Dimenzije krunične rubne pukotine

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Sažetak

Na 40 izvađenih zuba s krunicama izmjerena je veličina cervikalne rubne pukotine, tj. odnos kruničnoga ruba i granice preparacije zuba. Prosječna vrijednost od 143,3 (m bitno odstupa od vrijednosti koje preporučuje ADA specifikacija broj 8 (25 (m) i od opće veličine ovoga odnosa od 50 (m. Raščlamba varijance na razini povjerenja od P=95% nisu dokazane statistički znatne razlike u rezultatima mjerenja s obzirom na vrstuu krunice i zuba, te njihova položaja u čeljusti.

Ključne riječi: *rubna pukotina, krunica, zub*

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Uvod

Fiksna je protetika rekonstruktivno-rehabilitirajuća disciplina koja se za uspostavu okluzije, a time i funkcije (manje estetike), služi metalom. Protetski rad ima i preventivnu ulogu, tj. njime se nastoji sačuvati preostale zube do što starije životne dobi (1,2). Pri tome krunica kao terapijsko sredstvo ima odlučujuću ulogu u karijes i parodonto profilaksi. Svojim oblikom krunica mora spriječiti oštećenja mekih tkiva, i omogućiti osobno i stručno održavanje oralne higijene. Rub krunice jedan je od čimbenika koji je najčešće razlogom mehaničkih i bioloških pogrješaka. O njima pišu mnogi autori. Pri tom se, imajući na umu veličinu pukotine između bataljka i krunice, raščlanjuju: utjecaj vrste cervikalne preparacije (3,4,5,6), laboratorijsku točnost izradbe (3,7,8), kakvoću, izgled i finoću površine materijala (3,9,10), vrstu materijala za pričvršćivanje (3,6,10,11,12,13,14,15,16), pritisak tijekom cementiranja (3,6,14,17), učinak ventila (6,12,15,17) i drugo.

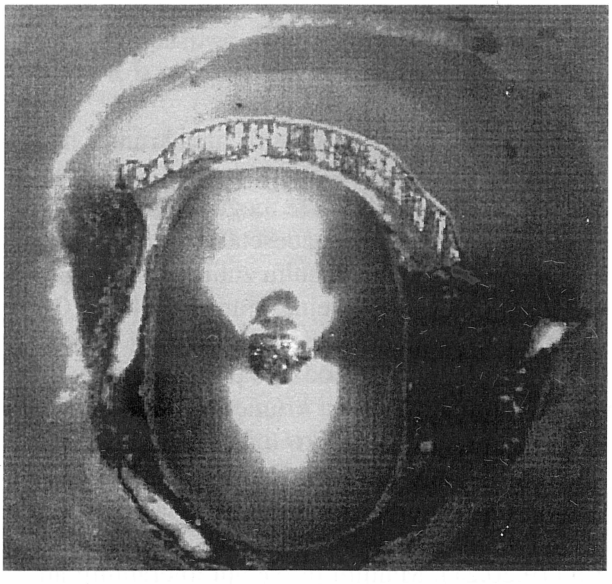
Mogućnost provjere točnosti ruba krunice na pacijentu vrlo je ograničena. Sonda i rtg nesiguran su čimbenik provjere i njima se mogu opaziti samo grube pogrješke. Još prije dvadesetak godina Marxkors (18) je izmjerio na izvađenim zubima nevjerojatnih 400 μm razmaka dvodjelne krunice i oko 220 μm udaljenosti lijevane krunice od bataljka. Korber i Lenz pišu o vrijednosti od 200 μm, koja uključuje i debljinu metalnoga ruba krunice (2). Koliko su se stajališta i tolerancijea oko toga čimbenika promijenili govori podatak da ADA specifikacija broj 8 zahtijeva da razmak ne smije biti veći od 25 μm (4), a najveći broj autora prihvaća pukotinu do 50 μm (19,20,21). Manjini pripadaju tolerantniji autori kao Wilson (17), koji smatra da je klinički prihvatljiva pukotina između 34-114 μm, dok za McLe-

ana i Von Fraunhofera (22) taj razmak može biti do 120 μm. U ovaj prosjek uklapa se i stajalište Christensena (23), Dedmona (24) i Spiekermanna (25).

