

TRANS-SEPTAL SUTURE METHOD VERSUS INTRANASAL SILICONE SPLINT IN SEPTOPLASTY

Dr. Abdulkhaliq Karim Amin¹, Dashti Ali Hasan², Dr. Ammar M. Saleh Jaff³

¹M.B.Ch.B.

¹Ph.D. Lecturer of Otolaryngology-Head and Neck Surgery,
Hawler Medical University.
haluk.emin@yahoo.com

Abstract

Background: Septoplasty is one of the commonest nasal surgeries performed by otolaryngologist. Silicone is the most common material used for nasal splints. Trans-septal suturing technique has been described to approximate the mucosal flaps after septal procedures to reduce the complication rate; however there are few studies proving the efficacy.

Objective: This study is to elucidate the efficacy of trans-septal suture method in preventing complications, discomfort and pain in comparison with intranasal splinting using silicone plates after septoplasty.

Patients and methods: This is a prospective study of 59 adult patients underwent Septoplasty, between August 2013-January 2014 in Rizgary Teaching Hospital - Erbil city. Patients were divided into 2 groups; trans-septal suture and silicone, 29 and 30 patients respectively. Visual analogue scale was used to evaluate postoperative pain, bleeding, post-nasal drip, dysphagia and sleep disturbance for three days. Epiphora and septal hematoma are also evaluated. Septal perforation, crustation, and adhesion were evaluated at 4th postoperative week.

Results: The severity of pain and post nasal drip were significantly lower in trans-septal suture group than silicone group ($P < 0.05$). The septal hematoma and septal perforation were not seen in the study. No any significant difference found concerning epiphora, crustation and adhesion.

Conclusion: we conclude that, suturing can be used safely in septoplasty specially when the septal deformity is not so complicated.

Key Word: Septoplasty, trans-septal suturing, silicone.

cartilaginous septum and minimize the persistence or recurrence of septal deviation. Despite these theoretical advantages, evidence to support the use of postoperative packing is lacking. Moreover, nasal packing is not an innocuous procedure. The most common morbidity associated with packing is postoperative pain⁽⁴⁾.

Nasal splints first time used in intranasal surgery by Salinger and Cohen in 1955 to keep the septum in position after septal surgery^(5,6). The commonest reason for using nasal splints which was mentioned by pringle in UK was to prevent the formation of adhesions⁽⁷⁾. Several types of materials have been used in the past such as strips of x-ray film, and the polyethylene tops of coffee cans, drug and intravenous fluid containers⁽⁷⁾, silicon or soft splints⁽⁸⁾, Wax plate splints⁽⁹⁾, magnet-containing silicone rubber intranasal splints⁽¹⁰⁾. According to the Royal National Throat, Nose and Ear Hospital in London, UK, silicon is the most common material used for nasal splints⁽¹¹⁾.

Several suturing techniques have been described to approximate the mucosal flaps after septal procedures to reduce the complication rate⁽¹²⁾. In 1984, Sessions et al.,⁽¹³⁾ reported continuous suture quilting using 4.0 plain catgut on a small cutting needle to approximate the mucosal flaps. A similar technique using a curved needle was described by Lee et al⁽¹²⁾. These techniques also help to close mucosal tears and support the remaining cartilage⁽¹⁴⁾.

I. INTRODUCTION

Septoplasty is a corrective surgical procedure done to correct or repair any defect of the nasal septum, it is one of the commonest nasal surgeries performed by otolaryngologist, alone or in combination with other procedures, such as inferior turbinoplasty, endoscopic sinus surgery and rhinoplasty⁽¹⁾.

Until the 1960s, submucous septal resection (SMR) as promoted by Freer and Killian was standard practice in Western Europe⁽²⁾. The main criticisms of the SMR were a high rate of septal perforation, external deformity, the inability to correct anterior deviations and the difficulty in performing revision surgery. These criticisms led to the emergence of the septoplasty operation⁽³⁾.

