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THE USE OF VESTIBULARLY DISPLACED FLAP FOR SOFT TISSUE AUGMENTATION

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Abstract

The presence of vertical and horizontal defects of edentulous parts of alveolar ridges often results in unesthetic treatment results in fixed prosthodontics. Several methods are offered to eliminate the mentioned problem: free gingival graft, subepithelial soft tissue graft, combined gingival and subepithelial soft tissue graft, bone graft alone, or bone graft with titanium-reinforced membranes. All these methods can be effective, but they are enough traumatic for the patient.

The aim of this study is to suggest a method of soft tissue augmentation for treatment of horizontal defects of alveolar ridges combined with lack of keratinized tissues.

Six patients with horizontal defects of alveolar ridges in the front region combined with lack of keratinized tissues from the vestibular side of the edentulous space were operated. A horizontal incision was made between the abutment teeth from a distance of 6-10 *mm* lingually from the alveolar crest. Two releasing incisions were made to the mucogingival junction from the vestibular side. Along the first 4-6 *mm* the flap was released as a split thickness flap, then a full thickness flap was released up to the mucogingival junction, then again a split thickness flap was released. The flap was displaced vestibularly, thus moving the thick part of the flap with gingival component covering the alveolar crest to the horizontal defect of the edentulous alveolar ridge with lack of keratinized tissues. This resulted in both elimination of the horizontal defect of the coronal part of the alveolar ridge and in augmentation of keratinized tissues by at least 3-4 *mm*. Before suturing the cortical plate in the apical part the alveolar ridge was perforated in several places and bone graft material was placed, thus eliminating the horizontal defect in the apical part of the alveolar ridge as well. The flap was sutured with simple loop sutures.

The results were satisfactory in all six cases. The operated sites healed without complications. The horizontal defects were almost entirely eliminated in all patients at both coronal and apical parts of the alveolar ridge. On the average, the width of keratinized tissues was augmented by 5 *mm*, which resulted also in the change of the reddish color of the mucosa in these sites. All the patients were satisfied with the surgical results.

Keywords: vestibularly displaced flap, soft tissue augmentation, bone augmentation.

Introduction

The presence of vertical and horizontal defects of edentulous parts of alveolar ridges often results in unesthetic treatment results in fixed prosthodontics [*Abrams L., 1980; Kaldahl W. et al., 1982*]. The patient can complain on unnatural appearance of very long teeth and reddish mucosa near the defect (Picture 1-*a*, *b*). As we know, the color of the alveolar mucosa is different from the one of the gingiva [*Seibert J., 1991*]. The presence of alveolar mucosa near the artificial teeth can cause also inflammatory processes, because it can be traumatized during everyday oral hygiene procedures. To overcome only esthetic problems, metalceramic bridges with pink colored ceramics can be used. However, this will often increase the surface of the pontic, which contacts the mucosa, and even some problems with interdental brushing can appear [*Davarpanah M. et al., 1993*]. Nevertheless, for the alveolar mucosa, which can also cause a reddish, unnatural appearance, and can be

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Picture 1 (a, b). *The horizontal defect of the edentulous part of the alveolar ridge. There is also lack of keratinized tissues and a reddish color of the oral mucosa is seen at the defect site.*

traumatized during tooth brushing, the only way to get rid of problems, is the augmentation of keratinized tissues [*Genon P., Ouhayoun J., 1982; Romagna-Genon Ch., Genon P., 2001*]. The augmentation of soft tissues can be done in addition or can result from the above-mentioned augmentation of keratinized tissues [*Meltzer J., 1979*]. Bone augmentation can be done as isolated intervention or can be another stage after the augmentation of keratinized tissues. To achieve these goals several methods can be used: free gingival graft [*Seibert J., Louis J., 1996*], subepithelial soft tissue graft [*Langer B., Calanga L., 1982*], combined gingival and subepithelial soft tissue graft [*Seibert J., Louis J., 1996; Seibert J., Salama H., 1996*], bone graft alone [*Boyne P., 1991; Gardella J., Renouard F., 1999*], or bone graft with titanium reinforced membranes [*Allen E. et al., 1985; Borghetti A., Monnet-Corti V., 2000*]. All these methods can be effective, but the free gingival and subepithelial soft tissue grafts need a donor site, which is usually on the palate, and which makes a lot of discomfort to the patient during healing period. Another problem is the free graft necrosis [*Borghetti A., Monnet-Corti V., 2000*] or complications on the donor site, which are not very rare. The titanium-reinforced membranes are quite expensive and need another small surgery for their removal.

The aim of this study is to suggest a method of soft tissue augmentation for the treatment of horizontal defects of alveolar ridges combined with lack of keratinized tissues.

Materials and Methods

Six patients with horizontal defects of alveolar ridges in the front region, varying from 1.5 to 3 *mm* in depth combined with lack of keratinized tissues from the vestibular side of the edentulous space were operated. In all patients the gingival margins of the temporary bridges in the edentulous space contacted the alveolar mucosa, which caused its traumatization during tooth brushing, thus complicating the oral hygiene procedures. All patients were instructed for better oral hygiene. None of 6 patients had periodontal pockets of more than 4 *mm*, the pocket depths in operated sites varied from 1 to 3 *mm*. All patients were co-operarable enough.

