

CASE REPORT

# Utility of human amniotic membrane allograft in re-epithelialization of the nasal tip

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## Abstract

Variations in skin thickness and contours pose significant challenges to reconstruction of the lower third of the nose. Human amniotic membrane allograft offers a potential alternative to tissue transfer in reconstruction of the lower third of the nose. We reviewed the procedure and photographs of a healthy 56-year-old male with a 22 × 18 mm lower third nasal defect involving full thickness skin and subcutaneous tissue. Following preparation for grafting, dehydrated human amniotic membrane was fashioned to the dimensions of the defect and applied. No further surgical intervention was provided for 3 months. Complete re-epithelialization of the nasal and adjacent defects was achieved with minimal scar formation. Human amniotic membrane allograft provides an efficacious and cosmetically acceptable alternative to local and regional tissue transfer.

## INTRODUCTION

Human amniotic membrane consists of an epithelial monolayer, a thick basement membrane, and an avascular connective tissue matrix. Placental donations from healthy mothers delivering via elective cesarean section provide the source. The first use was in 1910 and then subsequently utilized in a variety of reconstruction procedures, as a surgical dressing and in treatment of diabetic and burn wounds [1]. Concerns about possible transmission of disease led to abandonment of human amniotic tissue through the 1980s. Its use regained popularity followed reassurance of clinical safety, extending to use in ocular surface disease and spine surgery [2–5].

Literature review provided no references of human amniotic membrane used as a biologic dressing to aid reconstruction of

the nose. Evidence demonstrating efficacy in epithelialization and pain reduction along with anti-inflammatory and anti-scarring properties pointed to human amniotic membrane as an ideal option for nasal reconstruction [6–8]. This case report presents a patient in which dehydrated human amniotic membrane (EpiFix; MiMedex Group, Inc., Kennesaw, GA) was used to facilitate healing of the lower third of the nose.

## CASE PRESENTATION

A 56-year-old male presented status post assault with human bites to the tip of his nose, left ala, right ear and first digit of his left hand. He denied nasal obstruction and no facial fractures were associated. He denied of consciousness and reported no

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other trauma. Past medical history was significant for hypertension controlled with Lisinopril, diet and exercise. Patient denied tobacco and illicit drug use but reported occasional alcohol use. Physical exam revealed a well-developed, well-nourished adult Caucasian male in no acute distress. There was a 22 × 18 mm full thickness skin and subcutaneous tissue defect present on the nasal tip. The columella and left ala were similarly involved. The perichondrium and nasal cartilage remained intact and undamaged. Nasopharyngoscopy with a zero degree nasopharyngoscope revealed a slight right septal deviation without evidence of intranasal trauma, discharge or mucosal bleeding. Involvement of the patient's right auricular pinna was very superficial and treatment was deferred. No facial lacerations, bony abnormalities or palpatory tenderness was appreciated. Facial weakness and neurologic deficits were also not appreciated. Bilateral involvement of the hands and upper extremities also appeared very superficial and treatment was deferred.

Debridement of the nasal tip and adjacent structures was performed using standard sterile technique and local anesthesia. The defect measured 25 × 20 mm following debridement and the perichondrium and nasal cartilage was confirmed intact and without evidence of disease or injury. Dehydrated human amniotic membrane was fashioned to the dimensions of the defect and affixed to the wound. The allograft did not overly the native integument. Suture fixation was deferred. Sterile wet to dry dressing was applied and the patient was instructed to avoid recurrent trauma to, and washing of, the graft site. The patient was instructed to maintain a wet to dry dressing over the graft site at all times and to avoid displacement of the amniotic graft during dressing changes. Total procedure time was less than 20 minutes.

The patient returned on postoperative date #3 (POD #3) for wound check. The amniotic graft was undisturbed from initial placement and the wound bed was moist and clean. Patient provided wet to dry dressing changes continued for another 4 days at which time a simple bandage was applied. Again, the patient was instructed to avoid manipulation of the graft. Follow-up continued regularly at 10–14 day intervals for the duration of treatment. The wound remained clean and had no signs of infection during the healing period. No additional surgical or resurfacing procedures were required. The patient did not require medical assistance for wound care which included twice daily wet to dry dressing changes for 7 days postoperatively. Incorporation of the graft matrix at 7 days postoperatively was considered sufficient to defer further wet to dry dressing changes with conversion to simple bandage coverage with daily changes. Complete healing was noted at 3-month follow-up. Results demonstrated minimal nasal tip deviation and secondary scar contraction. Patient satisfaction was absolute and he denies any nasal obstruction.

## DISCUSSION

This case suggests that dehydrated human amniotic membrane provides an alternative to local tissue transfer and skin grafting for traumatic injuries involving the nose. Other studies have demonstrated dehydrated human amniotic membrane to be effective as an allograft in ocular surface reconstruction and in healing chronic wounds and burns [2–5, 9].

Human amniotic membranes functions through multiple properties. The extracellular matrix components provide

scaffolding for cell migration. Cytokines within the extracellular matrix include epidermal growth factor, keratinocyte growth factor, transforming growth factor and basic fibroblast growth factor. These cytokines promote re-epithelialization through support of keratinocyte proliferation and differentiation [10]. Anti-inflammatory properties limits fibrosis and scar formation. Several theories have been proposed to explain the anti-inflammatory effect of human amniotic membrane including down-regulation of transforming growth factor beta signaling, suppression of pro-inflammatory cytokines, and reduced polymorphonuclear cell infiltration and subsequent keratinocyte death [5–8].

Application of dehydrated human amniotic membrane appears a cost-effective strategy for treating wounds involving of the nose not involving the cartilage and perichondrium when compared to reconstruction with local or regional tissue transfer. Dehydrated human amniotic membrane grafts can be applied using local anesthesia and avoiding the costs and risks associated with intravenous sedation or general anesthesia. Application of dehydrated human amniotic membrane grafts are a simple single-stage procedure for treatment of the wound demonstrated in this case report. Pedicled tissue transfer by contrast is a minimum two-stage procedure and skin grafting entails donor site morbidity and possible complications.

Dehydrated human amniotic membrane appears to be a simple, efficacious, cosmetically acceptable and cost-effective strategy for treating traumatic wound of the nose without cartilage or perichondrium involvement. Future studies are warranted to compare the dehydrated human amniotic membrane to local tissue transfer, skin grafting and healing by secondary intention. Study outcomes should consider costs, time to resolution and cosmesis.

## CONFLICT OF INTEREST STATEMENT

None declared.

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