The use of postoperative packing has been proposed to minimize postoperative complications such as haemorrhage, mucosal adhesions, and septal haematoma. Additionally, postoperative packing is believed to stabilize the remaining

A. Indications for septoplasty:

Symptomatic deviated septum, as a part of septorhinoplasty for cosmetic reasons, as an approach to hypophysectomy and recurrent epistaxis due to septal spur are mentioned as the main indications for septoplasty (15).

B. Complications after septoplasty:

It includes excessive bleeding; septal hematoma; infection; septal abscess; septal perforation; saddle nose deformity; nasal tip depression; sensory changes, such as anosmia or dental anesthesia; cerebrospinal fluid rhinorrhea (16). Severe complications such as toxic shock syndrome, meningitis and cavernous sinus thrombosis (17). Some of these complications are rare but life threatening (18). For a long time, intranasal adhesion (fig.4) development has been a known important complication in the post-operative phase of nasal surgery (19).

The branches of the external and internal carotid arteries are responsible for the rich blood supply to the nose as in figure 3 (15).

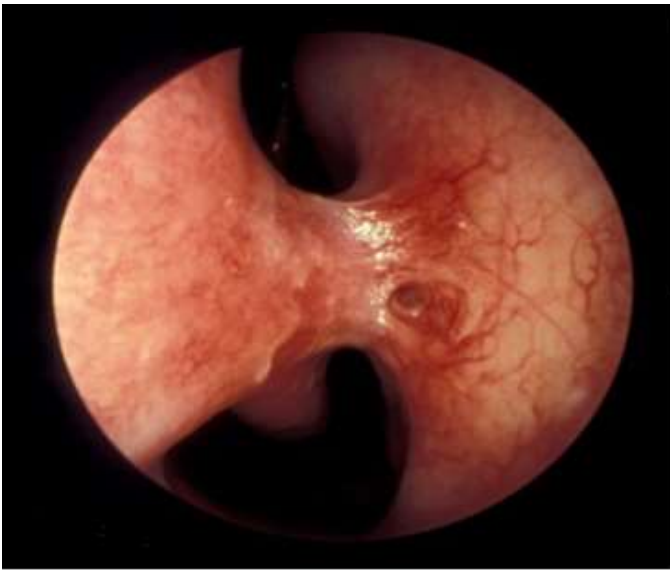
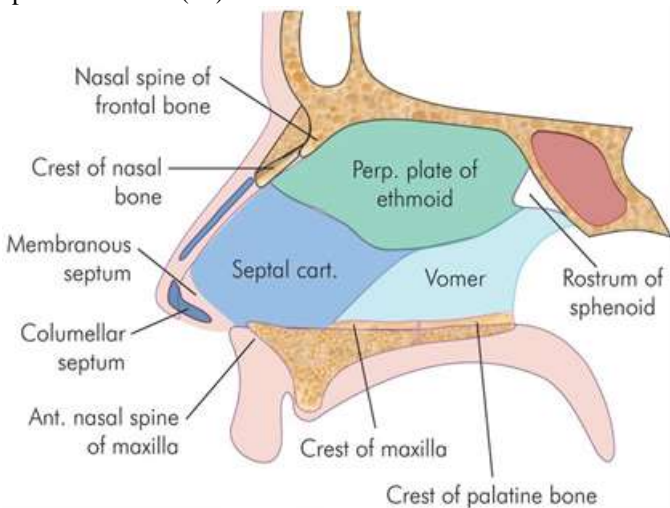


Figure (1): Adhesion between right inferior turbinate and nasal septum (19).

C. Anatomy of the nasal septum:

Nasal septum consists of three parts; columellar septum, membranous septum and the septum proper as in figure (2). The columella contains the medial crura of alar cartilages united together by fibrous tissue and covered on either side by skin. The membranous septum consists of double layer of skin with no bony or cartilaginous support and it lies between the columella and the caudal border of septal cartilage. The septum proper consists of osteocartilaginous framework that covered with nasal mucous membrane and its principal constituents are the perpendicular plate of ethmoid, the vomer, and a large septal (quadrilateral) cartilage wedged between the above two bones anteriorly, also other bones which make minor contributions at the periphery are: crest of nasal bones, nasal spine of frontal bone, rostrum of sphenoid, crest of palatine bones and the crest maxilla, and the anterior nasal spine of maxilla (15).



