

**THE USE OF IMPLANTS IN PROSTHETIC TREATMENT OF CONGENITAL PALATAL DEFECTS****Hovhannisyan S.R.<sup>1,2</sup>, Khachatryan G. E.<sup>3</sup>, Mashinyan K. A.<sup>2</sup>, Gasoyan H. S.<sup>2</sup>**<sup>1</sup>Dental Department, Central Clinical Military Hospital, Ministry of Defense, Yerevan, Armenia<sup>2</sup>Prosthodontics Department, Yerevan State Medical University after M. Heratsi, Yerevan, Armenia<sup>3</sup>Department of Maxillofacial Surgery, Yerevan State Medical University after M. Heratsi, Yerevan, Armenia**ABSTRACT**

*Congenital malformations of the teeth and maxillofacial region are ranked second in terms of all congenital anomalies.*

*In general, congenital palatal defects, are treated in childhood by means of surgery. Unfortunately, sometimes, even after several operations, the massive cleft of the palate cannot be closed. Some years later the patient will suffer from the defect, which is usually complicated by scars due to numerous previous operations.*

*This article presents a case report on the use of implants in prosthetic treatment of congenital palatal defects.*

*Studies showed that one of each 800-1000 newly-born children has a cleft of upper lip or cleft palate. In some countries the cleft lip and cleft palate prevalence rate increases to 1 per 300 births. Cleft lips make 20-30% and cleft palates reach 70-80% of all congenital facial deformities. Clefts of the lip and palate are commonly combined [Mossey P., Castilla E., 2001; Mastroiacovo P., 2010]. Unilateral cleft of the lip usually occurs on the left side. It is important to mention that, as a rule, these defects are treated in childhood by means of surgery. The reconstructive operations are usually performed stage-by-stage to obtain satisfactory results, because there is a deficiency of hard and soft tissues in the maxillofacial region. Sometimes, even after several operations, the massive cleft of the palate cannot be closed. Some years later the patient will suffer from the defect, which is usually complicated by scars due to numerous previous operations [Global Strategies, 2001]. If the operation is not performed at the proper time of child development, the formation of the jaw is complicated and there will be deficient sagittal and transverse growth of the maxilla. The situation can be also complicated in cases of edentulousness.*

**KEYWORDS:** cleft of lip, cleft palate, maxillofacial prosthesis.**INTRODUCTION**

The studies showed that one of each 800-1000 newly-born children has a cleft of upper lip or cleft palate (Figure 1). In some countries this rate increases to 1 per 300 births. It is important to mention that cleft lips make 20-30% and cleft palates are 70-80% of all congenital facial deformities. Clefts of the lip and palate are often combined. Unilateral cleft of the lip is often on the left side [Mossey P., Castilla E., 2001; Mastroiacovo P., 2010]. Without going into details of pathogenesis

and etiology of defects development, it is important to mention that palatal defects are treated in childhood by means of surgery.



**Figure 1.** Hard palate cleft.

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Taking into account the above-mentioned defects, there is a deficiency of hard and soft tissues in terms of defects in maxillofacial region, and reconstructive operations must be performed stage-by-stage to obtain satisfactory results. In some cases, even after several operations, the massive cleft of the palate cannot be closed, and as a result, some years later the patient will suffer from a defect complicated by numerous scars due to previous operations [Global Strategies, 2001].

Operation performed at the improper time, results in reimpairment of *maxilla* normal formation in sagittal and transverse direction, i.e. the formation of the jaw is not completed. The situation can be complicated in cases of edentulousness.

### CASE REPORT

A 42-year-old female consulted at the Dental and Maxillofacial Prosthodontics Department of the Central Clinical Military Hospital for prosthetic treatment. The patient reported with a chief complaint of oronasal communication and the absence of teeth. Her functions of eating, speaking and esthetics were complicated due to a large fissure in her palate.

Detailed case history revealed that the patient was born with congenital defects of the palate and upper lip. There was a cleft on her hard and soft palates along the whole length and bilateral cleft of her upper lip (Figure 2). The patient had been treated surgically (as a newly-born) to close the defects with local tissues, but the massive defect remained. These reconstructive operations were repeated several times, but they only helped to close the cleft of the upper lip and the soft palate's cleft (Figure 3). The *extra* oral examination revealed considerable hypoplasia of *maxilla* and several post operative scars on the upper lip. There was also some deformity of patient's nose.

