Meziodistalne i bukolingvalne dimenzije zuba pacijenata s hipodoncijom u hrvatskoj populaciji

**Mesiodistal and Buccolingual Dimensions in Croatian Orthodontic Hypodontia Patients’ Teeth**

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**Sažetak**

Svraća: Istraživanje uspoređuje meziodistalne (MD) i bukolingvalne (BL) dimenzije zuba pacijenata s hipodoncijom (lat. hypodontia) i onih u kontrolnoj skupini koji imaju sve svoje zube. Nušta hipoteza bila je da je između obje skupine nema razlike u veličini zuba kod pacijenata s hipodoncijom i onih u kontrolnoj skupini. **Metoda:** Uzorak se sastojao od 76 pacijenata s hipodoncijom (50 žena i 26 muškaraca) u dobi između 11 i 18 godina. U kontrolnoj skupini bilo je također 50 ženskih i 26 muških ispitanika iste dobne skupine kao i u ispitivanoj. Meziodistalne (MD) i bukolingvalne (BL) dimenzije zuba mjerene su na studijskim modelima pomićnom mjerkom s preciznošću od 0,01 milimetar. Svi podaci analizirani su u programu Statistica 7,1 (StatSoft Inc.) i statističkim paketom (deskriptivna statistika, test normalnosti distribucije, parametrijska statistika). **Rezultati:** Zubi koji kongenitalno najčešće nedostaju su drugi donji premolari (lijevo 13,45 % i desno 13,90 %), gornji lateralni incizivi (desni i lijevi 12,56 %) te drugi gornji premolari (desni 9,40 % i lijevi 10,31 %). Najveća razlika između ispitivane i kontrolne skupine pronađena je za gornje lateralne incizive 8,08 posto u MD dimenziji i 6,60 posto u LB dimenziji. Najmanja razlika zabilježena je u MD dimenziji donjih lateralnih inciziva (2,37 %), u MD dimenziji drugih donjih premolara i prvih gornjih molara (2,61 %) te u LB dimenziji donjih središnjih inciziva (2,26 %). **Zaključak:** Ispitanicima s hipodoncijom veličina zuba manja je negoli u kontrolnoj skupini i to prosječno za 4,02 posto u MD dimenziji i 3,85 posto u LB dimenziji. Zubi koji pokazuju najveću razliku u dimenziji su gornji lateralni incizivi.

**Uvod**

Hypodoncija je kongenitalni nedostatak jednoga ili više zuba i ubrava se u najčešću razvojnu anomaliju trajne denti
cie, isključujući treće molare (1 – 3). Prema podacima iz lit
terature, etiologija hipodoncije još nije dovoljno Jasna. Može nastati zbog genetskih ili okolišnih čimbenika ili kao njihova
va kambinacija. Istraživanja na bliznacima i unutar obitelji
upućuju na to da ulogu u ekspresiji tog obilježja imaju ne sa-
m o genetski čimbenici, nego i drugi faktori (4). Hipodonci-
ja se može pojaviti isolirano ili u kombinaciji sa sindromima
ektodermalna displazija (5) te rascjepi usne i/ili nepca (6). Često je u kombinaciji s dentalnim i skeletnim anomalijama
ko kao što su bimaksilarna retružija, mandibularni prognatizam,
smanjena maksila, smanjena vertikalna facijalna dimenzija te
rudimentarni gornji lateralni incizivi (7, 8). Kako bi postigli
estetiku zubog luka, pacijenti s hipodoncijom često zahtijevaju interdisciplinarni tretman, uključujući ortodontsku i re-
storativnu intervenciju. Dimenzije zuba ključne su za odluku

