

# Surgical treatment of patients with refractory migraine headaches and intranasal contact points

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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. We aimed to assess the benefits of surgical correction in patients with refractory migraine or transformed migraine, and radiographic evidence of contact points in the sinonasal area. We reviewed charts of patients who underwent endoscopic sinus surgery and septoplasty for contact point in the same surgical facility, from October 1998 through August 2003. Subjects eligible for surgery had: (i) refractory migraine (failed to standard pharmacological headache treatments) or refractory transformed migraine; (ii) contact points demonstrated by computed tomography scan; (iii) reported significant headache improvement after topical anaesthesia to the contact area. Headache characteristics were assessed preoperatively and at follow-up (6–62 months after surgery) using a standardized questionnaire. A total of 21 subjects (72.5% women) were assessed. Mean headache frequency was reduced from 17.7 to 7.7 headache days per month ( $P = 0.003$ ). Mean headache severity was reduced from 7.8 to 3.6 on a 0–10 scale ( $P = 0.0001$ ). Headache-related disability was reduced from 5.6 (10-point scale) to 1.8 ( $P < 0.0001$ ). A total of 16 subjects (76.2%) had their headache scores improved by 50% or more; nine (42.9%) were pain free at the last follow-up. A total of 18 (95.8%) had at least a 25% reduction in their headache scores. Two patients (9.5%) had increase in their headache score by less than 25%. For selected patients with refractory headaches, demonstrable contact points, and positive response after topical anaesthesia, surgical approach toward the triggering factor may be useful. Prospective studies are necessary to confirm our results. □ *Contact point, refractory headache, migraine, trigger point, surgical treatment*

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## Introduction

Contact points refer to intranasal contact between opposing mucosal surfaces. Contact points are frequently seen in rhinology clinics, although the prevalence of this anatomical variation in the population is unknown. In a cohort study of 973 patients consecutively seen in a specialty centre, contact points were present in 4% of subjects (1). Headaches have

been attributed to referred pain through the trigeminal system (1, 2).

Contact points may be a cause of secondary headache or an exacerbating factor for primary headaches (3). Mucosal contact headache is a newly added secondary headache disorder in the International Classification of Headache Disorders (ICHD-2) (3), 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. Acute rhinosinusitis must be excluded. The clinical findings of contact point headaches, according to the International Headache Society (IHS) description, correspond to variations in mucosal congestion mediated by gravitational changes. Finally, the IHS criteria require abolition of headache within 5 min following topical application of topical anaesthesia to the middle turbinate or contact point area, using placebo or other control, and significant improvement on the headache in less than 7 days after removal of mucosal contact points.

Contact points may also be viewed as a trigger factor of primary headaches. By definition, exposure to trigger factors increases the probability of a headache attack (4–8). Though some trigger factors have been reasonably well studied in epidemiological studies (menstruation) (9) or clinical trials (chocolate, aspartame) (10, 11), causal attribution in individual patients may be difficult.

In patients with migraine, contact points may contribute to treatment refractoriness, by acting as trigger point. Here we assess the headache outcome after surgical correction of contact points in the sinonasal area (intranasal contact between opposing mucosal surfaces) in patients with refractory migraine headaches (migraine or transformed migraine).

## Methods

### Overview

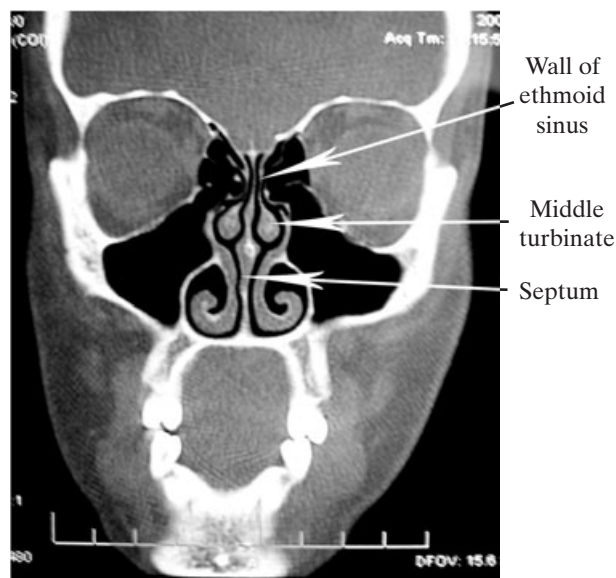
This clinical series was assembled by reviewing the charts of patients presenting to an otolaryngology practice for the assessment of refractory headaches.

