

Prevalence and Pattern of Taurodontism in an Indian Population: A Retrospective Radiographic Study

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Abstract

Objective: This study was undertaken to assess the prevalence and pattern of taurodontism in an Indian Population. **Materials and methods:** In this retrospective descriptive study, panoramic radiographs of 542 patients were evaluated by two maxillofacial radiologists for the presence of taurodontism which is defined as the teeth having apically displaced pulp chamber and lacking the conventional constriction at the cemento-enamel junction. A detailed medical and family history was recorded for all the subjects to determine the presence of any adjuvant developmental disorders or genetic disorders and any related syndrome. **Results:** Taurodont teeth were found in 32 patients with a person prevalence of 5.9% of which 15 (46.87%) were seen in males and 17 (53.12%) in females. In these 542 patients comprising of 7396 premolar and molars 52 teeth were seen with taurodontism with a teeth prevalence of 0.70%. Out of 52 teeth, the mandibular second molar teeth were most commonly effected (38.46%) followed by maxillary second molars (23.07%). Hypotaurodontism was the most common type (80.76%) followed by mesotaurodontism (11.53%) and the least common type was hypertaurodontism (7.69%). **Conclusion:** Taurodont teeth were found in 32 patients with a person prevalence of 5.9% and in 52 teeth were seen with taurodontism with a teeth prevalence of 0.70%.

Keywords: Developmental anomaly, taurodontism, premolar, molar

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Introduction

Various anomalies affecting the hard tissue including the teeth are frequently in the encountered in routine dental practice. Nevertheless, contrasted with the more typical disorders seen in the oral cavity, for example, caries and periodontal pathologies, these anomalies represent a moderately low number, however these may pose a dilemma amid treatment planning. Taurodontism is regarded as a morpho-anatomical alteration in the usual contour of teeth in which the size of tooth body is increased with the decrease in size of the roots.[2] The taurodont teeth seems to be rectangular shaped instead of tapering towards the roots. The pulp size of the taurodont teeth is enlarged in size with a increased vertical dimension and lacking the normal constriction at the cemento-enamel junction.[3] The aetiology of taurodontism is not clearly established till date. It is proposed that failure of Hertwig's epithelial sheath diaphragm to invaginate at the proper horizontal level, may lead to the decreased root size and increased dimension of the tooth body and pulp cavity. [4,5] Taurodontism is categorised based on the level of apical positioning of the pulpal

floor as hypotaurodont, mesotaurodont and hypertaurodont.[6] Taurodontism is a significant dental anomaly effecting both deciduous and permanent dentition. A special concern is needed during prosthodontic treatment planning, root canal therapy and while extraction and restoring these teeth. Taurodont teeth may complicate endodontic therapy by limiting instrumentation and obturation.[2,3] While extracting a taurodont the dental surgeon may face difficulty because of the shift of furcation area more apically.[6] A periodontist may expect a unfavourable prognosis of a taurodont tooth as these teeth may demonstrate a considerable periodontal loss before the furcation is involved. In case of prosthetic treatment of a taurodont tooth, the insertion of a post for reconstruction needs to be avoided. When considered as an abutment, these teeth may not offer a favourable stability and strength, because of the limited surface area within the bone.[6] Previous studies were carried out in different population to assess the prevalence of taurodontism[7-11] The present study has been carried out to determine the prevalence and pattern of taurodontism using panoramic radiographs.

Material and methods

In this retrospective observational study, a total of 542 panoramic images of patients with a mean age 32.8±8.14 years comprising of 7396 teeth were observed in this study. Radiographs were interpreted by two qualified experienced examiners, who were

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calibrated previously. A total of 287 male and 255 female participants, aged 15 years and above were included in this study. Radiographs of poor quality were not interpreted. Carious teeth, teeth with restorations, fractured teeth, impacted teeth and teeth having fused roots were not included in the study. Taurodontism was assessed as per criteria's laid by Schiffman and Channanal. [12] Taurodonts were subsequently classified as hypotaurodont, mesotaurodont, or hypertaurodont on the basis of level of apical displacement of the pulpal floor. Records of the patients with taurodontism were subsequently screened for any possible association with adjuvant developmental disorders or genetic disorders and any related syndrome. In order to check the intraobserver variations, the same radiologists carried out the interpretation after 2 weeks. The observations were analyzed using the computer program, SPSS 21.0 (SPSS Inc. Chicago, USA). Chi-square test was used to compare the prevalence of taurodontism between genders. The reliability of measurements was evaluated by kappa statistics.

