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An anthropometric study of craniofacial measurements and their correlation with vertical dimension of occlusion among fully dentate population in Serbia

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SUMMARY

Introduction In clinical conditions vertical dimension of occlusion (VDO) is defined as a distance between the two points, one above and the other one under the mouth, while teeth are intercuspidated. As a result of teeth loss, attrition, abrasion or unsuccessful dental interventions the VDO changes. Decrease of VDO not only changes the esthetic appereance of the lower third of the face, but also affects the function of the orofacial system. The objective of the study was to find correlation of VDO and craniofacial measurements among fully dentate subjects.

Material and methods The study was performed at the Clinic of Prosthodontics of University of Belgrade from October 2018 until March 2019. The participants included both genders age range between 22 and 24 years, class I occlusion and intact dentition. Twelve craniofacial lines were measured with specially constructed divider. Gathered results were analyzed in SPSS 22 computer software. Mean values and standard deviation were used for data description.

Results The results showed statistically significant correlation in values of some parameters in both genders. The proportion of the face was noticed among all participants, and possibility of analyzing face by thirds. Also the correlation was noticed between the lower facial height and the height of right ear as well as bi-pupillary distance where with increasing distance of bi-pupillary line, the value of the lower facial height was also increased. Statistical significance in values of both genders was noticed in middle facial height ($p = 0.006$), lower facial height/ vertical dimension of occlusion ($p = 0.004$), width of nose ($p = 0.01$), Frankfurt plane ($p = 0.008$), height of the right ear ($p = 0.000$).

Conclusion Obtained results showed correlation between VDO and craniofacial dimension among young adults with intact dentition.

Keywords: vertical dimension of occlusion, craniofacial analysis, and anthropometric measurements

INTRODUCTION

Vertical dimension of occlusion (VDO) is defined as lower facial height, measured between two points on the face when the maxillary and mandibular teeth are intercuspated [1]. It is changeable throughout life due to the both physiological and pathological factors. During the process of mastication as a consequence of masticatory forces the amount of enamel tissue is gradually thinning and it is the outcome of attrition [2]. Even though there is compensatory mechanism of producing new layers of cementum, it is not sufficient and vertical dimension of occlusion will undoubtedly be decreasing throughout the lifetime [2]. Therefore, the VDO needs to be restored especially if extensive prosthodontic procedures are needed.

Most commonly used techniques for determining VDO are physiological (based on the physiological rest position), phonetic and cephalometric [1, 2]. None of these techniques has been proven to be sufficiently reliable and accurate; therefore they should be used combined [1–6]. Some authors recommended that VDO may be determined using the external appearance of the face, with reference to nasolabial folds, harmony between lower third and other facial thirds and consistency with patients' age [2]. Willis showed that the distance between the outer corner of the eye to the labial commissure was equal to the distance from the base of the nose to the chin, and proposed the Willis clipper for this type of measurements [2, 7].

The most commonly used method is physiological rest position, but many authors have stated that it depends on numerous factors, such as head posture, emotional state, time of the day, presence or absence of the teeth, and parafunctional activities [1, 2]. However, determination of the new VDO in restorative procedures is complex and demanding procedure and has to be with patient's esthetic, biomechanical, and functional requests. In clinical conditions it is essential to properly determine VDO for the procedures of making dentures, full-mouth reconstructions and implant-supported restorations [2].

The objective of the study was to find correlation between VDO and craniofacial measurements among fully dentate subjects. The Null hypothesis was that there is significant correlation between VDO and some facial measurements.

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MATERIAL AND METHODS

The cross-sectional study was performed at the Clinic for Prosthodontics, School of Dental Medicine University of Belgrade during the period from October 2018 until February of 2019. Analysis was performed among young adults, who met the inclusion criteria (45.71% were male and 54.29% female participants). The inclusion criteria were the following: young adult patients (19–25 years), who did not have in dental history orthodontic or surgical interventions, had intact dentition, Angle class I occlusion, no extensive lesions of non-carious lesions (extensive abrasions, erosions and abfractions of teeth), with no visible facial asymmetry, and no mio-facial pain or signs of temporomandibular dysfunctions.

