

## Trans-Septal Suturing as an Alternative to Nasal Packing Following Septoplasty – A Prospective Study

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### Abstract

**Background:** Nasal packing following septoplasty has been followed traditionally with the aim to stabilise repositioned cartilage and prevent postoperative hemorrhage, and septal hematoma. It is, however, associated with intense pain and discomfort in the postoperative period, besides causing dry mouth, sore throat, vestibulitis, poor quality of sleep, hypoxemia and increased risk of synechiae. Trans-septal suturing offers better patient compliance owing to minimal peri-operative pain and discomfort, and decreased incidence of pack-related complications. We have conducted a prospective, randomised controlled trial to assess the surgical outcomes, efficacy and rate of complications of quilting trans-septal sutures as compared to nasal packing.

**Methods:** 50 patients presenting with symptomatic deviated nasal septum and undergoing septoplasty were randomly divided into two groups – Group A underwent nasal packing with soframycin-soaked ribbon gauze or merocel. Group B underwent trans-septal quilting suture without nasal packing. Patients were assessed for parameters like postoperative nasal pain, symptoms of dry mouth/sore throat, significant hemorrhage, vestibulitis, septal hematoma and synechiae. The results of both the groups were tabulated and analysed.

**Results:** Patients with nasal packing had significantly higher mean pain score (MPS) in the postoperative period as compared to trans-septal suturing group, both at 24 hours (5 vs 2.12) and at one week (4.4 vs 1.8). The most painful event was removal of nasal packs (MPS = 6.2). The rate of synechiae was higher with nasal packing (20% vs 8%). Dry mouth/sore throat (72%) and vestibulitis (12%) was exclusively associated with nasal packing. None of the patients in either group had septal hematoma or significant hemorrhage.

**Conclusion:** Nasal packing and trans-septal suturing are equally effective in preventing postoperative hemorrhage, septal hematoma and stabilising the repositioned cartilage. Trans-septal suturing avoids the severe postoperative pain and discomfort associated with nasal packing and can be used in all patients undergoing septoplasty as a reliable, cost-effective alternative.

**Keywords:** Merocel, Haemorrhage, Soframycin, Hypoxemia.

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## Introduction

Septoplasty for correction of symptomatic deviated nasal septum is one of the most commonly performed surgeries in otorhinolaryngology. Nasal packing following septal correction has been followed traditionally with the aim to prevent postoperative hemorrhage, septal hematoma and nasal synechiae. Nasal packing may also play a role in stabilising the repositioned cartilaginous septum in the early post-operative period, thereby, minimising the persistence or recurrence of septal deviation [1]. Nasal packing, however, is not without disadvantages. By abolishing nasal respiration, it causes mouth breathing, compromised quality of sleep, dryness of mouth, throat irritation, difficulty in swallowing and hypoxia [2,3]. Nasal packing also causes irritation of nasal mucosa due to friction at the time of insertion and removal, and due to prolonged pressure on mucosa. This affects nasal mucociliary activity, which may not return immediately upon pack removal. Vestibulitis, excessive crusting, synechiae formation are other known risks of nasal packing [2]. Retention of sinonasal secretions may cause headache, while obstruction to nasolacrimal outflow can cause epiphora. Several studies have shown that nasal packing inevitably leads to intense pain while packing, with pack in situ and during pack removal [4-7]. All these symptoms cause significant discomfort to patients in the perioperative period; the patients often describe nasal packs as the most unpleasant part of septal correction surgeries. Several techniques have been described to reduce the pain and discomfort associated with nasal packs such as wrapping the packs with gelfoam [8], blocking the sphenopalatine ganglion [9], using topical anesthesia for removal [10], keeping the pack for a shorter time [11]. The commonly used materials for nasal packing include ribbon gauze soaked with bismuth iodoform paraffin paste (BiPP), liquid paraffin, antibiotic

ointments, glove finger pack, Telfa and polyvinyl acetate sponge (merocel) pack.

