

# Post-operative Evaluation of Middle Turbinate Medialization versus Basal Lamella Relaxing Incision in Endoscopic Sinus Surgery

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Received 2 May 2014  
Accepted 6 June 2014  
PAN Arab Journal of Rhinology  
2014, 4:65–70

**Background:** Medialization of middle turbinate (MT) is important step in endoscopic sinus surgery (ESS). Several techniques of MT medialization have been described. The basal lamella relaxing incision (BLRI) is a novel technique of MT medialization aiming to maximize the distance between the middle turbinate and lateral nasal wall. So far, however, there has been little discussion about post-operative evaluation of this novel technique.

**Patients and Methods:** A prospective study was conducted involving thirty Patients with sinus pathology undergoing minimal ESS operation. Patients were divided into two groups. In group A fifteen patients underwent standard medialization of the middle turbinate while in group B fifteen patients were subjected to BLRI of the middle turbinate. Parameters used for evaluation were taken one month post-operatively.

**Results:** Concerning the two procedures, post-operative crustation has a statistical significance difference which is less in group B than group A with a P value 0.03. Also the total nasal score has a high statistical significance difference which is less in group B than group A with a P value <0.001. However, postoperative edema, mucopus, scarring, polyps and sinus ostium visualization were statistically insignificant with P values 0.06, 0.07, 0.17, 0.27 and 0.46 respectively.

**Conclusion:** BLRI and standard MT medialization show no significant difference regarding postoperative mucosal edema, mucopus, polyps, scarring and ability to visualize the sinus ostium. However, better results are noted with BLRI regarding postoperative crustations and total nasal score.

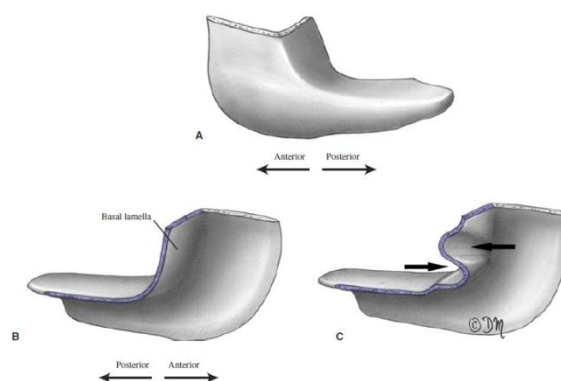
**Keywords:** Endoscopic sinus surgery; Middle turbinate medialization; basal lamella relaxing incision; lateralized middle turbinate.

## Introduction

Functional endoscopic sinus surgery (FESS) is a minimally invasive technique in which sinus air cells and sinus ostia are opened under direct visualization. The goal of this procedure is to restore sinus ventilation and normal function<sup>1</sup>. Knowledge of paranasal sinus anatomy is critical to understanding the pathophysiology, the possible complications, and the surgical treatments of sinusitis [2].

The middle turbinate has a complex bony attachment. Anteriorly, it is attached superiorly to the cribriform plate. Posteriorly, it swings laterally into the coronal plane and attaches itself to the lamina papyracea. This coronal portion of the middle turbinate is called the basal lamella or ground lamella (Fig.1). The lamella basalis divides the ethmoid cells into the anterior and posterior ethmoid cells. The middle turbinate continues posteriorly in an axial plane, forming the roof for the posterior portion of the middle meatus. This three-dimensional orientation gives the middle turbinate exceptional stability. Resection of the posterior portion may thus lead to anterior instability [3].

Figure 1



Anatomical configuration of the basal lamella of the right middle turbinate [4].

(A) Medial view.

(B) Lateral view.

(C) Lateral view with distortion of the basal lamella by the ethmoid cells.

Musy and Kountakis reported that the most common postsurgical findings associated with primary surgery

failure is lateralization of the middle turbinate (78%) [5].

