



PRESENTATION OF A MODIFIED METHOD OF VESTIBULOPLASTY WITH AN EARLY PROSTHETIC LOADING

Desislava Konstantinova¹, Elitza Djongova², Hristina Arnautska¹, Tihomir Georgiev², Stefan Peev³, Mariana Dimova⁴

1) Department of Prosthetic Dental Medicine and Orthodontics, Faculty of Dental Medicine, Medical University Varna

2) Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Medical University Varna

3) Department of Periodontology, Faculty of Dental Medicine, Medical University Varna

4) Department of Prosthetic Dental Medicine, Faculty of Dental Medicine, Medical University Sofia, Bulgaria.

ABSTRACT:

Experience reveals that preliminary surgical correction is quite often expedient in mounting dentures for edentulous jaws.

The purpose of the investigation is to introduce a method of vestibuloplasty for edentulous jaws by which the dentures are better held in place and retained. The use of xenoderm grafts with early insertion of the prostheses subsequent to surgical manipulation shows excellent results.

Materials and methods: Patients were divided into two groups - with the first group the prosthesis was made prior to surgery and placed on the 7th day after removal of sutures. With the second group the prostheses were made following a complete healing of soft tissue, i.e. 1 month after surgery. With both groups xenoderm grafts were applied to cover the open wound surface area.

Results: The post-operative period for both groups of patients proceeded normally and without complications. For the group with early prosthetic loading due to the method of vestibuloplasty it was possible to maintain the depth of the vestibule.

Conclusions: The method proposed by the authors using xenoderm grafts and early loading on the newly-formed vestibule has proved a success and implies further in-depth application with larger group of patients.

Key words: vestibuloplasty, preprosthetic surgery, xenodermal transplant

INTRODUCTION:

Restoration of the masticatory apparatus after complete edentulism poses a serious problem where many biological, psychological, technical and other aspects are to be taken into account [1]. Most widely applied in this case are plastic dentures. Despite increasing evidence that dentures mounted on implants are much more functional and reliable than conventional prostheses in that they improve chewing ability, comfort, oral health and the quality of life [2], the majority of patients still opt for conventional dentures for a variety of reasons, mostly financial [3].

G. Buisson, and J. Solas and Akermann [4, 5] classify pre-prosthetic surgical interventions in two groups: preliminary dentures and corrective ones. Preliminary dentures involve interventions on the alveolar bone right after teeth extraction whereas corrective dentures involve operations on the soft tissue, alveolar ridges and palate after healing of extraction wounds.

Vestibuloplasty is defined as corrective surgical procedure on the soft tissue of the alveolar ridge of the upper and lower jaw. The most widely recognized and commonly used methods are those of Clark [6], Kazanjan [7, 8], Edlan-Mejchar [9, 10], Obwegeser [11] among others. These methods have undergone a number of modifications, either in the use of transplants from the palate [12, 13] cheek [14] or the skin [15], or the application of alloderm [16, 14] and xenoderm grafts [17] in order to avoid their drawbacks. The main disadvantage of methods using surrounding tissues is the wound surface area left open and the associated pain, discomfort, slow recovery and difficulty in after-care. [9, 18] The application of alloderm and xenoderm grafts helps avoid the formation of a second wound area and spreading over a greater area.

PURPOSE:

The authors hypothesized that compliance with the exact protocol applying the method of vestibuloplasty on edentulous jaws (using preliminary dentures) would improve retention and reinforcement of dentures.

MATERIALS AND METHODS:

All participants signed an Informed Consent Agreement. The sample composed of 248 patients with edentulous jaws, examined over the period February - September 2013, who sought assistance at the Faculty of Dental Medicine (FDM), Medical University of Varna. 38 patients were selected, who then received consultation from a specialist in oral surgery. The patients examined were suitable for vestibuloplasty due to the mobility of soft tissues adjacent to the alveolar ridge and the displacement of insertions of some mucosal duplicates on the crest of the alveolar bone,

lack of sufficient attached gingiva and the presence of a secondary shallow vestibule [19].

