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Article



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REGIONAL FLAPS IN RECONSTRUCTION OF SOFT TISSUE DEFECTS AFTER RADICAL SURGERY FOR ORAL CANCER

Abstract: Background. The main contingent of patients with oral cancer turn to specialized clinics in the later stages. After radical resection in this category of patients, extensive defects occur that require primary reconstruction to restore form, function, and aesthetic effect. Objective. To present our experience in the reconstruction of oncological defects of the oral cavity using regional flaps. Materials and methods. The analysis of the collected data of patients who underwent radical resection followed by reconstruction with pedicled flaps for locally advanced oral cancer from 2015 to 2022 was carried out. Demographic data, primary tumor site, defect type, flap variant, and complication rates were analyzed. Results. Primary reconstruction of soft tissue defects after radical tumor resection was performed in 56 patients. The distribution of patients according to the prevalence of the primary tumor T3 - in 47, T4 - in 9 cases. The primary localization of the tumor in the oral cavity was the tongue (n=15), the floor of the mouth (n=12), the alveolar process of the mandible (n=11), the cheek (n=10), the retromolar region (n=5) and the alveolar process of the maxilla (n=3). The regional flaps used for reconstruction were submental flap (n=22), supraclavicular flap (n=10), platysma flap (n=8), sternocleidomastoid flap (n=7), nasolabial flap (n=6) and pectoralis major myocutaneous flap (n=3). We classified the types of soft tissue defects into mucosal defects (n=53) and full-thickness defects (n=3). The overall complication rate for flaps was 46.4%. Total necrosis of the flap was not observed, partial necrosis was detected in 4, marginal necrosis in 9, wound dehiscence in 13. Conclusion. Regional flaps are an effective method for reconstruction of soft tissue defects following oral cavity cancer surgery with acceptable functional and aesthetic results.

Key words: oral cancer, soft tissue defects, reconstruction, regional flaps.

Language: English

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Introduction

After radical resection of locally advanced tumors of the oral cavity, large defects occur that must be adequately reconstructed to restore functional (speech, swallowing, chewing) and aesthetic (facial contours) parameters (2, 3, 5, 14). Oral defect reconstruction options range from pedicled flaps to free flaps. Now that microsurgery options are available at most centers, free flaps are used for complex oral defects to achieve better cosmetic results and improved function. In centers with good infrastructure, free flap transfer has become the preferred method of reconstruction (5, 7, 13). However, the use of microvascular technology requires large financial costs and is not always feasible in patients with somatic pathology. Pedunculated flaps for the reconstruction of oral tumor defects are still an effective option. They are still the primary reconstruction method with a high success rate and fewer complications (1, 3, 11, 12, 15).

Objective.

Here we present our experience in the reconstruction of tumor defects in the oral cavity after surgery for locally advanced cancer.

Materials and methods.

A retrospective analysis of the collected data was carried out in the department of Head and Neck Tumor Surgery of the Oncology Clinic and in the department of Maxillofacial Surgery of the Training and Surgery Clinic of the Azerbaijan Medical University from 2015 to 2022. The study included 56 patients who required regional flaps for the reconstruction of soft tissue defects after surgery for locally advanced oral cancer. Patients in whom we used local flaps and split

skin grafts were excluded from the analysis. Patient demographics, primary tumor location, tumor stage, defect type, flap type, and postoperative complications were analyzed. Postoperative complications were divided into major and minor categories. It was determined that a major complication is one that requires additional surgical intervention, and a minor complication is one that resolves on its own with conservative treatment or minimal procedure.

The statistical analysis of the collected data was performed using biometric methods, which included the statistical application of various indicators such as the mean (M), mean deviation (m), maximum (max) and minimum (min) values, variance (σ) and the calculation of the Student's t-value. The analysis was conducted using the SPSS 10.0 version (SPSS, Chicago, Illinois, USA) software for Windows. A value of P less than 0.05 The results were considered statistically significant at the probability level (p-value) <0.05. The difference between quality indicators was determined by calculating Pearson's correlation coefficient.

