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## Originalni „V“ režanj za endodontsko-kirurško zbrinjavanje kroničnoga periapikalnog procesa

### *The Authentic “V” Flap for Surgical Endodontic Treatment of Periapical Chronic Diseases*

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#### Sažetak

Svrha ovog istraživanja jest predstaviti i ocijeniti originalni režanj u „V“ obliku kojim se liječnici koriste za kirurško-endodontsko zbrinjavanje kroničnoga periapikalnog procesa. Sudjelovalo je 55 pacijenata dobroga općeg zdravlja. Svi su upućeni u Zavod za oralnu kirurgiju zbog endodontsko-kirurškog zbrinjavanja maksilarnih zuba. „V“ režanj se primijenio u svim slučajevima. Kirurška tehnika je zasebno opisana. Svako kirurško polje provjereno je nekoliko puta tijekom postupka. Klinički intraoperativni i postoperativni nalazi govore u prilog individualnosti vestibularnog „V“ reznja kod endodontsko-kirurških zbrinjavanja kroničnih periapikalnih procesa. Postupak je jednostavan, što je pridonijelo atraumatskoj retrakciji s dostatnom krvnom opskrbljenošću te repoziciji reznja sa samo nekoliko šavova. Čak i bez premedikacije, oko 65,4 posto pacijenata nije osjećalo bolove. Blaga otekline kirurškog polja bila je prisutna u svim slučajevima. Cijeljenje je bilo potpuno, bez znakova retrakcije i dehiscijencije.

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#### Ključne riječi

periapiksne bolesti; oralna kirurgija; kirurški režanj

#### Uvod

Kirurški tretman kroničnoga periapikalnog procesa zahtijeva slobodan pristup kosti i korijenu. Dobar kirurški pristup je u osnovi povezan s pravilnim odabirom pristupnog reznja. Postoje određena načela u korištenju i konstrukciji reznja: Treba osigurati adekvatan pristup i vidljivost kirurškog polja; Rez se radi u jednom čvrstom potezu; Tkivima obuhvaćenima reznjem treba osigurati dobru opskrbu krvlju; Konstrukcija reznja mora dopuštati šivanje mekih tkiva na kosti (1); Prema potrebi režanj bi se trebao produžiti; Konstrukcija reznja treba omogućiti pasivnu retrakciju tkiva; Konstrukcija reznja treba omogućiti repositioniranje i šivanje dviju identičnih susjednih površina (2).

Dodatna pravila predložio je Arens (3): Vertikalni rez treba biti u konkavitetu između dvaju koštanih izbočenja; Vertikalni rez ne smije sezati u vestibularne plike; Kraj vertikalnog reza mora gingivalno završavati na mezijalnom ili distalnom kraju zuba.

Dvije su glavne kategorije periradikularnih kirurških rezova – puni i djelomični mukoperiostalni reznjevi (4). Lokacija horizontalne komponente reza određuje o kojoj se vrsti radi. Puni mukoperiostalni reznjevi uključuju intrasulkularnu horizontalnu inciziju s odvajanjem marginalne i interdentalne gingive. Djelomični mukoperiostalni režanj ima submarginalni, odnosno subsulkularni horizontalni rez

#### Introduction

The surgical treatment of periapical chronic diseases requires unimpeded access to bone and root structures. Good surgical access is fundamentally dependent on the selection of an appropriate flap design.

There are general principles which every flap design must follow: It should provide an adequate access and view of the surgical field; The incision must be made with firm, single stroke; It should provide for sufficient blood supply to the reflected tissues; The flap design should provide for soft tissue closure over solid bone (1); The flap should be able to be elongated, if necessary; The flap design should enable passive tissue retraction. The flap design should enable repositioning and suturing of two identical neighboring surfaces (2).

Arens (3) proposed additional rules to be followed, such as: The vertical incisions should be made in the concavities between bone eminences; The vertical incisions should not extend into the mucobuccal fold; The termination of the vertical incision at the gingival crest must be at the mesial or distal end of the tooth.

