# Study On the Outcome Of Surgical Management In Rhinogenic Contact Point Headache Due To Anatomical Variations In Nose

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## ABSTRACT
Headache and facial pain are very common and distressing complaints. Due to its multifactorial origin often it remains undiagnosed and inadequately treated. One very important cause which is missed in daily practice by primary physicians is rhinogenic contact point headache. In this study, we will elicit how effective surgical treatments are for rhinogenic contact point headaches when other causes are ruled out.

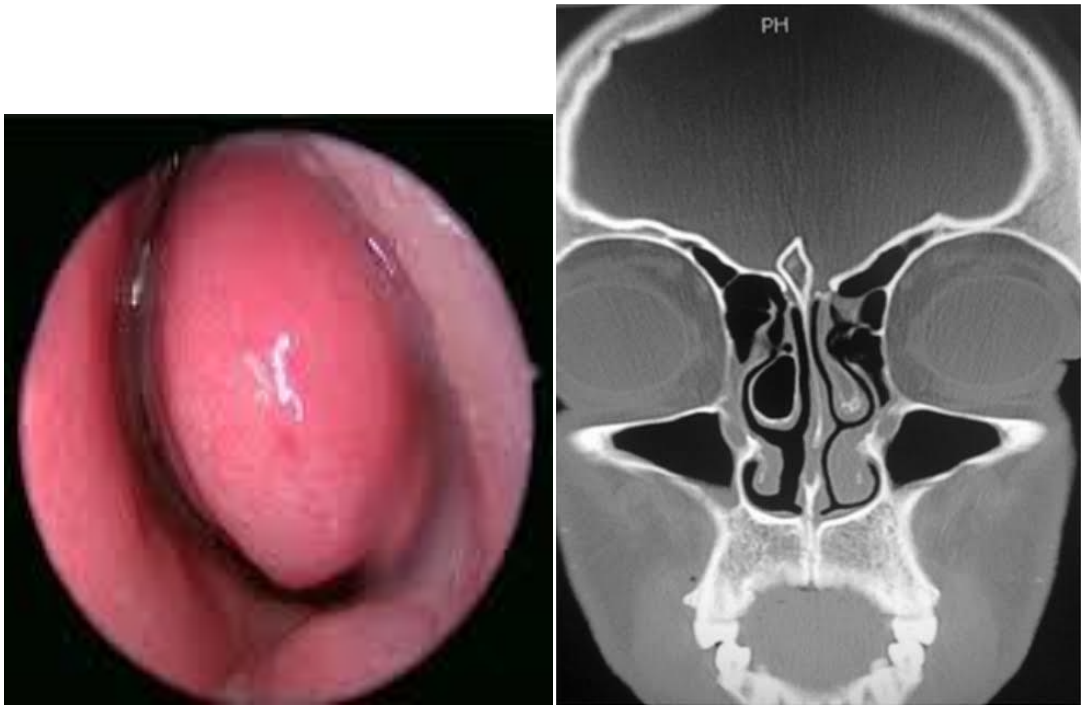
**Keywords** Headache ■ Facial pain ■ DNS ■ Spur ■ Septoplasty ■ Contact headache

## INTRODUCTION
Headache is a prevalent issue in medical environments and causes distress for both patients and physicians. However, when considering various causes, doctors should be vigilant about a potential rhinologic origin of pain[1]. Non-inflammatory sinonasal pathology-induced headache is a recently recognized clinical condition that has been extensively discussed in the literature for the past two decades[2][3].
Rhinogenic contact point headache (RCPH) is a term used to describe intermittent pain that occurs in specific areas around the eyes and temples[4]. This pain is caused by contact between the mucous membranes in the nasal cavities and does not involve any signs of inflammation, excessive tissue growth, discharge, or abnormal masses[5]. The headache typically subsides within 5 minutes after applying local anesthesia to the contact area and significantly improves within 7 days after removing the contact points[6].
Contact points can potentially trigger additional headaches or worsen primary headaches. Mucosal contact headache is a recently recognized secondary headache disease in the International Classification of Headache Disorders (ICHD-2) that is backed by inadequate data[7][8]. These headaches are defined by sporadic pain that is focused in the areas around the eyes and the inner corners of the eyes or the temples and cheekbones[9]. These headaches are accompanied by signs of contact between the nasal lining and certain locations, which can be observed through nasal endoscopy or computed tomography (CT) imaging[10][11].
The interaction between the structures, not only acts as a mechanical stimulus in the areas where pain originates, but also triggers a local inflammatory response, leading to the release of pain-related mediators. Substance P and histamine, acting as mediators, decrease the pain threshold in the receptors of the nasal mucosa[12] .The literature recognizes the mechanism of local reflex, which is initiated by contact between structures and results in the release of vasoactive amines and the development of edema[13]. The chemical P can serve as a mediator of the reflex in this mechanism[14].
Various stimuli acting on polymodal receptors in the nasal mucosa, including viral, chemical, caloric, or mechanical (pressure) irritants, can produce an orthodromic impulse to the cerebral cortex[15]. This impulse is mediated by substance P and is responsible for the perception of pain. Furthermore, these stimuli not only produce orthodromic impulses, but also generate antidromic impulses. These antidromic impulses have the ability to release P substance in the nasal mucosa, which in turn mediates plasma leak, vasodilation, smooth muscle contraction, and hypersecretion.

The term used to describe this mechanism is axonal reflex. The swelling of the mucosa might exacerbate the pressure between the structures, perpetuating the cycle[16][17].
Therefore, the objective of this study is to assess the results of surgical treatment for rhinogenic contact point headache caused by anatomical changes in the nose[18].

