

# Septorhinoplasty as a treatment modality in refractory migraine headaches

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**Abstract** Migraine headaches are fairly common among people throughout the world with many treatment modalities. The cornerstone of treatment has been traditionally medical treatment which is mostly symptomatic and needs to be repeated. A few surgical procedures have been proposed which eliminate the inciting factor, and septorhinoplasty is one of them. Between October 2001 and August 2004, 24 patients suffering from migraine headaches, underwent septorhinoplasty at 15th Khordad Hospital, Tehran, Iran. Our inclusion criteria were refractory migraine, contact points demonstrated by computed tomography scan, and significant headache improvement after topical anesthesia to the contact area. Reduced severity and frequency of migraine headaches were documented which is statistically significant ( $p < 0.05$ ). Septorhinoplasty in selected patients with contact points could reduce frequency, severity, and duration of migraine attacks.

**Keywords** Migraine · Contact-point headache · Septorhinoplasty

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## Introduction

Migraine headaches are among the common causes of headache, affecting 18% of women and 6% of men in general population. One third of the patients with periodic or chronic migraine headaches are not relieved by standard therapies [1].

In addition, even the most efficacious medications do not entirely eliminate migraine headaches but only reduce their severity and frequency. The many possible causes of headaches make their diagnosis and treatment very challenging to the medical community.

Contact-point headache is a fairly new issue which is caused by contact between the nasal septum and lateral nasal walls by a mechanism of referred pain involving the trigeminal nerve [2]. Contact points refer to intranasal contact between opposing mucosal surfaces.

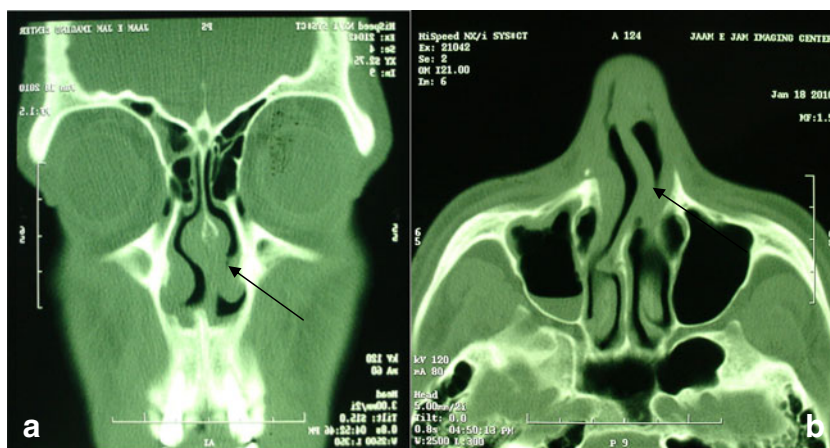
Contact points may be a cause of secondary headaches or an exacerbating factor for primary headaches [3]. This type of headache could be attributed to referred pain from the trigeminal nerve [4, 5].

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.

## Patients and methods

Between October 2001 and August of 2008, 24 patients with history of migraine headache and deviated nose

**Fig. 1** CT scan of septal deviation and contact point between septum and turbinate shown with an *arrow*. **a** Sagittal view, **b** coronal view



underwent septorhinoplasty at 15th Khordad Hospital, Tehran, Iran. All patients had been consulted by a neurologist before operation, and other causes of headache were excluded. In the preoperative workup, we requested computed tomography (CT) scan of nasal septum and paranasal sinuses. If contact points were demonstrated, first we applied topical anesthesia to these contact points, and if there was some improvement in headache, we considered operation.

Patients completed a preoperative questionnaire that collected data on age, sex, type of migraine (aura or non-aura), accompanying symptoms (nausea, vomiting, olfactory, and ocular symptoms), age at onset, frequency per month (in days), inability to work (in days), history of head trauma. With the patient under general anesthesia, the nasal septum was infiltrated with 1% Xylocaine and 1:100,000 units of epinephrine. After an interval to allow the vasoconstrictive effect of the infiltration solution to take place, a stair-step incision is performed on the mid-columellar region.