Patients were divided into two groups:

1st group (20 patients) - their dentures had been made prior to surgery and mounted 7 days after removal of surgical sutures.

2nd group (18 patients) - their dentures were made following surgery and full recovery of the prosthetic field (1 month after surgery).

Vestibuloplasty for both groups was performed as follows: after applying anesthesia a horizontal mucosal incision in the mucogingival line was carried out. In depth the incision reached the periosteum, followed by dissection of the mucosal flap from the lip base. The submucosal connective tissue and muscle attachment were incised, separated with a periosteal elevator from the periosteum and pushed apically. The separated mucosal flap was then pulled to the base of the newly-formed vestibule and was stitched to the periosteum. The exposed periosteal wound surface area of the alveolar ridge was covered with Mucoderm xenoderm transplant. The xenoderm transplant was rigidly fixed by sutures in order to reduce or eliminate the possibility of displacement and to provide optimal conditions for its integration. Sutures were then removed between the 7th -10th day after vascularization and integration of the xenoderm graft. Following the removal of sutures on the same day for the patients of the first group, prints for early loading of the prosthetic area were taken with a prosthesis designed beforehand. The rebased dentures were then mounted on the patients on the next day and instructions for good oral hygiene were given. For patients of the second group prostheses were made after the end of the healing process, integration of the graft and its covering with mucosa. (Fig. 1, 2, 3, 4)

Fig. 1. Prior treatment.



Fig. 2. During treatment.

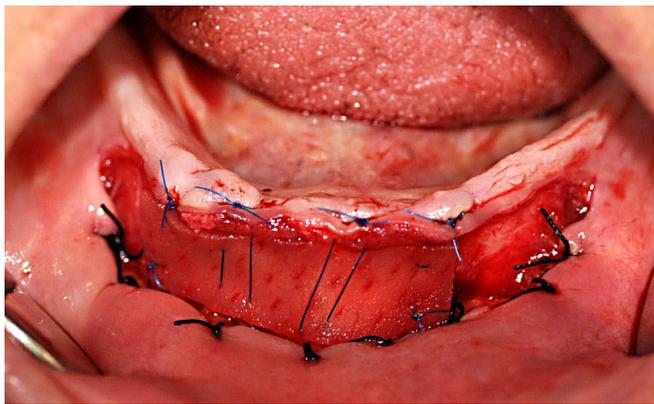


Fig. 3. One week post treatment (sutures removed)

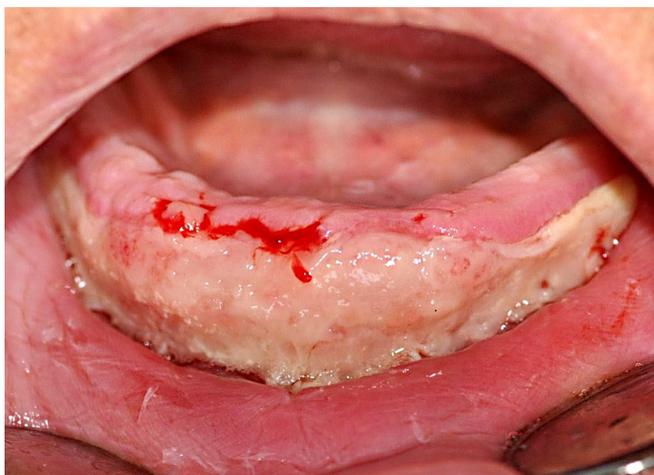


Fig. 4. One week post treatment (with preliminary dentures)



RESULTS:

38 patients were referred for surgical pre-prosthetic preparation. They were aged between 52 and 82 (typically 66-72 years of age).

In both groups of patients the application of the xenoderm graft indicated a healing process without any complaints. On the 1st day after surgery imbibing of the graft with blood was observed. On the 3rd day there was covering with granulation tissue, sprouting of capillaries and

change in color. On the 7th day the graft acquired the color of the surrounding mucosa and was integrated.