Several suturing techniques to approximate the mucosal flaps have been described as an alternative to nasal packing. Sessions described continuous quilting suture using 4.0 plain catgut on a small cutting needle to approximate the mucosal flaps [12]. A similar technique using a curved needle was described by Lee and Vukovic [13]. Wormald described his technique of quilting sutures using 3.0 vicryl on a slightly curved needle with stitches taken in a posterior to anterior direction [14]. Quilting sutures across nasal septum reduce the risk of septal hematoma by decreasing dead space between muco-perichondrial flaps. Moreover, any mucosal tears are simultaneously closed and repositioned septal cartilage is stabilised. Trans-septal suturing has better patient compliance owing to minimal peri-operative pain and discomfort, reduction of analgesia requirement and incidence of pack-related complications [3,15].

We, therefore, conducted a prospective, randomised controlled trial to assess the efficacy of trans-septal suturing in patients undergoing septoplasty for symptomatic septal deviations. The surgical outcomes and complications of quilting trans-septal sutures were compared with nasal packing.

## Materials and Methods

The study was conducted in the department of Otorhinolaryngology at our hospital, a tertiary care referral centre, over an 18-month period. A total of 50 patients undergoing septoplasty were recruited into the study based on the inclusion and exclusion criteria.

**Inclusion criteria:** Patients with symptomatic deviated nasal septum in the age group of 18-50 years were recruited into the study.

**Exclusion criteria:** Patients suffering from diabetes, hypertension, coronary heart disease, blood dyscrasias and those using blood thinners were excluded. Patients with history of previous nasal surgery, nasal polyposis, nasal allergy, drug use, and pregnant women were also excluded from the study.

All these patients underwent septoplasty, done by a single surgeon, and were randomly divided into two groups of 25 patients each.

**Group A:** Nasal packing. Group A was further divided randomly into two subgroups.

**Sub-group A1** (12 patients): Nasal packing with merocel.

**Sub-Group A2** (13 patients): Nasal packing with soframycin-soaked ribbon gauze).

**Group B:** Trans-septal quilting suture without nasal packing.

### **Surgical procedure**

Written, informed consent was taken from all patients. Before surgery, both the nasal cavities were packed with nasal patties soaked in 4% xylocaine. The nose was prepared with topical decongestant spray and by infiltration with 2% lignocaine and 1:100000 adrenaline solution. Septoplasty in all cases was done using the standard Cottle's maxilla-premaxilla technique. Either Killian's or hemitransfixion incision was used depending on presence or absence of caudal dislocation of septal cartilage. After correction of deviated septum, nasal packing was done in patients assigned to group A. In patients assigned to group B, trans-septal suturing was done as described below.

### **Procedure of trans-septal suturing**

We used the method described by Wormald to place quilting sutures across the nasal septum under endoscopic guidance. 3.0 vicryl suture on a curved cutting needle is used. Firstly, a knot is placed in the distal end of suture material. The needle is held along the shaft of a small needle holder so that the

force of pushing the needle through the tissue is applied directly behind the needle. The initial placement of the suture is across the posterior part

of the septum, either through or just anterior to the middle turbinates (if they are unstable),

The needle is passed back through the septum a few centimeters anterior to the previous site, creating the quilting effect. Using continuous suturing technique from posterior to anterior direction, mucoperichondrial flaps are approximated as the needle is advanced towards the caudal end of the septum. The septal incision is incorporated into this suture, the final pass of suture being through the skin of vestibule where the thread is knotted on itself.

Patients of both groups received systemic antibiotic and antihistamine (levocetirizine) for one week postoperatively. Nasal packs in Group A patients were removed gently after 48 hours. Patients were started with Xylometazoline nasal drops from day of surgery in the transseptal suturing group and after pack removal in the packing group. Alkaline nasal douching (with warm water, normal salt and baking soda) was started after 48 hours in patients of both the groups.

### **Outcome measurement**

The patients were assessed at 24 hours, 48 hours (pack removal in group A), at 1 week and at 1 month. Following measures of outcome were assessed-

1. Nasal pain - A Visual Analogue Scale (VAS) was used for pain assessment. Markings were made by the patient on a simple, horizontal, unnumbered 10 cm line, where 0 = no pain and 10 = most severe pain imaginable. The pain scores were assessed at 24 hours, at time of pack removal in group A (48 hours) and at 1 week.
2. Hemorrhage - Significant reactionary hemorrhage was defined as one sufficiently severe to require either

- repacking at the bedside, return to Operation Theater or blood transfusion.
3. Symptoms of dry mouth or sore throat.
  4. Presence of early and late adhesions/synechiae at 1 week and 1 month respectively - Assessed by diagnostic nasal endoscopy
  5. Presence of septal hematoma – Assessed by clinical examination
  6. Vestibulitis - Assessed by clinical examination