A periosteal elevator is used to undermine the septal flap in an exact submucoperichordrial plane until reaching the posterior bony septum. At this stage, any deviated parts of septal cartilage are carefully removed using a periosteal elevator while taking care to preserve the integrity of the contralateral flap. Excisions are limited to the central part of the cartilage, making sure that adequate cartilage dorsally and caudally is available to maintain the nasal dorsal and tip support.

Some of the patients who had inferior turbinate hypertrophy or stenosis of the maxillary ostium underwent an inferior turbinectomy and maxillary antrostomy, respectively. Figure 1 shows contact points as visualized during preoperative CT scan, and Fig. 2 shows the intraoperative view. Information about headache was obtained using standardized questionnaires as a baseline and at follow-up visits (6–41 months after surgery).

We collected information on headache frequency, location, severity (a 10-point ordinal scale, where 0 referred to no pain and 10 as the most severe pain), and associated

symptoms. We employed *t* test for our statistical analysis, and the *p* value set for the statistical significance was  $<0.05$ . At follow-up visits, we utilized the same questionnaire, and results were compared.

## Results

The onset of the symptoms ranged between 3 and 20 years (7 years mean) before admission, and the follow-up period after the operation was between 7 and 50 months (mean of 32/1 months).

Table 1 summarizes the preoperative complaints of our patients. Sixty-three percent of our patients had nausea and vomiting preoperatively.

The patients rated their pain severity according to the mentioned scale between 0 and 10 (10 being the worst), which was 8.9 on average (range of 8–10). Table 2 depicts our postoperative results. Sixty-six percent (66%) had no headaches postoperatively after a mean follow-up of 33.7 months.



**Fig. 2** Intraoperative view of the contact between septum and turbinate

**Table 1** Preoperative questionnaire

| Patient | Duration | Frequency | Pulsating | Severity | N/V | Location      |
|---------|----------|-----------|-----------|----------|-----|---------------|
| 1       | 2 h      | 5 months  | Yes       | 10       | Yes | Frontal       |
| 2       | All day  | Every day | No        | 8        | No  | Entire head   |
| 3       | 3 h      | 10 months | Yes       | 9        | Yes | Frontal       |
| 4       | 20 min   | 2 days    | Yes       | 8        | Yes | Eyes, frontal |
| 5       | 1 h      | Every day | Yes       | 9        | Yes | Eyes, frontal |
| 6       | All day  | Every day | No        | 8        | No  | Entire head   |
| 7       | All day  | 20 months | No        | 9        | No  | Entire head   |
| 8       | 30 min   | 10 months | Yes       | 10       | Yes | Frontal, eyes |
| 9       | 2 h      | 10 months | Yes       | 10       | Yes | Frontal, eyes |
| 10      | 3 h      | 15 months | Yes       | 9        | Yes | Frontal, eyes |
| 11      | All day  | Every day | No        | 8        | No  | Entire HEAD   |
| 12      | 4 h      | 7 months  | Yes       | 9        | Yes | Frontal       |
| 13      | 5 h      | 10 months | Yes       | 10       | Yes | Eyes, frontal |
| 14      | 3 h      | 4 months  | No        | 9        | No  | Frontal       |
| 15      | All day  | 19 months | No        | 7        | No  | Entire head   |
| 16      | 2 h      | 11 months | Yes       | 10       | Yes | Eyes, frontal |
| 17      | 4 h      | 16/month  | Yes       | 9        | Yes | Eyes, frontal |
| 18      | All day  | Every day | No        | 7        | No  | Entire head   |
| 19      | 20 min   | 4 months  | Yes       | 10       | Yes | Frontal       |
| 20      | 1/5 h    | Every day | Yes       | 9        | Yes | Eyes, frontal |
| 21      | 2 h      | 8 months  | Yes       | 10       | Yes | Frontal       |
| 22      | All day  | 21 months | No        | 7        | No  | Entire head   |
| 23      | 3 h      | 16 months | Yes       | 9        | Yes | Frontal       |
| 24      | 4 h      | 17/month  | Yes       | 8        | Yes | Frontal       |

Average pain severity after surgery was 0.72 (range of 0 to 3). Eleven patients had significant relief as a significant decrease in severity ( $p < 0.005$ ) and frequency ( $p < 0.005$ ); but they had a modest decrease in duration of pain ( $p = 0.15$ ) (Figs. 3, 4, 5).

