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REGENERATIVNA PARODONTALNA TERAPIJA – II deo

REGENERATIVE PERIODONTAL THERAPY: PART II

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Sažetak

Uvod: *Parodontalna oboljenja dovode do morfološke i funkcionalne dezintegracije potpornog aparata zuba, a osnova koncepta hiruške parodontalne terapije jeste eliminacija parodontalnih džepova, sa koštanim remodeliranjem i kreiranjem fiziološke arhitekture na apikalnijem nivou, čime se postižu bolji uslovi kontrole dentalnog plaka. U parodontalnom ligamentu postoje progenitorske ćelije koje služe za obnavljanje izgubljenog epitelnog pripoja. Vođena tkivna regeneracija (engl. guided tissue regeneration – GTR) jeste zahvat koji omogućuje sanaciju parodontalnog defekta ćelijama koje mogu stvoriti novi vezivni pripojni epitel i povećati nivo alveolarne kosti, a njen cilj je da recesija gingive bude što je moguće manja.*
Cilj: *Cilj ovog rada bio je predstaviti savremene pristupe terapiji obolelog parodoncijuma koji su usmereni na regeneraciju i kompletnu rekonstrukciju parodontalnih tkiva.*
Zaključak: *Razlika u pogledu ishoda regenerativne parodontalne terapije odnosi se na stepen saradnje pacijenta i terapeuta, nivo održavanja oralne higijene, odabir defekata, kao i na način hiruškog rada. Visok nivo kontrole dentalnog plaka i eliminacija patogene mikroflore, kao i intenzivna antimikrobna parodontalna terapija, poboljšavaju ishod parodontalne regenerativne terapije.*

Ključne reči: *parodontalna hirurgija, vođena regeneracija tkiva*

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Abstract

Introduction: *The periodontal diseases lead to the morphological and functional disintegration of the tooth-supporting apparatus, and a basic concept of surgical periodontal therapy is the elimination of periodontal pockets with the bone remodelling and creating the physiological architecture at a more apical level, thereby achieving better conditions for dental plaque control. The progenitor cell population in the periodontal ligament is served for the reconstruction of lost epithelial attachment. Guided Tissue Regeneration (GTR) is a procedure that allows for the repair of a periodontal defect by cells capable of creating new connective tissue attachment and alveolar bone, and the aim is a minimization of postoperative gingival recession. The objectives of GTR are the creation of a new epithelial attachment, an increase in the bone level, and the minimization of postoperative gingival recession.*
Aim: *Presentation of modern approaches, materials, prognostic factors as well as complications of periodontal therapy that are focused on attachment regeneration and complete reconstruction of periodontal tissue.*
Conclusion: *The difference in terms of outcomes of regenerative periodontal therapy relates to the degree of patient's cooperation with the therapist, the level of oral hygiene, the selection of an appropriate bone defect, as well as the methods of surgery. The high level of dental plaque control, elimination of pathogenic microflora and intensive antimicrobial periodontal therapy improve the outcome of periodontal regenerative therapy.*

Key words: *periodontal surgery, guided tissue regeneration*

Vođena regeneracija tkiva (engl. guided tissue regeneration – GTR)

Parodontalna oboljenja dovode do morfološke i funkcionalne dezintegracije potpornog aparata zuba, a osnova koncepta hiruške parodontalne terapije jeste eliminacija parodontalnih džepova, sa koštanim remodeliranjem i kreiranjem fiziološke arhitekture na apikalnijem nivou, čime se postižu bolji uslovi kontrole dentalnog plaka[1]. Prvi zapisi o vođenoj regeneraciji tkiva kao kliničkoj parodontalnoj hirurgiji nastali su pre više od 25 godina[2,3]. Ciljevi vođene regeneracije tkiva jesu stvaranje novog epitelnog pripoja, povećanje nivoa kosti i najmanja moguća postoperativna gingivalna recesija[3,4]. Sve vrste parodontalnih bolesti uzrokovane su mikroorganizmima dentalnog plaka, s tim što dodatni faktori poput traume, starenja, genetike, sistemskih bolesti i sl. doprinose još većoj destrukciji parodonta.

