

# RECONSTRUCTIVE PLASTIC SURGERY INVOLVING THE PECTORALIS MAJOR MUSCLE FOR BASAL CELL CARCINOMA OF THE FACIAL SKIN: A CLINICAL CASE

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## ABSTRACT

**Relevance:** Basal cell skin cancer is the most common malignant skin tumor originating from epithelial cells. Reconstruction of altered tissues and organs is an urgent and significant medical and social problem. In particular, head and neck injuries are complicated for functional, cosmetic, and aesthetic reconstruction.

**The study aimed to** share the experience of performing reconstructive plastic surgery using the pectoralis major muscle at the Head and Neck Tumor Center of Kazakh Institute of Oncology and Radiology, JSC (KazIOR, Almaty, Kazakhstan).

**Methods:** The article describes the experience, operation steps, and results of postoperative wound healing after reconstructive surgery for skin cancer progression. A split musculocutaneous flap with the inclusion of the pectoralis major on a vascular pedicle was used. The surgery was performed at the Center for Head and Neck Tumors of KazIOR.

**Results:** Follow-up control 6 and 12 months after surgery showed that the musculocutaneous flap was intact. There was no evidence of recurrence or metastasis.

**Conclusion:** Musculocutaneous flaps involving the pectoralis major can successfully reconstruct combined extensive head and neck injuries.

**Keywords:** basal cell carcinoma, pectoralis major, replacement flap, osteomyelitis, plastic, defect, fatty skin flap.

**Introduction:** Skin cancer refers to malignant neoplasms, one of the indicators of the population's health, with a significant degree of dependence on habitat quality. High morbidity is often considered a medical indicator of the territory's environmental woes. According to the literature, skin cancer most often occurs in the 50-69 age range, but in recent years there has been a tendency to its rejuvenation [1].

Non-melanoma tumors include basal cell skin cancer (basalioma) – 75 to 97% of all epithelial skin cancers, squamous cell cancer – 5 to 15%, and rare skin appendage cancer (sebaceous and sweat glands, hair follicles) less than 1%.

In the Republic of Kazakhstan, the incidence of intense skin cancer is as follows: 75.0 in the total population, 63.4 in men, and 85.1 in women. The standardized morbidity rates are 41.1, 45.9, and 39.8, respectively.

The main treatment methods for patients with locally standard head and neck cancer are combined and complex processes that include different combinations of radiation therapy, chemotherapy, and surgery [2]. The complexity of treating patients with locally spread head and neck tumors is that extended-combined surgeries often lead to significant complex defects and functional and aesthetic disorders. Therefore, in many cases, locally-spread primary, recurrent, and regional metastatic tumors are defined as inoperable due to their prevalence and the impossibility of closing postoperative defects using local tissues. This forces the surgeon to seek complete restoration of anatomical and functional abnormalities that can occur after radical surgical intervention [3]. One of the first steps in planning the reconstruction is to assess the defect nature, the condition of the anatomical structures requiring

repair, and the functional deficit resulting from the surgical intervention. Finally, malignant skin neoplasms remain one of modern medicine's most important and priority problems [4].

**The study aimed to** share the experience of performing reconstructive plastic surgery using the pectoralis major muscle at the Head and Neck Tumor Center of "Kazakh Institute of Oncology and Radiology" JSC (KazIOR, Almaty, Kazakhstan).

**Materials and methods:** This manuscript describes the experience, operation steps, and results of postoperative wound healing after reconstructive surgery for skin cancer progression. A split musculocutaneous flap with the inclusion of the pectoralis major on a vascular pedicle was used. The surgery was performed at the Center for Head and Neck Tumors of KazIOR.

**Patient information:** Patient S., born in 1958, was referred to the Head and Neck Tumor department of KazIOR in March 2021 with "T2N0M0 st2 skin cancer on the chin, condition after chemotherapy, disease progression."

### **Clinical data:**

**Anamnesis morbi:** The patient was registered at the local oncologist in April 2019, when he developed a formation on his chin, with the primary diagnosis of a "T2N0M0 st2 skin cancer on the chin." Histological report of April 2019: "Skin basalioma, solid type." The patient was referred to KazIOR.

This clinical case was discussed at the meeting of the interdisciplinary group. Considering the data from CT studies and the prevalence of the tumor process, it was decided to perform the following surgical treatment: removal of the skin tumor on his chin, and muscles of the mouth floor with resection

of the lower jaw fragment, with a skin and fat flap with a large pectoral muscle (LPM) on the left. In addition, the patient was hospitalized in the head and neck tumors center of KazIOR.

