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Efficacy of Septoturbinoplasty in the Management of Contact Point Headaches - A Clinical Study

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Abstract

Background: Rhinogenic contact point headache may arise from mucosal contact caused by septal deviation, septal spur, and turbinate hypertrophy. This study evaluated the efficacy of septoturbinoplasty in affected patients.

Methods: In this prospective clinical study, 100 patients underwent septoturbinoplasty and were assessed using headache Visual Analogue Scale (VAS), headache frequency, analgesic use, HIT-6, NOSE score, and nasal endoscopy. Outcomes were evaluated at 1, 3, and 6 months.

Results: Ninety-two patients completed 6-month follow-up. Mean VAS decreased from 7.55 to 2.73, headache days/month from 15.93 to 6.67, and analgesic use from 12.41 to 5.18 tablets/month (all $p<0.001$). HIT-6 and NOSE scores also improved significantly. A ≥50% VAS reduction was achieved by 78.3%, while contact-point resolution occurred in 91.3%. Clinical response was strongly associated with endoscopic resolution ($p<0.001$). Complications were mostly minor.

Conclusion: Septoturbinoplasty was effective and safe in carefully selected patients with Rhinogenic contact point headache.

Keywords: Rhinogenic headache; Septoturbinoplasty; Contact point; Septal deviation; Visual Analogue Scale

Introduction

Rhinogenic contact point headache is a secondary headache disorder attributed to contact between opposing nasal mucosal surfaces in the absence of active

sinonasal inflammation. Common anatomical causes are septal deviation, septal spur, inferior and middle turbinate hypertrophy and concha bullosa. Mechanical stimulation of these contact areas can stimulate trigeminal sensory fibres and neuro peptide-mediated pathways, resulting in referred frontal, periorbital or facial pain[1,2]. However, the causal link is still controversial, as intranasal contact points can also be found in people who do not have headache[3].

Patient selection is therefore crucial for diagnosis. Nasal endoscopy and computed tomography aid in the demonstration of the anatomical contact point and the exclusion of rhino sinusitis, polyps or tumours. Topical local anesthetic application is associated with a significant decrease in pain, which is consistent with a Rhinogenic origin, and excludes primary headache disorders, neurological, ophthalmological and dental causes. This is significant because the relief of headache following nasal surgery is not consistent when the indication is anatomical contact alone.

The goal of septoplasty or septoturbinoplasty is to remove the mucosal contact and to correct the septal deviation, turbinate hypertrophy and nasal obstruction. In carefully selected, medically refractory patients, there have been reports of substantial decreases in headache intensity and frequency following surgical correction[6-8]. A systematic review and meta-analysis also showed that endoscopic surgery was more effective than medical therapy in postoperative improvement, but there was significant heterogeneity, selection bias and limited controlled evidence.

Although encouraging results, evidence from Indian district level teaching hospitals is limited, especially for simultaneous changes in headache intensity, frequency, use of analgesics, headache related disability, nasal obstruction and resolution of contact points after surgery. The present study thus assessed the efficacy and safety of septoturbinoplasty in rhinogenic contact point headache and investigated the relationship between clinical response and contact-point anatomy, location and endoscopic resolution after surgery.

Materials and Methods

Study design and setting

This prospective, single-arm, before – and - after interventional study was conducted in the Department of Otorhinolaryngology, Chamarajanagar Institute of Medical Sciences, Chamarajanagar, Karnataka, from June 2025 to June 2026. A total of 100 consecutive patients with Rhinogenic contact-point headache who were considered suitable for septoturbinoplasty were enrolled.

Participants

Patients aged 18–60 years with recurrent frontal, periorbital, or facial headache for at least three months were eligible. All participants had an intranasal mucosal contact point caused by septal deviation or a septal spur with associated inferior turbinate hypertrophy, confirmed by diagnostic nasal endoscopy and computed tomography of the para nasal sinuses. Eligibility also required absence of active acute or chronic rhino sinusitis, persistence of symptoms despite at least four weeks of appropriate medical treatment, and a positive topical local-anaesthetic test, defined as a reduction of at least 50% in headache intensity after anaesthetic application to the contact point.