Glavni cilj u terapiji parodontalnih oboljenja jeste obnova parodonta i regeneracija parodontalnih tkiva. Danas plan terapije reparacije parodonta podrazumeva anti-inflamatorne mere (obrada i poliranje korena), vođenu regeneraciju tkiva (sa koštanim transplantatom ili bez njega) i/ili upotrebu faktora rasta; nijedan od njih neće sam po sebi u potpunosti obnoviti strukturu parodonta[5].

Vođena tkivna regeneracija (engl. *guided tissue regeneration* – GTR) jeste zahvat koji omogućuje sanaciju parodontalnog defekta ćelijama koje mogu stvoriti novi vezivni pripojni epitel i alveolarnu kost. Istraživanjima je utvrđeno da se prethodnici ćelija za stvaranje novog vezivnog pripojnog epitela nalaze u periodoncijumu[6,7,8].

Shodno tome, smatra se da je moguće dobiti novi vezivni pripojni epitel ako takve ćelije nasele površinu korena u toku zarastanja. To se može postići izolacijom ćelija epitelnog i vezivnog tkiva gingive iz područja zarastanja primenom fizičke membrane, koja će omogućiti ćelijama periodontalnog ligamenta da ponovo nasele površinu korena[9].

Izolacija brzorastućeg epitelnog i vezivnog tkiva iz parodontalne rane omogućiće spororastućem tkivu da zauzme prostor oko zuba za 6–8 nedelja. Osteoblasti, cementoblasti i ćelije periodoncijuma tada imaju mogućnost regeneracije novog pripojnog epitela na prethodno izmenjenoj površini korena. Dodatno objašnjenje principa delovanja membrane jeste osiguravanje dovoljnog prostora za optimalnu stabilnost rane, koji je neophodan za samu regeneraciju parodontalnih tkiva[10].

Guided tissue regeneration—GTR

The periodontal diseases lead to the morphological and functional disintegration of the tooth-supporting apparatus, and a basic concept of surgical periodontal therapy is the elimination of periodontal pockets with the bone remodelling and creating the physiological architecture at a more apical level, thereby achieving better conditions for dental plaque control[1]. The first documents on guided tissue regeneration (GTR), as clinical periodontal surgery, were created more than 25 years ago[2,3]. The objectives of GTR are the creation of a new epithelial attachment, an increase in the bone level, and the minimization of postoperative gingival recession[3,4]. All types of periodontal diseases are caused by microorganisms of dental plaque, although additional factors such as trauma, ageing, genetics, systemic diseases etc., contribute to even greater destruction of the periodontium.

The main goal in the therapy of periodontal diseases is the restoration of the periodontium and the regeneration of periodontal tissues. Today, the treatment plan for periodontal repair includes anti-inflammatory measures (scaling and root planning), guided tissue regeneration (with or without a bone graft), and/or the use of growth factors, none of them will completely restore the structure of the periodontium on their own[5].

GTR is a procedure that allows for the repair of a periodontal defect by cells capable of creating new connective tissue attachment and alveolar bone. Researchers have determined that precursors of cells for the creation of new connective epithelial attachment are located in the periodontal tissues[6,7,8].

Accordingly, it is considered possible to obtain a new connective tissue epithelial attachment if such cells colonize the root surface during healing. This can be achieved by isolating epithelial and connective tissue cells of the gingiva from the healing area by using a physical barrier membrane, which will allow cells of the periodontal ligament to re-colonize the root surface[9].

The isolation of a fast-growing epithelial and connective tissue from the periodontal wound over 6−8 weeks will allow the slower-growing tissue to occupy the space around the tooth. Osteoblasts, cementoblasts, and periodontal cells then have the opportunity to regenerate new epithelial attachment on the previously altered root surface.

Slični principi GTR-a primenjeni su kod defekta alveolarne kosti pri regeneraciji. Proces regeneracije kosti isti je kao nakon ekstrakcije zuba – stvaranje krvnog koaguluma inicira stvaranje nove kosti i revaskularizaciju tkiva s periferije defekta. Tako stvorena kost postupno se zamenjuje košću lamelarne strukture, a onda sledi sazrevanje i remodeliranje sekundarnih osteona. Ovakvim pristupom u regeneraciji specifičnog tkiva nije ostvarena veza između tkiva i zuba. Reč je o vođenoj regeneraciji kosti (engl. *guided bone regeneration* – GBR). GBR tehnika unapređena je u GTR, koji podrazumeva kompleksniju regeneraciju sa više specifičnih tkiva.