**Introduction**

Hypodontia is a congenital absence of one or more teeth and is one of the most common developmental abnormalities in the permanent dentition excluding the third molars (1-3). According to the literature, the etiology of hypodontia remains unclear. It may occur due to genetic or environmental factors, or as a combination of both factors. Family and twin studies have showed that not only genetic factors but also other conditions play a role in the expression of this trait (4). Hypodontia may be present as an isolated condition or in association with syndromes (ectodermal dysplasia (5) and cleft lip and/or palate (6)). It is frequently associated with dental and skeletal malocclusions such as bimaxillary retraction, mandibular prognathism, decreased maxillary jaw size, reduced vertical facial dimension, and peg shaped maxillary lateral incisors (7, 8). In order to achieve an esthetically pleasing dentition, patients with hypodontia often require inter-disciplinary treatment, including orthodontic and restor-
o raspodjeli prostora unutar zubnog luka gdje zubi nedostaju, te za omogućavanje funkcionalne okluzije. Prevalencija hipodoncije u mliječnoj dentici kreće se od 0,1 do 0,9 posto, a u trajnoj od 2,3 do 11,3 posto (9 – 12).

U literaturi su različiti podacii o dimenzijama zuba kod pacijenata s hipodoncijom. Chung i suradnici (13) istaknuli su da nema povezanosti između hipodoncije i smanjenja dimenzije zuba. Yamada i njegovi kolege (14) zaključuju da su pacijentima s blago izraženom hipodoncijom preostali zubi općenito veći od onih u kontrolnoj skupini, osim kad da nedostaju tri ili više zuba. Kod takvih slučajeva uočeno je značajno smanjenje veličine zuba u usporedbi s kontrolnom skupinom. Wisth i suradnici (15) nisu pronašli razliku kod pacijenata s hipodoncijom u usporedbi s onima iz kontrolne skupine.

Svaha istraživanja bila je usporediti meziodistalne (MD) i bukolingvalne (BL) dimenzije zuba pacijenata s hipodoncijom s onima u kontrolnoj skupini koji imaju sve zube. Nulta hipoteza bila je da nema razlike u dimenziji zuba između pacijenata s hipodoncijom i onih iz kontrolne skupine.

Materijal i metoda

Pacijenti

Uzorak je odabran iz arhiva Zavoda za ortodonciju Stomatološke klinike Kliničkoga bolničkog centra Zagreb. Odobrenje za istraživanje dalo je Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu. Jedan istraživač pregledao je više od tisuću kartona pacijenata. Hipodoncija je dijagnosticirana radiološkim i kliničkim pregledom. Uzorak se sastojao od 76 pacijenata s hipodoncijom (50 žena i 26 muškaraca) u dobi između 11 i 18 godina (prosječna dobar 13 ± 2,35 godina). U kontrolnoj skupini bilo je također 50 žena i 26 muškaraca iste dobi kao u ispitivanoj skupini. Kriteriji za odabir ispitanika u obje skupine bili su erupcija svih zuba osim trećih molara, studijski modeli i ortopantomogram prije početka terapije. Pacijenti kojima su ekstrahirani trajni zubi, ako su bili na ortodontskoj terapiji, oni s karijesima, aproksimalnim restauracijama ili ektopičnim nicanjem zuba, bili su isključeni.

Mjerenja i dimenzije zuba

Meziodistalne (MD) i bukolingvalne (BL) dimenzije mjerenje su na studijima modelima pomoću merkom (Levior S.R.O., Kokory 381-CZ) s preciznošću od 0,01 mm. MD dimenzija svakog zuba mjerenje je prema metodi koju je opisao Moorrees sa suradnicima (16) – od meziyalne kontaktnog točaka do distalne kontaktnog točke na njegovoj najvećoj interproksimalnoj udaljenosti. BL dimenzija mjerenja je na najvećoj udaljenosti između vestibularne i oralne površine zuba okomite na meziodistalnu dimenziju. Sva je mjerenja obavio dva puta isti istraživač pod dnevnim svjetlom (A.V) i to najviše sedam na dan kako bi se izbjegao umor očiju i minimalizirala mogućnost subjektivne pogreške.