Bilo je zanimljivo ispitati koji su rasponi vrijednosti širina rubnih pukotina na zubima naših protetski saniranih pacijenata.

Materijali i metode

Materijal za ispitivanje bio je slučajan uzorak od četrdeset izvađenih zuba, tangencijalno prepariranih i saniranih fasetiranim ili potpunim krunicama (33 fasetirane i 7 potpunih). Od toga broja 20 zuba bilo je postraničnih, a 20 prednjih. Zubi su pohranjeni u 3% vodikov superoksid, isprani, osušeni i uloženi u hladnopolimerizirajući akrilat. Slijedilo je rezanje korjenskoga dijela zuba na mikrokidalici (Accutom-2, Struers, Danska) do razine rubnoga završetka krunice. Rubne pukotine analizirane su na četiri mjerna mjesta: vestibularno, oralno, distalno i mezijalno pod svjetlosnim mikroskopom (Olympus, Japan) (Slika 1) i njihove su dimenzije izmjerene s pomoću uređaja za automatsku raščlambu slike, (Leco 2001, Leco, Canada). Na svakome mjernome mjestu učinjena su po tri mjerenja s razmakom od 0,25 μm i za raščlambu je uzeta u obzir srednja vrijednost mjerenja. Rezultati mjerenja raščlanjeni su jednosmjernim testom varijance (Anova).



Slika 1. *Poprečni presjek zuba s krunicom*
Figure 1. *Cross section of tooth with crown*

Rezultati

Rezultati mjerenja prikazani su na Tablici 1. Kreću se u rasponu od 0 - 578,8 μm (x = 149,3 μm), neovisno o mjestu mjerenja. Srednje vrijednosti po mjernim mjestima su sljedeće: vestibularno - 146,5

Tablica 1. *Srednje vrijednosti dimenzija cementne pukotine*
Table 1. *Results of measurement values of marginal gap*

Uzorak Sample				DEBLJINA CEMENTNE PUKOTINE, μm MARGINAL GAP			
R. br.	Mat.	Položaj	Vrsta	Vest.	Oral.	Dist.	Mez.
37	Au	prednji	fasetirani	122.2	102.8	90.1	131.1
8	Au	stražnji	fasetirani	134.2	81.9	29.2	45.4
15	Au	stražnji	fasetirani	252.2	433.3	421.9	483.4
20	Au	stražnji	potpuni	167.3	206.8	70.8	109.3
1	Ag-Pd	prednji	fasetirani	93.2	179.2	92.4	52.7
7	Ag-Pd	prednji	fasetirani	83.6	578.8	196.1	305.5
11	Ag-Pd	prednji	fasetirani	64.7	323.3	150.3	79.2
12	Ag-Pd	prednji	fasetirani	122.9	208.5	227.9	127.7
13	Ag-Pd	prednji	fasetirani	143.9	30.7	134.2	63
19	Ag-Pd	prednji	fasetirani	254	212.2	260.5	222
21	Ag-Pd	prednji	fasetirani	213.6	67.5	96.5	179.7
25	Ag-Pd	prednji	fasetirani	213.4	130.9	71.1	113.4
29	Ag-Pd	prednji	fasetirani	330.2	80.8	225.2	329.8
30	Ag-Pd	prednji	fasetirani	147.1	51.7	114.8	85.7
31	Ag-Pd	prednji	fasetirani	129.3	153.6	59.8	66.3
32	Ag-Pd	prednji	fasetirani	109.9	80.8	143.9	135.8
34	Ag-Pd	prednji	fasetirani	203.7	143.9	108.3	106.7
39	Ag-Pd	prednji	fasetirani	114.8	118	92.1	188
42	Ag-Pd	prednji	fasetirani	113.2	221.5	134.2	145.5
43	Ag-Pd	prednji	fasetirani	155.2	97	124.5	58.2
44	Ag-Pd	prednji	fasetirani	92.1	84.1	132.6	234.4
10	Ag-Pd	prednji	potpuni	0	465.6	72.2	219.9
14	Ag-Pd	prednji	potpuni	287.8	100.2	207.5	190.8
5	Ag-Pd	stražnji	fasetirani	45.1	83.6	128.6	57.9
9	Ag-Pd	stražnji	fasetirani	221.3	129.8	259.5	68.1
17	Ag-Pd	stražnji	fasetirani	75.9	153.6	185.9	195.6
18	Ag-Pd	stražnji	fasetirani	205.3	148.7	168.1	233.7
22	Ag-Pd	stražnji	fasetirani	115.8	86.8	77.2	57.9
24	Ag-Pd	stražnji	fasetirani	171.4	71.1	152	111.5
26	Ag-Pd	stražnji	fasetirani	139	116.4	106.7	51.7
28	Ag-Pd	stražnji	fasetirani	119.6	84.1	177.5	124.5
33	Ag-Pd	stražnji	fasetirani	139	29.4	74.4	77.6
35	Ag-Pd	stražnji	fasetirani	137.4	77.6	95.4	93.8
36	Ag-Pd	stražnji	fasetirani	130.4	53.3	98.6	119.6
38	Ag-Pd	stražnji	fasetirani	51.7	139.8	182.7	145.5
40	Ag-Pd	stražnji	fasetirani	32.3	76	87.3	111.5
3	Ag-Pd	stražnji	potpuni	38.8	24.2	74.4	100.2
4	Ag-Pd	stražnji	potpuni	234.7	64.3	80.4	186
23	Ag-Pd	stražnji	potpuni	292.6	241.2	363.3	109.3
41	Ag-Pd	stražnji	potpuni	163.3	140.6	93.8	108.3