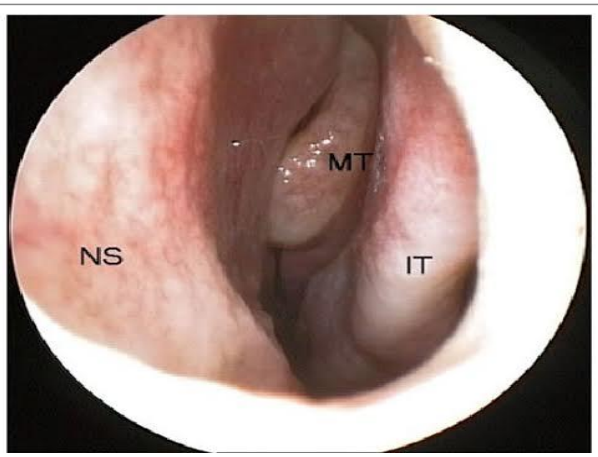
**Anatomical Variations**
The most common variations are :
**1) Variations in the middle turbinate**
**2) Variations in the uncinate process**
**3) Variations in the ethmoid bulla**
**4) Variations in the nasal septum[19]**

**Middle turbinate Variation:**
**Concha bullosa:**




The condition in which the middle turbinate becomes pneumatized is referred to as concha bullosa[20][21].

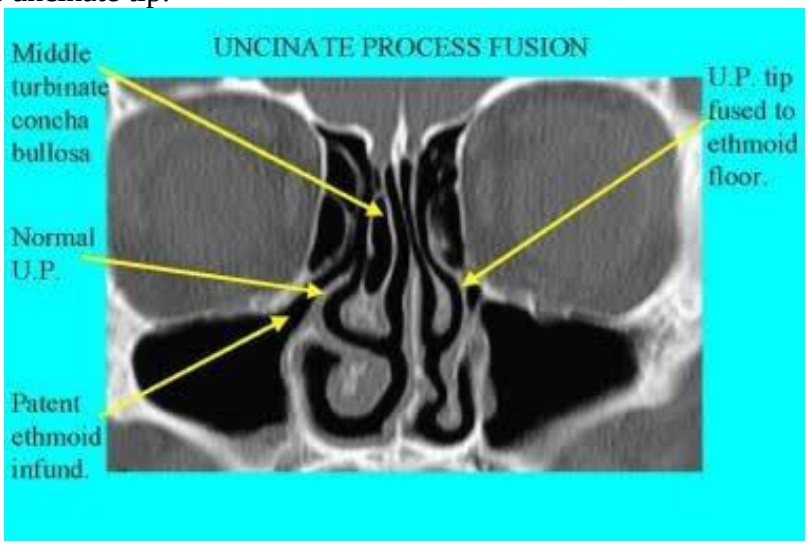
**Paradoxically curved middle turbinate:**



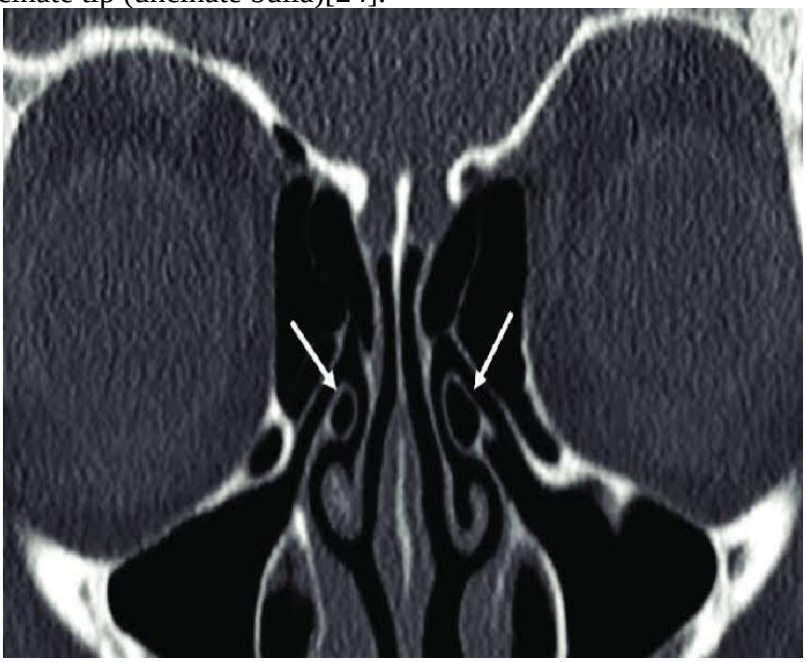
The middle turbinate bone typically exhibits a medial convexity towards the nasal septum[22][23]. When paradoxically curved, the convexity is oriented laterally, namely towards the lateral sinus wall.

**Uncinate Variations :**

- Deviation of the uncinate tip.

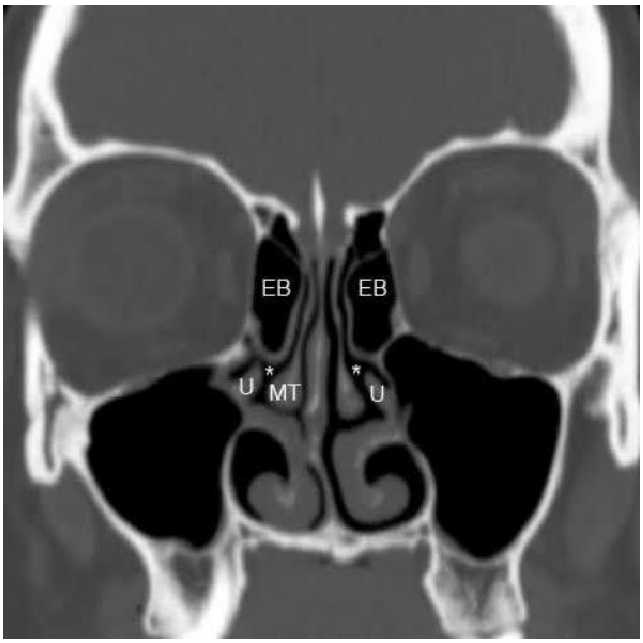



- Pneumatised uncinate tip (uncinate bulla)[24].

