

Primljen / Received on: 22.02.2022.
Revidiran / Revised on: 25.03.2022.
Prihvaćen / Accepted on: 12.05.2022.

INFORMATIVNI RAD
INFORMATIVE ARTICLE
doi: 10.5937/asn2285410K

ANTROPOMETRIJSKI PARAMETRI I ESTETIKA U IZRADI FIKSNIH STOMATOLOŠKIH NADOKNADA – 2 deo

ANTHROPOMETRIC PARAMETERS AND AESTHETICS IN THE MAKING OF FIXED PROSTHODONTIC RESTAURATIONS – Part 2

Milena M. Kostić^{1,2}, Marko A. Igić^{1,2}, Nikola R. Gligorijević¹, Maja Z. Anđelković², Marija G. Jovanović¹, Ana S. Pejčić^{1,2}, Kristina N. Burić¹

¹ UNIVERZITET U NIŠU, MEDICINSKI FAKULTET, NIŠ, SRBIJA
² KLINIKA ZA DENTALNU MEDICINU NIŠ, NIŠ, SRBIJA

¹ UNIVERSITY OF NIŠ, FACULTY OF MEDICINE, NIŠ, SERBIA
² CLINIC OF DENTAL MEDICINE NIŠ, NIŠ, SERBIA

Sažetak

Uvod: Uloga estetske stomatologije u domenu fiksne stomatološke protetike jeste redizajniranje osmeha, što ne podrazumeva samo tretman zuba, već i obradu okolnih mekih tkiva. Uspesna terapija može se ostvariti uspostavljanjem sklada između statičkih (zubi i gingiva) i dinamičkih faktora (usne, obrazi i mimični mišići) u stanju mirovanja i pri vršenju različitih funkcija orofacijalnog sistema.

Cilj rada: bila je analiza parametara mekih oralnih tkiva (zdravlje gingive, visina gingive, gingivalni zeniti, linija usana i simetrija i ravnoteža zubnog niza), koji utiču na estetiku fiksnih protetičkih nadoknada. Korišćeni su podaci iz literature i kliničko iskustvo.

Zaključak: Poštovanje opisanih parametara od velikog je značaja u izradi estetske funkcionalne fiksne protetičke nadoknade.

Ključne reči: estetika, gingiva, linija usana

Abstract

Introduction: The role of aesthetic dentistry in the field of fixed dental prosthetics is to redesign the smile, which means not only the treatment on the teeth, but also the treatment of the surrounding soft tissues. Successful therapy can be achieved by establishing the harmony between the static (teeth, gingiva) and dynamic factors (lips, cheeks, mimic muscles) at rest and when performing various functions of the orofacial system.

The aim: of the study was to analyze the parameters of the oral soft tissues (gingival health, gingival height, gingival zeniths, lip line and symmetry and balance of the dentition) that affect the aesthetics of fixed prosthodontic restorations. Literature data and clinical experience were used.

Conclusion: Adherence to the described parameters is of great importance in the development of aesthetic and functional fixed prosthetic restoration.

Key words: aesthetics, gingiva, lip line

Corresponding author:

Milena Kostić, DDM, PhD
Clinic of Dental Medicine Niš
Dr. Zorana Djindjić Blvd 52, 18000 Niš
E-mail: milena.kostic@medfak.ni.ac.rs

2022 Faculty of Medicine in Niš. Clinic of Dental Medicine Niš.
All rights reserved / © 2022. Medicinski fakultet Niš. Klinika za dentalnu medicinu Niš. Sva prava zadržana.

Uvod

Nesumnjivo je da je estetika lica oduvek zauzimala važno mesto u samopercepiji čoveka i determinisala njegov stav prema životnim vrednostima. Naime, samoulepšavanje i težnja ka očuvanju mladalačkog izgleda načini su ponašanja duboko ukorenjeni u čovekovo postojanje. Skladnost lica, posebno njegove donje trećine, može se poboljšati stomatološkim tretmanom, individualnim pristupom ili, daleko češće, timskim radom parodontologa, ortodonta, protetičara i, ponekad, maksilofacijalnog hirurga. Okluzalnom rehabilitacijom i adekvatnim tretmanom oralnih mekih tkiva, rad stomatologa obezbeđuje funkcionalnost orofacijalnog sistema, kreativnost u dizajniranju osmeha i socijalno-psihološku rehabilitaciju pacijenta. Imajući u vidu dominantnu ulogu, koju estetika ima u savremenoj stomatologiji, sve moderene koncepte u orofacijalnoj rehabilitaciji pacijenta možemo podvesti pod pojam estetske stomatologije.