Table 1: Distribution of taurodonts in the maxilla and mandible according to the affected tooth

	First premolar N (%)	Second premolar N (%)	First molar N (%)	Second molar N (%)	Total N (%)
Maxilla	2 (3.84)	2 (3.84)	6 (11.53)	12 (23.07)	22 (42.30)
Mandible	2 (3.84)	2 (3.84)	6 (11.53)	20 (38.46)	30 (57.69)
Total	4 (7.69)	4 (7.69)	12 (23.07)	32 (61.53)	52 (100)

Table 2: Distribution of taurodonts according to morphology and gender

	Male N (%)	Females N (%)	Total N (%)
Hypotaurodont	20 (38.46)	22 (42.30)	42 (80.76)
Mesotaurodont	2 (3.84)	4 (7.69)	6 (11.53)
Hypertaurodont	2 (3.84)	2 (3.84)	4 (7.69)
Total	24 (46.15)	28 (53.84)	52 (100)

Discussion

In the present study taurodontism was observed 5.9% of patients and 0.70% of teeth, in contrast to this, a high prevalence of taurodontism in 46.4% of individuals and 21.7% of posterior teeth by MacDonald-Jankowski et al., in Chinese population[9], in 22.8% of patients and 4.2% of extracted teeth by Topcuoglu et al., in Turkish population,[6] 8% for individuals and 4.4% for posterior teeth by Darwazeh et al., in Jordanian population,[7] 7.5% of patients by Ezoddini et al., in an Iranian population,[14] 5.6% for individuals and 1.5% for posterior teeth by Shifman and Channanal in Israeli population[12] and a lower prevalence in 2.25% of patients by Bürklein et al., in German population,[14] and 2.49% by Gupta et al., in a different Indian population was observed.[15] In comparison to present study, Ruprecht, et al., observed a higher prevalence of taurodontism 11.3% of patients and 43.2% for molars[10] and Yassin found a prevalence in 1.4% of patients in a Saudi Arabian population.[11]

These wide variations in prevalence between different populations may be attributed to ethnic variations, differences in the criteria used for interpretation of taurodontism and also the specific teeth interpreted the study. In the present study, the distribution of taurodontism was almost equal between males (46.87%) and females (53.12%) with no significant gender difference ($p > 0.05$). This finding was similar with the observations by Ruprecht A et al.,[10] Shifman and Channanal.,[12] Moshfeghi et al.,[16] and Barker.[17] However, a higher prevalence of taurodontism was found in females in the study carried out by Bronoosh et al.,[5] and McDonald-Jankowski et al.[9] This difference may be noted because of an overall increased number of female samples in these studies. In the present a higher prevalence of taurodonts was observed in the mandibular second molar teeth, this finding was similar to that of Bronoosh et al.,[5] and Shifman and Channanal.

Results

The observer reliability was very good, with Kappa values of 0.92 and 0.84 for intraoperator and interoperator agreement respectively. The study comprised of 287 males (51.9%) and 255 females (48.1%) with an age range of 15 to 48 years with a mean age of 29.8 years. Taurodont teeth were found in radiographs of 32 patients with a person prevalence of 5.9% of which 15 (46.87%) were seen in males and 17 (53.12%) in females. There was no statistically significant difference ($p > 0.05$) in the distribution between the gender. In these 542 patients, a total of 7396 premolar and molar teeth that were interpreted and 52 teeth were seen with taurodontism with a teeth prevalence of 0.70% (Figures 1-8). Out of the 52 teeth, the mandibular second molar teeth were most commonly effected (38.46%) followed by maxillary second molars (23.07%) and first molars of both jaws (11.53%) (Table 1). Hypotaurodontism was the most common type (80.76%) followed by mesotaurodontism (11.53%) and the least common type was hypertaurodontism (7.69%) (Table 2). None of the patient having taurodont tooth was found with adjuvant developmental disorders or genetic disorders and any syndrome.

,[12] and Moshfeghi et al.,[16] Whereas Laatikainen and Ranta[18] MacDonald-Jankowski et al.,[9] and Tulensalo et al.,[19] found that maxillary second molar teeth to be most frequently affected. Previously, a limited number of studies compared the morphologic types of taurodontism.[2,5] In this study, hypotaurodont were the most common variant and no significant differences were found regarding the type of taurodontism and between genders was noted ($p > 0.05$). This observation was similar to the findings of Patil et al.,[2] and Bronoosh et al.,[5] In the present study taurodonts were found more in the mandible (57.69%) when compared to the maxilla (42.30%). This finding was in accordance with Moshfeghi et al.,[23] Bronoosh et al.,[5] whereas in the study carried out in north Indian population, taurodonts were significantly found more common in the maxilla in comparison to the mandible.[2] In a previous study, premolars were not been evaluated stating radiographic evaluation of taurodontism in premolars requires mesiodistal sections. Due to the buccolingual positioning of the roots of these teeth and their superimposition on the conventional radiographic views, distinction of the both roots and exact localization of pulp chamber floor may not be precisely evaluated and the required dimensions could not be recorded.[23] Less number of sample and evaluation of only the permanent posterior teeth were the limitation of this study. Further studies with greater sample size from multiple centre and evaluation of deciduous teeth are recommended.

In the present study, we observed the panoramic radiographic data in a specific population, hence the results of this study may not be applied to the whole population of the country. Further studies from multiple centres may help in overcoming this limitation.

Conclusion

Taurodont teeth were found in 32 patients with a person prevalence of 5.9% with almost equal distribution between males and females.

In 32 patients comprising of 7396 premolars, 52 teeth were seen with taurodontism with a teeth prevalence of 0.70%.

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