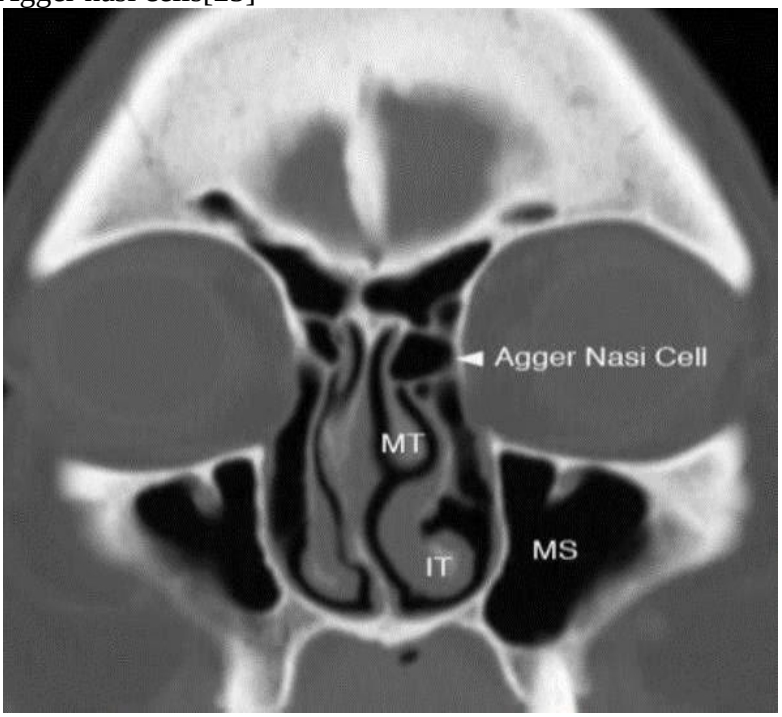


**Ethmoidal Variations**

- Enlarged ethmoidal bulla

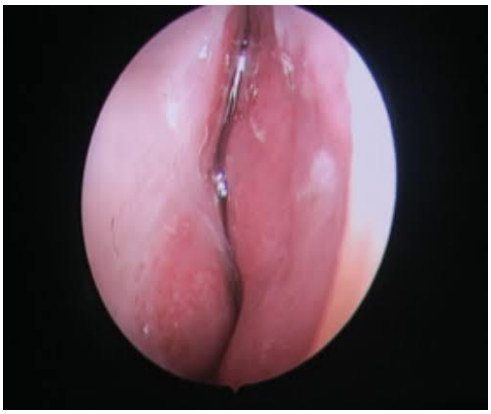



- Enlargement of Agger nasi cells[25]

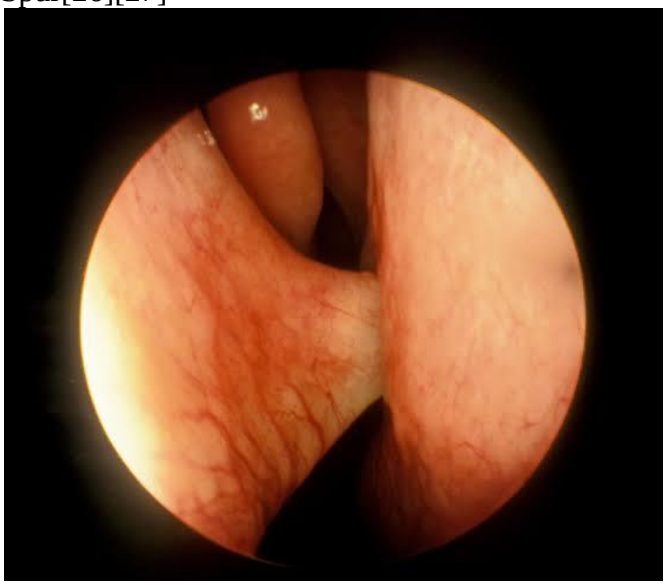


**Variations in the Nasal Septum :**

- Nasal septal deviation



- Spur[26][27]



**MATERIAL AND METHODS**

**STUDY DESIGN:** prospective observational study
**SET UP:** ENT department, dr sushilatiwari government hospital, haldwani
**DURATION OF STUDY:** 18 months of approval from IEC
**SAMPLING FRAME :** patients attending the ENT OPD with the major complaint of headache or facial pain

**STUDY UNIT:**

- patients attending the ENT OPD with The major complaint of headache or facial pain described as chronic, recurrent, excruciating, and/or
- disabling over the glabellar area and/or
- extending over the middle canthus region and/or
- supraorbital area unilaterally or bilaterally; and
- no signs of any inflammation, mass, or allergy in the nasal cavity and the paranasal sinuses as noted in the nasal endoscopy or CT of the paranasal sinuses and
- meeting the inclusion and exclusion criteria.

**INCLUSION CRITERIA :**

- Identification of contact areas in nose related to one or more anatomical variations on endoscopy and CT.
- Normal neurological examination
- Normal ophthalmologic evaluation
- Patients giving consent.