There are two major categories of periradicular surgical flaps, *full* and *mucoperiosteal flaps* (4). The location of the horizontal component of the incision is the distinguishing characteristic between these two categories. Full mucoperiosteal flaps involve an intrasulcular horizontal incision with

te režanj ne uključuje marginalnu ili interdentalnu gingivu (1).

Luebke i suradnici (5) pojednostavnili su klasifikaciju periradikalarnih kirurških reznjeva opisujući ih geometrijskim znakovima.

Svaki režanj ima jasnu indikaciju, prednosti i nedostatke, ali na kraju, u određenoj situaciji, samo iskustvo kirurga-operatera i izbor reznja određuju ishod operacijskog zahvata.

Djelomični ili submarginalni reznjevi obično su reznjevi izbora, kada se radi o periapikalnim procesima, prednjim zubima s fiksno-protetičkim radom i kada su imperativ estetika i zdravlje marginalne gingive.

„V“ režanj vrsta je submarginalnoga vestibularnog reznja. Otkako ga je 1980. godine uveo u praksu prof. Stefanovski u Zavodu za oralnu kirurgiju, mukoperiostalni „V“ režanj koristi se za kirurške tretmane kroničnih periapikalnih procesa kada su očuvana marginalna i lateralna parodontalna tkiva. Sastoji se od dvaju konvergentnih rezova u desnim iznad zahvaćenog zuba.

Nakana rada je predstavljanje i ocjenjivanje uspješnosti autentičnoga „V“ reznja u kirurškom zbrinjavanju periapikalnih kroničnih procesa.

## Pacijenti i metode

U istraživanju je sudjelovalo 55 zdravih pacijenata obaju spolova upućenih u Zavod za oralnu kirurgiju, UDCC-a „St. Pantelejmon“, u Skoplju. Svi su imali kliničku sliku blažega kroničnog periapikalnog procesa u maksili i zdrav marginalni i lateralni parodont te su podvrgnuti endodontsko-kirurškom zahvatu.

Svi su sudionici detaljno klinički i radiološki obrađeni.

Svaki zahvat obavljen je nakon provodne infraorbitalne anestezije (dva posto scandonesta s adrenalinom), uz dodatnu infiltracijsku anesteziju prema potrebi. „V“ režanj korišten je u svakom slučaju.

Mukoperiostalni rez načinjen je kirurškom oštricom br. 15.

Nakon što se odredi smještaj i smjer incizije, skalpelom se ulazi kroz sluznicu okomito na kost na polaznom mjestu mezijalno ili distalno od zahvaćenog zuba. Nakon toga, urežu se dva vertikalna konvergentna reza koji ocrtavaju slovo V iz točke iz koje se prvotno krenulo. Dva reza spajaju se od 4 do 5 milimetara subkrestalno.

Režanj je repositioniran svilenim koncem s isprekidanim šavovima (4/0 Silkam, B/Braun Aesculap) i okruglom iglom, počevši od najprominentnije točke i napredujući medijalno i distalno.

Pacijentima je savjetovano da prema potrebi stavljaju hladne kompresijske obloge i uzimaju analgetike.

Šavovi su uklonjeni poslije pet dana, a do tada je rana pregledana nekoliko puta.

Na dan zahvata, procijenjen je pristup operacijskom polju te repozicija reznja prema kirurgovu osobnom iskustvu.

reflection of the marginal and interdental (papillary) gingival tissues as part of the flap. On the contrary, limited mucoperiosteal flaps have a submarginal (subsulcular) horizontal or horizontally oriented incision, and the flap does not include the marginal or interdental tissues (1).

The addition of plane geometric terms to describe flap designs, as suggested by Luebke RG et al (5), provides for an easily identifiable classification of periradicular surgical flap designs.

All flaps have distinct indications, advantages and disadvantages, but the experience and the choice of the surgeon according to the situation play a major role in determining the final outcome of the procedure.

Limited or submarginal flaps are used when localized periapical diseases are in question, or when treating anterior teeth with fixed restorations and when aesthetics and health of the marginal gingiva are essential.

The “V” flap is a type of a submarginal vestibular flap. Since its endorsement at the Department of Oral Surgery in 1980's Prof. Stefanovski J, the mucoperiosteal “V” flap has been used for surgical treatment of chronic periapical diseases when marginal and lateral periodontal tissues were uncompromised. It consists of two relaxing converging incisions made in the attached gingiva, above the tooth in question.