Tablica 2. *Rezultati raščlambe varijance (ANOVA) izmjerenih vrijednosti rubne pukotine između uzoraka prednjih i stražnjih zuba*
Table 2. *Analysis of variance (ANOVA) between front and lateral teeth*

Anova: Single Factor
SUMMARY

Skupine - Groups	*Broj - Count*	*Zbroj - Sum*	*Prosjek - Average*	*Varijanca - Variance*
Stupac 1 - Column 1	7	1103.4	157.6286	3767.548
Stupac 2 - Column 2	33	4652.55	140.9864	4582.092

ANOVA

Podrijetlo varijance - Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Između skupina - Between Groups	1599.462	1	1599.462	0.359149	0.552536	4.098169
Unutar skupina - Within Groups	169232.2	38	4453.48			
Ukupno - Total	170831.7	39				

Tablica 3. *Rezultati raščlambe varijance (ANOVA) izmjerenih vrijednosti rubne pukotine između uzoraka s fasetiranim i potpunim krunicama*
Table 3. *Analysis of variance (ANOVA) between teeth with veneered and cast crowns*

Anova: Single Factor
SUMMARY

Skupine - Groups	*Broj - Count*	*Zbroj - Sum*	*Prosjek - Average*	*Varijanca - Variance*
Stupac 1 - Column 1	20	3048.875	152.4438	2922.197
Stupac 2 - Column 2	20	2707.075	135.3538	5915.224

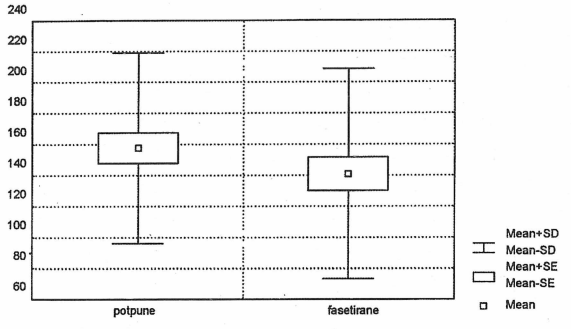
ANOVA

Podrijetlo varijance - Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Između skupina - Between Groups	2920.681	1	2920.681	0.66098	0.421279	4.098169
Unutar skupina - Within Groups	167911	38	4418.711			
Ukupno - Total	170831.7	39				

μm; oralno - 168,6 μm; distalno - 140,6 μm; mezijalno - 140,6 μm.