Figure(2): Anatomy of nasal septum (15).

D. Blood supply:

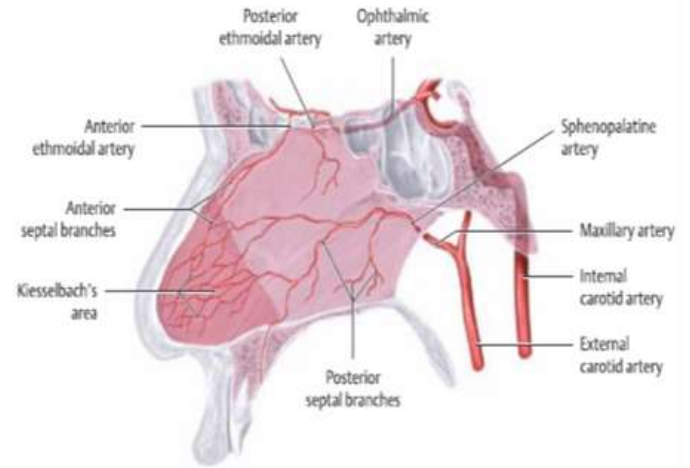


Figure (3): Arterial supply of the septum.(20).

E. Nerve supply:

The maxillary division of the trigeminal nerve provides the sensory supply to the majority of the nasal septum (Figure 4). The nasopalatine nerve supplies the bulk of the bony septum, entering the nasal cavity via the sphenopalatine foramen, passing medially across the roof of the upper septum and running down and forwards to the incisive canal to reach the hard palate. The anterosuperior part of the septum is supplied by the anterior ethmoidal branch of the nasociliary nerve and a smaller anteroinferior portion receives a branch from the anterior superior alveolar nerve. The posteroinferior septum also receives a small supply from the nerve to the pterygoid canal and a posterior inferior nasal branch of the anterior palatine nerve (21-23).

The sensory nerves are accompanied by postganglionic sympathetic fibers to blood vessels and postganglionic parasympathetic secretomotor fibers pass to glands with the branches from the pterygopalatine ganglion. The olfactory epithelium covers the inferior surface of the cribriform plate spreading down to cover a variable area on the upper septum and adjacent lateral wall, over the medial surface of the superior concha (21-23).

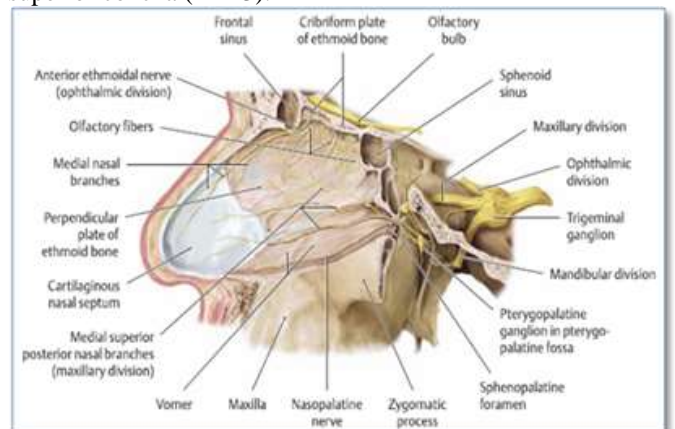


Figure (4): Nerve supply of nasal septum (20).

Lymphatic drainage: The anterior septum drains with the external nose to the submandibular nodes while drainage is to the retropharyngeal and anterior deep cervical nodes posteriorly (21-23).

II. AIM OF STUDY

This study aimed to elucidate the efficacy of trans-septal suture method in preventing complications, discomfort and pain in comparison with intranasal splinting using silicone plates after Septoplasty.

