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ODNOS RELATIVNIH POVRŠINA GORNJEG CENTRALNOG SEKUTIĆA I LICA

THE RELATIONSHIP BETWEEN THE RELATIVE SURFACE OF THE MAXILLARY CENTRAL INCISORS AND THE FACE

Marko Igić

¹UNIVERZITET U NIŠU, MEDICINSKI FAKULTET NIŠ, KATEDRA ZA STOMATOLOŠKU PROTETIKU, NIŠ, SRBIJA

¹UNIVERSITY OF NIŠ, FACULTY OF MEDICINE, DEPARTMENT OF PROSTHODONTICS, NIŠ, SERBIA

Sažetak

Uvod: Centralni sekutići, najkrupniji, najistureniji i najvidljiviji zubi, posebno utiču na estetiku zubne nadoknade.

Cilj ovog rada je upoređivanje relativne površine odabranog dela lica i relativne površine gornjeg centralnog sekutića.

Materijal i metode: Ispitivanje je vršeno kompjuterskom analizom fotografija lica 200 ispitanika, 100 ženskog i 100 muškog pola, kao i fotografija njihovih gipsanih modela gornjih zuba.

Rezultati: Upoređivanje relativne površine lica i relativne površine vestibularne površine centralnih sekutića ukazalo je na postojanje određenog odnosa među njima. Taj odnos je kod muškaraca 1,21, dok je kod žena 1,19.

Zaključak: Primena što većeg broja parametara može nam olakšati pravilan izbor veličine zuba prilikom izrade protetskih nadoknada. Dobijeni rezultati mogu se iskoristiti pri rekonstrukciji lica kao parametar ukoliko osoba poseduje zube, ili obrnuto za rekonstrukciju zuba kod bezubih osoba.

Ključne reči: Centralni sekutići, lice, površina, odnos

Corresponding author:

Marko Igić, DDS, PhD student
Dr. Z. Djindjić 81 Blvd. 18000 Niš, Serbia
+381641409459
E-mail:saigic@yahoo.com

Abstract

Introduction: Central incisors, the largest, most protruding and visible, affect denture aesthetics the most.

The aim of this paperwork was to compare the relative surface of a particular part of the face and the relative surface of the maxillary central incisors.

Material and methods: Measurements were done by computer analysis of face photographs of 200 subjects, 100 women and 100 men, as well as photos of their upper teeth plaster models.

Results: The comparison of the relative surface of the face and the vestibular surface of central incisors indicated the existence of a certain relationship between them. That relationship was 1.21 in men, and 1.19 in women.

Conclusion: The application of as many parameters may make the right choice of the size of teeth for dentures during their preparation easier. These results may be used during face reconstruction if an individual possesses all teeth, or vice versa, for the teeth reconstruction in edentulous individuals.

Key words: Central incisors, face, surface, relationship

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Uvod

Niz je elemenata koji predstavljaju činioce lepote, ali je u svakom slučaju neophodan sklad elemenata ljudskog tela. Postoji bezbroj elemenata koji mogu biti usklađeni, pa tako i veliki broj merenja i teorija koje se ovim bave.

Kako je pored funkcije žvakanja za protetičke nadoknade bitna i njihova estetika, postoji i niz teorija o usklađenosti pojedinih elemenata pre svega ljudskog lica i zuba, a naročito gornjih centralnih sekutića, koji su najkrupniji, najistureniji i najviše vidljivi, pa zato i utiču najviše na estetiku zubne nadoknade.

U dostupnoj literaturi nema podataka o merenjima površina lica i zuba i njihovom upoređivanju, te ni odgovarajućih rezultata.

Cilj ovog rada je upoređivanje relativne površine odabranog dela lica i relativne površine gornjeg centralnog sekutića.

Materijal i metode

Merenja su izvršena kod 200 ispitanika, 100 ženskog i 100 muškog pola. Birane su osobe čije lice deluje skladno, a koje nemaju vidljive deformitete lica, ožiljke ili izrazitu asimetričnost. Takođe nisu uzimane u obzir ekstremne osobe, bilo premale ili prevelike težine, jer se to odražava i na izgled lica.