Patients eligible for this review met the following criteria:

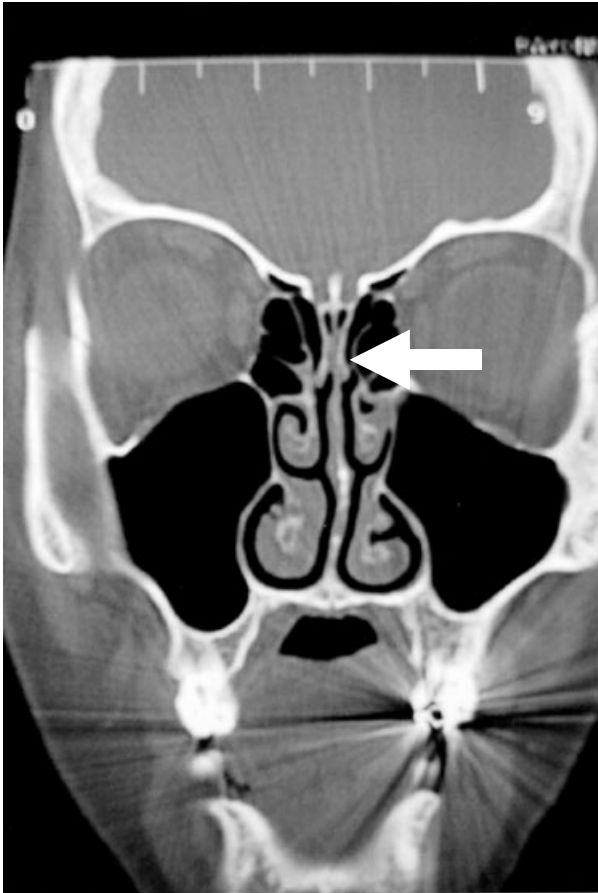
- 1 Presenting headaches meet criteria for migraine without aura, according to the ICHD-2 criteria (3), or transformed migraine, according to the criteria proposed by Silberstein and Lipton (12). The diagnosis of chronic migraine was not used because the study was conducted before the ICHD-2 publication. Transformed migraine, as defined here, was classified in those subjects with: (i) more than 15 days of headache per month, with an average duration of four or more hours per day; (ii) headache did not meet criteria for new daily persistent headache according to

the Silberstein and Lipton criteria; (iii) at least one of the following: (a) superimposed attacks of headache fulfilling the ICHD-1 criteria for migraine; (b) history of increasing frequency with decreasing severity of migraine features over at least 3 months; (c) history of headache fulfilling ICHD-1 criteria for migraine.

- 2 Patients failed a minimum of three standard pharmacological migraine preventive treatments.
- 3 Contact points had to be present on CT scan. This was defined by contact between the nasal septum and superior or middle turbinate and/or medial wall of ethmoid sinus (Fig. 1 displays the normal regional anatomy, while Fig. 2 shows contact points).
- 4 During a headache attack, patients reported significant improvement after topical anaesthesia to the contact area. The area of the contact point was treated with cottonoid soaked in decongestant and pontocaine. If the headache completely disappeared or diminished by more than 50% in intensity, subjects were considered candidates for surgery.
- 5 Patients submitted to endoscopic sinus surgery and septoplasty for contact point headaches in the same surgical facility, from October 1998 through August 2003.
- 6 Evidence of any sinus disease that could explain the headache symptoms was an exclusion criterion.
- 7 Using a stable dose of preventive medication during the entire course of the study.



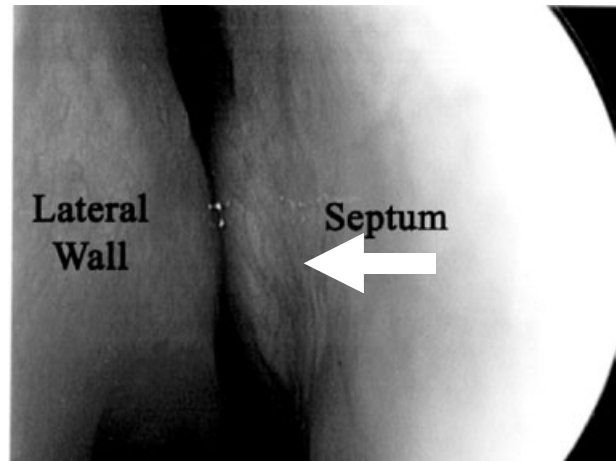
**Figure 1** Normal computed tomography scan, illustrating the normal naso-sinusal anatomy.



