


ORIGINAL RESEARCH

Higher incidence of headache in patients with intermittent mucosal contact points between the septum and lateral nasal wall

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Abstract

Introduction: The nasal mucosal contact points between the two opposing mucosal surfaces leading to the headache had been a point of debate for many years; the intermittent and fixed contact points and their relationship with headache have never been investigated before. We have studied the relationship of headache with a different type of contact points in our study.

Objectives: The aim of our study was to study two different types of mucosal contact point between the lateral nasal wall and the nasal septum and to study their relationship with symptom of headache.

There have been many papers published related to the mucosal contact points in the nose and their relationship with headache, most of the published data did not find any relation between the headache and the mucosal contact points. We conducted a retrospective study of 116 patients with deviated nasal septum and contact point with the lateral nasal wall.

Methods: A retrospective study done at a tertiary institute Included 116 CT scan of paranasal sinuses showing the deviated nasal septum with mucosal contact points, 64 CT scan showed severe deviated nasal septum with fixed contact points between the septum and the inferior turbinate, other 52 scans showed the intermittent mucosal contact point, that is, septum is coming in contact with inferior turbinate only when turbinate is enlarged.

Results: Thirteen patients out of 64 patients (20.31%) had a headache in the fixed contact point group as compared to 20 out of 52 (38.46%) patients in the intermittent mucosal contact points group; post-surgery, the 17/20 patients improved in the intermittent mucosal contact points group as compared to 5/13 in fixed contact points group.

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Conclusions: We conclude that the overall incidence of headache associated with mucosal contact points is low but the higher association is seen in the intermittent contact group.

Level of Evidence: 4.

KEYWORDS

deviated nasal septum, headache, inferior turbinate, mucosal contact point, septoplasty

1 | INTRODUCTION

Mucosal contact point (MCP) is defined as when two mucosal surfaces come in contact with each other, in the nose, the MCP is defined by the contact of nasal septal mucosa with mucosa from the lateral nasal wall, which can result from a deviated nasal septum touching the inferior turbinate or the lateral nasal wall. It can also be seen when there is a deviated nasal septum along with inferior turbinate hypertrophy.

There have been multiple papers published with studies related to multiple mucosal contact points in the nose and their relationship with the headache; the published scientific literature has failed to show any strong relationship between MCP and the headache, the incidence of MCP with headache is documented to be around 40% of all cases and not significantly higher than the general population, there are papers related to the improvement of headache in some patients with MCP post-surgery, McAuliffe et al¹ described how stimulating various regions of the nasal cavity can cause pain in the cutaneous distribution of the trigeminal nerve.

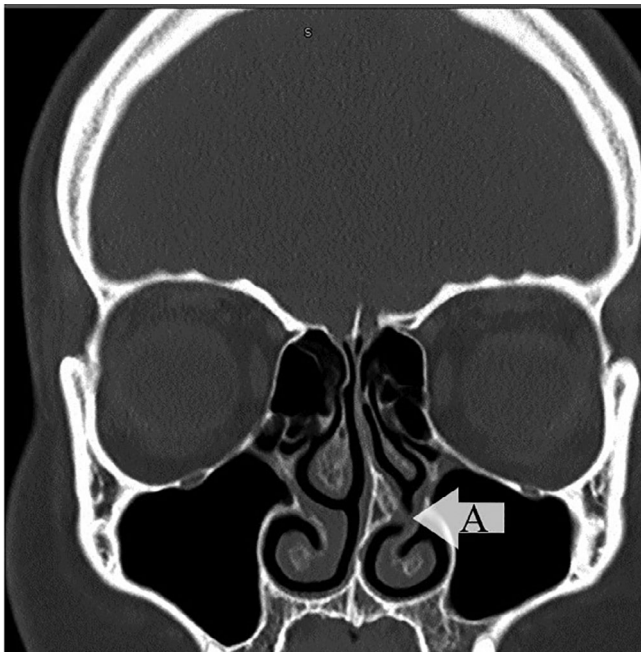


FIGURE 1 Fixed MCP On CT sinus (arrow). MCP, mucosal contact point

The paper published by Stumberger et al^{2,3} also proved the presence of substance p in higher concentration at the area of MCP.

We have carried out a retrospective analysis of 116 patients selected with radiological findings on coronal CT sinus and studied the improvement of the patient post-surgery. In this article, we have discussed the proposed theory and its explanation for the patient of intermittent MCP vs fixed MCP and higher association of intermittent MCP to cause a headache as compared to fixed MCP.

2 | MATERIALS AND METHODS

The study was conducted as a retrospective analysis of patient records, CT scan after obtaining the clearance from the Ethical Committee and Medical Research Center at Hamad Medical Corporation.

