

Original Article

Radiographic Evaluation for the Prevalence of Taurodontism in Iranian Population in 2018

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Abstract

Background and aim: Taurodontism is one of the Morpho-Anatomical changes in the Shape of one or more Molars or pre molars. In this situation; the tooth's pulp chamber grows as big as the size of the root length. The purpose of this study is to evaluate the prevalence of taurodont teeth by the use of panoramic radiographs.

Methods: This is a cross-sectional Study which is done on panoramic radiographs of the Patients referring to dental School Clinic. 493 panoramic radiographs for the patients age between 10 to 60 was evaluated randomly. The teeth were evaluated based on the criteria described by Schiffman and chanelle. In order to determine the general prevalence of taurodontism, the proportion of taurodont teeth was calculated to the total number of subjects and was reported in percentage of Cases. To compare the prevalence of Taurodontism in Maxilla and Mandible and in left or right Sections, chi-square Test was used. Also for determining the difference of severity of taurodontism in Jaw and quarted Chi-Square test was administered.

Results: 23 patients (67.4%) and (49.3%) of Studied teeth, had Taurodontism. According to Chi-square test, there is no meaningful relationship between gender variables and prevalence of taurodontism (p value = 0.267) The most prevalence of taurodontism was 83,47% simultaneously in Maxillary right first and second Molars, mandibullary left first and second Molars and as so maxillary left first molar and mandibular right First molar with 35,4% had the lowest prevalence.

Conclusion: in this study taurodontism was recognized in 23patients. The prevalence is estimated 67.4%.

Keywords: taurodontism, prevalence, radiography, panoramic

Introduction

Morpho - anatomical traits are important in regional and phylogenetic population studies. Taurodontism is one of the Morpho-anatomical changes in the Shape of one or more Molars or premolars so that the tooth's Pulp Chamber is enlarged as long as the tooth's root length (1-3). Although permanent Molar teeth are often affected; reports have shown that

taurodontism is also observed in premolars (4). Taurodontteeth have large vertical pulp Chambers and root bifurcation is displaced apically (5). This Criteria is due to the lack of proper Connection between the Hertwig epithelial Sheath the horizontal plane (6). Since taurodontism is an intra dental disorder, and the external Morphology of a taurodont teeth is quite similar to normal teeth, identification of these teeth is only done by radiographic examination (3).

Pulp cavity is noticeably enlarged in these teeth and longer Apico ocular height is seen and there is no cervical tightness. These teeth have short roots and bifurcation or in trifurcation may be only a few millimeters higher than the root-Apex (7). Taurodonts may make endodontics, orthodontics or prosthodontist treatments difficult (8). Taurodonts usually have abnormal Canals due to the Complex Shape, number and anatomy of the roots. As a result, root canal treatment for a taurodont is really challenging (9-11). In addition, the removal of a taurodont due to the enlargement of one third of the apical maybe difficult (12). Also, since taurodont teeth occupy less space in the alveolar bone, they are less stable than natural teeth that need to be considered in orthodontic and Prosthetic treatments (9). on the other hand, furcation involvement in periodontal patients in taurodonts in comparison to normal teeth have less risk and better prognosis (12). Taurodontism is related with Some Specific Syndromes and Some genetic disorders but its real significance still remains unknown (10, 13). Taurodontism is often considered as an isolated disorder but it is also seen with several developmental Syndromes and Anomalies such as Amelogenesis Imperfecta, Down syndrome, Extropical Dysplasia, Klein Fletcher Syndrome, TrichioDento Syndrome. Evasion (TDO), Moore syndrome, Wolf-Hirsch-Horn syndrome and Leo syndrome (14). It is also reported that taurodontism associated with some other rare Syndromes such as Smith-Magnuss syndrome (15), Williams's syndrome (16), McCain-Albright syndrome (7) and Van Woods's syndrome (17). Its prevalence is reported 5.2% to 3.11% in human population.

The range of these changes is probably due to differences in race and diagnosis (18). Taurodontism prevalence is 6.8% (19) in Korean patients it is reported 9.3%, with higher risk in mandible (20). Its prevalence is reported 5.5% in Iran mostly in mandibular second molar and it is more common in women (21). One study in India showed that the incidence of taurodontism was 2.5% and more severe in women (22). According to the change in the prevalence of taurodontism in different geographical locations and the fact that this abnormality might complicate some dental treatments, accurate diagnosis and evaluation of the prevalence are necessary. The aim of this study was to evaluate the prevalence of Taurodont teeth on panoramic radiographs of patients in Sari dental School.

