Chapter 121

Reconstruction Of Lower Lip Avulsion Due To A Human Bite: A Case Report

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ABSTRACT
Lips constitute a fundamental role in facial apparatus as they are responsible for ensuring functional movements besides contributing for phonation, deglutition or swallowing, oral sealing and aesthetics. Lips have a complex anatomy, constituted mainly by the circular muscle of the mouth, besides epithelial layers and mucosa. Avulsions associated with these structures represent real challenges concerning reconstruction complexity and high-risk necrosis. Under this perspective it is fundamental that the planning is efficient in order to provide function and aesthetic back to the patient. Therefore, the current case aims at reporting lower lip reconstruction due to traumatic avulsion as a consequence of human bite in female patients. The initial approach involved a repositioning and fixing of the fragment with suture. However, that attempt failed, which ended up in necrosis of the avulsed stump. As a result, the therapeutic approach was carried on with necrosectomy and labial reconstruction by using axial peninsular composite flaps made by using advancement technique. The one-year post-surgery follow-up presented appropriate aspects, with efficient lip sealing, functional return, absence of necrosis, and guaranteed satisfactory result to the patient.

Keywords: Maxillofacial injuries, Bites, Human, Lip.

1 INTRODUCTION

The labial anatomical structure is essentially made up of epithelial, muscular and mucous layers, the orbicular muscle of the mouth being the main component. In addition, it is made up of branches of the facial nerve, responsible for motor innervation, the trigeminal nerve, responsible for sensory innervation, and the superior and inferior labial arterial and venous branches, responsible for blood irrigation and drainage[1] .

The lips play an important operational role, as they participate in various functional movements, such as phonation, swallowing, facial expression, oral sealing, and aesthetics[1,2] . Thus, considering that facial injuries are a frequent occurrence in urgency and emergency services around the world, the importance of functional and aesthetic impairment, which can generate large facial deformities, is considerable, which generates negative impacts from the psychological point of view[1-3] .

Lip defects can be classified into two categories, being congenital or acquired. Congenital defects can be secondary to deformities such as cleft lip or harmatomas, while the acquired defect is related to tumor excision or traumatic episodes[1,4] . These defects can also be partial thickness, which involves mucosa or skin, or full thickness, which involves skin, muscle and mucosa .[1]

Another classification refers to the type of flap, which can be associated with the vascular pattern, composition, and transfer mechanism. The vascular pattern, which refers to the form of arterial nutrition, can be: a) randomized flap, in which there is no main axis of vascularization; b) axial flap, in which there is a main artery known as the source of irrigation, and can also be subclassified into peninsular (base with skin) and island (base without skin) or c) free flap, in which the vascular bundle is microsurgical, being anastomosed in a receptor vascular bundle. As for the composition, it can be: a) compound, in which more than one anatomical structure is transferred, or b) simple, when only one structure is transported. Finally, as to the transfer mechanism, it can be by advancement, rotation, transposition and interpolation[5-7] .

The types of facial injuries in soft tissue can also be categorized. These are: abrasive, when removal of the skin's most superficial layer occurs, with surface irregularities and poorly defined margins; punctiform, when they occur as a result of perforating or sharp trauma; sharp, when they result from the sliding of a sharp surface in the tissues; contuse, which presents irregular limits and are produced by pressure, traction, or dragging forces; and perforating-contusive, which encompasses trauma through instruments that perforate and bruise simultaneously[8] .

Bites are considered complex and potentially contaminated injuries due to the polymicrobiota involved. Thus, they present an important predisposition to infection. Therefore, it requires that the management be defined with agility in order to debride the traumatic wound and initiate antibiotic therapy to solve this complication[3] . Other points to be considered for the good management of the condition include the time between the trauma and the approach, which should not exceed eight hours, the vascularization of the affected site, the presence of contaminants, pre-existing diseases such as diabetes and malnutrition, and the nature of the aggressor[9] . All these issues must be evaluated at the time of anamnesis and physical examination, since the conduct to be performed and the prognosis of the treatment depend on them.

In situations of traumatic lip avulsion, reimplantation, when possible, is the best option to reestablish form and function. However, the vascularization of the lips is composed of small caliber arteries and veins, making blood flow a worrisome factor in reimplantation[2] . When reimplantation is unsuccessful, another therapeutic proposal involves labioplasty by means of flap advancement, especially in cases where tissue loss occurs[10] .

Thus, this paper aims to report a case of human bite with significant avulsion of the lower lip, as well as its tissue reconstruction process for functional and aesthetic return.

2 CASE REPORT

A 32-year-old melanodermic patient, R.S.B., victim of a human bite, presented approximately two hours after the event to the emergency room of the Oral and Maxillofacial Surgery service due to traumatic avulsion of the lower lip.

