

PULPARNI KOČIĆI

PULPAL PINS

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Kratak sadržaj

Cilj rada je isticanje prednosti fabričkih metalnih kočića, u odnosu na livene nadogradnje sa kočićem, kod restauracija endodontski lečenih zuba. Prodiskutovane su funkcije kočića, osobine endodontski lečenih zuba, rizici postavljanja kočića, vrste materijala, oblik dužina i dijametar kočića. Pobrajani su materijali za cementiranje kočića. Prikazan je način postavljanja i prednosti metalnih fabričkih kočića kod molara i premolara sa divergentnim korenovima. Cementiranje metalnih kočića smolastim cementima značajno pojačava retenciju kočića za zub.

Ključne reči: pulparni kočići, devitalizirani zubi

Uvod

Kod restauracije endodontski lečenih zuba primenjuju se: a) livene nadogradnje, b) fabrički metalni kočići, c) fabrički karbonski ili keramički kočići.

Livene nadogradnje se ne koriste tako često kao ranije jer je utvrđeno da liveni kočići prouzrokuju tri puta češće frakture korena od fabričkih, a postoje i problemi sa retencijom odlivka u kanalu. Posebne teškoće predstavlja izrada livene nadogradnje kod višekorenih zuba sa disparalitetom korenova i kanala.¹

Postoje različiti tipovi i oblici kočića, različite tehnike preparacije kanala kao i različiti materijali za cementiranje kočića i izradu nadogradnje oko kočića.

Abstract

The aim of this article was to discuss benefites of prefabricated metal posts than custom-cast post and core procedures in restauration of pulpless teeth. The post function in endodontically treated teeth, post materials, shape, and surface configuration, lenght and diametar of posts, as well as post cementing materials have been described. Industrial metal posts can be adapted to canals. It is possible to place two posts in molars and premolars with divergent roots. To incrise retention of the posts to the root's dentin it was suggested that metal posts could be cemented with resin cements.

Key words: pulpal pins, pulples teeth

Introduction

While restoring endodontic treated teeth we use: a) cast annexes, b) industrial metal sticks, c) industrial carbon or ceramic sticks.

Cast annexes are not used as often as before, because it was established that cast posts cause a tree times more frequent root fractures than the industrial sticks. Furthermore, there are problems with drain retention in the canal. Casting annexes with multirroot teeth with unparallel canals and roots, represents a special difficulty.¹ There are different stick types and shapes, different root canal preparation techniques, as well as different materials for stick cementing and making annexes around posts.

Funkcije kočica

Pulparni kočici imaju dve glavne funkcije: a) da zaštite zub od unutrašnjih stresova i frakture korena i b) da obezbede retenciju restauracije.

Zahtevi pri rekonstrukciji avitalnih zuba

- a) Dugotrajno očuvanje preostalog korena
- b) Reakcija kočica na mastikatorne stresove
- c) Jednostavno postavljanje
- d) Kompatibilnost kočica sa drugim restaurativnim materijalima

Osobine endodontski lečenih zuba

Gubitak vitaliteta smanjuje fizičke osobine i translucenciju preostale zubne strukture. Pored promene boje, koja ide od sive do braon, smanjena je otpornost tkiva na frakture. Zbog sprovođenja kanalne terapije i formiranja pristupnog kaviteta smanjuje se i jačina preostale krunice zuba. Često je potrebno pojačanje krunice i korena postavljanjem kočica u kanal korena zuba.

Pri tome se potencijalna tačka frakture zuba udaljava od gingivalne margine zuba ka vrhu korena, što smanjuje mogućnost frakture.

Korišćenje parakanalnih kočica i retencionih ureza kod avitalnih zuba može dodatno oslabiti zubnu strukturu, pa se retko primenjuju.

