


# Peri and Postoperative Complications of Endoscopic Posterior Limited Septoplasty Versus Conventional Method Septoplasty in Endoscopic Nasal Surgery

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## Abstract

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**Background:** A significant percentage of patients undergone endoscopic sinus surgery has septal deviation, that disturb adequate access to the osteomeatal complex or to the region of axilla of the middle turbinate. The good exposure is the most important key to a successful surgery. Straightening such a deflection improve the access to the work site on the lateral wall of the nasal cavity.

**Objective:** To compare the peri and post operative complications between conventional septoplasty (cottle's method) and the endoscopic posterior limited septoplasty in endoscopic sinus surgery.

**Patients and Methods:** Forty patients (all of them had a limited posterior nasal septal deviation ,nasal and paranasal sinus pathology in addition to septal deformity),were selected and divided randomly into two equal groups, (by the type of surgery for septal correction. group A which underwent conventional (Cottle's septoplasty), while group B that had endoscopic type septoplasty). All patients were assessed in the otolaryngology department in AL- Immamain Al khadimain medical city, from October 2016 to November 2017.patients were evaluated pre and post operatively by clinical and endoscopical examination, and followed in a period of 1week, 1month and 3months post operatively.

**Results:** Functional endoscopic sinus surgery was the most primary surgery done, followed by Dacrocystorhinostomy and Endoscopic sphenopalatine artery ligation .Most common intraoperative complication was mucosal flap tear which observed more in conventional group, .Regarding mean operative time for limited septoplasty it was shorter in endoscopic group .Synechia and delay wound healing as a post operative complication was more in endoscopic group, while hematoma and perforation was more in conventional group.

**Conclusion:** During endoscopic sinus surgery, limited posterior septal deviation can be corrected by endoscopic method which provides better direct visualization of the deviation, more conservative surgical manipulation, shorter in time and less intra and post-operative complications.

**Keywords:** Functional Endoscopic Sinus Surgery( FESS), Dacrocystorhinostomy (DCR), ostiomeatal complex(OMC), deviated nasal septum(DNS)

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## Introduction

Septoplasty used for decades for the treatment of obstruction of nasal airway. In other cases septoplasty is done to have adequate access for the nose and paranasal area. With the use of FESS the treatment of the deviated septum has been done to achieve good visualization and to permit for using endoscopic instruments [1].

1947: Cottle introduced the hemi transfixion incision and the practice of conservative septal resection, Boenninghaus prefer that resection continued posteriorly to the vomer or perpendicular plate of the ethmoid, for good airway opening. The using of endoscopic technique for correction of septal deviations was done firstly in 1991 by Stumberger [2]. Giles and et al evaluate endoscopical septoplasty in FESS [3]. Park and et al. concluded that visualization of nasal septum by magnification using a video monitor working with precision [4]. Hwang clarified that endoscopic septoplasty was helpful in treating of posterior type septal deformity, revision cases and teaching purposes [5,6].

### Anatomy

The nasal septum consist of an anterior membranous portion, cartilages and few bones: the perpendicular plate of the ethmoidal bone , the vomer and bony crests of maxilla and palatine bone. The cartilaginous portion formed by quadrilateral cartilage and part of lower and upper lateral alar cartilages. The quadrilateral cartilage had 3–4 mm thickness in its center and increased to 4-8mm anteroinferiorly[7-11].

## Classification of septal deviation

In 1987, Mladina classified deformities of septum into seven abnormalities and noticed the relationship between them and maxillary deformities [12]. In 1999, Guyuron and et .al. suggest that each type of septal deviation needs a specific treatment [13]. Guyuron’s classification described six different types: a tilt•anteroposterior C, cephalocaudal C, anteroposterior S•cephalocaudal S and thick spurs. Septal deviation can be as a “C” or “S” or a large spur[11].

