CONSERVATION OF ACTIVE ALVEOLAR PREIMPLANTAR SITE AFTER EXTRACTION

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Keywords: *socket preservation, augmentation, three dimensional consolidation, bone graft*

Abstract: *Objectives: After the extraction, the most important thing is the guided bone resorbtion process, so it is recommended to fill up the socket for the consolidation of the walls. This technique is called "Socket Preservation" and plays an important part in the process of socket transformation after extraction. If the natural teeth do not correspond to the aesthetic and functional exigency or they do not worth being kept, it is recommended to extract them and immediately or in a future stage be replaced by a fixed overdenture. In these cases, the edentulous space is filled with an implant or a bridge fixed on the adjacent teeth. Material and Methods: In the study, two groups of patients were included: group A for which the preservation techniques have not been applied after tooth extraction, and a second group B of patients who received one of the techniques practiced by preservation and maintenance alveolar bone volume after extraction. Results and discussion: Irrespective of the technique of alveolar preservation or augmentation materials (bone graft + membrane), there was a significant maintenance bone wildness and height compared to conventional postextractional sites in all cases in the study. Also, a significant recession's stop of the soft tissue was noticed while maintaining the gingival papilla morphology. Conclusion: The variety of techniques of "Socket Preservation" ensures aesthetic and functional insertion of the implants and maintains the hard and soft tissues around the overdenture.*

Cuvinte cheie: *prezervare alveolară, augumentare, consolidare tridimensională, grefe osoase*

Rezumat: *Obiective: Postextracţional este foarte important menţinerea unui proces de rezorbţie osoasă minimă şi în cele mai multe cazuri o augmentare a alveolei cu o consolidare a pereţilor marginali. Tehnica a fost numită "Socket Preservation" şi reprezintă o contribuţie importantă în procesul de modificare a alveolelor postextracţionale. Dacă dinţii naturali nu mai corespund exigenţelor estetice şi funcţionale şi nu au valoare protetică, se optează pentru extracţia acestora, urmând ca imediat sau într-o etapă ulterioară să fie înlocuiţi cu o restaurare protetică fixă. În astfel de situaţii, breşa edentată va fi substituită de un implant sau convenţional de o punte fixată pe dinţii stâlpi adiacenţi. Material şi metodă: În cadrul studiului au fost incluşi două categorii de pacienţi: un grup (de 50 – 80) la care nu au fost aplicate tehnici de conservare a crestelor alveolare după extracţia dinţilor şi un lot de pacienţi cărora li s-a practicat una din tehnicile de prezervare şi menţinere a volumului osos alveolar postextracţional. Rezultate şi discuţii: Indiferent de tehnica de prezervare alveolară şi de materialele de augumentare (grefă osoasă + membrană) folosite, s-a constatat o menţinere semnificativă a lăţimii şi înălţimii osului în comparaţie cu situsurile postextracţionale clasice, la toate cazurile aflate în studiu. De asemenea, o stopare semnificativă a recesurilor ţesuturilor moi cu păstrarea morfologiei papilelor gingivale. Concluzie: Variatele tehnici de "Socket Preservation" asigură inserţia estetică şi funcţională a implantelor şi după încărcarea protetică asigură menţinerea ţesuturilor dure şi moi din jurul restaurărilor.*

INTRODUCTION

The reorganization process of the socket after extraction is complex and it is worth being observed. After the blood invasion and the formation of the blood clot at 2-3 days after extraction, the inflammatory stage follows that will initiate the formation of granulation tissue and reorganization of the existing cells. The granulomatous clot will be replaced in the week following the extraction by a fibrous clot that will follow a slow process of mineralization in the next two to three weeks.

At 45 days after extraction, the covering process of the socket will be finalized, and the maturation of the mineralized osteoid will happen at the end of the third month post extraction.

Some morphological features can influence the cicatrisation process: when the vestibular bone is thick, the support of socket walls will not be compromised and the results of the three dimensional support of the hard and soft structures that surround the implant crown are predictable, but the socket walls will be compromised if the vestibular wall and the socket margins are thinner than 1,5-2 mm or the periodontal fibers fixed in the internal cortical bone disappear along with the thin socket walls. More studies have shown that socket preservation techniques cannot stop the socket resorbtion process, but in the absence of augmentation materials the bone resorbtion will be almost complete.

The presence of thin walls will not stop the resorbtion even if there is immediate implantation after an extraction.(1)

Another guide mark represents the socket's wideness after an extraction. The wide sores that appear after extractions

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Article received on 03.02.2014 and accepted for publication on 04.04.2014
ACTA MEDICA TRANSILVANICA June 2014;2(2):287-289

of lateral teeth will not fill up very good with blood and new bone, and the healing process of the socket will be with rapid lack of horizontal bone structures, due to the cone-shaped roots.

