OSTEOPLASTY OF THE MAXILLARY BONE DEFECTS THROUGH MENTALIS AUTOTRANSPLANTS

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Abstract: In this study we have used the method of osteoplasty of the alveolar processes by means of mentalis autotransplants. We have analysed and assessed this method in order to enable a bone pre-implanting offer. The authors of this study have applied this method on 14 patients (6 men, 8 women) aged 21-57 years old, during the performing of the operations. In this study the success rate of these operations has registered 71,43%. Relying on these data we can conclude that these methods are not perfect yet, therefore they require to be continuously studied.

Key words: autotransplantation, osteoplasty, mandible.

INTRODUCTION

Prosthetic rehabilitation of the patients by means of dental endosseous implants is one of the modern methods in the stomatological therapy. Due to the development of modern technologies of the implant manufacturing, improvement of the surgical methods of their placement, minimal complications, oral implantology extends its area of confidence among both doctors and patients Nowadays oral implantology has attained remarkable achievements, although a series of surgical, esthetic, biological problems is still unsolved. Among these problems, the extremely important ones are those caused by the bone atrophy [1, 2, 3]. Severe bone atrophy of the bone tissue sometimes causes difficulties at dental implants placement. Sometimes it is almost impossible to place them. In these cases doctors recommend to their patients, sometimes even insist on treatment by means of the mobile prostheses. These prostheses are hardly accepted by the majority of patients. Due to patients`demand and due to specialists`enthusiasm, nowadays severe maxillary atrophies are minutely studied in order to assess the implantologic treatment.

In the last years a lot of methods in the field of stomatological assistance were worked out. These methods comprise the osteoplasty of the alveolar process (xeno-, allo-, auto – or combined transplantation, bone expansion through „osteosplitting", controlled bone regeneration, elevation through augmentation of the nasal floor of the maxillary sinus – „sinuslifting", transposition of the mandibular canal, etc.). Their purpose is to increase the bone volume which is necessary for implantation [4,5]. In the study we will dwell on the method of osteoplasty of the alveolar processes with mentalis autotransplants.

Transplant – is called an excerpt of tissue or organ, transferred from a region (donor cite) to another (recipient cite) to remove the structural and/or functional defect. Autogenous bone transplant is so far the only sourse of osteogenic cells. It is considered to be „a golden standard" in oro-maxillo-facial reconstructive surgeries [3,6].

PURPOSE OF THE STUDY

To assess the method of osteoplasty of the alveolar processes with mentalis bone transplants for creation of the preimplantory bone offer.

MATERIAL AND METHODS

During 2006-2009 the authors of this study, by means of this method, performed operations on 14 patients (6 men, 8 women) aged 21/57 years in order to create a preimplantory bone offer. The mean age was 38.33 years. Creation of the bone offer at the level of the alveolar apophysis by means of bone grafts usage can be carried out by collecting them from different neighbouring donor cites: mentalis, ramus, the coronoid maxillary tuber, bone sawdust at milling. In this study we transplanted the bone from the mentalis region. As recipient area for osteoplasty of the alveolar processes was: mandible in 8 cases, of which 6 cases in the posterior region, while in 2 cases in the anterior region; maxilla in 6 cases, of which 2 cases in the anterior region, while 4 cases in the posterior region.

Surgical technique

Anesthesia can be local, enhanced local or general one. In our study 10 patients were subjected to local anesthesia, 2 emotional patients received enhanced local anesthesia, while 2 other patients underwent general anesthesia due to a massive intervention. Thus, anesthesia will be chosen depending on the duration and amplitude of the intervention, as well as the patient's desire.

Intraoperatory hemorrhage was diminished through infiltrative anesthesia of the soft tissues from the region of intervention, by means of anesthetic solution containing vasoconstrictors.