### Diagnostic nasal endoscope

Procedure: patient in sitting position. Topical anesthetic 4% xylocaine is used for anesthetizing the area before the procedure. Using of 7 ml of 4% xylocaine and few drops of xylometazoline. Cotton are soaked in the solution; Packs are left for five minutes. Rigid endoscopy is performed using a 0 and 30 degree 4mm nasal endoscopes. The nasal endoscopy can be done by three passes facilitating a thorough and detailed examination [15,16].

### Operative technique for septal correction

The surgical procedure can includes:

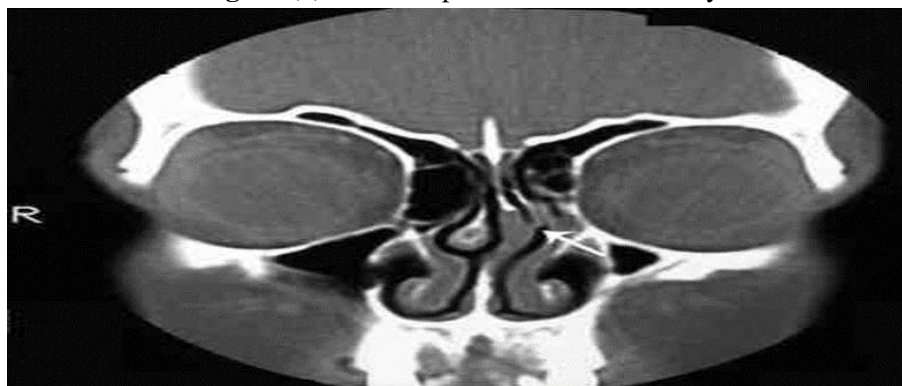
- (1) access of septum
  - (2) correct the deviation
  - (3) remove the pathology
  - (4) reshaping
  - (5) rebuilding of the septum; and
  - (6) stabilizing the septum.
- (6).When septal deviation observed during endoscopic sinus surgery, then begin with non deviated side[17].

### Conventional (cottle's) method

Endoscopic method [18,19]. Using of 0 degree Hopkins rod nasal endoscope.



**Figure (1):** Endoscopic view of nasal cavity



**Figure (1):** CT scan of nose and paranasal sinuses

### Complications of septoplasty

Hematoma of septum may be seen when a quilting stitch was not used and septal perforation may result from uncorrected mucoperichondrial tears or failing of repositioning the mucoperichondrial flap at the end of the septal surgery. Changes of nasal shape as ptosis of tip and dorsal nasal saddling could result due to over resection the caudal part of septum. Postoperative mild oozing may occur.

Some patients may have significant bleeding postoperatively; especially in those who did inferior turbinate resection. Infection is rare, but rhinorrhea may persist for a few months postoperatively, and synechiae can develop between the septum and the turbinate or lateral nasal wall due to traumatic technique[20].

### Patients and Methods

#### Type of study

The current study was prospective comparative study.

**Selection of patients:** Forty patients (all of them had posterior nasal septal deviation, with nasal or paranasal sinus pathology) were selected randomly and divided in 2 groups, each group of [20] patients (according to the surgical approach. Group A had a conventional (cottle's septoplasty), while group B had endoscopic type septoplasty). All patients were assessed in the otolaryngology department in AL- Immamain Al kadimain Teaching hospital, from October 2016 to November 2017. Clinical, endoscopic and radiological assessment of the nose and Paranasal sinuses were done for all of them.

#### Assessment of patients

Clinical assessment included: history, full otolaryngology examination, diagnostic nasal endoscope, radiological assessment by computerized tomography. All data had documented in formulated questioner paper.

**Inclusion Criteria** Patients age above 18 years who prone to ESS, and had limited posterior septal deviation that obscure the

visualization, and limited access to the work area (middle turbinate and ostiomeatal complex), discovered by nasal endoscope, were included in this study.

### Exclusion criteria

1. Symptomatic septal deviation alone.
2. Caudal dislocation.
3. Severe septal deviation with external nasal deformity needs septorhinoplasty.