The authors present and evaluate the authentic “V” shaped flap for surgical treatment of periapical chronic diseases.

## Patients and methods

Our study included 55 healthy patients of both sexes, referred to the Department of Oral Surgery at UDCC “St. Pantelejmon” in Skopje for surgical endodontic treatment of maxillary teeth with minor periapical chronic diseases and uncompromised marginal and lateral periodontium.

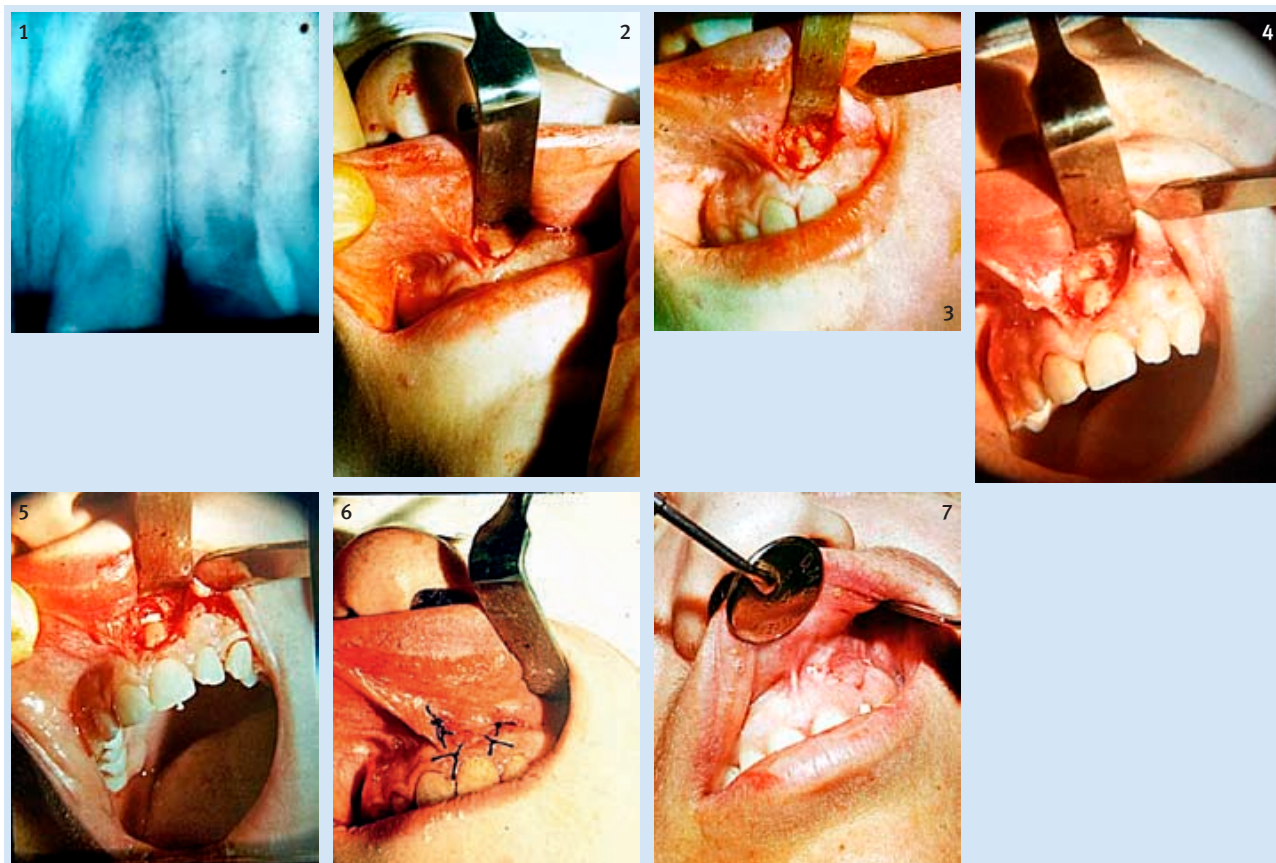
Patients were subjected to a meticulous clinical and radiology assessment. All the procedures were done under infraorbital block anesthesia (scandonest 2% with adrenalin), with additional terminal anesthesia if necessary. The “V” flap was used in all cases. Mucoperiosteal incision was made with surgical blade No. 15.

