

## Microsurgically aided upper lip replantation – case report and literature review

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### ABSTRACT

A case with a patient who suffered an upper lip amputation and a lower lip laceration due to dog bite is presented. The amputated segment was replanted using microsurgical technique. The operative technique and postoperative care is presented, as well as a review of the current literature on the subject.

### ARTICLE HISTORY

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### KEYWORDS

Lip amputation; lip replantation; microsurgery

### Introduction

Lip trauma is common due to the exposed position in the face. This exposition also makes scars and deformities clearly visible when looked upon; hence, a meticulous repair of lip injuries is important for the cosmetic outcome. Lip amputations, however, are rare and swift management with microsurgical approach is essential for a good cosmetic and functional outcome. We present a case of lip amputation due to dog bite and a review of the literature.

### Methods

A Medline/PubMed search was performed for all scientific English literature involving lip amputation and replantation using microsurgery. The keywords used were “lip amputation,” “lip avulsion,” “lip replantation,” and “lip reimplantation.”

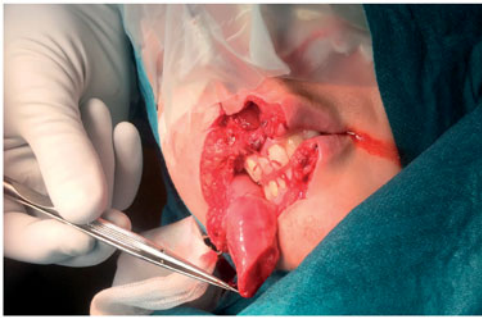
### Case report

A 28-year-old woman presented at an emergency department on a weekend night at a rural hospital following dog bites sustained to her lips. There were two bites, one that lacerated the lower lip that was still connected to the face by a small, lateral pedicle and one that amputated more than half of the upper lip. The defect crossed the philtrum medially and extended laterally to the nasolabial fold (Figure 1).

No other injuries were afflicted to the patient. The patient was referred to the Sahlgrenska University Hospital and arrived at the Department of Plastic Surgery 90 min after the trauma. The amputate, measuring  $4.5 \times 3$  cm, had been kept in a hypothermic state (Figure 2). Emergency replantation surgery was initiated. Peroperatively, a 1 mm superior labial artery was identified laterally on the amputate and was microsurgically anastomosed to the proximal stump of the superior labial artery using 10–0S and T sutures. The ischemia time was approximately 4 h and 45 min. Even after reperfusion, no veins suitable for anastomosis could be identified. One nerve was identified, but it was too damaged to repair. The lip was sutured in three layers: the mucosa, the orbicularis oris muscle, and finally, the skin, which was loosely sutured to allow bleeding and lessen the risk of hematoma. The lip rapidly turned blue as a sign of venous congestion. A leech (*Hirudo medicinalis*) was applied to the lip in order to achieve venous drainage and it immediately regained adequate skin color and became less swollen (Figure 3). The lower lip was also sutured in three layers and was adequately vascularized through the right inferior labial artery during the whole procedure. During first night, leeches were applied every 45 min, and thereafter, the interval was extended, guided by the color of the lip; day 2 every 90 min, day 3–5 every 2 h, day 6–10 every 3 h, day 11–12 every 4 h. On the 13th day, the lip did not need leech therapy and the

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**Figure 1.** Preoperative picture showing the defect in the upper lip and the large laceration of the lower lip.



**Figure 2.** The amputated part of the upper lip, measuring  $4.5 \times 3$  cm, was kept in a hypothermic state.



**Figure 3.** Shortly after the lip was reapproximated, venous congestion occurred. A leech was immediately applied and the lip regained normal color.

patient could be discharged on day 14. Anticoagulant therapy was provided using subcutaneous injection of dalteparin 5000 U/day for 14 days. The constant bleeding from the lip during leech therapy necessitated several blood transfusions to a total of seven units.

Broad spectrum antibiotics (meropenem 0.5g three times daily) was used for 10 days in order to prevent



**Figure 4.** The patient at one year follow-up. The lip still has a slight edema, which is slowly subsiding.

infections from bacteria associated with dog bites and bacteria of the leeches normal flora (e.g. *Aeromonas hydrophila*).[1]

Nutrition was achieved by clinifeeding tube during the first three days but was converted to parenteral nutrition due to severe nausea and vomiting. On the 8th day, the patient could ingest sufficient amounts per oral route.

