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apesb@terra.com.br

Universidade Federal da Paraíba  
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LAZAREVIC, Vladan; BANKOVIC LAZAREVIC, Dusica

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# Treatment of Basocellular Carcinoma of the Alar & Alar Base Using Bilobed Flap: A Review

## Tratamento de Carcinoma Basocelular de Base Alar Usando um Retalho Bilobado: Uma Revisão

Vladan LAZAREVIĆ<sup>1</sup>, Dusica BANKOVIĆ LAZAREVIĆ<sup>1</sup>

<sup>1</sup>General Hospital of Čuprija, Serbia.

### RESUMO

**Introdução:** Durante as últimas três décadas ocorreu um aumento na epidemia de tumores cutâneos e carcinoma basocelular. Além de medidas preventivas através de educação e promoção de nesta área, a detecção precoce dos tumores por profissionais adequadamente treinados é uma condição sine qua non. Como etapa final, o tratamento cirúrgico dos tumores cutâneos e carcinoma basocelular é a parte mais delicada do processo. Adequados conhecimentos e habilidades em técnicas cirúrgicas de reconstrução dará melhores chances para o tratamento e resultados estéticos e funcionais adequados.

**Objetivo:** Demonstrar que os tumores cutâneos são um problema de saúde pública e mostrar sua complexidade através de fatores etiológicos, o comportamento biológico do tumor por meio de interações com o hospedeiro, morfológica básica e tipos patológicos dos tumores, diagnóstico e tratamento cirúrgico. Na cirurgia de carcinoma basocelular da base alar são usados e diferentes tipos de retalhos, anatomia básica da região alar e base alar e nariz com atenção à fisiologia da região. Apesar das diferentes técnicas reconstrutivas descritas neste trabalho, o retalho bilobado foi discutido para o tratamento do carcinoma basocelular da base alar.

**Conclusão:** Os melhores resultados estéticos e funcionais podem ser obtidos com retalho bilobado na região do nariz, especialmente a parte apical. Mas a sua aplicação em defeitos na região de base alar é incomum e decorre de limitações específicas.

### ABSTRACT

**Introduction:** During the last three decades almost epidemic spread of cutaneous tumors and basocellular carcinoma occurred. Apart from preventive measures through health education and health promotion in this area, early detection of the tumors by the adequately trained professionals is the condition sine qua non. As a final step, surgical treatment of the cutaneous tumors and basocellular carcinoma is the most delicate part of the process. Adequate knowledge and skills in reconstructive surgical techniques will give the best chances for treatment and adequate aesthetic and functional result.

**Objective:** To point that cutaneous tumors is a public health problem, and to show its complexity through etiologic factors, biologic behaviour of the tumor host interactions, basic morphologic and pathologic types of the tumors, diagnosis and surgical treatment. In surgery of basocellular carcinoma of the alar and alar base it is stress out biomechanics and geometry of different types of the flaps, basic anatomy of the alar and alar base region and nose with accent on the physiology of this region. Apart from different reconstructive techniques described in this paper bilobed flap was discussed for the treatment of the basocellular carcinoma of alar and alar base.

**Conclusion:** The best esthetic and functional results can be achieved with bilobed flap in the region of the nose especially apical part. But its application in the region of the alar and alar base defects is unusual and emerged from specific limiting circumstances.

### DESCRITORES

Carcinoma basocelular; Cartilagens nasais; Tratamento.

### KEYWORDS

Carcinoma, basal cell; Nasal cartilages; Treatment.

## INTRODUCTION

During the last three decades almost epidemics spread of cutaneous tumors and basocellular carcinoma occurred. Apart from preventive measures through health education and health promotion in this area, early detection of the tumors by the adequately trained professionals is the *conditio sine qua non*. As a final step, surgical treatment of the cutaneous tumors and basocellular carcinoma is the most delicate part of the process. Adequate knowledge and skills in reconstructive surgical techniques will give the best chances for treatment and adequate aesthetic and functional result.

The aim of this work is to point that cutaneous tumors is a public health problem, and to show its complexity through etiologic factors, biologic behaviour of the tumor host interactions, basic morphologic and pathologic types of the tumors, diagnosis and surgical treatment.

## LITERATURE REVIEW

### Etiology

The face is the most prominent part of the human appearance. All parts of the face are of extreme importance in making image of an individual in social contact.