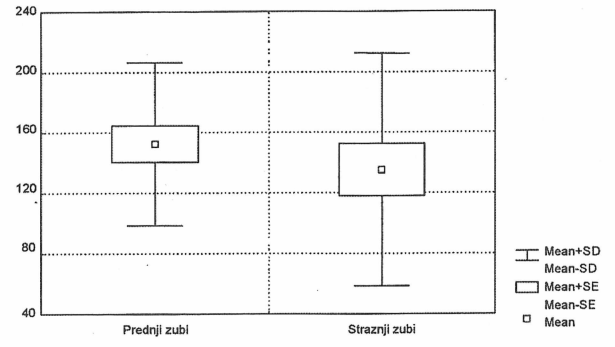
Statistički su uspoređivane vrijednosti rubne pukotine s obzirom na vrstu krunice (potpuna i fasetirana) (Tablica 2) i s obzirom na položaj zuba (prednji i stražnji) (Tablica 3).

Raščlamba varijance na razini povjerenja od P = 95% pokazala je da se varijance uspoređenih skupova znatno ne razlikuju. Isti rezultati prikazani su na Slikama 2 i 3.



Slika 2. *Dijagram srednjih vrijednosti debljine rubne pukotine - usporedba zuba s fasetiranim i potpunim krunicama*

Figure 2. *Box plot of measurement values of marginal gap - comparison between veneered and cast crowns*



Slika 3. *Dijagram srednjih vrijednosti debljine rubne pukotine - usporedba prednjih i stražnjih zuba*

Figure 3. *Box plot of measurement values of marginal gap - comparison between front and lateral teeth*

Rasprava

Rezultati mjerenja veličine rubne pukotine najčešće su različiti od autora do autora. Oni prvenstveno ovise o tome jesu li mjerenja provedena *in vivo* ili *in vitro,* o vrsti krunice i načinu mjerenja. Logično je da su rezultati na modelima u pravilu uvijek manji od onih na prirodnim zubima (22, 26, 27). Tako Wilson piše o 40 mikronskoj pukotini kod zlatnih krunica na čeličnim modelima (17). Moore i sur. (26) izmjerili su na modelu pukotinu od 9,5 μm nakon cementiranja krunice, a poslije cementiranja 35, 6 μm. Tjan i sur. (15) su na uzorcima dokazali da tip III zlatne slitine osigurava najbolji odnos prema bataljku (8 μm), zatim Ag-Pd slitine (17 μm); slijede Au-Pd slitine (23 μm), Pd-slitine (45 μm) i najveću, ali još uvijek optimalnu pukotinu pokazuje Ni-Cr-Mo slitina (86 μm). Ovi rezultati pokazuju ljevljivost i obradivost pojedinog tipa slitine.

Rijetki su autori kao Marxkors (cit. po Löstu, 28), Ayad i Rosenstiel (29) i Kydd i sur. (30) koji su svoja mjerenja proveli na izvađenim zubima. Prvi je autor izmjerio na 100 zuba s lijevanim krunicama rubnu pukotinu od 90 - 230 μm i zadovoljava se prosjekom od 30-80 μm. Ayad i Rosenstiel (29) su na zubima s potpunim zlatnim krunicama došli do zadovoljavajućih 85 μm. *U našem uzorku bio je samo jedan zub s potpunom lijevanom zlatnom krunicom (x=138,5 μm), odnosno sveukupno sedam lijevanih potpunih krunica, tako da je isključena svaka moguća usporedba.* Kydd i sur. izmjerili su prosjek od 74 μm, time da su maksimalno izmjerene vrijednosti postranične pukotine bile do 244 μm. *I u Schwickerqathovim mjerenjima* (31) *vidljive su razlike između četiriju mjernih mjesta, ali podudarno našim rezultatima, bez statističke znatnosti.*

Ispitivanja Dürsterheusa (18) kod tangencijalne preparacije pokazala su distalno 270, mezijalno 230, vestibularno 160 i oralno 110 μm veličinu rubne pukotine. *Naša mjerenja, dvadeset godina poslije, s prosjekom od 149,3 μm, nisu puno bolja,* iz čega je vidljivo, da smanjenje cementne pukotine na razinu klinički prihvatljivih vrijednosti kojima svi težimo još nije postignuto u našoj praksi. No, za razliku od ovog autora, koji je izmjerio najmanju pukotinu oralno, *naša mjerenja, osim što pokazuju znatno manji raspon vrijednosti glede mjernoga mjesta, najveća su upravo oralno. Razlog tome vjerojatno je u manjkavostima preparacije tog dijela zuba i u smanjenoj mogućnosti vizualnog nadzora krunice tijekom probe.*