Results.

The study population consisted of patients with locally advanced oral squamous cell carcinoma who were reconstructed using regional pedicled flaps. A total of 56 patients were included in the study, including 39 men and 27 women. Age ranged from 30 to 78 years, mean age 58.3 years. The distribution of patients according to the prevalence of the primary tumor was pT3 - 47 cases, pT4 - 9 cases. The reconstruction offered for tumors of various parts of the oral cavity and the distribution of the flaps are shown in Table 1.

Table 1. Distribution of patients according to tumor location, type of defect and flap used.

Options	N	%
Tumor localization		
Tongue	15	26,8±5,9%
Floor of the mouth	12	21,4±5,5%
Alveolar process of the mandible	11	19,6±5,3%
Alveolar process of the maxilla	3	5,4±3,0%
Cheek	10	17,9±5,1%
Retromolar region	5	8,9±3,8%
Total	56	100,0%
Used flaps		
Naso-labial	6	10,7±4,1%
Supraclavicular	10	17,9±5,1%
Sternocleidomastoid flap	7	12,5±4,4%
Platysma flap	8	14,3±4,7%
Submental	22	39,2±6,5%
Pectoralis major	3	5,4±3,0%
Total	56	100,0%
Type of defect		

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Mucosa + soft tissues	53	94,6±3,0%
Mucosa + skin (full-thickness)	3	5,4±3,0%
Total	56	100,0%

Among the localization of tumors of the oral cavity, the most common was the tongue (n=15 or 26.8±5,9%), followed by the floor of the mouth (n=12 or 21.4±5,5%), the alveolar process of the mandible (n=11 or 19.6±5,3%), cheek (n=10 or 17.9±5,1%). The rarest localization of the tumor was the retromolar

region (n=5 or 8.9±3,8%) and the alveolar process of the upper jaw (n=3 or 5.4±3,0%). The most commonly used pedicled flaps were the submental (n=22 or 39.2±6,5%) and supraclavicular (n=10 or 17.9±5,1%) flaps (Figures 1-7).



Fig. 1 - Appearance of a tumor of the left cheekmucosa



Fig. 2 - Soft tissue defect after radical resection

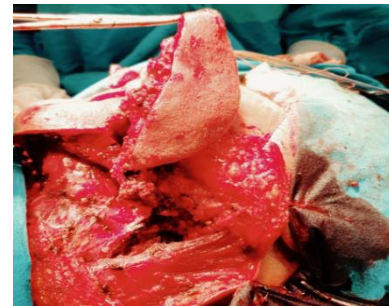


Fig.3 - Harvesting of the submental flap

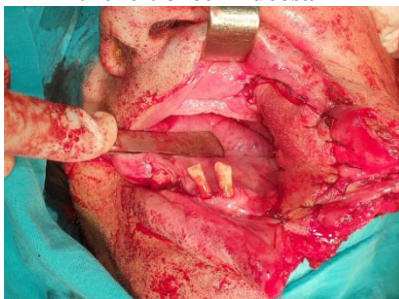


Fig 4 - Defect reconstruction using submental flap



Fig 5 - Primary closure of the donor site



Fig. 6 – Six weeks postoperatively



Fig. 7 – One year postoperatively, after radiotherapy

Other flaps with reduced frequency of use were platysma flap (n=8 or 14.3±4,7%), sternocleidomastoid flap (n=7 or 12.5±4,4%), nasolabial flap (n=6 or 10.7±4,1%) and pectoralis major muscle flap (n=3 or 5.4±3,0%) (t=1,04; P>0,05) (Fig. 3).

Defects were presented by the oral mucosa defects in 53 (94.6±3,0%) and full-thickness defects (mucous membrane + skin) in 3 (5.4±3,0%) patients (t=21,03; P<0,001). The complication rates associated with the use of flaps are shown in Table 2.