Material and methods

Patients

The sample was chosen from archives of Department of Orthodontics, Dental Clinic, Clinical Hospital Center Zagreb. The approval for this study was obtained by the Ethics Committee, School of Dental Medicine, University of Zagreb. More than a thousand of patient files were reviewed by the same examiner. Hypodontia was diagnosed by radiological and clinical examinations. The sample comprised 76 patients with hypodontia (50 female and 26 male) aged between 11 and 18 years (mean age 13 ± 2.35 years). The control group comprised 50 females and 26 males with the same age range as the study group (mean age 12.54 ± 1.95 years). The inclusion criteria for both study groups consisted of full eruption of all teeth except third molars, having dental casts and pretreatment panoramic radiographs. The patients with history of permanent tooth extraction or previous orthodontic treatment and those with caries, interproximal restorations and ectopic tooth eruption were excluded from the study.

Measurement and dental dimensions

Mesiodistal (MD) and buccolingual (BL) dimensions were measured on pretreatment dental casts with a digital caliper (Levior S.R.O., Kokory 381-CZ) to the nearest 0.01 mm. The MD dimension of each tooth was measured according to the method described by Moorrees et al. (16), from its mesial contact point to its distal contact point at its greatest interproximal distance. The BL dimension was measured as the greatest distance between vestibular and oral teeth surface perpendicular to the mesiodistal dimension. All the measurements, taken under natural light, were performed twice by the same operator (A.V) who did not exceed the number of seven casts per day in order to avoid eye strain and to minimize the possibility of subjective error.
Data analysis

The data were analyzed using Statistica 7.1 (StatSoft Inc.) statistical package (descriptive statistics, test of distribution normality, parametric statistics). A test of distribution normality was performed by means of the (one way/unidirectional) Kolmogorov-Smirnov test. The results showed that the tested variables were normally distributed (p>0.01) and consequently parametric tests were used (t test).

Results

The distribution of agenesis by tooth type in hypodontia group is presented in Table 1. The most commonly congenitally missing teeth were the lower second premolars (left 13.45% and right 13.90%) and upper lateral incisors (both left and right 12.56%), followed by the upper second premolars (right 9.40% and left 10.31%).

The paired-sample t-test was used to compare the mean values of the same dimension measured on the left and the right side of each dental arch. Since no statistically significant difference was found (p<0.05), the results were averaged for further analysis.

The differences of mesiodistal and buccolingual dimensions for hypodontia patients and the control group are presented in Table 2. The average differences in tooth size between hypodontia patients and the control group were found in MD dimension (4.02%) and in BL dimension (3.85%). The greatest differences were found in the upper lateral incisors. They amounted to 8.08% in MD and 6.40% in BL dimension. The smallest difference was found in BL dimension of the lower lateral incisor (2.37%), MD dimension of the lower second premolars and the upper first molar (2.61%) and MD dimension of the lower central incisor (2.26%).

| Table 1. Distribucija hipodoncije po tipu zuba kod eksperimentalne skupine. | Table 1 | The distribution of hypodontia in experimental group. |
|---|---|---|
| Zub • Tooth | Br. • No. | % |
| 15 | 21 | 9.40 |
| 25 | 23 | 10.31 |
| 35 | 30 | 13.45 |
| 45 | 31 | 13.90 |
| 12 | 28 | 12.56 |
| 22 | 28 | 12.56 |
| 46 | 1 | 0.45 |
| 47 | 5 | 2.24 |
| 27 | 6 | 2.69 |
| 31 | 13 | 5.83 |
| 41 | 18 | 8.07 |
| 17 | 4 | 1.79 |
| 37 | 5 | 2.24 |
| 13 | 1 | 0.45 |
| 33 | 1 | 0.45 |
| 43 | 1 | 0.45 |
| 24 | 4 | 1.79 |
| 14 | 3 | 1.35 |
| Total | 223 | 100 |
Discussion

Several authors (4, 17, 18) have reported that patients with congenitally missing teeth had smaller teeth in MD and BL dimensions than subjects in the control group, which was also confirmed in our study. In contrast to the above-mentioned authors, Wisth et al. (15) found no statistical difference in the MD diameter of the teeth between the hypodontia group and the healthy controls, which is in concordance with Chung et al. (13) who concluded that hypodontia was not associated with reduced tooth size.