Patients with migraine or another primary headache disorder, neurological, ophthalmological, dental, temporomandibular, cervical, or psychiatric causes of headache, inflammatory sinonasal disease, nasal polyposis, sinonasal tumours, previous septal or

turbinate surgery, major craniofacial abnormalities, contraindications to surgery or anaesthesia, pregnancy, lactation, or incomplete baseline data were excluded.

Preoperative assessment

Baseline evaluation included demographic characteristics, duration and location of headache, headache intensity on a 0–10 Visual Analogue Scale (VAS), headache days per month, average duration of individual episodes, monthly analgesic consumption, and previous medical treatment. Headache-related disability and nasal obstruction were assessed using the Headache Impact Test-6 (HIT-6) and Nasal Obstruction Symptom Evaluation (NOSE) scores, respectively.

The anatomical type, location, and side of the mucosal contact point were documented using nasal endoscopy and computed tomography. Other primary and secondary causes of headache were excluded through appropriate clinical evaluation.

Intervention and follow-up

All eligible participants underwent septoturbinoplasty under standard institutional protocols. The procedure included correction of the septal deviation or septal spur and reduction of the hypertrophied inferior turbinate responsible for the mucosal contact point. Operative and postoperative complications were recorded.

Participants were reviewed at approximately 1, 3, and 6 months after surgery. At each visit, headache VAS score, headache frequency, episode duration, analgesic consumption, HIT-6 score, NOSE score, postoperative complications, and endoscopic status of the mucosal contact point were assessed.

Outcome measures

The primary outcome was clinical response at six months, defined as a reduction of at least 50% in mean headache VAS score compared with baseline.

Secondary outcomes included changes in headache VAS score, headache days per month, average episode duration, monthly analgesic consumption, HIT-6 score, and NOSE score. Endoscopic resolution or persistence of the contact point, recurrence, and postoperative complications were also evaluated.

Six-month clinical outcomes were classified as complete relief when no headache was present, good response when VAS reduction was at least 50%, partial response when the reduction was 30%–49%, and no response when the reduction was less than 30% or headache severity worsened.

Statistical analysis

Continuous variables were summarised as mean with standard deviation or median with interquartile range, according to their distribution. Categorical variables were reported as n (%). Changes between baseline and postoperative assessments were analysed using the paired-samples t-test or Wilcoxon signed-rank test, as appropriate. Serial changes across baseline and follow-up visits were evaluated using repeated-measures analysis of variance or the Friedman test.

Associations between six-month clinical response and the anatomical type, location, or postoperative endoscopic status of the contact point were examined using the chi-square test or Fisher's exact test. Effect estimates were presented with 95% confidence intervals where applicable. A two-sided p value <0.05 was considered statistically significant.

Ethical considerations

The study was conducted after approval from the Institutional Ethics Committee of Chamarajanagar Institute of Medical Sciences. Written informed consent was obtained from all participants, and confidentiality was maintained throughout the study.

Results

Study cohort and baseline characteristics

A total of 100 patients underwent septoturbinoplasty between 7 June and 13 December 2025. Follow-up assessments were completed by 98 (98.0%) patients at 1 month, 95 (95.0%) at 3 months, and 92 (92.0%) at 6 months. The mean age was 33.5 (SD 9.2) years, and 56 (56.0%) participants were male. The baseline clinical and anatomical profile is presented in Table 1.

Table 1: Baseline clinical and anatomical characteristics (N = 100)