The vertical bone loss after molar extraction is statistically shown.

Traumatic or inflammatory complications that appear after extraction determine serious soft tissues sores with disorders regarding the socket bone regeneration; these complications can grow the gingival tissue volume in the socket and can stop the forming process of bone tissue.(2)

Patients want the ceramic restorations and gum tissue surrounding the implant to be indistinguishable from the neighbouring natural teeth.(3)

For this reason, keeping vertical and horizontal size of the bone that offers the hard support for soft tissue contours are the essential parameters for aesthetics and functional crowns on implants and gums surrounding the implant.

On the other side, there are the disturbances of bone regeneration after extraction when recessions reach 4 mm vertically and horizontally to nearly 3-5 mm. Also, in our study we found that the maxillary alveolar apophysis vertical resorbtion is less than the mandibular one and buccal alveolar wall shows more marked recessions than the oral one. In cases with aesthetic impact, vestibular wall has a big role in accessing and maintaining the correct three-dimensional soft tissue integrity that surrounds the implant or under the over denture's body, reason to have permanent control over bone regeneration after extractions.

METHODS

In the study, two groups of patients were included: group A for which the techniques of alveolar preservation have not been applied after tooth extraction, and a second group B of patients who received one of the techniques practiced by preservation and maintenance of alveolar bone volume after extraction.

Most patients in the first group A came from other dental offices and we have no information on the care with which the extraction was made. In the study sheets, the reasons for tooth loss due to the anamnesis study were mentioned. From the same group there were patients who had extraction done in our clinic, but for different reasons, mostly financial, the extraction was not followed by augmentation.

In the second group B we applied the "Ridge Preservation" augmentation technique when we had loss after extraction of one or two alveolar walls and "Socket Preservation" techniques selectively depending on the resorption severity, cause of tooth loss, functional importance, but especially aesthetic tooth positioning on the arch, the economic possibilities of the patient, surgical limits, limits of edentulous site- quality, soft and hard tissues, the patient's medical history.

The following techniques were applied, which included:

1. Xenografts, Bio-Oss Bio-Oss Geistlich grained 0.5 to 1 mm, impregnated with blood and mixed with autogenic sawdust bone, covered with resorbable membrane (Geistlich Bio-Gide) and suture of the wound;
2. Xenografts Bio-Oss Geistlich Collagen addition without membrane, but covered with a flap and optimal suture;
3. Socket filled with a blood clot covered with a dissolving membrane and sutured with no tension flap;
4. Socket is filled with granular xenogenic bone mixed with blood and island of sawdust bone without membrane and without any possibility of whole coverage with alveolar gum.

We tried to use the same materials to replace bone - xenograft – Bio-Oss Geistlich (small particles 0,25- 1,0 mm; 0,5 g) and the same type of dissolving collagen membrane to make the best possible assessment of the effectiveness of the techniques and the advantages and disadvantages of each technique based on prosthetic outcome: classical reconstruction or implants. We never used nonresorbable membrane (figures no. 1, 2 (a,b), 3).

Figure no. 1. Bone defect alter extraction

Figure no. 2. Filling defect by addition of bone block (a) and xenograft Bio-Oss Geistlich

Figure no. 3. Application of resorbable membrane Bio-Gide Geistlich when needed

When the granular graft is not coated by membrane, the gingival epithelial tissue invades into the depth of the graft. The contaminated resorbable membranes can dissolve very quickly, but they provide enough time to get a wound closure, and it is preferable to be covered by tension-free soft tissue suture.

When the postextractional socket opening was too large (eg: canine, central incisor), and the edges of the wound would not coat the granular graft a epithelialized or fibrous connective free graft was used - harvested from fixed palatal mucosa or the tuberosity, stopping thus developing soft tissue from the wound periphery in depth of the bone graft (figure no. 4).

Figure no. 4. Harvesting fibrous connective graft

Infectious complications are prevented by preoperative administration of 1 gr. Amoxicillin or 600 mgr.

Clindamycin, and post-operative over a period of 7-10 days as 2 gr. / Day Amoxicillin or 1.2 g. / Day Clindamycin. Inflammation and pain are prevented by administration of Ibuprofen 400-600 mg. preoperatively and 7 days postoperatively, the same dose for 2 to 3 days. Local wash with chlorhexidine 0, 12%, chlorhexidine gel 3 times per day. So the results can be as close to reality as we used the same type of grafts at all the patients who have undergone augmentation: xenogenic granular graft and the osteoinductive factor was autogenous sawdust bone harvested from either poxtectracţional site or the tuberosity. It is the most beneficial osteoinductive factor, only requiring intraoperative intervention on the tuberosity, and with minimally invasive surgical instruments is not complicated.