We have studied the coronal CT scan of paranasal sinuses (bone window) of 116 patients undergoing septoplasty procedure in our institute between 2016 and 2020; the patients were selected based on the MCP and divided into two groups.

Fixed MCP (F-MCP) was defined as MCP which was constant and based on the severe deviation of the nasal septum, the nasal septum was significantly deviated to touch the lateral nasal wall or inferior turbinate with impaction at the side of deviation (Figures 1 and 2).

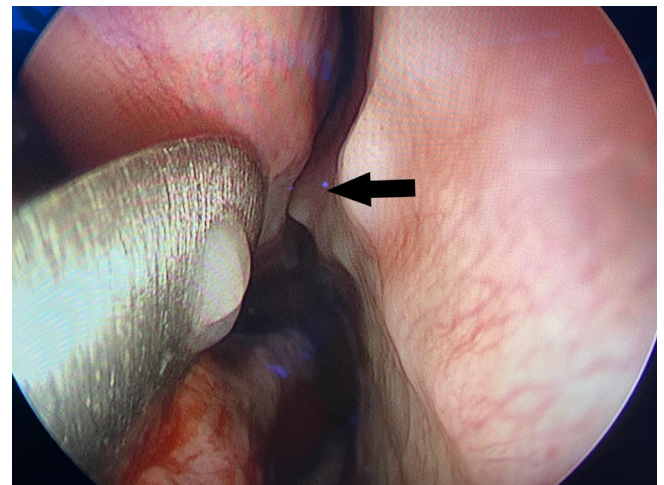


FIGURE 2 Fixed MCP endoscopic view (arrow). MCP, mucosal contact point

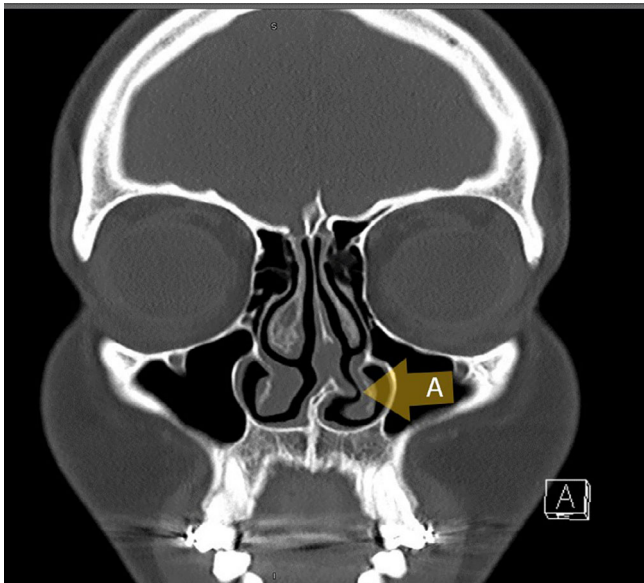


FIGURE 3 Intermittent MCP with indentation sign On CT sinus (arrow). MCP, mucosal contact point

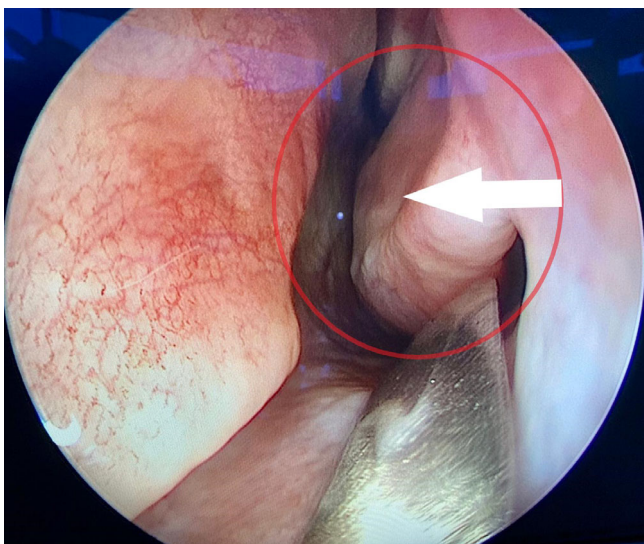


FIGURE 4 Intermittent MCP with indentation sign endoscopic picture (arrow). MCP, mucosal contact point

Intermittent MCP (I-MCP) was defined as contact points seen on the scan as a groove on the inferior turbinate but there was well-defined space between the septum and the inferior turbinate, mucosal surface indentation was a sign of intermittent mucosal contact, which was confirmed by the history of intermittent nasal obstruction (Figures 3 and 4).