Mnogo pre nego što je uveden koncept GTR, uočeno je da će se kavitet s pristupom osteoblasta i krvnim sadržajem ispuniti novom kosti ako je izolovan od okolnog mekog tkiva, kao i da će se u slučaju izostanka izolacije ispuniti fibroznim tkivom[11].

Indikacije za vođenu regeneraciju tkiva su intrakoštani trozidni i dvozidni koštani defekti, furkacije korena II stepena i lokalizovane gingivalne recesije. Jednozidni intrakoštani defekti, furkacije II stepena u gornjoj vilici i furkacije III stepena u donjoj vilici slabo reaguju na vođenu regeneraciju tkiva. Pre vođene regeneracije tkiva treba sprovesti odgovarajuću kauzalnu parodontalnu terapiju.

GTR nije postupak za lečenje parodontopatije, već metoda regenerisanja defekata koji su se razvili kao posledica parodontalnog oboljenja. Samim tim, uvek treba sprovesti odgovarajuću kauzalnu terapiju parodontopatije pre nego se započne sa primenom GTR-a[9]. Naime, brojne kliničke studije pokazale su da je GTR uspešan tretman u parodontalnoj rekonstruktivnoj hirurgiji, te je usvojen kao jedan od češće korišćenih zahvata u parodontalnoj praksi, samostalno ili zajedno sa drugim metodama lečenja[5,12,13,14].

Izvođenje postupka

Zahvat počinje sulkusnim ili rubnim incizijama, a potom se izvode vertikalni oslobađajući rezovi i odiže se režanj pune debljine. Na režnju se ostavlja sveže vezivno tkivo i time se uklanja sav epitel džepa. Granulaciono tkivo najpre se uklanja, a zatim se struže (obrađuje) i polira koren. Membrana se bira po obliku i osobinama, a onda se prilagođava tako da prekrije defekt. Membrana se pruža preko kosti barem 3 mm od ruba defekta. Potrebno je osigurati dobru povezanost sa alveolarnom kosti i tako izbeći preklapanje ili nabiranje membrane. Rubovi režnja pomeraju se koronarno i ušivaju tako da rub membrane bude 2 mm ispod ruba režnja.

An additional explanation of the principle of membrane's action is to ensure enough space for optimal wound stability, necessary for the regeneration of periodontal tissues itself[10].

Similar principles of GTR are applied to the regeneration of alveolar bone defects. The process of bone regeneration is similar to the process that follows tooth extraction—the formation of a blood clot initiates the creation of new bone and revascularization of tissue from the periphery of the defect. The created bone is gradually replaced with the lamellar bone structure, followed by maturation and remodelling of the secondary osteons. With this approach in the regeneration of specific tissue, a connection between tissue and tooth is not completed. This procedure is referred to as Guided Bone Regeneration (GBR). The GBR technique has been refined into GTR, which is a more complex procedure of regeneration involving more specific tissues. Long before the introduction of the GTR concept, it was observed that a cavity with access to osteoblasts and blood content would fill with new bone if it were isolated from the surrounding soft tissue, unlike in the same situation without isolation, when it would be filled with fibrous tissue[11].

Indications for GTR include intra-bony defects that are three-walled and two-walled, grade II furcations, and localized gingival recessions. Single-walled intra-bony defects, grade II furcations in the upper jaw, and grade III furcations in the lower jaw respond poorly to GTR. Before proceeding with GTR, appropriate causal periodontal therapy should be performed.

GTR is not a procedure for the treatment of periodontitis but a method for regenerating defects caused by periodontal disease. Therefore, appropriate periodontal causal treatment should always be carried out before the beginning of the GTR[9]. Thus, numerous clinical studies have shown that GTR is a successful treatment in periodontal reconstructive surgery, adopted as one of the more frequently used procedures in periodontal practice, either alone or in conjunction with other treatment methods[5,12,13,14].