**Figure 2** Computed tomography scan demonstrating contact points between septum and superior turbinate (arrow).

### *Surgical technique*

Once the diagnosis was made and consent was obtained, surgery was scheduled. This procedure required general anaesthesia. The area between the septum and middle turbinate and/or ethmoid sinuses and/or the superior turbinate was visualized and the contact point was identified. The surgery included septoplasty, middle turbinectomy and medial ethmoidectomy. If the superior turbinate showed contact, it was either removed or lateralized. Septoplasty was always performed first, followed by a middle turbinectomy in order to gain access to the medial wall of ethmoid cells. Next, the ethmoidectomy was performed, and the medial wall of ethmoid sinuses were lateralized or removed. If the superior turbinate was causing the contact, then it was fractured laterally at this point. Patients who had contact between the septum and middle turbinate had a middle turbinectomy and septoplasty performed. Some of the patients who had inferior turbinate hypertrophy or stenosis of the maxillary



**Figure 3** Contact point area—surgical visualization.

osteom underwent an inferior turbinectomy and maxillary antrostomy, respectively. Figure 3 shows contact points as visualized by the surgeon.

### *Data collection and analysis*

Headache information was obtained using standardized questionnaires at baseline and at follow-up visits (6–62 months after surgery). This questionnaire was specifically designed to collect information on the procedure and was administered by the same physician (F.B.) both preoperatively and postoperatively as a part of his routine assessment of potential candidates for the surgery. At baseline we collected information on headache frequency, severity (10-point ordinal scale, where 0 was no pain and 10 was pain as bad as it can be), clinical characteristics of the headaches, associated symptoms, headache-related disability (10-point ordinal scale, where 0 was no impairment and 10 was complete impairment of usual activities) and number of previous treatments. At follow-up we repeated the same questionnaire. We also used a headache score (frequency multiplied by intensity) as a derived outcome.

We contrasted variables obtained at baseline and at the last follow-up visit. Data were analysed using the paired t-test after the normality KS test. Proportions were compared using the Fischer exact test.

This retrospective review was approved by the New Jersey Medical School Institutional Review Board.

### **Results**

A total of 50 patients were submitted to surgery. Of these, 27 did not meet the eligibility criteria, one died

**Table 1** Headache characteristics before (baseline) and after (follow-up) surgical treatment

	Baseline	Follow-up	P-value
Headache frequency, mean (SD)	17.7 (11.2)	7.7 (7.6)	<0.01
Headache severity, mean (SD)	7.8 (1.5)	3.6 (3.7)	0.0001
Associated symptoms, N (%)	21 (100%)	10 (47.6%)	<0.0001
Headache score, mean (SD)	138 (96.8),	54.8 (93.7)	<0.01
Headache-related disability, mean (SD)	5.6 (2.6)	1.8 (2.2)	<0.0001

of other causes after 2 years but was headache free, and two were lost to follow-up and could not be contacted. A total of 21 subjects (72.5% women) answered the follow-up questionnaires and continue to be assessed.

Migraine was the diagnosis of 12 (57.2%) subjects, while transformed migraine was diagnosed in nine (42.8%). Ages ranged from 21 to 73 years (average 45 years). At the time of surgery, patients had been using pharmacological treatment from an average of 11 years (ranging from 3 months to 40 years). All patients included in this study had sought care before for their headaches.

We compared the preoperative baseline assessment with the last follow-up visit (6–62 months after surgery) (Table 1). Mean headache frequency was reduced from 17.7 (11.2) days per month to 7.7 (7.6) headache days per month ( $P = 0.003$ ). Mean headache severity was reduced from 7.8 (1.5) to 3.6 (3.7) ( $P = 0.0001$ ).

At baseline, all subjects reported associated symptoms with their most severe headache attacks. In the last follow-up visit, 10 (47.6%) subjects reported them ( $P < 0.0001$ ). The headache score was reduced from 138 (96.8) at baseline to 54.8 (93.7) at follow-up ( $P < 0.01$ ). Finally, subjects' mean disability was 5.6 (2.6) at baseline and 1.8 (2.2) at follow-up ( $P < 0.0001$ ).