The patient received a tracheostomy preoperatively in order to secure the airway due to face swelling and the continuous bleeding from the lip which to some extent went into the mouth and throat.

After discharge, the follow-up was uneventful. At one-year follow-up, the patient had good oral continence, good lip motion, no problems with articulation, but the sensitivity for heat/cold and pin prick was still poor (Figure 4). The lip still has a slight edema, which is slowly subsiding.

## Discussion

Lip amputation is rare but has severe consequences both functionally and esthetically if it cannot be primarily reconstructed with the use of the amputated tissue. It is therefore important to quickly provide the means for a microsurgical repair. Smaller segments ( $\leq 1.5$  cm) can, in an elective setting, survive as composite grafts.[2] However, in a traumatic setting, especially with larger segments, the chance for the survival of a composite graft is small [3] and highly unpredictable and can therefore not be recommended.

In the literature search, 32 cases were found in English literature [4–21], 16 case reports and two case series of microsurgically treated amputated lips (Table 1). Even after the artery has been anastomosed and the lip amputate revascularized, the search for a

**Table 1.** Lip replantation cases reported in English literature ( $n = 32$ ).

CASE	Localization:	Type of trauma	Size of amputate	Ischemia time	Arterial anastomosis	Venous anastomosis	Leeches, time	Necrosis	Anticoagulants
1 <sup>4</sup>	Upper lip + part of nose	Dog bite	15 cm <sup>2</sup>	3.5 h	One	One	No	Partial	Aspirin, dextran, heparin
2 <sup>5</sup>	Upper lip	Industrial accident	Not reported	5.5 h	One	One artery to vein	Yes, 10 days	None	Not reported
3 <sup>6</sup>	Lower lip + part of chin	Horse bite	Not reported	>8 h	One	One	No	None	Aspirin, dextran
4 <sup>7</sup>	Upper lip	Motor vehicle accident	Not reported	Not reported	One	None	Yes, not reported	None	Heparin
5 <sup>8</sup>	Upper lip	Dog bite	Not reported	6 h	Two	None	Yes, day 2–12	None	Heparin
6 <sup>9</sup>	Lower lip	Human bite	9 cm <sup>2</sup>	8 h	One	One artery to vein	No, intra-replant heparin 9 days	None	Aspirin, dextran, heparin
7 <sup>10</sup>	Upper lip	Dog bite	10 cm <sup>2</sup>	17 h	One	One	Yes, day 2–8	None	Not reported
8 <sup>11</sup>	Upper lip	Dog bite	16,5 cm <sup>2</sup>	>6 h	One	One	No, mechanical pricking + topical heparin	Partial	Aspirin, heparin
9a <sup>12</sup>	Upper lip	Dog bite	Not reported	Not reported	One	Two	Yes, 1 day	None	Heparin
9b <sup>12</sup>	Upper lip	Dog bite	12 cm <sup>2</sup>	Not reported	One	None	Yes, 5 days	None	Heparin
9c <sup>12</sup>	Lower lip	Dog bite	8 cm <sup>2</sup>	Not reported	One	None	Yes, 7 days	None	Heparin, dextran
9d <sup>12</sup>	Upper lip	Dog bite	12,5 cm <sup>2</sup>	Not reported	One	None	Yes, 6 days	None	None
9e <sup>12</sup>	Upper lip	Dog bite	8 cm <sup>2</sup>	Not reported	Two	One	Yes, 7 days	None	Heparin, dextran
9f <sup>12</sup>	Lower lip	Dog bite	12 cm <sup>2</sup>	Not reported	One	None	Yes, 4 days	None	Aspirin, heparin
9g <sup>12</sup>	Upper lip	Dog bite	7,5 cm <sup>2</sup>	Not reported	One	Two	Yes, 7 days	None	Aspirin, dextran, heparin
9h <sup>12</sup>	Upper lip	Dog bite	36 cm <sup>2</sup>	Not reported	One	None	Yes, 6 days + topical heparin	None	Dextran
9i <sup>12</sup>	Lower lip	Human bite	12 cm <sup>2</sup>	Not reported	One	One	Yes, 8 days + topical heparin	None	Aspirin, dextran
9j <sup>12</sup>	Upper lip	Dog bite	3 cm <sup>2</sup>	Not reported	One	None	Yes, 1 day	Partial	Heparin
9k <sup>12</sup>	Upper lip	Dog bite	6 cm <sup>2</sup>	Not reported	One	One	No	None	Heparin, dextran, coumadin
9l <sup>12</sup>	Upper lip	Dog bite	6 cm <sup>2</sup>	Not reported	One	None	Yes, 8 days	None	Heparin, dextran
9m <sup>12</sup>	Lower lip	Human bite	10 cm <sup>2</sup>	Not reported	One	None	No	None	Aspirin, heparin
10 <sup>13</sup>	Lower lip	Human bite	7,5 cm <sup>2</sup>	>12 h	One, with vein graft	None	No, mechanical pricking + intrareplant heparin 7 days	None	Aspirin, dextran, heparin
11a <sup>14</sup>	Lower lip	Dog bite	Not reported	Not reported	One	None	Yes, 6 days	None	Not reported
11b <sup>14</sup>	Upper lip	Dog bite	Not reported	Not reported	One	None	Yes, 6 days	None	Not reported
11c <sup>14</sup>	Upper lip	Knife attack	Not reported	Not reported	One, with vein graft	None	Yes, 6 days	Partial	Not reported
12 <sup>15</sup>	Upper lip	Dog bite	Not reported	>7 h	One	None	Yes, 7 days	None	Not reported
13 <sup>16</sup>	Upper lip	Dog bite	7,5 cm <sup>2</sup>	6 h	One	None	Yes, 12 days	None	Aspirin, heparin
14 <sup>17</sup>	Lower lip	Human bite	Not reported	Not reported	Two	None	Yes, 8 days	Partial	Aspirin, heparin
15 <sup>18</sup>	Upper lip + lower lip + nose	Bicycle accident	Not reported	Not reported	Two, with vein grafts	Two, one with vein graft	No	None	Heparin
16 <sup>19</sup>	Upper lip + lower lip	Dog bite	Not reported	4 h	One	One	Yes, not reported	None	Not reported
17 <sup>20</sup>	Upper lip + cheek	Dog bite	Not reported	9 h	One	None	Yes, 5 days	Partial	Not reported
18 <sup>21</sup>	Upper lip + nose	Dog bite	21 cm <sup>2</sup>	3 h	One	Three	No	None	Not reported