Once the location and the direction of the incision were determined, a single perpendicular blade entry to bone was made at the starting point, medially or distally to the tooth in question. The blade then proceeded, and two convergent vertical incisions were made, outlining the “V” shaped flap. The two releasing incisions met 4-5 mm subcrestally. Subsequently, the flap was mobilized and retracted. Surgical endodontic procedures were performed according to standard protocol.

The Flap was repositioned with interrupted silk sutures (4/0 Silkam, B/Braun Aesculap) and round needle, starting from the most prominent point, and then proceeding medially and distally.

The patients were advised to apply cold compression, and to use analgesics, if necessary.

The follow ups were made, and the sutures were removed after 5 days. The surgical sites were assessed at several points in time.



Slika 1. *Parodontitis apicalis ch. granulomatosa*

Figure 1 *Parodontitis apicalis ch. granulomatosa* 21

Slika 2. Napravljen i odignut „V“ režanj

Figure 2 Created and reflected “V” flap

Slika 3. Intraoperativni pogled – periapikalna osteotomija i prikazivanje korijena

Figure 3 Intraoperative view - periapical osteotomy and root exposure

Slika 4. Intraoperativni pogled – resekcija korijena

Figure 4 Intraoperative view - root resection

Slika 5. Intraoperativno retrogradno punjenje

Figure 5 intraoperative ortho filling

Slika 6. Zašiveni „V“ režanj

Figure 6 Sutured “V” flap

Slika 7. Potpuno zarasla rana nakon što su uklonjeni konci

Figure 7 Complete healing after suture removal

Nakon zahvata otekline i bol procijenjeni su verbalnom ljestvicom (bez bolova, slaba, umjerena, jaka bol).

Nakon uklanjanja šavova ocijenjeno je zarastanje (potpuno ili nepotpuno).

Dobiveni rezultati prezentirani su opisnom metodom (postotci).

## Rezultati

Ukupno 55 pacijenata bilo je uključeno u istraživanje. Odnos spola i dobi predstavljen je u tablici 1. Dominiraju žene (63,7 %) između 30 i 40 godina.

Distribucija kirurški tretiranih zuba predstavljena je u tablici 2. Kirurški tretman bio je najčešći na maksilarnim središnjim (34,5 %) i lateralnim incizivima (32,7 %).

Distribucija preoperativne dijagnoze predstavljena je u

On the day of the surgery, we evaluated the surgical access and the flap repositioning, according to the surgeon's personal experience.

After the surgery, pain and swelling were evaluated using verbal rating scale (none, mild, moderate, severe).

At suture removal, the healing was assessed (complete or incomplete).

Achieved results were presented using a descriptive method (percentage).

## Results

A total of 55 patients were included in this study. The sex and age distribution are presented in Table 1. Female patients were dominant with 63.7 %, between 30 and 40 years of age.

Distribution of surgically treated teeth is presented in Table 2. Surgical treatment was most frequently performed on maxillary central (34.5%) and lateral incisors (32.7%), followed by maxillary canines and first premolars.

**Tablica 1.** Distribucija spola i dobi (n=55)  
**Table 1** Age and sex distribution (n=55)

Dob • Age groups	Spol • Sex	
	muškarci • male %	žene • female %
20 - 30	7	11
30 - 40	5	15
iznad 40 • over 40	8	9
ukupno • total	20 (36.3)	35(63.7)
	55 (100)	

**Tablica 3.** Distribucija kliničkih dijagnoza (n=55)  
**Table 3** Distribution of clinical diagnosis (n=55)

Dg	N	%
<i>Parodontitis apicalis chronica difussa sine fistulae</i>	41	74.5
<i>Parodontitis apicalis chronica granulomatosa</i>	14	25.5
Ukupno • Total	55	100

**Tablica 5.** Verbalna ljestvica otekline  
**Table 5** Verbal swelling rating scale

Swelling score	Degree of swelling	Response	
		N	%
0	None	/	/
1	Mild	55	100
2	Moderate	/	/
3	Severe	/	/

tablici 3. Za 74,5 posto svih kirurški tretiranih maksilarnih zuba dijagnosticiran je *parodontitis apicalis chronica difussa sine fistulae*, a za ostale je dijagnoza bila *parodontitis apicalis chronica granulomatosa*.