Access. Two techniques of incision can be used in the dental region both in the donor cite and in the recipient one:

1. Incision through the gingival sulcus requires more prolonged time, more delicate manipulations to protect the edges of the flap and papillae. This access is less traumatic due to maintainance of the integrity of the periosteum and muscles. Subsequently, an insignificant manifestation of the edema and post-operatory pain is recorded.

2. Incision through the vestibular access is done directing it 5 mm apically from the region of the keratinized gum by sectioning the mucous membrane, muscles and periosteum by a movement. In the edentulous regions the incision is done on the alveolar ridge in the region of the keratinized mucous membrane. Some other vertical incisions will be done to mobilize the flap towards the vestibule in order to prevent impairment of the soft tissues during the surgical manipulations. Lifting of the mucoperiosteal flap will be carried out carefully, through exposure of the bone relief and the neighbouring anatomical formations initially of the recipient cite, then of the donor cite.

The recipient cite will be the first examined to determine the size of the defect or the degree of atrophy and the bone volume necessary for the transplantation. The assessment will be carried out by means of a ruler or through modelling a foil pattern and its transfer on the bone surface of the donor cite.

Taking the transplant. Milling of the cortical-spongy graft is carried out by means of the cylindrical mills, according to the transferred pattern. It is compulsory to do the irrigation with the antiseptic solution or physiological serum to prevent bone combustion. The bone graft is detached by means of a chisel and a hammer. To prevent the impairment of the anatomical formations we will comply with the „5" figure rule [3], which consists in placing the site of the osteotomy 5 mm below the apex of the tooth roots, 5 mm medially the vasculonervous mentalis bundle, 5 mm upper the basal edge. We enlarged the obtained defect with the alloplastic material „Colapol CP-3LM".

Adjustment and fixation of the transplant. The bone graft has to be adjusted as well as possible in the recipient cite to obtain a maximum surface of contact. Rigid fixation of the transplant

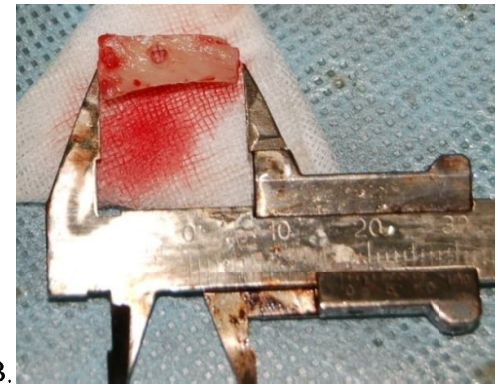
will be done by means of one or two screws.

To stimulate the osteointegration of the transplant, compactosteotomy in the cortical area of the recipient lodge will be carried out before its fixation. The bone sawdust collected during the milling or the spongy one from the donor cite combined with the alloplastic material (Colapol CP-3LM, or Tricalciufosfat) will replace the defect and will outline the relief of the alveolar ridge. The protection membrane is applied.

Wound closure. Suturing has to be done hermetically. To exclude the flap tension we have carried out periostomy of mobilization. The wound is sutured in the recipient cite, then in the donor one, using non-traumatic wire Nr.4-5. The needle is preferred to be round in section.

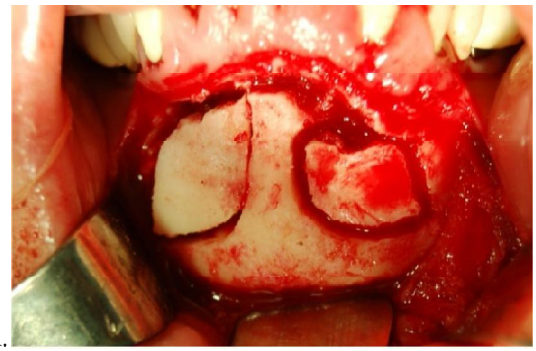
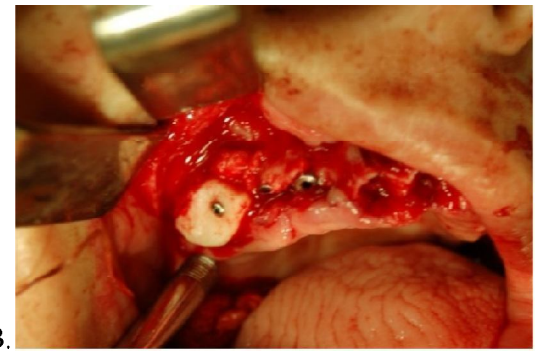
RESULTS AND DISCUSSIONS