Uloga estetske stomatologije u domenu fiksne stomatološke protetike jeste redizajniranje osmeha, pod kojim se ne podrazumeva samo tretman zuba, već i obrada okolnih mekih tkiva. Protetska nadoknada svojim dizajnom i odnosom prema strukturama sa kojima dolazi u kontakt (usne i obrazi) utiče i na estetiku lica, te je od nepobitne važnosti za celokupnu skladnost izgleda pacijenta¹.

Imajući u vidu velikobrojnosti raznolikost izgleda pacijenata, od posebne je važnosti ustanoviti i poštovati kriterijume oblikovanja osmeha, koji obezbeđuju univerzalnu dopadljivost. Kada su u pitanju tvrda zubna tkiva, to je odnos središnje linije zuba i lica, dužine zuba, interdentalne kontaktne tačke i površine, oblika, veličine i proporcije zuba i njihova boja². Analiza mekih oralnih tkiva obuhvata poziciju zenitnih tački, gingivni pripoj, liniju osmeha, odnosno liniju usana. Smatra se da se uspešna terapija može ostvariti uspostavljanjem sklada između statičkih (zubi i gingiva) i dinamičkih faktora (usne, obrazi i mimični mišići) u stanju mirovanja i pri vršenju različitih funkcija orofacijnog sistema³.

Cilj rada bila je analiza parametara mekih oralnih tkiva, koji utiču na estetiku fiksnih protetičkih nadoknada, na osnovu podataka iz literature i kliničkog iskustva.

Introduction

There is no doubt that facial aesthetics has always occupied an important place in a person's self-perception and determined his attitude towards life values. Namely, self-beautification and striving to preserve a youthful appearance are a way of behaving deeply rooted in human existence. The harmony of the face, especially its lower third, can be improved by dental treatment, individual approach or, far more often, teamwork of periodontists, orthodontists, prosthodontists and, sometimes, maxillofacial surgeons. With occlusal rehabilitation and adequate treatment of oral soft tissues, the work of a dentist ensures the functionality of the orofacial system, creativity in designing a smile and social and psychological rehabilitation of the patient. Having in mind the dominant role that aesthetics has in modern dentistry, all modern concepts in orofacial rehabilitation of the patient can be summed up as aesthetic dentistry.

The role of aesthetic dentistry in the field of fixed dental prosthodontics is the redesign of the smile, which means not only the treatment on the teeth but also the treatment of the surrounding soft tissues. Prosthodontic compensation with its design and relation towards the structures with which it comes into contact (lips, cheeks) also affects the aesthetics of the face, and is of undeniable importance for the overall harmony of the patient's appearance¹.

Given the infinity of different patient appearances, it is of particular importance to establish and adhere to smile-shaping criteria that seek to ensure universal appeal. When it comes to dental hard tissues, it is the relationship between the midline of the teeth and the face, the length of the teeth, the interdental contact points and surfaces, the shape, size and proportions of the teeth and their color². The analysis of the oral soft tissues includes the position of the zenith points, gingival attachment, smile line, or lip line. It is believed that successful therapy can be achieved by establishing the harmony between the static (teeth, gingiva) and dynamic factors (lips, cheeks, mimic muscles) at rest and when performing various functions of the orofacial system³.

The aim of this study was to analyze the parameters of the oral soft tissues that affect the aesthetics of fixed prosthodontic restorations based on the literature data and clinical experience.

Zdravlje gingive

Preprotetska parodontološka priprema i usvajanje postulata optimalne oralne higijene preduslov su za uspešnost i trajnost protetske terapije. Zdrava gingiva je blede roze boje, matirane površine i karakterističnog izgleda „kore narandže“. Proteže se oko gleđno-cementne granice, u vidu okvira. Različito je vidljiva u zavisnosti od dužine i konture usana, a nepoštovanje njenog anatomorfološkog oblika smanjuje estetski efekat nadoknade i može biti uzrok funkcionalnih oštećenja. Pojedini autori smatraju da je širina pripojne gingive od 2mm optimalna da ujedno zadovolji estetske kriterijume i obezbedi trajno zdravlje parodontalnog tkiva nakon cementiranja fiksnih protetskih konstrukcija³. Loša oralna higijena i konsektivne zapaljenske promene menjaju arhitektoniku gingive, dovode do njenog povlačenja i remete estetiku i funkcionalnost stomatološkog rada. Sa druge strane, recesija gingive i sledstvene parodontalne promene mogu biti i jatrogene prirode, a obično su izazvane postojanjem marginalne pukotine između protetskog rada i brušenog zuba (kratke ili široke krune) ili subgingivalnom pozicijom demarkacije preparacije⁴. Kako su zdrava marginalna gingiva i interdentalni prostori ispunjeni papilom neophodni za lep izgled mostova i osmeh pacijenta, neophodno je maksimalno precizno izgraditi sinergiju mekih oralnih tkiva i veštačkih materijala od kojih su oni napravljeni, kao i obučiti pacijenta kako da štiti oralno zdravlje.