Also frequency of nausea and vomiting significantly reduced after surgery ( $p < 0.005$ ) (Fig. 6). Three patients, who did not have complete relief in their symptoms, had generalized pattern of headache and it was not localized.

## Discussion

The most common sinonasal cause of headaches has traditionally been viewed as sinusitis [2]. In 1980, middle turbinate headache syndrome was described by Morgenstern and Krieger [6]. They described contact points between the middle turbinate and septum causing headaches secondary to referred pain. Most of the patients who underwent a middle turbinate resection and septoplasty recovered from their symptoms. It should be noted that most of their patients were diagnosed with migraine without aura headache and treated medically without success before the pain was surgically relieved.

Mucosal contact headache is a newly added entity in secondary headache disorder in the international classification of headache disorder (ICHD-2) [3]. 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 CT.

Contact-point headaches are thought to occur by the mechanism of referred pain from the first and second branches of the trigeminal nerve [7]. These nerves also supply the sensation to superior turbinates and ethmoidal sinuses. Sensory fibers of maxillary branch of trigeminal nerve (V2), travel through the sphenopalatine ganglion and innervate the middle and inferior aspect of the nasal septum and lateral nasal wall.

In patients with migraine, contact points may contribute to treatment refractoriness, by acting as a trigger point, although the prevalence of this anatomical variation in general population is unknown. In a cohort study of 973 patients consecutively seen in a tertiary center, contact points were present in 4% of the subjects [4].

Stammberger and Wolf mentioned that mucosal contact could cause headaches through substance-p (sp) which is released to the nasal mucosa [8, 9]. Behin et al. reported an

**Table 2** Postoperative questionnaire

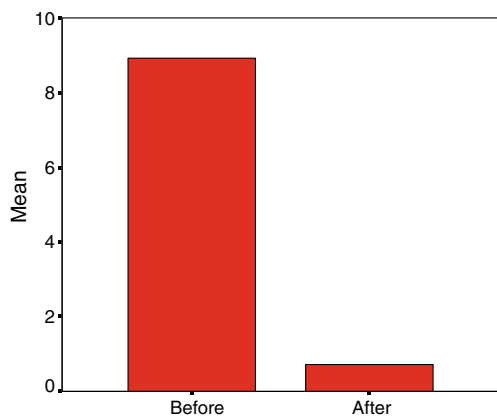
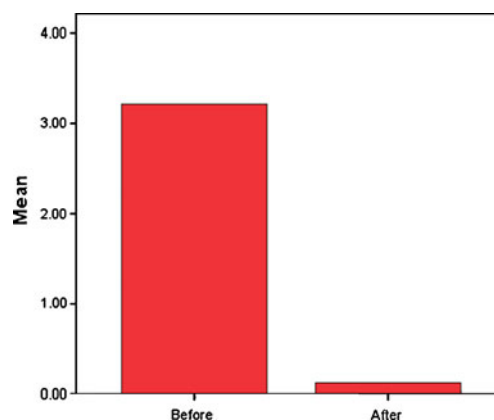
| Patient | Duration | Frequency | Pulsating | Severity | N/V | Location      | Follow-up |
|---------|----------|-----------|-----------|----------|-----|---------------|-----------|
| 1       | None     |           |           |          |     |               | 7         |
| 2       | None     |           |           |          |     |               | 40        |
| 3       | None     |           |           |          |     |               | 36        |
| 4       | None     |           |           |          |     |               | 50        |
| 5       | None     |           |           |          |     |               | 42        |
| 6       | All day  | Every day | No        | 3        | No  | Entire head   | 21        |
| 7       | All day  | 20 months | No        | 2        | No  | Entire head   | 40        |
| 8       | None     |           |           |          |     |               | 30        |
| 9       | 30 min   | 5 months  | No        | 2        | Yes | Frontal, eyes | 24        |
| 10      | None     |           |           |          |     |               | 31        |
| 11      | All day  | 20 months | No        | 1        | No  | Entire head   | 34        |
| 12      | None     |           |           |          |     |               | 15        |
| 13      | None     |           |           |          |     |               | 21        |
| 14      | 30 min   | 6 months  | Yes       | 4        | No  | Frontal       | 30        |
| 15      | All day  | Every day | No        | 4        | No  | Entire head   | 22        |
| 16      | None     |           |           |          |     |               | 41        |
| 17      | None     |           |           |          |     |               | 29        |
| 18      | All day  | 23 months | No        | 4        | No  | Entire head   | 17        |
| 19      | None     |           |           |          |     |               | 22        |
| 20      | 1.5 h    | Every day | Yes       | 9        | Yes | Frontal, eyes | 10        |
| 21      | None     |           |           |          |     |               | 30        |
| 22      | All day  | 10 months | No        | 7        | No  | Entire head   | 6         |
| 23      | None     |           |           |          |     |               | 18        |
| 24      | None     |           |           |          |     |               | 27        |