The performance of a procedure

The procedure begins with sulcular or marginal incisions. Then, vertical releasing incisions are made, and a full-thickness flap is elevated. Fresh connective tissue has to be left on the flap, and all the pocket epithelium removed.

Treba motisvisati pacijenta da nakon operacije pravilno održava oralnu higijenu kako bi se smanjio rizik od infekcije i eventualne traume. Operisano područje se prve dve nedelje ne četka, a kasnije se nežno četka mekom četkicom i ispire 0,12% – 0,2% hlorheksidinom dva ili tri puta dnevno.

Antibiotici (tetraciklini i amoksicilin) se ne propisuju sistematski, budući da nije dokazana nikakva prednost njihove upotrebe kada je reč o zarastanju i konačnom rezultatu. Neresorptivna membrana uklanja se nakon od 3 nedelje do 6 nedelja. Ako se upotrebljavaju bioresorptivne membrane, period kontrole eventualne infekcije u usnoj šupljini produžava se na 6–8 nedelja. Preporučuje se nastavak parodontalnog tretmana uz izbegavanje sondiranja, obrade i poliranja operisanog područja u periodu od šest meseci do godinu dana[3,9].

Membrane za parodontalnu regeneraciju

Glavni cilj membrane u GTR-u jeste odvajanje gingivalnog epitela i vezivnog tkiva od površine korena. Prostor koji se dobija membranom dopušta ćelijama periodoncijuma da nasele površinu korena zuba. Membrana za regeneraciju tkiva mora biti biokompatibilna, imati osobinu ekskluzije ćelija, čuvati prostor, izdržati mastikatorne sile, integrisati se sa tkivom i biti jednostavna za upotrebu. U kriterijume koje bi trebalo da zadovoljava idealna membrane spadaju biokompatibilnost, održavanje prostora, integracija tkiva, sposobnost stvaranja i održavanja prostora uz koren i resorptivnost[3]. Membrane se dele na neresorptivne i resorptivne[15].

Neresorptivne membrane

S obzirom na to da zadržavaju građu i oblik u tkivima, neresorptivne membrane uklanjaju se hirurškim zahvatom. Prva generacija membrana GoreTex® e-PTFE sastavljena je od okluzivne membrane i otvorenog mikrostrukturisanog okovratnika koji se nalazi koronarno. Okovratnik pospešuje urastanje vezivnog tkiva, sprečava apikalnu migraciju epitela i osigurava stabilnost rane. Okluzivna membrana održava prostor za regeneraciju i prepreka je prema mukogingivalnom režnju.

Ugradnjom titana između dva sloja e-PTFE-a povećava se mehanička čvrstoća i bolje se čuva prostor. Nakon postavljanja, može doći do kolonizacije bakterijama i upale okolnog tkiva[16].

Granulation tissue is removed, then the scaling and root planning is performed. The membrane is selected based on the shape and characteristics, and then it is adjusted to cover the defect. The membrane extends over the bone at least 3 mm from the edge of the defect. It is necessary to ensure a good connection with the alveolar bone and to avoid overlapping or bunching of the membrane. The edges of the flap are moved coronal and sutured so that the edge of the membrane is 2 mm below the edge of the flap.

After periodontal surgery, the patient should be motivated to maintain proper oral hygiene, to reduce the risk of infection and potential trauma. The operated area should not be brushed for the first two weeks, and later has to be brushed gently with a soft brush and rinsed with 0.12−0.2% chlorhexidine two to three times a day.

Antibiotics (tetracyclines and amoxicillin) are not prescribed systemically, as no advantage has been proven in healing or the outcome. Non-resorbable membranes have to be removed after 3−6 weeks. With the use of bioresorbable membranes, the period for controlling possible infection in the oral cavity has been extended to 6–8 weeks. Continuation of periodontal treatment with avoidance of probing, scaling and root planing of the operated area for 6 months to a year is recommended[3,9].

Membranes for periodontal regeneration

The primary goal of the barrier membrane in GTR is to separate the gingival epithelium and connective tissue from the root surface. The space created by the membrane allows periodontal cells to colonize the tooth root surface. A membrane for tissue regeneration must be biocompatible, have cell exclusion properties, maintain space, withstand masticatory forces, integrate with tissue, and has to be easy to use. The ideal membrane should meet the following criteria: biocompatibility, space maintenance, tissue integration, ability to create and maintain space near the root, and resorbability[3]. Membranes are divided into non-resorbable and resorbable[15].