III. PATIENTS AND METHODS

This is a prospective comparative study conducted on 59 adult patients in Rizgary teaching hospital-Erbil between August 2013 and February 2014. In all patients who were enrolled in the study, informed consent was obtained prior to enrollment.

Symptomatic deviated septum and age of above 17 years were included in the study, while the exclusion criteria were history of previous nasal surgery, the presence of chronic sinusitis or nasal polyposis, diabetic patients, uncontrolled hypertension, blood disorders, patients on anticoagulant therapy or hormonal therapy, aspirin intake or systemic steroids (because of bleeding is one of the main side effect in last two criterias).

Following history taking, a routine clinical assessment by anterior rhinoscopy and endoscopic examination done. The airway examined by cottle test, forced cottle test and cotton strap test.

Patients were fully investigated by: Blood group and Rh, blood sugar, clotting time, bleeding time, and virology screen. The patient above 40 years assessed for: Blood urea, serum creatinine, chest X-ray, ECG and anesthesiological consultation.

All septoplasties were performed under general anesthesia with endotracheal intubation, the septum was infiltrated with 1% lignocaine with adrenaline, 1:100,000. A caudal septal incision is made (hemitransfixion). The septum is approached by elevating the perichondrium flap; the various septal parts are dissected free and mobilized by chondrotomies, as required. The deviated cartilage and bone removed or reshaped, we tried to preserve cartilage as much as possible to prevent external nose deformation. then the incision was closed using 4-0 PDS sutures.

Patients were randomly divided into two groups, continuous trans-septal suturing done by using 4-0 PDS suture material (Group I) and bilateral nasal airway silicone splint (Group 2) were inserted and fixed by one suture to the caudal end of the nasal septum (Figure 5). The silicones were removed on 7th postoperative day



Figure (5): Airway nasal silicone splint (11).

Patients were monitored and discharged to the ward, where advised for elevation of the head about 30 degree. All patients received oral analgesic tablet, with sea water spray for the 0 postoperative day. In the 1st, 2nd and 3rd post-operative days all patients discharged on sea water spray and paracetamole as analgesia and we followed up them daily in the outpatient.

Postoperatively the subjective symptoms were evaluated, including postoperative pain, nasal bleeding, postnasal drip, sleep disturbance, dysphagia and epiphora. Each of these evaluations was performed using a visual analogue scale (VAS; a scale between 0 and 100; 0 nil, 100 very severe). Patients were interviewed regarding their symptoms on 1th, 2nd and 3rd postoperative days. Complications such as perforation, adhesion and crustation were evaluated at 4th postoperative week.

IV. STATISTICAL ANALYSIS

Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 18). Chi square test of association was used to compare between proportions of the study groups. A p value of equal or less than 0.05 was considered statistically significant.

V. RESULTS

The mean of the sample was 27.18 ± 7.78 years, ranging from 17 – 50 years. The main age group was between 20-29 years (35 cases), as shown in figures (6 and 7).

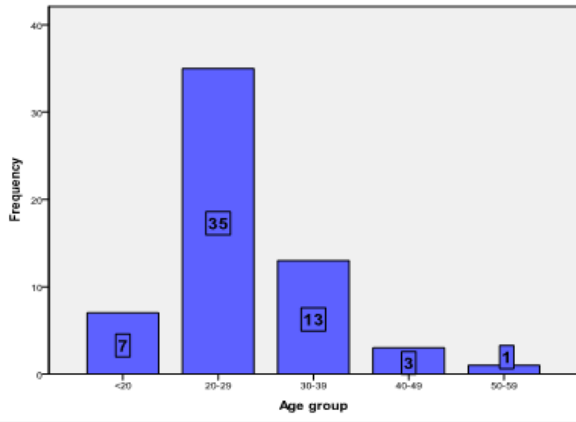


Figure (6): Age groups.

Out of total 59 patients, 43 patients were males (72.88%) and 16 patients were females (27.12%) as shown in the figure (7).

