

Oralna higijena i stanje gingive u pacijenata s privremeno cementiranim mostovima

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Sažetak

Svrha je ovog istraživanja bila usporediti oralnu higijenu i stanje gingive u kontrolne skupine (studenti stomatološkog fakulteta, n=20) i u pacijenata (n=137) s novim, privremeno cementiranim mostovima. Također se željelo ispitati postoji li razlika u oralnoj higijeni između oralne i vestibularne strane mosta i postoji li razlika u oralnoj higijeni i stanju gingive između nosača mosta i homolognih zuba. Grupa pacijenata dobila je detaljne upute o načinu održavanja higijene mosta, mostovi su cementirani privremeno i pregledani nakon 14 dana. Stupanj oralne higijene i stanje gingive bodovano je prema plak i gingivnom indeksu autora Silnessa i Løe. Kontrolna skupina provodila je zadovoljavajuću oralnu higijenu i imala zadovoljavajuće stanje gingive, za razliku od pacijenata. U pacijenata je zabilježen značajno veći stupanj plaka na oralnoj i gingivnoj strani mosta nego na vestibularnoj ($p < 0,01$). Nije bilo značajne razlike za plak i gingivni indeks između zuba nosača i homolognih zuba ($p > 0,05$). Na osnovi dobivenih rezultata zaključeno je da je potrebno provoditi dodatne napore u objašnjavanju važnosti i prikladnih načina održavanja oralne higijene kada su u ustima prisutni fiksni protetski radovi.

Ključne riječi: plak indeks, gingivni indeks, privremeno cementirani mostovi

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Uvod

U literaturi su opisana mnoga istraživanja o postotku protetskih radova u odnosu prema dobi, spolu i lokalizaciji u ustima (1-3), o trajnosti protetskoga rada, o tehnološkoj i funkcijskoj trajnosti rada u dugotrajnim ("long term") ispitivanjima (4-14), o važnosti kruničnoga rubnog završetka (15-16), o

utjecaju abrazivnosti materijala na zube suprotne čeljusti (17) ili o vrsti i tipu okluzije protetskoga rada (18). O ispitivanju utjecaja oralne higijene na stanje gingive nosača protetskoga rada te o higijeni mostova na oralnoj strani nije bilo mnogo radova. Nije bilo ni istraživanja o usporedbi oralne higije i stanja gingive na nosačima mosta i homolognim zubima istih pacijenata.

Zato je svrha ovoga rada bila ispitati i usporediti stanje oralne higijene i gingive kontrolne skupine (studenti stomatološkog fakulteta, bez ijednoga protetskoga rada u ustima), te pacijenata koji su dobili nove mostove.

Također je svrha rada bila usporediti oralnu higijenu i stanje gingive nosača mostova s homolognim zubima na kojima nije bilo protetskoga rada.

Željelo se i utvrditi stanje oralne higijene onih dijelova mosta koji su najteže dostupni četkanju: aproksimalne strane sidra mosta na prijelazu u međučlan te oralne i gingivne strane međučlana.

Ispitanici i postupci

Kontrolna skupina sastojala se od 20 zdravih ispitanika (studenti četvrte godine Stomatološkog fakulteta u Zagrebu, u dobi od 21-25 godina) koji su dobro održavali oralnu higijenu, a nisu imali nijedan protetski rad, nijedan karijes ili vidljive promjene na parodontu. Imali su jedan ili više amalgamskih i/ili kompozitnih ispuna. Nisu imali kroničnih i/ili akutnih bolesti i nisu uzimali nikakve lijekove, što je utvrđeno anamnestički.

Drugu skupinu ispitanika tvorilo je 137 pacijenata koji su u razdoblju od jedne godine dobili unilateralne mostove. Mostovi su bili izrađeni iz srebro-paladijske slitine (Auopal S "Zlatarne Celje"). Svi su mostovi bili izrađeni u laboratoriju Zavoda za fiksnu protetiku Stomatološkog fakulteta i Stomatološke klinike KBC-a u Zagrebu. Mostovi su bili izrađeni prema doktrini Zavoda za fiksnu protetiku: rubovi krunica (sidro mosta) završavali su u početnome dijelu gingivnog sulkusa, a međučlanovi su točkasto (linearno) dodirivali mukožu alveolarnoga grebena. Kontaktne točke sidra mosta i međučlana bile su iznad papile zuba. Pacijenti nisu bolovali od akutnih i/ili kroničnih bolesti (npr. dijabetes melitus, uremija, krvne bolesti, autoimune bolesti i sl.), koje bi mogle utjecati na stanje gingive, te nisu uzimali lijekove koji djeluju na stanje gingive i oralne mukoze (npr. hormoni, citostatici itd.). Ispitanici su bili u dobi od 27 do 62 godine. Neki pacijenti bili su podvrgnuti parodontnom liječenju prije izrade mosta, što je uključivalo upute o održavanju oralne higijene, supra i subgingivno skidanje kamenca ili eventualnu kiretažu. Niti jedan pacijent nije trebao kirurške parodontne zahvate. Dakle, pacijenti koji su bili parodontno tretirani bili su lakši slučaji

jevi s eventualnim džepovima koji nisu bili veći od 5 mm.