Characteristic	Value
Age, years, mean (SD)	33.5 (9.2)
Sex	
Male	56 (56.0%)
Female	44 (44.0%)
Residence	
Rural	62 (62.0%)
Urban	38 (38.0%)
Headache duration, months, median (IQR)	16.0 (9.0-25.0)
Dominant headache site	
Frontal	49 (49.0%)
Periorbital	38 (38.0%)
Facial	13 (13.0%)
Baseline VAS score, mean (SD)	7.54 (0.93)
Headache days/month, mean (SD)	16.1 (4.8)
Episode duration, hours, median (IQR)	3.1 (2.1-4.3)
Analgesic tablets/month, mean (SD)	12.5 (4.3)
HIT-6 score, mean (SD)	68.4 (3.7)
NOSE score, mean (SD)	71.1 (15.0)
Contact-point anatomy	
Septal deviation–inferior turbinate	45 (45.0%)
Septal spur–inferior turbinate	35 (35.0%)
Combined deviation and spur–inferior turbinate	20 (20.0%)
Contact-point location	
Anterior	42 (42.0%)
Middle	40 (40.0%)
Posterior	18 (18.0%)
Contact-point side	
Right	42 (42.0%)
Left	34 (34.0%)
Bilateral	24 (24.0%)
Septal deviation grade	
Moderate	67 (67.0%)
Severe	33 (33.0%)
Inferior turbinate grade	
Grade II	36 (36.0%)
Grade III	59 (59.0%)
Grade IV	5 (5.0%)
Local-anaesthetic VAS reduction, %, median (IQR)	63.8 (57.8-72.2)

Values are n (%) unless otherwise indicated. HIT-6, Headache Impact Test-6; IQR, inter quartile range; NOSE, Nasal Obstruction Symptom Evaluation; SD, standard deviation; VAS, Visual Analogue Scale.

Headache and symptom outcomes

Among the 92 patients with complete 6-month follow-up, mean headache VAS decreased from 7.55 (SD 0.93) at baseline to 4.62 (SD 1.55), 3.43 (SD 1.97), and 2.73 (SD 2.20) at 1, 3, and 6 months, respectively (Green house - Geisser corrected $F(1.22, 111.45) = 454.63$, $p < 0.001$). The mean 6-month reduction was 4.82 points (95% CI 4.40-5.24). Headache frequency, episode

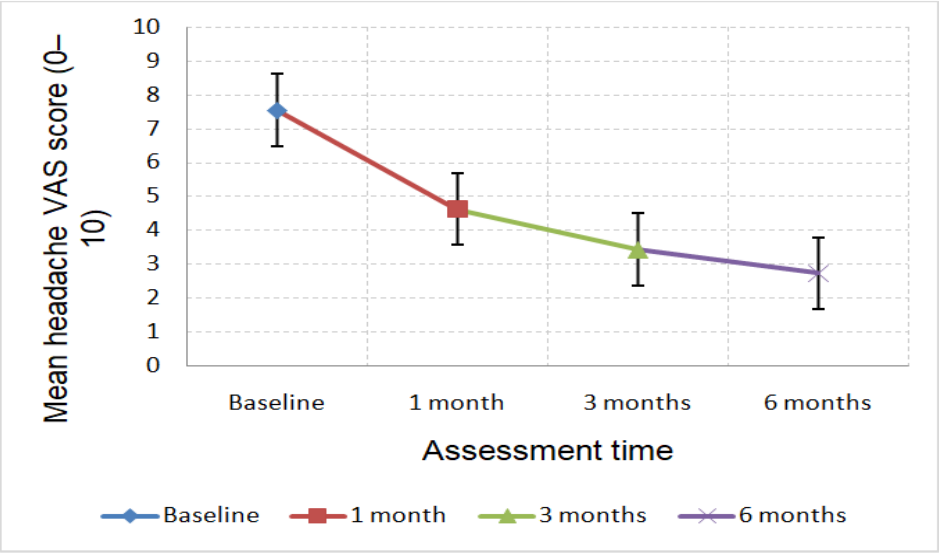
duration, analgesic consumption, HIT-6 score, and NOSE score also improved significantly over time (all p < 0.001; Table 2).

Table 2: Changes in headache and symptom outcomes through six months (complete cases, n = 92)

