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RESULTS OF APPLICATION OF BUCCAL FAT PAD IN THE CLEFT PALATE SURGERY

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Abstract:

Currently, there is no accepted gold standard of surgical intervention for a specific type of cleft palate. Aspects of cleft surgery necessitate the development of new methods of palatoplasty with local tissues and the search for the optimal way to form flaps with sufficient size and good blood supply in order to avoid postoperative complications. The study is devoted to the analysis of the timing of epithelialization of sites in the area of lateral defects, depending on the material used to cover the wound surface. The results of the study of 103 patients demonstrated an acceleration of the healing and epithelialization process with the use of buccal fat pad (BFP) compared with iodoform, PRF and collagen sponge. The simplicity of mobilization, minimal traumatization and accessibility of the method determine the prospects of the proposed method for covering areas of lateral defects.

Keywords: congenital cleft palate, palatoplasty, iodoform, PRF, collagen sponge, buccal fat pad

RELEVANCE. Despite the existence of more than 300 methods of surgical treatment of congenital cleft palate (CCP), the treatment of such children remains among the important tasks of pediatric maxillofacial surgery due to developing postoperative complications and the need for additional interventions to correct unsatisfactory results of plastic surgery. There are such types of early postoperative complications as suture dehiscence on the mucous membrane of the hard or soft palate, necrosis of the mucoperiosteal flap (MPF). These complications arise as a result of the development of a local inflammatory process, a deficiency of soft tissues for complete closure of the defect and end with relapse or the formation of rough scars, which lead to limited mobility and shortening of the soft palate, to various types of jaw deformities [1, 2, 5, 8].

For primary palate plastic surgery, various methods of palatoplasty have been developed, including plastic surgery by Frolova L.E., intravelar veloplasty by Limberg, palatoplasty by Bardach, palatoplasty by Azimov M.I. and etc. The use of each technique is somewhat surgeon/facility dependent, and there is currently no gold standard surgical procedure for a specific cleft type. However, in cases of wide clefts, primary closure alone is often insufficient, given the increased tension in the defect area and insufficient coverage of local tissues, especially in the lateral palate along the Ernst-Langebeck incision lines [3, 4, 6, 7].

The above aspects of cleft surgery necessitate the development of new methods of plastic surgery with local tissues and the search for an optimal way to form flaps with sufficient size and good blood supply to avoid necrosis, rejection and relapse, as well as primary healing of the lateral parts of the palate with a large deficit in tissue volume. Also relevant is the issue of obtaining full-fledged transplants from intraoral donor areas [9, 11].

THE PURPOSE OF THE STUDY There was a comparative analysis of the effectiveness of using a buccal fat pad (BFP) to cover the area of lateral defects in the surgical treatment of congenital cleft palates.

MATERIALS AND METHODS. An open prospective randomized study included 103 children aged from one to 5 years with congenital cleft lip and palate (CCLP), who were registered at the department of pediatric maxillofacial surgery of the clinic of the Tashkent State Dental Institute.

The largest percentage of children with CCP were boys – 64 (62.1%), there were 39 girls (37.9%).

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In terms of the severity of the defect, unilateral CLP was found in 32 (31.1%), bilateral CLP – In 36 (34.9%), isolated cleft palate – In 35 (34%) children.

Depending on the severity of the congenital defect of the upper lip and palate, operations were performed in children at the following times depending on age:

1) cheiloplasty – from 6 to 8 months; 2) veloplasty – from 8 months to 1.2 years; 3) palatoplasty – at the age of 1.6 to 5 years.

Before surgery, all children underwent a clinical examination, including a general clinical analysis of blood and urine, a biochemical blood test for total protein, protein fractions, enzymes, residual nitrogen, urea, bilirubin, electrolytes, and, if necessary, chest radiography and ECG. In addition, the children were consulted by a pediatrician, an anesthesiologist, an orthodontist, and, if necessary, an otolaryngologist and a neurologist.

The largest number of children – 37 (35.9%) – were operated on using the method of Frolova L.E. 35 (34%) children were operated by M.I. Azimov's method – transverse dissection of the soft palate, with longitudinal suturing of the wound, palatoplasty by Bardach J. was performed in 31 (30.1%) children. Depending on the method of coating (material) of the wound surface in the area of lateral defects, each group of subjects was divided into subgroups by random distribution: a – iodoform (n = 25), b – PRF (n = 27), c – collagen sponge (CS) (Belkozin, Russia) (n=25), d – buccal fat pad (n=26) (Table 1).