### Pre operative assessment

Full rhinological history was taken for each patient, .Nasal examination were done by anterior rhinoscopy (pre and post decongestant application by xylometasoline 0.1%).Evaluation of vestibular skin, septum position, inferior turbinate mucosa and size, color of nasal mucosa and the presence discharge. Diagnostic nasal endoscope was done after preparation of nasal cavity, cotton soaked in 1 % xylocaine and xylometazoline 0.1% was left in the nasal cavity for 5 minutes. The examination was done in sitting position, 0 degree 4mm Hopkins rod nasal endoscope was used, (classical three passes was done, posterior septal deviation at the level of OMC and middle turbinate was identified and recorded in addition to other sinonasal pathology. Degree of septal deviation was scored depending on the passage of rigid 4mm endoscope, whenever scope not passed patient was included in this study. Radiological assessment by computerized tomography . Laboratory investigations were done as a routine preparation for surgery.

### Operative procedure

Consent was taken from all patients. Cotton soaked in xylocaine 1% and adrenaline1/10000 was inserted in the nasal cavity 15 minute before the operation. Under general anesthesia with cuffed endotracheal tube,

reverse Trendelenburg position, 0 degree 4mm Hopkins rod nasoscope were chosen, ESS begun with non -deviated side. For the endoscopic septoplasty group, longitudinal incision was done on convex side about 2 to 3mm caudal to the deviation .Using suction elevator, mucoperichondrial and mucoperiosteal flap were elevated and the dissection continue posteriorly ,chondrotomy was done and the opposite side of the cartilage dissected . The deviated cartilages and the bony septum, limited to work area, were resected and then the flap was repositioned.

In classical headlight method, hemitransfixion incision was done and the mucoperichondrial flap was elevated from the concave side and the dissection continue posteriorly, followed by posterior chondrotomy. The deviated cartilaginous and the bony segment were resected. The flap was repositioned and sutured by absorbable suture, After correction of septal deviation by either method mentioned above and access for work area gained ESS were completed for other side ,nasal septal splint inserted ,nasal pack in form of merocele were inserted.

### Post-operative

Immediately after complete the operation general condition were assessed in the ward. Antibiotics were prescribed in form of third generation cephalosporin (ceftriaxone 1gm) if not allergic, pain killer in form of (paracetamol vial 1gm.as single dose if needed).

Day1 post operatively nasal packs were removed and the nasal cavity was cleaned by suction clearance under direct vision. All of them discharged home on oral antibiotic (cefixime capsule 400 mg single dose per day ,analgesia(paracetamol tablet 500mg three doses per day, and sodium bicarbonate

nasal wash. On day 7 post-operative, removal of the splint, cleansing of nasal cavity by suction. Endoscopic examination was done. Further treatment may be prescribed according to the main pathology like intranasal steroid.

### Statistical analysis

Most of data presented frequency and percentage ,comparison between two group was done using fisher exact test and Chi square test, only age and operating time presented with a mean with SD and comparison between two group using unpaired student test P value of less than 0.05 was considered significant. The soft excel and graph pad prism 6 was used in this study.

### Results

Forty patients are included in this study, and was categorised equally into 2 groups. Group (A) underwent traditional septoplasty while group (B) underwent endoscopic septoplasty. Data from the questionnaire formula were analyzed and arranged in the following categories:

#### Age distribution

Mean age of group (A) was 34.50,S.D. was 10.38,with age ranging between 18-55years,while group(B)mean age was(36.95years),S.D.(10.57),age range was(18-55years).

P value =0.464.as in Table (1).

**Table (1):** Age distribution

Age(year)	Group(A)	Group(B)	P-value
Mean	34.50	36.95	0.464
S.D	10.38	10.57	
Range	18-55	18-52	
Total	20	20	

### Sex distribution

Males were 60% (12patient) in group (A),while it was 55% (11 patients) in group (B).Females were 40%(8 patient),45%(9

patient)in group(A),(B) respectively .value =1.00. Table (2).