Outcome	Baseline	1 month	3 months	6 months	Test statistic	p-value
Headache VAS	7.55 (0.93)	4.62 (1.55)	3.43 (1.97)	2.73 (2.20)	F(1.22,111.45) = 454.63	<0.001
Headache days/month	15.93 (4.94)	10.53 (4.94)	8.26 (5.52)	6.67 (5.64)	F(1.69,153.67) = 265.05	<0.001
Episode duration (hours)	3.43 (1.90)	2.34 (1.52)	1.79 (1.25)	1.45 (1.32)	F(1.40,127.38) = 143.03	<0.001
Analgesic tablets/month	12.41 (4.41)	7.78 (4.08)	6.16 (4.34)	5.18 (4.69)	F(1.63,148.59) = 238.05	<0.001
HIT-6 score	68.49 (3.79)	59.26 (5.96)	55.23 (7.37)	51.59 (9.53)	F(1.57,143.14) = 274.72	<0.001
NOSE score	70.60 (14.62)	32.01 (9.67)	22.17 (7.61)	17.61 (6.48)	F(2.41,219.35) = 985.84	<0.001

Values are mean (SD). Test statistics are from repeated -measures ANOVA with Greenhouse - Geisser correction. HIT - 6, Headache Impact Test-6; NOSE, Nasal Obstruction Symptom Evaluation; VAS, Visual Analogue Scale.

Figure 1: Mean headache VAS scores from baseline to six months among 92 participants with complete follow-up. Error bars represent 95% confidence intervals. The overall time effect was significant (p < 0.001).



Six-month clinical response

At six months, 72 (78.3%; 95% CI 68.8%-85.5%) of 92 evaluated patients achieved the primary outcome of at least 50% reduction in headache VAS. Complete relief occurred in 20 (21.7%), while 52 (56.5%) had a good response, 10 (10.9%)

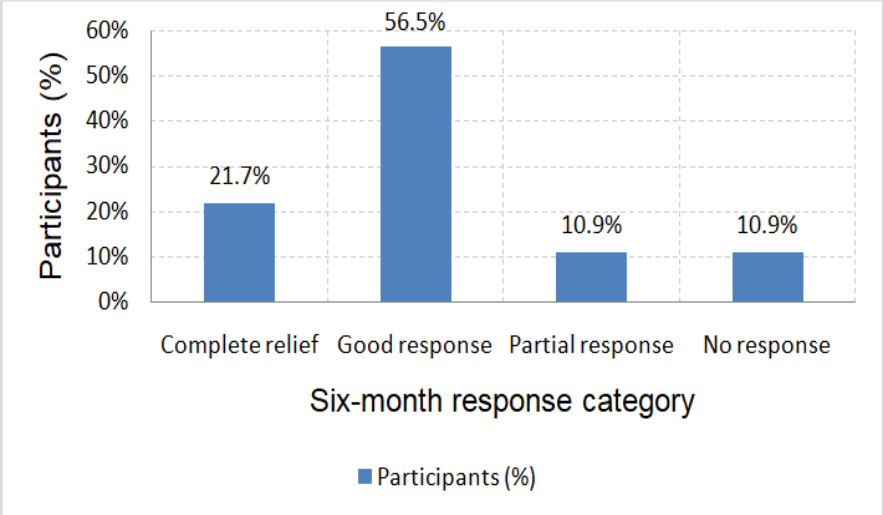
had a partial response, and 10 (10.9%) had no response. Worsening headache was recorded in 2 (2.2%) patients (Table 3 and Figure 2).

Table 3: Six-month clinical and endoscopic outcomes (n = 92)

Outcome	n (%)	95% CI (%)
Primary clinical response (>=50% VAS reduction)	72 (78.3%)	68.8-85.5
Response category		
Complete relief	20 (21.7%)	14.5-31.2
Good response	52 (56.5%)	46.3-66.2
Partial response	10 (10.9%)	6.0-18.9
No response	10 (10.9%)	6.0-18.9
Worsening headache	2 (2.2%)	0.6-7.6
Endoscopic contact-point status		
Resolved	84 (91.3%)	83.8-95.5
Persistent	3 (3.3%)	1.1-9.2
Recurrent	5 (5.4%)	2.3-12.1

Confidence intervals were calculated using the Wilson method. Primary clinical response comprised complete relief and good response.

Figure 2: Distribution of six-month clinical response categories among 92 patients. Complete relief and good response together constituted the primary clinical response.



