

The Prevalence of Taurodontism in Croatian Population

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Učestalost taurodontizma u hrvatskoj populaciji

Summary

The purpose of the present work was to establish prevalence of taurodontism in Croatian common population.

The study was carried in the sample of 678 subjects; 339 males and 339 females.

Taurodontism has been diagnosed on the basis of methods proposed by Jorgenson et al, 1982, and Shifman and Chanannel, 1978. Taurodont teeth were found in 6 out of 579 mandibular molars within the sample of 339 males, and in 12 out of 894 mandibular molars within the sample of 339 females.

All affected teeth were hypotaurodont.

The frequency of taurodontism in normal Croatian population was 2,65%.

The observed prevalence of taurodontism in Croatian population was on the level very close to the other recent Caucasian populations.

Key words: taurodontism, root morphology, X chromosome, teeth, pulp chamber

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Introduction

The taurodontism is defined as an apical extension of the pulp chamber in a tooth with bifurcated or trifurcated root. The apical extension of the pulp chamber results in the root being disproportionately short in taurodontism.

The first reference on taurodontism was probably the one by Sir Artur Keith in 1913 (1).

This trait has been seen in premolars and molars and in both primary and permanent dentitions (2).

It is considered that results from a failure of invagination of the epithelial root sheat sufficiently early during the root formation (3,4).

Taurodontism occur frequently among Eskimos, Aleuts, natives of the Kalahari desert,

Australoid people, in Central American Indians and peoples of Mongoloid stock (5-8).

This condition has been also reported in modern Caucasians, American Negroes and Japanese (9-11).

Most patients with an extra X chromosomes and those with trisomy 21 (Down's syndrome or mongoloism), also display taurodontism (12). Males with Klinefelter's syndrome (XXY), as well as those with chromosomal constitutions XXXY, XXXXY and various mosaics have been reported to have taurodontic molars frequently (13,14).

The increased prevalence of taurodontism was found in some syndromes such as: Trichodento-osseous syndrome, Mohr syndrome (oral-

-facial-digital syndrome) and hypohidrotic ectodermal dysplasia (15–18).

Shaw (7) classified taurodontism in three types: hypotaurodontism, mesotaurodontism and hypertaurodontism. These categories were established by comparison with known specimens: certain Bantu hybrid teeth – hypotaurodontic, Heidelberg teeth – mesotaurodontic and Krapina teeth – hypertaurodontic (Figure 1. A–D).

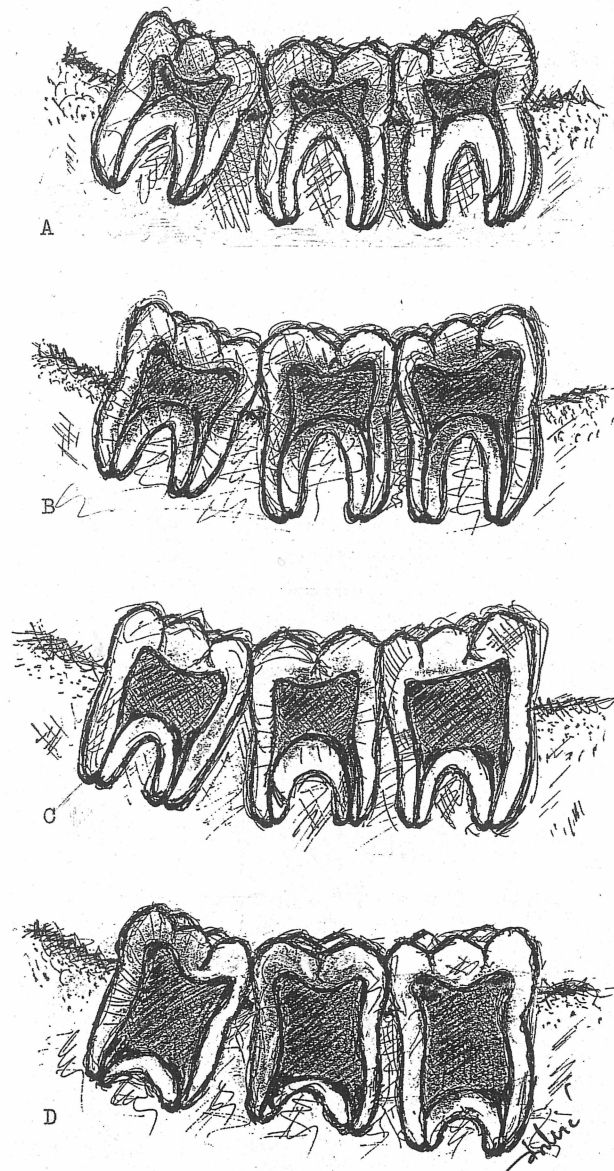


Figure 1. A) Cynodont, B) Hypotaurodont, C) Mesotaurodont, D) Hypertaurodont

Slika 1. A) Normalan, B) Hipotaurodontizam, C) Mezotaurodontizam, D) Hipertaurodontizam

Shaw based his typology on both external and internal tooth root morphology as more reliable method than this based only on tooth morphology (7,19).

