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Original article

CLINICAL COMPARISON OF THREE METHODS FOR VESTIBULOPLASTY IN THE ANTERIOR PART OF THE MANDIBULE

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ABSTRACT

Purpose: The aim of this research was to use platelet-rich fibrin membranes as an alternative to autogenous epithelial grafts for vestibuloplasty procedures and to compare the results from different vestibuloplasty techniques.

Materials and methods: The study includes two patients with atrophic lower jaw who require deepening of the vestibulum in the frontal area of the mandible. The surgical site in both of the patients was divided into two equal halves. Half of the prepared bed in each patient was plastically covered with free epithelial graft. On the first patient, the second part of the surgical site included the performing of Edlan - Mejchar technique. On the second patient, the entire surgical site was plastically covered with a PRF membrane. Follow up of the healing process was performed on the 7th, 14th and 30th day.

Results: The post-operative period underwent without any complications in all areas. The healing process was better in the second patient where a PRF membrane was used.

Conclusion: The final result of the technique for vestibuloplasty with a PRF membrane revealed that it might be a good alternative compared to other techniques which are widely used in practice. Further research is needed to confirm our results.

Keywords: preprosthetic surgery, vestibuloplasty, PRF, Edlan-Mejchar, Clark

INTRODUCTION

Vestibuloplasty is defined as a surgical procedure on the soft tissue of the upper or lower jaw. The purpose of this technique is to correct the insufficient depth of the vestibulum and the limited amount of keratinized gingiva.[1]

Progressive bone resorption in the edentulous mandible leads to difficulties in stability and placement of conventional dentures. Therefore patients often suffer from non-retentive total prosthetic dentures with functional and esthetic limitations, including difficulties with eating and speaking, pain, loss of soft-tissue support and less attractive facial appearance.[2] There are three possible strategies in order to overcome these drawbacks: construction of new dentures (CD), performing preprosthetic surgery in order to enlarge the denture-bearing are (PPS) and construction of implant-retained mandibular overdenture (IRO). [3] Although implant-supported overdentures reveal over 95 percent success rate[4] and offer improved esthetics, stability, and quality of life, most of the patients still prefer conventional dentures, mainly due to financial reasons. [5]

The most common preprosthetic surgical methods are submucosal vestibuloplasty, secondary epithelial vestibuloplasty and soft tissue grafting vestibuloplasty.[6] The ones that are most widely used are Kazanjan's technique [7], Clark's apically positioned flap [8], the lip switch technique with different modifications [9] and the Edlan-Mejchar technique [10]. Most of these methods have been subjected to different modifications and improved ever since. The first reports of free gingival transplants were described by Bjorn [11] and Nabers [12]. The free autogenous gingival graft is a surgical procedure with a high degree of predictability of success in producing an increased zone of keratinized gingiva. [13] Nevertheless this method has a lot of disadvantages – the use of palatal donor tissues increases morbidity, delays healing and leads to esthetic alterations[14].

Platelet-rich fibrin, or PRF, is a second-generation autogenous, containing an increased amount of leukocytes and platelets, solid biomaterial. [15] PRF has the ability to form natural fibrin matrix composed of growth factors, cytokines, platelets and stem cells [16] and because of that it is successfully used as a stimulating factor for soft and bone tissue regeneration in dental implantology and periodontal surgery.

MATERIALS AND METHODS

The study includes two patients with atrophic mandible, which were referred to the Department of Oral surgery at the Faculty of dental medicine in Plovdiv for surgical treatment. The clinical examination revealed severe bone atrophy of the lower jaw and less than 10 mm bone height. One of the patients was partially edentulous, and the other was with a fully edentulous lower jaw. They required a procedure for deepening of the vestibulum in the frontal area of the lower jaw.

Surgical treatment

After performing nerve block technique in the mental foramen on both sides of the lower jaw as well as lingual anesthetic technique, a straight-line mucosal incision

on the lower lip or 1 cm below the mucogingival junction was performed, followed by two vertical releasing incisions at the premolar/canine regions. The surgical site in both of the patients was divided into two parts. Half of the prepared bed in each patient was plastically covered with free epithelial graft (Fig. 1). In the first patient, the second part of the operation area included the performing of Edlan - Mejchar technique. (Fig. 2, 4) The mucosal flap was carefully elevated by blunt dissection. The periosteum on top of the alveolar crest was incised, and a muscle-periosteal flap was elevated. Half of the mucosal flap was then placed over the bone and sutured to the periosteum to the bottom of the newly formed vestibulum depth. The labial incision margins were sutured to the muscle-periosteal flap. (Fig. 4) On the second patient, the rest of the surgical site was plastically covered with a PRF membrane, which was carefully sutured above the area. (Fig. 3, 5) The donor site of the epithelial graft on the palate was covered with PRF membrane. (Fig. 8)

