

# Study of Role of Contact Points in Nose as a Causal Factor in Refractory Headaches and the Outcome of Surgical Treatment

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## Abstract

**Introduction:** Contact point headaches have been attributed to intranasal contact between opposing mucosal surfaces, resulting in referred pain in the distribution of the trigeminal nerve. In subjects with primary headaches, contact points may be associated with treatment refractoriness.

**Aim:** The aim of this study is to evaluate the outcome of surgical treatment of patients with refractory headaches with intranasal mucosal contact points and to find out the most common contact point related to headache.

**Materials and Methods:** Patients clinically presenting with headache were selected. Only patients with headache due to rhinogenic causes without sinusitis were subjected to computed tomography scan of paranasal sinuses and diagnostic nasal endoscopy and were followed up to evaluate management.

**Results:** Overall 86% of patients felt marked improvement in their headaches while 8% had moderate and 6% had mild symptoms at the end of the study.

**Conclusion:** Surgical correction of contact points in the nose by functional endoscopic sinus surgery results in relief of chronic headache. The results of surgical outcome of treatment of chronic headache are evident mostly within 2 months of treatment.

**Key words:** Concha bullosa, Headache, Septal deviation

## INTRODUCTION

Headache is a very frequent symptom, which is the complaint of half of the subjects that come to the physician. Chronic headache is distressing for both the patient and the physician to the former due to its nagging nature and to the latter for his inability to diagnose and for problems of self-medication in many cases.<sup>1</sup> The causes of headache are multifactorial varying from simple tension headache, migraine, myofascial spasm, temporomandibular joint arthralgia, vascular headache, refractory errors of

vision, and brain tumors, it requires a multidisciplinary approach to diagnose the causative factors.<sup>2,3</sup>

Contact points may be a cause of secondary headache or an exacerbating factor for primary headaches.<sup>4</sup> Mucosal contact headache is a newly added secondary headache disorder in the International Classification of Headache Disorders (ICHD-2) supported by limited evidence. According to the ICHD-2, these headaches are characterized by intermittent pain localized in the periorbital and medial canthal or temporozygomatic regions, associated with evidence of mucosal contact points by nasal endoscopy or computed tomography (CT) imaging.<sup>5</sup>

The contact between the structures, in addition to being a mechanical stimulus in those regions considered as origin of the pain, promotes local inflammatory process, with release of mediators that are related with the painful process. The presence of mediators such as substance P

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and histamine reduces pain threshold in the nasal mucosal receptors. The theory of local reflex triggered by contact between structures with release of vasoactive amines and onset of edema suggests that substance P acts as a mediator of this reflex. Substance P is a neuropeptide known since 1931 and found in sensitive nervous fibers of the nasal and paranasal mucosa, among other sites.<sup>6</sup>

Different stimuli in polymodal receptors located in the nasal mucosa such as infectious, chemical, caloric, or simply mechanical (pressure) irritating agents may generate an orthodromic impulse to the cerebral cortex, mediated by substance P, responsible for the painful stimulus. In addition to orthodromic impulse, such stimuli generate antidromic impulses, also capable of releasing P substance in the nasal mucosa, mediating plasma leak, vasodilation, smooth muscle contraction, and hypersecretion. This mechanism is called axonal reflex. Mucosa edema may increase the existing pressure among the structures, maintaining the process in a vicious cycle. The occurrence of local trauma by the contact and pressure between the structures can also lead to release of substance P in the nasal mucosa.<sup>7</sup>

### Aim

The aim of this study is to evaluate the outcome of surgical treatment of patients with refractory headaches with intranasal mucosal contact points and to find out the most common contact point related to headache.

## MATERIALS AND METHODS

This prospective study was conducted in the Department of Otorhinolaryngology, Government Tirunelveli Medical College Hospital. 50 patients with a rhinogenic headache without symptoms and signs of acute and chronic sinonasal inflammation that underwent treatment were included in the study. Effects of surgical treatment for contact point headache in 50 patients were assessed in the follow-up period of 12 months.

### Inclusion Criteria

Refractory headaches (failed to standard pharmacological headache treatments) or refractory transformed migraine headaches having intermittent pain localized to the periorbital and frontal or temporozygomatic regions from 6-month to 5-year duration. Diagnostic nasal endoscopic and/or CT imaging evidence of mucosal contact points without acute rhinos, contact points had to be present on CT scan.