All the patients underwent CT Sinuses for pre-op evaluation, the presence of indentation on inferior turbinate corresponding to the part of the deviated septum was taken as a sign of I-MCP. All the patients were analyzed for symptoms of headache in the preop evaluation and during follow-up period of 3-month post-surgery. All patients underwent a septoplasty.

TABLE 1 Percentage of headache in patients with I-MCP and F-MCP pre-operatively

Results			
	Headache	No headache	Total
Intermittent MCP	20	32	52
Fixed MCP	13	51	64
Total	33	83	116 (Grand total)

Note: The Fisher exact test statistic value is 0.0092. The result is significant at $P < .05$.

Abbreviations: F-MCP, fixed MCP; I-MCP, intermittent MCP; MCP, mucosal contact point.

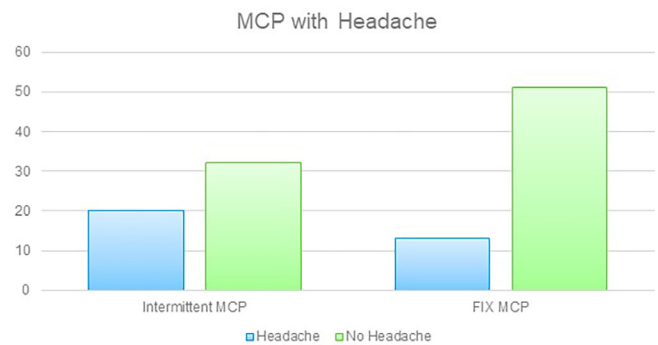


FIGURE 5 A graph showing the number of patients with headache in intermittent and fixed MCP preoperatively. MCP, mucosal contact point

Following patients were excluded from the study:

- Pediatric patients.
- All the cases of migraine and other neurological cause of headache.
- Patients with acute and chronic rhinosinusitis.
- Patients with Concha bullosa.

2.1 | Statistical analysis

Statistical analyses were performed using IBM SPSS 22.0 for Windows (IBM Corp., Armonk, NY). The significance level was set at $P < .05$.

A total of 116 patients was studied and they were classified into fixed and intermittent MCP groups with symptoms of headache, the data were formulated as pre- and post-surgery 2×2 table.

2.1.1 | Pre-surgical analysis

Out of 116 patients, 52 (44.82%) were I-MCP and 64 (55.17%) were F-MCP.

The headache was seen in 20 (38.46%) patients in the I-MCP group as compared to 13 (20.31%) in the F-MCP group.

Results			
	Improvement	No improvement	Total
Intermittent MCP	17	3	20
Fixed MCP	5	8	13
Total	22	11	33 (Grand total)

TABLE 2 Percentage of improvement of headache in patients with I-MCP and F-MCP pre-operatively

Note: The Fisher exact test statistic value is 0.0092. The result is significant at $P < .05$.

Abbreviations: F-MCP, fixed MCP; I-MCP, intermittent MCP; MCP, mucosal contact point.

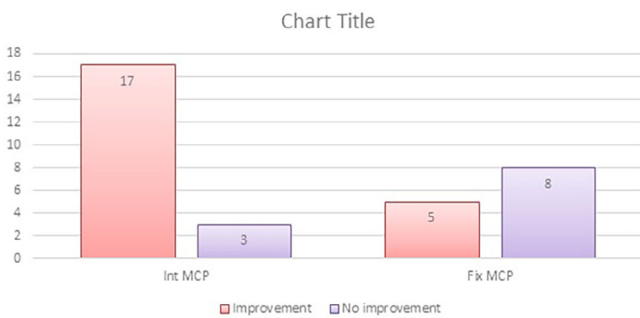


FIGURE 6 A graph showing the number of patients with headache in intermittent and fixed MCP post-operatively. MCP, mucosal contact point

The data were analyzed using Fisher exact test as follows in Table 1.

The results showed the patient in the group of I-MCP had significantly higher symptoms of headache as compare to F-MCP (Figure 5).

2.1.2 | Post-surgery analysis

The analysis of the patient who underwent septoplasty surgery was as follows, out of 116 patients undergoing surgery, 33 were the patients with preop headache as symptom.

Patients were evaluated for headache 3 months' post-surgery.

17 (85%) of I-MCP group showed improvement of headache as compared to 5 (38.46%) in F-MCP group

The results were analyzed using Fisher test as follows (Table 2).

The results showed significant improvement in headache for patient with I-MCP as compare to F-MCP post septoplasty after all mucosal contacts were cleared (Figure 6).

3 | DISCUSSION

Headache in patients with MCP has been extensively investigated in the literature, many papers have been published in the past, still the MCP with headache remains widely debated topic between rhinologists and neurologists all over the world.