**Table (2):** Sex distribution

Gender	Group A	Group B	P- value
Male	12(60%)	11(55%)	1.00
Female	8(40%)	9(45%)	
Total	20(100%)	20(100%)	

### Primary surgical procedure conjugated with limited septoplasty

All 40 patients were classified according to the primary endoscopic sinus surgery needed in conjugation with limited septoplasty, following table showing: 31 patients (77.5%) underwent FESS for surgical treatment of

CRS.6 patients (15%), were complained from epiphora due to distal nasolacrimal duct obstruction and underwent endoscopic DCR. There are 3 patients (7.5%) underwent endoscopic sphenopalatine artery ligation for recurrent epistaxis not responded to other measures Table (3):

**Table (3):** Primary surgery in conjugated with endoscopic surgery

Primary sur-gery	Primary disease	Number of patient	Percent
FESS	CRS	31/40	77.5%
Endoscopic DCR	Persistent epiphora	6/40	15%
ESPAL	Recurrent epistaxis	3/40	7.5%

**Operative time**

The septal correction time (regardless to the primary pathology) was: In Group A, ranged between (33-65minute) with a mean of

(50.10 minute, S.D=8.80), while in group B ranged was (12-30minute) with a mean of (19.35minute S.D=5.7) p.value = (0.0001). Table (4):

**Table (4):** Mean Operative time

Time in minute	Group A	Group B	P-value
Mean	50.10	19.35	0.0001
S.D	8.80	5.70	
Range	35-65	12-30	

**Intra operative complication**

Two patients(10%) in group A ,1 patient (5%) in the group B had intraoperative hem-

orrhage.15% (3 patients) in groupA,10%(2 patients) in group B had mucosal flap tear ,P-value =0.661. Table (5) :

**Table (5):** Intra operative complication

Perioperative complication	GroupA,number, percent%	Group B,number percent%	P-value
Hemorrhage	2/20,(10%)	1/20(5%)	0.56
Mucosal flap tear	3/20,(15%)	2/20(10%)	0.661

**Post-operative complication**

Hemorrhage and hematoma were observed in 2/20(10%) ,1/20(5%),in group A and B respectively, p value=0.56. Synchroniae, in group A was observed only in one patient 1/20, while in group B it observed in 5/20(25%),P-value=0.18.Delay septal incision wound healing was observed in 0/20

in group A, In group B 2/20(10%) ,P-value=0.487.

Septal perforation found in one case (5%) in group A, while no case reported in group B,P-value=1.00. There were no case reported of external nasal deformity in both groups . Table(6):

**Table (6):** Post-operative complication

Postoperative Complication	Group A, number, percent%	Group B, number, percent%	P-value
Hemorrhage, Hematoma	2/20,10%	1/20,5%	0.56
Synechia	1/20,5%	5/20,25%	0.18
Delay in septal incision healing	0/20,0%	2/20,10%	0.487
Change in external nasal appearance	0/20	0/20	

## Discussion

With the increase in the number of ESS done, another indication of nasal septal correction other than nasal obstruction became evident which is limited septoplasty to get adequate access to the work area of the lateral nasal wall and OMC. for visualization and instrumentation. Limited septal deviation can be corrected by conventional (cottle's) method or endoscopic assisted septoplasty .In this study all patients with limited septal deviation diagnosed by endoscope submitted to septoplasty were classify according to the method of surgical septal correction mentioned previously, data were collected and analyzed and the results were:

### Age and sex

Mean age was in the mid-thirties in both groups .Males were predominant in a ratio of 1.3/1.

This was in concordance with the study done by Tariq Ashur, in which male to female ratio was (2.6:1) with an age from 19 to 40 years old [22]. Prayaga N. *et al* in their study .The incidence of DNS is higher in males than females with a ratio of 2:1 [23].