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Table2. Local complication rate after reconstructive surgery

Complications	N	%
Total (subtotal necrosis)	—	0%
Partial necrosis	4	15,4±7,1%
Marginal necrosis	9	34,6±9,3%
Wound dehiscence	13	50,0±9,8%
Total	26	100,0%

The overall complication rate in our study was 26 (46.4±6,7%) cases. Serious complications in the form of total / subtotal necrosis were not observed in any patient, partial necrosis - in 4 (15.4±7,1%). Minor complications included marginal necrosis in 9

(34.6±9,3%) and wound dehiscence in 13 (50.0±9,8%) patients. The frequency of complications depending on the flap used is shown in Table 3 (t=1,14; P>0,05).

Table 3. Complication rate depending on the type of reconstruction

Used flap	N	Complication rate	
		N	%
Submental flap	22	7	27,0±8,7%
Pectoralis major muscle flap	3	1	3,8±3,7%
Supraclavicular flap	10	4	15,4±7,1%
Naso-labial flap	6	3	11,5±6,2%
Sternocleidomastoid muscle flap	7	5	19,2±7,7%
Platysma flap	8	6	23,1±8,3%
Total	56	26	100,0%

The lowest frequency of complications was observed when using submental and supraclavicular flaps and pectoralis major muscle flap and amounted to 31.8% (in 7 of 22), 40.0% (in 4 of 10) of 33.3% (1 of 3), respectively (P>0,05).

When using other flaps, the complication rate was higher and amounted to 50.0% (in 3 out of 6) with the nasolabial flap, 57.1% (in 5 out of 7) with the flap on the sternocleidomastoid muscle, and 75% with the flap on the platysma muscle (6 out of 8) (P>0,05).

Discussion.

Primary reconstruction of oral defects after radical surgery for locally advanced tumors is essential to achieve acceptable functional and aesthetic results in order to improve the quality of life in these patients. Despite the fact that free flaps are currently considered the leading option for the reconstruction of oral defects, pedicled flaps are still the method of primary reconstruction in patients with comorbidities, in elderly patients, due to lower cost. Other indications for the use of regional pedunculated flaps are vessel-depleted neck, neck irradiation, salvage surgery defects, cancer recurrence, reconstruction failure with free flaps (1, 3, 15).

In recent years, submental and supraclavicular flaps have been widely discussed for the reconstruction of tumor defects in the oral cavity (8, 9, 10). The advantage of the submental flap is the ease of insertion, a wide arc of rotation, adequate blood supply, proximity to the oral cavity, the possibility of

forming a flap of various thicknesses and sizes, and an inconspicuous scar in the donor area (9, 14).

The advantages of the supraclavicular flap include the reliability and constancy of the vascular pedicle, ease of variation, matching in color and texture, the lack of hair growth, and minimal defect in the donor bed (4, 6).

The characteristics of submental and supraclavicular flaps are considered by many authors as an alternative to free grafts and do not require microsurgical skills and instruments (9, 10).

In our material, these two flaps were used in more than half - 57.1±6,6% (in 32 out of 56) of patients with the least frequent local complications, satisfactory functional and aesthetic results in the recipient and donor areas.

All patients after reconstructive surgery were in the intensive care unit for the first 24 hours for better postoperative care and flap monitoring. The flap was monitored for color, temperature, swelling, and capillary sensation. The pinprick test is commonly used to monitor the flap.

In our experience, the frequency of local complications when using flaps was 46.4±6,7% (in 26 and 56), of which serious complications in the form of total necrosis of the flap were not observed, and partial necrosis was detected in 7.1±3,4% (in 4 and 56) patients. At the same time, literature data show that the frequency of local complications after reconstructive operations using regional flaps varies from 4.5±2,8% to 60,06,5±% (2, 14).

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Conclusion.

The main goal of the reconstruction of oral defects after tumor resection surgeries is to restore the shape and function of the lost part of the organ. Reconstruction with regional flaps presents a wide range of opportunities for isolated and complex soft tissue defects. In our study, the restoration of oral

defects had a high success rate, an acceptable functional and aesthetic result. Submental and supraclavicular flaps have proven to be the most common and versatile method of oral defect reconstruction, making them effective alternatives to free flaps.

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