*Intra* oral examination revealed a massive defect on the upper jaw. It was located on the central and frontal parts of the hard palate, extending to the right. The left part of the remaining *maxilla* was larger than the right one. The alveolar bone was atrophied. Part of premaxillary bone (*premaxilla*) residues and the vestibular wall of this bone were attached to the upper lip with the rough



Figure 2. Palatal Cleft, 42 y/o female.



Figure 3. Reconstructive operation on soft palate did not close velopharyngeal defect effectively.

scar. The soft palate was considerably shorter and scarred. It was obvious that there was a palatal insufficiency, i.e. inadequate length of the soft palate to affect velopharyngeal closure that could result in hypernasality and decreased intelligibility of her speaking and swallowing functions. The patient's upper jaw was edentulous and her lower jaw had only canines remaining.

The patient's speaking, chewing and swallowing functions were complicated. Hypernasality was notable. Her appearance was not terribly changed, but the presence of mentioned defects affected her psychological health. The patient was not willing to communicate and answer any of the physician's questions. She refused any new surgical interventions or conventional prosthesis.

The prosthetic rehabilitation of the mandible was not a difficult procedure. The prosthesis of the *maxilla* closed oronasal communication, restored function of soft palate and teeth, as well as provided more esthetic appearance.

The fixation and stabilization of the upper pros-

thesis was a complicated procedure due to the small size of *maxilla*, existing massive defects, absence of teeth, re-absorption of alveolar crest and the existence of easily movable soft tissues on the borders of the soft palate. The fixation of prosthesis was accomplished using a scar band of the cleft and by means of implants placed on the residual parts of the alveolar bone.

Prosthetic treatment involved three stages.

*The first stage:* A fully removable prosthesis-obturator was fabricated for the *maxilla*. The objective here was to seal oronasal communication and give psychological support to patient inserting a temporary obturator, as well as replacing the



Figure 4. Full denture for palate's cleft closure.

missing teeth with provisional fully removable resin prosthesis. A partially removable denture was fabricated for the mandible.

The fabrication of the prosthesis was done during the course of five appointments similar to the procedure for conventional denture sets. The patient was advised to use an adhesive for her complete dentures (Figure 4) before implantation in case of insufficient stability of the prosthesis.

*The second stage:* Placement of implants in re-



Figure 5. Ankylos A-14 (Dentsply Friadent) implants were placed on both sides.

sidual parts of the *maxilla* was planned and completed for stabilization of a fully removable prosthesis. A computerized tomography (CT) scan of the upper jaw was taken. Evaluation of CT scan data showed that there was enough space for implant placement only in maxillary tuberosity region. It was decided to place an implant of 14 mm in length and 3.5 mm in diameter. The implant overdenture was planned to have ball attachment system (Figure 5).

Under local anesthesia, a full-thickness flap was raised. The cortical layer of bone was penetrated with a carbide round bur. When spreading the bone, the pilot drill used 2 mm diameter bur. The pilot drill penetrated to the desired depth of 14 mm. Following the osteotomy, widening was begun with drills, using increasing diameters up to 3.2 mm.

Ankylos A-14 (Dentsply Friadent) implants were placed on both sides. The flap was approximated and sutured. Wound healing proceeded without any complications.



Figure 6. Ball attachment abutments were placed on implants.



Figure 7. Patrix was tested in the mouth cavity.



**Figure 8.** Patrix was housed inside the denture base using a self-curing resin.



**Figure 9.** Denture was inserted.



**Figure 10.** Posterior border of the denture was enlarged to the posterior wall of the pharynx.

In 3 months, the retaining caps were removed under local anesthesia and the ball attachment abutments were placed (Figures 6-7). Holes were made on the base of the complete denture for patrix attachments. The patrix was housed inside the denture base by means of a self-curing resin and fitted over the matrix (Figures 7-8). Finally, the occlusal relationship was checked and adjustments were made (Figure 9).

*The third stage:* To afford velopharyngeal closure, the posterior border of the prosthesis was enlarged to the posterior wall of the pharynx (Figure 10).

The treatment was completed successfully. Now the patient's functions of eating, speaking and swallowing became normal. She has also become more self-confident and satisfied with her appearance. Her quality of life has been enhanced overall by these procedures.

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