Twelve craniofacial measurements were performed including VDO with a specially constructed divider. Patients were instructed to sit upright and look straight with head parallel to the floor. Craniofacial measurements that were analyzed included upper height of the face (UHP), middle height of the face (MHP), lower height of the face (LHP), facial height (FH), distance between zygions (Zyg-Zyg), inter-pupillary distance (ID), interocular distance (IO), length of the right eye, distance between gonions (Go-Go), width of the lips (LW), width of the nose (NW), Frankfurt plane (FRA) and the height of the right ear (EH) (Picture1).

VDO was determined by measuring the distance between two points, one was marked on the tip of the nose and one on the tip of the chin. Taking into account that its accuracy was pivotal, measured values were recorded twice by two therapists.

1. UFH (upper facial height) - distance measured from the hairy part of head to the radix area of the nose.
2. MFH (middle facial height) - distance measured from radix of the nose to the base of the nose.
3. LFH (VDO) - distance measured from the most prominent point on the nose to the most prominent point on the chin.
4. Zyg-Zyg - distance measured from the most prominent areas on zygomatic bone on the left and right side.
5. Inter-pupillar distance - distance measured between two pupils while patients were looking straight with occlusal plane parallel to the floor.
6. Inner distance between two eyes (IO) - distance measured between two inner angles of the eyes, while looking straight
7. Width of the right eye - distance measured between outer and inner angle of the right eye
8. Go-Go (distance between gonions) - distance measured between the two most prominent points on the lower third of mandible ramus on the right and left side
9. Width of the lips - distance measured from the right to the left angle of the mouth
10. Width of the nose - distance measured between right and left wings of nose
11. Frankfurt plane - distance measured between tragus and outer angle of the right eye
12. Height of the right rear - distance measured from the base to the tip of the right ear

Obtained results were statistically analyzed in SPSS 22 computer software. Mean values and standard deviations were used in order to describe data. T-test and Man- Whitney test were used in order to compare tested groups. Spearman correlation was applied in order to get correlation between used parameters.