Kirurški je pristup bio dobar – postignuta je traumatska retrakcija te jedinstvena repozicija režnja s nekoliko šavova.

Verbalna ljestvica boli i otekline dan nakon zahvata predstavljena je u tablicama 4. i 5. Prema njoj, 5,4 posto pacijenata nije imalo bolove, a ostali su osjetili blagu nelagodnu. Blage otekline imali su svi pacijenti.

Zarastanje rane bilo je kompletno u svim slučajevima i bez retrakcije tkiva ili dehiscijencije.

## Rasprava

Najčešće rabljeni režnjevi u endodontsko-kirurške svrhe su sulkularni režnjevi (6). Njihov najveći nedostatak su gingivalne recesije te nepredvidivo smanjivanje papile tijekom cijeljenja (7). Zbog prevencije marginalnih gingivalnih recesija predložene su submarginalne incizije (8). Nekoliko je submarginalnih režnjeva između kojih kirurg može birati, ovisno o pojedinačnom slučaju i vlastitu iskustvu.

Polumjesečasti režnjevi više se ne preporučuju, iako su neki bili često u primjeni. Iako takvi režnjevi ne ugrožavaju epitelni pričvrstak, njihov nedostatak je nedovoljna preglednost i pristup radnom polju, nemogućnost zatvaranja koštanog defekta i šivanja na čvrstoj podlozi, veća mogućnost krvarenja te formiranje ožiljkastog tkiva tijekom cijeljenja (9). Polumjesečasti režnjevi mogu dovesti do dehiscijencije rane (10).

**Tablica 2.** Distribucija kirurški tretiranih maksilarnih zuba (n=55)  
**Table 2** Distribution of surgically treated maxillary teeth (n=55)

• Teeth group	N	%
• Maxillary central incisors	19	34,5
• Maxillary lateral incisors	18	32,7
• Maxillary canines	11	20,0
• Maxillary first premolars	7	12,8
Ukupno • Total	5	100

**Tablica 4.** Verbalna ljestvica boli  
**Table 4** Verbal pain rating scale

• Pain score	• Degree of pain	Response	
		N	%
0	None	36	65.4
1	Mild	19	34.6
2	Moderate	/	/
3	Severe	/	/

Distribution of preoperative diagnosis is presented in Table 3. 74.5% of all surgically treated maxillary teeth were diagnosed with *parodontitis apicalis chronica difussa sine fistulae*, while the rest were diagnosed with *parodontitis apicalis chronica granulomatosa*.

We achieved a good surgical access, a traumatic retraction and an easy flap repositioning with few stitches in all cases.

The verbal pain-and-swelling scale noted the following day is presented in Table 4, and Table 5 respectively. 65.4% of the patients experienced no pain at all, while the rest felt mild discomfort. Mild swelling of the surgical site was observed in all patients.

The healing was complete, without signs of tissue retraction and dehiscence in all cases.

## Discussion

The most frequently used flaps for endodontic surgery purposes were sulcular flaps (6), but their main disadvantages were recession and unpredictable papilla shrinkage during healing (7). To prevent the marginal recession of the gingiva, submarginal incisions were suggested (8). There are several submarginal flaps that surgeons can choose from, according to the case presentation and their preference. They all have advantages and disadvantages.

Once frequently used, semi-lunar flaps are not recommended nowadays. Although they do not disturb the periodontal attachment, they have the disadvantages of limited access and visibility, encroachment on and closure over osseous defects, increased potential for hemorrhage, and healing with scar formation (9). They can lead to wound dehiscence, as a result of improper design of semi-lunar incision (10).



Pravilan odabir režnja može izravno utjecati na kirurški pristup i preglednost radnog polja, veličinu rane, trajanje zahvata te na postoperativni rezultat.