The bone volume obtained from the mentalis region was different in those 14 patients, taking into consideration their anatomical peculiarities, presence or absence of the teeth in this region. We will collect a regular shaped transplant with a moderate volume in the dentulous patient, if we stick to the „5" figure rule (Pic.1).

A.  B. 

Pic.1. Volume of the mentalis transplant in patient V is 17 x5x6mm.
A. Donor cite. B. Assessment of the bone volume

According to the bibliographic sources [1,3] the mean dimension of the mentalis cortico-spongy transplant is approximately 20,9x9,9x6,9 mm. A bigger volume will be collected from the edentulous patients or from those with concomitant diseases [7]. Ex.: One patient was diagnosed with Chronic Granulomatous Periodontitis of teeth 43,42,41,31,32,33. We combined the collection of the mentalis transplant with the operation of „Apical resection of teeth 43,42,41,31,32,33". Thus, we did the osteotomy line upper, obtaining a bigger bone volume (Pic.2).

A.  B. 

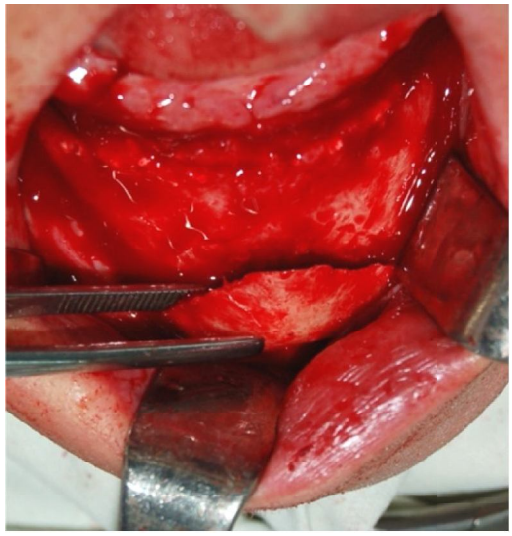
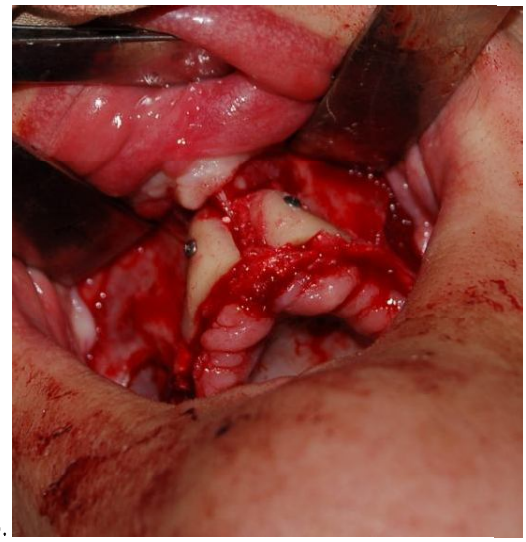
Pic.2. A bigger volume of the mentalis transplant was obtained through combination of osteotomy for its collection with the operation „Apical resection of the frontal teeth on the mandible". A. Donor cite. B. Maxilla – recipient cite.

Another patient with diagnosis „Mandibular prognathism" underwent the operation "Modelling resection of the mentalis prominence", thus, being obtained a bigger volume of bone (Pic.3). Maxillary osteoplasty was carried out in both cases, they requiring transplants with a bigger volume of bone.