Fig. 1. Clinical photograph of harvesting the graft from the donor site

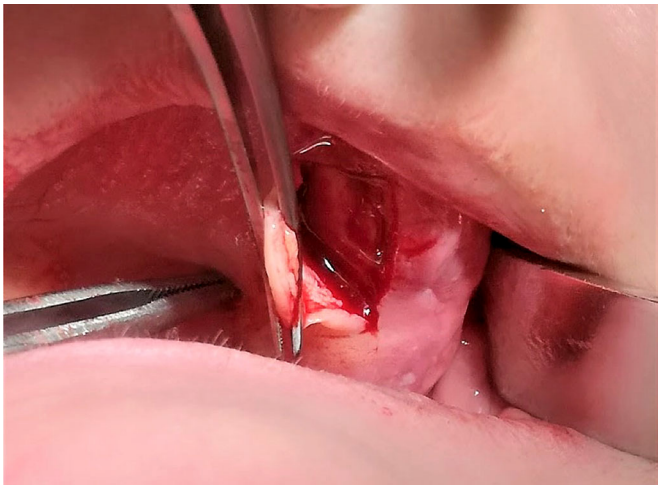


Fig. 2. Preoperative clinical picture of the first case

Fig. 3. Preoperative clinical picture of the second case

Fig. 4. Placed sutures on the first case

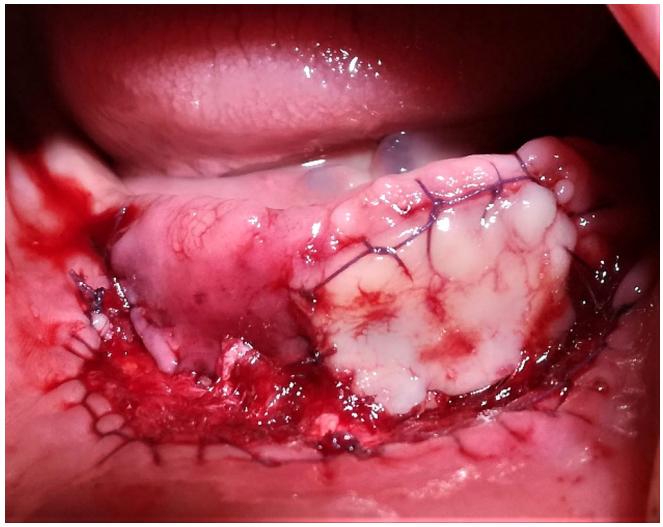


Fig. 5. Placed sutures on the second case

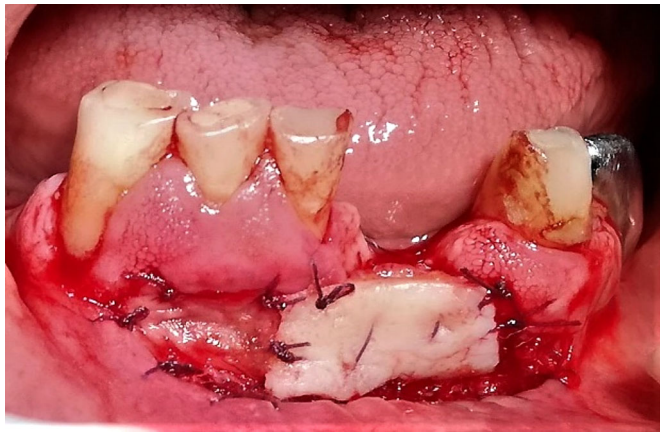


Fig. 6. Suture removal – 14 days after the operation

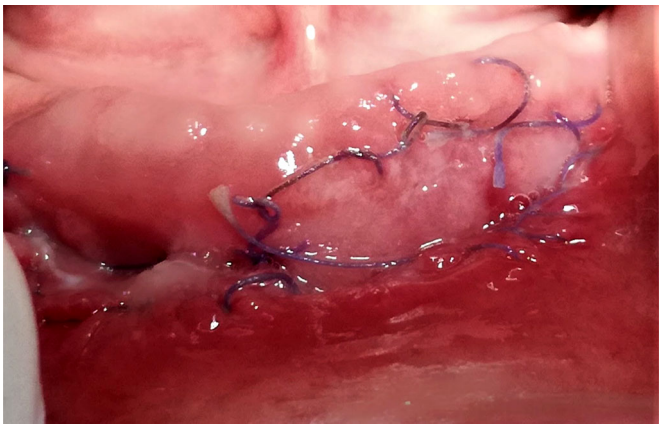


Fig. 7. Suture removal – 14 days after the operation

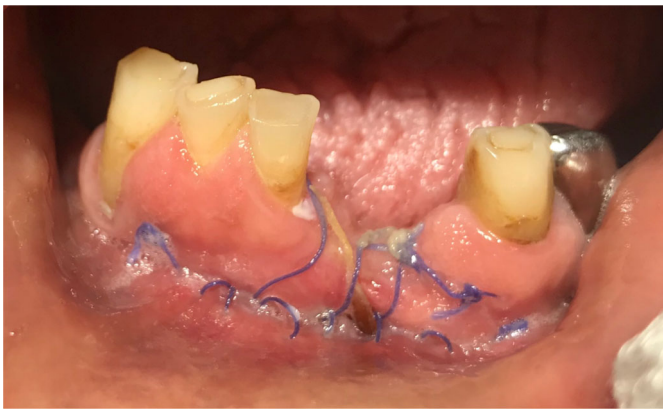
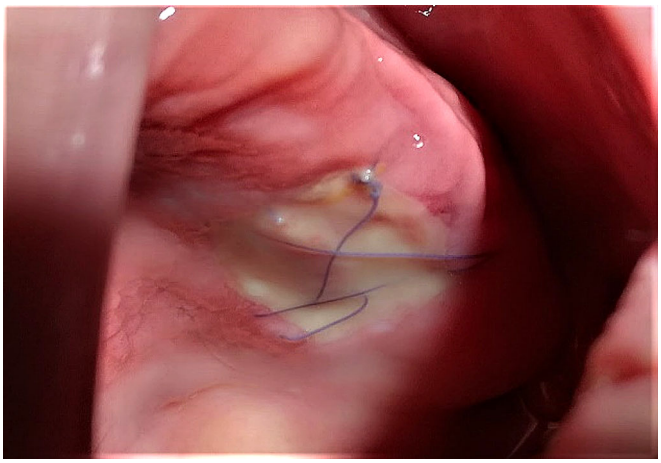


Fig. 8. Donor site healing – 7 days after the operation



Preparation of the PRF

After venipuncture of v.cubity with a 10ml vacuum test-tube (Advanced- PRF™), 9ml of blood is taken from the patient. The blood is then immediately put into a PRF DUO (Processfor PRF®-France) centrifuge for 8 minutes at 1500 rpm. The PRF clot obtained in the middle of the tube was separated from the red corpuscles base by using sterile tweezers and scissors. The A-PRF membrane, in our methodology [17] was formed out of two A-PRF clots by putting them on top of one another – the areas bordering with the red part were put at the opposite ends, and it was then dried in a special for this purpose metal box – A-PRF Box®.

Postoperative care

Postoperatively the patient was prescribed an oral intake of NAIDs (Aulin 0.10g) for a period of 3 days and irrigation of the oral cavity with 0.2% solution of chlorehexidine for 14 days. Follow up of the healing process was performed on the 7th, 14th and 30th day. Sutures were removed on the 14th day after the operation. (Fig. 6, 7) No complications were observed during that period of time. The postsurgical pain was mild to moderate, especially in the donor areas of the palate.

RESULTS

The postoperative period underwent without complications in all areas. The healing process was noted to be faster on the second patient where a PRF membrane was used. The donor sites on the palate, which were covered with PRF membrane healed uneventfully and without any complains from the patients. (Fig. 8) At the 30 days follow up results showed that with the new method a good amount of keratinized gingiva was gained and excellent esthetics were obtained. (Fig. 9, 10)

Fig. 9. One month postoperatively – fist case

Fig. 10. One month postoperatively – second case

DISCUSSION