For patients of the first group with early prosthetic loading the observations showed preservation of the operational depth of the vestibule as a result of the adaptation of pre-designed denture. In long-term monitoring (after 1 month and 3 months) following the procedure post-surgery results appeared the same. Patients did not report pain or discomfort, any feelings of withdrawal or problems during meals or rest. Clinical examinations revealed that the operative field was free of decubitus and scarring, and seemed to have normal mucosa and preserved postsurgical vestibular depth. The pre-designed prostheses with extended smoothed edges serve as the temporary forming plates without being traumatically fixed to the body of the jaw.(Fig. 5, 6)

Fig. 5. One month post treatment



Fig. 6. Denture refitted



For patients of the second group where prosthetics started after complete healing of soft tissue following the surgery a reduction in the vestibule height was noticed, correlating with the timing of the prosthetics.

In 10 of the cases a scar had formed limiting the mobility of the tissue, reducing the vestibule size and causing discomfort when wearing dentures. The early functional loading of the deepened vestibule led to the preservation of the operating depth, avoiding the formation of coarse post-operative scarring and an associated sense of withdrawal and discomfort. A 28-day waiting period is also not necessary for complete clinical healing. This improves patients' motivation for treatment and shortens adaptation period.

For patients of the first group the placement of a rebased preliminary denture was carried out on the 7th day

of the operation immediately after removal of sutures. For patients of the second group prosthetics began after complete healing of soft tissue, i.e. a month after the surgical intervention. For 5 patients of the second group the recovery of the masticatory apparatus with removable dentures started later than expected. This was caused by in compliance with the instructions given to the patient after surgery where follow-up checks were skipped by the patient. For patients with preliminary dentures refitting took place on the day of removal of sutures and 3 months later their condition was reevaluated and second refitting or development of new prosthesis followed.

DISCUSSION:

Vestibuloplasty is a surgical pre-prosthetic method which can be performed using surrounding soft tissues (methods of Clark, Kazanijan, Edlan-Mejchar and others or modifications thereof) or using autogenous, xenoderm and alloderm grafts [20, 21, 22, 23, 24, 25, 26]. The main drawback of methods with surrounding tissue is the wound surface area left open which heals subsequently. Among patients' complaints are pain, discomfort, difficulty in speaking and eating and reduced oral hygiene. When using autogenous grafts (both palatal and buccal) the main downside is the presence of a second operative wound in the mouth cavity. Therefore, it is more justifiable to use alloderm and xenoderm transplants, thus avoiding secondary injury and because they may be implemented over larger wound surface areas.

Botiss' Mucoderm is a transplant made of animal dermis. The latter is subjected to multi-processing which aims to eliminate all possible components that could lead to tissue reaction. Its use is meant to avoid the disadvantages of traditional methods for deepening the vestibule, namely leaving a wound area of secondary epithelialization or avoidance of secondary trauma when taking a transplant from the palate, cheek or skin (most often retroauricularly). The choice of Mucoderm xenoderm graft is justified by the following: it is used as soft tissue, a substitute for mucosal transplants; it is easily integrated; it does not produce allergic or tissue reactions; it can undergo complete remodeling in the soft tissues of the patient; it is easy to work on and fix; it sustains its thickness; it shortens the post-surgery period and any associated discomfort; it allows for early prosthetic loading and rehabilitation of the masticatory apparatus of the patient.

Temporary forming dentures are important for monitoring the epithelialization process and the preserving of vestibule depth. A number of authors such as Skaloud, Trauner, Kemeny, Varga and Dal Pont [27, 28, 29, 30] among others have developed options for their application. The modification suggested in the present paper includes the advantage to the patient of feeling more motivated and higher self-esteem due to the aesthetic, functional and *psycho-preventive* effect.

Preliminary as well as permanent dentures are designed by a classical method in five stages.