Nakon postavljanja kočica, rekonstrukcija krunice može biti intrakoronarna (inlay tip) i ekstrakoronarna (krunica ili onlay, overlay). Postavljanje ekstrakoronarne restauracije jako smanjuje stresove usmerene na bukalne i lingvalne kvržice i produžava vek zuba.²

Značaj kočica

Postavljanje kočica u jednom ili više kanala korena utiče na pomeranje potencijalne tačke frakture sa vratnog dela zuba dalje prema apeksu korena.

Rizici postavljanja kočica

- Kočić je intraradikularna restauracija i zavisi od jačine i integriteta preostale zubne supstance koja ga retinira na mestu postavljanja.

Post Function

Pulp posts have two major functions: a) to protect the tooth from interior stress and root fractures, and b) to provide the retention of the restoration.

Demands of the restoration of non-vital teeth:

- a) A long-term preservation of the leftover root
- b) A post reaction to masticatory stresses
- c) A simple placing of a post
- d) The post compatibility with other restorative materials

Features of Endodontically Treated Teeth

The loss of vitality reduces the physical features and translucency of the leftover tooth structure. Beside the colour change, which goes from grey to brown, there is also a reduction of the tissue resistance to fractures. The strength of the leftover tooth crown is also reduced because of the carrying out of canal treatment and opening a way through the crown. It is often necessary to strengthen the crown and the root by placing a post in the root canal. When doing this, the potential fracture point moves away from the gingival tooth margin to the top of the root, which reduces the possibility of fracture taking place.

After setting up a post, the crown restoration can be intracoronary (inlay type) or extracoronary (a crown, or onlay, overlay). Extracoronary restoration reduces heavily the stresses on the buccal and lingual knots and lengthens the tooth's life span.²

The Post Significance

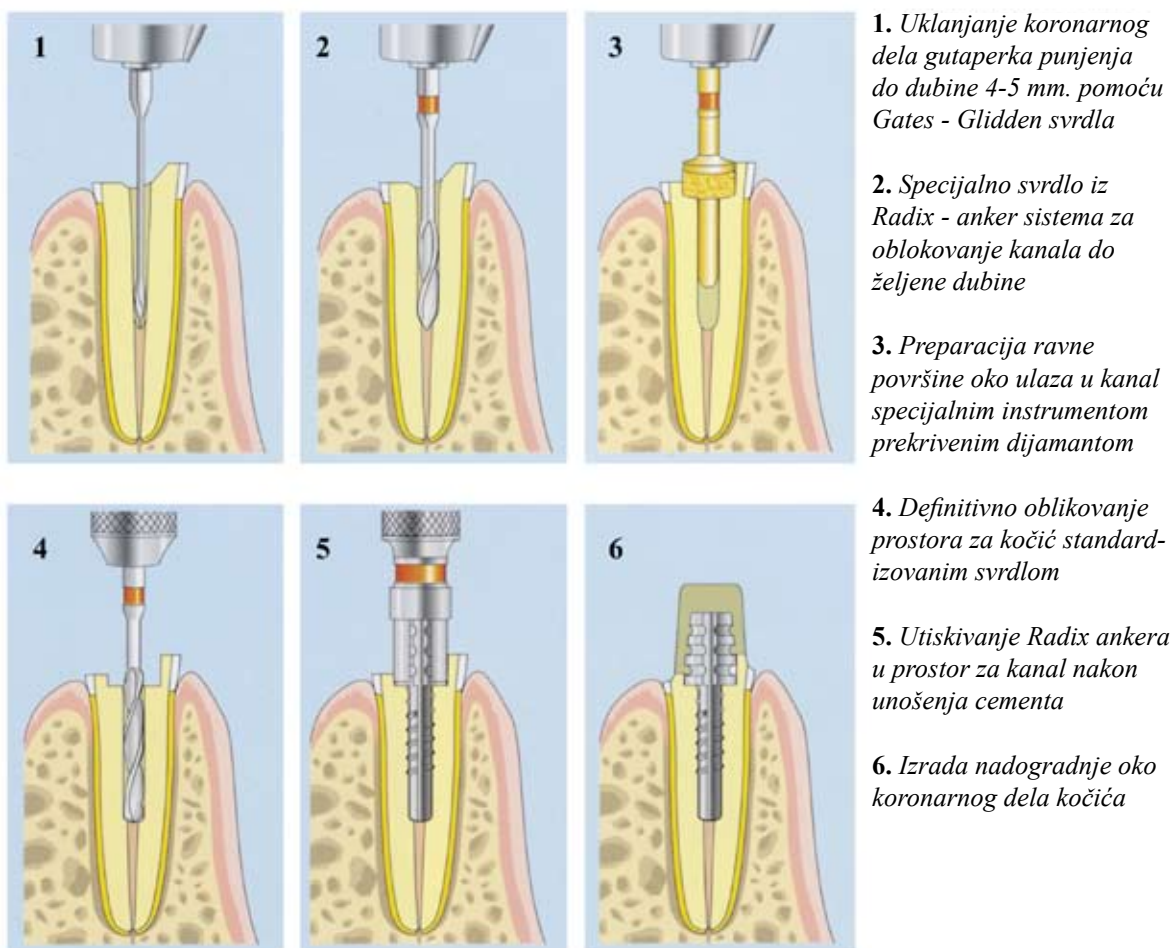
Placing a post in one or more root canals influences the moving of the potential fracture point from the neck of the tooth further to the root apex.

