

Nasal reconstruction with nasolabial flap.

A case report.

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Background

The importance of wounds in the facial region, whether due to tumors, traumatic or genetic causes, in any patient population; children, adults or elderly, is the great cosmetic impact and the great reconstructive ability they represent. For their part, animal bites (dogs or cats) in the facial region continue to be very frequent affectations, which represent a challenge in terms of their successful management. The type of wounds range from superficial wounds to complete avulsions and their predominant location is in protruding regions such as lips, nasal region and auricular pavilions(1).

Keywords: Facial wounds, Nasal reconstruction, Nasolabial flap.

Jalisco, Mexico

Case report

Plastic Surgery



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Avulsed wounds require special management to achieve acceptable esthetics, which can only be achieved with reconstructive procedures using local or regional flaps.

In our case we present a patient with an avulsion wound secondary to a dog bite in the lower nasal region, in whom it was decided to perform a transitional upper nasolabial pedicle nasolabial flap with subsequent successful evolution.

Nasal reconstruction is one of the greatest challenges because it represents the respect to replace each tissue with its best equivalent, facial harmony, the principle of aesthetic subunits and the search for symmetry, make the difference between the reconstructions of higher aesthetic quality, which are practically undetectable, from those that, despite

using the same hangers, are deforming and striking (16).

The selection of repair techniques depends on the topography, loss of substance and depth, whether they are superficial or penetrating. When there is loss of superficial substance in the upper region, the most commonly used flaps are the Marchac frontolabellar rotation flap, the Rohrich dorsal nasal flap and the "islet" advancement flaps. Full-thickness skin grafts are most useful in the lower region, at the tip of the nose, where the Rieger flap, the Zitelli modified bilobed flap, the Rybka musculocutaneous nasal muscle flap are suitable for most cases. In total substance loss of the tip, composite grafts from the root of the helix or earlobe, folded nasolabial flaps and nasolabial or frontal flaps with transitional pedicles have shown good results (18).

It was decided to present this case, given the importance of the correct management of such deforming wounds as dog bite facial wounds, in regions as harmonious as the nasal region, the loss of tissue in the nasal pyramid is very frequent and the reconstruction of this area is a surgical challenge, not only because of the great facial aesthetic impact but also because it is important to maintain functionality, therefore, the importance of a successful choice of reconstructive technique.

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Figure 1. Nasal reconstruction.

Case report

He is a 38-year-old male, with no significant chronic degenerative history, positive for marijuana and cocaine for the past 5 years, in addition to positive smoking at the rate of 5 cigarettes a day. A month ago he was walking down the street when he was attacked by a dog, causing a bite on his face, arm and leg, both right. On physical examination, neurologically intact, muco- integumentary with adequate hydration, head in frontal region with macerated wound in the nose, with total avulsion of the nasal tip and 40% of the nasal ala, in addition to avulsion of the columella and loss of the left alar cartilage (Figure 1A). Car- diopulmonary without alterations. Extremities right upper limb and right lower limb with puncture wound and scratches.

Surgical cleaning of the wound was decided, followed by removal of devitalized material and resection of irregular edges. It was decided to perform a transitional upper nasolabial pedicle nasolabial flap (Figure 1B),

Surgical technique

The marking of the cutaneous island is performed according to the related loss of the nasal tip and nasal ala. **2.** The superior pedicle flap is lifted following the nasolabial fold with a thickness of approximately 3 to 4 mm. Dissection is performed up to the subcutaneous cellular tissue to achieve the rotation of the cutaneous island up to 150 degrees. **4.** Previous re-modeling of the edges of the nasal defect. Cutaneous island is fixed for coverage by non-absorbable monofilament suture. **5.** Primary closure of the donor area is performed following the fold. **6.** Wait 3 to 4 weeks for adaptation of the transitional flap and subsequent independence of the flap. Follow-up at one week post-surgery (Figure 1C), follow-up at two weeks (Figure 1D). Subsequently, the flap is made independent at three weeks (Figure 1E and Figure 1F).

Discussion

Currently, dog bite wounds in the facial region continue to be a common condition. And above all it represents a challenge in terms of its successful management, due to the severity of the injury, the cosmetic result caused by the injury itself and even the surgical management.