**EXCLUSION CRITERIA :**

- Epistaxis
- Benign or malignant tumors
- Granulomatous disorders
- Chronic rhinosinusitis
- Nasal polyposis
- Allergic rhinitis
- Psychogenic headache
- Patients not giving consent
- Loss to follow up

**SAMPLE SIZE**

All the patients of headache or facial pain who came to the ENT OPD and met the inclusion criteria, were included in the study sample size= 82

**SAMPLING DESIGN**

Consecutive sampling/ total enumerative type

**STUDY TOOLS**

- Endoscopy unit by karl storz, Germany

**WORKING DEFINITIONS**

1) Diagnostic nasal endoscopy : endoscopy of nose helps in the diagnosis of diseases of nose , paranasal sinuses and nasopharynx. Because of brighter illumination, magnificent and angled view provided by the endoscopes, it is possible to examine all clefts and crevices of nose and nasopharynx. It is an important part of examination of nose and nasopharynx.

**Materials required :** endoscope ( 30 degree / 0 degree )
Topical anaesthesia ( 4% lignocaine+ adrenaline 1:100000)
Tilley's foreceps
Freer's elevator
Suction tips
Antifog solution / savlon

**2)** NCCT nose & PNS : it is a non invasive diagnostic imaging procedure that uses a combination of x-rays and computer technologyto produce cross-sectional images(slices) of the body it shows detailed images of any part of the body , including bones , muscles , fat , organs and blood vessels
**3)** X-RAY PNS : it is a penetrating form of high energy electromagnetic radiation used for medical imaging

**METHODOLOGY**

data of the patient was collected in a pre-designed proforma . the particulars , investigations , treatment, examinations, history and follow up etc were recorded at the relevant time.

The assessment of the patient included a complete history and head and neck examination. In the history importance was given to headache or facial pain described as chronic, recurrent, excruciating, and/or disabling over the glabellar area and/or extending over the middle canthus region and/or supraorbital area unilaterally or bilaterally. migraine , tension headache , neurologic causes ,ophthalmic causes and hypertension sinusitis and polyps were ruled out. Other medical problems such as diabetes , lung, heart and kidney disorders were documented.

**PROCEDURE**

Requirements :

- endoscopy unit
- Topical anaesthesia ( 4% lignocaine+ adrenaline 1:100000)
- Nasal instruments ( tilley's forceps , nasal speculum , freer's elevator )
- NCCT/ X-RAY
- The nasal examination started with evaluation of the external nose for any skin lesions and osteocartilaginous framework deformities such as swelling, scars, sinus , ulcer, neoplasm , deformity , bony or cartilaginous enlargement.
- Vestibule was evaluated by lifting the tip of the nose. We looked for any abnormalities like furuncle, fissure, crusting, dislocated caudal end of septum and tumors.
- Then Anterior rhinoscopy was performed where we examined the nasal cavities , septum, floor of nose , inferior and middle turbinates, inferior and middle meatuses.
- In posterior rhinoscopy we examined the posterior choana , posterior ends of inferior turbinates and nasopharynx.
- Diagnostic nasal endoscopy will be performed to look for any anatomical variations causing headache.
- Decongestion test was performed. Pledgets soaked in 4% lignocaine & adrenaline (1/100000) were kept between the anatomical variation and the mucosal contact point. If the patient got some relief after decongestion , it meant he/she will be benefited from the planned surgery.
- Diagnostic nasal endoscopic findings was corelated with NCCT/ X-RAY findings.
- Routine blood investigatins were sent.
- Endoscopic surgery was performed according to the anatomical variations present. Concha bullosa will be treated by lateral, subtotal, or submucous resection to allow the lateralization of the medial remnant of the turbinate away from the nasal septum. An uncinate process will be resected if pneumatized or medially or laterally bent. In the presence of an overpneumatized bulla, it will be opened removing only the bulge of the cell following uncinectomy. Agger nasi cells, if narrowing the frontal recess, will also be removed carefully without traumatizing the mucosa of the frontal recess area. A paradoxically bent middle turbinate will be treated by segmental resection with turbinate scissors throughout its bulbous part leaving the lamellar or superior part of the turbinate intact. In cases with nasal septal deviation or septal spurs, nasal septoplasties or spur resections will be carried out.
- Post op follow up was done in 1$^{st}$ week and 6$^{th}$ week and outcome was assessed using VAS scoring system.

**RESULTS**

- The present study was conducted on 82 patients presenting with headache or facial pain.

**Table 1: Age wise distribution of patients**

| Age group (Years) | Frequency | Percentage |
|---|---|---|
| 18 – 30 | 62 | 75.60 |
| 31 – 40 | 18 | 21.94 |
| 41 – 50 | 1 | 1.23 |
| 51 – 60 | 1 | 1.23 |
| Range | 18 – 56 | |
| Mean ± SD | 27.90 ± 5.89 | |

The mean age of the patients was 27.90 ± 5.89 years, ranging from 18 – 56 years. Maximum number of the patients were in the age group of 18 – 30 years (75.6%).