Non-resorbable barrier membranes

These membranes retain structure and shape in tissues, and they could be removed by surgical procedure. GoreTek® e-PTFE (expanded polytetra-fluoroethylene) membrane is the first generation of a barrier membrane,

Resorptivne membrane

Uvedene su u primenu GTR-a kao druga generacija membrana, s ciljem da se izbegne druga operacija uklanjanja. Upotrebom resorptivne membrane smanjuje se mogućnost posthirurških komplikacija. Građene su od prirodnih i sintetičkih materijala[16,17].

Resorptivne membrane od prirodnih materijala

Bio-Gide® membrana napravljena je od kolagena tipa I i III, uzetog iz svinjskog dermisa. Kolagen se proizvodi u nekoliko faza u kojima se dobija kolageni dvosloj – on se tretira bazama da bi se eliminisala kontaminacija bakterijama ili virusima. Terminalne peptidne regije od kojih zavisi antigenost odvajaju se i uklanjaju se ostaci lipida i proteina. Kontrolišu se bio-kompatibilnost i sterilnost. Konačni proizvod sastoji se od čistih kolagenih vlakana, bez ostataka i hemijskih supstanci.

Bio-Mend® membrane napravljene su od kolagena tipa I, uzetog iz goveđe tetive. Kolagen razgrađuju makrofagi i polimorfo-nuklearni neutrofili. Enzim kolagenaza deli molekul kolagena na delove koji se denaturišu i prelaze u želatin. Želatin se dalje preko gelatinaza i proteinaza razgrađuje do amino-kiselina. Bio-Gide® membrana razgrađuje se za 24 nedelje, a Bio-Mend® membrana za 6–8 nedelja.

Resorptivne membrane napravljene od sintetičkih materijala

Sintetički materijali za resorptivne membrane derivati su organskih alifatskih termoplastičnih polimera. Najviše se koriste poli-α-hidroksilne kiseline, u koje se ubrajaju polilaktična i poliglikolna kiselina. Njihovu prednost predstavlja razgradnja hidrolizom do vode i ugljen-dioksida.

Guidor® je dvoslojna resorptivna membrana. Spoljašnji sloj membrane ima četvorougaone otvore koji potiču od urastanja tkiva, što znači da se postoperativna recesija gingive smanjuje. Unutrašnji sloj ima stopere i unutrašnje otvore koji čuvaju prostor između membrane i korena.

Resolute® ima okluzivnu membranu koja sprečava urastanje tkiva i porozni deo koji poboljšava integraciju tkiva. Atrisorb® je jedina membrana koja se priprema intraoperativno. Polilaktični polimer je u tečnom obliku i otopljen u N-metil-2-pirolidonu. Membrana nastaje tek nakon 4–6 minuta, kada se doda fiziološki rastvor. Seče se prema želji terapeuta.

composed of an occlusive membrane and an open micro-structured collar located coronary. The collar promotes the ingrowth of connective tissue, prevents apical migration of the epithelium, and ensures wound stability. The occlusive membrane maintains space for regeneration and acts as a barrier to the mucogingival junction.

By embedding titanium between 2 layers of e-PTFE, mechanical strength is increased and space is better preserved. After placement, colonisation by bacteria and inflammation of the surrounding tissue can occur[16].

Resorbable barrier membranes

GTR membranes have been introduced as the second generation of membranes to avoid the multiple operative procedures. The use of resorbable membranes reduces the possibility of post-surgical complications. They are made of natural and synthetic materials[16,17].

Resorbable membranes, made from natural materials

The Bio-Gide® membrane are made from type I and III collagen, taken from the pig dermis. The collagen is produced in several stages where a collagen bilayer is obtained, which is treated with bases to eliminate bacterial or viral contamination. Terminal peptide regions, which depend on antigenicity, are separated, and remnants of lipids and proteins are removed. Biocompatibility and sterility are controlled. The final product consists of pure collagen fibres without residues and chemical substances.