### Statistical analysis

The data was entered into Microsoft Excel Worksheet to create the master chart. Statistical analysis was done using IBM Statistical Package for Social Sciences (SPSS) version 29.0. Categorical variables

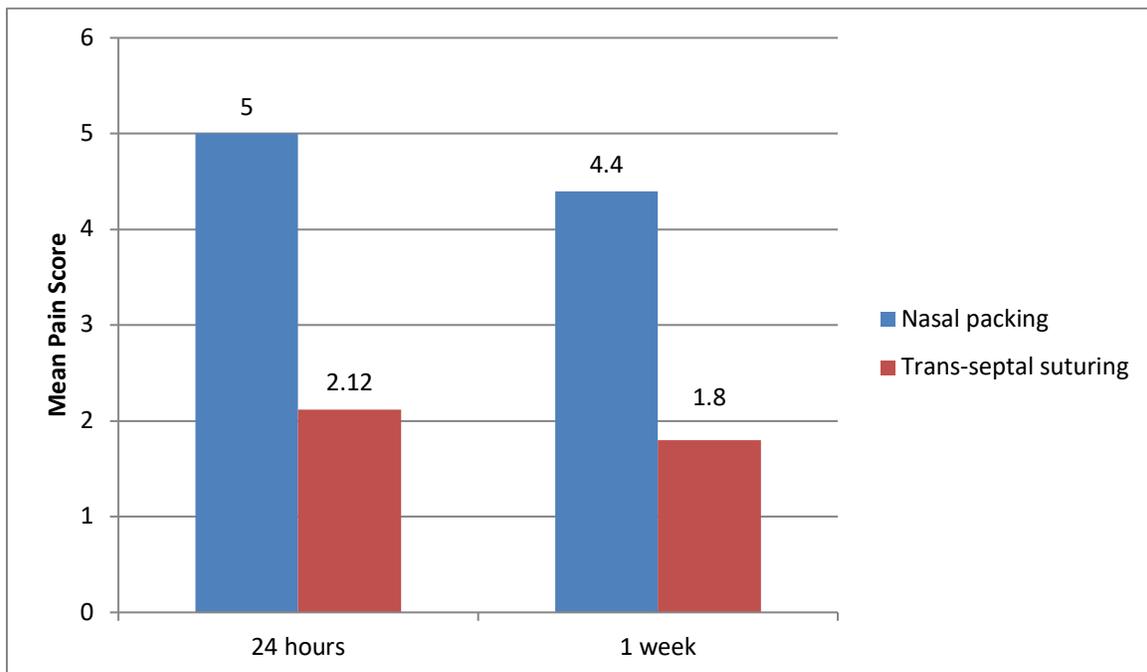
have been presented as absolute numbers and percentages while continuous variables have been presented as mean with standard deviation for normally distributed values and median with interquartile range for non-normally distributed values.

Quantitative variables were compared using Unpaired t-test/Mann-Whitney Test (when the data sets were not normally distributed) between the two groups. Qualitative variables were correlated using Chi-Square test /Fisher's exact test. A p value of <0.05 was considered statistically significant.