Risks of Placing Posts

- A post is, actually, an intraradicular restoration, which, therefore, depends on the strength and integrity of the leftover tooth substance which keeps it in place.

- Veći dijametar kočića, slabljenje ostatka korena,
 - Tanji kočić, veća mogućnost njegovog savijanja,
 - Duži kočić, veći rizik bočne perforacije,
 - Kraći kočić, manja retencija,
 - Velika pažnja je potrebna pri preparaciji šupljine za kočić. Ona mora da prati oblik i pravac kanala korena, ne sme da ide lateralno niti da ošteti punjenje apikalnog dela korena.
- The bigger the post diameter, the greater weakening of the leftover root,
 - The thinner the post, the greater the possibility of its bending ,
 - The longer the post, the greater risk of lateral perforation,
 - The shorter the post, the weaker the retention,
 - One should be very careful when preparing the cavity for a post. It has to follow the shape and direction of the root canal, and it should not go laterally nor damage the filling of the apical part of the root.

Preparacija šupljine (kanala) za kočić



Slika1. Preuzeto iz Beer,R. Et al.: Endontology. Thieme, Stuttgart. New York 2000.

Pictures (1-6):

1. The removing of the coronary part of the gutta-percha filling up to 4-5mm in depth, using Gates - Glidden bore
2. The special bore from the Radix-anker system for shaping canals to the desired depth
3. The preparation of the flat surface around the canal opening with a special instrument covered with a diamond
4. The definite shaping of the space for the post with a standard bore.
5. The impressing of the Radix-anker into the canal space, after applying cement.
6. The making of the annex around the coronary part of the post.

Preparacija šupljine (kanala) za kočić

Pre početka preparacije radi se radiografija zuba da bi se procenila uspešnost endodontskog lečenja zuba i nivo apikalnog punjenja. Nekad je teško proceniti krivinu kanala korena. Ukoliko je kanal ispunjen gutaperkom ili pastom i gutaperka poenom, preporučuje se razmekšanje punjenja kanala toplim instrumentom (sonda). Zatim se u kanal unosi strugač radi uklanjanja preostalog materijala i identifikacije pravca kanala. Korišćenje lupe i fibrooptičkog svetla može biti od pomoći. Dužina kočića treba da bude najmanje ista kao i visina buduće krune zuba ili minimum 10 mm. Kada se kanal otvori do željene dubine, može se širiti do potrebne veličine. Preporučuje se korišćenje antirotacionog sistema na otvoru kanala radi smanjenja naponskog stresa u cementu. Dovoljno je napraviti, neku vrstu manžetne (u širini oko 2 mm) na otvoru kanala, koja prati anatomiju kanala. To pojačava kočić i deluje kao antirotacioni mehanizam. Kočić treba da bude deblji na koronarnom kraju da bi odoleo stresovima savijanja u vratu zuba i delovao kao celina sa nadogradnjom krunice.

