

Nasal Reconstruction with Paramedian Forehead Flaps at University of Port Harcourt Teaching Hospital and Professor Kelsey Harrison's Hospital, Port Harcourt, South-South, Nigeria: Our Experience

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ABSTRACT

Background: Nasal reconstruction is one of the most challenging head and neck surgeries. It demands a thorough understanding of the anatomy of the nose by the surgeon who will do a meticulous planning and have an excellent surgical skill in order to achieve good outcomes. The forehead flap is a veritable option for reconstruction with acceptable colour match and donor site morbidity. In our environment, the skill is not yet readily available. **Objective:** To share our experience with the use of paramedian forehead flap in the reconstruction of complex defect of the nose in the two referral hospitals in the South-South zone of Nigeria. **Method:** This is a retrospective study which involved analysis of the data obtained from the three male patients treated in two referral hospitals from the month of May 2013 to April 2015. Three cases of nasal defects reconstructed with paramedian forehead flaps were presented. The three cases designated 1, 2 and 3 here, presented with full thickness defects of varying number of aesthetic subunits, resulting from matchete cut, high velocity gunshot and human bite respectively. In all the cases, the three-dimensional form of the nose was achieved, with patent nasal passage which was indeed a pretty challenge. The outcome, including the donor site morbidity, was acceptable to all the patients, so were satisfied. **Result:** The complex defects, involving the lining, the skeletal support and the cover, in the three male patients were reconstructed using paramedian forehead flap, and both lining and skeletal support were provided. The outcome in terms of the colour match, texture, patency and tip projection were acceptable to the patients. **Conclusion:** Paramedian forehead flap remain the workhorse for nasal reconstruction and the expertise is available in the Port Harcourt to serve the populace in the South-South region of Nigeria.

Key Words: Nasal Reconstruction, Paramedian Forehead, flap, Port Harcourt, South-South, Nigeria.

INTRODUCTION

There is no other part of the face that is as prominent and projecting as the nose, therefore it is very prone to injury.¹ Apart from its physiological role, the nose is seen, used and perceived, in various ways, by various people with different cultural backgrounds: it may symbolize honour, shame, wisdom, sex, wisdom or beauty.² These reasons, whether fact or myth, make its reconstruction imperative, whenever it is structurally defective. Nasal reconstruction is one of the most challenging head and neck surgeries due to the unique anatomy of the nose e.g. the three dimensional configuration, the skeletal support arrangement, the contour of the various subunits and texture of the overlying, and these, as much as possible, need to be taken into consideration while reconstructing it.³ The surgery demands a thorough understanding of the anatomy of the nose by the surgeon who will do a meticulous planning and have an excellent surgical skill in order to achieve good outcomes. The reconstruction of a complex nasal defects involving restoration of the skeletal framework, the cover and lining of many subunits of the nose, is most challenging. Forehead flap, which has been in use as far back as 600BC⁴, is still useful today, especially in our sub-region where many reconstructive surgeons are not yet versatile with free flap (microvascular) surgical techniques. The flap has a robust vascular pedicle which makes its survival certain. Kazanjian was the first to describe the blood supply in 1930s⁵. Besides, it provides cover as well as lining when turned over itself for many subunits.⁶ Complex nasal defects involve complete or incomplete loss of one or more subunits of the nose especially when the cover, lining and skeletal framework are involved⁷.

The aim of this study was to investigate and share our experience with the use of paramedian forehead flap in the reconstruction of complex nasal defect and show that patients having such defect, in Port Harcourt City in South-South, Nigeria and its neighbourhood, can receive succour from the available skills.

PATIENTS AND METHODS

This is a retrospective study which involved analysis of the data obtained from the medical records of the three male patients treated in two referral hospitals from the month of May 2013 to April 2015.

We, therefore, present three cases of nasal defects, designated 1, 2 and 3 here, reconstructed with paramedian forehead flaps. The three cases presented with full thickness defects which involved a varying number of aesthetic subunits, resulting from matchete cut, high velocity gunshot and human bite respectively.

CASE 1

G.D., a 20-year old male presented with a complain of matchete cut on the face and upper limbs resulting to loss of almost the whole of lower half of the nose (fig.1). He had a profuse bleeding, but no fainting spell or coma.

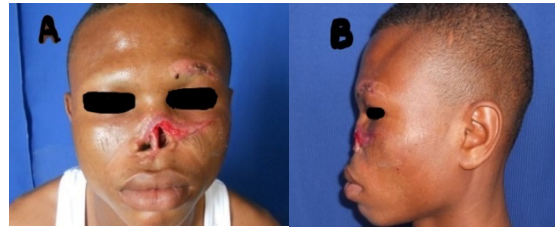


Figure1: Case 1 front view (A), Side view (B)

Defect Analysis: case 1

Complete full thickness loss (CFTL) of right ala, CFTL of left ala, tip, columella & soft triangles, incomplete FTL of septum, incomplete loss of dorsum & both side walls.