Methods

This Cross Sectional study was done on panoramic radiographs of patients referring to Sari dental Clinical of Mazandaran university of Medical Sciences between January 2017 to April 2018. 493 radiography of patients aged between 10 to 60 was analyzed randomly. These panoramic radiographs were evaluated for different purposes (second Molar extraction, orthodontic treatment, periodontal evaluation etc. exclusion Criteria include: presence of Molar teeth with open apex, congenital loss of posterior teeth, presence of systemic disease or syndrome (with Significant effect on panoramic radiography), extracted posterior or posterior teeth that underwent root canal treatment, teeth with large restorations and low quality of radiography. Patient's demographic information was reported by the executor. All radiographs were reviewed by an Endodontics resident. By the means of 100 radiography, an

internal agreement between the density was calculated using the Kappa Cohen statistics ($\kappa=0.97$).

Digital panoramic radiography is displayed on the computer monitor. The brightness and contrast of the monitor are standardized before viewing. Coded digital images and measurement on digital radiography was done with Scanoraversion (Soredex, Helsinki, Finland).

Data was recorded on the relevant forms, the teeth were evaluated based on the criteria described by Schiffman and Channele. The distance from the most apical point in the roof of pulp chamber (A) to the most coronally at the bottom of the floor of pulp chamber (B) was measured and was divided to the distance between roof of pulp chamber and the apex of the longest root (b) and the value obtained was multiplied in 100. If the Value was > 20 and the distance between CEJ (cemento-enamel junction) to floor of pulp (B) was more than 5.2 mm, the examined tooth is evaluated as a taurodont (**Figure 1**).

Eventually, taurodonts are classified according to Severity as shown below:

hypotaurodontism: Mild form, with the specific amount between 9.29 - 20 %

mesotaurodontism: Moderate form, with the specific amount between 9.39 - 30%

hypertaurodontism: severe form, with the specific amount between 75 - 90%.

The collected data were analyzed using SPSS Software version 16 (SPSS Inc. IL, USA). To determine the general prevalence of taurodontism, the proportion of these teeth was Calculated to the total number of subjects and was reported in percentage. Chi-square test was used to compare the

prevalence of taurodontism in maxilla and mandible and for right and left sides. This was also used for determining the severity in jaws (upper/lower) and quarter (left/right).

Results

The number of people in the Study, were 493, 329 were Female (73.66%) and 164 were male (27.33%) and Total number of studied teeth were 3235. Based on chi-Square test, there were no meaningful difference between the two gender (Chi-square=55.223, $df=1$, $P\text{-value}<0.001$) (**Table 1**). Of the 493 patients Studied, 23 patients (4.67%) and 44.3% of the Studied teeth had taurodontism. 12 of them were men and others were women. The study has shown that the Frequency of taurodontism in the female group is more than that in the men. Chi-Square test was used to examine the relationship between sex variable and taurodontism. This test showed that there is no meaningful relationship between the two variables ($p\text{-value}=0.267$), Fisher's exact test was used for comparing and evaluating the relationship between age variables and the prevalence of taurodontism (0.598). Based on **table 2**, the highest number of taurodontism is in person's 20th decade, but the comparison between people with taurodontism and people without taurodontism showed that the amount of subjects with taurodontism in the age range of 60-50 is significantly less than those without taurodontism. The highest incidence of taurodontism with 47.83% was observed in the 6th and 7th maxillary right and 6th and 7th mandibular left respectively. The 6th and 7th maxillary left teeth were ranked second with 43.48%. In the same way, the maxillary left first molar and mandibular right first molar teeth had

the lowest incidence of 4.35% (**Table 3**). From the 23 number of patients with taurodontism, 10 patients (43.47%) had taurodontism in all four quadrants. Also, out of 23 patients who had a history of taurodontism, 1 patient (4.34%) had taurodontism in all areas except the right side of mandibular teeth.