Taurodontism is rare condition in contemporary human population; its prevalence usually varies between 0,5% and 5% (12,20,21,22).

The purpose of this study was to establish incidence and degree of taurodontism in a sample of males and females of Croatian origin.

Material and Methods

The material consisted of orthopantomograms taken from subjects (339 males and 339 females).

The orthopantomograms were taken on »ORTOCEF 5« at an exposure of 80 KV and 15 mA.

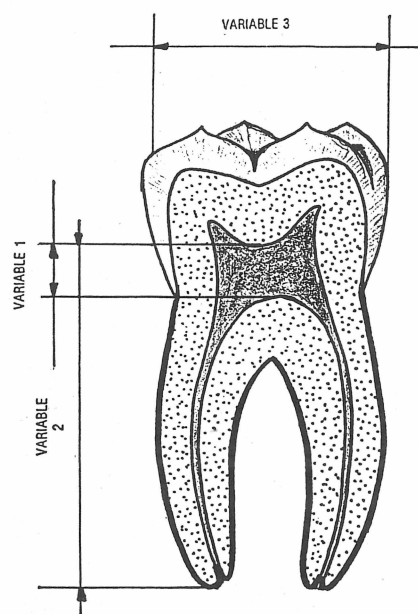


Figure 2. Method of taurodontism diagnostic
1) height of the pulp chamber, 2) roof of pulp chamber to root apex, 3) mesiodistal dimension of crown

Slika 2. Metoda dijagnosticiranja taurodontizma
1) visina pulpne komore, 2) raspored endodontskog prostora od krova pulpne komore do vrha korijena, 3) dimenzija krune u meziodistalnom smjeru

The first and second mandibular molars were studied from orthopantomograms and classified into normal, hypotaurodont, mesotaurodont and hypertaurodont.

Maxillary molars were not evaluated in this study because of the difficulties regarding size analyses of their dimensions from orthopantomograms.

The criteria used in detection and classification of taurodontism were those proposed by Jorgenson et al. (23), and Shifman and Chanan-el (24), (Figure 2).

Results

Taurodont teeth were found in six of the 339 males and in twelve of the 339 females (Table).

Thus, the frequency of taurodontism in our sample of males was 1,77% and 3,53% in the sample of females.

Table Prevalence of taurodontism in mandibular molars of normal males and females

Tablica Učestalost taurodontizma na donjim molarima kod muškaraca i žena

Group	Individuals			Teeth			
	N	Affected Cases	%	M ₁		M ₂	
				N	n	N	n
Males	339	6	1,77	237	3	342	3
Females	339	12	3,53	402	3	492	9
Total	678	18	2,65	639	6	834	12

N - sample size
 n - number of affected teeth
 M₁ - first mandibular molar
 M₂ - second mandibular molar

Overall frequency of taurodontism in the samples under study was 2,65%.

All affected teeth were hypotaurodont (Figure 3). The occurrence of taurodontism was bilateral in eight and unilateral in ten cases.

The difference in frequencies between males (1,77%) and females (3,53%) was not significant.