Svi su ispitanici, pošto su im potanko razjašnjeni svi postupci, dobrovoljno pristali sudjelovati u ovom istraživanju.

Pacijentima su, nakon potankih uputa o održavanju oralne higijene s fiksnim radom u ustima (četkanje, upotreba zubnoga konca), mostovi privremeno cementirani (Scutabond nF, Espe) u razdoblju od 14 dana.

Svim je ispitanicima određen: stupanj oralne higijene s pomoću plak indeksa po Sillness i Loe (19,20) (plak indeks bio je modificiran utoliko što je korišten relevator, eozin tablete, da bi se plak mogao bolje vidjeti, ali je bodovanje ostalo izvorno prema opisu autora) i stanje gingive s pomoću gingivnog indeksa prema istim autorima. Premda se u literaturi spominju mnogi indeksi za procjenjivanje higijene i stanja gingive, indeksi po Sillness i Loe odabrani su zbog jednostavnosti u kliničkom ispitivanju i zbog moguće usporedbe s rezultatima drugih autora, jer se ti indeksi često upotrebljavaju u literaturi (21).

Mostovi su nakon privremenog cementiranja u intervalu od 14 dana pregledani u usnoj šupljini kako bi se odredio stupanj oralne higijene i gingivni indeks u pacijenata, a zatim su mostovi skinuti i potanko pregledani kako bi se odredio stupanj oralne higijene s aproksimalne, oralne i gingivne strane međučlanova mosta.

Dobiveni su rezultati statistički obrađeni s pomoću statističkog paketa SPSS 3,0 (Statistical package for social science) te su izračunane distribucije frekvencija, postoci, aritmetičke sredine i standardne devijacije. Znatnost razlike između pojedinih parametara testirana je Wilcoxonovim neparametrijskim testom ekvivalentnih parova za ovisne uzorke.

Rezultati i rasprava

U Tablici 1 prikazani su rezultati dobiveni određivanjem stupnja **plak indeksa** i **gingivnog indeksa u kontrolnoj skupini** - studenti (n=20). U kontrolnoj skupini, plaka nije bilo u 45% ispitanika, a 45% ispitanika imalo je stupanj 1. Stupanj 2 za plak postojao je u 10% ispitanika, a stupanj 3 nije bio zastupljen. Gingivni indeks stupnja 0 (potpuno zdrava

Tablica 1. Plak indeks i gingivni indeks u kontrolnoj skupini; n = broj ispitanika; aritmetička sredina = x ; standardna devijacija = SD

Table 1. Plaque index and gingival index in the control group; n = number of individuals; mean value = x ; standard deviation = SD

Kontrolna grupa - studenti (n = 20) Control group - students (n = 20)				
Plak indeks - Plaque index				
Stupanj - Score	0	1	2	3
n	9	9	2	0
Postotak - Percentage	45%	45%	10%	0%
Gingivni indeks - Gingival index				
Stupanj - Score	0	1	2	3
n	13	6	1	0
Postotak - Percentage	65%	30%	5%	0%

$x=0,65$
 $SD=0,654$

$x=0,35$
 $SD=0,614$

va gingiva) bio je zabilježen u 65% ispitanika, stupanj 1 u 30% i stupanj 2 u 5% ispitanika, a stupanj 3 nije bio zastupljen. Ovi rezultati pokazali su razmjerno dobru oralnu higijenu i stanje gingive u studenata.

U Tablici 2 prikazani su rezultati dobiveni određivanjem **plak indeksa** na mostovima: a) s vestibularne strane (u ustima), b) s oralne strane (što je određeno nakon skidanja mosta), i **gingivnog indeksa** na zubima nosačima. Na vestibularnoj strani sidara mosta plaka nije bilo u pacijenata u 10,94% slučajeva (stupanj 0), 19,71% imalo je stupanj 1, 56,21% stupanj 2 i 13,14% imalo je stupanj 3. Na oralnoj strani mosta niti jedan ispitanik nije bio bez plaka (stupanj 0 - 0%), stupanj 1 zabilježen je u 13,87%, stupanj 2 u 63,5% i stupanj 3 u 22,63% ispitanika.

Nakon 14 dana nošenja privremeno cementiranih mostova oralna higijena nije bila zadovoljavajuća, premda su pacijenti bili potanko upućeni kako održati higijenu protetskih radova. Premda su svi ispitanici dobili upute o uporabi zubne svile, većina ispitanika nije se njome služila, što pokazuje i visoki rezultat plak indeksa s oralne strane mosta, odnosno postojanje plaka na oralnoj strani mosta u svih pacijenata.