Pri preparaciji šupljine za kočić mora se uzeti u obzir određeni rizik zbog anatomske varijacije korena koje se ne vide jasno na radiografijama.³

Izbor kočića prema obliku i površinskoj konfiguraciji

Postoji mnogo raspoloživih sistema fabričkih kočića kao i velike varijacije materijala od kojih su izrađeni. Između koničnih i kočića paralelnih strana, preporučuju se ovi drugi. Poželjno je da imaju ureze duž bočne strane koji deluju kao evakuacioni kanal za višak cementa. Horizontalni useci na kočiću pojačavaju mehanički spoj sa cementom. Nazupčeni kočići pružaju bolju retenciju od glatkih. Nazupčeni kočići paralelnih strana su sa najjačom retencijom, dok najslabiju retenciju imaju konični glatki kočići.⁴

Materijal za kočice

Najčešće korišćeni materijali za izradu kočića su: nerđajući čelik, titanijum, platina-zlato-paladijum, hrom i bakar. Nerđajući čelik

Cavity (canal) Preparation for a Post

Before the preparation, one should first make an X-ray of the tooth so as to estimate the success of the endodontic tooth treatment and the level of the apical filling. It is sometimes difficult to estimate the curve of the root canal. In case that the canal is filled with gutta-percha, or paste and a gutta-percha point, it is suggested that one use a warm instrument (probe) for softening of the canal filling. The next step is to put a scraper into the canal in order to remove the leftover material and to identify the root direction. It can be rather useful to use the zooming in and the fibro optical light. The post length should be at least the same as the height of the future crown or minimum 1 Omm. When the canal is opened up to the desired depth, it can be widened to obtain the desired size. It is recommended to use the anti-rotating light at the canal opening so as to reduce the pressure stress in the cement. It is sufficient to make some kind of a cuff (about 2 mm wide), on the root opening, following the root anatomy. This fortifies the post and has an effect of an anti-rotating mechanism. The post should be thicker at the coronary end so as to resist the bending stresses in the tooth neck, and to make a whole with the annex of the crown.

When preparing the post cavity, one should take into account the risk from the anatomic variations of the root which cannot be seen clearly on the radiography.³

The Choice of Posts According to the Shape and Surface Configuration

There are many available systems of industrial posts, as well as a great variety of materials they are made of. When choosing between a conical post and the one with parallel sides, it is advisable to use the latter. It is desirable that they have cuts along their lateral sides, which function as evacuation canals for cement surplus. The horizontal cuts on a post increase the mechanical connection with cement. Cogged posts provide a better retention than the smooth ones. Cogged posts of parallel sides provide the strongest retention, while conical, smooth ones, provide the weakest retention.⁴

Post Materials

The materials which are most often used for making posts are: stainless steel, titanium, platinum-gold-palladium, chromium, copper.

je njači među metalima, ali ima korozivni potencijal. Titanijum je vrlo biokompatibilan i u svom metalnom obliku jači od zlata ali slabiji od nerđajućeg čelika. Jedina nepogodnost titanijuma je niski radioopacitet.

Najnoviji materijali za izradu pulparnih kočića su: vlaknasti karbon ojačan epoksi smolom i cirkonijum dioksid keramika.

Karbonska vlakna uložena u matriks od epoksi smole imaju veliku otpornost na pritisak i visok modul elastičnosti. Ovi kočići se vezuju za zidove kanala korena pomoću dentin bonding sistema i kompozitnog smolastog cementa.

Cirkonijum keramički kočići su paralelnih strana i cementiraju se kompozitnim smolastim cementom.