Ispitanici su bili starosti između 18 i 25 godina, bez vidljivih znakova abrazije zuba.

U radu se pošlo od pretpostavke da ukoliko postoji sklad drugih delova tela verovatno postoji i sklad zuba i lica. U mnogim teorijama (kao što je npr. Williamsova teorija) upoređuju se oblici lica i zuba i pri tom nalazi manji ili veći sklad.

I pored toga što vestibularne površine zuba i samo lice nije moguće izmeriti, jer su granice nepoznate, jasno se može videti njihova kontura, što odgovara dvodimenzionalnom objektu. U radu je izvršeno merenje površina ovih dvodimenzionalnih – u ravni projektovanih objekata.

Da bi moglo da se izvrši upoređivanje površina lica i centralnih sekutića bilo je neophodno da se oni na neki način usklade. To je izvršeno tako što je definisan pravougaonik koji služi kao osnova pri snimanju lica i zuba.

Snimani objekat je smeštan u opisani pravougaonik tako da se poklapa sa njegovom širinom. Zatim je ispitanik rotirao glavu gore-dole tako da se dobije njena najveća vertikalna dimenzija, uz nepromenjenju širinu.

Introduction

There is an array of elements representing beauty factors, however, it is necessary that these elements of the human body are in harmony. There are countless elements that could be harmonized, and thus a large number of measurements and theories that deal with this matter.

In addition to mastication, aesthetics is also essential for dentures. Consequently, there is a wide range of theories on the harmony of certain elements, primarily of the human face and teeth, especially the maxillary central incisors, which are the largest, most protruding and visible, and therefore affect denture aesthetics the most.

The existing literature provides us neither with data on face and teeth surface measurements and their comparison, nor with adequate results.

The aim of this paperwork was to compare the relative surface of a particular part of the face and the relative surface of the maxillary central incisors..

Material and methods

Measurements were done in 200 subjects, 100 women and 100 men. Subjects with a harmonious face, with no visible deformities, scars or pronounced asymmetry were selected. Furthermore, extreme subjects, either too thin or overweight, were not taken into consideration, since that is also reflected on their faces.

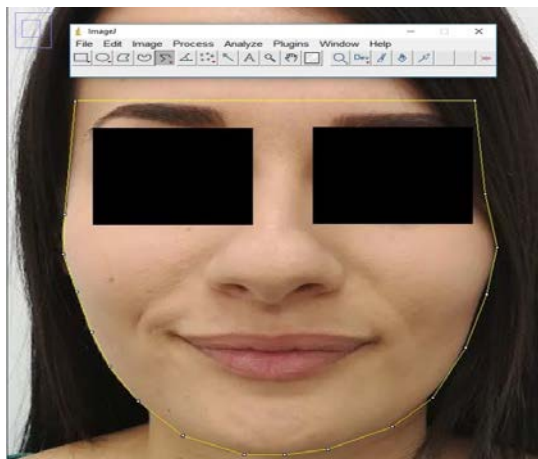
Subjects were between 18 and 25 years of age, with no visible signs of dental abrasion. The paperwork started from the assumption that if other body parts are in harmony, most probably the teeth and the face are in harmony as well. Many theories (e.g. the Williams theory) compare the shapes of the face and teeth and find that there is a certain degree of harmony between them.

Even though the vestibular surface of the teeth and the face itself are not possible to measure because their boundaries are unknown, their contours can clearly be seen, which corresponds to a two-dimensional object. In this paperwork, we measured the surface of these two-dimensional objects – in the projection plane.

In order to compare the surface of the face and central incisors, first it was necessary to harmonize them in a way. It was done by defining a rectangle which served as the basis for face and teeth imaging.

To je učinjeno i sa modelom prednjih zuba dobijenim na osnovu otiska uzetog tom ispitaniku. Da bi moglo da se vrši pravilno pozicioniranje gipsanog modela, po horizontali i vertikali, on je postavljen na postolje koje omogućava pokrete u svim pravcima. Zatim je, pri adekvatnom povećanju, dakle kada bi se širina zuba poklopila sa širinom orijentacionog pravougaonika, uz najveću dužinu, izvršeno snimanje.