Rezultati za plak indeks na sidrima privremeno cementiranih mostova ($x=1,71$, Tablica 2) slični su rezultatima Bačića iz 1987. (22), koji je slične indekse zabilježio u nasumce izabranih zdravih ispitanika različite dobi bez protetskih radova (plak in-

Tablica 2. Plak indeks s vestibularne strane sidara mosta i oralne strane mostova i gingivni indeks zuba nosača; x = aritmetička sredina; SD = standardna devijacija

Table 2. Plaque index on the vestibular and gingivo-oral side of the bridges and gingival index of the abutments; x = mean value; SD = standard deviation

Pacijenti - Patients (n = 137)				
Plak indeks određen na oralnoj strani sidara 14 dana privremeno cementiranih mostova Plaque index on the vestibular side of 14 days temporarily fixed bridges				
Stupanj - Score	0	1	2	3
n	15	27	77	18
Postotak - Percentage	10,94%	19,71%	56,21%	13,14%
Plak indeks određen na oralnoj strani 14 dana privremeno cementiranih mostova Plaque index on the gingivo-oral side of 14 days temporarily fixed bridges				
Stupanj - Score	0	1	2	3
n	0	19	87	31
Postotak - Percentage	0%	13,87%	63,50%	22,63%
Gingivni indeks određen na zubima nosačima 14 dana nakon privremeno cementiranih mostova Gingival index on the abutments of 14 days temporarily fixed bridges				
Stupanj - Score	0	1	2	3
n	14	74	35	14
Postotak - Percentage	10,22%	54,01%	25,55%	10,22%

$x=1,71$
 $SD=0,84$

$x=2,09$
 $SD=0,59$

$x=1,197$
 $SD=1,024$

deks iznosio je 1,6). No njegovi rezultati za bolesnike koji boluju od *diabetes melitus* pokazuju još veći plak indeks ($x=2,1$), što je više od rezultata dobivenih u ovom istraživanju.

Gingivni indeks na nosačima mostova iznosio je 1,19, što je nešto niža vrijednost od Bačićevih (22) rezultata za ispitanike bez mostova (G.I.=1,7).

Oralna higijena u studenata Stomatološkog fakulteta bila je mnogo bolja nego u pacijenata (Tablice 1 i 2), što se i očekivalo, jer su studenti svjesni svih štetnih posljedica plaka pa zato i više motivirani.

U Tablici 3 testirano je s pomoću neparametrijskog Wilcoxonova testa ekvivalentnih parova za ovisne uzorke postoji li znatna razlika plak indeksa između vestibularne i oralne strane mosta. Test je pokazao da postoji statistički znatna razlika

Tablica 3. Znatnost razlike između stupnja oralne higijene (plak indeks) s vestibularne i oralno-gingivne strane mostova; p = vjerojatnost

Table 3. Significance of the difference for plaque index between the vestibular and gingivo-oral side of the bridges; p = probability

Znatnost razlike plak indeksa između vestibularne i oralne strane mosta Wilcoxonov test ekvivalentnih parova Significance of the differences for plaque index between vestibular and gingivo-oral side of the bridges Wilcoxon test of matched pairs	
Z vrijednost - Z value	p
- 4,341	< 0,01

($p < 0,01$), tj. da se pri vjerojatnosti od 99% može zaključiti da je bolja oralna higijena na vestibularnoj strani u usporedbi s oralnom stranom mosta.

Ovi rezultati (Tablice 2 i 4) pokazuju da higijena mostova nije bila zadovoljavajuća u pacijenata, posebice s oralne strane. Većina je pacijenata izjavila da nije upotrebljavala zubnu svilu, a dokazano je da se bez zubne svile ne može provoditi dobra oralna higijena na oralnoj strani mosta, pogotovo ne na gingivnome dijelu mosta gdje postoji točkasti linearni dodir s mukozom alveolarnoga grebena (23-27).

Tablica 4. Plak indeks i gingivni indeks homolognih zuba; x = aritmetička sredina; SD = standardna devijacija

Table 4. Plaque index and gingival index of homologous teeth; x = mean value; SD = standard deviation

Pacijenti - Patients (n = 137)				
Plak indeks određen na homolognim zubima 14 dana nakon privremenog cementiranja mostova Plaque index on the homologous teeth after a period of 14 days of temporarily bridge fixation				
Stupanj - Score	0	1	2	3
n	20	42	58	17
Postotak - Percentage	14,60%	30,66%	42,33%	12,41%
Gingivni indeks određen na homolognim zubima 14 dana nakon privremenog cementiranja mostova Gingival index on the homologous teeth after a period of 14 days of temporarily bridge fixation				
Stupanj - Score	0	1	2	3
n	32	94	10	1
Postotak - Percentage	23,36%	68,61%	7,30%	0,73%

$x=1,525$
SD=0,889

$x=0,84$
SD=0,582

Stein (23) je ustanovio da se prostor ispod tijela mostsa, ubrzo nakon cementiranja, zatvara zbog nakupljanja mekih i tvrdih naslaga. Silness i sur. ustanovili su postojanje plaka ispod svih tijela mostova koje su skinuli u razdoblju od 12 godina, mikrobiološki je prevladavala gram-negativna anaerobna flora, a oralna mukoza bila je kronično upaljena (24) Prema Hirsbergu (28) dodirna točka između krunice i tijela mosta mora biti više od 3 mm iznad gingivnoga ruba. Unatoč tako izrađenim mostovima, autor je utvrdio da se u 6 mjeseci nošenja privremeno cementiranih mostova taj prostor zbog neprikladne higijene zatvori jer se zbog hiperplazije gingiva poveća 2-3 mm. Tolboe i sur. (26,27) ustanovili su da je četkanje uz upotrebu zubne svile jedina metoda koja onemogućuje nastanak plaka ispod tijela mosta i na aproksimalnim stranama nosača.