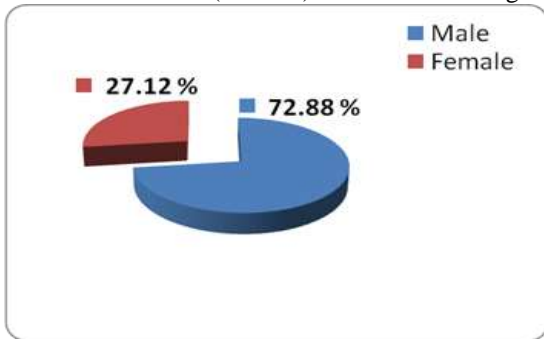


Figure (7): Sex distribution

Postoperative pain:

The Postoperative pain level was significant only on 1st postoperative day with a mean 18.97 for trans-septal suture (group 1) and 27 for silicone (group 2) as shown in table(1) and figure (8). P value is significant only in the 1st day.

Group		1st POD	2nd POD	3rd POD
Group (1)	Mean	18.97	10.69	2.41
	SD	7.24	5.93	5.11
Group (2)	Mean	27.00	13.67	2.33
	SD	9.52	8.90	4.30
P value		0.001	0.138	0.948

Table(1): postoperative pain.

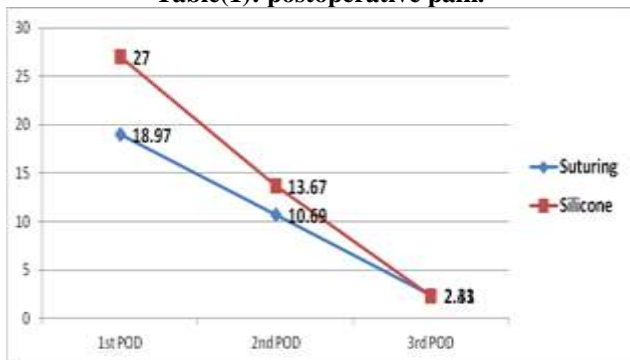


Figure (8): postoperative pain.

Postoperative bleeding:

There was no significant difference between both groups, p value was > 0.05 as shown in table (2).

Group		1 st POD	2 nd POD	3 rd POD
Group (1)	Mean	11.72	5.17	0.00
	SD	8.05	5.09	0.00
Group (2)	Mean	12.67	7.33	0.00
	SD	8.68	5.21	0.00
P value		0.667	0.11	

Table (2): postoperative bleeding.

Postoperative Post-nasal drip:

The results of the postoperative post-nasal drip were significant on 1st and 2nd postoperative days with a mean 12.07 and 5.52 and in Group 1 respectively which were lower than the score of Group 2 (18.33 and 12.33) as shown in table (3) and figure(9).

Group		1 st POD	2 nd POD	3 rd POD
Group (1)	Mean	12.07	5.52	0.00
	SD	5.59	5.72	0.00
Group (2)	Mean	18.33	12.33	0.00
	SD	6.99	7.28	0.00
P value		<0.001	<0.001	

Table (3): Postoperative post-nasal drip.

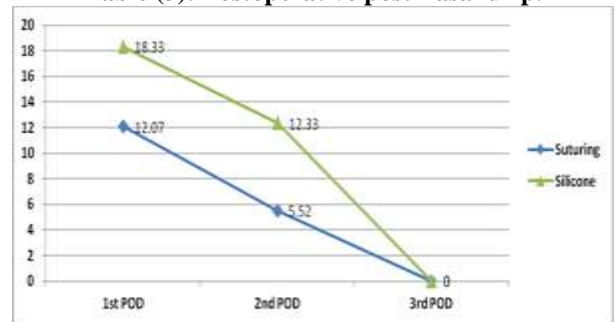


Figure (9): Postoperative post-nasal drip.

Postoperative Sleep disturbances:

There was no significant difference between both groups, p value was > 0.05 as shown in table (4).