Kydd i sur. smatraju da se tijekom cementiranja mala rubna pukotina popuni cementom i tako sprječava nastajanje mikropopuštanja u spoju zub-krunica (30). Tu tvrdnju podržava i Fick (30). Međutim, kako sva sredstva za učvršćenje ne nude trajnu nepropustljivost, te zbog svoje makar i male rastvorljivosti predstavljaju "slabu kariku u lancu" u fiksnoj protetici, ne može se posve podržati to stajalište. Sigurno je i da određeni pritisak tijekom cementiranja, koji neutralizira viskoznost cementa, ima pozitivan učinak na prilijeganje krunice na bataljak. Prejaki pritisak može intrudirati zub, a preslabi rezultira rubnom pukotinom (17). Ipak manje sile smanjuju mogućnost deformacije krunice u usporedbi s velikim silama.

Što se različitih vrsta krunica tiče, susrećemo se i različite vrijednosti. *U našim ispitivanjima radilo se isključivo o lijevanim krunicama, potpunim ili fasetiranim polimernim ljuskama. Prosječne vrijednosti rubne pukotine od 157,6 μm za potpune i 140,9 μm za fasetirane krunice statistički se znatno ne razlikuju.* Metal-keramičke krunice najčešće pokazuju zadovoljavajuće odnose, što se dovodi u vezu s preparacijama zuba sa stubom. Chaffe i suradnici (5) pišu o 0 - 145 μm, Matsumoto i suradnici (8) o 33 - 205,50 μm kod metal-keramičkih krunica izrađenih različitim tehnikama. Lauer i sur. (21) izmjerili su 5 - 30 μm, Setz i Weber (32) 25 - 96 μm, a Kelly i sur. (33) 30- 60 μm.

Neke potpune keramičke krunice, a naročito CAD CAM inleji, općenito pokazuju nešto veće vrijednosti rubne pukotine od opće prihvatljivih. Mei-

er i sur. (34) izmjerili su prosječno 130 μm kod Dicor krunice, a Schäffer i sur. (27) pišu o prosjecnih 28 μm mjerenih *in vitro* i 50 μm *in vivo* za istu vrstu krunice. Rinke (35) navodi 32 - 45 μm kod In Ceram krunica, ovisno o tome je li prednja ili stražnja. Siervo je kod Cerec inleja izmjerio 75 μm, Mörmann prosječnih 192 μm, a Bronwasser *in vitro* 143, a *in vivo* 198 μm rubnu pukotinu (Cit. po Hickel i sur, 36). Kelly i sur. (33) izmjerili su vrijednosti od 50-150 μm.

Zaključak

Već desetljećima stručna literatura posvećuje osobitu pozornost rubu krunice.Autori u radu raščlanjuju kruničnu rubni završetak s profilaktičkoga gledišta i vlastitih kliničkih ili laboratorijskih iskustava. Svi se slažu da je precizno rubno zatvaranje uvjet kliničkog uspjeha krunice i da ono ovisi o nizu čimbenika. Rezultati našeg ispitivanja pokazali su velik rasap vrijednosti mjerenja za zube s tangencijalnom preparacijom i nepoznatom trajnošću cementiranih krunica, a i sam prosjek je znatno iznad dopuštenih vrijednosti prema ADA specifikaciji broj 8. To upućuje da je potrebna veća pozornost i preciznost u svim fazama izradbe kako bi se dobio što dugotrajni terapijski učinak krunice, kojoj je to i osnovna namjena.

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Dimensions of the Crown Marginal Gap

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Summary

The size of the cervical marginal gap, i.e. the relation between the crown margin and the tooth preparation margin, was measured on 40 extracted teeth with crowns. mean values of 149.3 μm significiantly differ from the values recommended by ADA specification no. 8 (25 μm), and from the generally accepted value of 50 μm. Analysys of variance on the P level = 95% showed no significant difference between the crowns and the teeth position.