The results achieved in terms of retention and reinforcement of prostheses are observed early : when the den-

ture is prescribed rebasing is carried out, then a month later and again 3 months later new rebasing or the construction of new dentures may be necessary. The data from our patients show 1 case only of incomplete adjustment period after 30 days and 1 case of breached integrity of the prosthetic plate after improper storage outside the mouth. During follow-up examinations the remaining 36 dentured patients reported feeling great in terms of aesthetics, speech and chewing. The results recorded after the interventions where temporary prostheses were prepared beforehand display a tendency to preserve the vestibule depth, and the absence of scarring in 100%.

CONCLUSION:

The results of the study suggest that in the cases described in the present paper special attention is paid to the shortening of the post-surgery period as well as the preserving of the vestibule depth, which renders the method successful for the full recovery of the masticatory apparatus. Patients' follow-up checks reveal good clinical results for those undergoing vestibuloplasty with xenoderm transplant and early prosthetic loading. This naturally points to the need for further extensive research on the topic.

REFERENCES:

- Housset, P. [La Prothese Physiologique].- *L'Odontologie*, 1947 [in French]
- Hyland R, Ellis J, Thomason M, El-Feky A, Moynihan P. A qualitative study on patient perspectives of how conventional and implant-supported dentures affect eating. *J Dent*. 2009 Sep;37(9):718-723. [[PubMed](#)] [[CrossRef](#)]
- Kawai Y, Murakami H, Shariati B, Klemetti E, Blomfield JV, Billette L, et al. Do traditional techniques produce better conventional complete dentures than simplified techniques? *J Dent*. 2005;33:659-668. [[PubMed](#)] [[CrossRef](#)]
- Akermann F. [Symposium de chirurgie pre prothetique chez I, edente total.] [in French] *Schw Mschr Zahnk*. 1956; 6
- Buisson G, Solas J. Surgical procedures in the preparation of the mouth for complete prostheses. *Intern DJ*. 1958; 3.
- Clark HB. Deepening of labial sulcus by mucosal flap. Advancement report of case. *J Oral Surg*. 1953; 11:165
- Kaznijan VH. Surgery as aid to more efficient service with prosthetic dentures., *J Am Dnt Assos*. 1935; 22:566-72
- Kazanijan, VH. Essentials of Oral Surgery, Blair VP, IvyRH, eds 3rd edn. St.Louis. MO: Cv mosby;1944
- Davis WH. Surgical management of soft tissue problems in Recostructive Preprosthetic Oral and Maxillofacial Surgery (Fonseca RJ, Davis WH, eds) Philadelphia. Pa WB Sanders.1986; 69-116
- Edlan A, Mejchar B. Plastic surgery of the vestibule in periodontal therapy. *InterDent J*.13,1963,4, 593-596.
- Obwegeser H. Die Submucose Vestibuleplastik. *Dtsch Zahnartztl Z*. 1959;14:629
- Basa S, Ercan MT, Aras T, Araz, K. Blood flow to palatal mucosal grafts in mandibular labial vestibuloplasty measured by 133Xe clearance technique. *Int J Oral Maxillofac Surg*. 1987;16:548-53
- Goldberg JS, Bayers SS, Di Stefano J. Follow-up study of palatal graft donor sites in 24 patients. *J Oral Surg*. 1978; 36:608-9
- Hashemi HM, Parhiz A, Ghafari S. Vestibuloplasty: allograft versus mucosal graft, *Int J Oral Maxillofac Surs*. 2012 Apr;41(4):527-30. [[PubMed](#)] [[CrossRef](#)]
- Show SR, Shelton DW, Billingsley ML, Newhouse RF. Expansion meshed skin graft in care of the donor site in skin grafting vestibuloplasty. *J Oral Surg*. 1981 Jan;39(1): 26-29. [[PubMed](#)]
- Bhola M, Newell DH, Hancock EB. Acellular dermal allograft for vestibuloplasty-an alternative to autogenous soft tissue grafts in preprosthetic surgical procedures: a clinical report. *J Prosthodont*. 2003 Jun;12(2):133-7. [[PubMed](#)]
- Georgiev T. [Clinical case of application of xenodermal graft Mucoderm in vestibuloplastics]. [in Bulgarian] *Dental Review*. 2012; 4:43-47.
- Hillerup S, Eriksen E, Solow B. Reduction of mandibular residual ridge after vestibuloplasty. A two-years follow-up study comparing the Edlanflap, mucosal and skin graft operations. *Int J Oral Maxillofac Surg*., 1989 Oct; 18(5):271-6. [[PubMed](#)]
- Khariton VS, Tarasik MI, Soboleva LM. [Age features of vestibule depth and its role in the development of periodontal disease.] [in Russian] *Stomatologiia (Mosk)*. 1985 Nov-Dec;64(6):16-7. [[PubMed](#)]
- Ephros H, Klein R, Sallustio A. Preprosthetic Surgery. *Oral Maxillofac Surg Clin North Am*. 2015 Aug; 27(3):459-72. [[PubMed](#)] [[CrossRef](#)].
- Mozzati M, Mortellaro C, Gallesio G, Ruggiero T, Pol R. Surgical treatment of denture-induced fibrous hyperplasia with plasma rich in growth factors. *J Craniofac Surg*. 2015 May;26(3):772-5. [[PubMed](#)] [[CrossRef](#)].
- Keerthi R, Vaibhav N, Raut R. Amniotic membrane as a biological scaffold after vestibuloplasty. *J Maxillofac Oral Surg*. 2015 Mar;14 (Suppl 1):383-7. [[PubMed](#)] [[CrossRef](#)].
- Velavan K, Kannan VS, Ahamed AS, Abia VR, Elavarasi E. A noble method of using intravenous infusion set as a stent in localized lower posterior vestibuloplasty: A technical note. *J Pharm Bioallied Sci*. 2015 Aug;7(Suppl 2):S806-8. [[PubMed](#)] [[CrossRef](#)].
- Schmitt CM, Moest T, Lutz R, Wehrhan F, Neukam FW, Schlegel KA. Long-term outcomes after vestibuloplasty with a porcine collagen matrix (Mucograft®) versus the free gingival graft: a comparative prospective clinical trial. *Clin Oral Implants Res*. 2015 Feb 27. [Epub ahead of print] [[PubMed](#)] [[CrossRef](#)]
- Barakat K, Ali A. Thermoplas-