Napankanga i sur. (29). su u desetgodišnjoj studiji ustanovili da je higijena mostova vestibularne strane bila zadovoljavajuća uz upotrebu zubne paste i četkice najmanje jedanput na dan. Međutim, niti jedan pacijent nije upotrebljavao zubnu svilu ili svilu za čišćenje mostova, interproksimalne četkice ili tuš za zube. Dakle, odnos prema zubnoj svili i četkicama za aproksimalne prostore sličan je u finskoj populaciji (29) kao i u ovom ispitivanju, tj. pacijenti ne upotrebljavaju navedena sredstva za koja se zna da jedina omogućuju adekvatnu higijenu aproksimalnih strana i tijela mosta. Napankanga i sur. (29) sinu ispitali količinu plaka s oralne i sproksimalne strane mostova, jer su mostovi bili fiksirani u ustima, a niti stanje mukoze ispod tijela mosta.

Rezultati ovog istraživanja upućuju na lošu oralnu higijenu i vestibularne oralne strane mostova, s činjenicom da je higijena oralne strane statistički znatno lošija.

Oralna mukoza ispod tijela mosta bila je upaljena ispod svih skinutih mostova već nakon 14 dana, a da nije ustanovljena kompresija mukoze od međučlanova, što znači da je upala nastala zbog neprikladne higijene. Ti su rezultati slični rezultatima Steina za mostove skinute nakon 12 godina (23) i Hirsberga (28) za mostove skinute nakon 6 mjeseci.

U Tablici 4 prikazani su rezultati dobiveni određivanjem **plak indeksa i gingivnog indeksa** na homolognim zubima. Stupanj 0 zabilježen je za plak indeks na homolognim zubima u 14,6% slučajeva, stupanj 1 u 30,66%, stupanj 2 u 42,33% i stupanj 3

Tablica 5. Znatnost razlike između stupnja plaka određenog na vestibularnim stranama sidara i na homolognim zubima suprotne strane iste čeljusti; p = vjerojatnost; NS = nije znatno (signifikantno)

Table 5. Significance of the difference for plaque index between abutments and homologous teeth; p = probability; NS = not significant

Znatnost razlike plak indeksa na vestibularnim stranama sidara mosta i na homolognim zubima Wilcoxonov test ekvivalentnih parova Significance of the differences for plaque index between abutments and homologous teeth Wilcoxon test of matched pairs	
Z vrijednost - Z value	p
- 0,944	> 0,05 NS

u 12,41% slučajeva. Stupanj 0 za gingivni indeks zabilježen je na homolognim zubima u 23,36% slučajeva, stupanj 1 u 68,61%, stupanj 2 u 7,3%, a stupanj 3 u 0,73% slučajeva.

U Tablici 5 testirano je s pomoću neparametrijskoga Wilcoxonova testa ekvivalentnih parova za ovisne uzorke postoji li znatna razlika plak indeksa između sidara mosta (s vestibularne strane) i homolognih zuba u pacijenata. Test je pokazao da razlika nije statistički znatna ($p > 0,05$, Tablica 5), iako su nešto bolji rezultati dobiveni za plak indeks na homolognim zubima (Tablica 4).

U Tablici 6 testirano je Wilcoxonovim neparametrijskim testom ekvivalentnih parova za ovisne uzorke postoji li znatna razlika gingivnog indeksa između zuba nosača mosta i homolognih zuba. Test je pokazao da razlika nije statistički značajna

Tablica 6. Znatnost razlike između gingivnog indeksa određenog na vestibularnim stranama nosača mostova i na homolognim zubima suprotne strane iste čeljusti; p = vjerojatnost; NS = nije znatno (signifikantno)

Table 6. Significance of the difference for gingival index between abutments and homologous teeth; p = probability; NS = not significant

Znatnost razlike gingivnog indeksa na vestibularnim stranama nosača mosta i na homolognim zubima Wilcoxonov test ekvivalentnih parova Significance of the differences for gingival index between abutments and homologous teeth Wilcoxon test of matched pairs	
Z vrijednost - Z value	p
- 1,4301	> 0,05 NS

($p > 0,05$, Tablica 6), premda je bolje stanje gingive utvrđeno na homolognim zubima.

Tu malu razliku moguće je protumačiti neizbježnim, iako minimalnim, oštećenjem gingive pri likom preparacije zuba nosača i eventualno privremenom osjetljivošću brušenoga zuba, zbog čega pacijenti možda slabije četkaju područja oko brušenoga zuba.

Valderhaug i Heloe (30) te Ericsson i Marken (31) proučavali su plak indeks i gingivni indeks u ispitanika s protetskim radovima.

Valderhaug i Heloe (30) dobili su visoke plak i gingivne indekse u ispitivanoj norveškoj populaciji za različito stare mostove, a njihovi su rezultati neznatno bolji od rezultata ovog istraživanja: od 101 ispitanog zuba, stupanj 0 zabilježili su na 11 zuba (10%), stupanj 1 na 68 zuba (68%), stupanj 2 na 20 zubi (20%), a stupanj 3 na 2 zuba (2%) za plak indeks. Švedski su autori (31) dobili slične rezultate kao i autori iz Norveške (30) za nosače mostova i za homologne zube.