McAuliffe¹ described how when stimulating various regions of the nasal cavity, pain could be felt in cutaneous areas of the

trigeminal nerve. These findings have been used to support the idea that mucosal contact points can cause referred pain and headache. A systemic review published by Harrison et al^{1,3,4} found no relationship between MCP and headache, the theories advocating MCP as the cause of headache postulate that substance P is released from MCP which causes stimulation of type C pain fibers which are relayed to the trigeminal nerve branches causing the headache and facial pain.⁵ There are studies comparing the surgical outcomes post removal of MCP, post-surgery either the facial pain has been eliminated or improved.

There are several studies^{2,3,6} that have analyzed the success of the surgery of contact point headache. The criteria for inclusion and the results were different from study to study.^{7,8} The biggest series, which was presented by Huang et al,^{9,10} included 66 patients divided into three groups: with a deviation of the nasal septum, with concha bullosa, and with orbit ethmoidal (Haller's) cell.¹¹ After the surgical treatment, the authors found a reduction of intensity and frequency of headache in 81.8% of the patients. Parsons and Batra^{12,13} demonstrated an improvement rate of 91% in a retrospective study including 34 subjects with contact between the septum and nasal turbinate. Sadeghi et al¹⁴ published similar results (improvement in 93.3% of patients) with similar groups for a total of 30 patients.

Stammberger and Wolf¹⁵ measured the concentration of substance P in the nasal mucosa and concluded that it is higher in healthy mucosa at MCP compared with chronically inflamed hyperplastic mucosa and mucosa of the nasal polyps.¹⁶ They explained that at the area of MCP the NEP (neural endopeptidase) which degrades the substance p is limited, leading to increase the concentration of substance P which stimulates the pain fibers.

The area of contact between the septal mucosa and the mucosa of the lateral nasal wall has been found to have a high concentration of substance p which act as a mediator for the pain perceived as headache or facial pain,^{4,17,18} the nerve supply to the lateral nasal wall is from the branches of the ophthalmic and maxillary division of trigeminal nerve.^{14,15,19} Depending upon the anatomy of the nasal septum and its relation to the anterior nasal wall, the contact point can either be fixed as seen with severe septal deviation when the septum is in constant contact with the nasal wall or intermittent when the contact points are present when there is nasal congestion or during nasal cycle.^{20,21}

There have been various papers published in describing the correlation between the headache and other anatomical variations like concha bullosa, maxillary sinus volumes, most of the studies^{22,23} did not

found any correlation between the headache and MCP,²⁴⁻²⁶ the overall incidence of headache reported in other studies ranges from 15% to 30% with MCP. Our study also found a similar result of the headache with all types of MCP to be 38%.

In our study, we found a significant correlation between the headache and intermittent MCP, we postulate that in patients with fixed MCP the nerve ending undergoes desensitization over time as a result of constant contact, hence there is no secretion of substance P over time, in patients with intermittent MCP, they are intermittent contact between the septum and nasal mucosa, contact points are created when there is inflammation, which results either from allergy-causing inferior turbinate hypertrophy or rhinosinusitis causing the inflammation of nasal mucosa. When there are intermittent MCP, the nerve ending does not undergo desensitization. The improvement of headache is better in series of patients undergoing surgical intervention with intermittent MCP as compare to fixed MCP.

Our study is relevant for pre-operative counseling of the patients, and likely predictor for the post-surgical improvement of headache and facial pain, the patients with fixed MCP are the patients with a more severe degree of septal deviation where the septum is either dislocated or impacted to either inferior turbinate or lateral nasal wall, and these patients are more symptomatic for nasal obstruction, but the outcome for improvement of headache post-surgery in their patient is poorer than the patients with intermittent MCP. The patients with intermittent MCP are preoperatively less symptomatic for nasal obstruction but post-op improvement in terms of headache is better. The patients with fixed MCP should be investigated for other causes of headache and should be counseled for post-op outcomes. Patients with fixed MCP are more likely to improve for breathing after surgery but less improvement is expected for facial pain or headache.

4 | CONCLUSION

The overall incidence of headache with MCP is low and their relationship is still debated, but the patients with I-MCP have a higher incidence of headache as compare to F-MCP and the post-surgical improvement is better with I-MCP as compare to F-MCP for headache.

Our study has limitations in that it was not conducted as a prospective randomized trial and the VAS for headache improvement was not used. Our study provides an evidence based on which future randomized controlled trials can be conducted.

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CONFLICT OF INTEREST

We do not have any conflict of interest to disclose.

FINANCIAL DISCLOSURE

There are no financial conflicts of interest to disclose.

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