Table 1. Subgroups depending on the application material used for lining of lateral defects

Palatoplasty methods	Application material				Total
	iodoform (a)	PRF (b)	collagen sponge (c)	BFP (d)	
by Frolova L.E.	8	10	10	9	**37**
by Bardach J.	7	8	7	9	**31**
by Azimov M.I.	10	9	8	8	**35**
Total	**25**	**27**	**25**	**26**	**103**

PRF was obtained by centrifugation of 30 ml of venous blood in dry glass vacuum tubes (3000 rpm, 10 min). Sterile forceps were used to remove the PRF from the tube and separate it from the adjacent layer of red blood cells. The PRF was maintained with a gauze pad for 5 days after surgery. The surgical technique using the BFP ("d" subgroup) essentially repeated the dissection planes of standard cleft repair techniques. After restoration of the oral and nasal muco-muscular layers, the lateral relaxing incision was extended posteriorly towards the convexity of the fat pad on the oral mucosa. Careful dissection with scissors was carried out until fat appeared in the wound, which was then carefully and gradually pulled out with tweezers, avoiding excessive stretching. After mobilizing a sufficient amount of fat, it was filled into the lateral defects and secured with vicryl sutures (Fig. 1).

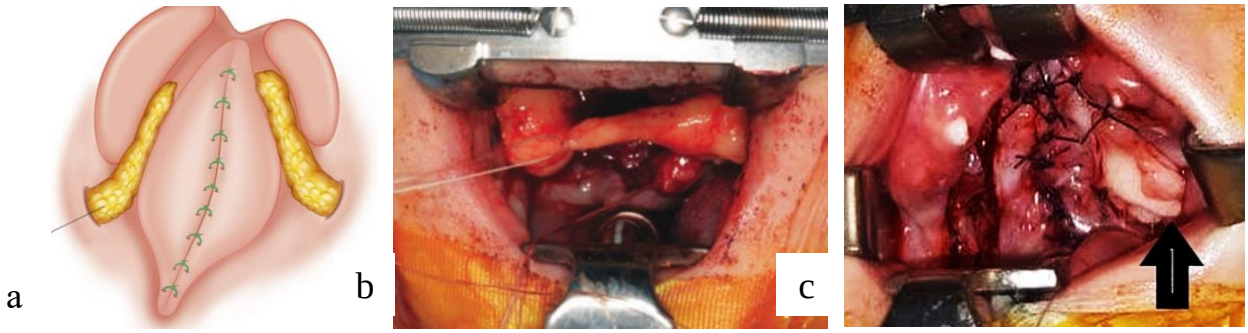

Fig. 1. Application of BFP for lining of lateral defects: a – access formation; b – bilateral mobilization of buccal fat pads, checking that the length of the layer corresponds to the parameters of the lateral defects; c– zone of lateral defects lined with fat

Postoperative follow-up was carried out in the first, second and third weeks after the intervention, which included clinical assessment of the palatoplasty area and examination of the patients. To assess the rate of wound epithelization, we used a 3% H_2O_2 solution (H_2O_2 bubble test), which interacts with connective

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tissue catalase to form bubbles. Conversely, vesicles do not form if the epithelium covers the wound surface [10]. The degree of epithelization was assessed on days 7, 14, 21 and 28 after surgery. The results were designated as 0, 1/3, 2/3, 1 for each wound site. The intensity of wound epithelization was assessed by cytological analysis of smears from the defect area on days 3, 5, 7 and 14 after removal of iodoform and a tampon with PRF from its surface. The smears were placed on fat-free glass slides, evenly distributed over the surface with a spatula, fixed in alcohol, and then stained according to Romanovsky-Giemse. Visualization of smears and counting of cellular elements were carried out on a EUROMEX BIO MED microscope (Euromex Microscopen bv, the Netherlands).

Data analysis was performed using SPSS Statistics for Windows (IBM, Armonk, NY). Stratification was performed based on the incidence of postoperative complications using the Chi-square test, and p less than 0.05 was considered statistically significant.

RESULTS. The greatest number of complications was noted in the group of patients in whom iodoform was used to cover the wound surface of lateral defects. There was an accumulation of food, which caused bad breath and the development of an inflammatory process (5 (20%)), which in turn prevented the epithelization of the surgical wound and in some cases required additional surgical intervention. In 8 (32%) patients, rough scarring was observed. The epithelization process in this subgroup lasted an average of 30 ± 3.5 days (Table 2).