Visina gingive

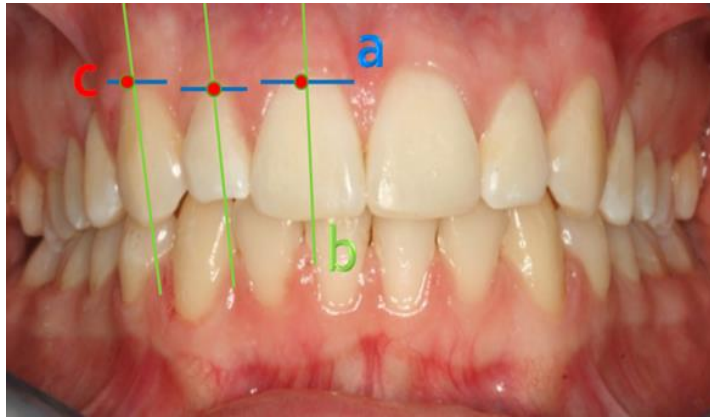
Kontura gingive gornjih centralnih sekutića i očnjaka ima elipsiodni, a lateralnih sekutića polukružni oblik. Za pravilno oblikovanje osmeha neohodno je pravilno pozicioniranje nivoa gingive. Posmatrano u horizontalnoj ravni, najviša pozicija gingivalne konture gornjih centralnih sekutića nešto je više pozicionirana u odnosu na poziciju lateralnih sekutića. Visina gingive gornjih lateralnih sekutića nalazi se 0,5 mm do 0,2 mm ispod nivoa gingive centralnih sekutića⁵. Najviša tačka gingivalne konture gornjih očnjaka postavljena je nešto apeksnije u poređenju sa najvišom tačkom gingivalne konture centralnih sekutića. Razlike u visini nivoa gingive gornjih prednjih zuba čine osmeh zanimljivijim i atraktivnijim (Slika 1).

Gingival health

Pre-prosthetic periodontal preparation and adoption of the postulates of optimal oral hygiene are a precondition for the success and durability of prosthetic therapy. The healthy gingiva has a pale pink color, matte surface and the characteristic appearance of "orange peel". It extends around the enamel-cement border in the form of a frame. It is different depending on the length and contour of the lips, and disrespecting its anatomical and morphological shape, the gingiva reduces the aesthetic effect of compensation and can be the cause of functional damage. Some authors believe that the width of the adhered gingiva of 2 mm is optimal to meet the aesthetic criteria and ensure lasting health of periodontal tissue after cementation of fixed prosthetic structures³. Poor oral hygiene and consequent inflammatory changes modify the architecture of the gingiva, lead to its withdrawal and disrupt the aesthetics and functionality of dental work. On the other hand, gingival recession and consequent periodontal changes can be iatrogenic in nature, and are usually caused by the existence of a marginal crack between prosthetic work and a prepared tooth (short or wide crown) or a subgingival position of preparation demarcation⁴. Since the healthy marginal gingiva and interdental spaces filled with papillae are necessary for the beautiful appearance of bridges and the patient's smile, it is necessary to make the synergy between oral soft tissues and artificial materials they are reproduced of, as well as teach the patient how to protect oral health.

Gingival height

The contour of the gingiva of the upper central incisors and canines has an ellipse shape, and the lateral incisors have a semicircular shape. Proper gingival leveling is necessary for proper smile formation. Observed in the horizontal plane, the highest position of the gingival contour of the upper central incisors is somewhat more positioned in relation to the lateral incisors. The height of the gingiva of the upper lateral incisors is 0.5 to 0.2 mm below the level of the central incisors gingiva⁵. The highest point of the gingival contour of the upper canines is set somewhat more apically compared to the central incisors. Differences in the level of the gingiva of the upper front teeth make the smile more interesting and attractive (Figure 1).