In the literature studies of growth factor at very high concentrations, as "bone morphogenetic protein – 2" was used with good results and with a very high osteoinductive function being done by stimulating primary mesenchymal cells to differentiate into osteoblasts. Perhaps in the not too distant future BMP -2 will be as affordable as the alloplastic or xenogeneic bone grafts.(4) The graft used by us is of animal origin (bovine), is devoid of organic compounds so it will not produce immune reactions, it is sterilized and processed in authorized institutions because of its usage in other areas of medicine .

RESULTS AND DISCUSSIONS

Histomorphometric studies have shown that allograft ("freeze -dried -bone – allograft") containing β calcium phosphate and hydroxyl apatite and xenogenic grafts have the lowest degree of resorption and an osteoconductive potential.(5)

With the stability of bone grafts matched, time for the integration was up to six months. When the augmentation was done in order to maintain vestibular wall in aesthetic areas under the bridge's body the graft stability was good even 2 years after augmentation. The survival rate of the implants inserted in the site compounded after extraction was 98, 5%.

The causes of implants losses are biomechanical and likely without involving the graft. The percentage approaches the survival of implants inserted immediately after extraction and augmentation in the same session.

In "Socket preservation" we must have a justified cost, for the doctors effort and biological material.

Analyzing the control group, in the cases which healed without preservation after extraction, the buccolingually socket volume had a 30-35 % repair in the first three months and between 40-50 % at 6 months from the extraction.

Irrespective of the technique of alveolar preservation or augmentation materials (bone graft + membrane), there was a significant maintenance bone wildness and height compared to conventional postextractional sites in all cases in the study. Also, it was noticed a significant recession's stop of the soft tissue while maintaining the gingival papilla morphology

For economical reasons and surgical steps it would have been good at the insertion of implants to not be needed a second augmentation procedure, but as in all cases under study there was a degree of recession (12-13 %) of the alveolar wall and almost half (38 %) of the patients with "Socket preservation" needed additional augmentation, especially patients who had lost teeth due to trauma or periodontal disease. (Quoted here Prof. Dr. Viorel Ibric Cioranu with "Preimplant bone reconstructions" exposed on Implantium Internacional Symposium Sinaia 2013 21-24 February). But we had cases (27 %) in the control group where was possible to insert correctly the three-dimensional implant with augmentation only at insertion and satisfactory aesthetic result.

If more than half of patients who underwent Socket preservation technique did not require laborious, expensive and unpredictable augmentation at the time of implant insertion, the economic justification would be explainable. When various causes (infection, dehiscence), "Socket preservation" techniques could not have stopped resorption (21 % of cases), requiring a costly intervention at insertion, "Socket preservation" cost justification could be questionable.

We consider that the grid costs should include the situation in which following extraction conditions using minimally invasive techniques (sindesmotomy, piezosurgery) with no inflammatory healing can smoothly insert implants without prior preservation.

CONCLUSIONS

The success of the implant therapy after extraction is secured by the quality of the soft tissue (gum biotype) in relation to the integrity of the alveolar walls. Thus, for patients with gingival biotype well represented (between 3-4 mm), and the alveolar walls over 2 mm thick with good gingival support, we recommend immediate insertion after extraction, fill in circumferential gaps. If primary stability is good (over 25 Ncm) and implant suitable (Implantium Superline, Nobel Biocare), we recommend immediate loading.

The second situation when we have thick biotype, but the alveolar walls are intact or thin (1 - 1.5 mm) we practiced the Socket preservation and insertion of the implant at 8 weeks after extraction.

When we had thick biotype and intact alveolar walls, we chose the path of tooth extraction and conventional healing.

For patients with thin biotype, but intact alveolar walls it is preferable to use the Socket preservation technique and seal the socket with free epithelial graft.

The presence of dehiscence, thin, incomplete or fractured alveolar walls that need a socket augmentation and after 2 months we inserted the implant with new consistent augmentation. Thick gingival biotype is recognized by the broad and flat teeth, consistent interdental papillae, broad –based, voluminous and visible rounded ,with a thick buccal mucosa fixed on a voluminous vestibular bone support (<2 mm).

Thin biotype is recognized by the emergence of triangular teeth, in which an elongated, thin and sharp papilla developed along with a thin vestibular bone, with less than 1 mm gum thickness.

Site-resorption after extraction is high, regardless the type of preservation, conventional or with implants.

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