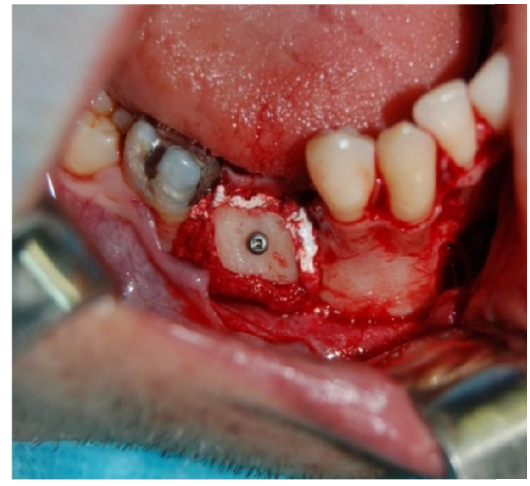
In other cases the transplant dimensions were correlated with the size and shape of the defect. In small defects, the size and shape of the obtainend transplant will correspond as close as posible in order to adapt them more presicely, increasing the surface of transplant – bone contact (Pic.4).

10 patients have reported insignificant post-operatory pain which required analgesics. Of these 10 patients, 6 patients had pain in the recipient cite, 2 patients - in both regions, 2 patients had pain in the donor cite, while 4 patients did not have a painful syndrome. In all patients the post-operatory edema was moderate and it did not cause any discomfort.

Speaking about intra-operatory and post-operatory complications we would like to dwell on a frequent subject of discussions in the medical literature, regarding this theme [1]. The high advantages osteoplasty with autotransplants is opposed to a high frequency of complications. According to the data of ofther authors [2,3] the success rate in these operations is approximately 81-97%, while in our study it constitued 71.43%. These contradictory data have proved that these methods are not perfect yet and they require a continuous study.

A.  B. 

Pic.3. Operation « Modelling resection of the mentalis prominence » enabled us to obtain a bigger bone volume. A. Donor cite. B. Maxillary area – recipient cite.

A.  B. 

Pic.4. The mentalis transplant corresponds to the defect according to its dimension and shape. A. Donor cite. B. Recipient cite

In our study the intra-operatory complications (teeth damage, impairment of the vasculonervous bundle) have been avoided. Post-operatory complications were the following:

Diffuse haematoma was recorded in one case. This complication did not present any danger. It was a complete resorption (Pic.5A). The wound dehiscence (Pic.5B) with suppuration in the recipient cite in the 7th post-operatory day was recorded in 3 patients on the mandible and in 1 patient on the maxilla. Despite the thorough antiseptic care, we were forced to remove the transplants in these 4 cases. The cause of the wound dehiscence after the operation was the

insufficiency of soft tissues for covering a bigger volume of transplanted bone.

Periostomies carried out to mobilize the flap were not sufficient for their tensionless suture. The flap's thickness below 2mm was not sufficient either. There were no complications in other 10 cases, the recovery was good.

A.  B. 

Pic.5. Post-operatory complications. A. Diffuse haematoma. B. Wound dehiscence

The advanced resorption of the transplants occured in those 4 cases of wound dehiscence. In the rest of 10 cases, at the stage of implantation in 4-6 months, there was no significant resorption of the transplants. This method enabled us to obtain an increase of the bone offer horizontally, from 2mm before theoperation to 6mm after 4-6 months. There was also assessed a vertical bone growth of 2 mm, in 2 patients on the mandible and in 1 on the maxilla.

CONCLUSION

Having analysed the obtained results we can state: mentalis as a donor cite is favorable due to efficacy and security of the manipulations in this region; an average volume of bone can be collected from the mentalis cite; the mentalis area represents a well visible operatory field sufficient for surgical manipulations; there is insignificant post-operatory pain; absence of skin scars.

The advantages are: simplicity of the procedure, minor probability of septic complications, foreseeable result, reduced cost of the materials.

Disadvantages: a significant resorption of the transplant is possible, reduced possibilities in vertically increase of offer.

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