### Exclusion Criteria

Other patients were found to have some systemic cause for headache, cluster headache, with refractory error, and

temporomandibular pain were thus excluded from this study. Patients with obvious frank sinogenic symptom attributable to headache were also excluded from the study.

All the patients were subjected to detailed history taking, clinical and systemic examination before ENT examination to rule out any systemic causes such as hypertension, migraine, tension headache, neurological causes, ophthalmological examination to rule out refractory errors, and gynecological checkup to eliminate premenstrual tension and premenopausal syndrome as a cause of headache. ENT examination consisted of a detailed history of headache periodicity, intensity, localization, precipitating factors, associated symptoms such as nausea, vomiting, nasal block, rhinorrhea, anosmia, epistaxis, and snoring anterior and posterior rhinoscopy was done to assess and evaluate any anatomical variation or pathological lesion.

The surgery included septoplasty, middle turbinectomy, uncinectomy, and ethmoidectomy. Septoplasty was always performed first, followed by a middle turbinectomy to gain access to the medial wall of ethmoid cells. Next, the ethmoidectomy was performed, and the medial wall of ethmoid sinuses was removed. Patients who had contact between the septum and middle turbinate (MT) had a partial middle turbinectomy and septoplasty performed.

## RESULTS

The patients presenting were in the age range of 18-50 years. The mean age of presentation was 26.7 years. 26 were females (52%), and 24 were males (48%). It was found that 26% had bilateral nasal block and 76% had unilateral nasal block. 14 patients suffered from deviated nasal septum with spur (26%), isolated deviated nasal septum - 6, deviated nasal septum with MT variation - 5, with inferior turbinate hypertrophy - 3. 21 patients had concha bullosa - 44% (Unilateral - 10, bilateral - 7), concha associated with lateral nasal wall variation - 3, and associated with septal variation - 4. 10 patients had over pneumatized bulla - 26% (unilateral - 4, bilateral - 6), 5 patients had paradoxical MT - 10% (unilateral - 0, bilateral - 5), 2 patients had prominent agger nasi - 4% (unilateral - 1, bilateral - 1), and 13 patients had nasal blockage (26%).

Out of the total 50 patients, 16 subjects (32%) had headache at frontal region, followed by 12 subjects (24%) had headache at temporal region (Table 1).

The most common mucosal contact zone is found to be between MT with lateral nasal wall followed by MT with nasal septum (Table 2).

**Table 1: Region of headache**

Region of headache	Unilateral (F)	Bilateral (F)	Unilateral (M)	Bilateral (M)
Frontal	5	4	5	2
Temporal	3	3	4	2
Frontotemporal	3	1	3	0
All over head	2	0	4	4
Unilateral facial pain	3	0	2	0

**Table 2: Mucosal contact zones**

Contact zones	Male	Female
MT with septum	5	8
MT with Lateral nasal wall	15	15
IT with septum	1	3
Septum with agger	1	2

MT: Middle turbinate, IT: Inferior turbinate

The most frequent mucosal contact point for headache is middle turbinate with lateral nasal wall. So lateral lamellectomy and anterior ethmoidectomy are the frequent surgeries performed (Table 3).

**Follow-up**

All patients were followed up from 2<sup>nd</sup> month to 6 months. At 2<sup>nd</sup> month, the headache was relieved in 43 patients and 7 patients had persistent headache. After 6-month post-operatively, only 5 patients had headache and 45 patients had relieved of their symptoms. The mean headache frequency was reduced from 14.2 to 2.4 days after 2 months of surgery. The mean headache severity was reduced from 5.9 to 1.48 in 2 months. Overall 86% of patients felt marked improvement in their headaches while 8% had moderate and 6% had mild symptoms at the end of the study.