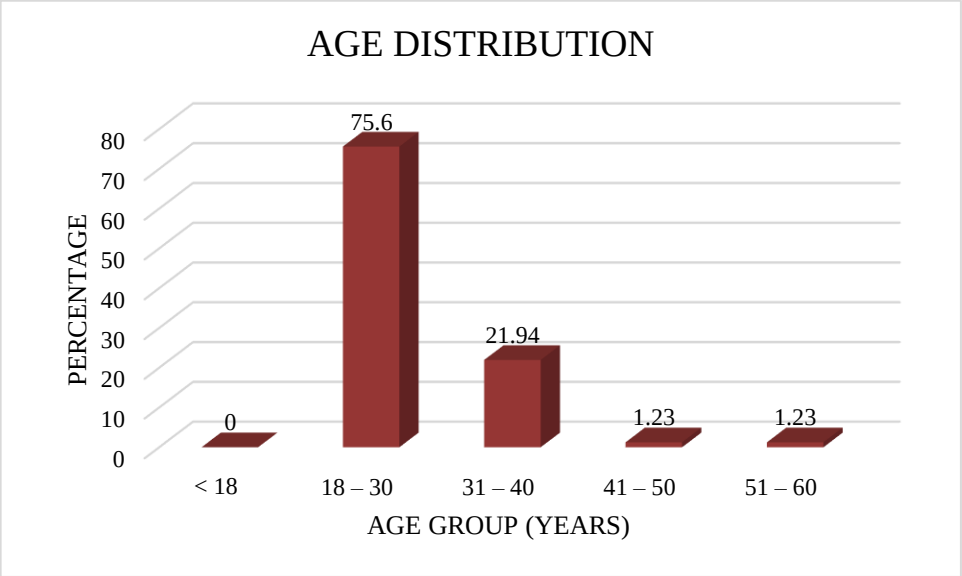



**Table 2: Gender wise distribution of patients**

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 43 | 52.44 |
| Female | 39 | 47.56 |
| Total | 82 | 100 |

Of the total 82 patients, 52.44% were males and 47.56% were females.

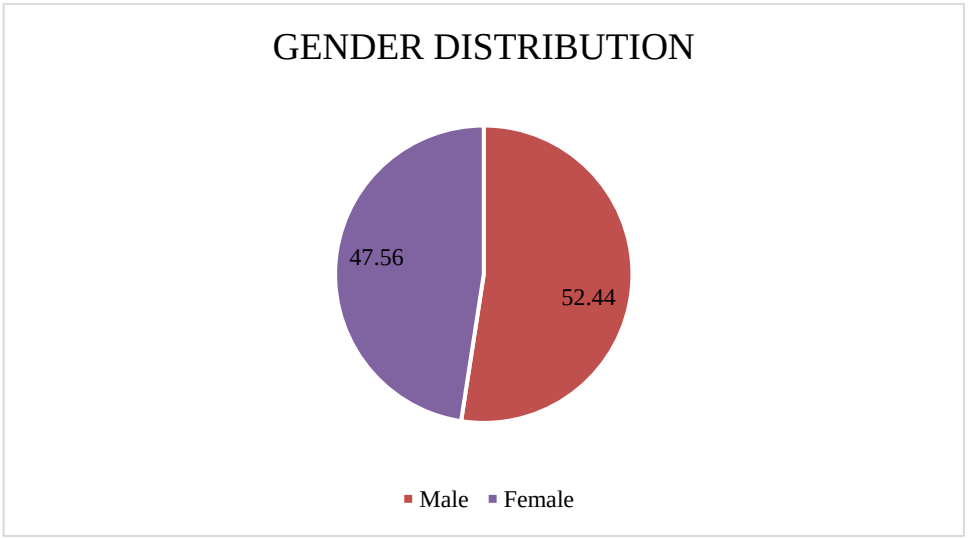


**Table 3: Presenting symptoms of the patients**

| Presenting symptoms | Frequency * | Percentage |
|---|---|---|
| Headache | 82 | 100.00 |
| Facial pain | 16 | 19.51 |

*** Multiple response**

All the studied patients presented with the complain of headache while 19.51% reported having facial pain.

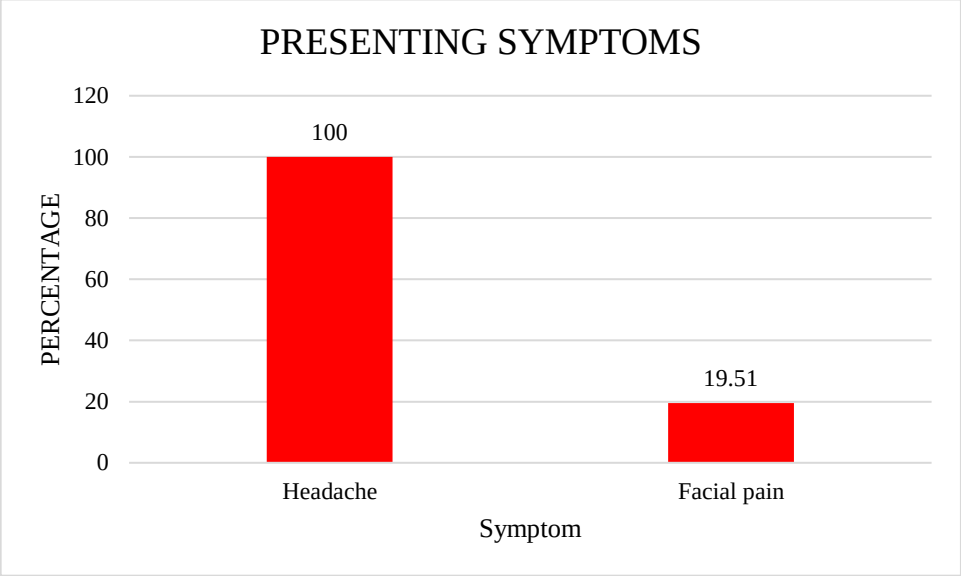



**Table 4: Co-morbidities in the patients**

| Co-morbidities | Frequency | Percentage |
|---|---|---|
| None | 77 | 93.90 |
| Diabetes mellitus | 4 | 4.88 |
| Chronic Kidney Disease | 1 | 1.22 |

Most of the patients did not have any co-morbidity (93.9%). 4 patients had diabetes mellitus and 1 patient had CKD.