It is estimated that one to two million people in the USA are affected by animal bites (dogs or cats), and of these more than 50% are infants and school children. The type of injuries range from superficial wounds to complete avulsions and their predominant location is in protruding regions such as the lips, nasal region and auricular pavilions(1).

Animal bites are always contaminated with bacteria of the human bacterial flora and particularly include *Pasteurella multocida* (2).

There is a classification to determine the depth and severity of animal bite wounds, it is the Lackmann classification (4)

Initial evaluation and treatment

The treatment of bite wounds in the facial region, since 1979 Jones and Shires stated that dog bites in the face should not be treated surgically with primary closure, due to the high risk of wound infection (5). However, this does not hold up to date, since many authors later determined that primary closure of these wounds results in functional and

I.	Superficial lesion without muscle involvement.
II.	Deep injury with muscle involvement.
III	Deep injury with muscle involvement and tissue defect.
IV	<ol style="list-style-type: none"> a. Class III in combination with vascular damage or nerve injury. b. Class III in combination with bone damage or organ involvement.

Table 1. Lackmann classification

esthetic improvement (3, 6, 7), which is the currently adopted conduct.

As well as all trauma injuries, priority is given to any life-threatening condition, according to the Advanced Trauma Life Support (ATLS) guidelines, especially those involving vascular, nerve, tendon or bone injuries.

After the above is ruled out, since all bite wounds are contaminated with the oral flora of the aggressor, initial treatment should include antibiotic prophylaxis, in addition to rabies prophylaxis and tetanus prophylaxis.

Surgical management includes adequate irrigation of the wound, and especially in bites in the facial region, surgical debridement should follow, with resection of macerated or irregular edges, which continues to be the mainstay of treatment in all bite wounds (7,8,9).

In one study, it was identified that primary closure of head and neck bite wounds was associated with infection rates of 5.7% and 4.4% for dogs and cat bites, respectively (10). Even GUY and ZOOK reported an infection rate of 1.4% after primary closure of 145 head and neck dog bite wounds without antibiotic administration (11).

Based on the classification, initial therapeutic management is proposed (3).

1. Stage I lesions can be treated with local anesthesia with or without sedation. most are outpatients.
2. From stage II onwards, we recommend hospitalization. To achieve better esthetic results, primary and definitive surgical management is proposed.
3. Stage III and IV lesions, primary surgical management is recommended, skin grafts, pedicled flaps, microsurgical vascular reconstructions or surgical procedures on the bone should be performed under general anesthesia.

In all cases of major bite lesions, a skull X-ray examination is necessary for accurate staging. Stage III or IV patients should be treated with

prophylactic antibiotics. According to the most frequent pathogens (3)

Amoxicillin with clavulanate is the preferred agent for outpatient management, while the most commonly used intravenous antibiotics are ampicillin-sulbactam (13) recommend antibiotics, especially for avulsion lesions of the ear or nose with cartilage exposure (Type IIIB), whether treated with primary closure or delayed closure (12, 13).

Avulsed wounds (Type III) require special management to achieve acceptable esthetics, which can only be achieved with reconstructive procedures by means of local or regional adhesions (14,15).

Wound reconstruction in the nasal region: Transitional nasolabial foldnasolabial flap.

This is the reason for presenting our case, the cosmetic impact of type III wounds, in which we present the management of an avulsion wound in the nasal region, secondary to a dog bite, it was decided to perform a nasogenian flap of the upper pedicle with subsequent successful evolution.

In order to achieve an adequate quality and esthetic result in the reconstruction of the nose, three basic principles or pillars have been proposed:

The first consists of making an accurate diagnosis of the loss of substance, its topography, extension and depth; the second, which is common to all facial reconstructions, consists of replacing each tissue with its best equivalent, i.e. the one most similar to what has been removed, which will be a local or contiguous tissue; the third principle is to respect the aesthetic units, i.e. the nasal dorsum, nasal walls, nasal wings, soft triangles, nasolabial folds, nasolabial folds, nasolabial folds and nasolabial folds; the third principle is to respect the aesthetic units, i.e. the nasal dorsum, nasal walls, nasal wings, soft triangles, nasolabial folds, nasolabial folds and nasolabial folds. Nasal tip and columella closely relate to a better analysis of the artistic anatomy of the nose (16, 17).