It should be noted that collecting a sufficient amount of venous blood for PRF in most patients presented certain difficulties associated with the physiological characteristics of childhood. There was also a discrepancy between the obtained PRF volume and the parameters of the surgical wound in the area of the lateral defects. The epithelization process in this subgroup lasted an average of 23 ± 1.3 days.

Table 2. Analysis of the rate of epithelization depending on the method of coating (material) of the wound surface in the area of lateral defects

Observation period	Material	Epithelialization			
		0	1/3	2/3	1
7th day	iodoform	23	2	-	-
	PRF	23	4	-	-
	CS	21	4	-	-
	BFP	16	6	4	-
14th day	iodoform	3	10	10	2
	PRF	-	8	17	2
	CS	-	6	16	3
	BFP	-	4	16	6
21st day	iodoform	-	3	10	12
	PRF	-	1	11	15
	CS	-	-	8	17
	BFP	-	-	-	26
28th day	iodoform	-	1	2	22
	PRF	-	-	2	25
	CS	-	-	1	24
	BFP	-	-	-	26

When using a collagen sponge, 4 (16%) patients experienced suture dehiscence and, as a consequence, material loss from the surface of the defect. It was also difficult to obtain material with the appropriate parameters for complete coverage of the area of lateral defects. The epithelization process in this subgroup lasted an average of 22 ± 2.2 days.

The process of epithelization of lateral defects under the BFP occurred without complications and lasted on average 18 ± 1.5 days. A visual examination revealed healing of the wound without signs of necrosis and gross scarring. Already on the 7th day, complete formation of granulation tissue was observed in all patients, and in 38.5% of patients epithelization of half the surface of the lateral defects was noted. On the 21st day after the intervention, complete epithelization of all studied areas of this subgroup was observed (Fig. 2) .

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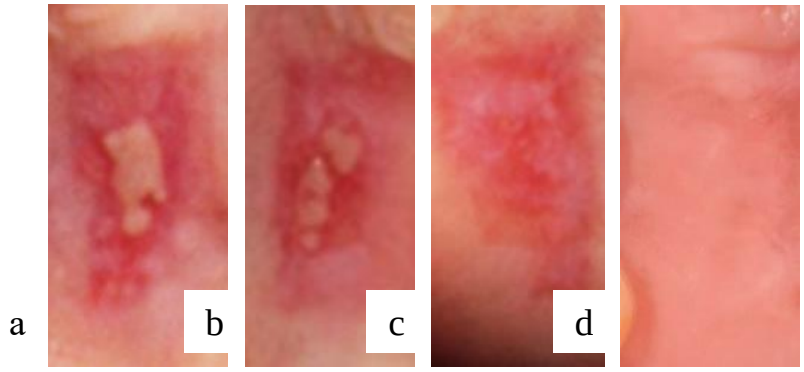

Fig. 2. Results of visual examination of lateral defects on the 21st day after palatoplasty, covered with: a – iodoform, b – PRF, c – collagen sponge, d – buccal fat pad

It was noted that when using BFP to close the surface of lateral defects, the time for wound healing, the formation of granulation and connective tissue is reduced, and epithelization is accelerated by a total of two times.

Cytological examination revealed significant differences in the timing of epithelization. On all smears obtained on the 3rd day after removal of the iodoform and the PRF, massive hemorrhages and a large number of red blood cells were visualized. Differences were found in the severity of the inflammatory process, which was significantly lower in samples obtained from the surface of lateral defects covered with BFP, and the content of neutrophils in the studied samples was 2 times lower than in samples from subgroup "a" (iodoform).

On the 5th day, a significant number of red blood cells remained in the impression smears of lateral defects, previously covered with an iodoform swab, while in other samples (PRF, collagen, BFP) an increase in differentiated epithelial cells (intermediate epithelial cells) was noted. It should be noted that in the impression smears obtained from lateral defects covered with BFP, neutrophil infiltration was not determined, and elements of young granulation tissue (macrophages, fibroblasts), leukocyte infiltration and components of the extracellular matrix were found, which indicated an increase in regenerative-reparative processes (Fig. 3).