Dužina kočića

Kod određivanja dužine kočića svaki zub se individualno procenjuje. Planira se dužina kočića u odnosu na stres, retenciju i apikalno punjenje. Duži kočić stvara manji stres u cervikalnom regionu. Ako je kočić bliže (od 4 mm) do apeksa, stres se pojačava u apikalnom kraju korena. Idealna dužina kočića bila bi 2/3 dužine kanala korena. Kočići koji su kraći od kliničke krune izbegavaju se zbog velikog stresa koji tada nastaje u cervikalnom regionu.

Dijametar kočića

Dijametar kočića ne treba da bude veći od 1/3 širine korena na njegovom najužem promeru. Kočić treba da bude okružen čvrstim dentinom u širini od 1 mm.

Materijali za cementiranje kočića

Za cementiranje pulparnih kočića koriste se cink fosfatni, karboksilatni, glas jonomerni i epoksi-smola cement. Utvrđeno je da glas jonomer cement ne daje povećanje retencije u odnosu na ostale cimente. Od 1980. god. intenzivno se proučava mikromehanička retencija smole za zubnu strukturu. Proučavano je i kondicioniranje prostora za kočić, pre njegovog cementiranja Bis GMA smolom. Pokazalo se da ovaj postupak povećava jačinu vezivanja čak i kratkih kočića. Uklanjanje smear layer pomoću kiselina (kondicioniranje) jako povećava vezivanje

Stainless steel is the strongest metal, but it has a corrosive potential. As for titanium, its only inconvenience is that it has a low radiopacity.

The most recent materials for making posts are: fibrous carbon strengthened with epoxy resin, and zirconia ceramics.

Carbon fibers set into the epoxy resin matrix have a greater resistance to pressure, and a high module of elasticity. These posts are bound to the root canal walls with the dentin bonding system and composite resinous cement.

Zirconium ceramic posts have parallel sides and they are cemented with composite resinous cement.

Post Length

When determining the post length, each tooth is individually estimated. The length is planned according to the stress, retention and apical filling. A longer post provokes less stress in the cervical region. If the post is closer (up to 4mm) to the apex, the stress increases in the apical part of the root. The ideal post length would be two thirds of the root canal length. Posts which are shorter than the clinical crown should be avoided because of the stress that then arises in the cervical region.

Post Diameter

The post diameter should not be bigger than one third of the root width at its narrowest diameter. A post should be surrounded with a hard dentin at the width of 1 mm.

Post Cementing Materials

For cementing posts we use phosphate zinc, carboxylates, and glass ionomer and epoxy-resin cement. It was established that glass ionomer cement does not give an increased retention in comparison with other cements. Micro mechanic resin retention for dental structure has been intensively studied since 1980. Conditioning of the post space, before its cementing with Bis GMA resin, was studied. It was showed that this procedure increases the binding strength, even with short posts. The removing of smear layer with acid (conditioning) strongly increases the binding for dentin. According to numerous re-

za dentin. Na osnovu brojnih proučavanja je utvrđeno da dentin adhezivni sistemi, primenjeni nakon kondicioniranja dentina zidova kanala, a uz primenu smolastih cemenata značajno pojačavaju retenciju kočica za zub. Ovako se mogu cementirati sve vrste kočica jer se smola cement vezuje za nerđajući čelik, titanijum, karbon vlakno, cirkonijum oksid keramiku.⁵

U kombinaciji sa fabričkim kočicama, za nadogradnju krunice zuba, koriste se sledeći materijali: amalgam, glas jonomer ojačan srebrom i kompozit. Amalgami i kompoziti se smatraju jače retinirajućim od glas jonomera.

Osobine fabričkih metalnih kočica (Filpost - Filhol Dental)

- Obezbeđuju maksimalne pogodnosti zbog sigurnosti, očuvanja mase dentina, retencije, pasivnosti i lakoće primene. Za razliku od drugih sistema mogu se prilagoditi kanalima;
- Moguće je postavljanje dva kočica kod molara i premolara sa divergentnim korenovima;
- Izrađeni od čistog (99,8%) titanijuma;
- Biološki inertni, medicinski sigurni;
- Kompatibilni sa svim zubnim materijalima;
- Brzo i lako se postavljaju;
- Zahtevaju malo uklanjanje dentina;
- Mogu se savijati i kratiti radi oblikovanja;
- Pasivno postavljanje uz izuzetnu retenciju;
- Minimalnemogućnosti krunično korenske frakture (slika 2).

