Case report

Post amputation reconstructive rhinoplasty with nasolabial, philtral flaps and autogenous keratin: Case report

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1. Introduction

Several options have been put forward in reconstructing the partially amputated nose. Here presented is an innovative alternative for combined single staged replacement of skin, cartilage and columella: the use of nasolabial and bilateral philtral flaps with keratin derived from the fingernail.

Abnormal facial appearance has significant impact on daily and psychosocial functioning. Successful rhinoplasty, apart from the obvious aesthetic and functional benefits, restores psychosocial health.8

2. Case report

G.P. a 57 year male polygamous farmer, resident at Nkanu, Enugu State, Nigeria was involved in civil strife in December 2007. He presented at the Accident and Emergency department of Enugu State University of Technology Teaching Hospital with facial lacerations, and amputation of the lower 1/3 of nose following a machete cut. He was admitted in December 2007 and referred to the plastic surgery service where he was seen in January 2008 with healed multiple facial lacerations involving the right side of the forehead, right eyebrow and upper eyelid, and philtrum. The lower 1/3 of the nose was transected exposing the septum, with a 1/3 of the nose was transected exposing the septum, with a forehead, right eyebrow and upper eyelid, and philtrum. The lower 1/3 of the nose was transected exposing the septum, with a forehead, right eyebrow and upper eyelid, and philtrum. The lower 1/3 of the nose was transected exposing the septum, with a forehead, right eyebrow and upper eyelid, and philtrum. The lower 1/3 of the nose was transected exposing the septum, with a forehead, right eyebrow and upper eyelid, and philtrum.

The operation was carried out on 15/1/2008 with the patient under general anaesthesia. The patient was given intravenously for prophylaxis. The plan was to use the right nasolabial flap foralar and tip replacement, the fingernail for septal, crural, and ala cartilage, and bilateral philtral flaps for columella. Following cleaning and draping of the face and right hand, the right long fingernail was selected (Fig. 2). Following cleaning the index nail was lifted with curved mosquito artery forceps and carefully avulsed. The volar and dorsal surfaces were scrapped off of skin and then washed and kept in saline. The finger was dressed with Tulle gras and gauge.

Attention was now turned to the nose. The ulcer was marginally excised (Fig. 3) and the mucosa approximated. Sharp and blunt dissection of the septum created pockets for the graft. Superiorly based bilateral philtral flaps were raised with an attempt at avoiding the hair bearing area. The incision was bevelled medially (to include more dermis in the flap) and carried down to subcutaneous tissue, stopping distally at the vermilion. The proximal incision curved slightly to base the flaps on the nostril sill. The tip inferiorly was widened for soft triangle reconstruction. The flaps were turned up and sutured side to side with 6/0 prolene (Fig. 4). The secondary defect was closed directly with 4/0 nylon. A superiorly based right nasolabial flap was elevated including the skin, subcutaneous tissue, and parts of the ala (Fig. 1). The nail folds and nails of this patient had no clinical evidence of infection.

The investigations included a complete blood count, wound swab from the ulcer for microscopy culture and sensitivity, and urinalysis. No abnormal results were returned. Povidone iodine dressings were commenced and the proposed procedure was explained to the patient. The use of the nail as a cartilage substitute would hopefully reduce morbidity on the patient. The patient scheduled for reconstructive surgery and an informed consent obtained.

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The post operative course was uneventful; the sutures were removed within a week and the patient discharged home in two weeks.
He was last seen on January 2010. Soft tissue X-ray done at six months suggested intact graft. An acceptable nasal form and tip were achieved and the Cupid’s bow remained balanced (Fig. 8). There was however transient nasal stuffiness. A few strands of hair grew on the neo columella. The nail regrew uneventfully. The patient expressed satisfaction with the outcome (Fig. 9). He was comfortable appearing in the market place with it.