Discussion

In this study, panoramic radiographs were used to evaluate taurodontism. However, it is difficult because it makes detection difficult due to the distortion that it creates (24, 25). On the other hand, there should be differential diagnosis between taurodontism and large pulp chamber. The reliable diagnosis of taurodontism molars is possible using autopontogram. Overall, the best way for diagnosis is fullmouth internal periapical images. In endodontics

point of view, taurodontism is a challenge and equipments such as magnifying loops and surgical microscopes can be useful for diagnosing the orifices and evaluating the canals (26). The prevalence of taurodontism varies from 0.25% to 48% in different studies in different societies (27). In the present study, out of 493 cases that were examined, 23 cases of taurodontism were observed. The prevalence of taurodontism in this study is 4.67%. In various studies, including a study in Asians, the prevalence of taurodontism in women is more than that of men (28). In this study, the prevalence of taurodontism in women has been higher. However, there is no meaningful relationship between sex variables and taurodontism (P value= 0.267).

Also, the incidence of taurodontism was higher in the age group of 20 to 30 years

and the lowest incidence was in the age group of 50 to 60 years. However, there was no statistically significant relationship between age and prevalence of taurodontism.(P value= 0.598) The highest prevalence of taurodontism (47.83%) was in right maxillary 6th and 7th mandibular left 6th and 7th. The lowest prevalence with 4.348% was in the maxillary left 6 and mandibular right 6th. This information is also consistent with the results of other studies, in which the second mandibular molar also showed the highest prevalence of taurodontism (29), also one-sided taurodontism is more common than two sided taurodontism (21, 30-32).
Conclusions: in this study from 493 patients that were evaluated, taurodontism was recognized in 23 patients. The prevalence is estimated 67.4%.

Key words: taurodontism, prevalence, radiography, panoramic

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Figures and Tables:

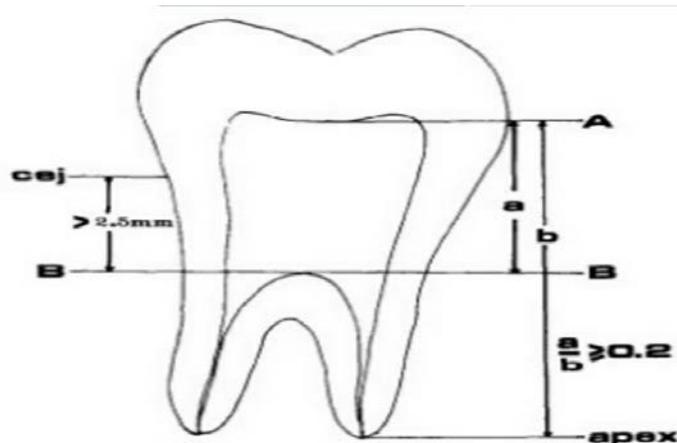


Figure 1. Evaluation of taurodont based on schiffman and chanelle criterion (23)

Table 1. Frequency and overall frequency percentage of Sex

		sex								
		male			female			Total		
		Frequency	Frequency percentage in column	Frequency percentage in rows	Frequency	Frequency percentage in column	Frequency percentage in rows	Frequency	Frequency percentage in column	Frequency percentage in rows
taurodontism	YES	12	32/7%	86/42%	16	86/4%	14/57%	28	68/5%	100%
	NO	152	68/92%	69/32%	313	14/95%	31/67%	465	32/94%	100%

Table 2. Prevalence of taurodontism in different age groups

Age classification	taurodontism			
	YES		NO	
	Frequency	Frequency percentage in column	Frequency	Frequency percentage in column
20-10	7	00/25%	64	76/13%
30-20	11	29/39%	205	09/44%
40-30	7	00/25%	135	03/29%
50-40	3	71/10%	52	18/11%
60-50	0	00/0%	9	94/1%
Total	28	100%	465	100%

Table 3. Frequency and overall frequency percentage of taurodontism in each tooth

		Frequency	Frequency percentage in column	Total
Maxilla's right tooth number	7,6	11	75/68%	83/47%
	6	3	75/18%	04/13%
	7	2	50/12%	70/8%
Maxilla's left tooth number	7,6	10	43/71%	48/43%
	6	1	14/7%	35/4%
	7	3	43/21%	04/13%
Number of tooth right mandible	7,6	8	06/47%	78/34%
	6	2	76/11%	70/8%
	7	7	18/41%	43/30%
Mandible left tooth number	7,6	11	11/61%	83/47%
	6	1	56/5%	35/4%
	7	6	33/33%	09/26%