U rezultatima ovog istraživanja u najvećem postotku bio je zabilježen stupanj 2 i to u 56,21% ispitanika, a stupanj 1 bio je u 19,71% (Tablica 2). Stupanj 0 u ovom istraživanju zabilježen je u 10,94% pacijenata.

Valderhaug i Heloe (30) za gingivni su indeks zabilježili najveći postotak za stupanj 1. Stupanj 0 zabilježili su na 8 zuba (8%), stupanj 1 na 52 zuba (52%), stupanj 2 na 39 zuba (39%), a stupanj 3 na jednome zubu (1%). Autori su češće pronalazili stupanj 2 kod subgingivne preparacije.

Iz Tablice 2 vidljivo je da je u ovom istraživanju, također, najčešće zastupljen stupanj 1 (54,01%), zatim stupanj 2 (25,55%), a stupanj 0 i stupanj 3 u po 10,22% ispitanika. Rezultati za plak indeks lošiji su u provedenom istraživanju od rezultata drugih autora (30,31), ali nisu za gingivni indeks. S obzirom na loš stupanj higijene, bilo je za očekivati i lošije stanje gingive, no 14 dana, koliko su mostovi bili privremeno cementirani u ustima, očito nije bilo dovoljno dugo razdoblje da bi se loša oralna higijena reflektirala na gingivi nosača.

Zaključci

1. Kontrolna skupina (studenti) provodila je zadovoljavajuću oralnu higijenu, a oralna higijena u pacijenata nakon četrnaestodnevnoga nošenja

- privremeno cementiranih mostova nije bila zadovoljavajuća.
2. Usporedbom plak indeksa na vestibularnoj i na oralno-gingivnoj strani mosta zabilježen je statistički znatno veći stupanj plaka ($p < 0,01$) na oralno-gingivnoj strani, što potvrđuje na lošiju oralnu higijenu oralne strane mosta, bez upotrebe zubne svile.
 3. Između zuba nosača i homolognih zuba za plak indeks i gingivni indeks nije registrirana statistički znatna razlika, premda su rezultati bili nešto bolji za homologne zube.
 4. Rezultati ovog istraživanja upozoravaju da je potrebno više uzastojati kako bi se bolje objasnila važnost oralne higijene i prikladni načini održavanja higijene u pacijenata s protetskim radovima.

Literatura

1. KOSOVEL Z, IVANIŠ T, LAZIĆ B, BAUČIĆ I. Vrste mostova u naših pacijenata s obzirom na dob, spol i lokalizaciju. U SUVIN-KOSOVEL: Fiksna protetika. Školska knjiga Zagreb, 1975.
2. IVANIŠ T, ŽIVKO J, LAZIĆ B, PREDANIĆ-GAŠPARAC H. Primjene samostalnih krunica i dob pacijenta. Acta Stomat Croat 1992;26:219-225.
3. GLANTZ P-OJ, NILNER K. Patient age and long term survival of fixed prosthodontics. Gerodontology 1993;10:33-38.
4. IVANIŠ T. Evaluacija fiksnoprotetskih nadomjestaka nakon određenog vremena uporabe. Magistarski rad, 1980.
5. IVANIŠ T, KOSOVEL Z. Technical and functional durability of fixed prosthodontic constructions. Proc Europ Prosthodont Assoc 1983;6:136-139.
6. IVANIŠ T, LAZIĆ B. Trajnost krunica i parodontna priprema. Zbornik Sažetaka I Kongresa specijalista za bolesti usta, zubi i parodonta Jugoslavije, 1983; pp 55-56.
7. KOSOVEL Z, IVANIŠ T, LAZIĆ B, BAUČIĆ I, BRAUT Z. Struktura fiksnoprotetskih radova u naših protetskih pacijenata s osobitim osvrtom na krunice. Acta Stomat Croat 1974;8:7-16.
8. KOSOVEL Z, IVANIŠ T, ČATOVIĆ A. Stanje oralnog zdravlja i potreba protetske sanacije u ispitanika postpubertetske dobi. Acta Stomat Croat 1986;20:103-109.
9. ERICSON G, NILSON H, BERGMAN B. Cross-sectional study of patients fitted with fixed partial dentures with special reference to the caries situation. Scand J Dent Res 1990;98:8-16.
10. CASTELLANI D, BACCETTI T, GIOVANNONI A, BERNARDINI UD. Resistance to fracture of metal ceramic and all-ceramic crowns. International Journal of Prosthodontics 1994;7:149-154.
11. GLANTZ P-OJ, NILNER K, JENDERSEN MD, SUNDBERG H. Quality of fixed prosthodontics after 15 years. Acta Odontologica Scandinavica 1993;51:247-152.
12. LEEMPOEL PJB, KAYSER AF, van ROSSUMI GMJM, de HAAN AFJ. The survival rate of bridges. A study of 1674 bridges in 40 dutch general practices. J Oral Rehabilitation 1995;22:327-333.
13. PALMQUIST S, SWARTZ B. Artificial crowns and fixed partial dentures 18-23 years after placement. International Journal of Prosthodontics 1993;6:279-283.
14. THURMOMD JW, BARKMEIER WW, WILWERDING TM. Effect of porcelain surface treatment of bond strength of composite resin bonded to porcelain. J Prosthet Dent 1994;72:355-359.
15. KOSOVEL Z, ŽIVKO J. Profilaktički značaj kruničnog rubnog završetka. Zbornik radova Stomatoloških dana Hrvatske 1977: 253-255.
16. CHEN TY, CHANG GL, WU SH. Holographic evaluation of the marginal fits of complete crowns loaded at the central fossa. Optical Engineering 1995;34:1364-1368.
17. RATLEDGE DK, SMITH BGN, WILSON RW. The effect of restorative materials on the wear of human enamel. J Prosthet Dent 1994;72:192-197.
18. YI SW, CARLSSON GE, ERICSON I, WENSTROM JL. Long term follow-up of cross-arch fixed partial dentures in patients with advanced periodontal destruction: evaluation of occlusion and subjective function. J Oral Rehabilitation 1996;23:186-196.
19. LÖE M, SILNESS J. Periodontal disease in pregnancy I. Acta Odontol Scand 1963; 21:532-551.
20. SILNESS J, LÖE M. Periodontal disease in pregnancy II. Correlation between oral hygiene and periodontal condition. Acta Odontol Scand 1964; 22:121-135.
21. SPOLSKY V W, JEFFREY AG. Comparing measures of reliability for indices of gingivitis and Plaque. J Periodontol 1996;67:853-859.
22. BAČIĆ M. Bakterijski morfotipovi u parodontnim džepovima bolesnika sa šećernom bolesti Acta Stomat Croat 1987;21:277-284.
23. STEIN RR. Pontic residual ridge relationship: A research report. J Prosthet Dent 1966;16:251-258.
24. SILNESS J, GUSTAVSEN F, MANGERSNES K. The relationship between pontic hygiene and mucosal inflammation in fixed bridge recipients. J Periodont Res 1982; 17:434-439.
25. MÜLLER HP. The effect of artificial crown margins at the gingival margin on the periodontal conditions in a group of periodontally supervised patients treated with bridges. J Clinical Periodontol 1986;13:97-102.
26. TOLBOE H, ISIDOR F, BUDTZ-JORGENSEN E, KAABER S. Influence of oral hygiene on the mucosal conditions. Scand J Dent Res 1987;95:475-482.
27. TOLBOE H, ISIDOR F, BUDTZ-JORGENSEN E, KAABER S. Influence of pontic material on alveolar mucosal conditions. Scand J Dent Res 1988; 96:442-447.