Even minor distortions and imperfections of the face will impair integrity of someone's appearance. One of the factors that can distort the face by destructing it are skin tumors and among them basal cell carcinoma (BCC)<sup>1</sup>.

Exposure to the sun is *conditio sine qua non* for the appearance of the BCC. So the face as the part of the body that is exposed the most to the sun receives substantial damage to the skin and is the area with the highest percentage for the occurrence of the BCC. H zone is the most likely part of the facial skin to be targeted (according to the Rowe and associates). BCC accounts for 25% of all human malignancies.

Amongst the factors that cause BCC ultraviolet radiation is in the first place. Ultraviolet radiation is divided into 3 segments: UVC, UVA and UVB. UVC is completely absorbed by the atmospheric ozone, so the rest of the spectrum (UVA and UVB) cause the damage to the DNA, that will subsequently give rise to the skin cancer. After mid seventies drastic changes in thickness of the ozone layer occurred, therefore ultraviolet radiation is more intense and incidence of the skin cancer increase and has almost epidemic characteristics. Having in mind the fact that the effect of the radiation is cumulative and that the most part of the irradiation is received during childhood

and young age, health education of the population is of extreme importance. With adequate use of the sun block creams (with high SPF value) adequate clothing will diminish occurrence of the skin cancer<sup>1,2</sup>.

The other factors to influence occurrence of the skin cancer are: (1) Ethnic origin- Caucasians from the northern hemisphere with fair skin; (2) Gender- men tend to be at higher risk; (3) Age- in older people skin cancer arises in higher frequency (cumulative effect of UV irradiation); (4) Immunosuppression- higher incidence in immunosuppressed persons; (5) Ionizing radiation and (6) Chemical exposure<sup>1,2</sup>.

Sometimes genetic disorders such as xeroderma pigmentosum - autosomal recessive disease and Gorlin syndrome - autosomal dominant disease have extreme incidence of BCC.

### Biologic Behaviour of BCC and Non-Melanoma Skin Cancer (NMSC)

Carcinogenesis is the process through normal cell is transformed from normal to malignant cell and consists of the three phases: (1) Initiation: a genetic mutation that starts process of carcinogenesis; (2) Promotion: until that phase which requires environmental factor (UV irradiation ionizing irradiation, etc.) process can be reversed and (3) Progression: final step consists of expansion in filtration spread and metastasizing<sup>1-3</sup>.

Along the path of the least resistance malignant cells through the process of metastasizing penetrate and via hematogenous and lymphatic route overcome mechanical and immunologic obstacles of the organism. BCC accounts for 0.002% for metastasizing<sup>3</sup>.

### Types of BCC

There are five main types: (1) Noduloulcerative: the most common type accounting 50-54% of BCC begins as a nodule, which ulcerates; (2) Pigmented: similar in appearance to the previous type but pigmented; (3) Morphea: ill defined depressed scar like very deceptive; (4) Superficial spreading: eczematous appearance, involves sometimes large areas of skin and (5) Fibroepithelioma<sup>4</sup>.

### Treatment

The treatment involves: (1) Cryotherapy, usually with liquid nitrogen, commonly used at 50 C exclusively for small lesions; (2) Electrodessication; (3) Laser surgery; (4) Radiation therapy; (5) Standard excision and (6) Mohs surgery - multilayered excision<sup>5</sup>.

In the treatment of the NMSC, the method of choice is excision of the lesion. Excision always includes process of reconstruction. When the lesion is small enough, and defect is subsequently small, the method of choice is

direct closure of the wound. But, when the defect is large enough to exceeds capacity of the soft tissues to stretch, and exceeds biomechanical properties of the skin, different methods of the reconstruction is employed<sup>6</sup>: (1) Free cutaneous grafts depending of the thickness of the graft: Thiersch , Blair and Wolf and (2) Cutaneous flaps which may be local or distant.

### Flap Surgery

#### Historic background

Early reconstructions not only parts but the whole nose are recorded early in India using skin from the forehead region, which amazed people from other parts of the world. That was known as Indian plasty. Later on knowledge of medical science had been spread from east and Byzant to Italy, and the well known italian plasty for the reconstruction of the missing part of the nose became known to the Europe.

