Partial salvage of avulsed tissue after dog bite

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ABSTRACT

Injuries to the nose can be severe from both a functional and cosmetic perspective. After suffering a dog bite to the central part of the face, an 18-year-old woman underwent replantation of the avulsed tissue with the help of microsurgical arterial anastomosis. A venous anastomosis was impossible and venous congestion was treated with leech therapy. Subsequent skin necrosis occurred after a few days and the replantation was revised, revealing healthy tissue immediately below. The defect was covered with a full-thickness skin graft. At follow-up review eight months later, the functional and cosmetic result was satisfactory. To our knowledge, this is one of few cases where an injury of this severity healed with a cosmetically acceptable result.

KEYWORDS

Nose injuries – Amputation – Trauma surgery – Replantation

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Animal bites, especially dog bites, are a common cause of emergency room visits. In Denmark, these account for approximately 7,500 emergency room visits per year.¹ Although many of the scientific publications focus on the infectious pathology of animal bites, this case report addresses the injury itself and the reconstruction. It highlights the importance of a plastic and microsurgical on-call service, and illustrates that even large pieces of avulsed tissue can be replanted if necessary precautions are taken.

Case history

An 18-year-old otherwise healthy woman was attacked by a family dog and suffered a bite to the central part of the face (Fig 1). The avulsed tissue was conserved in a plastic

Figure 1 The injury on arrival at the trauma centre

Figure 2 Avulsed tissue

bag within another plastic bag with iced water. It consisted of the nose tip, the entire left ala, half of the right ala and approximately 3cm of the upper lip including the philtrum (Fig 2). The tissue contained a combination of skin, muscle, mucosa and nasal cartilage.

The avulsed tissue was deemed appropriate for replantation and an artery was anastomosed to the left superior labial artery. However, three initial attempts resulted in no blood flow. Only after a wrist vein was used for a vein graft was a satisfactory (albeit not optimal) blood supply achieved (Fig 3). The patient was admitted to the intensive care unit, and remained intubated and sedated for just over 24 hours. Owing to inadequate venous outflow, leeches were employed. The patient received epoprostenol 4ng/kg/min for 24 hours and daily injections of tinzaparin 3,500iu to maximise anticoagulation. Ciprofloxacin, metronidazole and benzylpenicillin were administered as infection prophylaxis.

Over the following hours after admission to the intensive care unit, the leeches began to lose interest in the flap, which also became pale as a sign of devascularisation. On day 4 after the trauma, the flap grew increasingly darker. Nevertheless, a conservative approach was taken and after ten days, the patient was discharged while awaiting demarcation of the flap (Fig 4).

One month later, the flap was deemed to be non-vital, with dry necrosis of the skin (Fig 5). Expecting a large defect and reconstruction with both an Abbe flap and forehead flap, the patient underwent surgical debridement and

Figure 4 Early demarcation

Figure 3 After replantation

Figure 5 Skin necrosis

Figure 6 After removal of superficial skin necrosis

although the skin was clearly not viable, healthy tissue was surprisingly found immediately underneath (Fig 6). The avulsed tissue could therefore be characterised as a composite graft without skin. After transposing the orbicularis muscle to give the lip some central 'fullness', the defect was covered with a full-thickness postauricular skin graft (Fig 7). The skin graft took 100% and follow-up review has shown an acceptable cosmetic result (Fig 8) but further surgery might be indicated to optimise the result.

Discussion

Leonardo Fioravanti described replantation of an amputated nose as a composite graft as early as the mid 1500s but owing to the relative rarity of the condition, common guidelines have not been published.² Flores *et al* showed a similar successful result when replanting the left part of a nose after a dog bite.³ The same approach was used with debridement under loupe magnification, arterial anastomosis only and leech therapy.

In our case, the venous anastomosis was considered impossible although this is an important factor in successful replantation of amputated tissue. We supported the venous outflow by applying leeches.

The use of leeches and pinpricks to relieve venous congestion was described by Kayıkçıoğlu *et al* after replantation of an amputated nose and microsurgical arterial anastomosis.⁴ An acceptable cosmetic result was achieved without further operations.

Figure 7 Full-thickness skin graft

Figure 8 Eight months after the injury

Our case was complicated by the fact that the amputated tissue consisted of both parts of the nose, the philtral area and lip. DeLeon *et al* presented a case where a six-year-old child underwent microsurgical replantation of a portion of the upper and lower lip.⁵ Arterial and venous anastomosis was successful but here too, venous congestion appeared despite the venous anastomosis.

With regard to replantation of an amputated nose, the literature indicates that this should always be attempted as secondary reconstruction is difficult, and the cosmetic and functional results are not consistently good.⁶ Our case report also highlights the necessity of 24-hour access to plastic and microsurgery in trauma.

Conclusions

In our patient, partial salvage of the avulsed tissue was achieved even though a stable patent vascular anastomosis was not achieved. We believe that debridement under microscope and a thoroughly performed suturing technique made a crucial difference in treating this difficult case.

The replanted tissue healed in a somewhat similar manner to a composite graft and despite skin necrosis, viable tissue underneath was a good base for a full-thickness skin graft. Should the skin necrosis have revealed non-viable tissue underneath, the patient would have required a forehead and Abbe flap.

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