28. HIRSENBERG SM. The relationship of oral hygiene to embrasure and pontic design. *J Prosthet Dent* 1972;27:26-38.
29. NAPANKANGA MAM, SALONEN MAM, RAUSTIA AM. A 10-year follow-up study of fixed metal ceramic prosthodontic. *J Oral Rehabil* 1997;24:713-717.
30. VALDERHAUG J, HELOE LA. Oral hygiene in a group of supervised patients with fixed prostheses. *J Periodontol* 1977;48:221-224.
31. ERICSSON SG, MARKEN KE. Effect of fixed partial dentures on surrounding tissues. *J Prosthet Dent* 1968;20:517-525.

Oral Hygiene and Gingival Health in Patients with Temporarily Fixed Bridges

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Summary

The aim of this study was to compare oral hygiene and the state of gingiva in the control group (students of a dental school) and the patients with new, temporarily fixed bridges (n=137). The aim was also to compare the hygiene of the vestibular and gingivo-oral side of the bridges, as well as the plaque and gingival scores on the abutments and homologous teeth. All the patients were given detailed instructions on how to maintain oral hygiene with bridges and then the bridges were fixed temporarily and examined after a period of 14 days. Oral hygiene and gingival state were scored according to Sillness & L(e) indices. The control group maintained a proper oral hygiene and had a healthy gingiva, opposite to the patients. Significantly higher plaque index ($p < 0.01$) was registered on gingivo-oral side of the bridges than on the vestibular side. There was no significant difference for the plaque and the gingival index between the abutments and the homologous teeth ($p > 0.05$). Based on the obtained results, it was concluded that additional effort is necessary in emphasising the importance and the methods of maintaining a proper oral hygiene in patients with fixed prosthodontic appliances.

Key words: *plaque index, gingival index, temporarily fixed bridges*

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Introduction

There have been many papers throughout the literature on the percentage of fixed prosthodontic appliances with regard to age, gender and localisation in the jaw (1-3); the durability of the fixed prosthodontic appliance, and technological and functional

durability in long term studies (4-14); the importance of correct crown margin location (15,16); the influence of the material on the attrition of opposing teeth (17); or the type of occlusion (18). However not many papers are available on the influence of oral hygiene on gingival health of abutment teeth, and on hygiene on the oral side of the pon-

tics. There are also not many papers available on the effect of oral hygiene and gingival health on abutments and homologous teeth.

Therefore, the aim of this study was to determine and compare the state of oral hygiene and gingival health between the control group (students of the School of Dental Medicine University of Zagreb, without any prosthodontic appliances) and patients with new bridges.

The aim of this study was also to compare oral hygiene and gingival health between abutments and homologous teeth without prosthodontic appliances, and to determine the state of oral hygiene with regard to the bridge for which proper hygiene is most difficult to maintain, i.e. the approximal side, where retainers and pontics are in contact and the oral and gingival side of the pontic.