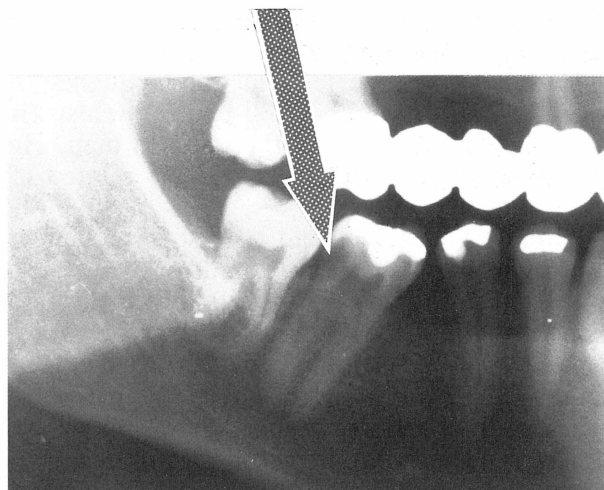


Figure 3. Hypotaurodont mandibular molars

Slika 3. Hipotaurodontni donji kutnjaci

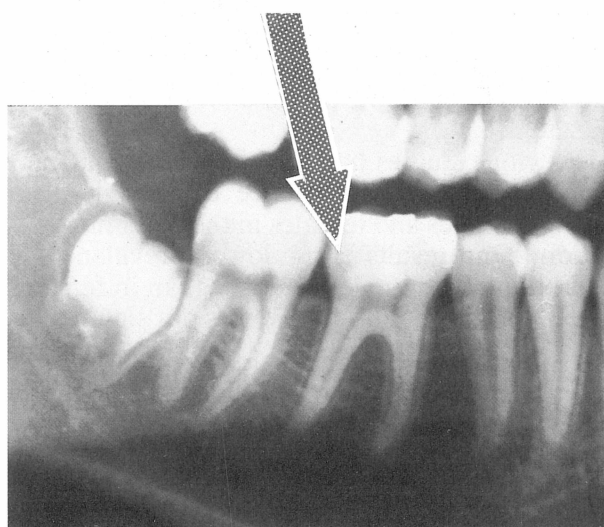


Figure 3.1. Cynodont molars

Slika 3.1. Cinodontni kutnjaci

Discussion

There are sex differences in several aspects of tooth morphology, as well as in the measurements. Males generally have larger teeth than females (25-27).

Differences in tooth size are reported to be greatest for the first and the second mandibular permanent molars, but are more consisted for the maxillary permanent canines than for other teeth.

The frequency of taurodontism in deciduous teeth has been reported as 0,5% among Japanese

se, and 0,08% among Northern Europeans of unspecified national background (11,28).

Brabant (29) reported that the frequency of taurodontism was one in 30 in the prehistoric man and one in 1 000 in the modern man. He specified that the frequency figures related to the permanent dentition.

Blumberg et al (30) did not list frequency of taurodontism, but stated that 200 of their population sample of 11.905 had »longitudinal pulp enlargements«. These 200 persons could represent a frequency of 1,7%. The authors were not clear whether all mentioned 200 persons were included in their final »biometric analysis«.

Shaw (7) reported taurodontism in 33–41% of several hybrid African tribes. Jorgenson et al (23) found this trait in 4,37% of American black population.

Our results indicate that only 2,65% of the normal Croatians have this trait. This finding is similar to those reported in the previous studies of US populations obtained by Blumberg et al (2,5%), Keene (3,2%) and Witkop (2,6%), (22,30,31).

Previous studies had not reported significant difference in the prevalence of taurodontism between males and females in the general population. Our results show lower prevalence of taurodontism in males (1,77%) than in females (3,53%), but the difference was not significant.

Taurodontism shows a field effect. It involves the second permanent molar more frequently and more severely than the first molar (7,24).

Recent studies show that taurodont teeth are relatively common trait in males with an extra X chromosome (Klinefelter syndrome). Varrella and Alvesalo (32) found taurodontism in 35% of Klinefelter's syndrome while Brkić et al (33) obtained frequency of 25%. Jaspers (12) found taurodontism in 30% of Down's syndrome patients.

A possible explanation for the increased prevalence of taurodontism in aneuploid states may relate to the disruption of cell growth cycles by the excess or lack of chromosomal material. A reduction in cell turnover time could result in discoordination of timing of epithelial and mesenchymal interactions such that the timing of the invagination of the root sheath is delayed (31). Taurodontism may be inherited as an autosomal dominant, autosomal recessive or polygenic trait (34,35).

The prevalence of taurodontism found in the Croatian sample of 2,65% is within the range for the recent Caucasian populations (22, 30, 31).

Higher frequency in females (3,53%) than in males (1,77%) could be attributed to the effect of X chromosome since an increased frequency of taurodontism has also been found in individuals with an excessive X chromosome.

Additional studies of taurodontism in subjects with various number of X chromosomes (various chromosomal constitutions) are required to elucidate this problem.

UČESTALOST TAURODONTIZMA U HRVATSKOJ POPULACIJI

Sažetak

Cilj ovoga rada bio je prikazati učestalost taurodontizma u hrvatskoj populaciji.

Studija je obradila 678 ispitanika; 339 muškaraca i 339 žena. Taurodontizam je dijagnosticiran na temelju metodologije koju su postavili Jorgenson i sur. 1982. i Shifman i Chanannel 1978. Taurodontni zubi pronađeni su u 6 od 579 donjih kutnjaka na uzorku od 339 muškaraca i u 12 od 894 donjih kutnjaka na uzorku od 339 žena. Svi zahvaćeni zubi bili su hipotaurodontni. Učestalost taurodontizma u normalnoj hrvatskoj populaciji iznosila je 2,65%.

Promatrana učestalost taurodontizma u hrvatskoj populaciji vrlo je slična drugim istraživanjima kod bijele rase.

Ključne riječi: taurodontizam, morfologija korijena, X kromosom, zubi, pulpna komora.

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