

PERIODONTAL REGENERATIVE EFFECT OF HYDROXYAPATITE IN THE TREATMENT OF INTRABONY DEFECT

PARODONTNI REGENERATIVNI UČINAK HIDROKSIAPATITA U LIJEČENJU INFRAKOŠTANOG DEFEKTA

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ABSTRACT

Periodontal regeneration in patients with advanced periodontitis and loss of a connector is a big challenge for the periodontist.

Objective: To describe a case of application of hydroxyapatite in the treatment of intra-bony deep pocket.

Methods: At the beginning of therapy, the plaque index was verified and gingival bleeding index and pocket depth were measured. After the initial therapy was performed, an open flap surgery was done filling the intra-bony pocket with bone substitute. Radiograph analysis was performed before and after surgical treatment.

Conclusion: After a year, clinical parameters and radiographic analysis showed a reduction of pocket depth and tooth scheduled for extraction was preserved.

Key words: Periodontal regeneration, Intra-bony defect, Bone Substitute

SAŽETAK

Parodontna regeneracija kod pacijenata sa uznapredovalim parodontitisom i velikim gubitkom pripoja predstavlja veliki izazov za parodontologa.

Cilj: Opisati slučaj primjene hidroxyapatita u liječenju infrakošanog dubokog džepa.

Metode: Na početku terapije verificiran je plak indeks, index krvarenja gingive i izmjerena dubina džepova. Nakon provedene inicijalne terapije pristupa se otvorenoj flep operaciji, tokom koje je infrakoštani džep ispunjen koštanim nadomjestkom. Rengenološka analiza rađena je prije i nakon hirurškog tretmana.

Zaključak: Godinu dana kasnije klinički parametri i RTG analiza pokazali su redukciju dubine džepa, a zub predviđen za ekstrakciju sačuvan je.

Gljučne riječi: parodontalna regeneracija, infrakoštani defekt, koštani nadomjestak

Introduction

Periodontal regeneration of patients with aggressive periodontitis and high level of a connector loss presents great challenge for periodontist [1]. Implementation/Application of guided tissue regeneration (guided tissue regeneration-GTR) and guided bone regeneration (guided bone regeneration-GBR) became healing/treatment standard in Periodontology. Principals of guided regeneration application combined with endodontics - periodontal treatment of pulp-periodontal lesion is very challenging task [2]. Interdisciplinary approach, that includes combination of endodontic and periodontal (chirurgical) treatment can save the tooth intend for extraction. Guided tissue regeneration was introduced as a term by Melcher [3]. Epithelial cells migrate 10 times faster than other types of periodontal cells [4]. If migration of epithelial cells to wound is disabled long enough, other types of cells with regenerative potential will have a chance. That can be performed with usage of various kinds of barriers, membranes, with or without bone substitute.

Contrary to non-absorbing membranes, absorbing membranes have relatively good features and can be reabsorbed in optimal period, denying a need for chirurgical interventions [5]. However, these

membranes are very sensitive and it is recommended to reinforce them by combining them with bone substitute (bone graft) [6]. Since usage of membranes increases costs and work duration, several authors tried to apply bone substitute without membrane as an alternative way of treatment. In order to achieve the simplicity of handling without need to apply membrane, bovine hydroxyapatite (BH) is developed. BH is used for correction of periodontal bone defects and reabsorbed alveolar bone around the implants [5,7,8-13]. Resemblance that it has with human bone (porosity and microstructure) induces/creates great osteo-conductive environment within bone defects. Several pre-clinic and clinic studies are showing that combination of BH and GTR improves periodontal regeneration especially for infra-bony pockets [13-16]. Endodontic infection influences development of bone loss [17]. Teeth with periapical pathological process have approximately 2 mm lower radiological loss of connection in comparison to teeth without it [18]. Thomas Von ARX et al. 2001 suggested classification of membrane application in endodontic chirurgical treatment that is based on type of peri-radicular lesion [19]. According to Thomas Von ARX et al. Class II of lesions presents combination of endodontic and periodontal lesion. According to the same author Class II b of lesion (pulpy-periodontal communication) is the most difficult to treat and