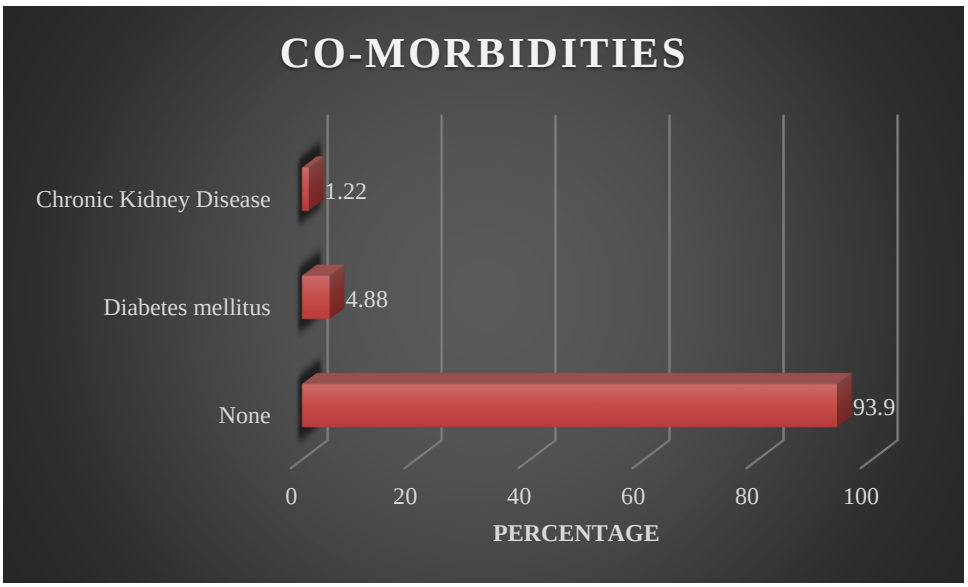


**Table 5: Anatomical variations in the nose of the patients**

| Presenting symptoms | Frequency * | Percentage |
|---|---|---|
| U/L Concha Bullosa | 18 | 21.95 |
| B/L Concha Bullosa | 21 | 25.61 |
| DNS | 59 | 71.95 |
| Septal Spur | 24 | 29.27 |
| Overpneumatized Ethmoidal Bulla | 17 | 20.73 |
| Agger Nasi Cell | 15 | 18.29 |
| Malformed Uncinate Process | 6 | 7.32 |
| Paradoxical Middle Turbinate | 9 | 10.98 |

*** Multiple response**

The most common anatomical variation found in the studied patients was DNS (71.95%) followed by septal spur (29.27%) and B/L Concha Bullosa (25.61%). The least frequent anatomical variation observed was malformed uncinate process (7.32%).

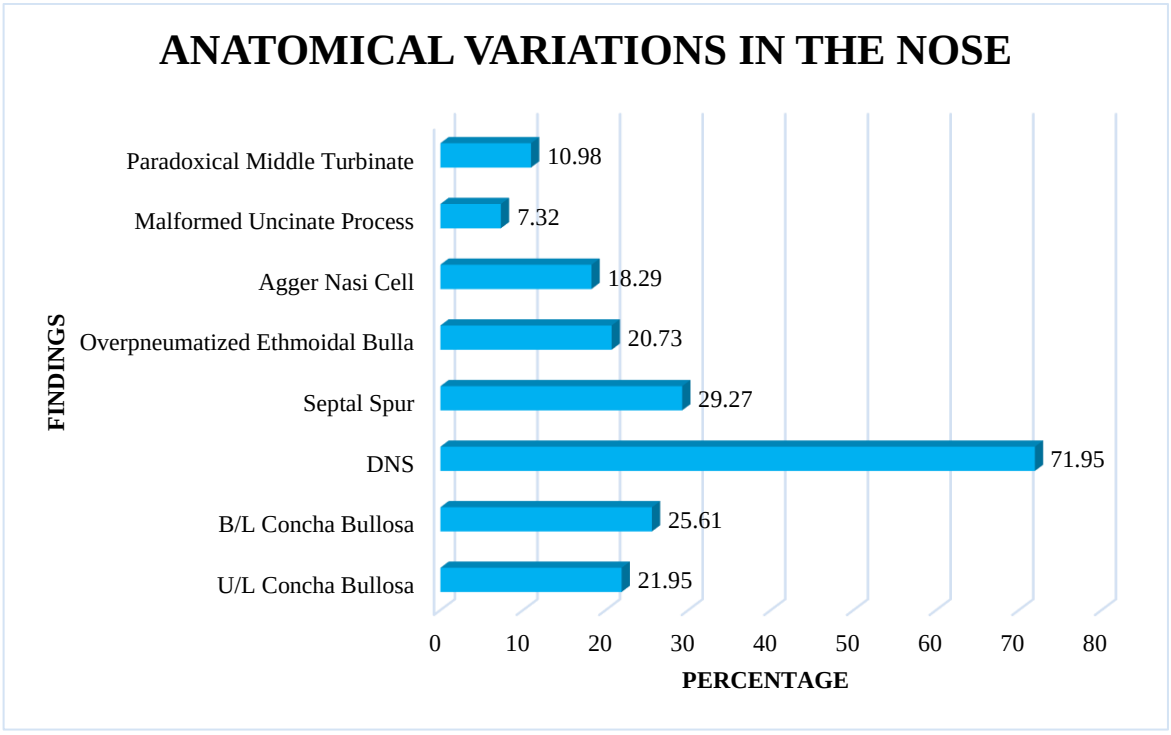



**Table 6: VAS Pain Scores for Headache**

| VAS Pain Score | Mean ± SD | Median (IQR) |
|---|---|---|
| Preoperative | 5.60 ± 1.00 | 6 (6 – 5) |
| Post operative 1st week | 1.93 ± 1.25 | 2 (3 – 1) |
| Post operative 6th week | 0.48 ± 0.69 | 0 (1 – 0) |

The mean VAS pain score preoperatively, Postoperative 1st week and Postoperative 6th week were 5.60 ± 1.00, 1.93 ± 1.25 and 0.48 ± 0.69 respectively.