Subjects and methods

The control group consisted of 20 healthy individuals (students of the School of Dental Medicine, University of Zagreb, age range from 21 to 25 years), who maintained good oral hygiene, and had no prosthodontic appliances, no caries lesions, or any visible changes on periodontal tissue. They had one or more amalgam or composite restorations in the mouth and were free of any chronic or acute diseases which might have an influence on the gingiva. They were not taking any medications, which was anamnestically confirmed.

The second group consisted of 137 patients, who had received Ag-Pd alloy (Auropol S "Zlatarne Celje") new bridges unilaterally in a one year period. All the bridges were made in the Laboratory for Fixed Prosthodontics in the School of Dental Medicine University of Zagreb. The bridges were made according to the standards of the Department of Fixed Prosthodontics, i.e.; crown margins were located at the gingiva, and the pontics were spheroidly designed with a rounded point contact with the oral mucosa (linear contacts). Contact points between the retainer and the pontic were placed above the papilla of the abutment (normal embrasures). Patients were free from any acute or chronic diseases (e.g. diabetes mellitus, uraemia, blood diseases, autoimmune diseases etc.), which might influence the gingival state and had not undergone any drug therapy which could influence the gingiva and oral mucosa

(e.g. hormones, cytostatics, etc.). The age range was between 27 and 62 years.

Some of the patients received periodontal treatment before the prosthetic treatment, including motivation and instruction on oral hygiene, supra and subgingival calculus elimination and eventual scaling. As the pockets were not deeper than 5 mm before treatment the patients were not severe periodontal cases and no periodontal surgery was needed.

All subjects were volunteers, to whom the nature of the experiment was explained.

After clear instructions on how to maintain proper oral hygiene of a fixed appliance (brushing, dental floss), the bridges were temporarily fixed in the mouth (Scutabond nF, Espe) for a period of 14 days.

In all subjects oral hygiene was assessed by the plaque index according to Silness and Løe (19,20) (the procedure was modified because relevators, i.e. eosin tabs, were used, although the scores were as originally described) and gingival health was assessed according to the gingival index of the same authors. Indices described by Silness and Løe were used in this study because of their simplicity and frequency of use in literature (21).

After a period of 14 days, the bridges were assessed for oral hygiene. The state of gingiva was also assessed and after removal of the bridges the oral and gingival side of the pontics were assessed for the plaque index. Plaque and gingival indices were also assessed on the homologous teeth.

Statistic analysis was performed by the statistical program - SPSS 3.0 (Statistical package for social science). The distribution of frequencies, percentages, means and standard deviation were calculated and the significance between the differences for plaque and gingival scores were tested by using the non-parametric Wilcoxon test of matching pairs.

Results and discussion

The results of the plaque and gingival scores in the control group (20 students) are presented in Table 1. Plaque was not present in 45% of the students, 45% had score 1, and 10% had score 2, while score 3 was not registered. Score 0 for gingival index (healthy gingiva) was registered in 65% of the

students, score 1 in 30%, score 2 in 5% and score 3 was not registered. The results indicate relatively adequate oral hygiene and healthy gingiva in the control group.

Plaque scores on the bridges: a) on the vestibular side and b) on the oral and gingival side (which was assessed after bridge removal) are presented in Table 2, as well as the scores for gingival index on the abutments. Plaque score 0 was registered in 10.94% of the patients on the vestibular side of the bridges, score 1 was registered in 19.71%, score 2 in 56.21% and score 3 was registered in 13.14% of the patients. On the oral and gingival side of the bridges, score 0 was not registered, score 1 was registered in 13.87%, the score 2 in 63.5% and the score 3 in 22.63% of the patients.

After a period of 14 days of temporary bridge fixation, oral hygiene was unsatisfactory in spite of the fact that all the patients had been thoroughly informed on how to maintain proper hygiene of the bridges. Although they had been given instructions on how to use dental floss, the majority of patients had not used it, which could be seen in the high scores for plaque index on the oral, approximal and gingival side of the pontics i.e. plaque was present on the oral and gingival sides of pontics in all patients.

The results for the plaque index on the abutments of 14 days temporarily fixed bridges ($x=1.71$) resemble the results of Bačić in 1987 (22), who registered similar scores in randomly selected healthy individuals of similar age, but without any prosthodontic appliances (mean for the plaque index was 1.6). On the other hand, the values that he registered for the plaque index in patients with diabetes mellitus were higher ($x=2.1$), than those of this study.

Mean for the gingival index registered on the bridge abutments, was 1.19, which is a lower value than Bačić (22) registered in individuals without bridges (G.I.=1.7).

Oral hygiene was much better in the dental school students than in the patients (Table 1, 2), which was expected, as the students are aware of all the possible harmful influences of dental plaque to the surrounding tissues and are therefore highly motivated.

The significance of the difference between the plaque indices on the vestibular and the oral side of

the bridges were assessed by the nonparametric Wilcoxon test for matched pairs. The test revealed significant difference ($p<0.01$), i.e. with 99% of probability it could be concluded that oral hygiene is more satisfactory on the vestibular than on the oral side of the bridges.

The results indicate (Tables 2 and 4) unsatisfactory oral hygiene in patients, especially on the oral side of bridges. Almost all the patients stated that they had not been using dental floss, although it had been demonstrated that without dental floss proper hygiene could not be maintained, especially on the oral and gingival sides and beneath point contacts of pontic with alveolar mucosa (23-27).