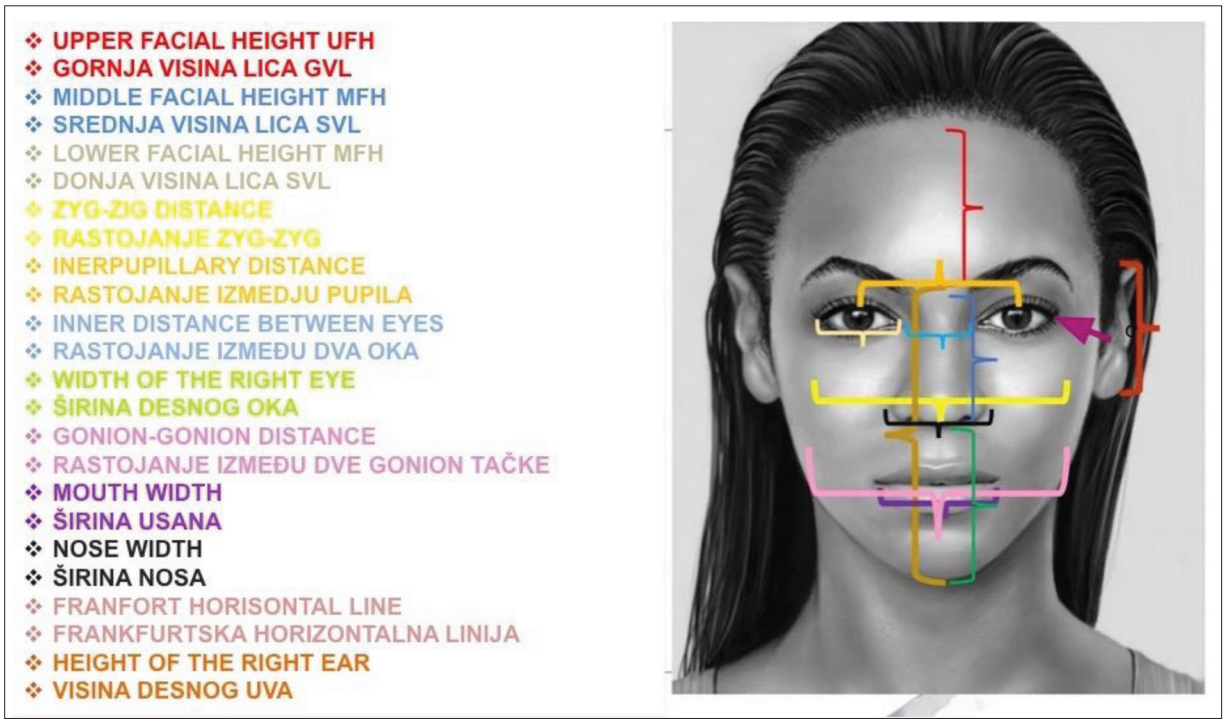

Figure 1. Craniofacial lines on the face of the patients that were used in research
Slika 1. Kraniofacijalne linije na licu pacijenta koje su korišćene u istraživanju

RESULTS

Obtained results are presented in Table 1. The results showed facial harmony of facial thirds among tested participants of both genders. Although facials proportions were slightly higher among male participants the harmony of the face was noticed among all participants. Statistical significance between genders was noticed for the following craniofacial parameters MHP (p = 0.006), VDO (p = 0.004), width of the nose (p = 0.01), Frankfurt plane (p = 0.008) and height of the ear (p = 0.000).

Table 1. Craniofacial parameters for all participants of both genders
Tabela 1. Kraniofacijalni parametri za ispitanike oba pola

Parameter Parametar	Male Muški pol	Female Ženski pol	p
UFH GVL	6.35 ± 0.79 (5.50–8.00)	6.35 ± 0.79 (4.80–7.70)	
MFH SVL	6.38 ± 0,54 (5.70–7.90)	5.93 ± 0.34 (5.40–6.60)	0.006
LFH (VDO) DVL (VDO)	6.69 ± 0.82 (5.40–8.10)	5.94 ± 0.62 (4.80–7.30)	0.004
FH VL	12.16 ± 1.01 (10.50–14.40)	11.29 ± 0.92 (10.10–13.10)	0.012
Zg-Zg Zg-Zg	12.34 ± 1.25 (9.60–14.50)	11.68 ± 1.15 (10.00–14.00)	0.112
IPD MPR	6.14 ± 0.52 (4.90–7.00)	5.47 ± 0.65 (4.00–6.50)	0.002
IOD MOR	3.28 ± 0.24 (2.90–3.70)	2.99 ± 0.25 (2.60–3.50)	0.001
Width of the right eye Širina desnog oka	3.44 ± 0.29 (2.90–3.90)	0.24 ± 0.24 (3.00–3.80)	0.275
Go-Go Go-Go	12.42 ± 1.21 (11.00–16.30)	11.43 ± 0.96 (10.00–13.80)	
Width of the nose Širina nosa	3.57 ± 0.37 (3.00–4.40)	3.31 ± 0.55 (2.50–5.30)	
Width of the mouth Širina usta	5.30 ± 0.70 (3.80–6.70)	4.91 ± 0.40 (3.90–5.40)	
FHL FHL	3.80 ± 0.42 (7.10–8.80)	3.04 ± 0.45 (6.80–8.50)	0.008
Height of the right ear Visina desnog uva	6.83 ± 0.44 (6.00–8.00)	6.07 ± 0.30 (5.60–6.50)	0.000

Mild correlation among genders was noticed between VDO and inter-pupillar distance (p = 0.04), as well as between VDO and height of the right ear between both genders (p = 0.004). The dimensions of the right ear had positive correlation among female participants. Also, positive correlation between VDO and inner distance between two eyes (p = 0.04), as well as lower facial height and width of the lips (p = 0.06) was demonstrated. In addition, correlation was demonstrated between upper and middle facial height of the face, due to the fact that if value of one parameter increases, the other one increases as well.

Furthermore, the Pearson Correlation coefficient demonstrated statistically significant correlation between VDO and inter-pupillar line (p = 0.44). Positive coefficient means that increasing the value of one parameter will undoubtedly lead to increase of another.

Also, positive correlation was demonstrated between VDO and height of the ear (p = 0,004) and VDO and width of the nose (p = 0,031). VDO and width of the lips did not correlate significantly according to Pearson correlation coefficient with value 0.325.