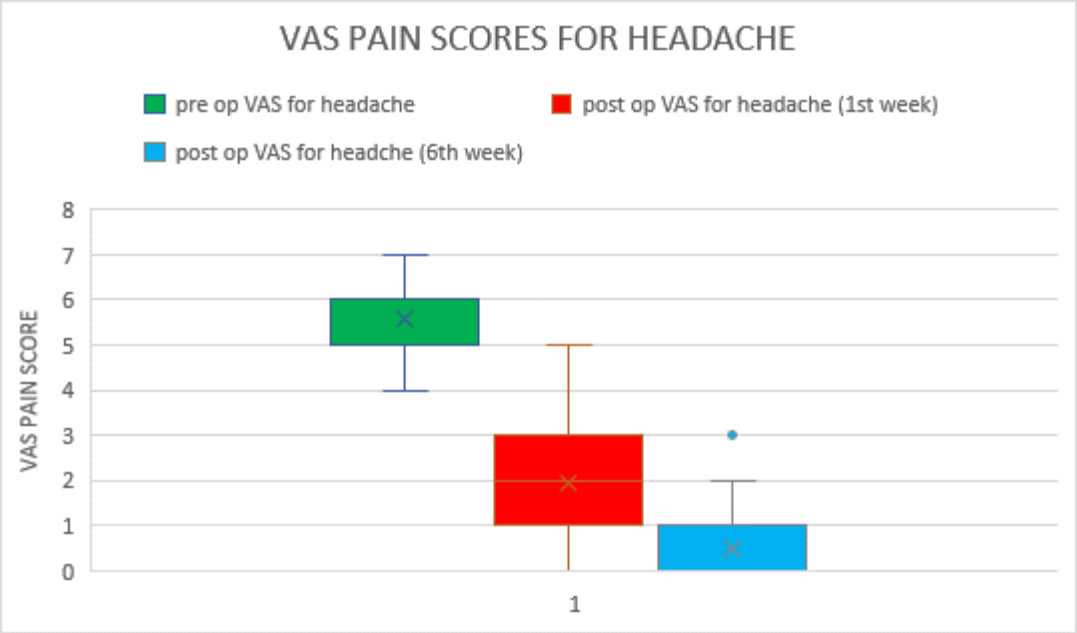



**Table 7: VAS Pain Scores for Headache preoperatively and at Post operative 1st week**

| Parameter | Preoperative (Mean ± SD) | Post operative 1st week (Mean ± SD) | p value |
|---|---|---|---|
| **VAS Pain Score** | 5.60 ± 1.00 | 1.93 ± 1.25 | <0.00001 |

The mean VAS score for headache declined from preoperative period to post operative 1st week and this decline was highly significant (p <0.00001).

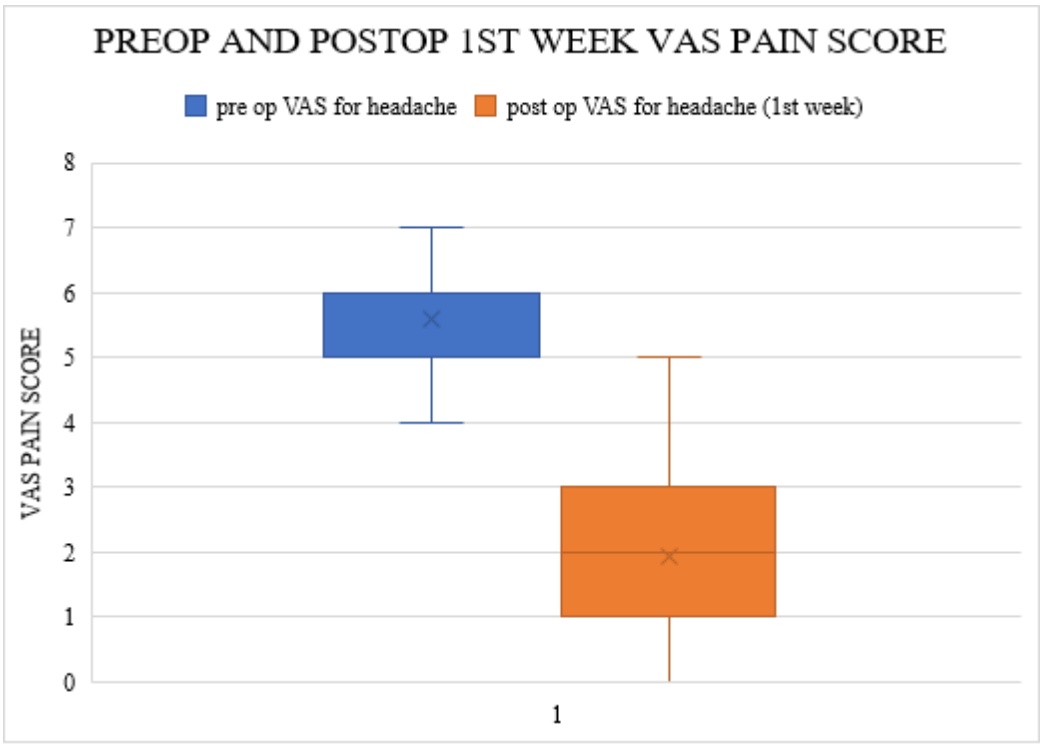


**Table 8: VAS Pain Scores for Headache preoperatively and at Post operative 6th week**

| Parameter | Preoperative (Mean ± SD) | Post operative 6th week (Mean ± SD) | p value |
|---|---|---|---|
| **VAS Pain Score** | 5.60 ± 1.00 | 0.48 ± 0.69 | <0.00001 |

There was highly significant decline in VAS Pain score for headache at Postoperative 6th week from the preoperative period (p <0.00001).