Flaps are always preferred over skin grafting because grafted area is always pale in color, depressed comparing to the surrounding skin, and does not meet esthetic standards. Therefore when ever possible, flap surgery is the method of choice.



**Figure 1. Preoperative: patient on admission with carcinoma of the right alar region.**

Planning process is the most critical, and crucial. Surgeon must assess tissue availability, determine the amount of tissue and to determine which flap to use. Comparing to the grafting, flap always offers good match in color , avoids depression, meeting esthetic standards and good function<sup>6</sup>.

#### Biomechanic

Knowledge of biomechanics, for volumen of skin decreases with stretching, areas of tissue availability must be detected, for this the most important step in planning. Skin has elasticity, so it can be stretched to the certain point, but if the constant pressure is applied long enough phenomenon of stress relaxation occurs (during surgery carefully exercised stretching of the flap can achieve

desired length of the flap). This is especially important in the region of the scalp where stress relaxation enables in skilled hands closure of the defect without tension<sup>6</sup>.

#### Defect Area

The defect area must be examined thoroughly in order to assess the amount of the skin and underlying tissue to be excised, and according to the size and position of the defect , the donor area and type of flap will be chosen.

Location of the lesion will pose more or less problems to the surgeon in the region of the facial and skin of the scalp. Meticulous knowledge of the anatomy with emphasis on the vasculature and function of the different parts of the maxillofacial region is of paramount importance<sup>7-9</sup>.

#### Types of Flaps

Rotation flap: in cases of triangular defects, with a base along a circle line, enables closing of a defect by means of a rotational movement of the skin flap, good planning means that enough skin is required for when is not the case phenomenon ischemia occurs below the line of maximum tension.

Transposition flap: is rectangular, in shape with round edges, maximal transposition angle is 90 degrees. Defect may be adjacent to the flap or the area of the interpositioned skin is present. Flap must have enough volume to fill the defect, and good movement of the flap and surrounding skin is required. If it is not achieved, line of maximum tension which runs diagonally along the flap will occur, and can cause subsequent necrosis of the flap.

Advancement: in this type of flap , defect is in the front of an advancement flap , which may be of V-Y type or rectangular<sup>6</sup>.

Insular: in this method flap can be on the defect edge, or with the part of interpositioned skin. Basically strap of the subcutaneous tissue is prepared with skin insula on top , and so vascularised skin flap is placed into the defect.

Rhomboid flaps: in 1946 Limberg introduced 120 and 60 degrees rhomboid flap , which may be used as a single, double or triple rhomboid flap. Duforementel modified in 1962 by changing the angle or a rhomboid to 150 and 30 degrees rhomboid.

Bilobed flap: first described 1918 by Esser, for the use in nasal tip defect. Later Zymany described possible applications of the procedure to the different areas of reconstruction. Mc Gregor and Soutar specified understanding of choice of region in which to be used. They have explained the geometry , and have shown

where this type of the flap can be used. In facial reconstruction bilobed flap is most useful on the nose. This flap is in fact rotation flap that spreads the load assembling two transposition flaps. When the defect is outlined and two flaps are drawn, each should be smaller in the width than the defect, and the second one than the first. Flaps represent in fact the radius of a circle on whose edge outer rim of the defect lies. Flaps are rotated to their bases achieve good movement<sup>6</sup>.

#### Anatomic Considerations of the Alar Nasi

Alla nasi, infraorbital, buccal and zygomatic region when it comes to the reconstructive surgery are very challenging<sup>8</sup>.

**Skin:** The nasal skin shows difference in thickness, color and appearance in different parts of the nose. Part of the skin covering bony skeleton and lateral parts of the nose is thin and pale. The skin in the tip area is always thick and rich in sebaceous adnexa. The alar skin is also thick and rich in sebaceous adnexa. Columellar skin is thin and delicate. Vestibulum nasi is lined with delicate, thin skin containing hair follicles<sup>8,9</sup>.

**Musculature:** The muscles of the nose are: procerus, compressor nares and depressor septi nasi.

**Nerve supply:** Motor innervation is derived from the upper buccal branches of the facial nerve. Sensitive innervation is provided from the ophthalmic nerve and maxillary nerve.