The patients aged from 35 to 55 years. None of them had severe concomitant diseases complicating the periodontal condition.

Surgical technique

All the surgeries were done under local block anesthesia with very little infiltration for hemostasis. A horizontal incision was made from lingual side between the abutment teeth from a distance of 6-10 *mm* from the alveolar crest (Picture 2). Two releasing incisions were made to the muco-

Picture 2. *A horizontal incision is made between abutment teeth 6-7 mm lingually from the alveolar crest.*

gingival junction from the vestibular side, and, if needed, 2-3 *mm* apart from it. The first 4-6 *mm* the flap was released as a split thickness flap, then a full thickness flap was released up to the muco-gingival junction (Picture 3); then again, a split thickness flap was released. The flap was displaced vestibularly, thus moving the thick part of the flap with gingival component, covering the alveolar crest, to the horizontal defect of the edentulous alveolar ridge with lack of keratinized tissues (Picture 4). This procedure resulted in both elimination of the horizontal defect at the alveolar ridge coronal part and in augmentation of keratinized tissues at least by 3-4 *mm*. Prior to suturing the cortical plate in the apical part the alveolar ridge was perforated in several places and bone graft material placed, thus eliminating the horizontal defect in the apical part of the alveolar ridge as well. The flap was sutured with simple loop sutures (Pictures 5, 6). Solkoseryl dental adhesive paste was prescribed to cover the donor site from the lingual side.

Results

The results were satisfactory in all six cases. The operated sites healed without complications, none of patients suffered much pain, had marked oedema or any special discomfort. The donor sites from lingual side also healed well. None of the patients had necrosis of the flap or at the donor site. The horizontal defects were almost entirely eliminated in all patients both at the coronal and at the apical parts of the alveolar ridge. On the average, the width of the keratinized tissues was augmented by 5 *mm.* This resulted also in the change of the reddish color of the mucosa in these sites. All patients mentioned that oral hygiene procedures have been much-facilitated 2.5 months after the surgery compared with the pre-surgery situation (Picture 7). All the patients were satisfied with the surgical results.

Discussion

The results were quite satisfactory for treatment of horizontal defects of edentulous alveolar ridges. The surgical technique also resulted in augmentation of the width of the keratinized tissues in all patients at least by 3 *mm*, which is enough to achieve normal conditions near the margins of the pontic (Picture 8). Thus, it is obvious that this method can be offered for the treatment of small (up to 3 *mm* in depth) horizontal

Picture 3. *The flap is released. The thickness of the soft tissues covering the alveolar crest is enough to cover the horizontal defect of the alveolar ridge.*

Picture 4. *Vestibularly displaced flap covers the coronal part of the horizontal defect of the edentulous alveolar ridge.*

Picture 5. *Simple loop sutures are placed after bone graft material was put under the base of the flap.*

Picture 6. *Occlusal view.*

Picture 7. *The situation 1.5 month after surgery. It is obvious, that the horizontal defect is fully eliminated.*

Picture 8. *2.5 Months after the surgery. Both horizontal defect and the lack of keratinized tissues are eliminated. The temporary bridge took part in gingival contouring.*

Picture 9 (*a, b*). *The final view 3 months after surgery. a-facial, b-oblique.*

defects of the edentulous alveolar ridges [*Seibert J., 1983; Seibert J., Salama H., 1996*], combined with lack of keratinized tissues. It is also obvious that the mentioned method is less traumatic, because it does not require a second donor site on the palate or in any other place. The palatal donor site is well known to give good donor tissues. However, it creates much discomfort to the patient and has a known percentage of undesirable complications [*Ouhayoun J., 1999*]: necrosis of the free gingival graft; complicated healing of the donor site; bleeding at the day and even several days after the surgery; difficulties to explain the patient about the importance of another operative site; the expense of the surgery, etc. Apropos, the addition of some bone graft material under the base of the flap eliminated also the horizontal defect in the apical part of the edentulous alveolar ridge [*Atwood D., 1979; Abrams H. et al., 1987*].

The second advantage of using local tissues was the good vascularization of the flap from the vestibular side, which lessens the percentage of complications, compared to the free gingival and subepithelial connective tissue grafts. Moreover, the surgeries were done to eliminate only horizontal defects of up to 3 *mm* in depth. In cases that are more complicated a deeper defect might require the use of titanium-reinforced membrane [*Phillips J., Rahn B., 1990*] with a greater quantity of bone graft material [*Sautier J. et al., 1998; Bruno J., 1994*]. The vestibularly displaced flap can also be needless, when both vertical and horizontal defects have to be eliminated, because at that time it will be impossible to fully eliminate the vertical defect of the edentulous alveolar ridge. Nevertheless, the mentioned surgical technique can be very attractive for patients with defects of small and medium sizes (Pictures 9-*a*, *b*).

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