tic vestibuloplasty: a novel technique for treatment of lip and cheek adhesion. *Craniomaxillofac Trauma Reconstr.* 2014 Dec;7(4):258-62. [PubMed] [CrossRef]

26. Cortell-Ballester I, Figueiredo R, Gay-Escoda C. Lowering of the mouth floor and vestibuloplasty to support a mandibular overdenture retained by two implants. A case report. *J Clin*

Exp Dent. 2014 Jul 1;6(3):e310-2. [PubMed] [CrossRef].

27. Dal Pont G. Surgical correction of the oral sulci. *J Am Dent Assoc.* 1960 Jul;61(1):56-62. [PubMed] [CrossRef]

28. Kemeny I, Varga I. [Einneues operatives VerfahrenzurVerbesserung der Stabilitaet der unterenProthese.] [in

German] *Schweiz Mschr Zahnk.* 1954, 2
29. Kemeny I, Varga I. [Operative fixation method of providing a denture in the lower jaw.] [in Russian], *Dentistry.* 1956, 1.

30. Skaloud F. Correction chirurgicale des musquese du vestibule avec prothese inferieure fixee. *Rev de Stom.* 1949, p.12

Please cite this article as: Konstantinova D, Djongova E, Arnautska H, Georgiev T, Peev S, Dimova M. Presentation of a modified method of vestibuloplasty with an early prosthetic loading. *J of IMAB.* 2015 Oct-Dec;21(4):964-968. DOI: <http://dx.doi.org/10.5272/jimab.2015214.964>

Received: 22/09/2015; Published online: 27/11/2015

Address for correspondence:

Tihomir Georgiev,
18, Hristo Popovich str., 9000 Varna, Bulgaria.
Mobile: +359/898 614 905,
E-mail: tgeorgievphd@yahoo.com