Slika 1. Estetika gingive a) cervikalna visina gingive maksilarnog lateralnog sekutića nalazi se oko 0,5–0,2 mm ispod nivoa gingive centralnih sekutića i očnjaka; b) uzdužna osovina zuba c) gingivalni zeniti

//www.sfzg.unizg.hr › estetika_u_ortodonciji

Figure 1. Aesthetics of the gingiva a) the cervical height of the gingiva of the maxillary lateral incisor is about 0.5–0.2 mm below the level of the gingiva of the central incisors and canines; b) longitudinal axis of the tooth c) gingival zeniths

//www.sfzg.unizg.hr › aesthetics_in_orthodontics

Gingivalne konture gornjih prednjih zuba nejednake su visine, sa prividnom nesavršenošću i tada govorimo o klasi I gingivalnih visina. Klasa II gingivalnih visina podrazumeva apeksnije postavljene gingivalne konture lateralnih sekutića u odnosu na gingivalne konture centralnih sekutića i očnjaka.

Pri fiksno protetskoj rekonstrukciji, bitno je prepoznati kojoj klasi gingivalnih kontura pripada posmatrani slučaj, jer od pravilne rekonstrukcije mekih tkiva, koja okružuju zube, zavisi kako estetski tako i funkcionalni uspeh terapije³. Ukoliko je pozicija gingive značajno izmenjena nakon destrukcije ili gubitka zuba, pre izrade protetskog rada neohodna je gingivoplastika.

Gingivalni zeniti

Gingivalni zeniti ili zenitne tačke najviše su apikalne tačke zuba na spoljašnjoj konturi gingive. Obično su lokalizovani distalnije od uzdužne osovine maksilarnih sekutića i očnjaka. Kod lateralnih sekutića gornje vilice, ona je u pravcu uzdužne osovine zuba (Slika 1). O položaju gingivalnih zenita treba voditi računa tokom brušenja zuba i otiskivanja, kao i prilikom modelovanja članova fiksnog protetskog rada.

The gingival contours of the upper front teeth are unequal in height, with apparent imperfection, and then we talk about class I gingival heights. Class II gingival heights include more apically placed gingival contours of the lateral incisors in relation to the central incisors and canines.

During fixed prosthodontic reconstruction, it is important to recognize which class of gingival contours the observed case belongs to, because both aesthetic and functional success of therapy depends on the correct reconstruction of soft tissues surrounding teeth³. If the position of the gingiva is significantly changed after the destruction or loss of the tooth, gingivoplasty is necessary before making prosthodontic work.

Gingival zenith

The gingival zeniths or zenith points are the most apical points of the tooth on the outer contour of the gingiva. They are usually located distal to the longitudinal axis of the maxillary incisors and canines. In the lateral incisors of the upper jaw, it is in the direction of the longitudinal axis of the tooth (Figure 1). The position of the gingival zeniths should be taken into account during tooth preparation and impression, as well as during the modeling of members of fixed prosthodontic work.

Linija usana

Ekponiranost gornjih zuba i gingive zavisi od pozicije linije gornje usne. Sa druge strane, linija osmeha donje usne blago dodiruje sečivne ivice gornjih prednjih zuba⁶.

U odnosu na vidljivost postoje tri tipa linija gornje usne: visoka, srednja i niska linija, što utiče na vidljivost zuba i, samim tim na estetski izgled lica⁷ (Slika 2). Niska linija usana najmanje je estetski prihvatljiva, jer prekriva gingivu i veći deo zuba, pa su oni jedva vidljivi. Ukoliko je moguće, vidljivost zuba može se povećati produžavanjem kliničkih kruna zuba⁸. Starenjem, gornja usna postaje opuštenija gornja usna je opuštenija i u većoj meri prekriva gornje centralne sekutiće, te su donji zubi vidljiviji u odnosu na gornje⁹.

Srednja linija usana dozvoljava vidljivost zuba od 1 mm do 3 mm i smatra se estetski najprihvatljivijom. Kod visoke linije usana, desni i zubni su vidljivi, što ne izgleda lepo, a klinički se teško koriguje¹⁰.

Lip line

The exposure of the upper teeth and gingiva depends on the position of the upper lip line. On the other hand, the smile line of the lower lip lightly touches the cutting edges of the upper front teeth⁶.

In relation to visibility, there are three types of upper lip line: high, middle and low, which affects the visibility of the teeth and thus the aesthetic appearance of the face⁷ (Figure 2). The lower lip line is the least aesthetically pleasing because it covers the gingiva and most of the teeth, so they are barely visible. If possible, tooth visibility can be increased by lengthening the clinical crowns of the teeth⁸. With age, the upper lip is more relaxed and covers the upper central incisors to a greater extent, so the lower teeth are more visible than the upper ones⁹.

The middle line of the lips allows the visibility of the teeth from 1 to 3 mm and is considered the most aesthetically pleasing. With the high lip line, the gums and teeth are very visible, which does not look nice, and it is clinically difficult to correct¹⁰.