**Diagnostics:** General condition on admission: The patient's condition is closer to satisfactory. Consciousness is clear. The physique is average. Visible skin and mucous membranes were pale pink. The subcutaneous fatty tissue and muscular system were evenly developed, and the osteoarticular apparatus was without deformity. The thorax was regular. Lung breathing was vesicular, with no audible rales, and the heart boundaries were normal. Cardiac tones were muffled and

rhythmic. BP – 120/80 mm Hg, HR – 76 bpm. The abdomen was soft and painless on palpation. The liver and spleen were not enlarged. The Pasternatsky's symptom was negative on both sides. Stool and diuresis were regular.

**Locally:** External examination determined a tumor formation in the lower jaw central area up to 8.0 cm in diameter. The skin above the tumor was ulcerated, with purulent discharge. Single lymph nodes up to 1.5 cm were detected in the sub-mandibular area on both sides. Oroscopy showed no evidence of oncopathology.

Figure 1 shows the preoperative view of the patient.



Figure 1 – Preoperative view of Patient S., born in 1958. Diagnosis: T2N0M0 st2 skin cancer on the chin, condition after chemotherapy, the disease progression

**Examinations at admission:** A CT scan of the mandible was performed in the preoperative period to assess the process's extent and select an adequate scope of surgical treatment. A series of tomograms dated March 2021 revealed a defect of the external skin of the genian up to 19.2x17.5 mm, reaching the outer cortical layer of the mandible. There was thickening and infiltration of adjacent soft tissues with heterogeneous contrast accumulation. Areas of lytic destruction of bone tissue with free gas bubbles were detected in the mandible, and the integrity of the outer and inner lamina of the cortical layer was compromised. There was also a nidus of lytic destruction in the

proper alveolar process up to 8.2 x 6.2 mm. Genian, upper, and middle jugular lymph nodes of the neck on both sides were up to 11x5.8 mm.

**Conclusion:** CT signs of a defect in the external skin of the mandibular area with thickening and infiltration of the adjacent soft tissues. Areas of lytic destruction of the bone tissue of the mandible with free gas bubbles and disruption of the integrity of the outer and inner lamina of the cortical layer (signs of osteomyelitis). A focal point of lytic destruction in the alveolar process of the mandible on the right. Lymphadenopathy of the neck's genian, upper and middle jugular lymph nodes on both sides (Figure 2).

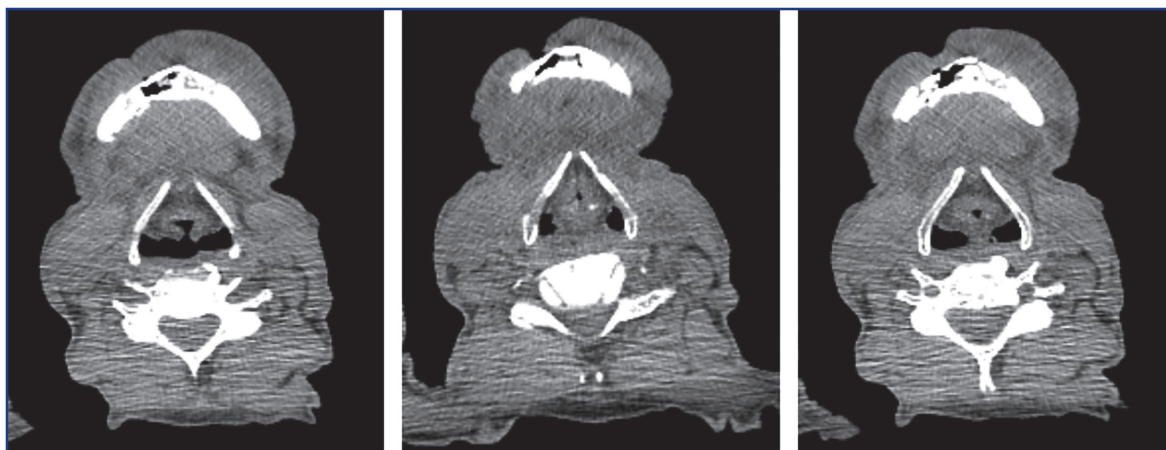


Figure 2 – Patient S., born in 1958: a contrast-enhanced CT scan of the mandible and soft tissues of the neck (March 2021)

**Treatment:** After histological verification, the patient received close-focus X-ray therapy with a total boost dose of 60 g from June to July 2019. The patient remained under clinical observation. In April 2020, he developed a relapse of an ulcerative dermal tumor in the chin. The cytology of scraping from the neoplasm in June 2022 showed post-radiation dysplasia and single carcinoma cells. In July 2020, the Overall Multidisciplinary Team recommended polychemotherapy. Two conducted scheduled courses included cisplatin 130 mg and doxorubicin 90 mg. Against the treatment, the ulcerative formation with purulent discharge increased.

