best visualized on the radiograph. The radiographic examination is the best way to visualize the pulp chamber in a rectangular configuration. Involved teeth tend to assume a rectangular shape rather than tapering towards the root. The pulp chamber is extremely large with a much greater apico – occlusal height than normal and lacks the usual constriction at the cervical region of the teeth with exceedingly shortened roots. The bifurcation or trifurcation maybe only few millimetres above the apices of the roots [2]. The root and root canals are exceedingly short with increased dimension between the cemento-enamel junction and furcation [7].

### CONCLUSION

This article attempts to address the etiology pathogenesis classification and clinical consideration of taurodontism and its association with some syndromes. Taurodontism is a rare dental anomaly in modern man which needs special attention while performing any treatment. The presence of taurodontism in a tooth must be identified before treatment and this can be achieved through clinical and radiographic examination. From this review, it is apparent that taurodont teeth are presumed characteristic of neanderthal man and are still present as a morphological entity in modern man. Taurodont teeth show wide variations in size and shape of the pulp chambers and the potential for the additional root canal system. The dentist needs to be more aware of the various dental treatment that can be chosen and implemented according to the diagnosis.

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