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THERAPEUTICAL DERMATOSURGICAL APPROACHES OF THE MALIGNANT TUMORS OF THE NOSE

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Abstract. The nose is the most frequent localization of skin cancer at the cephalic extremity.
The dermatologist is familiar with all clinical aspects and the carcinologic properties of skin tumors, so he is at the forefront of the oncological skin surgery. The increasing incidence of cutaneous carcinomas has fueled the interest for refinement of the methods of nasal reconstruction. The bilobed flap, by its double transposition , can redistribute the tension vectors as to prevent distortion of the nasal pyramid. This article addresses the option of nasal reconstruction following skin cancer excision with anatomically adapted bilobed flaps. Special attention is given to discussions regarding the flap execution, from preoperative planning and design to the meticulous technique of suturing. We consider that intraoperative modifications of the standard technique should be a rule in approaching every individual case. The versatile bilobed flap represents a good reconstructive option for nasal reconstruction, being mindful that a well-known flap can be modified in innovative ways to reconstruct a defect.
Keywords: bilobed flap, skin cancer excision, nasal reconstruction.

Introduction

The nasal pyramid is the most common localization of malignant epithelial tumors at the cephalic extremity, the basal cell carcinoma being the most common form of skin cancer [1,2].

The surgical excision of the malignant tumors present at this level within safe oncological limits remains the best therapeutical approach, with significantly lower recurrence rates than other methods. This therapeutic approach is justified also at the level of the embryonal coalescence areas, where it was suggested that their structure provides „the lowest resistance path" in the dynamics of tumor cells, facilitating their subclinical migration both horizontally and in depth [3-6].

Often, nasal reconstruction after tumor excision is a challenge even for an experienced doctor. Although nasal reconstruction is an ancient art, being cited reports of tissue transfer techniques back in the Vedic age (Sushruta Samhita, 1000-600 BC), the progress and innovative approaches of the recent years have allowed obtaining predictable and long term stable functional and aesthetic results. These developments have involved a better understanding of the biomechanics of tissue mobilization in the nasal pyramid, special histological investigative techniques, scar management strategies, advanced surgical instruments.

The nose is the central pillar of the face and the most difficult facial feature to reconstruct. Although simply "filling the hole" is sometimes the best option, rarely is this approach an option for the patient or skillful dermatologic surgeon. The complex anatomy is as difficult to recreate three-dimensionally, as it is to maintain on a long term, as the threat of a scar contracture near the alar margins can shadow the best reconstructive efforts. Fortunately, there are many options in terms of reconstructing a normal appearance and a functionally stable nose.

Among these, the bilobed flap, through its double transposition of the tissues from an area of laxity located away from the primary defect, can prevent distortion of free anatomical alar margins by a broad redistribution of tension vectors.

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This article addresses the option of reconstructing nasal defects with anatomically adapted bilobed flaps. In addition, special attention is given to detailed discussions regarding the execution, from the preoperative planning and design, to meticulous techniques of undermining and suturing.

Relevant anatomy

The nose is a pyramid-shaped anatomical structure which in the proximal part is anchored to rigid bone structures and distally has malleable tissue structures: mucosa, cartilage, muscles, subcutaneous tissue and skin. The tegument fits the subjacent bone and cartilage structures, resulting in a complicated three-dimensional anatomical structure, with concavities and convexities. Thus, the nose has distinct visual areas. Gonzalles-Ulloa was the first to describe the concept of facial aesthetic units [7].

No discussion of skin cover for nasal reconstruction is complete without addressing the concept of nasal aesthetic subunits as proposed by Burget and Menick [8].

In general, aesthetic facial units are skin areas with similar color, texture, porosity and surface [8-10]. The nose is divided into cosmetic subunits, which include the root of the nasal pyramid, the dorsal and lateral sides of the nasal pyramid, the tip, nasal wings, soft triangle and columella. According to this principle, scars are best concealed in the subunit borders, and if more than 50 percent of a subunit is involved, Burget and Menick recommend excision of the entire subunit before reconstruction. Some groups have challenged the merit of the subunit principle. These subunits describe adult Caucasian noses and may not apply to other ages or races [11-13].

Moreover, the resurfacing of an entire subunit by excision of normal tissue is not universally accepted and has been discussed and controversed [12,14,15]. There is no better tissue to replace nasal tissue than nasal tissue.

We believe that local flaps provide the best match for color and texture, and scars within subunits are barely visible if the contours are respected and sometimes adjunctive procedures are used, such as resurfacing by dermabrasion or laser [15].

The subunit principle should not be a rigid rule, but a tool aiding in planning a reconstruction [16]. This principle can be modified to fit the individual needs of the patient.

The bilobed flap

The bilobed flap is a double transposition flap with a common basis, which transposes a cutaneous fragment from an area of skin laxity to cover a defect. When properly designed, flaps harvested from nasal skin have the advantage of color, texture and thickness similar to those of the missing skin of the defect.

The nasal bilobed cutaneous flaps are not sufficient to resurface an entire aesthetic unit of the nose, and the resulting scars do not always fall in the borders between aesthetic units. However, the final contour of the reconstructed nose is more important aesthetically than the number and location of scars. The bilobed flap is the most versatile and useful of the nasal cutaneous flaps for the caudal nose, where the skin is more mobile than in the proximal nose.