A total of 16 subjects (76.2%) had their headache scores improved by 50% or more after surgery; nine (42.9%) were pain free at the last follow-up. Just one (14.2%) had less than 25% reduction in their headache score (4.7%), while two (9.5%) had less than 25% increase in their headache scores.

## Discussion

Previous studies have assessed the surgical treatment of mucosal contact point headaches (1, 2), a group which has been variously defined and probably overlaps with the patients we studied. The appendix of the ICHD-2 (4) defines mucosal contact point headaches as a secondary disorder and requires three essential features: (i) clinical, endoscopic or imaging evidence of mucosal contact; (ii)

abolition of pain with local anaesthesia within 5 min after diagnostic topical application of local anaesthesia, using placebo or other controls, or gravitational variation of pain with postural movement; (iii) resolution of pain within 7 days of surgery. Because we did not use placebo, we cannot correlate our findings with regard to the ICHD-2 classification. However, all of our patients had more than 50% response after topical anaesthesia, and nine patients had complete abolition of pain postoperatively. We assessed patients with refractory migraine or transformed migraine with imaging evidence of contact points, and clinical evidence of headache response to intranasal anaesthetics. We considered that the contact points would be acting as trigger factors or being a cause of refractoriness to pharmacological treatment. We showed good outcomes in most of the patients where follow-up information was obtained.

Limited studies show good surgical results in patients with contact point headaches. In a series of 30 patients, total relief was achieved in 43% and significant improvement in 47% of the patients, after endoscopic endonasal surgery. The intensity of the headache remained the same in just 10% of the patients (2). A similar study retrospectively analysed 34 patients who presented with headaches as one of their primary sinonasal complaints, and were subsequently found to have contact points between the nasal septum and at least one turbinate. After surgery, reduction in headache intensity was reported by 91% and reduction in frequency by 85% of the patients (13).

A recent study assessed contact point surgery in patients with migraine and cluster headaches. Twenty patients with refractory cluster headache or migraine (selected after demonstrated failure of several standard preventive treatments) were followed up for a maximum of 10 years after surgery. Six patients remained completely free of pain, seven had significant symptom improvement, and seven received no benefit from surgery (65% improvement) (14).

Our series probably included patients with the secondary disorder mucosal contact point

headaches, as well as patients with migraine exacerbated by contact points. In either case, there are plausible biological mechanisms, which include the release of inflammatory mediators in the contact point areas (15). Stammberger and Wolf theorized that neuropeptides, especially substance P, are involved in the mediation of facial pain owing to mucosal contact points (16). They postulated that stimulation of nasal mucosal receptors causes release of substance P both centrally and peripherally (15, 16). This may also be true for calcitonin gene-related peptide (CGRP) (16). Substance P and CGRP are also released during the migraine attacks (17, 18). Substance P causes vasodilation and mucosa hypersecretion and it is well recognized that it is released in allergic rhinitis after antigen exposure (19, 20). Nerve fibres displaying substance P immunoreactivity have been detected in the nasal mucosa of several mammals (21). Substance P and neurokinin A, a peptide important in pain pathways, can be demonstrated in C-fibres in the human nasal mucosa. Substance P, CGRP and neurokinins are well-recognized mediators in nociceptive fibres in the central nervous system (15). We hypothesize that contact points cause the release of pain mediators that are also present in the trigeminovascular system and are of importance in migraine. In migraine sufferers contact points may therefore provide additional input, decreasing the threshold for migraine attacks and contributing to refractoriness to treatment.

Caution is required in interpreting our results. First, this is a retrospective study. Though consistent data elements were collected, information was collected at different time points. Headache calendars and validated questionnaires (like MIDAS) were not used, which raises the issue of interpretation of the data. Finally, because a number of patients could not be recontacted, differential loss to follow-up may influence results, particularly if poor outcome was associated with loss to follow-up.

We conclude that in patients with refractory migraine or transformed migraine, if contact points are present and headaches respond to local anaesthesia, surgery appears to improve outcomes. Additional work is needed to distinguish the secondary headache disorder, mucosal contact point headache, from contact points as an exacerbating factor for migraine. Prospective studies are necessary to confirm our results.

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