The Bio-Mend® membranes are made from type I collagen, taken from bovine tendon. The collagen is degraded by macrophages and polymorphonuclear neutrophils. The enzyme collagenase breaks the collagen molecule into parts that denature and turn into gelatin. Gelatin is further degraded into amino acids by gelatinases and proteinases. The Bio-Gide® membrane degrades over 24 weeks, while Bio-Mend® degrades in 6−8 weeks.

Resorbable barrier membranes made from synthetic materials

Synthetic materials for resorbable membranes are derivatives of organic aliphatic thermoplastic polymers. Poly-α-hydroxy acids are most commonly used, including polylactic and polyglycolic acids.

Njena debljina iznosi od 600 μm do 750 μm. Postavlja se u defekt laganim pritiskom i tako se pripaja[15].

Nema dokaza da između bioresorptivne i neresorptivne (e-PTFE) membrane postoji razlika u kvalitetu stvaranja kliničkog pripojnog epitela i smanjenja dubine sondiranja[10]. Prema novijim istraživanjima, GTR se u terapiji intrakoštanih i furkacijskih defekata pokazala uspešnijom od konvencionalne operacije otvorenog režnja (engl. *open flap debridement* – OFD)[18,19,20]. Stvara se klinički epitelni pripoj i smanjuje dubina sondiranja kod defekata kosti i otvorenih furkacija.

Komplikacije

U vođenoj regeneraciji tkiva komplikacije su česte i povezuju se sa pogoršanjem parodontalnog zdravlja i izostankom kliničkog uspeha. Izloženost membrane navodi se kao glavna komplikacija u 70% – 80% slučajeva[21,22]. Učestalost izloženosti membrane smanjena je primenom modifikovanih tehnika pristupnog režnja (modifikovana tehnika očuvanja papile, očuvanje aproksimalnog tkiva i pojednostavljena tehnika očuvanja papile) koje štede interdentalno tkivo. Veoma je važna kontrola izloženosti membrane pošto je kontaminiranost bakterijama dokazana. Kontaminacija resorptivnih i neresorptivnih membrana povezana je sa smanjenjem dobijenog epitelnog pripoja kod intraosealnih defekata.

Kao druge postoperativne komplikacije mogu se izdvojiti edem, eritem, supuracija, klizanje ili perforacija režnja i postoperativna bol. Postoperativna bol kontroliše se analgeticima. Lokalna kontaminacija bakterijama kontroliše se upotrebom hlorheksidina u obliku rastvora za ispiranje ili gelova, kao i korišćenjem mekih četkica za zube. Perforacija režnja i ozbiljna izloženost membrane u nekim slučajevima mogu rezultirati odstranjivanjem membrane[23].

Prognostički faktori u rege-nerativnoj parodontalnoj terapiji

Primenom različitih pristupa identifikovan je velik broj prognostičkih faktora koji mogu biti povezani sa pacijentom ili sa defektom koji se obrađuje.

Their advantage is decomposition by hydrolysis into water and carbon dioxide.

Guidor® is a dual-layer resorbable membrane. The outer layer of the membrane has quadrangular openings that promote tissue ingrowth, meaning that postoperative recession of the gingiva is rarely reduced. The inner layer has stoppers and internal openings that preserve the space between the membrane and the root.

Resolute® has an occlusive membrane that prevents tissue ingrowth and a porous part that enhances tissue integration. Atrisorb® is the only membrane that is prepared intraoperatively. The polylactic polymer is in liquid form and dissolved in N-methyl-2-pyrrolidone. The membrane is formed after 4−6 minutes, when a physiological solution is added. The therapist makes cutting decisions. Membrane thickness is 600−750 μm. It is placed in the defect with gentle pressure and thus adhered[15].

There is no evidence that there is a difference between bioresorbable and non-resorbable (e-PTFE) membranes in the quality of clinical attachment of epithelium formation and reduction of pocket probing depth10. According to more recent research, GTR has been proven to be more successful in the therapy of intrabony and furcation defects than conventional open flap debridement (OFD) surgery[18,19,20]. Clinical epithelial attachment is formed and pocket probing depth reduced in the bone and open furcation defects.