Zaključak

Fabrički metalni kočici, kao i novi materijali za njihovo cementiranje, sve se češće koriste u restauraciji endodontski lečenih zuba. Metalni fabrički kočici cementirani smolastim cementom imaju pojačanu vezu sa zubnim tkivima kao i za materijal za nadogradnju krunice.

Neki metalni kočici (Filpost – Dental Filhol) mogu se savijati, pa su posebno indikovani kod zuba sa divergentnim korenovima.

search, it was established that dentin adhesive systems, applied after conditioning of dentin for root walls, together with the application of resinous cement, significantly increase post retention for a tooth. In this way, all types of posts can be cemented since resinous cement binds itself to stainless steel, titanium, carbon fibers, zirconium oxide ceramics.⁵

In combination with industrial posts, for the annex of tooth crowns, the following materials are used: amalgam, glass ionomer strengthened with silver, and composite. Amalgam and composite are considered to provide a stronger retention than glass ionomer.

Industrial Metal Post Features (Filpost-Filhol Dental)

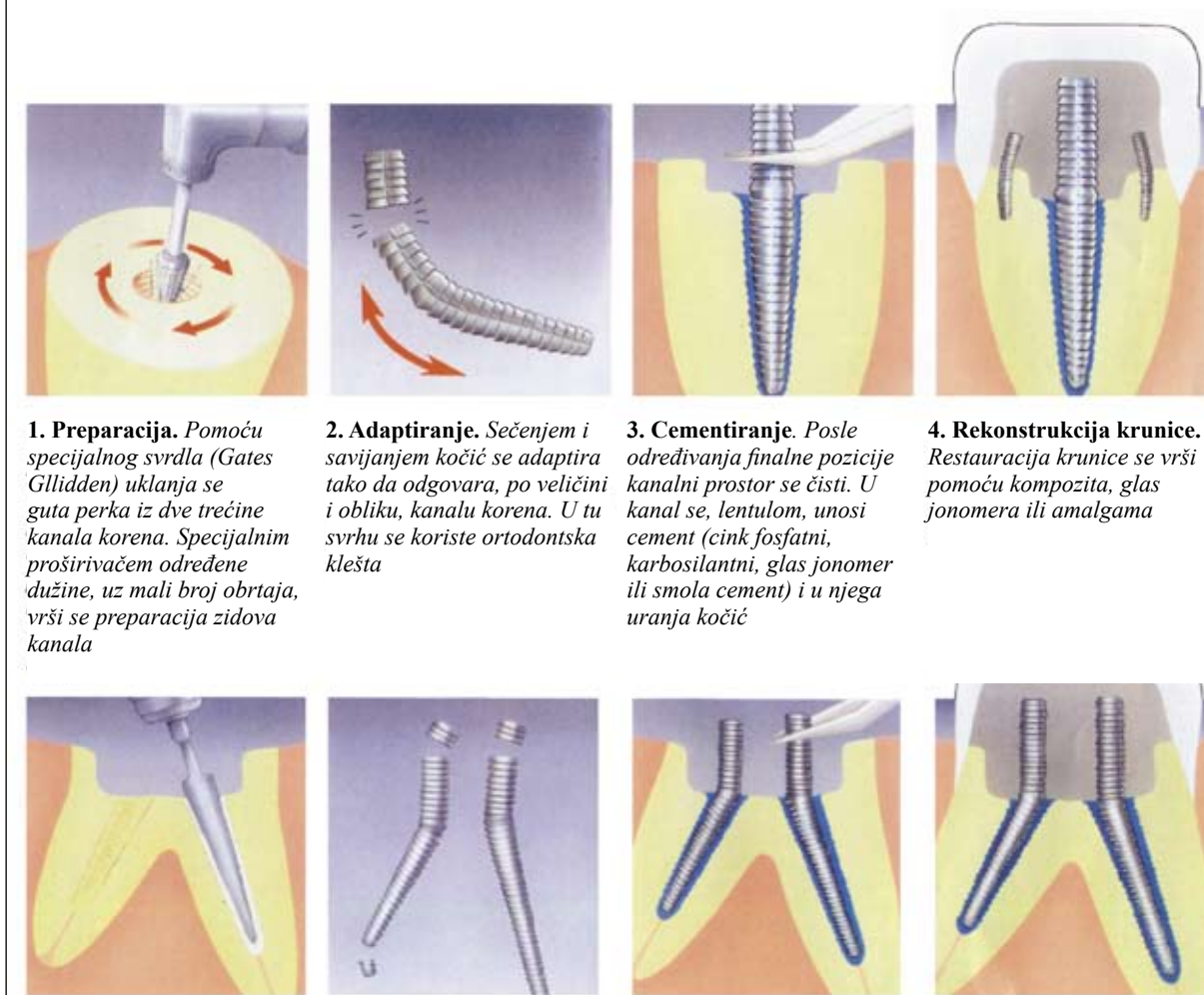
- They provide a maximum number of conveniences because of their safety, preservation of the dentin, retention, passivity and ease of application. They can be adapted to canals, unlike other posts;
- It is possible to place two posts with molars and premolars with divergent roots;
- They are made of pure titanium (99,8%);
- They are biologically inert, and medically safe;
- They are compatible with other tooth materials;
- They are quick and easy to place;
- They demand little removing of dentin;
- They can be bended and shortened for reshaping;
- They can be passively placed with extreme retention;
- There are minimal fracture possibilities of crowns and roots (figure 2).