Stein (23) found that the space beneath the pontic was soon occluded with plaque and calculus. Silness et al. found calcified plaque beneath all pontics in the bridges which they had removed during a 12 year period, with prevalence of gram-negative anaerobic microbial flora and chronically inflamed oral mucosa beneath the pontics (24). Hirseberg (28) pointed out that the contact between the crown and the pontic should be at least 3 mm above the gingival margin. In spite of this he found that this space was closed for 6 months in temporarily fixed bridges due to gingival hyperplasia, as a consequence of inadequate oral hygiene. Tolboe et al. (26,27) pointed out that tooth brushing and daily use of dental or bridges floss in the only way to prevent plaque accumulation beneath pontics and in approximal parts of bridges.

Napankanga et al. (29) found that in patients with bridges for approximately 10 years the hygiene on the vestibular side was satisfactory, with the use of toothpaste and a toothbrush at least once a day. However, none of the patients used dental floss, floss for bridges, interproximal brushes or toothpicks every day. Therefore, Finnish population had not been using floss (as well as our patients), in spite of the fact that it is well known that this is the only way to allow adequate hygiene beneath pontics. Napankanga et al. (29) did not examine plaque beneath pontics, on mucosal inflammation, as the bridges were fixed in the mouth.

The results of this study indicate inadequate oral hygiene, both on the vestibular side of bridges and on the oral side and beneath pontics with significantly worse hygiene on the oral side of bridges, compared to the vestibular side. After 24 days, oral mucosa beneath pontics was inflamed in all patients.

ts without compression, which means that the inflammatory changes were caused by inadequate hygiene. These results corroborate the findings of Stein (23) for bridges removed after a period of 12 years and Hirsenberg (28) for bridges removed after a period of 6 months.

The results for plaque and gingival indices scored on homologous teeth are presented in Table 4. Score 0 for plaque was found in 14.6%, score 1 in 30.66%, score 2 in 42.33% and score 3 in 12.41% of the cases. Score 0 for the gingival index was registered in 23.36%, score 1 in 68.61%, score 2 in 7.5% of the patients. Score 3 was not registered.

The significance of the plaque scores between the abutments and the homologous teeth was tested by Wilcoxon non-parametric test matched pairs, which revealed that the difference was not statistically significant ($p > 0.05$, Table 5), although better results were registered on homologous teeth (Table 4).

The significance of the gingival scores between the abutments and the homologous teeth was tested by Wilcoxon non-parametric test for matched pairs, which revealed that the difference was not statistically significant ($p > 0.05$, Table 6), although better results were again registered on homologous teeth (Table 4).

This slight difference in results for the homologous teeth and bridges could be attributed to minimum damage at the gingival margin during preparation and possible sensibility of the prepared teeth.

Valderhaug & Heloe (30) and Ericsson & Marken (31) also assessed plaque and gingival indices in patients with bridges.

Valderhaug & Heloe (30) registered high plaque and gingival scores in an examined Norwegian population for bridges of different age, and their results are a little better than ours. According to their results for the plaque index assessed on 101 examined abutments, score 0 was registered on 11 teeth (10%), score 1 on 68 teeth (68%), score 2 on 20 teeth (20%), and score 3 on 2 teeth (2%). Ericsson and Marken (31) registered results similar to the Norwegian authors (30) for abutments as well as for homologous teeth.

According to the results of this study, the highest percentage (56.21%) was registered for score 2, which

score 1 was registered in 19.71% of cases (Table 2). Score 0 was registered in 10.94% of the patients in this study.

Valderhaug & Heloe (30) registered the highest percentage for score 1 for the gingival index. Score 0 was registered in 8%, score 1 in 52%, score 2 in 39%, and score 3 in 1% of the cases. Score 2 was registered more often with the subgingival preparation.

The results of this study, presented in Table 2, show the highest frequency of score 1 (54.01%), followed by score 2 (25.55%), while score 0 and score 3 were registered in 10.22% of each patient.

Results for the plaque index are worse in this study than in other studies (30,31). However, this was not the case for the gingival index. Regarding the improper oral hygiene registered in this study, one could expect similar gingival scores. The period of 14 days of temporary bridge fixation, is obviously too short a period for inadequate hygiene to reflect upon the gingiva.

Conclusions

1. The control group (students) maintained correct oral hygiene, while oral hygiene was inadequate in the examined group of patients after a period of 14 days of temporary bridge fixation.
2. Comparison of the plaque indices on the vestibular and gingivo-oral side of the bridges revealed significantly higher plaque scores ($p < 0.01$) on the gingivo-oral side of the bridges, which indicates inadequate hygiene beneath the pontics, without the use of dental floss or interdental toothbrushes. After a period of 14 days oral mucosa was inflamed beneath all the removal bridges without signs of compression, which means that inadequate hygiene of bridges was responsible for the inflammation.
3. There was no significant difference ($p > 0.05$) for the plaque and the gingival index between abutments and homologous teeth, although the results are a little better, as registered on the homologous teeth.
4. The results of this study indicate the need for additional effort in emphasizing the importance of methods for maintaining adequate hygiene for fixed prosthodontic appliances in the mouth.