Anatomical and endoscopic associations

Six-month response rates were 28 (71.8%) among patients with septal deviation-inferior turbinate contact, 28 (82.4%) with septal spur-inferior turbinate contact, and 16 (84.2%) with combined deviation and spur contact; the difference was not statistically significant (p = 0.430). Response also did not differ significantly by anterior, middle, or posterior contact-

point location (p = 0.114). Endoscopic contact-point resolution was observed in 84 (91.3%) patients, while 3 (3.3%) had persistent contact and 5 (5.4%) had recurrent contact. Clinical response occurred in 72 (85.7%) of 84 patients with resolved contact and in 0 (0.0%) of 8 patients with persistent or recurrent contact (Fisher exact p < 0.001; Table 4).

Table 4. Association of anatomical and endoscopic factors with the primary six-month response

Factor	Category	Evaluable n	Responders, n (%)	Test statistic and p-value
Contact-point anatomy	Septal deviation–inferior turbinate	39	28 (71.8%)	$\chi^2(2) = 1.69$; p = 0.430
	Septal spur–inferior turbinate	34	28 (82.4%)	
	Combined deviation and spur–inferior turbinate	19	16 (84.2%)	
Contact-point location	Anterior	37	33 (89.2%)	$\chi^2(2) = 4.35$; p = 0.114
	Middle	38	27 (71.1%)	
	Posterior	17	12 (70.6%)	
Six-month contact status	Resolved	84	72 (85.7%)	Fisher exact p < 0.001
	Persistent or recurrent	8	0 (0.0%)	

Pearson chi-square tests were used for contact-point anatomy and location; Fisher's exact test was used for six-month contact status.

Operative and postoperative safety

General anaesthesia was used in 88 (88.0%) patients and local anaesthesia with sedation in 12 (12.0%). A small intraoperative mucosal tear occurred in 7 (7.0%) patients and was repaired during surgery. The median hospital stay was 1 day (IQR 1-2). At least one postoperative complication occurred in 21 (21.0%) patients; crusting was the most frequent event, affecting 12 (12.0%) patients (Table 5).

Table 5. Operative and postoperative adverse events (N = 100)

Event	n (%)
Small intraoperative mucosal tear	7 (7.0%)
Any postoperative complication	21 (21.0%)
Crusting	12 (12.0%)
Postoperative bleeding	4 (4.0%)
Adhesions	4 (4.0%)
Infection	2 (2.0%)
Septal haematoma	1 (1.0%)
Septal perforation	1 (1.0%)

Individual patients could experience more than one postoperative event.

Discussion

In carefully selected patients with rhinogenic contact point headache, this prospective study showed significant improvement following septoturbinoplasty. The mean VAS for headache decreased from 7.55 to 2.73 at 6 months, headache frequency from 15.93 to 6.67 days/month, and the consumption of analgesics from 12.41 to 5.18 tablets/month. HIT-6 and NOSE scores also significantly improved and 78.3% had a 50% or greater reduction in headache intensity. Endoscopic contact-point resolution was achieved in 91.3% and was strongly correlated with clinical response.

The amount of headache relief is comparable to previous surgical series. Behin et al. assessed patients with refractory contact point headache undergoing septal and sinonasal surgery, and found that 83% had complete resolution of headache, 8% had significant relief, and 80% of patients with a previous diagnosis of migraine were treated successfully. Their results suggest that surgery may be beneficial following failure of medical therapy, but the selection of patients in a retrospective fashion and the concomitant sinus surgery may have enhanced the apparent response[10]. The present response rate was slightly lower, perhaps due to the requirement for a predetermined ≥50% VAS reduction and the fact that all patients had a relatively standardized septoturbinoplasty procedure.

In 23 patients with refractory headache and no prominent sinus symptoms, Ramadan compared the effectiveness of nonsurgical treatment to endoscopic surgery. The study specifically looked at septal or middle-turbinate contact, involved patients who did not respond to conservative treatment, and demonstrated that surgical management was more effective than continued nonsurgical management[11]. Likewise, Harley et al. evaluated 79 consecutive patients with headache and surgically correctable septal and/or turbinate abnormalities, 71 of whom underwent surgery, with over half having contact points preoperatively and eight of ten patient-relevant outcomes showing significant improvement. The most significant reductions in headache severity and frequency were seen after correction of mucosal contact[12]. These results are similar to the concurrent reduction in headache intensity, frequency, disability and nasal obstruction seen in our cohort.