DISCUSSION

Obtained results in our study showed positive correlation between VDO and craniofacial dimensions among young adults with intact dentition. Positive correlation between VDO and height of the right ear was observed in both genders, as well as between VDO and inter-pupillary distance. Our results are in concordance with the results of Budai et al. [8].

Selected method was proven to be convenient, reproducible, non-invasive, easily operated and inexpensive. On the other side, in comparison to some computer methods it is less precise in locating and measuring particular craniofacial dimensions.

The study of Majeed et al. came to similar conclusion. They also demonstrated strong positive correlation between exocanthion-right labial commissure and mesial wall of the right external auditory canal-orbitale with VDO in both genders [4].

Taking into account that our investigation was performed among young adults, whose VDO was not diminished, obtained results should not be implemented in edentulous patients, whose VDO has changed and needs reestablishing. Therefore, it should be underlined that VDO represents the critical point of prosthodontics therapy. Determination of maxillomandibular relationship is essential stage during prosthodontics treatment that usually appears to be obstacle of the majority of dental practitioners in clinical practice.

Although positive correlation between the VDO and ear height is documented in this study, further investigation is needed in order to establish how these parameters change in relation to each other.

Many researchers point out the importance of determining relations between craniofacial dimensions and VDO, in order to be introduced in daily clinical practice, especially since concept of VDO is frequent topic of discussion in dental literature [9, 10, 11].

Some authors use ear-eye distance to predict chin-nose distance [12, 13] but contrary to them the results of this study could not establish correlation between these two parameters.

Inadequately determined VDO will significantly affects not only the esthetic but also the function of the oro-facial system [7, 12]. This methodology has shown to be reproducible, inexpensive, non-invasive, and may be used in numerous investigations regardless of gender or ethnicity [3, 14].

One limitation of our study was that it was performed on one ethnic group, (European Caucasian) in Serbian population, and the results may be applicable only on them. Moreover, computer analysis could be more accurate and reliable in comparison to other techniques [3, 5, 8, 10, 11]. However, the exposure to the radiation should also be considered, if radiography is used.

CONCLUSION

Obtained results demonstrated correlation between craniofacial dimensions and VDO among fully dented individuals of both genders. Finding reliable dimensions on the face can be of great importance for practitioners during procedures related to adjustment and reestablishment of VDO.

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Antropometrijska studija kraniofacijalnih dimenzija i njihova korelacija sa vertikalnom dimenzijom okluzije u populaciji Srbije kod pacijenata sa očuvanom denticijom

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KRATAK SADRŽAJ

Uvod U kliničkim uslovima vertikalna dimenzija okluzije (VDO) definiše se kao rastojanje gde je jedna tačka lokalizovana iznad, a druga ispod nivoa usana, kada su zubi u maksimalnoj interkuspidaciji. Kao posledica gubitka zuba usled atricije, abrazije, odnosno neuspešnih stomatoloških intervencija VDO se menja i ne utiče samo na estetski izgled donje trećine lica već i na funkciju mastikatornog aparata.

Cilj ovog rada bio je da se utvrdi povezanost vrednosti VDO i kraniometrijskih dimenzija kod pacijenata sa intaktnom denticijom.

Materijal i metode Ispitivanje je sprovedeno na Klinici za Stomatološku protetiku Univerziteta u Beogradu i trajalo je od oktobra 2018. do marta 2019. godine. Ispitanici su bili muškog i ženskog pola, prosečne starosti između 22 i 24 godine, I skeletne klase i intaktne denticije.

Dvanaest kraniometrijskih linija je izmereno korišćenjem specijalno izrađenog šestara. Prikupljeni rezultati su analizirani u kompjuterskom programu SPSS 22. Prosek i standardna devijacija su korišćeni za deskripciju podataka, a Spirmanova korelacija za utvrđivanje povezanosti između parametara.