Complications

Complications in GTR are common and associated with the deterioration of periodontal health and the absence of clinical success. Membrane exposure is cited as the main complication in 70–80% of cases[21,22]. The frequency of membrane exposure is reduced by using modified flap access techniques (modified papilla preservation technique, preservation of approximal tissue, and simplified papilla preservation technique) that save interdental tissue. Control of membrane exposure is very important, as bacterial contamination has been proven. Contamination of resorbable and non-resorbable membranes is associated with a reduction in the achieved epithelial attachment in the intraosseous defects.

Other postoperative complications include oedema, erythema, suppuration, flap slippage or perforation, and postoperative pain. Postoperative pain is controlled with analgesics.

Faktori povezani sa pacijentom

Regenerativnom terapijom parodontopatije ne leči se parodontopatija, nego se deluje na regeneraciju defekata do kojih je ovo oboljenje dovelo. Najpre treba sprovesti kauzalnu parodontalnu terapiju, a zatim započeti postupak regeneracije. Ako kod pacijenata sa završenim ciklusom kauzalne parodontalne terapije i sa lošom oralnom higijenom prilikom sondiranja dođe do krvarenja i visoke koncentracije specifičnih mikrooragnizama, ishod regenerativne parodontalne terapije biće los[25,26,27].

Nivo održavanja higijene ima veliki uticaj na ishod parodontalne regeneracije. Kod pacijenata sa optimalnom oralnom higijenom primećen je viši nivo kliničkog epitelnog pripoja nego kod pacijenata čija je oralna higijena bila lošija od idealne[25,26,28].

Možemo zaključiti da visok nivo kontrole dentalnog plaka i eliminacija patogene mikroflore, kao i intenzivna antimikrobna parodontalna terapija, poboljšavaju ishod parodontalne regenerativne terapije.

Pušenje

Retrospektivnim istraživanjem potvrđeno je da su ishodi regenerativne terapije znatno lošiji kod pušača nego kod nepušača[25]. Nizom istraživanja pokazano je da konzumacija cigareta utiče na smanjenje nivoa kliničkog epitelnog pripoja[29,30,31]. Iako nema formalnih dokaza, treba preporučiti pacijentima da prestanu sa ovom navikom. Takođe, treba ih obavestiti o mogućnostima slabijeg rezultata terapije, ali i preporučiti im da ne konzumiraju cigarete pre i posle terapijskog zahvata.

Drugi faktori povezani sa pacijentom

Smatra se da i drugi faktori koji se tiču pacijenta, kao što su starost, genetika, sistemska oboljenja ili nivo stresa, mogu biti povezani sa suboptimalnim regenerativnim ishodima. U nedostatku dokaza, može se reći da nema potrebe za bilo kakvim dodatnim postupcima, osim u slučaju da postoje kontraindikacije za hirušku terapiju (npr. nekontrolisani ili nestabilni dijabetes, teške bolesti i sl.).

Local bacterial contamination is controlled by using chlorhexidine in the form of rinsing solutions or gels, as well as soft toothbrushes. Flap perforation and severe membrane exposure in some cases can result in membrane removal[23].

Prognostic factors in regenerative periodontal therapy

Development of the application of different approaches suggests that a large number of prognostic factors have been identified, which may be related to the patient or the treated defect.

Patient-Related Factors

Regenerative therapy for periodontitis cannot treat periodontitis itself, but rather aims to regenerate defects that have occurred during the course of the disease. It is necessary to first perform causal periodontal therapy, and then begin the regeneration process. In patients who completed a cycle of causal periodontal therapy, but have not maintained good oral hygiene, the presence of bleeding upon probing and a high concentration of specific microorganisms will likely result in poor outcome of regenerative periodontal therapy[24,25,26,27].

The level of hygiene maintenance has a significant impact on the outcome of periodontal regeneration. In patients with optimal oral hygiene, a higher level of clinical epithelial attachment may be observed compared to patients with a less than optimal oral hygiene status[25,26,28].

We can conclude that a high level of dental plaque control and elimination of pathogenic microflora, as well as intensive antimicrobial periodontal therapy, improve the outcome of periodontal regenerative therapy.