Group		1 st POD	2 nd POD	3 rd POD
Group (1)	Mean	12.07	5.51	0.00
	SD	4.91	5.06	0.00
Group (2)	Mean	13.67	6.33	0.00
	SD	6.69	4.9	0.00
P value		0.32	5.53	

Table (4): Postoperative sleep disturbance.

Postoperative food intake and dysphagia:

There is no significant difference between both groups regarding dysphagia and difficulties of food intake as shown in table 5).

Group		1st POD	2nd POD	3rd POD
Group (1)	Mean	11.03	0.00	0.00
	SD	4.89	0.00	0.00
Group (2)	Mean	12.33	0.00	0.00
	SD	5.04	0.00	0.00
P value		0.32		

Table (5): Postoperative food intake and dysphagia.

Postoperative epiphora:

There was epiphora in three patients (10.3%) in Group1 and five patients (16.7%) in Group 2. p value is 0.47 which is not significant (table 6).

higher in group two, possibly due to silicone irritation. There is no study comparing this parameter between suture and silicone splint.

There is no significant difference between both groups in postoperative sleep disturbance in our study, while there is significant sleep disturbance found in a study done by Jawaid et al (2012) in which they compared packing and non-packing (80% in the packing group had less than six hours of sleep on the night of the surgery, compared with only 16.2% in non packing group ($p < 0.05$) (30). More sleep disturbance found in packing group, due to nasal passage obstruction by pack, while in this study nasal passage not obstructed in both groups, neither in silicone nor in suture.

The postoperative food intake and dysphagia between both groups were not significant. As mentioned above no study found comparing suture with silicone, but regarding trans-septal suture Korkut et al (2010) found that no patient had difficulty in swallowing (31), Which is similar to our study results.

There is no statistical significant difference between both groups concerning the postoperative epiphora, eight cases (3 in group1 and 5 in group2) developed epiphora. Epiphora in septoplasty mainly caused by obstruction of the nasolacrimal duct by packing, their presence in our study may be due to minor trauma during surgery or mucosal edema and inflammation postoperatively.

Neither septal hematoma nor nasal perforation occurred in our patients. Awan et al (2008) found that 1 of 44 cases of trans-septal suture group developed septal hematoma and Gunaydin et al (2011) showed no septal perforation in 100 case of trans septal suture (24,27) which are not significant. Results of first and second studies are similar to our study results.

In group 2, nasal crust was seen in 2 patients and adhesion in one patient, while no such complications occurred in group 1, but the difference is statistically not significant. Asaka et al (2012) found crustation in 2 of 15 cases of silicone group and no adhesion noted (28), which is statistically similar to our study. Awan et al (2008) reported no adhesion in suture group (25), which is like our study (24).

VII. CONCLUSIONS AND RECOMMENDATIONS

Although the consensus in current world literature is that packing should be avoided, non-packing alternatives such as postoperative suturing techniques are still underused in many ENT centers, partly because the many clinical questions had not been answered. Suturing technique and silicone packing showed similar risk for postoperative haemorrhage, septal perforation, septal haematoma, mucosal adhesions. However, suturing indicated a significant decrease in the postoperative pain; therefore, it can be considered as the preferred technique in Septoplasty.

We recommend that, for the time being, suturing can be used safely in septoplasty specially when the deviation is in the anterior part of septum and when the septal deformity is not so complicated.

ACKNOWLEDGMENT

- Thanks for God for everything.

Groups	Epiphora	Number of patients	Percentage	P value
Group (1)	Yes	3	10.3%	0.47
	No	26	89.7%	
Group (2)	Yes	5	16.7%	
	No	25	83.4%	

Table (6): postoperative epiphora.

Evaluation at 4th postoperative week:

Crustation and adhesion were not found in Group 2, while two cases (6.9%) with unilateral nasal crust and a case of unilateral adhesion were seen in Group 1. p value 0.14 and 0.30 respectively which are not significant, as shown in tables (7) and (8).