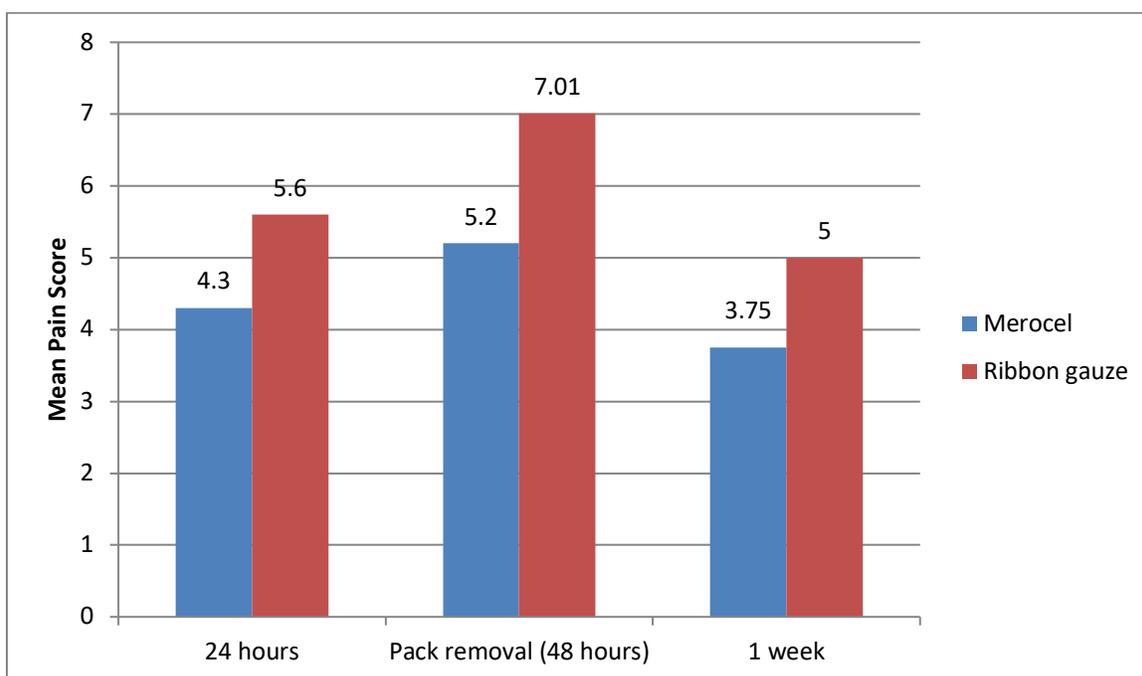
### Observations and Results

#### Nasal pain

The results of postoperative mean pain score (MPS) are shown in Figure 1 and 2.



**Figure 1: Mean Pain Score (MPS) after nasal packing and trans-septal suturing**



**Figure 2: Mean Pain Score (MPS) after merocel and soframycin-soaked ribbon gauze packing**

Patients with nasal packing suffered significantly more pain in the postoperative period as compared to trans-septal suturing group, both at 24 hours and at one week. The mean pain score at 24 hours in the packing group was 5 compared to 2.12 in the suturing group. Moreover, the pain score remained significant (4.4) even in the 7th POD visit in the nasal packing group. The pain score in the quilting group was almost negligible on the 7th POD (1.8). The difference in values were found to be statistically significant both at 24 hours and on the 7th day on Man Whitney U test ( $p < .05$ ).

Patients in whom soframycin-soaked ribbon gauze was used for nasal packing complained of significantly more pain than those with merocel at all times - at 24 hours, 48 hours and 7th day, the difference in values being statistically significant ( $p < .05$ ) on Man Whitney U test. The most painful event during the postoperative period was removal of nasal packs, the MPS being 6.2.

The adverse effects and complications following nasal packing and trans-septal suturing are shown in Table 2.

**Table 1: Adverse effects and complications following nasal packing and trans-septal suturing**

Complications	Nasal packing			Suturing n=25
	Merocel (n=12)	Ribbon gauze (n=13)	Overall (n=25)	
Hemorrhage	0	0	0	0
Septal hematoma	0	0	0	0
Vestibulitis	0	3	3	0
Dry mouth/sore throat	8	10	13	0
Adhesions	0	5	5	2

## Evaluation of Postoperative Bleeding/Ooze

Significant hemorrhage, as defined by the need for repacking, re-exploration or blood transfusion, was not observed in any of the patients.

### Postoperative symptomatology

18 (72%) patients in the nasal packing group presented with dryness of mouth and/or sore throat, while none of the patients in the suturing group had these symptoms. As for the type of nasal packing, those with ribbon gauze packing (76.9%) had a slightly higher frequency of these discomforting symptoms when compared to merocel (66.6%); the difference, however, was not statistically significant. ( $p=0.56$ )

### Postoperative examination findings

None of the patients in this study developed septal hematoma.

Vestibulitis was seen in 3 (12%) of patients with nasal packing, while none in the suturing group developed this complication. However, this occurred only with ribbon-gauze packing and not with merocel.

Adhesions/synechiae developed in 5 (20%) patients with nasal packing as compared to 2 (8%) with trans-septal suturing. The difference in both groups was not statistically significant with Pearson's chi-squared test ( $p=0.22$ ). Synechiae developed only in those with ribbon-gauze packing and not with merocel.