The surgery performed at KazIOR in March 2021 included the removal of the skin tumor on the chin, resection of muscles of the oral cavity and the alveolar process of the mandible from the 4th tooth on the right to the 4th tooth on the left, and reconstruction by adipose-dermal flap with the inclusion of the GPM on the left with a tracheostomy.

**Stages of the surgery:** The first stage of the process in aseptically produced a boundary incision of the skin, subcutaneous tissue of the mandibular area deviating from the tumor by 1.0 cm, within healthy tissues, a branch of the mandible was allocated (Figure 3).



Figure 3 – The appearance of Patient S. during the first stage of surgery

The revision revealed lithic destruction of the alveolar process of the mandible. A mandible fragment from the 4th tooth on the right to the 4th tooth on the left was resected using a Jiggly saw (Figure 4). Hemostasis was performed.

In the second stage, a dermal-muscular flap with BPM inclusion on the left side was excised and moved to the defect site, hemostasis, layer-by-layer sutures, drains, and a nasogastric probe, and imposed aseptic bandage. Then a longitudinal incision of the skin and subcutaneous tissue was made under general anesthesia above the jugular notch. The rectus muscles of the neck were pulled aside with a sharp-blunt straight; the isthmus of

the thyroid was exposed and led to the top; the front surface of the trachea was exposed, and a tracheostomy was formed between the 2 and 3 tracheoles (Figure 5).

Figure 6 shows a macro preparation of the skin tumor on the chin, with a jaw fragment, extracted from patient S.

The patient was treated with antibacterial and supportive therapy in the postoperative period. The patient was discharged in satisfactory condition on the 8th postoperative day.

Locally: On the 8<sup>th</sup> postoperative day: Facial asymmetry due to the postoperative defect of the frontal mandible was replaced by a skin-fat flap with GPM. The flap is intact. There were no signs of necrosis (Figure 7).

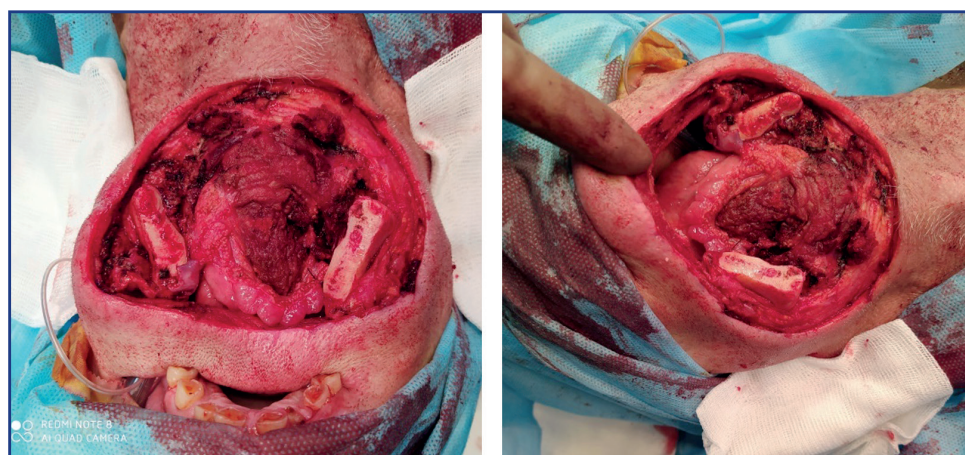


Figure 4 – The resected mandibular fragment



Figure 5 – Cutting and fixation of the flap



Figure 6 – Macro preparations: skin tumor on the chin, with a fragment of the jaw



Figure 7 – The appearance of Patient S., Day 8 after surgery

Postoperative histology report dated March 2021: purulent-productive inflammation, purulent actinomycotic osteomyelitis. No tumor cells were detected-grade 4 pathomorphosis.

**Results:** The musculocutaneous flap was intact during follow-up visits 6 and 12 months after surgery. There was no evidence of recurrence or metastasis (Figures 8 and 9).



Figure 8 – The appearance of Patient S, 6 months after surgery



Figure 9 – The appearance of Patient S, 12 months after surgery

Follow-up CT scan dated September 2021: CT image of the condition after complex treatment for skin cancer on the chin. There was no evidence of recurrence of the underlying process and no MTS lesion (Figure 10).

As of today, the patient is under control and follow-up with an oncologist at the place of residence.