The whitish extracted specimen, indicating ischemia, was presented by the patient in a container containing ice. It was then removed and immediately packed in 0.9% saline solution (Figure 1).

The patient was anesthetized using a local infiltrative technique with 2% lidocaine solution with 1:200000 epinephrine, and the wound was cleaned and debrided copiously with 0.9% saline and subsequently with 2% aqueous chlorhexidine, which totaled 10 minutes. Then, the avulsed labial stump was repositioned and stabilized by sutures with 4-0 polyglycolic acid in muscle and mucosa layer and 5.0 nylon in skin (Figure 2a and 2b).

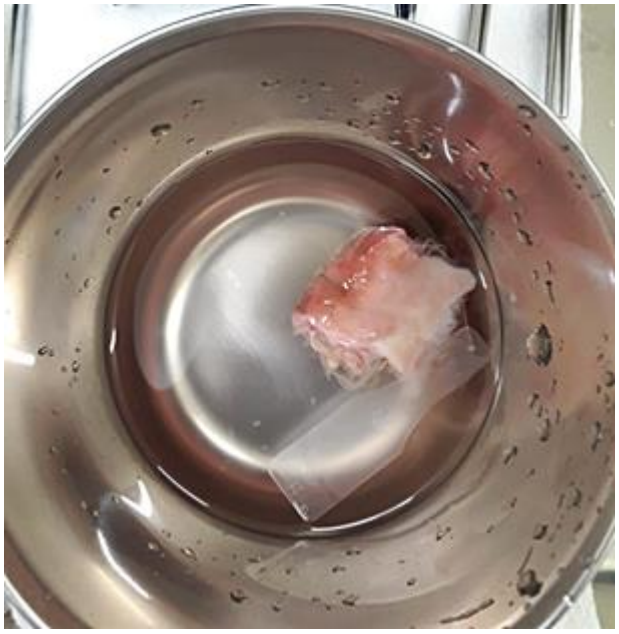

FIGURE 1. Inferior labial stump avulsed by human bite.

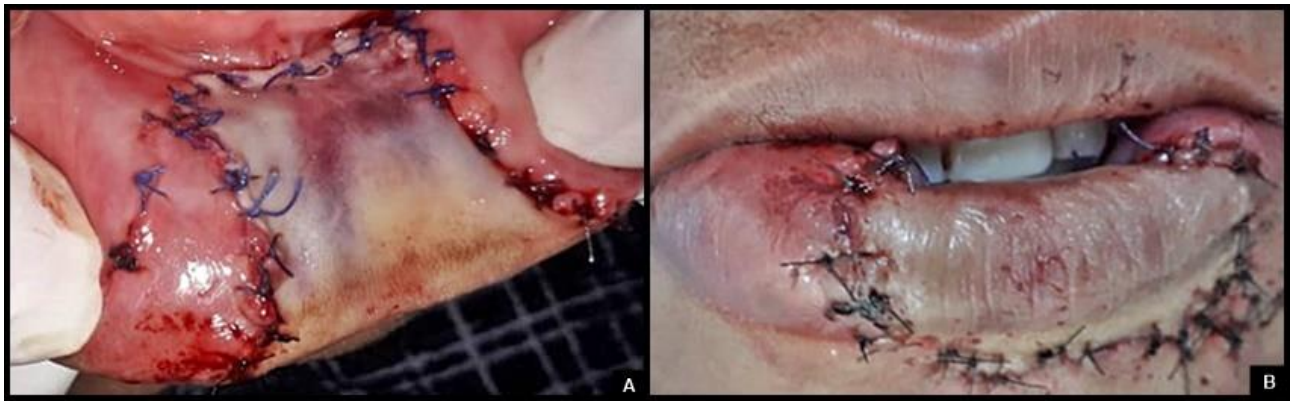

Figure 2. a) Intraoral labial aspect after repositioning and stabilization with 4-0 polyglycolic acid. b) Extraoral labial aspect after repositioning and stabilization with 4-0 polyglycolic acid, in mucosa and orbicular muscle, and 5.0 nylon in skin and vermilion.

After local care, we evolved with orientations to the patient about postoperative care, such as local hygienization, care with sun exposure and feeding. The postoperative prescription included amoxicillin

875mg and clavulanate 125mg, nimesulide 100mg and paracetamol 500mg associated with codeine 30mg. Finally, for continued local care, we prescribed intra-oral chlorhexidine gel, hydrogel with alginate and collagenase 0.6U/g extra-oral. Immunization was ensured by injecting anti-rabies and anti-tetanus boosters according to the Ministry of Health's health surveillance guide .[11]

Initially, the case was followed up every other day. However, the case did not evolve satisfactorily, leading to necrosis and infection with drainage of purulent secretion on the 6th day of follow-up, requiring a new approach for repair.