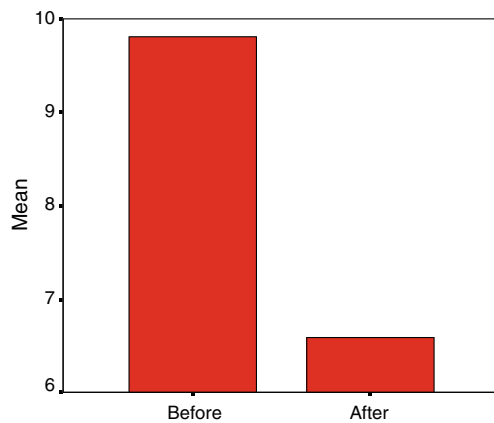
80% improvement after surgical treatment of 23 patients with contact-point headaches [2].

In another study by Guyuron et al. on 249 patients in a 10-year period, it was approved that resection of corrugator supercilii muscle eliminates or significantly improves migraine headaches [10]. Two factors may contribute to improvement of migraine headaches after septorhinoplasty. First, in septoplasty, we remove the contact point between

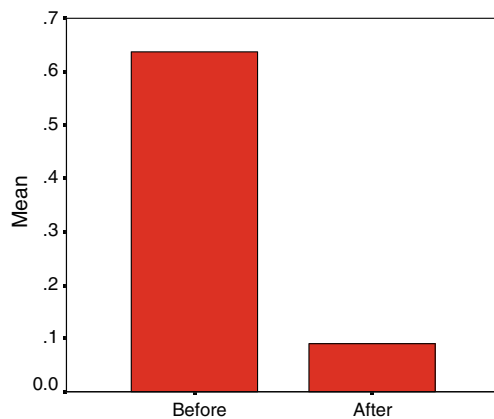
the nasal septum and the lateral nasal wall. Second, when we dissect radix and glabella in rhinoplasty, corrugator and procerus muscles get weak [11].

In our study, we had an overall 66% success rate. All of our patients had significant decrease in severity of pain after septorhinoplasty. Location of pain in 75% of patients, who did not have complete relief in their headaches, was not localized in one area.

**Fig. 3** Severity of pain before and after surgery**Fig. 4** Frequency of pain before and after surgery



**Fig. 5** Duration of pain before and after surgery



**Fig. 6** Nausea and vomiting before and after surgery

So, statistically, it seems that after septorhinoplasty in patients who had a history of chronic refractory migraine headache, there was significant improvement in the severity and duration of their pain. Although we did not face any recurrence of complaints in our follow-ups, the longevity of this treatment modality is a matter of debate. In a study by Welge-Luessen et al. in the long-term follow-up, there could be some return of symptoms in a few patients after more than 7 to 8 years [12].

## Conclusion

We believe that septorhinoplasty could improve severity and duration of headaches in patients with history of migraine. In addition, we believe that some forms of chronic, refractory headaches could be caused by contact between the septum and lateral nasal wall or inferior or superior turbinates.

We recommend paranasal sinus CT scan to diagnose this entity, and if there is improvement of headache with topical anesthesia preoperatively, surgical intervention could be advised. However, more extensive prospective studies are definitely necessary to confirm our results.

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