Key words: *marginal gap, crown, tooth*

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Introduction

Fixed prosthodontics is a reconstructive and rehabilitating discipline using metal to obtain occlusion and function (less esthetic). The fixed prosthodontic reconstruction also plays a preventive role, i.e. its purpose is to preserve the remaining teeth as long as possible (1,2). In this the crown plays a crucial role as a therapeutic means in caries and periodontal prophylaxis. With its shape the crown must prevent the damaging of soft tissues and enable personal and professional maintenance of oral hygiene. The crown margin is one of the factors being the most frequent cause of the occurrence of mechanical and biological imperfections. These imperfections have been described by a number of authors, and bearing in mind the size of the void between the abutment and the crown, the most frequently analyzed is: influence of the type of cervical preparation (3,4,5,6), precision of laboratory construction, quality, appearance and fineness of the material's surface (3,9,10) type of luting material (3, 6,10-16), pressure during cementing (3,6,14,17), venting (6,12,15,17) etc.

The possibility of examining the precision of the crown margin on a patient is very limited. The sonde and the X-ray are not precise verification means and may reveal only serious imperfections. Some

twenty years ago Marxkors (18) measured, on extracted teeth, an incredible 400 μm of discrepancy between a veneered crown and the abutment, and about 220 μm of discrepancy between a cast crown and the abutment. Korber and Lenz write about the value of 200 μm, which includes the thickness of the crown metal margin (2). The fact that ADA specification number 8 requires discrepancy not to be more than 25 μm (4) shows how much opinion and tolerance of this factor have changed, although the majority of authors accepts a void of up to 50 μm (19, 20, 21). More tolerant authors such as Wilson (17) belong to the minority group who believe that a void of 34 - 114 μm is clinically acceptable, while according to McLean and Von Fraunhofer (22) this void may be up to 120 μm. The position of Christensen (23), Dedmon (24) and Spiekermann (25) is within this average range.

It would be interesting to study the value ranges of marginal voids on the teeth of our prosthodontically treated patients.

Material and methods

The investigation material was a random sample of forty extracted teeth, tangentially prepared and treated by veneer or cast crowns (33 veneer and 7 cast crowns). Twenty teeth from the total number were lateral teeth and twenty were frontal teeth. The teeth were stored in 3% hydrogen superoxide, rinsed, dried and immersed in a cold polymerizing acrylate. This was followed by cutting the root section of the tooth on the universal precision cutt-off machine (Accutom-2, Struers, Denmark) up to the crown margin finish line. Marginal discrepancies were analyzed on four points: vestibularly, orally, distally and mesially under a light microscope (Olympus, Japan) (Fig. 1), and their dimensions were measured by automatic Image Analyser (Leco 2001, Leco, Canada). Each measurement point was measured three times with discrepancy of 0.25 μm, and the average measurement value was used for the analysis. The measurement results were examined by a one-way analysis of variance (Anova).

Results

The measurement results are shown in Table 1. They range from 0 to 578.8 μm (x = 149.3 μm), regardless of the measurement point. The mean values at measurement points were as follows: vestibularly - 146.5 μm; orally - 168.6 μm; distally - 140.6 μm; mesially - 140.6 μm.

The marginal void values were compared by taking into consideration the type of crown (veneer or cast) (Table 2) and the tooth position (frontal or lateral) (Table 3). The analysis of variance on the level P = 95% shows that variants of the compared groups do not differ significantly. The same results are shown in Figures 2 and 3.

Discussion

The measurement results of the size of the marginal void usually differ from author to author. They depend for the most part on whether the measurements were conducted *in vivo* or *in vitro,* on the type of crown and the type of measurement. It is logical that results obtained on models are, as a rule, always lower than the ones obtained on natural teeth (22,26,27). Thus Wilson writes about a 40 μm void measured on gold crowns on steel models (17). Moore et al. (27) measured a void of 9.5 μm on a model before cementing the crown, and 35.6 μm after cementing it. Tjan et al. proved on samples that type III of gold alloy ensures the best condition of the abutment (8 μm), followed by Ag-Pd alloy (17 μm), Au-Pd alloy (23 μm) and Pd- alloy (45 μm) while the largest, although still optimal void occurs with Ni-Cr-Mo alloy (86 μm). These measurements result from the castability and technical procedure with each type of alloy.