**Vascular supply:** Alar region and membranous part of the septum are supplied by the branches of the facial artery. Dorsal and lateral areas are supplied by the branches of the ophthalmic artery and infraorbital branches of the maxillary artery, venous drainage is provided by the anterior facial and ophthalmic artery.

**Lymphatic drainage:** Lymphatic drainage of the external nose drains to the facial lymph nodes which are in relation to the facial vein. The anterior part of the nose drains to the submandibular nodes. Intranasal area drains to the upper deep cervical nodes<sup>8-10</sup>.

#### Tumor Assessment

Size of a tumor, especially vertical growth dimension, and possible adhesion to the deep tissues, bone and cartilage will determine the size of a defect to be created after excision of a tumor. The size of a tumor will determine the type of reconstruction.

Armed with previous knowledge, surgery begins with demarcation, of the area to be excised. Excision must be with respect for the tissue because when surgeon lacks gentle tissue handling, damage to the tissue to be excised can spill tumor cells with subsequent recidive<sup>11</sup>.

After excision, excised tumor with enough healthy

tissue must be thoroughly inspected, and if there is any doubt additional excision is required. It is wise to mark one pole of excised tumor with a stitch to facilitate pathohistologic analysis (determining clearance margins). Drawing of the excisedate, with placed orientation must be made.

#### Surgical Technique - Process of Rising Flap

This step begins with outlining the flap and width and length of the flap must be planned well, so tension forces will not occur with subsequent impairment of the circulation of the flap. Soft tissue handling and sharp dissection, are *conditio sine qua non* in such a meticulous surgery. Flap survival will be compromised with rough handling because of damage done to the vascular supply of the flap. Haemostasis is done using mono or bipolar electrocauterisation, and ligation. Next step in the process will include suturing in one or more layers. Choice of the suture material whether monofilament or braided is the matter of choice, but of course suture material except for the skin is resorbable<sup>6</sup>. Local anesthesia Lidocaini 2% + Adrenalin 1:200000 is appropriate, for infiltration and block anesthesia (of the infraorbital branch).



**Figure 2.** The defect after tumor excision, and rectangular flap of the vestibular skin.

Choice of a needle to be used in suturing is of course very important. Reverse cutting needles, and spatula needles are the only possible choice to be made for the atraumatic handling of the tissues. Sutures must not grasp too much tissue within itself and must not be too tightened in order to avoid excessive scarring. Suturing can be done in interrupted manner or continuous. Interrupted most commonly used can be simple, vertical and horizontal mattress. After stitching the next step to be done is dressing with an antibiotic coating in a form of an ointment, and gauze, but dressing must not interfere with vascular supply to the flap, and excellently performed surgery can be compromised with dressing applying too much pressure to the flap tissue. Too much pressure on the operative region can cause necrosis



of the flap. Good care of the wound must be taken in immediate post operative period when vascularisation of the tissues is checked by matching the color of the flap to the surrounding skin. Bleeding test with hypodermic needle is sometimes performed, and even a removal of a single suture sometimes can enhance vascularisation and prevent necrosis of the flap<sup>6,11</sup>. Recommended therapy for administration during 7 days is: Ceftriaxon 2x1gr, metronidazole 3x500mg.

Local flaps are very demanding, great experience is required, lack in experience can not only cause necrosis of the flap tissue, but inadequate excision can cause recidive of a tumor. Local flaps are excellent in the skilled hands, but can cause disastrous problems when there is not enough skill.

Bilobed flap is the one of the most complicated to be performed and always used in delicate areas to be reconstructed. One of the regions of the face which reconstruction is extremely demanding is region of the allae nasi. Alar defect caused by the BCC, for its complexity is a real challenge for the surgeon. Allar zone has the outer skin, and skin that outlines vestibulum nasi, therefore reconstruction of the allae nasi is one of the most complicated. Numerous methods can be exploited, but sometimes restrictions can lead us towards unusual methods of reconstruction such is the case in this paper.



**Figure 3. The unusual use of the bilobed flap raised and rectangular vestibular advancement flap sutured as lining.**

Alar & alar base reconstruction - bilobed flap as a solution

Alar & alar base anatomy is delicate for its appearance and function. Nose is connected to the cheek and as a result of that connection an angle is formed making a groove. Any defect of that region will destruct that anatomic relationship, and will pose a problem for the reconstruction. Secondly the fact that the normal respiration is of extreme importance, the next problem to be solved is restoration of that function.