Esser was the first who described this flap (1918) for defects of the nasal tip [17]. The original description required a 90-degree arc of tissue transfer for each lobe of the flap, resulting in a total transposition of more than180 degrees. The wide angles between the axes of each flap created standing cutaneous deformities and a trapdoor phenomenon. Mc Gregor and Soutar modified the initial design of the bilobed flap, observing that the arc of tissue transfer would vary between each of the two lobes of the flap.[18] Furthermore, Zitelli (1989), describing his experience in nasal reconstruction with bilobed flaps, recommended narrow angles of tissue transfer, 45 degrees between each lobe, so that the total pivotal movement occurs over no more than 90-110 degrees.[19] This approach has led to the elimination of excess standing cutaneous deformities and the postoperative trapdoor.

Tissue biomechanics of the bilobed flap

The bilobed flap is actually a modified rotation flap with a component of tissue transposition, having more mobility as compared to a simple rotation flap. The first lobe is transposed over the triangular tissue peninsula between the primary defect and the first lobe, like a modified Z-plasty. The same phenomenon happens also when transposing the second lobe on the secondary defect. Thus, the bilobed flap, as a double modified Z-plasty, leads to repositioning of adjacent tissues, with redistribution of tension vectors, preventing distortion of the important free anatomical structures such as nasal ala.

Principles and techniques of execution

We believe that the bilobed flap's design must be anatomically adapted to the area under reconstruction, taking into account basic principles, avoiding the geometric application of a standard template. Non geometrical adjustments are very useful in each particular case.

The key design of the ingenious bilobed flap in order to be successful has to respect the principle of double transposition around the pivot point, with

Figure 1. Frontal view with preoperative planning

Figure 2. The 15-mm x25 mm defect; a medially based bilobed flap is designed, taking care to avoid distorting landmarks of alar margin

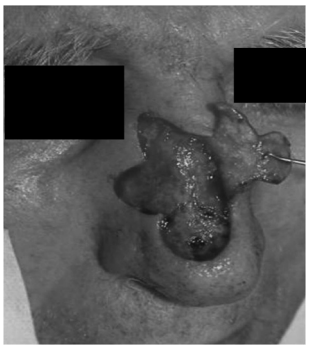

Figure 3. The flap is elevated, with lateral undermining

Figure 4. Transposition without tension

Figure 5. The transposed flap is sutured into place

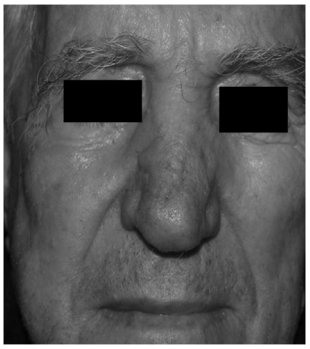

Figure 6. Three years following reconstruction

the end of the primary lobule designed to extend beyond the defect. Another advice is to look after an area of loose skin to permit direct closure of the secondary flap defect, by pinching the skin between the examiner's fingers to find the loosest zone. Unlike the original design described by Esser, the pivotal point exceeds the primary defect area, incorporating the excess tissue to be removed in one of the circular primary defect sides. Because the radius of both lobules of the flap is greater than the primary defect, both lobules have a smaller rotative angle, which distorts less the flap basis [20]. The first lobe may also be adjusted by a 20% diameter reduction which permits decreasing the phenomenon of trapdoor.

The flap is elevated under local anesthesia and dissected above the perichondrium; the flap and the adjacent skin are completely undermined in order to reduce closure tension, to facilitate the transfer, and to reduce the so called trapdoor deformity.

The donor site for the second lobe is closed first by primary approximation, then the first lobe is transposed into the defect. The thickness of the first lobe should be adjusted or trimmed in order to match into the depth of the defect, with careful alignment of the edges by mindful sutures (taking the same bite depth as to align the surface planeity).

The second lobe is then transposed, trimmed as necessary as to fit into the secondary defect. Skin incisions are sutured with 5-0 or 6-0 polypropylene simple interrupted sutures or 4-0 vicryl.

Clinical discussions

Due to the anatomical free margins of nasal ala, the methods of reconstructing defects in the distal nose poses great challenges to the dermatologic surgeon.

From our experience, the bilobed flap finds its utility in reconstructing defects in the distal nasal pyramid, for defects less than 2 cm in dimension, on the central nasal tip or supratip, and on the lateral nasal tip with at least 0.5 cm above the alar margin.

The double transposition, which redirects the tension vectors as not to distort the free margins, represents a good option for a safety reconstruction in terms of an aesthetical and functional result.

The current recommendations are that whenever possible, the flap should be based laterally, but we believe that also medially based bilobed flaps are successful due to the rich vascular supply with a reliable perfusion pressure in the nasal skin.

The flap is also most useful in patients with thin

skin and laxity along the nasal sidewall. Moreover, our opinion is that a correct preoperative planning, nongeometrical, adapted to the anatomical characteristics of the patient, together with a good technique of execution can make the bilobed flap a good option for nasal reconstruction patients, as we illustrate in our case (Fig.1-6).

Intraoperative modifications of the standard technique of the bilobed flap design should be a rule in approaching every individual case. An "ideal" reconstruction following the general guiding rules of a bilobed flap for a certain defect of the nose varies according to the patient's characteristics and the doctor's thinking.

The increasing incidence of cutaneous carcinomas creating the need for nasal defects reconstruction has fueled the interest in and refinement of the methods of nasal reconstruction.

The versatile bilobed flap represents a good reconstructive option for nasal reconstruction, being mindful that a well known flap can be modified in innovative ways to reconstruct a defect.

The best approach is being creative with reconstructing defects, based on experience rather than on classical and rigid textbooks solutions.

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