To perform the repair, anesthetic technique was used to block the bilateral mental nerve with lidocaine and vasoconstrictor and then the sutures were removed and the necrotic tissue excised. The reconstruction process was planned to perform a peninsular axial composite flap using the advancement technique (Figures 4a, 4b, 4c and 4d), considering the significant loss of tissue substance in the lip.

Initially, delimitations were made respecting the disposition of the mentonian muscle fibers and an axial peninsular composite flap was performed using the advancement technique, providing linear and quadrangular characteristics to the defect, which favors the alignment of the orbicularis oris muscle and mucocutaneous junction. The flap advancement was maintained by intraoral sutures with 4-0 polyglycolic acid in the orbicular muscle of the mouth and labial mucosa, and 5-0 nylon in the skin tissue (Figure 4e and 4f).

Figure 4. a) Inferior lip presenting necrosis, associated with infection and drainage of purulent secretion. b) Labial mucosa presenting necrotic aspects and sutures of the first approach out of position. c) Labial site after debridement. d) Traumatized labial remnant. e) Repositioning flap and sutures with 5-0 nylon + sutures with polyglycolic acid in labial mucosa. f) Intraoral sutures with 4-0 polyglycolic acid.

After the surgical procedure, the patient was oriented regarding local care, such as feeding, local hygienization, precaution with sun exposure, and systemic care. The home prescription included amoxicillin 875mg + clavulanate 125mg and dipyrone 1g, besides extra-oral silver sulfadiazine and chlorhexidine 0.2% intra-oral gel. Laser therapy sessions were also requested, but the patient was unable to have them due to unavailability of the service in her home town.

The follow-up followed weekly, when we observed evolution with good healing aspect, absence of inflammatory, infectious signs or suggestive of tissue necrosis, normal coloring, patient satisfaction, being concluded with sixty days postoperatively. On her return visit, approximately one month after surgery, the beginning of the keloid formation process was noted (Figure 5). After being questioned about her scarring history, the patient reported the presence of other similar scars on her body.

Figure 5: Postoperative 60 days.

In a one-year postoperative evaluation, despite the keloid, the patient was satisfied with the reconstruction. She stated that she was being followed up by a dermatology team, which, in order to eradicate the scar, proposed a non-surgical treatment using corticoid infiltrations. The patient has had three sessions so far, which resulted in scar reduction (Figure 6).

Figure 6. Postoperative 365 days.

3 DISCUSSION

Facial trauma can present a challenging surgical reconstruction, especially in cases of avulsion, since the main objectives are the functional and, when possible, aesthetic restoration[3,12] . In the case presented in this article, the challenge lay precisely in planning the best flap, considering the importance of tissue loss in an anatomical structure that has an extremely important function in the masticatory process. Failure in functional reestablishment could generate serious problems in relation to the patient's nutrition, which did not occur, since the result achieved reflected the efforts in search of the best reconstructive surgical treatment, successfully restoring the function of the lower lip and its aesthetics.

In the scenario of Oral and Maxillofacial Surgery and Traumatology, bites usually result from animal attacks, especially in children, while human bites are usually self-inflicted in falls or epilepsy conditions,

presenting the lips, nose and ear as the most involved sites[13] . A study carried out in hospitals in an African country evaluated the frequency of human lip bites in a 5-year period. The sample consisted of 28 patients, 22 women and 6 men with a mean age of 32 years ranging from 16 to 61 years. All cases were inflicted by women, in fights in drinking establishments, workplaces, and neighborhoods. The lower lip was the most affected structure with tissue loss in 23 cases[14] . These studies corroborate the frequency found in our Oral and Maxillofacial Surgery and Traumatology service, being illustrated by the case presented, which occurred in the lower lip in a female patient through her relationship partner.

Another African study evaluated 11 cases of human bite, showing a predominance in young adults, involving marital fights or drinking places[13] , being similar to what was exposed by Aloua[3] about human bites having a predominance associated with males and aggression associated with alcoholism[3] . The epidemiological results shown here are also in line with those presented in these studies.

The lower lip has a single subunit, whereas the upper lip consists of lateral nasolabial units and a central philtral subunit, which makes its reconstruction more complex and challenging. These are structures that constitute the largest part of the lower third of the face and, consequently, have an important function in lip competence, facial mimicry and appearance, which makes the preservation of the orbicularis oris muscle of the mouth a key objective in reconstructions[1,10, 14] .