**Time scale:**

The described clinical case time scale is shown in Figure 11.

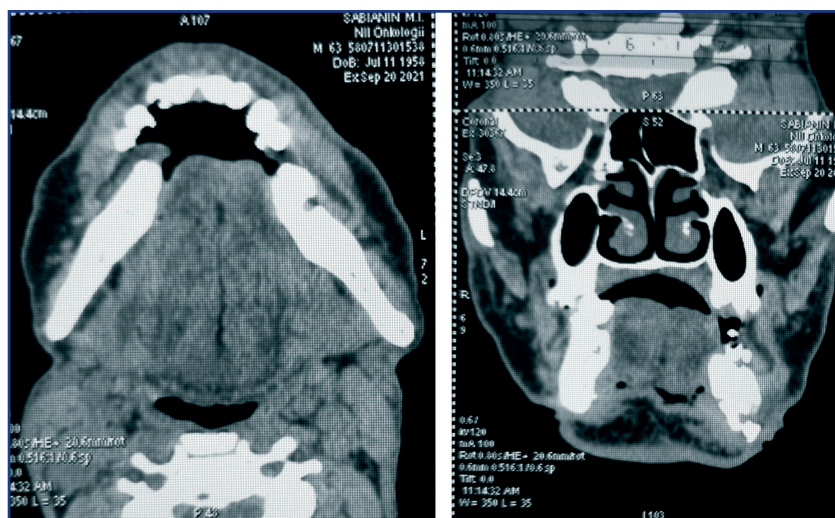


Figure 10 – CT picture of the condition after complex treatment for skin cancer on the chin

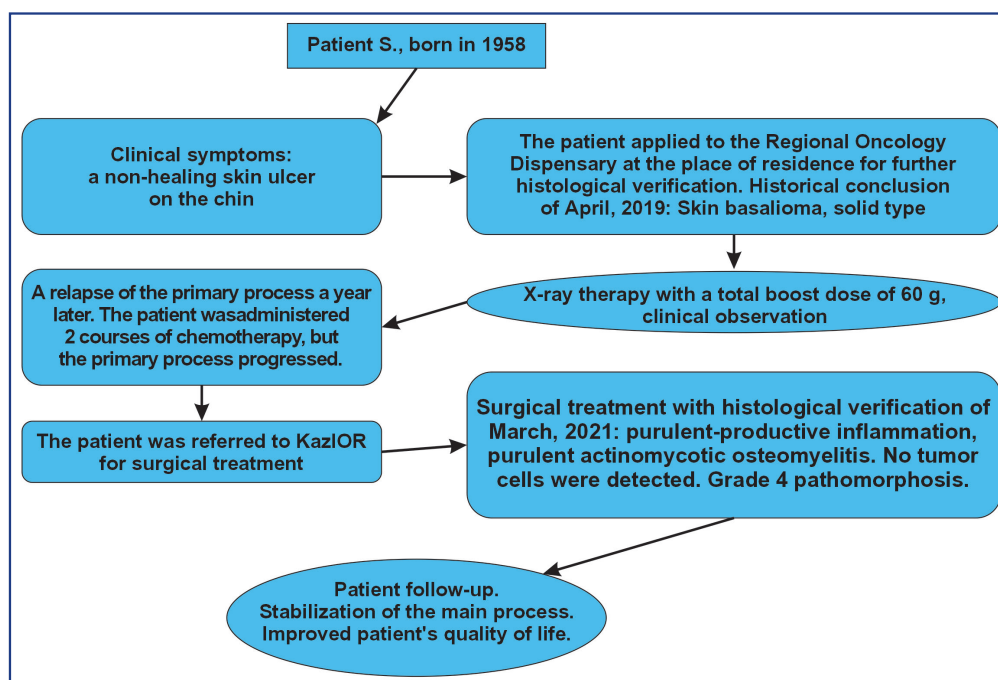


Figure 11 – Time scale of the clinical case of basal cell skin cancer on the chin with reconstructive and plastic surgery

**Discussion:** Patients with extensive injuries, defects, and deformities of the head and neck represent a particular clinical group; their treatment and rehabilitation pose a complex problem for surgeons. As a rule, ample head, face, and neck defects imply damage to the tissue complex. Its recovery requires plastic material of a large area and thickness, including skin, cellulose, muscles, and bone [5].

The presented case describes the surgery results and the experience of the Center’s surgeons in treating the primary process and restoring the patient’s function and quality of life after an extensive disabling surgical intervention.