**Types of primary endoscopic surgery done in association with septoplasty:** FESS was the commonest primary surgical procedure performed (77.5% in this study) ,followed by 15% for DCR and 7.5% for ESPAL respec-

tively. All septoplasty surgeries were done as a secondary procedure to achieve adequate access for ESS, for lateral nasal wall pathologies.

### These results consistent with the findings:

In a study done by Ranjan G Aiyer, Rahul Gupta, Jayman Raval [24].Septoplasty carried out with FESS in 10 patients out of 19; two out of 19 had DCR. Other study done by Leena Jain et al ; 20 out of 50 cases underwent endoscopic septoplasty in conjunction with FESS[25].Nishi Gupta et al. study, 20 /48(41%) endoscopic septoplasty performed in conjunction of endoscopic DCR. 8 cases (16%) endoscopic septoplasty were performed a lone [26].

### Operative time for septal correction:

Operative time depended upon many factors like surgeon experites and technical factor ,in our study we try to standardize the operative technique. The time needed for septoplasty was calculated from the beginning of septal mucosal incision to the end of the suturing of septum .The mean time of surgery was(50.1 ± 8.8 minutes) for the conventional group, while it was (19.35 ± 7.3) for the endoscopic group p<0.0001 .These result were consistent with the finding of:

Paradis and Rotenberg [27], in there study on 63 patient, 32 endoscopic and 31 conventional method ,the mean operative time was(52 ±

12.5) for conventional group, (24 ± 7 minute) for endoscopic group with (p<0.001). Bothra and Mathur[28], in their study refer to time saving in endoscopic group. Gulati *et al* [29], Gupta and Motwani [30], Sathyaki *et al*, [31]. C. Champagne [32]. In their study, result was more time will be saved with increased in number of endoscopic septoplasty operation done by surgeon. Mean operating time was 52.4 ± 17.7min, 42.3 ± 11.2min in less expert hand surgeon, mean time decrease to 21.1 ± 9.6, 19.2 ± 8.2 after 60 endoscopic septoplasty done by surgeon.

### Intraoperative complications

Mucosal flap tear was observed more in conventional group in this study 3/20(15%) patient, while in endoscopic group 2/20(10%), p=0.661. Intraoperative hemorrhage in this study was 2/20 (10%) in conventional group, 1/20(5%) in endoscopic group.

This consistent with finding: Paradis and Rotenberg[27] Sathyaki and [31]. reported double cases of mucosal damage, three times as many of intraoperative hemorrhage in the conventional group. Sathyaki, Chary Geetha, G. B. Munishwara, M. Mohan, and K. Manjanth in their study. In same study intraoperative bleeding was 8/50, 6 patient in conventional group, 2 in the endoscopic group.

Post operative complications: Post-operative hemorrhage and haematoma were observed in 2/20 (10%) in conventional group, 1/20(5%) in the endoscopic septoplasty group p=0.56

All of them were managed conservatively. This consistent of finding of :Gupta and Motwani [30], Bothra and Mathur, [28].

Synechia as complication was 5/20 (25%) in endoscopic group, which may be due to:

1. Iatrogenic synechia because of other procedure done to middle turbinate (for medialization).
2. The non-suturing technique used during endoscopic septoplasty incision and just approximation of edges was done.

While synechia was 1/20(5%) in conventional group. This finding concordance with :Gulati *et al*. [29], synechia was more in endoscopic group, while it was less in conventional group. Sathyaki *et al*. [31], .Gupta and Motwani, [30]. While in Bothra and Mathur, [28], in their study that included 80 patient divided into two group, synechia was 10/40 patient (25%) in conventional group while only 2/40 patients (5%) in endoscopic group had synechia.

Delay healing of the incision. Due to non suturing technique for wound closure in endoscopic septoplasty, delay in wound healing was observed in comparison to conventional group, We observed that 2/20(5%) of patient had delay in wound healing, no case in conventional group. This goes with finding of Sathyaki *et al*. [31], in his study.