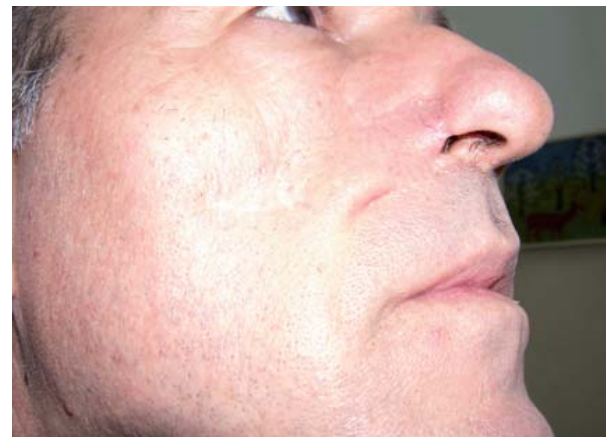
In normal physiologic circumstances nasal valve

during every inspiration maintains the nares wide open enabling air to freely circulate. If for some reason nasal valve does not function, inspiration is hardly possible, and this represents delicate anatomy problem.

Good functional and cosmetic result was achieved using bilobed flap in treatment of BCC of the alar region (Figure 4). After the sutures removal, healing of the operative wounds, optimal result was obtained. Appearance one year after the surgery (Figure 5).



**Figure 4. Bilobed flap sutured to the defect. Final result.**



**Figure 5. Patient one year postoperatively.**

Unity of esthetic and functional problems to be solved represents real challenge for reconstruction, for if the chosen flap is too bulky nose cheek junction will not appear naturally and will be erased. Different combination of local flaps can be made for the problem of the reconstruction is that two epithelial surfaces should be reconstructed. Usually combination of two flaps – for the vestibular plane insular, from the nasolabial region and second flap from the dorsal nasal of forehead skin, for the outer surface<sup>6</sup>. In some cases there is enough vestibular skin left at the lateral angle and base of the naris orifice which can be used as an advancement flap for vestibular epithelial lining reconstruction. If the forementioned vestibular skin is missing, upper parts of the nasal mucosa (from the lateral wall) can be used as

a flap, for the alar lining. In the option is split thickness graft, as a vestibular lining. If the forehead flap is large enough flap can be folded to reconstruct both epithelial surfaces.

Skin cancer in the maxillofacial region requires special attention in the treatment for very often the desire not to harm the cosmesis and function can be deceptive and must not to interfere with radicality of the excision<sup>1,2,5</sup>.

When the tumor is excised meticulous inspection of the excised tumor is required and enough of the healthy tissue will guarantee success. In any case of suspicion frozen section is required for clearance margins are the condition sine qua non.

In the post operative process special attention must be paid to the vascularization of the skin flaps, sometimes some stitches must be removed and adequate dressing should be used (to avoid pressure on the operative region and subsequent necrosis)<sup>7-9</sup>.

Allar region is one of the most challenging anatomic regions for the reconstruction, due to the not only cosmetic, but to the functional requirements having in mind nasal valve and its role in respiration<sup>10</sup>.

In specific use of bilobed flap described above, the allar defect in full thickness, and defect of the skin of the nasolabial region represented not only a problem, but challenge, to achieve good cosmetic and functional result<sup>4</sup>.

Excluding flaps of the forehead skin, the process of the reconstruction, rather unusual application of the bilobed flap emerged<sup>6,10,11</sup>. Skin of the infraorbital and zygomatic region was used, with thick subcutaneous tissue for good contour. No active or passive drainage was used, for every possible gap was eliminated with adequate multilayered suturing using Vicryl 4/0 for subcutaneous and Vicryl 5/0 for the skin.

Vestibular skin as an rectangular advancement flap was used for the lining. After healing process took place, good cosmetic, and functional result was achieved.

## CONCLUSION

The best esthetic and functional results can be achieved with bilobed flap in the region of the nose especially apical part. But it's application in the region of the allar and allar base defects is unusual and emerged from specific limiting circumstances.

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### Correspondence:

Lazarevic Vladan,  
K. Oktobra 1/1, 35000 Jagodina  
Serbia  
E-mail: lazarevic.vladan@open.telekom.rs