Preprosthetic surgery includes procedures for bone and soft tissue augmentation. Decreased residual alveolar ridge is a prerequisite for compromised esthetics and functional results when manufacturing and placing conventional dentures. The keratinized mucosa is affected negatively by the progressive bone resorption and the use of removable dentures. Therefore connection of the mucosa and muscles around the complete denture plays an important role in prosthesis retention and stability. A wide range of different techniques for increasing the amount of keratinized mucosa and deepening of the vestibulum (Vestibuloplasty) have been described.

A routine approach for vestibuloplasty is the free gingival graft. It is first described by Bjorn [11], and because of its stability in time and predictable results, it is widely used. [14] Although the surgical method involving epithelial graft is well-established in clinical research, it has several disadvantages, including the need of a second surgical site, delayed healing process on the palate, compromised esthetic results.

In the last couple of decades, a lot of grafting materials, autogenic, allogenic, xenogenic and alloplastic have been proposed to serve as substitutes of the free mucosal palatal graft, with different rates of success. One of the most commonly used is the porcine collagen membrane. [18]

Preparation of PRF is a simple and inexpensive procedure for the formation of an autologous fibrin matrix. PRF contains a lot of growth factors such as PDGF, TGF- β, VEGF, and epidermal growth factor and serves as a scaffold for the migration and proliferation of epithelial cells.[19] The adhesive, mechanical properties and the fibrin glue function of the PRF membrane [20] play an important role in the avoidance of infection and inflammation both on the surgical and donor site of the operating field.

CONCLUSION

The technique for vestibuloplasty with a PRF membrane revealed that it might be a good alternative to other techniques, which are widely used in practice. The timeframe of the study was too short for the complete estimation of the advantages and disadvantages of the PRF membrane as a sole grafting material in this novel modification of the apically positioned flap technique. Nevertheless, it showed enhanced healing and better esthetics than the conventional method. In our opinion, further prospective studies are needed, to fully evaluate the significance of this modern approach.

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