Rezultati Rezultati su pokazali statistički značajnu povezanost kraniometrijskih linija kod osoba oba pola. Uočena je skladnost lica ispitanika, i mogućnost analize lica po trećinama. Pokazana je korelacija srednje jačine između donje trećine lica i veličine uveta. Takođe je zapažena korelacija donje trećine lica i bipupilarne linije jer je uočeno da se pri povećanju rastojanja bipupilarne linije povećavala i vrednost donje trećine lica. Statistička značajnost u rezultatima među polovima je uočena kada su u pitanju srednja visina lica ($p = 0,006$), donja visina lica/vertikalna,

dimenzije okluzije ($p = 0,004$), širine nosa ($p = 0,01$), Frankfurtske horizontale ($p = 0,008$), visine desnog uveta ($p = 0,000$).

Zaključak Dobijeni rezultati su pokazali da postoji korelacija VDO i kraniometrijskih dimenzija među pacijentima mlađe životne dobi sa intaktnom denticijom.

Ključne reči: vertiklana dimezija okluzije; kraniometrijska analiza; antropometrijske mere

UVOD

Vertikalna dimenzija okluzije (VDO) definiše se kao donja visina lica, koja se meri između dve tačke kada su maksilarni i mandibularni zubi u interkuspidaciji [1]. Ona je promenjiva tokom života zbog sinergističnog delovanja fizioloških i patoloških faktora. Tokom procesa mastikacije kao posledica mastikatornih sila količina gleđi se postepeno smanjuje i to oslikava fiziološki proces atricije zuba [2]. S druge strane, ukoliko se jave patološke lezije zuba kao što su abrazija, erozija i abfrakcija, VDO će se bez sumnje smanjiti, iako tokom života dolazi do kompenzatornog mehanizma stvaranja slojeva cementa zuba [2]. VDO zahteva ponovno uspostavljanje kod obimnih protetskih intervencija.

Među najčešćim tehnikama određivanja VDO su fiziološka (bazirana na fiziološkom položaju mirovanja), fonetska i kefalometrijska [1, 2]. Kako se nijedna od navedenih tehnika nije pokazala dovoljno pouzdanom i preciznom, ne bi ih trebalo koristiti pojedinačno [1–6].

Tarner i *Foks* su preporučili da se VDO određuje u odnosu na spoljašnji izgled lica, uzimajući u obzir nazolabijalne brazde, skladnost donje trećine sa ostalim trećinama lica i godine pacijenta [2].

Vilis je pokazao da je rastojanje između spoljašnjeg ugla oka do labijalne komisure jednako rastojanju merenom od baze nosa do brade, i unapredio Vilisov merač za ovu vrstu merenja [2]. Najčešće korišćen metod je položaj fiziološkog mirovanja, iako su mnogi autori potvrdili da on zavisi od brojnih faktora – položaja glave, emocionalnog stanja pacijenta, doba dana, prisutnosti ili odsustva zuba, odnosno dnevnih i noćnih parafunkcija [1, 2].

VDO treba da zadovolji pacijentove estetske, biomehaničke i funkcionalne potrebe. U kliničkim uslovima pri izradi proteza, potpunoj implantatno-podržanoj rehabilitaciji neophodno je pravilno i ponovno uspostavljanje VDO i obezbeđivanje potpore gornjoj usni promenom položaja frontalnih zuba u gornjoj vilici [2].

Cilj ovog istraživanja je bio da se utvrdi povezanost vrednosti VDO i kraniometrijskih dimenzija kod pacijenata sa intaktnom denticijom.

Nulta hipopteza je bila da postoji značajna korelacija između VDO i pojedinih kraniometrijskih linija.

MATERIJAL I METODE

Studija preseka je sprovedena na Klinici za stomatološku protetiku Univerziteta u Beogradu u periodu od oktobra 2018. do februara 2019. godine. Analize su urađene kod pacijenata mlađe životne dobi u rasponu od 22 do 24 godine, koji su zadovoljavali uslove studije. Ispitanici muškog pola obuhvatali su 45,71%, a ženskog 54,29% testiranih osoba.

U istraživanje su uključeni pacijenti životne dobi 19–25 godina koji prethodno nisu bili povdrgnuti ortodontskoj ili hirurškoj terapiji na vilicama, koji su imali intaktnu denticiju i I skeletnu klasu, bez uočenih lezija nekarijesne etiologije (obimne abrazije, erozije i abfrakcije zuba), pacijenti bez vidljivih asimetrija lica (povreda, malformacija, otoka) i pacijenti

bez miofacijalnih bolova i bez znakova temporomandibularnih disfunkcija.