Naša namjera u ovom istraživanju bila je predstaviti „V“ režanj za kirurški pristup na maksilarnim zubima zbog toga što su maksilarni zubi najzastupljeniji u endodontsko-kirurškim tretmanima. Taj se režanj isto tako može iskoristiti za endodontsko-kirurški tretman u interkaninu prostoru mandibuularnih zuba.

Istraživanje je provedeno na 55 pacijenata dobrog zdravlja, a odabrani su na osnovi sljedećih kriterija inkluzije: klinički i radiološki potvrđen je mali periapikalni kronični proces te nekompromitiran marginalni i lateralni parodont.

Gledajući kriterije inkluzije preoperativno je za 74,5 posto maksilarnih zuba bio dijagnosticiran *parodontitis apicalis chronica diffusa sine fistulae* (tablica 3.), a za ostale *parodontitis apicalis chronica granulomatosa*.

Neki endodontsko-kirurški terapijski protokoli preporučuju upotrebu analgetika prije operacije. Argument je – bolje spriječiti bolove preoperativno nego kada se pojave postoperativno (10, 11). Drugi autori, kao Tsesis i suradnici (12), preporučuju preoperativnu uporabu kortikosteroida. U njihovu istraživanju procijenjene su kod pacijenata postoperativne otekline i bolovi nakon endodontsko-kirurškog zahvata. Svima je dana jedna doza deksametazona oralno (8 mg) prije zahvata te dvije pojedinačne doze (4 mg) prvi i drugi dan nakon zahvata. Ističu da 64 posto pacijenata nije primijetilo otekline, pa je incidencija postoperativne boli bila vrlo niska.

Našim pacijentima nije dana premedikacija. Kako je iskustvo pokazalo, kod endodontsko-kirurških zahvata zdravim pacijentima nije potrebna premedikacija u obliku analgetika ili kortikosteroida. Intenzitet bolova znatno se smanjuje prvi dan nakon operativnog zahvata. Nakon toga slabe progresivno svaki sljedeći dan.

Verbalna ljestvica boli dan nakon operacije pokazala je odsutnost boli kod 65,4 posto pacijenata, dok su ostali osjećali blagu nelagodu (tablica 4.). Verbalna ljestvica otekline pokazala je blage otekline na operiranom području u svim slučajevima (tablica 5.). Takvi rezultati pripisuju se odabiru „V“ režnja čak i kada nije dana premedikacija.

Taj vestibularni režanj jednostavno je izvesti. Njegove dimenzije omogućile su pridržavanje cijelog mukoperiostnog režnja retractorom, sprječavajući kolabiranje režnja i traumatsku retrakciju. Šira baza režnja u odnosu na njegove dimenzije omogućila je dostatnu opskrbu krvlju, za razliku od nedostatne opskrbe krvlju kod drugih režnjeva.

Readaptacija režnja idealna je sa samo nekoliko šavova. Šivanje najprominentnijeg dijela režnja obično ga reponira, a uz dva dodatna šava repozicija je potpuna. Repozicija i rekonstrukcija jednostavnije su kod režnja s vertikalnim rezovima negoli kod onih s horizontalnima. Kod režnjeva s vertikalnim rezovima kutovi se sliježu jednostavnije, što omogućuje i jednostavnije šivanje. S druge strane, polumjesečasti režnjevi nemaju dvije identične površine, što otežava rekonstrukciju i repoziciju te zahtijeva veći oprez.

Cijeljenje tkiva bilo je potpuno i bez retrakcije u svim slučajevima.

The selection of an adequate flap design can affect surgical access and visibility, extent and duration of the surgery and postoperative outcome.

In this study, our intention was to present the “V” flap for surgical treatment of maxillary teeth as they are most frequently subjected to periapical surgery. This flap can be used for periapical surgery of mandibular teeth in intercanine region.

Our study was conducted on 55 patients in good general health who were selected according to the following inclusive criteria: clinical and radiological confirmation of small periapical chronic disease and uncompromised marginal and lateral periodontal tissues.

In this respect, preoperatively 74.5% of all surgically treated maxillary teeth were diagnosed as *parodontitis apicalis chronica diffusa sine fistulae* (Table 3), while the rest were diagnosed as *parodontitis apicalis chronica granulomatosa*.