**Conclusion:** According to our experience, authorized transplants based on the pectoralis major muscle can successfully reconstruct combined extensive head and neck injuries. Satisfactory results of these plastic reconstructive surgeries have been clinically confirmed (Figures 8, 10).

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АНДАТПА

**БЕТТІҢ БАЗАЛДЫ ЖАСУШАЛЫ ТЕРІ ІСІГІ КЕЗІНДЕ КЕУДЕ БҰЛШЫҚЕТІНІҢ НЕГІЗГІ БӨЛІГІН ҚАМТИТЫН РЕКОНСТРУКТИВТІК ПЛАСТИКАЛЫҚ ОПЕРАЦИЯ: КЛИНИКАЛЫҚ ЖАҒДАЙ**

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**Өзектілігі:** Базальды жасушалы тері қатерлі ісігі – эпителий жасушаларынан пайда болатын ісіктердің ішінде ең көп таралған түрі. Өзгертілген тіндер мен мүшелерді қайта қалпына келтіру адамзаттың медициналық және әлеуметтік өзекті және маңызды

проблемаларының бірі болып табылады. Әсіресе, Бас және мойын зақымданулары функционалдық және әсемдік тұрғыда қалтына келтіру үшін өте қиын.

**Зерттеудің мақсаты:** АҚ ҚазОжРФЗИ Бас және мойын ісіктері орталығында үлкен кеуде бұлшықетін қолдана отырып, реконструктивті пластикалық операцияларды жүргізу тәжірибесімен бөлісіңіз

**Әдістері:** Мақалада «Қазақ онкология және радиология ФЗИ» АҚ бас және мойын ісіктері орталығының (Алматы, Қазақстан) тері қатерлі ісігінің прогрессирленуі кезіндегі үлкен кеуде бұлшықетін (ҮКБ) қосумен тамырлы аяқшадағы лоскут арқылы реконструктивті-пластикалық операциядан кейінгі тәжірибесі, ота кезеңдері және отадан кейінгі жараны емдеу тәжірибесі және нәтижелері көрсетілген.

**Нәтижелер:** Операциядан кейін 6 және 12 айдан кейін динамикада бақылау нәтижесінде тері-бұлшықетті лоскут қалтында, ісік-тің қайталануы және метастазына объективті деректер жоқ.

**Қорытынды:** ҮКБ негізіндегі тері-бұлшықетті лоскуттар бас және мойын комбинирленген, үлкен ауқымды тіндердің жетіспеушілігі кезінде сәтті пайдалануға болады.

**Түйінді сөздер:** Базальды жасушалық ісік, үлкен кеуде бұлшықеті (ҮКБ), алмастырушы қақпақ, остеомиелит, пластика, тін жетіспеушілігі, тері-майлы қақпақ.

## АННОТАЦИЯ

# РЕКОНСТРУКТИВНО-ПЛАСТИЧЕСКАЯ ОПЕРАЦИЯ С ВКЛЮЧЕНИЕМ БОЛЬШОЙ ГРУДНОЙ МЫШЦЫ ПО ПО-ВОДУ БАЗАЛЬНОКЛЕТОЧНОГО РАКА КОЖИ ЛИЦА: КЛИНИЧЕСКИЙ СЛУЧАЙ

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**Актуальность:** Базальноклеточный рак кожи – наиболее часто встречающаяся злокачественная опухоль кожи, происходящая из эпителиальных клеток. Реконструкция измененных тканей и органов является одной из актуальных и значимых медико-социальных проблем. В частности, наиболее сложными для функциональной, косметической и эстетической реконструкции являются повреждения головы и шеи.

**Цель исследования** – поделиться опытом проведения реконструктивно-пластических операций с использованием большой грудной мышцы в Центре опухолей головы и шеи АО «Казахский научно-исследовательский институт онкологии и радиологии» (Алматы, Республика Казахстан).

**Методы:** В статье освещается опыт, этапы операции и результаты заживления послеоперационной раны после реконструктивной операции по поводу прогрессирования рака кожи с использованием расщепленного кожно-мышечного лоскута с включением большой грудной мышцы (БГМ) на сосудистой ножке.

**Результаты:** По данным контрольного наблюдения через 6 и 12 месяцев после операции кожно-мышечный лоскут состоятелен, объективных данных за рецидив и метастазирование нет.

**Заключение:** Кожно-мышечные лоскуты с включением БГМ могут быть успешно применены для реконструкции комбинированных обширных повреждений головы и шеи.

**Ключевые слова:** Базальноклеточный рак, большая грудная мышца (БГМ), замещающий лоскут, остеомиелит, пластика, дефект, кожно-жировой лоскут.

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