Success in endoscopic surgery of the sinuses relies strongly upon visualization of key anatomic structures. Medialization of MT technique allows the surgeon for maximal exposure and improved manipulation with the endoscope and instrumentation. By allowing unabated access to the sinuses the surgeon maximizes visualization and avoids inadvertent damage to the surrounding mucosal surfaces [6].

To date various methods have been developed and introduced for middle turbinate medialization. The standard method of medialization relies on microfracturing or “green-sticking” the turbinate bone with a Freer elevator or similar instrument [7]. Friedman & Landsberg have described Suturing the MT to the nasal septum or using a middle meatalantrostomy stent or creation of denuded area between the medial surface of MT and the septum [8]. Medialization of middle turbinate using nasoseptal flap has been also suggested [9].

The basal lamella relaxing incision (BLRI) is a novel technique of middle turbinate medialization that is designed to maximize the distance between the middle turbinate and lateral nasal wall, and thus the working area within the middle meatus [7].

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## Patients and methods

A prospective study was conducted in Cairo university hospitals in the period between November 2012 and October 2013. Thirty Patients with sinus pathology undergoing minimal ESS operation were enrolled in the study. Patients with anterior group chronic sinusitis, sinus mucocoeles and antrochoanal polyps were included in the study while patients with extensive sinonasal polyposis, complicated sinusitis, previous ESS, allergic fungal sinusitis and affection of posterior group sinuses were excluded.

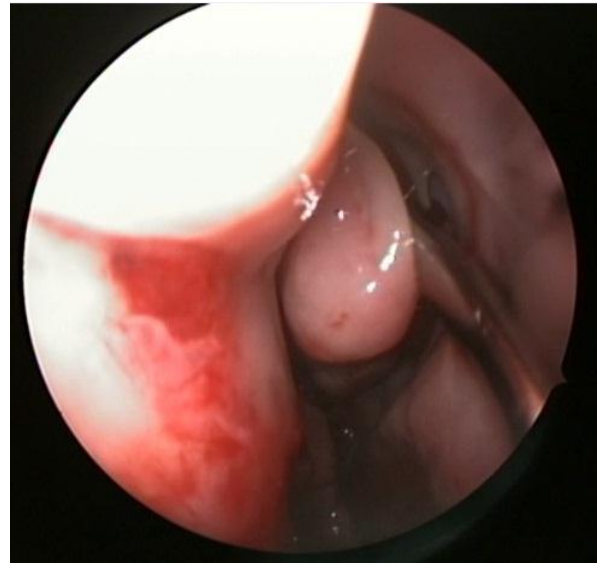
Preoperative history taking and clinical examination, CT nose and paranasal sinuses were performed.

All thirty patients were divided into two groups. In group A: fifteen patients underwent standard medialization of the middle turbinate while in group B fifteen patients were subjected to BLRI of the middle turbinate.

Under general anesthesia, decongestion of the nose was done using nasal packs soaked with Adrenaline (concentration 1/50000).

Group A patients underwent medialization. The standard method of medialization relied on microfracturing or “green-sticking” the turbinate bone with a freer elevator or similar instrument (Fig. 2).