Tokom merenja je korišćeno dvanaest kraniometrijskih linija, uključujući i VDO. Merenje je realizovano specijalno konstruisanim šestarom. Pacijentima je bilo objašnjeno da sede uspravno, sa pogledom usmerenim napred i paralelno sa podom. Analizirane su sledeće kraniometrijske linije: gornja visina lica (GVS), srednja visina lica (SVS), donja visina lica (DVS), visina lica (VL), rastojanje između zigoma (Zyg–Zyg), interpupilarno rastojanje (IR), unutrašnje rastojanje očiju (URS), širina desnog oka, rastojanje između goniona (Go–Go), širina usta, širina nosa, Frankfurtska horizontala i visina desnog uha (Slika 1).

VDO je određena merenjem rastojanja između dve tačke, jedne obeležene na najprominetnijem delu nosa, a druge na vrhu brade. Imajući u vidu njenu verodostojnost, vrednosti su merene dva puta, a merenje su realizovala dva istraživača.

1. GVL (gornja trećina lica) – rastojanje mereno od kosmatog dela glave do korena nosa
2. SVL (srednja trećina lica) – rastojanje mereno od korena nosa do baze nosa
3. DVL(VDO) – rastojanje mereno od najprominentnije tačke na nosu do najprominentnije tačke na bradi
4. ZYG–ZYG – rastojanje mereno od najispupčenijeg mesta na zigomatičnoj kosti sa desne i leve strane
5. BIP linija – rastojanje mereno između dve papile, merene dok pacijent gleda pravo sa okluzalnom linijom, koja je paralelna sa podom
6. URO (unutrašnje rastojanje očiju) – rastojanje mereno između dva unutrašnja ugla očiju, dok pacijent gleda pravo
7. Širina desnog oka – rastojanje između spoljašnjeg i unutrašnjeg ugla desnog oka
8. Go–Go (gonion–gonion) – rastojanje mereno između najprominentnije tačke u donjoj trećini ramusa sa desne i leve strane
9. Širina usta – rastojanje mereno od desnog do levog ugla usne
10. Širina nosa – rastojanje mereno između desnog i levog nosnog krilca
11. Frankfurtska horizontala – rastojanje mereno između tragusa i spoljašnjeg ugla desnog oka
12. Visina uveta – rastojanje mereno od baze do vrha desnog uveta

Dobijeni rezultati su statistički obrađeni u kompjuterskom programu SPSS22. Prosek i standardna devijacija su korišćeni radi deskripcije podataka. T-test i Men–Vitnijev test su korišćeni radi poređenja ispitivanih grupa. Spirmanova korelacija je korišćena za utvrđivanje povezanosti između korišćenih parametara.

REZULTATI

Dobijeni rezultati su prikazani u Tabeli 1.

Rezultati su pokazali skladnost dimenzija facijalnih trećina kod testiranih osoba oba pola. Iako su facijalne proporcije bile nešto veće među muškim ispitanicima, skladnost trećina lica uočena je kod svih ispitanika. Statistička značajnost između polova je uočena kod SVS ($p = 0,006$), DVS ($p = 0,004$), širine nosa ($p = 0,01$), Frankfurtske horizontale ($p = 0,008$) i visine uha ($p = 0,000$). Umerena korelacija između polova je uočena između DVS i bipupilarnog rastojanja ($p = 0,04$), kao i između VDO i visine desnog uha kod oba pola ($p = 0,004$). Veličina desnog uha je imala pozitivnu korelaciju među ispitanicima ženskog pola. S druge strane, pokazana je pozitivna korelacija između VDO i URO ($p = 0,04$), kao i donje trećine lica i širine usana ($p = 0,06$). Pokazana je korelacija gornje i srednje visine lica, jer se sa povećanjem jednog parametra povećavao i drugi.

Korišćenjem Pirsonove korelacije uočena je statistički značajna povezanost između VDO i bipupilarne linije ($p = 0,44$), pozitivnog smera, što znači da se povećanjem vrednosti jednog parametra povećava vrednost drugog. Takođe, Pirsonova korelacija je pokazala pozitivnu umerenu povezanost VDO i visine desnog uha kod ispitanika oba pola ($p = 0,004$). Između VDO i širina nosa je isto tako uočena pozitivna korelacija ($p = 0,031$). Ipak, VDO i širina usta nisu bili u pozitivnoj korelaciji ($p = 0,325$).