Indian evidence is especially pertinent. Lakshmanan et al. studied endoscopic septoturbinal surgery in a retrospective manner, excluding patients who had undergone functional endoscopic sinus surgery. The mean VAS score was 6.82 preoperatively and 3.36 at 1 month, 4.50 at 2 months, 5.48 at 3 months and 5.01 at 1 year, but all postoperative scores were still significantly lower than the preoperative score. This partial recurrence is in contrast to the progressive improvement observed in our study from 4.62 at 1 month to 2.73 at 6 months, and underscores the need for anatomical stability and longer follow-up[13].

Not all anatomical contacts are necessarily causative in relation to headache. Wang et al. found mucosal contact points in 85.9% of patients with recurrent headache but also in 80.4% of participants without headache. Septal deviation touching the lateral wall was more common in the headache group (55.1% vs 40.2%) and of 25 surgically treated patients, 44% had recovered within seven days, with a significant improvement in pain scores. The results of this study should be interpreted with caution when choosing patients based on imaging alone[14]. The higher response rate in the present study may be related to the inclusion of compatible symptoms,

endoscopy, computed tomography, and failure of medical treatment, as well as a median response to topical anaesthesia of 63.8%.

Anatomical subtype did not significantly influence outcome in our study: response rates were 71.8% for septal deviation–inferior turbinate contact, 82.4% for septal spur contact and 84.2% for combined deviation and spur. Li et al. studied another anatomical type (isolated superior turbinate–septal contact) in 80 patients over a 12-month period. Headache disappeared completely in 56 patients, improved substantially in 20 and remained unsatisfactory in four, yielding a 95% overall success rate. This means that benefit is not limited to inferior-turbinate contact, but may be related to anatomical definition and selection criteria[15].

Comparative evidence in recent years also confirms surgery, but indicates possible differences between subtypes. Lavalle et al. prospectively studied 90 patients receiving surgery or medical treatment. The mean VAS score in the surgical group was reduced from 6.02 to 2.51, and the mean headache frequency score was reduced from 9.11 to 3.04, while there was no significant reduction in the mean VAS score or the mean headache frequency score in the medical treatment group. All anatomical subtypes improved, but concha bullosa had a higher postoperative VAS score than septal deviation or septal spur (4.0 vs. 1.8 and 1.73, respectively), and the postoperative VAS score was a predictor of the postoperative headache frequency, but not the intensity of the headache[16]. Isolated concha bullosa was not included in our study, and this may account for the lack of significant differences in response between the evaluated septal–inferior turbinate configurations.

This is an important association that was found. Of the patients who had resolved contact, 85.7% responded clinically, while no patients with persistent or recurrent contact responded clinically. This implies that the type of contact point or the location of the contact point may not be as significant as the sustained mechanical separation. However, the improvement cannot be solely blamed on contact removal as septoturbinoplasty also resulted in an improvement of nasal airflow as evidenced by the significant decrease in NOSE score. Placebo effects, regression to the mean and concurrent postoperative treatment may also have played a role.

The procedure had an acceptable safety profile. The complications were mostly minor, such as crusting (12%) and bleeding (4%) and adhesions (4%). Septal haematoma and perforation were rare. But 21% had at least one postoperative event, highlighting the importance of careful technique and a planned postoperative management.

The advantages of this study are that it is prospective, the surgery is standardised, the outcomes are multidimensional, the surgery is confirmed endoscopically, and 92% of patients were followed up at 6 months. Its limitations are that it is single arm, there is no blinded assessment or medical-treatment control group, it is single centre and has a six month follow up. Exclusion of primary headache disorders decreases diagnostic misclassification but decreases generalizability. Longer controlled studies are needed to determine durability and distinguish anatomical benefit from nonspecific treatment effects.

Conclusion

Septoturbinoplasty produced clinically meaningful reductions in headache intensity, frequency, analgesic use, disability and nasal obstruction. Successful postoperative elimination of the contact point was more strongly associated with response than its preoperative

anatomy or location, supporting careful diagnostic selection and endoscopic confirmation of anatomical correction.

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