Some surgical endodontic protocols recommend preoperative use of analgesics. They argue that it is better to prevent the pain than deal with it later (10, 11). Others, like Tsesis I et al. (12) suggest preoperative use of corticosteroids. In their study, patients undergoing surgical endodontic treatment were evaluated for postoperative pain and swelling. They were pre-medicated with single dose of oral dexametason (8 mg) and two single doses (4 mg) first and second day postoperatively. 64% did not report any swelling and there was low incidence of postoperative pain.

In our study, when planning the surgical procedures, pre-medication was not given to any of the patients. According to our experience, when periradicular surgery is in question, in healthy patients there is no need for premedication with either corticosteroids or analgesics. A significant reduction in pain usually occurs on the first post-operative day, followed by a steady, progressive decrease in discomfort each succeeding day.

Verbal rating pain scale one day following surgery, showed absence of pain in 65.4% of the patients, while the rest felt mild discomfort (Table 4). Verbal swelling scale showed mild swelling of the surgical site in all cases (Table 5). It was the “V” flap properties that were responsible for such results, even when no medication was issued prior to surgery.

This vestibular flap was easy to create. Due to its dimensions, the retractor held the whole mucoperiosteal flap, thus preventing its collapsing and enabling a traumatic retraction.

Its wider base compared to its dimensions, obtained blood supply in abundance, compared to all other types of vestibular flaps.

Readaptation was ideal with few sutures. Suturing of the most prominent point almost completely readapted the entire flap. Additional two sutures were necessary to completely readapt the flap. Repositioning and reconstruction is easier in flap designs with vertical than in horizontal incisions. In such flap designs, the flap angles are initially sutured, which facilitates suturing of other flap parts. On the contrary, semilunar flaps lack two identical, closely related surfaces, making the repositioning and reconstruction somewhat troublesome, and demanding greater attention.

Endodontsko-kirurški postupci u kojima se koristi „V“ režanj zahtijevaju preciznu dijagnozu te radiološku potvrdu lokalizacije i proširenosti periapikalne lezije, kako bi se isključila potreba za proširenjem reznja.

## Zaključak

Postoperativni klinički rezultati implementacije vestibularnog „V“ reznja u endodontsko-kirurškom tretmanu kroničnih periapikalnih procesa potvrdili su uspješnost i individualnost toga reznja. Jednostavan je, omogućuje atraumatsku retrakciju s dovoljnom opskrbbom krvlju te repoziciju s nekoliko šavova. Čak i bez premedikacije, dan nakon operacije 65,4 posto pacijenata nije osjećalo bolove, a blage otekline imali su svi. Proces cijeljenja bio je potpun, bez retrakcije reznja.

Healing was complete without tissue retraction in all cases.

Surgical endodontic procedures using the “V” flap demand precise diagnosis, radiological confirmation of the localization and extension of the periapical lesion, thus preventing any unexpected need for flap extension.

## Conclusion

Our postoperative clinical findings regarding the implementation of the vestibular “V” flap in surgical treatment of periapical chronic diseases, have confirmed its individuality. It was easy to create, enabled atraumatic retraction with abundant blood supply and repositioning with few sutures. Even without premedication, the following day 65.4% of the patients experienced no pain, and mild swelling of the surgical site in all cases. The healing process was complete, without any flap retraction.

### Abstract

The aim of this study was to present and evaluate the authentic “V” shaped flap for surgical endodontic treatment of periapical chronic diseases. The study included 55 patients in good general health, referred to the department of oral surgery for surgical endodontic treatment of maxillary teeth. “V” shaped flap was used in all cases. The surgical technique was described. The surgical sites were assessed at several points in time. Our intraoperative and postoperative clinical findings regarding the implementation of the vestibular “V” flap in surgical treatment of periapical chronic diseases, have confirmed its individuality. It was easy to perform the procedure which enabled atraumatic retraction with abundant blood supply and repositioning with a few stitches. Even without premedication, the following day 65.4% of the patients experienced no pain, and mild swelling of the surgical site was evident in all cases. The healing was complete, without any signs of tissue retraction and dehiscence.

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