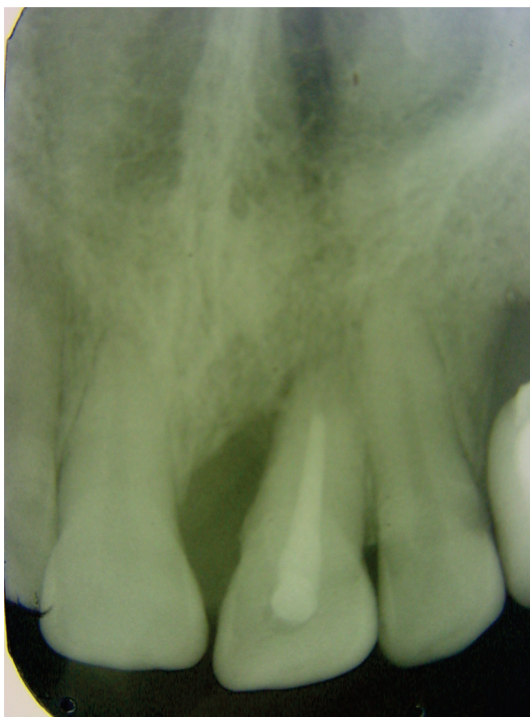


Figure 1.

X-ray image before periodontal chirurgical therapy



Figure 2.

3 months after chirurgical therapy

imply usage of GTR and GBR principles in order to improve conditions for tissue renewal, providing optimal environment for creation of needed connective tissue.

Case report

35-year old patient D.A. was admitted at the Department for Oral surgery according the recommendation of her dentist for tooth extraction 21 that was under pain and mobility.

Through clinical examination and with an x-ray analysis, it was diagnosed pulp-periodontal communication, infra-bony pocket 11 mm deep on mezzoproximal side, and II degree of tooth mobility giving that tooth extremely bad prognosis.

Since it was central incisors in complete dental arch, combined endodontic periodontal treatment was suggested to the patient D.A. trying to preserve the tooth. After patient agreed on treatment, endodontic treatment was performed first followed by periodontal therapy. At the beginning of periodontal therapy, plaque index, bleeding on probe index (BOP), depth on probe measured and occlusion analysis were verified. After initial therapy was done, flap operation followed. After local anesthesia, cut with vertical relaxation distally was made with muco-

periost lifted on the part of partial loss of buccal bone lamella. Using the Greycy and universal curette, complete scaling and root plane (de-bridman) was performed. All granulated tissue was removed from the bone defect and root surface was treated. Bone defect was filled with graft of hydroxyapatite type (Geistlich Bio Oss) and stabilized by covering with tensionless lobe and sewn with non-absorbing silk (4-0 Silkam, Brown).

Patient received guidelines on the post-operational treatment including the rinsing of mouth with Curasept ADS 220 liquid (Curadent, Swiss) during the first 2 weeks. Antibiotics were recommended (Amoxicillin 500mg with clavulanic acid 125 mg) for 14 days. Stitches were removed 10 days after and wound treated with 3% hydrogen peroxide and cotton balls. Directives about oral hygiene were given again and control examinations were scheduled at 3, 6 and 12 months after the operation.

At clinical control examination after 12 months 2 mm recessions were noticed, and even with present esthetic, the patient was satisfied with achieved results.

Analysis of x-rays made before chirurgical intervention (**Figure 1**) and the other made at control examinations after 3, 6, and 12 months (**Figure 2, 3, and 4**) were used for the evaluation of this therapy's success.



Figure 3.
6 months after chirurgical therapy



Figure 4.
12 months after chirurgical therapy

Discussion

It was proved that the Class II b lesion is the biggest challenge for treatment. In clinical research including periapical surgery, according to Hirsch et al., only at 27, 3% teeth out of the total number of teeth with buccal bone loss, satisfying treatment outcome is achieved [20]. According to Skoglund and Persson, retrospective evaluation of periodontal therapy of teeth with total loss of buccal bone lamella showed that only 37 % was successful three years after [21]. Sculean et al. concluded that treatment of infra-bony defects with flap-operation resulted with better clinical connection level staying during 5 years [22].

We decided in our case to apply bone graft without absorbing membrane based on the experience of numerous authors [22, 23, 24, 25, and 26], as well as due to size of defect itself and good conditions of its total coverage with tensionless lobe. Based on clinical surveillance and x-ray control examinations we came to the conclusion that significant probing depth reduction was achieved and degree of tottering was reduced even after 12 months. Our result is correlating with results of quoted authors by whom this therapy is evaluated as exceptionally complicated, so more cases that would be long-term monitored should get better clinical results.

Conclusion

Successful therapy (open flap operation with principal GTR and GBR) represents imperative in treating infra-bony defects with buccal bone lamella loss. Interdisciplinary approach of endodontic and periodontal therapists' in treatment of pulp-periodontal complications can prevent teeth loss being indicated for extraction.

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