Smoking

A retrospective study confirmed that smokers exhibited significantly reduced regenerative outcomes when compared to non-smokers[25]. A number of studies have shown that cigarette smoking reduce the levels of clinical epithelial attachment[29,30,31]. Although there is no formal evidence, patients should be advised to stop smoking, they should be informed about the possibility of a poor therapeutic outcome, as well as given advice on smoking cessation before and after the therapeutic procedure.

Faktori povezani sa defektom

Vrste defekata

Trenutno dostupne parodonatalne regenerativne procedure ne pružaju dokaze da se suprakoštani defekti i furkacije III stepena mogu lečiti regenerativnim pristupom. Ova ograničenja odnose se i na interdentalne kratere, tako da infrakoštani defekti i defekti furkacije II klase mogu biti lečeni na ovaj način.

Morfologija defekata

Morfologija defekata ima važnu ulogu u zarastanju rane nakon parodontalnog regenerativnog lečenja infrakoštanih defekata. To se pokazalo u istraživanju u kojem su dubina i širina koštanog defekta uticale na nivo novog kliničkog epitelnog pripoja i dobijanja alveolarne kosti, i to nakon godinu dana. Dublji defekt imao je viši nivo kliničkog epitelnog pripoja. Uvidelo se i sledeće: što je širi defekt, dobijanje epitelnog pripoja i kosti je manje[28,32].

Faktori povezani sa zubom

Endodontski status zuba smatra se potencijalno važnim faktorom u parodontalnom lečenju. Sve je više dokaza o tome da endodontski lečeni zubi drugačije reaguju na parodontalnu terapiju. Kliničko ispitivanje koje je obuhvatilo 208 ispitanika sa jednim intrakoštanim defektom pokazalo je da pravilno sprovedena terapija endodontska terapija ne utiče negativno na dugotrajnu stabilnost rezultata lečenja dubokih intrakoštanih defekata tretiranih membranama[33].

Teška nekontrolisana pokretljivost zuba (klasa II po Mileru ili više) može ugroziti regenerativni terapeutski tretman.

Zaključak

Vođena regeneracija tkiva predstavlja najbolje dokumentovani postupak za regeneraciju parodonta u intrakoštanim defektima i furkacijama II stepena. Razlika u pogledu ishoda regenerativne parodontalne terapije odnosi se na stepen saradnje pacijenta i terapeuta, nivo održavanja oralne higijene, odabir defekata, te način hiruškog rada.

The other patient-related factors

It is believed that other patient-related factors such as age, genetics, systemic diseases, or stress levels can be associated with sub-optimal regenerative outcomes. Despite a lack of evidence, no action is necessary unless there are contraindications for surgical therapy (e.g., uncontrolled or unstable diabetes, severe illnesses, etc.).

Defect-related factors

Types of defects

Currently available periodontal regenerative procedures do not provide evidence that suprabony defects and grade III furcations can be treated with a regenerative approach. These limitations also apply to interdental craters, meaning that infrabony defects and Class II furcation defects can be treated in this way.

Defect Morphology

The morphology of defects plays an important role in the healing of a wound after periodontal regenerative treatment of infrabony defects. A research showed that the depth and width of the bone defect affected the level of new clinical epithelial attachment and gain of alveolar bone after one year. A deeper defect was associated with a higher level of clinical epithelial attachment, while a wider defect was linked to decreased epithelial attachment and bone gain[28,32].

Tooth-related factors

The endodontic status of a tooth is considered a potentially important factor in periodontal treatment. There is increasing evidence that teeth treated endodontically respond differently to periodontal therapy. A clinical trial that included 208 participants with a single intrabony defect showed that properly conducted endodontic therapy did not negatively affect the long-term stability of the treatment results of deep intrabony defects treated with membranes[33].

Severe uncontrolled tooth mobility (Miller Class II or upper) may compromise the regenerative therapeutic treatment.

Conclusion

GTR is the best documented procedure for periodontal regeneration in intraosseous defects and grade II furcations. The difference patient's cooperation with the therapist, the level of his oral hygiene, the selection of an appropriate defect, as well as the methods of surgery.

Izjava o sukobu interesa

Autori izjavljuju da nema sukoba interesa.

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Conflicts of Interest statement

The authors declare no conflicts of interest.

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