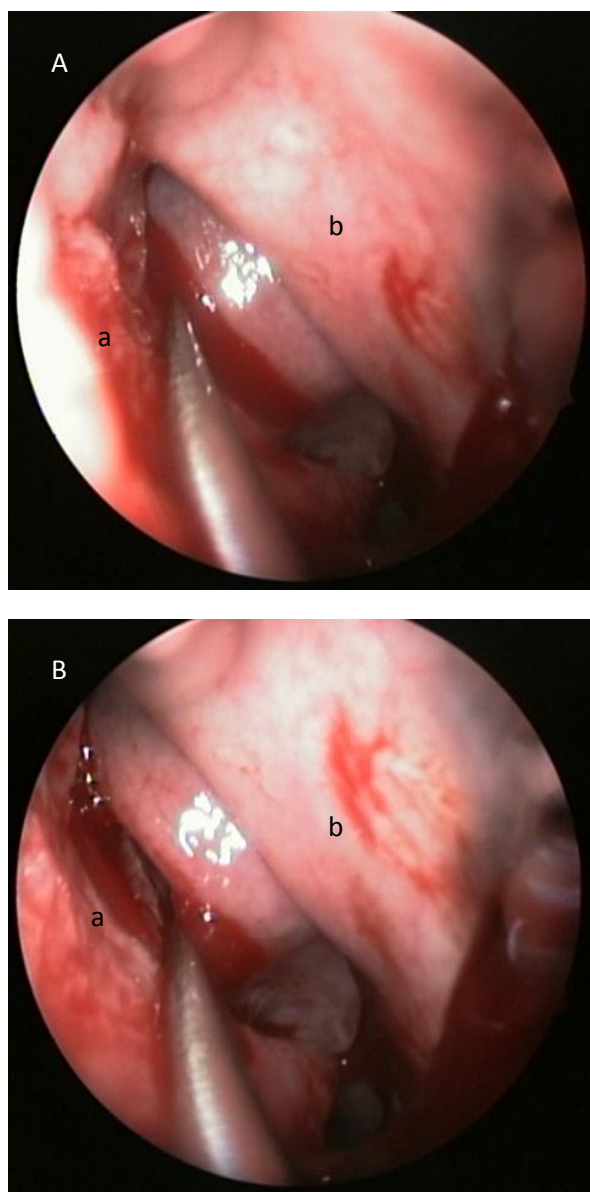
**Figure 2**



**Medialization of Left middle turbinate**

Group B patients were subjected to BLRI. BLRI was done under direct endoscopic visualization, the middle turbinate was gently medialized to reveal the basal lamella, visible immediately posterior to the medial border of the bulla ethmoidalis. A vertical incision was made at the medial aspect of the basal lamella using the sharp end of the Freer elevator. The incision was made through all layers of the basal lamella at the transition between the sagittal and coronal planes of the middle turbinate (Fig.3). An incision length of approximately 1.5 to 2 cm was created, taking care to stay at least 1 cm above the inferior free edge of the basal lamella to avoid disruption of the branches of the sphenopalatine artery. With the tip of the freer elevator positioned in the superior meatus, medial pressure was then exerted against the sagittal portion of the middle turbinate, dilating the incision to achieve successful turbinate medialization.

Figure 3



A Start of left side BLRI, B End of left side BLRI.  
a= First part of middle turbinate, b= lateral nasal wall

Postoperatively, patients received systemic antibiotic e.g. Cefoperazone sodium 1g / 12 hrs for 2 days. Nasal packs were removed 2 days after operation, patients continued on oral antibiotics e.g. Amoxicillin and Clavulanic Acid 1 gm /12 hrs for 10 days, alkaline nasal wash /8 hrs for 2 weeks.

Parameters used for evaluation were taken one month postoperatively as follows:

A. Endoscopic assessment was done on admission and 1 month post-operatively for both the left and right sides. The endoscopic appearances were

quantified on 0-2 point basis (0 = not present, 1 = not marked, and 2 = marked). The parameters were:

- Inflammatory mucosal edema at ostiomeatal complex (OMC)
- Polyp at the OMC region
- Muco-pus in the middle meatus
- Scarring or adhesions
- Crusting

Total score included the sum of the above 5 criteria.

- The ability to visualize the sinus ostium postoperatively
- Occurrence of complication whether intraoperative or postoperative

The data was coded and entered using the statistical package SPSS version 15. The data was summarized using descriptive statistics: mean, standard deviation, median, minimal and maximum values for quantitative variables and number and percentage for qualitative values. Statistical differences between groups were tested using Chi Square test for qualitative variables, Mann Whitney test for quantitative variables, which were not normally distributed. P-values less than or equal to 0.05 were considered statistically significant.