Slika 2. Visoka (a), srednja (b) i niska (c) linija usana⁸
Figure 2. High (a), middle (b) and low (c) lip line⁸

Simetrija i ravnoteža zubnog niza

Simetričnost zubnog niza posmatra se u odnosu na središnju liniju lica. Sredina zubnog luka i sredina zubnih nizova treba da se poklapaju, što se posebno odnosi na zube gornje vilice (Slika 3). Nepodudarnost srednje linije lica i sredine donjeg zubnog niza češća je, ali sa estetskog stanovišta nije od bitnog značaja⁸.

Za skladnu kompoziciju osmeha poželjana je paralelnost linije koja prolazi kroz komisure usana i linije koja spaja vrhove očnjaka¹¹.

Symmetry and balance of the dentition

The symmetry of the dentition is observed in relation to the midline of the face. The middle of the dental arch and the middle of the dental rows should coincide, which is especially true for the teeth of the upper jaw (Figure 3). The mismatch between the middle line of the face and the middle of the lower dentition is more common, but from an aesthetic point of view it is not important⁸.

For a harmonious composition of the smile, the parallelism of the line passing through the commissures of the lips and the line connecting the tips of the canines¹¹ is desirable.



Slika 3. Blaga nepodudarnost središnje linije lica i sredine gornjeg zubnog niza ¹²

Figure 3. Mild mismatch of the center line of the face and the middle of the upper dentition¹²

Zaključak

Poštovanje opisanih funkcionalnih i estetskih parametara važno je u izradi fiksnih protetičkih nadoknada, kojim treba težiti kako bi se postigli elementarni postulati lepog. Ipak, ljudska lepota ne može biti apsolutno definisana opisanim kriterijumima. Ona je stvar raznolikosti, lične percepcije, stanja duha, pa je stoga individualna vrednost svakog pojedinca, uz opasku da i nesavršenost može biti i te kako zanimljiva.

Conclusion

Observance of the described functional and aesthetic parameters is important in the creation of fixed prosthodontic restorations, which should be strived for in order to achieve the elementary postulate of the beautiful. However, human beauty cannot be absolutely defined by the described criteria. It is a matter of diversity, personal perception, state of mind, so it is the personal value of each individual, for imperfection can be very interesting.

Konflikt interesa: Nema
Finansijske podrške: Nema
Zahvalnice: Nema

Conflict of Interest: Nil
Financial Support: Nil
Acnowledgments: Nil

LITERATURA /REFERENCES

1. Morley J, Edubank J. Macroesthetic elements of smile design. *J Am Orthod Dentofac.* 2006;130:163-169.
2. Gligorijević N, Igić M, Andjelković M, Jovanović M, Janković N, Kostić M. Anthropometric parameters and aesthetics in the making of fixed prosthodontic restorations - part 1. *Acta Stomatol Naissi.* 2021; 37(84): 2325-2333.
3. Obradović Đuričić K, Kostić Lj, Martinović Ž. Gingivalni i dentalni parametri u proceni estetskih obeležja fiksnih nadoknada-1 deo, *Srp Arh Celok Lek* 2005; 133:190-187
4. Lindhe J, Karring T. Anatomy of periodontium-gingiva. In: Lindhe J, Karring T, Lang NP, editors. *Clinical Periodontology and Implant Dentistry.* Copenhagen: Munksgaard; 1997. p.21-4.
5. Rufenacht, C.R. *Fundamentals of Esthetics.* Quintessence Publishing Co; Chicago. 1990.
6. Morley J. Smile design. Specific considerations. *CDAJ.* 1997;25:636.
7. Mentha SB, Banergi S, Aulakh R. Patient Assesment: Preparing for Predicable Aesthetic Outcome. *Dent Update* 2015; 42:78-86.
8. Melo M, Ata-Ali J, Ata-Ali F, Bulsei M, Grella P, Cobo T, Martínez-González JM. Evaluation of the maxillary midline, curve of the upper lip, smile line and tooth shape: a prospective study of 140 Caucasian patients. *BMC Oral Health.* 2020 Feb 6;20(1):42.
9. Choi SH1, Kim JS2, Kim CS2, Hwang CJ1. The influence of age on lip-line cant in adults: a cross-sectional study. *Korean J Orthod.* 2016 Mar;46(2):81-86.
10. Gurel G. *Znanje i vještina u izradi estetskih keramičkih ljuski,* Chicago: Quintessence Publishing; 2009.
11. Camargo PM1, Melnick PR, Camargo LM. Clinical crown lengthening in the esthetic zone. *J Calif Dent Assoc.* 2007 Jul;35(7):487-498.
12. <https://www.yourdentistryguide.com/smile-anatomy>