CASE 2

U.A., a 38-year old male, a long distant lorry driver, was shot in the face with a high velocity gun by armed bandit from the side, 3 days prior presentation. He bled significantly.



Figure2: Case 2 (A) Front view, (B) Preop marking

Defect Analysis: case 2

CFTL of the tip and columella and the distal third of the dorsum, incomplete FTL of distal part of right sidewall and left ala, incomplete avulsion of the right ala; Near total loss of nasal septum, edges of the wound were uneven, tissue loss over the right maxillary prominence and lateral third of the left upper lip extending to melo-labial fold (fig.2).

CASE 3

K.D., a 24-year old male, who had human bite to his nose and presented to a private hospital (PKHH) plastic surgery clinic 7 days after.



Fig.3: Case3 front view showing nasal defect 3-day post-injury (A), 3-week post-injury and preop marking (B)

Defects analysis Case 3

CFTL of the tip, columella, incomplete FTL of both alae, dorsum, side walls and nasal septum (fig.3).

None of the three cases had any pre-existing diseases prior to the injuries.

The investigations done included: a) Laboratory tests i.e. Haemogram, white blood cell count, urinalysis showed normal parameters. Wound swab for culture & sensitivity (yielded bacteria growths in cases 2 & 3, and were treated accordingly with appropriate antibiotics). Plain radiograph was also done. Wound dressing, antibiotics, analgesics & multivitamins were administered prior to reconstruction.

Technique

All the patients were admitted and the reconstruction was done under general anaesthesia after obtaining informed written consent. Using a reverse planning and Millard's technique,^{8,9} a gull-wing shaped paramedian flap (1.5cm wide, pedicle) based on supratrochlear artery was designed (fig.4A), bearing in mind the course of the artery as described by Shumrick and Smith.¹⁰ The cases being complex nasal defects, the skeletal support and lining were provided before rotating the flap which served as cover and lining as well for the vestibules for the case1. The skeletal support were the cortical bone strut and the costal cartilage in cases 2 & 3 respectively, whereas the case 1 was supported with septal hinge flap. The lining used included the skin turn-over of the forehead flap and nasal mucosa flaps for cases 2 and 3 respectively and the infolded skin of the forehead flap and that of melo-labial turnover flaps were for the case1. Paramedian forehead flaps were used in all following reverse planning and skin markings and bilateral superiorly based melo-labial turn over flaps for both alae in case1. Septal mucoperichondrial flap raised from the residual septa in all the cases served as the lining, however, this was combined with distally based hinge (turned) thin cutaneous flap raised on the dorsum (fig.4A, fig.5A, pointed at by the artery forceps), unlike Cerci and Co who sutured the defect, we did not and the overlying paramedian flap covered it.^{11,12} The skeletal support for cases1 and 3 was costal cartilage fashioned as strut (20mm long x 2mm wide x 1mm thick) and a pair for the alae (10mm long x 2mm wide x 1mm thick) sutured to the distal projecting end of the strut using polypropylene 4-0 and a 5mm long cartilage of same width and thickness was vertically placed and the portion of the flap for columella used to wrap over it in case1. The cortical strut, harvested from tibia, was strong enough that there was no support used for the alae in case2. The parallel incisions were made down to the eyebrow to ensure the flap was long enough to cover the defect. The flap was elevated and rotated over the defect in all the cases and sutured in two layers using polyglactin 3-0 and polypropylene 3-0 for the skin including the secondary defect which was closed directly. In case1, proximally based melo-labial flaps were raised and turned over on both sides to reconstruct the alae respectively, and were sutured to the overlying paramedian flap. The nasal passages were stented for varying periods of time in cases1 and 2. The forehead flaps were divided and inset on the 21 days post-elevation. The residual stump of the pedicle refashioned, the eyebrow realigned and the residual defect closed. Antibiotics were routinely prescribed in all the cases.

RESULTS

In all the cases (fig. 4 B&C, 5C&D, 6B&C), the three-dimensional form of the nose was achieved with patent nasal passage which was indeed a pretty challenge. Raising the mucoperichondrial

flaps for lining and fashioning and placement of the cartilaginous support was not simple. The alignment of the ala bases in case1 was not as congruous as expected (fig.4D). Occlusion of the nasal passage was a very noticeable complication especially in case 1, thus necessitating prolonged stenting in both cases 1 and 2. The outcome, including the donor site morbidity, was acceptable to all the patient so they were satisfied. However, they were lost to follow up (the longest was 5month post-reconstruction).