## Results

This study included 30 patients. 14 patients with anterior group sinusitis, 9 patients with anterior group polyps, 4 patients with antrochoanal polyp, 2 patients with fronto-ethmoidalmucocele, 1 patient with maxillary cyst. Regarding the overall patient population, there were 12 males (40%), 18 females (60%) ranging between 17 and 65 years with a mean age of  $30.13 \pm 12.83$  years. Patients were divided into two groups; group A and group B. In group A there were 7 males (46.7%), 8 females (53.3%) ranging between 17 and 65 with mean age of  $31.80 \pm 12.83$ . While group B there were 5 males (33.3%), 10 females (66.7%) ranging between 19 and 65 with mean age of  $28.47 \pm 11.49$ .

**In group A:** Mucosal edema was absent in 2 patients (13.3%), not marked in 8 patients (53.3%) and marked in 5 patients (33.3%). Polyps were absent in 10 patients (66.7%), not marked in 5 patients (33.3%). Mucopus was absent in 4 patients (26.7%), not marked in 6 patients (40%) and marked in 5 patients (33.3%). Scarring was absent in 4 patients (26.7%), not marked in 7 patients (46.7%) and marked in 4 patient (26.7%). Crustation was absent in 3 patients (20%), not marked in 2 patients (13.3%) and marked in 10 patient

(66.7%). Sinus ostium was visualized in 8 patients (53.3%) while in 7 patients (46.7%) sinus ostium couldn't be visualized. Total nasal score has a mean of  $5.07 \pm 2.25$ .

**While in group B:** Mucosal edema was absent in 8 patients (53.3%), not marked in 5 patients (33.3%) and marked in 2 patients (13.3%). Polyps were absent in 14 patients (93.3%), not marked in 1 patient (6.7%). Mucopus was absent in 12 patients (80%), not marked in 3 patients (20%). Scaring was absent in 7 patients (46.7%), not marked in 7 patients (46.7%) and marked in 1 patient (6.7%). Crustation was absent in 10 patients (66.7%), not marked in 4 patients (26.7%) and marked in 1 patient (6.7%). Sinus ostium was visualized in 10 patients (66.7%) while in 5 patients (33.3%) sinus ostium couldn't be visualized. Total nasal score has a mean of  $1.87 \pm 1.92$ .

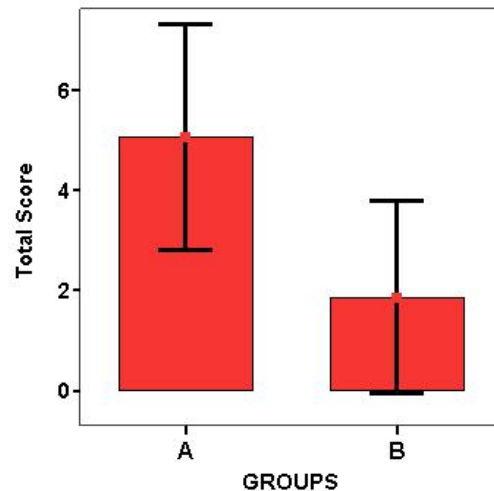
No complications were encountered either intraoperative or post-operative in both groups.

Concerning the two procedures, post-operative crustation has a statistical significance difference which is less in group B than group A with a P value 0.03 (Fig. 5-7). Also the total nasal score has a high statistical significance difference which is less in group B than group A with a P value  $<0.001$ (Fig.4). However, postoperative edema, mucopus, scaring, polyps and sinus ostium visualization were statistically insignificant with P values 0.06, 0.07, 0.17, 0.27 and 0.46 respectively (Table 1).