1–8, 10 and 12–18 being case reports, 9a–m and 11a–c being case series.

suitable vein can be difficult. In the lips, the veins are usually small, and since the trauma mechanism in 84% of the cases were some sort of bite, the chance to find a good-size anastomosable vein is small. If, however, a vein anastomosis can be accomplished, the resulting outflow is often insufficient. In the 15 cases with venous anastomosis, some sort of method to relieve venous congestion was still needed in 60% of the cases (Table 1). This can be achieved in several ways; medicinal leeches, mechanical pricking with topical heparin or intra-replant heparin.[4–21] Without venous anastomosis, it is essential to use some sort of venous drainage for the replanted segment to survive. Therefore, it is good a good idea to be prepared to use an additional method to relieve venous congestion, even when a successful venous anastomosis is accomplished. In the cases where no venous anastomosis

was possible, the average duration for the relief of venous congestion was 6.6 days (range 1–12 days). This is in accordance with neoangiogenesis creating functional veins 4–6 days postreplantation.[22,23] In the presented case, we used medicinal leeches, which can be hard to accept for the patient, even though the patient tolerated it well in this case. The usage of leeches also involves significant blood loss which requires blood transfusions. In this case, the patient had a total of seven units of blood, which is within the normal limit in when using leeches for 12 days. There is a risk of infection but with the use of proper prophylactic antibiotic, the risk can be decreased. Even if the time lapse from trauma to repair is long, a successful lip replantation has been managed after as long as 17 h of ischemia.[9] Thus, even if the primary contact is at a rural hospital where microsurgery is not

available, it is well motivated to send the patient to a secondary hospital with experience in microsurgical technique, provided that the amputate is handled correctly and put in a hypothermic state.

About 19% ( $n = 6$ ) of the 32 cases got partial necrosis, none had total necrosis.

There is no international consensus on what type of anticoagulant/s or prophylactic antibiotics to use in this type of cases. Heparin, dextran, and aspirin were the most commonly used substances in these 32 cases, either alone or in combinations.

### Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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