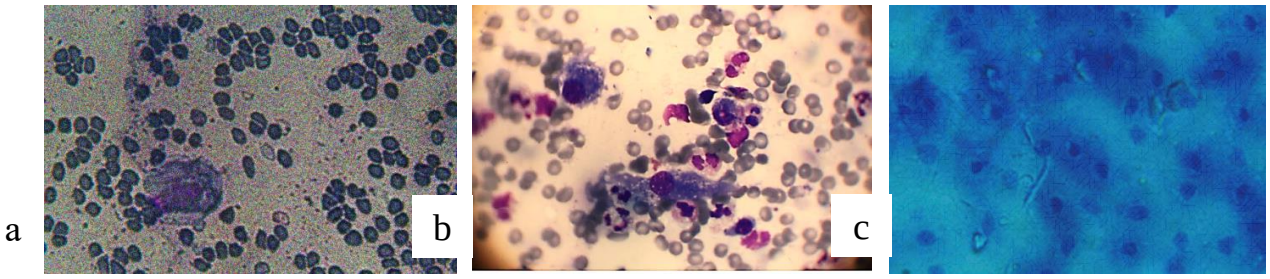

Fig. 3. Cytological examination of smears-imprints from the surface of lateral defects covered with BFP (azur-eosin by Romanovsky-Giemse, magnification 400): a – 3rd day, b – 5th day, c – 7th day

By the 7th day, in the impression smears from areas of the mucous membrane of subgroup "a" (iodoform), single epithelial cells were found and a decrease in the intensity of neutrophil infiltration was observed, while in the area of lateral defects of patients of other subgroups epithelization of the wound was visualized due to the active formation of epithelial cells. In smears obtained from the surface of lateral defects covered with BFP, the cytological picture indicated a decrease in the growth of granulations and an active process of maturation of immature connective tissue. A similar picture in subgroup "a" (iodoform) was visualized by the 14th day in only 40% of the samples.

The Chi-square test and Fisher's exact test were used to identify associations between categorical variables. A statistically significant association was found between the observed groups regarding healing on the 14th ($p<0.001$) and 21st day ($p<0.001$), while statistically insignificant associations of the main group were found regarding gender ($p=1.000$), age group ($p=1.000$), cleft side ($p=1.000$), cleft type ($p=1.000$).

CONCLUSIONS. The buccal fat pad is the optimal source of vascularized tissue to cover the area of lateral

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defects during surgical treatment of congenital cleft palate. Ease of mobilization, minimal trauma and accessibility of the method make this method perspective. The rate of epithelization and wound healing is higher compared to the traditional method (iodoform), the use of collagen sponge and PRF with a minimal risk of complications.

REFERENCES:

1. Azimov M., Shomurodov K. A new method of uranoplasty in patients with congenital cleft palate // Stomatologiya. – 2017. – T. 1. – No. 3 (68). – pp. 55-57.
2. Shaeva R.G., Shomurodov K.E., Bekmurodov E.E. Prospects for the use of buccal grafts in the surgical treatment of congenital cleft palate. Integrative dentistry and maxillofacial surgery. 2023;2(3):9–15.
3. Shaeva R.G., Shomurodov K.E., Mirkhusanova R.S. Development of surgical methods for treating congenital cleft palate. Integrative dentistry and maxillofacial surgery. 2023;2(1):39–45.
4. Shomurodov K.E. Current ethical principles and clinical approach in pediatric dentistry // Humanitarian treatise. – 2018. – No. 24. – pp. 69-72.
5. Shomurodov K.E., Mirkhusanova R.S. Ethical principles and clinical approach in the complex treatment of children with cleft palate //Healthcare management: challenges and risks of the 21st century. – 2021. – P. 203-204.
6. Adeyemo WL, Ibikunle AA, James O, Taiwo OA. Buccal Fat Pad: A Useful Adjunct Flap in Cleft Palate Repair. J Maxillofac Oral Surg. 2019 Mar;18(1):40-45.
7. Azimov M.I., Shomurodov K.E. A technique for Cleft Palate Repair //Journal of research in health science. – 2018. – T. 1. – No. 2. – pp. 56-59.
8. Khan I, Cho N, Ahmed M, et al. (August 29, 2021) The Application of Buccal Fat Pad to Cover Lateral Palatal Defect Causes Early Mucolization. Cureus 13(8): e17532.
9. Ku YC, Al-Malak M, Mulvihill L, et al. Tissue adjuncts in primary cleft palate reconstruction: A systematic review. J PlastReconstrAesthetSurg. 2023;86:300-314.
10. Marucha, P. T., Kiecolt-Glaser, J. K., & Favagehi, M. (1998). Mucosal wound healing is impaired by examination stress. Psychosomaticmedicine, 60(3), 362–365.
11. Ruslin M, Hajrah-Yusuf AS, Tajrin A, Lo LJ, Forouzanfar T. Utilization of pedicled buccal fat pads for coverage of the lateral relaxing wound: A review of literature and a case series of 15 patients. J Clin Exp Dent. 2018;10(5):e502-6.