In this study, the percentage of reduction in the tooth dimensions of hypodontia group was 4.02% in MD and 3.85% in BL dimension. The greatest difference was found in MD (8.08%) and BL (6.40%) dimensions of the upper lateral incisor. Brook et al. (17) reported that male hypodontia patients showed greater difference in BL dimension in anterior segment and in MD dimension in posterior segment of dental arch. Gun-
Gungor and suradnici (19) pronašli su smanjenu MD i BL dimenziju zuba kod pacijenata sa ječa izraženom hipodoncijom (nedostatak šest ili više zuba), negoli kod onih sa manje izraženom (bez dva do pet zuba), a najveća razlika bila je u MD dimenziji zuba u objema skupinama sa hipodoncijom kod gornjih i donjih lateralnih inciziva i drugih premolara.

Raspon dobi naših ispitanika (hipodoncija i kontrolna skupina) bio je od 12 do 18 godina. Tako mladi ljudi odabrali su se za to da bi smanjio utjecaj utjecaja, ispuna ili karijesa na MD dimenzije zuba, što se poklapa s istraživanjem Dorisa i suradnika (20). Posljedično je učinak tih čimbenika na stvarnu MD širinu zuba bio minimalan.

U ovom istraživanju statistički značajne razlike u dimenziji zuba između pacijenata s hipodoncijom i onih u kontrolnoj skupini pronađene su na onim zubima koji su najčešće zahvaćeni hipodoncijom, no najveća razlika bila je kod gornjih lateralnih inciziva. Ramazandezeh i suradnici (21) istaknuli su da je razlika u širini zuba između dviju skupina ispitanika bila vidljiva za prve i druge premolare te molare, negoli u prednjim segmentima. Brook i suradnici (18) navode najveću razliku za donje središnje i gornje lateralne incizive u MD dimenziji te za donje središnje incizive u BL dimenziji. Rezultati ovog istraživanja upućuju na to da je mjerenje zuba iščekovano važno kad je riječ o pacijentima sa hipodoncijom. Kliničke istraživanja potvrđuju da različitost u morfologiji zuba nije samo u veličini, nego i u obliku, što svakako treba uzeti u obzir pri planiranju terapije kako bi se postigla što bolja estetika i funkcionalna okluzija na kraju ortodontske terapije.

**Conclusions**

The most commonly congenitally missing teeth in this study were the lower second premolars (left 13.45% and right 13.90%) and the upper lateral incisors (both left and right 12.56%), followed by the upper second premolars (right 9.40% and left 10.31%).

The dimensions of teeth in hypodontia groups were smaller than those in control subjects. Measurements showed that average sizes were 4.02% in mesiodistal dimension and 3.85% in buccolingual dimension. The maxillary lateral incisor showed the greatest variation in size.

**Conflict of Interest**

None declared
Abstract

Objective: This study compared mesiodistal (MD) and buccolingual (BL) tooth dimensions of hypodontia patients with a control group with complete dentition. The null hypothesis was that there was no difference in tooth sizes between hypodontia patients and the controls. Methods: The sample comprised 76 patients with hypodontia (50 female and 26 male) aged between 11 and 18 years. The control group comprised 50 females and 26 males with the same age range as the study group. Mesiodistal (MD) and buccolingual (BL) dimensions were measured on pretreatment dental casts with a digital caliper to the nearest 0.01 mm. The data were analyzed using Statistica 7.1 (StatSoft Inc.) statistical package (descriptive statistics, test of distribution normality, parametric statistics). Results: The most common congenitally missing teeth were the lower second premolars (13.45%) and right 13.90% and upper lateral incisors (both left and right 12.56%), followed by upper second premolars (right 9.40% and left 10.31%). The greatest differences between the study and control group were found in upper lateral incisors, 8.08% in MD and 6.40% in BL dimension. The smallest difference was found in BL dimension of lower lateral incisor (2.37%), MD dimension of lower second premolars and upper first molar (2.61%) and MD dimension of lower central incisor (2.26%). Conclusion: The teeth are smaller in subjects with hypodontia than those of the controls on average 4.02% in MD dimension and 3.85% in BL dimension. The tooth that showed the greatest difference in tooth dimension was maxillary lateral incisor.

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