Conclusion

Significant increases in the use of prefabricated posts in restoration of pulpless teeth, have been associated with a use of new materials for cementation like a autocure resin cements.

Prefabricated metal posts are easily placed, strong, relatively inexpensive and predictable. Some metal posts like Filpost – Filhol Dental

Način postavljanja Flipost kočića



1. Preparacija. Pomoću specijalnog svrdla (Gates Glidden) uklanja se guta perka iz dve trećine kanala korena. Specijalnim proširivačem određene dužine, uz mali broj obrtaja, vrši se preparacija zidova kanala

2. Adaptiranje. Sečenjem i savijanjem kočić se adaptira tako da odgovara, po veličini i obliku, kanalu korena. U tu svrhu se koriste ortodontska klešta

3. Cementiranje. Posle određivanja finalne pozicije kanalni prostor se čisti. U kanal se, lentulom, unosi cement (cink fosfatni, karbosilantni, glas jonomer ili smola cement) i u njega uranja kočić

4. Rekonstrukcija krunice. Restauracija krunice se vrši pomoću kompozita, glas jonomera ili amalgama

Slika 2. Preuzeta iz reklamnog prospekta

(pictures 1-4)

1. Preparation: with the help of bores (Gates Gilden) gutta-percha is removed from two thirds of the root canal. With a special widener, of a specific length, and with a small number of rotations, preparation of the root walls is done.
2. Adaptation: cutting and bending, the post is adapted so that it fits, by its size and shape, to the root canal. Orthodontic pliers are used for this purpose.
3. Cementing: after determining the final position, root space is cleaned. Cement (phosphate zinc, carboxylates, glass ionomer or resinous cement) is put with a lentula into the canal, and post is placed into it.
4. Crown reconstruction: Crown restoration is done with a composite, glass ionomer, or amalgam.

Fabrički kočići se lako postavljaju, jaki su i relativno jeftini.

Većina stomatologa koristi kočiće u tehnici nadogradnje zuba zato što je to brže, lakše, i u mnogim slučajevima manje agresivno po zub od livenih nadogradnji.

can be adapted in divergent canals, and fixed with risin cement too.

The most dentists use industrial posts in post and care techniques which are faster, easier and less abusive to teeth than cast annexes.

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