**Table 1. Showing P values among different parameters**

Parameter	P value
Total nasal score	$<0.001$
Crustation	0.03
Edema	0.06
Mucopus	0.07
Scaring	0.17
Polyps	0.27
Sinus Visualization	0.46

**Figure 4**



Showing comparison between both groups regarding the total score of endoscopic parameters

**Figure 5**



Postoperative endoscopic evaluation of a patient underwent BLRI of the left side after 1 month showing absent edema, pus, polyps, scar or crustation

**Figure 6**

Postoperative endoscopic evaluation of a patient underwent medialization of right side after 1 month showing marked crustations

**Figure 7**

Postoperative endoscopic evaluation of a patient underwent BLRI of right side after 1 month showing minimal crustations

## Discussion

Lateralization of the MT appears to be the most common complication of ESS, occurring in as many as 43% of patients. The formation of scar tissue between the MT and the lateral nasal wall can obstruct the outflow of the ethmoid, maxillary, and frontal sinuses, leading to recurrent symptoms and necessitating attempts of lysis in the office or further

surgery. Proper handling of the MT and prevention of lateralization appear to be the keys to avoiding complications in the postoperative period and ensuring a successful outcome for the patient, and are important aspects of ESS.

Getz & Hewang claimed that BLRI creates a controlled separation of the sagittal segment of the middle turbinate from the coronal segment of the middle turbinate (the basal lamella), thereby releasing the attachment of the middle turbinate to the lateral nasal wall. They recommended further studies comparing the standard technique of medialization versus BLRI as regarding postoperative healing [7].

The current study is a complementary study to the previous research. In this study, postoperative evaluation of group A of patients who were underwent medialization of MT compared to group B who were subjected to the novel technique BLRI is done. postoperative endoscopic assessment of edema, polyps, pus, scar, crustation, visualization of sinus ostium and intraoperative or postoperative complication were done.

Considering both groups, there were no intraoperative or postoperative complications. Group B showed less crustations with statistically significant P value 0.03 and less total nasal score which is highly significant with a P value <0.001 than group A. However, there was no statistical significance concerning other parameters. Although visualization of sinus opening (P value 0.46) was statistically insignificant, yet it was better in group B than group A.

These results may be due to improved intraoperative exposure and visualization leading to less trauma to the nasal and MT mucosa. These results match those published in Getz & Hewang study results<sup>7</sup> who proposed potential benefits of BLRI in the form of increasing the operative area within the middle meatus at the outset of surgery and prevention of unnecessary surgical trauma to the turbinate mucosa that will decrease rate of postoperative scarring and related complications.

## Conclusion

BLRI and standard MT medialization show no significant difference regarding postoperative mucosal edema, mucopus, polyps, scarring and ability to visualize the sinus ostium. However, better results are noted with BLRI regarding postoperative crustations and total nasal score.

Further comparative studies with larger sample size are recommended to assess its effect over long period of time.

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## References

1. Slack R and Bates G. Functional Endoscopic Sinus Surgery. *Am FamPhysician* 1998;58:707-718.
2. Salamone F. Current Otolaryngology. Chapter 14 (acute and chronic sinusitis) 2007. p272-283
3. Dwivedi A and Singh K. CT of the paranasal sinuses: normal anatomy, variants and pathology. *Journal of Optoelectronics and Biomedical Materials* 2010;2:281-289.
4. Clemente M. Surgical Anatomy of the Paranasal Sinus. Chapter1 (Surgical Anatomy of the Paranasal Sinus) 2005.p18.
5. Musy P and Kountakis S. Anatomic findings in patients undergoing revision endoscopic sinus surgery. *Am J Otolaryngol* 2004;25:418-422.
6. Lee M and Marple B. Middle turbinate medicalization for improved access during endoscopic sinus surgery. *International Forum of Allergy & Rhinology* 2011;1:187-190.
7. Getz A and Hwang P. Basal lamella relaxing incision improves endoscopic middle meatal access. *International Forum of Allergy & Rhinology* 2012;0:1-5.
8. Friedman M and Landsberg R. Middle Turbinate Medialization and Preservation in Endoscopic Sinus Surgery. *Operative Techniques in Otolaryngology Head And Neck Surgery* 2001;12:66-68.
9. Abelardo E, Sanuki T and Yumoto E. Medialization and Stabilization of the Middle Turbinate using a Nasal Septal Flap in Endoscopic Sinus Surgery. *Philipp J Otolaryngol Head Neck Surg* 2006;21:43-46.