Rare authors like Marxkors (quote by Löst, 28), Ayad, Rosenstiel (29) and Kydd et al. (30) conducted their measurements on extracted teeth. The first author measured a marginal void of 90 - 230 μm on 100 teeth with cast crowns, and established an average of 30 - 80 μm. Ayad and Rosenstiel (29) obtained a satisfying 85 μm on teeth with cast gold crowns. Our sample contained only one tooth with a cast gold crown, i.e. alltogether seven cast crowns, so that there is no possibility for comparison. Kydd et al. measured an average of 74 μm, while maximum measured values of the side void were 244 μm. The measurements of Schwickerath (31) indicate differences between the four measured points, however with no statistic significance, which corresponds to our results.

Research conducted by Dürsterheus (18) on tangentially prepared teeth showed the size of marginal void to be distally 270, mesially 230, vestibularly 160 and orally 110 μm. Our measurement results conducted twenty years later, with an average of 149.3 μm, are not significantly better and it can be concluded that the decrease of the cement void to a clinically acceptable value, which is the aim of all of us, has not yet been achieved in practice.

However, unlike this author who had measured the smallest marginal leakage orally, our measurements, apart from indicating significantly smaller ranges of values regarding the measurement point, show the highest result when measured orally. The reason for this may be the preparation imperfection of this part of the tooth, and the poorer visual control of the crown during clinical control.

The opinion of Kydd et al. is that by cementing the small marginal opening is filled with cement, therefore preventing the occurrence of microleakage in the tooth-crown interface (30). This opinion is supported by Fick (30). However, as all luting materials do not offer lasting impermeability and in fixed prosthodontics represent a "weak link" due to their, however small,solubility, this point of view cannot be fully acceptable. Certain pressure during cementing, which neutralizes the cement viscosity certainly has a positive effect on seating of the crown on the abutment. Therefore, pressure which too strong may intrude the tooth, while one which is too weak results in a marginal void (17). However, smaller forces decrease the possibility of crown deformation compared to stronger forces.

Different values are obtained with different types of crowns. Metal-ceramic crowns are the ones most often showing satisfactory results, which is connected to preparing the tooth with a shoulder. Chaffee et al. (5) write about a range of 0 to 145 μm and Matsumoto et al. (8) about 33 - 205.50 μm obtained on metal-ceramic crowns constructed by various techniques. Lauer et al. (21) measured 5 - 30 μm, Setz and Weber 25 - 96 μm (32), and Kelly et al. 30 - 60 μm (33).

Some complete ceramic crowns, and in particular the CAD CAM inlays usually show marginal void values somewhat higher than the generally acceptable values. Meier et al. (34) measured an average of 130 μm on the Dicor crown, while Schaffer et al. (26) write about an average of 28 μm measurable *in vitro* and 50 μm *in vivo*. Rinke (35) reports 32 - 45 μm on In Ceram crowns, depending on whether the crown is located in the front or the back of the oral cavity. Unlike these authors Siervo measured 75 μm on a Cerec inlay, Mörmann an average of 192 μm, a Bronwasser the marginal void of 143 μm in vitro and 198 μm in vivo (quote by Hickel et al., 36). Kelly et al. measured values of 50 - 150 μm (33).

Conclusion

For decades professional literature has been paying great attention to the crown margin. Authors analyze the crown margin finish line from the prophylactic point of view, as well as through personal clinical or laboratory experience. Everyone agrees that precise marginal closure is necessary for the clinical success of the crown, and that it depends on a number of factors. The results of our analysis have shown a great range of values measured on teeth prepared tangentially with cemented crowns of unknown duration, and the average obtained was significantly higher than the proposed values set by the ADA specification no. 8. Thus, it can be concluded that there is a need to pay more to accuracy in all stages of crown construction, with the aim of obtaining the longest possible therapeutic duration of the crown, this also being its basic purpose.