The nose is divided into upper and lower region, the upper part comprises the dorsal medial region of the nose, extending from the glabella to the

nasal tip, as well as the lateral sides of the nose to the medial ridges. The lower region consists of the two nasal wings separated from the tip by the soft triangles, the tip and the columella.

Substance losses of the lower third of the nose, which are usually total, must be repaired by the association of flaps for mucosal lining, skin lining and reconstruction of the cartilaginous support. In some cases, these total losses of substance can be repaired by composite grafts if they only affect the nasal ala, tip or tail (16).

The literatures refer to the importance of the antecedents to determine if a flap will be successful, such as a history of cancer, radiotherapy, but above all within the most unfavorable is smoking. It refers evidence that it is unlikely that a common graft will be successful in a young smoker patient. Quitting smoking completely one month before the intervention could have a satisfactory result for composite grafts, as well as for the survival of axial flaps (16).

Our patient had a history of being a chronic smoker, as well as chronic drug addictions, fortunately there were no complications, so it should not be an exclusion criterion, the evidence indicates that it increases the risk of failure but it is not a decisive factor. Several authors determine that given the aesthetic importance of the nose, tissue necrosis after surgery has scarring effects of greater deformity. The risk is higher in grafts than in flaps, however, there are recommendations to reduce the risk of necrosis, such as an adequate preparation of the receptor bed, an adequate design of the flap, minimizing the tension at the time of closing the wound, performing a meticulous hemostasis, among others (19).

The two nasal regions represent challenges for the plastic surgeon, however the lower region (tip, nasal wings and columella) are of greater complexity, for technique selection as well as for skill and experience.

When there is superficial loss of the substance of the nasal ala, the most recommended grafts are those of the pretragal area, or especially nasogenian, because of their texture, thickness and coloring similar to the nasal ala. However, when the involvement is in the nasal tip, pretragal and nasogenian grafts are suitable, because they are less exposed to dyschromia. It is usual to remove all the fat from the deep aspect of full-thickness skin grafts. However, Hubbard advises to keep 3-4 mm of adipose tissue under the nasolabial grafts, which thus become cutaneous adipose composite grafts (18).

If there is loss of superficial substance of the nasal tip, less than 20 mm, some local flaps allow good quality repairs by similar coloration, thickness and texture, some of these flaps are; the

nasofrontal flaps of Rieger, the dorsal nasal flap of Rohrich, the bilobed flap modified by Zitelli, the "islet" flap of Rybka, the dorsal transposition flap of the nose in "islet" of Texier and the nasogenian transposition flap of Préaux (16).

On the other hand, if there is loss of deep or penetrating substance, such as the one presented by our patient, the literature recommends transient pedicle flaps, the one performed in our patient is the transient superior pedicle nasolabial flap, for which Burget proposes, if there is loss of more than 50% of the nasal ala (20):

1. A shell or septum cartilage graft 25 mm long by 7 mm high and 1 mm thick, plus sculpting of the edges to obtain the curvature of a nasal ala.
2. The two ends of the flap are buried under the recipient tissues on both sides of the loss of substance, and its central portion is sutured to the endonasal lining.
3. Subsequently, the nasolabial "islet" flap with superior subcutaneous pedicle is traced and raised.
4. After locating the nasolabial fold, the pattern will orient the tracing of the flap to above the fold, adding 1 mm to all its dimensions.
5. The distal end of the flap is lifted and mobilization is continued to allow the 150° transposition, useful to reach the nose.
6. The distal part of the flap is partially cleaned of fat and the flap is sutured to the nasal tip with loose stitches.

The pedicle is sectioned at day 21. The residual skin of the nasal ala at the nasal base and at the threshold of the nares is replaced by the proximal portion of the flap (16).

From the cases reported in the literature, regarding the reconstruction of the nose secondary to trauma or any other cause, whether tumor or genetic, in our patient, it can be concluded that the expectations were met in terms of: aesthetic quality and functionality, a technique was performed in order to achieve harmony, symmetry and configuration of the nasal ala reconstructed with respect to the contralateral one. However, it is not free of complications such as keloid or hypertrophic scars, especially due to the important history of chronic smoking. Transitional pedicle flaps are a good option when we face nasal reconstructions due to severe trauma.

Conflicts of interests

The authors have no conflicts of interest to declare.

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