**DISCUSSION**

Very few studies have assessed the surgical treatment of mucosal contact point headache. Limited studies show good surgical results in patients with contact point headaches. Out of the total of 50 patients, 26 were females, and 24 were males. As it was compared with Mahajan *et al.*, 2003, the occurrence of male:female ratio of contact headache was equal.<sup>8</sup>

The most common age group of occurrence of contact headache is between 21 to 30 years –50%, followed by 31-40 years –28%. When compared with Mahajan *et al.*, 2003,<sup>8</sup> the percentage is almost equal (Table 4). The theory is growth of facial skeleton is completed at the age of 20 years. Hence, the mucosal contact point headache due to anatomical variant is common in these age groups. The

**Table 3: Most common surgical procedures**

Surgical procedure	Number of patients
Lateral lamellectomy	15
Lateral lamellectomy with anterior ethmoidectomy	13
Lateral lamellectomy with uncinectomy, MMA	5
Septal correction	11
Septal correction with lateral lamellectomy	4
Agger nasi cell removed	2

MMA: Middle meatal antrostomy

**Table 4: Comparison age group**

Age group	Mahajan <i>et al.</i> 2003 <sup>8</sup> (%)	Current study (%)
15-20	8 (25)	9 (18)
21-30	14 (43.75)	25 (50)
31-40	10 (31.25)	14 (28)
41-50	0	2 (4)
Male:female	15:17	24:26

male:female ratio is equal in both studies: 15:17 in Mahajan *et al.*, 2003<sup>8</sup> and 24:26 in the current study. Deviation of the nasal septum was found in 26% of cases in the present study. In a study done by Salihoglu *et al.* had nasal septal deviations, and of those about 60% were bilateral and 40% were unilateral.<sup>9</sup> Agger nasi cells are 6% in our study and 40% in a study done by Chopra *et al.* (Table 5).<sup>10</sup>

The mean headache frequency was reduced from 14.2 to 2.4 days after 6 months of surgery. The mean headache severity was reduced from 5.9 to 1.48 at 6 months. These parameters are compared with Behin *et al.* (Table 6).<sup>11</sup>

The mean headache frequency and mean headache severity are proportionately reduced in both the studies. In our study, in a series of 50 patients, 86% had significant improvement after 2 months of surgery. Tosun *et al.*<sup>12</sup> showed, in a series of 30 patients, total relief was achieved in 43% of patients, significant improvement in 47% of patients, after endoscopic sinus surgery. As similar study by Harley *et al.*,<sup>13</sup> in 2003, retrospectively analyzed the clinical outcome of surgical treatment of sinonasal headaches in 34 patients and found that all patients had at least one contact point between nasal septum and one of the turbinates. After surgery, reduction in headache intensity was reported by 91% and reduction in frequency by 85% of patients.

As per study done by Novak and Makek,<sup>14</sup> most of the patients (356, 80%) were asymptomatic postoperatively, 45 (10%) had a sensation of pressure in the head on rare occasions but no further migraines, and 45 (10%) continued to experience headaches that occurred only rarely and were mild and of short duration. The overall success rate was 98%.

**Table 5: Comparison anatomical variant**

Anatomical variant	Current study 2009	Chopra <i>et al.</i> 2006 <sup>10</sup>	Mahajan <i>et al.</i> 2003 <sup>8</sup>
	Total (%)	Total (%)	Percentage
Deviated nasal septum	14 (26)	22 (44)	3
Concha bullosa	21 (44)	8 (16)	8
Over pneumatic ethmoid bulla	10 (20)	7 (14)	15
Paradoxical middle turbinate	5 (10)	5 (10)	
Agger nasi	3 (6)	20 (40)	6

**Table 6: Comparison pre-operative and post-operative headache frequency**

Headache	Current study		Behin <i>et al.</i> 2005	
	Pre-operative	Post-operative	Pre-operative	Post-operative
Headache mean frequency (days/month)	14.2	2.4	17.7	7.7
Mean headache severity (pain scale grade)	5.9	1.48	7.8	3.6

**CONCLUSION**

Surgical correction of contact points in the nose by functional endoscopic sinus surgery (FESS) results in relief of chronic headache. The results of surgical outcome of treatment of chronic headache are evident mostly within 2 months of treatment. Contact point - as an etiological factor for headache is more relevant in 20-30 years of age group, i.e. after completion of development of faciomaxillary skeleton. The most frequent contact point for headache is MT with lateral nasal wall. Refractory migraine headache can be successfully treated in carefully selected patients after precise pre-operative localization of exact point by modern investigations (nasal endoscopy) and appropriate surgical interventions (FESS) Patients diagnosed to have a chronic refractory headache/transformed migraine should be accessed for mucosal contact point headache and its appropriate surgical management for cure.

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