Groups	Crust	Number of patients	Percentage	P value
Group (1)	Yes	2	6.9%	0.14
	No	27	93.1%	
Group (2)	Yes	0	0.0%	
	No	30	100%	

Table (7): postoperative nasal crustation.

Groups	Adhesion	Number of patients	Percentage	P value
Group (1)	Yes	1	3.4%	0.30
	No	28	96.6%	
Group (2)	Yes	0	0.0%	
	No	30	100%	

Table (8): postoperative nasal adhesion.

There were no septal hematoma and septal perforation in our study.

VI. DISCUSSION

Several studies showed that the results were in favor of trans-septal suturing compared to packing (24). No previous study found comparing trans-septal suture with silicone alone in septoplasty as we did in our study.

A significant statistical difference in the severity of nasal pain seen between both groups on 1st postoperative day, which was lower in group 1. This is in accordance with the results of Awan et al (2008), Ardehali et al (2009) and Gunaydin et al (2011) in which suture compared with packing (25-27). In other study, Asaka et al (2012) in which packing compared with silicone, the nasal pain score for silicone splint was very close to our result of silicone group (28).

Regarding the postoperative bleeding, results show non significant statistical difference in postoperative bleeding from day one to day three between both groups. Six cases (2 in Group1 and 4 in Group2) had minor oozing stopped without packing. In a study done by Cukurova et al (2012) mild bleeding occurred in 4 from 363 cases of trans-septal suture group (29) while in this study 2 out of 29 cases of group one had simple bleeding. The difference in the result is due to different sample size. Asaka et al (2012) reported that no significant amount of bleeding occurred in silicone group (28). The result was similar to our study.

In postoperative post-nasal drip there was a statistically significant difference at 1st and 2nd postoperative days. It is

- I would like to express my deep respect, appreciation and gratefulness to my supervisor Dr. Abdulkhaliq Karim Amin for his kind guidance and support and encouragement to complete this study.
- I acknowledge with gratitude all specialists, colleagues & staff in ENT department in Rizgary Teaching Hospital for their kind help and co-operation.

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Appendix: Questionnaire Form.

Trans-septal suturing versus airway nasal silicone splint in Septoplasty.

Appendix: Questionnaire Form.

Trans-septal suturing versus airway nasal silicone splint in Septoplasty.

name : age: gender: address: occupation: date of op: mob. no:

Presenting symptoms :

Nasal obstruction Rt Lt Bilateral
 Duration of obstruction :

Associated symptoms:

Facial-pain-pressure-fullness	yes	<input type="checkbox"/>	no	<input type="checkbox"/>
Post nasal drip /discharge	yes	<input type="checkbox"/>	no	<input type="checkbox"/>
Sneezing	yes	<input type="checkbox"/>	no	<input type="checkbox"/>
Itching	yes	<input type="checkbox"/>	no	<input type="checkbox"/>
Epistaxis	yes	<input type="checkbox"/>	no	<input type="checkbox"/>
Crustation	yes	<input type="checkbox"/>	no	<input type="checkbox"/>

groups: suture (1) silicone (2)

op: Visual analogue scale

1- Pain

Day	No pain	10	Mild 20	30	Moderate 40	50	Sever 60	70	V. sever 80	100
1										
2										
3										

2- Nasal bleeding:

Day	No Bleeding	10	Mild 20	30	Moderate 40	50	Sever 60	70	V.sever 80	100
1										
2										
3										

3- Post nasal drip

Day	No drip	10	Mild 20	30	Moderate 40	50	Sever 60	70	V.sever 80	100
1										
2										
3										

4- Sleep disturbance:

Day	Non	10	Mild 20	30	Moderate 40	50	Sever 60	70	V.sever 80	100
1										
2										
3										

5- Effects on food intake

Day	No	10	Mild 20	30	Moderate 40	50	Sever 60	70	V.sever 80	100
1										
2										
3										

6- Epiphora

yes

7-Septal hematoma

yes

4 Weeks post op. assessment:

- Nasal crustation yes
- Nasal adhesion yes
- Septal perforation yes