DISKUSIJA

Dobijeni rezultati ovog istraživanja su pokazali da kod mladih osoba sa intaktnom denticijom postoji korelacija između VDO i kraniofacijalnih dimenzija. Uočena je pozitivna korelacija između VDO i visine desnog uha kod oba pola, kao i između VDO i bipupilarne linije. Dobijene vrednosti SVL su saglasne sa rezultatima do kojih su došli *Budai* i saradnici [8].

Odabrana metodologija se pokazala prikladnom jer je ponovljiva, neinvazivna, laka za upotrebu i jeftina. S druge strane, u odnosu na neke kompjuterske metode može biti nepreciznija u lociranju određenih tačaka, ali i merenju odabranih kraniofacijalnih linija u ovom istraživanju.

Slične rezultate kao u ovom istraživanju dobili su *Majeed* i saradnici [4]. Oni su pokazali jaku pozitivnu korelaciju između *ehokantion* leve labijalne komisure i medijalnog zida desnog spoljašnjeg ušnog kanala i VDO kod oba pola. S druge strane, visina ušne školjke je imala pozitivnu korelaciju kod ženskih ispitanika.

Nalazi ovih istraživanja su potvrdili korelaciju između rastojanja nosa i uha sa VDO, pa se nulta hipoteza može prihvatiti jer postoji korelacija između VDO i pojedinih kraniometrijskih linija [4].

Imajući u vidu da je istraživanje sprovedeno među mladim pacijentima, gde VDO nije bila smanjena, dobijeni rezultati se ne bi mogli koristiti kod bezzubih pacijenata, čija je VDO ugrožena i zahteva ponovno uspostavljanje [2]. Zato je neophodno naglasiti da VDO predstavlja kritičnu tačku protetske terapije, a određivanje međuviličnih odnosa važnu fazu i često izazov brojnih stomatologa u kliničkoj praksi [2, 4].

Iako je uočena pozitivna korelacija između vrednosti VDO i visine desnog uha, neophodna su dalja istraživanja i praćenja svakog pojedinačnog slučaja kako bi se registrovalo kako odabrani parametrni i njihove dimenzije utiču jedni na druge.

Pojedini istraživači smatraju da je neophodno ustanoviti povezanost između kraniofacijalnih linija i VDO, kako bi se ovakva metoda uvela u svakodnevnu stomatološku praksu, jer je koncept VDO česta tema diskusije u literaturi [9, 10, 11]. Pojedini istraživači su u analizama koristili rastojanje između

dva oka u cilju koreliranja rastojanja između brade i nosa [12, 13]. U ovim istraživanjima ova povezanost nije uočena.

Neadekvatno uspostavljanje visine donje trećine lica značajno ugrožava kako estetiku tako i funkciju stomatognatnog sistema [7, 12]. Korišćena metodologija je ponovljiva, jeftina i neinvazivana za upotebu, i može da se koristi u brojnim istraživanjima nezavisno od pola i nacionalnosti [3, 14]. Dodatno ograničenje ovog istraživanja je u tome što je spovedeno samo na jednoj etničkoj grupi (Evropskim belcima) u srpskoj populaciji, pa je teško ove rezultate koristiti za neka druga poređenja.

Primena kompjuterske analize, po mišljenju brojnih autora, ukazala je na daleko preciznije i pouzdanije nalaze u poređenju sa drugim korišćenim metodama [3, 5, 8, 10, 11]. Izlaganje zračenju pacijenata korišćenjem telerendgenskih snimaka kod kefalometrijskih metoda može biti problem, ali bi se zbog izuzetne preciznosti moglo razmotriti.

ZAKLJUČAK

Dobijeni rezultati su pokazali da postoji korelacija između kraniometrijskih dimenzija i VDO kod osoba oba pola sa intaktnom denticijom. Pronalaženje pouzdane dimenzije na licu može biti od koristi praktičarima, tokom obimnih intervencija koje su skopčane sa promenom i ponovnim uspostavljanjem VDO.