3. Discussion

Rhinoplasty involves the replacement of lost skin, skeletal support and mucosa with similar material. Nasal amputation is most often post tumour ablation or from falling sharp objects and road traffic injury. Bites from animals and humans have also been implicated. Machete cuts resulting in partial nose amputation in a fight appears uncommon. Amputated noses have been replanted successfully by several workers; this patient did not recover the amputated part, thereby precluding replantation. Single staged reconstruction is advocated where practicable for excellent results in replacing skin, lining and mucosa.

Facial flaps are in use for nasal reconstruction; the nasolabial flap being frequently used to replace alar, tip, columella, mucosa, or combinations of subunits. The flap design, size and dimensions are limited by the redundancy of available tissues and the possibility of closing the donor site primarily along the nasolabial fold without deformity, especially to the lower eyelid and commissure. It may be based superiorly or inferiorly. This was superiorly based, as is used by other workers for resurfacing the nose. Complete reconstruction of the lower 2/3 of the nose completely replacing the subunits with a flap from the forehead is well established; it may require more stages with added morbidity patients may not accept. This patient had forehead scars. The author thought it best to avoid more.
The skeletal support in the middle and lower third is made up of cartilage which gives deformable support. Auricular and costal cartilage are substitutes. Calvarial, costal or ileac bones when used provide rigid support in place of deformable support and can lead to an unnatural feel. Other autogenous materials include fascia and dermis which do not provide firm support. Autogenous materials are preferred in rhinoplasty because of their high biocompatibility and low risk of infection and extrusion, though concerns of donor-site morbidity, graft availability, and graft resorption exist. Cadaveric sources and xenografts have been used but may be rejected immunologically (and socially in sub saharan Africa).

Autogenous alternatives for nasal cartilage have hitherto been limited to cartilage (harvested from the nose, ear or rib cage), bone, fascia and dermis. The harvest of such reduces the availability from the donor site and may lead to significant morbidity. Keratin, a fibrous protein which provides strength and resilience to wool, hair, feathers, and nails, has evoked interest as an implant material for plastic and reconstructive surgery. 7–20% of the total amino acid content of the keratin molecule is cysteine whose residues are oxidized to form inter and intramolecular disulfide bonds, that stabilize and crosslink filaments, giving flexibility and strength. When implanted in bone the tissue reaction is most similar to a "largely inert material of very low antigenicity and toxicity" and involves capsule formation but no humoral or cellular immune response, or cellular necrosis. Some degradation to amino acids occur which are easily phagocytosed by macrophages. Excellent biocompatibility, low antigenicity, procurement by non-invasive procedures, and high physical strength in its natural state, make keratin an ideal candidate for many surgical applications. Subcutaneously implanted reconstituted keratin in sheep at 6 weeks had collagen deposition at the periphery forming a thin capsule and remained thus up till the end of that study (24 weeks). Keratin is harvested from the nail without any incision and healed without scarring in the patient.

Columella reconstruction is very challenging with apparently no first choice; each option having advantages and
challenges. By the Izmir classification this is a type III columella defect. Such have been managed with distant tissue transfers as forehead flaps, free flaps, or bilateral nasolabial flaps with auricular cartilage to form and support the nasal septal cartilage; and may require several revision procedures to achieve acceptable results. Here reported is a single staged alternative procedure. Whilst V–Y flaps in the philtral region have been reported for partial columella loss, this technique appears unreported for complete columella reconstruction. The mild hair growth experienced by the patient is a drawback, and the attempt to recreate a soft triangle was unsuccessful. Using the philtral ridges and stopping short of the vermillion ensured a hidden scar and an even cupid bow. The growth of a moustache completely hides such scars. Will women accept philtral flaps?

The end result, as happens sometimes, has not been perfect, even though the patient is happy with it (which is very important in rhinoplasty). His satisfaction was verbalized and manifest in freedom to appear in the market place. People that feel negatively judged about appearance isolate themselves.
4. Conclusion

Philtral flaps may be used in combination with naso labial flaps for subtotal nasal reconstruction. Autogenous Keratin is a possible cartilage substitute in rhinoplasty. Larger studies over longer periods will help determine its exact place as a cartilage substitute.

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References