Kako bi se izračunala površina lica ispitanika korišćen je softver ImageJ. Slika lica ispitanika je učitavana u program, a zatim je primenom odgovarajućeg alata vršeno označavanje dela lica čija će se površina izračunavati (Slika 1.). Prethodno je vršena kalibracija alata, kako ne bi došlo do odstupanja u dimenzijama. Merenje lica vršeno je od gornje ivice obrva do donje ivice brade. Nakon toga je vršeno merenje površine odabranog centralnog sekutića, na isti način kao i merenje površine lica.



Slika / Fig 1.

Slika lica ispitanika sa označenom površinom za merenje
The image of the face of a subject with marked surface to be calculated

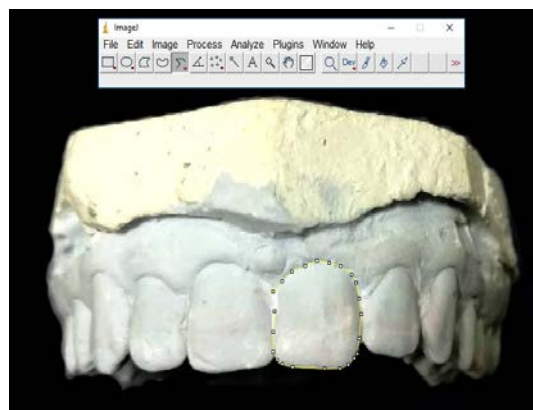
Rezultati

Upoređivanje relativne površina lica i relativne površine vestibularne površine centralnih sekutića ukazalo je na postojanje određenog odnosa među njima. Rezultati merenja predstavljeni su u Tabeli 1.

The recorded object was placed in the described rectangle to match its width. Next, the subject moved their head up and down to get its largest vertical dimension, whereas the width remained unchanged.

The same was done with the model of the front teeth obtained based on the teeth impression mold taken from the subject. In order to position a plaster model well, both horizontally and vertically, it was placed on a stand which allows movements in all directions. Then, with an adequate increase, that is, when the width of the teeth matched the width of the orientation rectangle, its longest side, dental imaging was performed.

ImageJ software was used to measure the surface of the face of the subjects. The image of the face of a subject was loaded into the program, and then the part of the face whose surface needed to be calculated was marked using appropriate tools (Fig 1.). Previously, the calibration of the tools was done to avoid possible deviations in dimensions. The face was measured from the upper eyebrow line to the lower chin line. Next, the surface of the selected central incisor was measured, in the same way as the surface of the face.



Slika / Fig 2.

Slika gipsanog modela gornjih zuba sa označenim sekutićem za merenje
The image of a plaster model of upper teeth with marked incisor to be calculated

Results

The comparison of the surface of the face and the vestibular surface of central incisors indicated the existence of a certain relationship between them. The measurement results are presented in Table 1.

	MUŠKARCI MALES	ŽENE FEMALES
BROJ / NUMBER	100	100
PROSEČNA POVRŠINA ZUBA (U PIKSELIMA) AVERAGE TEETH SURFACE (IN PIXELS)	88320	85240
STANDARDNA DEVIJACIJA STANDARD DEVIATION	7389	7945
PROSEČNA POVRŠINA LICA (U PIKSELIMA) AVERAGE FACE SURFACE (IN PIXELS)	72991	71630
STANDARDNA DEVIJACIJA STANDARD DEVIATION	5024	6831
ODNOS POVRŠINA SURFACE RATIO	1.21	1.19

Tabela / Table 1.