### Discussion

Septal correction surgery has been conventionally followed by nasal packing for 24-48 hours. The proposed advantages of nasal packing were to prevent development of postoperative septal hematoma, synechiae, hemorrhage and to stabilise the repositioned septal cartilage. However, it is associated with significant patient discomfort in the perioperative period owing to nasal pain, headache, dryness of mouth, sore throat,

difficulty in swallowing and poor quality of sleep. In our study, nasal packing caused significantly more pain in the postoperative period as compared to trans-septal suturing, both at 24 hours and at one week. It was noted that the most painful event during postoperative period was removal of nasal packs, the MPS at this time being 6.2. With pack in-situ, pain is probably related to the intense pressure exerted on the nasal mucosa. Moreover, at the time of removal, the packing material causes significant mucosal trauma leading to intense pain sensation. The mucosal trauma due to insertion and removal may contribute to the increased pain sensation even at one week following surgery.

Schoenberg *et al* reported that pain was significantly higher in the group that were packed after surgery; and the removal of packing proved to be the most painful event in the postoperative period. They observed a MPS of 4.2 and 5.7 in the first 24 hours and on pack removal respectively, which was comparable to our study (5.0 and 6.2) [5]. Nunez *et al* did a study comparing nasal packing with septal suturing and found worse pain scores in the nasal packing group than patients who underwent mucosal suturing [6]. Several other studies have shown similar results of increased pain and discomfort with nasal packing [15-17].

The use of merocel (polyvinyl acetate sponge) instead of ribbon gauze has significantly reduced pain and discomfort for the patient as evidenced by our study results. There was a statistically significant difference in the MPS of two subgroups (4.3 vs 5.6 at 24 hours and 5.2 vs 7.01 at pack removal). This could be explained in view of merocel's softer material as well as its relatively atraumatic insertion with subsequent swelling to exert mucosal pressure. However, it must be noted that merocel still caused significantly more postoperative pain than trans-septal suturing.

The nasal mucosa humidifies and warms the inspired air. Nasal packing compromises these functions leading to dryness of mouth and sore throat. These distressing symptoms were present in 72% of patients with nasal packing and none in the suturing group. Some studies have reported these symptoms in all the patients with nasal pack in-situ [3,18].

None of the patients in this study group had significant hemorrhage in the postoperative period, requiring packing (in suturing group) or repacking (in packing group). Other studies have reported no significant differences in the rates of postoperative hemorrhage between nasal packing and trans-septal suturing [15,19,20]. None of our patients developed septal hematoma in the postoperative period. Several studies have similarly found no or very low incidence of septal hematoma with trans-septal suturing [15,19,20]. Therefore, nasal packing as well as trans-septal suturing are equally effective in preventing postoperative hemorrhage and septal hematoma.

Synechiae/adhesions develop when two opposing, traumatized mucosal surfaces come into contact with each other. One of the benefits traditionally attributable to nasal packing has been prevention of adhesion formation as it forms a barrier between opposing surfaces in the early postoperative period. However, nasal packing and especially removal, cause diffuse mucosal trauma, making it susceptible to synechiae formation.

Our study showed a higher incidence of synechiae with nasal packing (20% vs 8%), although the difference was not statistically significant. The degree of mucosal trauma is also dependent upon the material of nasal pack, which may explain why synechiae was limited to ribbon-gauze packing and none with merocel developed adhesions. Some studies have found a higher incidence of adhesions with nasal packing [20,21] while

others have found no significant difference [6,17]. The key to preventing adhesions is avoiding mucosal trauma during surgery. The surgeon should aim at minimal manipulation of turbinates, careful handling of the septal mucosa and meticulous use of instruments [3].

We used 3.0 vicryl for placing quilting sutures across the nasal septum. The septal incision was closed within this trans-septal suture, thus no extra cost is borne by the patient. Since conventional ribbon gauze packing is associated with increased pain and risk of adverse effects, and cost of good quality nasal packs can be prohibitive, this suturing technique is also a cost-effective alternative.

### Conclusion

Nasal packing as well as trans-septal suturing are equally effective in preventing postoperative hemorrhage, septal hematoma and stabilising the repositioned cartilage. Nasal packing is associated with severe pain and discomfort in the postoperative period, besides causing dry mouth, sore throat, vestibulitis and increased risk of synechiae. Trans-septal suturing can be performed in all patients undergoing septoplasty as it significantly improves patient's comfort and postoperative quality of life.

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