The surgical technique must be planned according to the type of lip defect. This is a fundamental point to ensure the preservation of the buccal sphincter and avoid labial contraction with disorientation of the muscle fibers. When considering the level of resection of skin, muscle and mucosa, this can be less than 1/3, 1/3 to 2/3, or more than 2/3 of total involvement, the latter as shown in this study[1,2] . In defects involving skin, primary closure is the first choice, and is indicated for impairments of up to 40% in the upper lip and up to 50% in the lower lip or approximately three centimeters[15] . Mucosal defects can be addressed through primary closure when it is small enough not to cause lip distortion. Lower lip defects heal with little contracture[12] . Thus, the case reported here does not meet the parameters that justify reconstruction by primary closure alone, since more than 50% of the lip was avulsed in the trauma.

The literature encompasses several reconstructive procedures that can be considered based on the limitation of the defect, necessary flap and labial remnant. Among them are the primary closure, Abbey flap, Abbey Estlander flap, Bernard Webster flap, Karapandzic flap and advancement flap[1] , which was the one proposed in this case since this technique allowed a better relation between closure and postsurgical aesthetics.

One study involved the search for lip reconstructions over a ten-year period, involving 76 men and 13 women, whose main etiology was tumor resection, in which the technique used was consistent with the size of the anatomical defect. Thus, in lesions that affected less than 1/3 of the total size of the lip, the therapeutic options involved primary closure, Abbe Estlander flap and Abbe flap, obtaining hypertrophic scar in 5 patients and partial necrosis in 1 patient[1] . When tissue loss involved from 1/3 to 2/3, the most used techniques were Karapenzic flap, Bernard Webster flap and peri-alar crescent flap, with partial

necrosis in 3 patients and total necrosis in 1 patient. In addition, in situations of traumatic lip avulsion, reimplantation, when possible, is the best option to reestablish form and function, and the blood supply and muscle tension after reconstruction should be carefully observed. However, the flow in this region may not be sufficient to maintain vitality, since it is composed of small caliber blood vessels[2] . This premise agrees with the follow-up of the aforementioned case, considering that reimplantation was performed and evolved unsatisfactorily due to necrosis.

The use of prophylactic antibiotics in cases of bite is controversial, because the face is highly vascularized, which relatively reduces the risk of infection[2] . Even so, it is necessary to weigh this possibility and use antibiotics early[2,3] , which was the therapy chosen to conduct the case presented here.

In infected wounds, antibiotic therapy depends on the severity of the infection, and most soft tissue infections do not exceed 10 - 14 days, and have as first line amoxicillin 875mg + potassium clavulanate 125mg every 12 hours and/or metronidazole 500mg every 8 hours for approximately 07 days. There is still debate about the need for the initial dose to be administered parenterally to achieve adequate tissue levels[3] . Management is initiated with adequate lavage, surgical debridement, and antibiotic coverage. There is consensus on antitetanic prophylaxis for all, as opposed to antibiotic use.[3] The case reported here involved a reimplantation that evolved to a necrotic process associated with active drainage of purulent secretion. Thus, the drug and immunization therapy was consistent with the suggested protocol based on the use of amoxicillin 875mg + potassium clavulanate 125mg and antitetanic prophylaxis.

Another recommendation is the use of ointments, which help to reduce the formation of crusts by keeping the wound moist, besides favoring re-epithelialization. Antibiotic substances should be applied in the first 07 days, followed by ointments without antibiotics. Systemic antimicrobials are not indicated for simple wounds that can be irrigated and debrided efficiently and are reserved for cases with irregular edges, high contamination, presence of foreign bodies, immunocompromised patients or high risk of adverse reactions[2] . In the present case, topical treatment was carried out using silver sulfadiazine, alginate hydrogel and collagenase with the aim of maintaining a local antimicrobial effect and contributing to the healing process. In association with the ointments, the use of sunscreen was recommended to avoid pigmentary alterations, in addition to laser therapy as postoperative care, agreeing with what was previously exposed .[2]

A postoperative characteristic observed was the formation of keloids, which can be considered an abnormal fibroproliferative response, where the scar tissue grows excessively, reaching areas beyond the original borders[15,16] . Therefore, keloids have inciting stimuli such as dermal injury, environmental factors in a location that is prone to this condition, such as inflammatory process, and finally topological factors in patients who are genetically predisposed. The last mentioned factor may be complemented by the fact that the risk of developing this scar is directly proportional to the increase in pigmentation, making the black population, in which the patient of the present study fits, with the highest incidence of this condition[15] .

4 CONCLUSION

Lip reconstruction requires careful planning in order to obtain satisfactory functional and aesthetic results. For this, understanding and expertise of the labial anatomical particularities and planning is fundamental. The management must be adapted to the type of defect in order to reduce complications and achieve better results, as well as the use of antibiotics, antitetanic prophylaxis, and local care such as hygiene and little sun exposure. The case reported here demonstrates the advancement technique as a reconstructive option in cases of partial lip avulsion, as it ensures the maintenance of lip competence and the return of quality of life.

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