### Conclusions

During endoscopic sinus surgery, limited posterior septal deviation can be better corrected by endoscope approach which provide direct visualization of deviation, more conservative surgical manipulation, shorter time and less intra and post-operative complications.

### Recommendations

1. Further studies on a large sample are recommended to support this study.



2. Further studies will be recommended for endoscopic septoplasty as a procedure submitted for symptomatic septal deviation.

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**Ethical clearance:** The project for this study was taken from the Medicine College / Diyala University ethical committee.

**Conflict of interest:** Nil

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## المضاعفات خلال وبعد عملية تعديل الحاجز الأنفي الخلفي المحدود بواسطة المنظار بالمقارنة مع تعديل الحاجز الأنفي بالطريقة التقليدية

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### الملخص

**خلفية الدراسة:** نسبة كبيرة من المرضى الذين يخضعون لعملية جراحة الأنف المنظارية لديهم انحراف في الحاجز الأنفي، مما يعيق الوصول الكافي إلى مجمع فتحات الجيوب الأنفية أو إلى المنطقة الإبطية من الزعفة الأنفية الوسطى. تصحيح الانحراف للحاجز الأنفي هو واحد من مفاتيح العملية الجراحية الناجحة. استقامة مثل هذا الانحراف تحسن الوصول إلى منطقة العمل على جدار الأنف الجانبي.

**اهداف الدراسة:** لمقارنة بين طريقة (كوتل) التقليدية والطريقة الناظورية لتصحيح انحراف الحاجز الأنفي الخلفي المحدود الذي يقتضي تصحيحه الوصول إلى منطقة العمل خلال جدار الأنف الجانبي، من حيث الفعالية المحيطة بالجراحة (الوقت والتعقيد)، ومضاعفات ما بعد الجراحة.

**المرضى والطرائق:** تم اختيار أربعين مريضاً (كل منهم لديه انحراف خلفي محدود في الحاجز الأنفي، بالإضافة لوجود حالة مرضية في الأنف والجيوب الأنفية تستدعي تدخلاً جراحياً)، وتنقسم عشوائياً إلى مجموعتين متساويتين، (وفقاً لنهج الجراحة لتصحيح الحاجز الأنفي. خضعت المجموعة (أ) التقليدية (طريقة كوتل)، في حين خضعت المجموعة ب إلى تجميل الحاجز الأنفي بالمنظار). تم تقييم جميع المرضى في قسم العيادات الخارجية لأمراض الأنف والأذن والحنجرة في مدينة الاماميين الكاظمين (ع) الطبية، من تشرين الأول ٢٠١٦ إلى تشرين الثاني ٢٠١٧. تم تقييم المرضى قبل وبعد العملية سريريًا والمنظار، وأجريت المتابعة بعد فترة ١ أسبوع، ١ شهر و ٣ أشهر بعد العملية.

**النتائج:** جراحة الجيوب الأنفية المنظارية الوظيفية كانت الجراحة الرئيسية الأكثر إجراءً للمرضى، تليها عملية التفويه الأنفي للقناة الدمعية ثم عملية الربط الناظوري للشريان الوددي الحنكي. فيما يتعلق بمتوسط الوقت المستغرق لتصحيح الانحراف المحدود للحاجز الأنفي كان أقصر في المجموعة ب (الطريقة الناظورية) مقارنةً بالمجموعة أ (بالطريقة التقليدية). النزف مع التجمع الدموي وثقب الحاجز الأنفي كان أبرز المضاعفات في المجموعة (أ) الطريقة التقليدية بينما كانت الالتصاقات وتأخر التئام الجرح أهم المضاعفات في الطريقة (ب) الطريقة المنظارية.

**الاستنتاجات:** خلال الجراحة الأنفية بالمنظار، يمكن تصحيح انحراف الحاجز الأنفي الخلفي المحدود بواسطة المنظار التي توفر الوصول المباشر للانحراف، وأقصر في الوقت وأقل في المضاعفات.

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