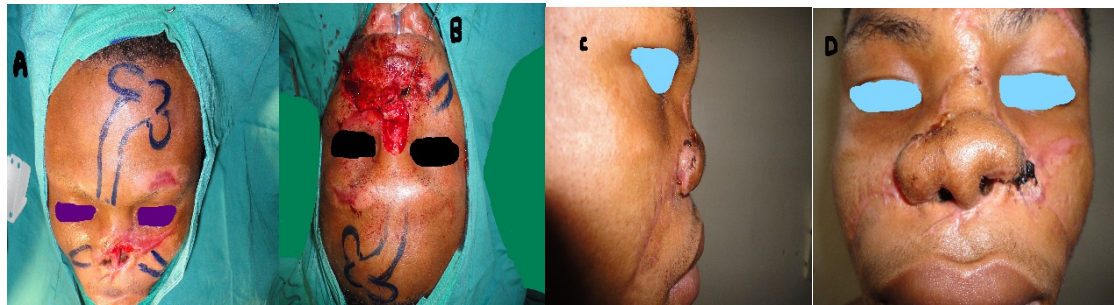


Figure4:Case1, Flap design (A), Hinge (turn down) skin flap held with skin hook (B), week4 post flap division: Side view (C), Front view (D)



Figure4: Case 1 Week8 Post flap division (D) Front view



Figure 5: Case 2: Artery forceps pointing to skin turn down flap (A), Immediate postop: ZoneIII view (B), Case2 Month5 Postop: Front (C), Side (D), and Zone III (E) views

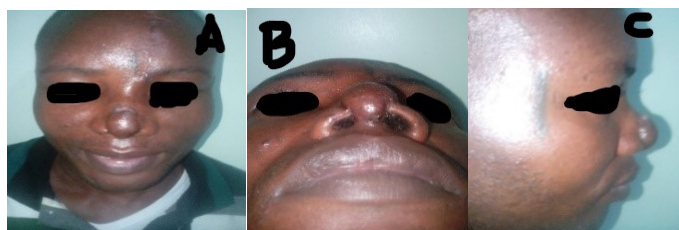


Figure6, Case3: 6-week post operation front view (A), zone III view (B), side view (C)

DISCUSSION

The nose being the most prominent structure in the face and located in the centre is very prone to injury. It is also one of the most common sites for cancer of the skin.¹² As a matter of principle, the missing tissues were replaced with the likes the three layers, that is, the lining, skeletal support and the covering (skin) in all the three cases. Provision of lining in nasal reconstruction is of utmost importance, because nasal reconstruction can fail if the lining fails. Available options include nasal mucosal flaps, forehead turnover flap, skin grafting, local nasal hinge flap, full thickness skin grafting of forehead flap, mucoperichondrial hinge flap, composite septal chondro-mucosal pivotal flap among others.^{11,12,13} From our experience, raising of chondro-mucosal pivotal flap is not simple and we combined it with turn over skin flap hinged inferiorly at the border of the primary defect on the dorsum of the nose. The “beak” part of the flap was thinned primarily in order to reconstruct the columella especially in case1 which is supported with cartilage.

The skeletal support which included cortical bone strut (which was the lead surgeon’s choice in case2) and costal cartilage graft were to enhance projection of the tip, for reduction of contraction of the soft tissue, maintain the nasal passage and prevent distortion of the three-dimensional form of the nose as stated by Cerci and Dellatorre.¹² Nevertheless, the support provided did not completely prevent the narrowing of the nasal aperture, thus necessitating the use of stent. Many authorities obtain the majority of the cartilage by harvesting the conchal cartilage.¹⁴ We did not breach the parietal pleura while harvesting the costal cartilage in neither of the cases. It appears majority of surgeons divide and inset the flap between 10-14 days, some do so about 21days, like we did, while others like Correa BJ prefer to do so at 4th week, believing that delay will improve the survival of the flap post division as the oedema could have been significantly reduced and blood supply improved also.¹⁴

The flap survival in all the cases was full and the eyebrow alignment was properly restored and the donor site scar was satisfactory and acceptable by the patients (fig.4, 5E). We lost all the patients to follow up as early as six months postoperatively, which was not surprising because in our environment keeping to follow up is still a culture yet to be imbibed by majority, especially when they feel they are okay.

CONCLUSION

The nose is prone to various forms of injuries and it is known to play important roles in the humans. The nature of nasal injuries seen in our environment is complex coupled with other diseases like cancer that affect it, therefore, having the reconstructive skill especially with the use of forehead flap which a veritable option for reconstruction with acceptable colour match and donor site morbidity, will provide succour to those who would need it.

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