Jedinice mere i razmere
Measurement results and obtained ratio

Diskusija

U prirodi postoji određeni sklad elemenata čijim proučavanjem su se ljudi, a naročito umetnici bavili od davnina. Svakako da takav sklad poseduje i ljudsko telo, a za stomatologe je posebno važan sklad zuba i ostalih delova tela, pre svega lica. Ljudsko telo je manje ili više zaobljeno, praktično skoro da nema nekih jasno izraženih geometrijskih oblika. I čovekova glava i njegovi zubi su manje ili više zaobljeni, te zato lice i vidljiva - vestibularna strana zuba nemaju jasne granice u odnosu na ostale elemente glave ili zuba. Iako su ove površine manje ili više ispupčene, pri susretu sa nekom osobom iz daljine praktično vidimo dvodimenzionalnu sliku, koja sa približavanjem postaje sve više jasno trodimenzionalna. Ako se posmatrač udalji da bi jasno video lice neće dobro videti zube i obrnuto, ako se približi da bi video zube neće moći da pogledom obuhvati celo lice.

Kako u dostupnoj literaturi nema podataka o istraživanjima ove vrste, nije bilo moguće upoređivanje sa rezultatima drugih autora.

U literature se uglavnom nalaze podaci o jednodimenzionalnim merenjima pa su tako upoređivani dužina i širina pojedinih ili grupe zuba sa određenim elementima lica. Često je vršeno upoređivanje širine centralnih sekutića sa širinom filtruma¹, interpupilarnim razmakom^{2,3}, bizigomatičnom širinom^{4,5}. Sterrett je čak vršio upoređivanje dimenzija centralnog sekutića i visine ispitanika⁶.

Discussion

There is certain harmony of elements in the nature which has been studied for ages by people, especially artists. It is certain that the human body also possesses such harmony, and the harmony between the teeth and other body parts, especially the face, is particularly important for dentists. The human body is more or less rounded, practically there are no clearly pronounced geometrical shapes. Moreover, the human head and their teeth are also more or less rounded, therefore the face and the visible - vestibular side of the teeth do not have clear boundaries regarding other elements of the head or teeth. Even though these surfaces are more or less protruding, when we see a person from a distance we practically see a two-dimensional image, which evidently becomes three-dimensional as we approach. If the observer moves away to see the face clearly, they won't see the teeth well, and vice versa, if they approach to see the teeth, they will not be able to see the entire face.

Given that the existing literature does not contain data on this type of research, it was not possible to compare our results with the results of other authors. The literature mostly contains data on one-dimensional measurements, thus the length and width of an individual tooth or groups of teeth were compared to certain facial elements. The width of central incisors was often compared with the philtrum width¹, interpupillary distance^{2,3}, bizygomatic width^{4,5}. Sterrett even compared dimensions of central incisors with

Lombardi je još početkom 1970-ih predložio kriterijume kojih bi se trebalo pridržavati prilikom izrade protetskih nadoknada^{7,8}.

Apsolutna površina zuba ili površina lica nisu istraživani jer su te vrednosti jako varijabilne kod različitih osoba, pa je zato ispitivan samo njihov sklad. Iz istog razloga u obzir nisu uzimane osobe sa izrazitim odstupanjem od proseka – jako mršave i jako pune osobe.

Zaključak

Primena što većeg broja parametara može nam olakšati pravilan izbor veličine zuba prilikom izrade protetskih nadoknada.

Dobijeni rezultati odnosa merenih površina zuba i lica (1,19 za žene i 1,21 za muškarce, što u proseku čini 1,2) pokazuju da među ovim površinama postoji određeni sklad. Ovi rezultati mogu se iskoristiti pri rekonstrukciji lica ukoliko osoba poseduje zube, ili obrnuto za rekonstrukciju zuba kod bezubih osoba.

Zahvalnica

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the height of subjects⁶. Back in the early 1970s, Lombardi suggested criteria that should be met when making dentures^{7,8}.

The absolute surface of the teeth or the surface of the face was not studied since those values were quite variable in different individuals, and therefore, only their harmony was examined. Individuals with a significant deviation from the average, i.e. very thin and overweight individuals, were not taken into consideration for the same reason.

Conclusion

The application of as many parameters may make the right choice of the size of teeth for dentures during their preparation easier.

The obtained results of the relationship between the measured surface of the teeth and the face (1.19 for women and 1.21 for men, 1.2 on average) reveal that there is a certain degree of harmony between them. These results may be used during face reconstruction if an individual possesses all teeth, or vice versa, for the reconstruction in edentulous individuals.

Acknowledgments

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