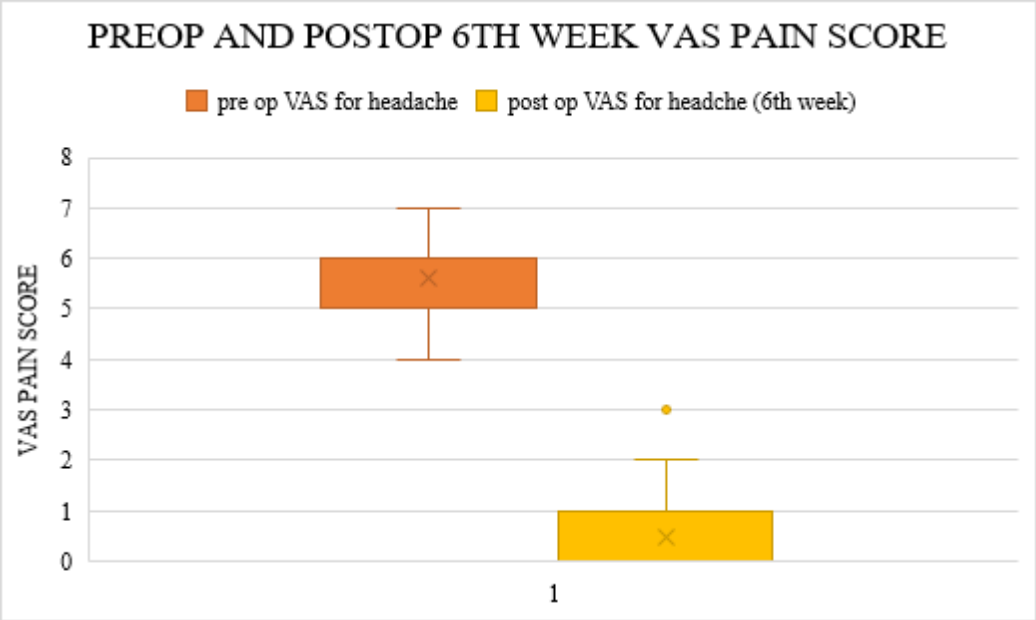
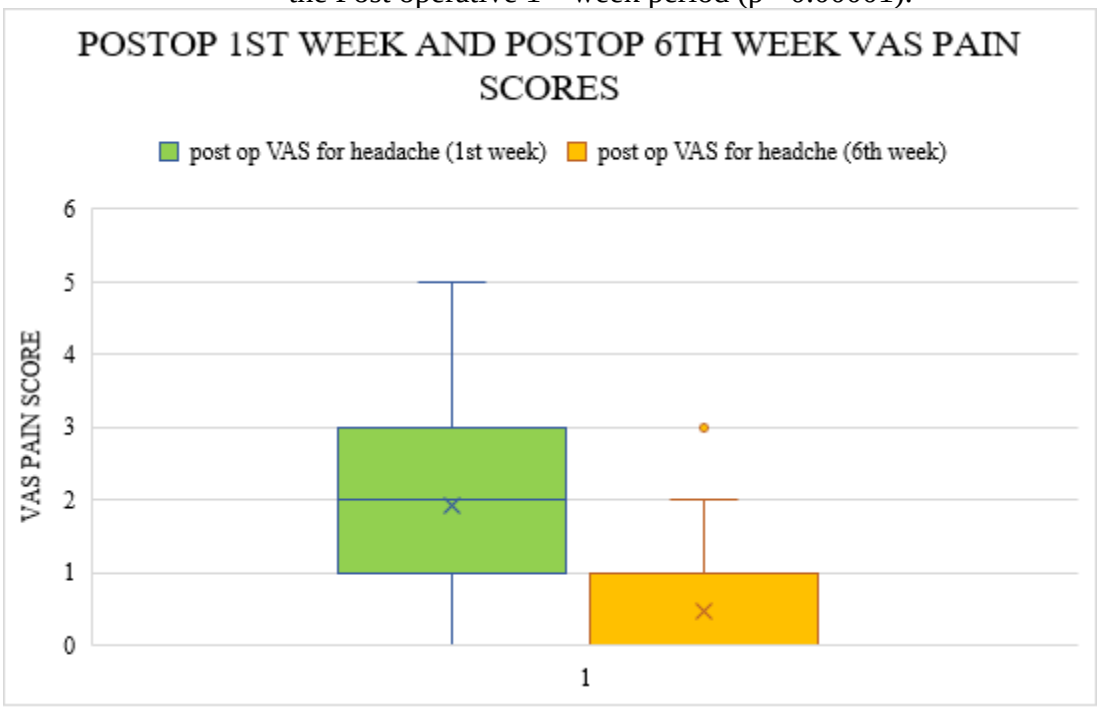



**Table 9: VAS Pain Scores for Headache Post operative 1st week and at Post operative 6th week**

| Parameter | Post operative 1st week (Mean ± SD) | Post operative 6th week (Mean ± SD) | p value |
|---|---|---|---|
| **VAS Pain Score** | 1.93 ± 1.25 | 0.48 ± 0.69 | <0.00001 |

There was highly significant decline in VAS Pain score for headache at Postoperative 6th week from the Post operative 1st week period (p <0.00001).



## DISCUSSION

The present study was conducted on 82 patients presenting with headache or facial pain.The mean age of the patients was 27.90 ± 5.89 years, ranging from 18 – 56 years. Maximum number of the patients were in the age group of 18 – 30 years (75.6%).Of the total 82 patients, 52.44% were males and 47.56% were females.

All the studied patients presented with the complaint of headache while 19.51% reported having facial pain. **Similar study conducted by folic MM et al (2023) (1)**A total of 45 patients with rhinogenic headache with no signs and symptoms of rhinosinusitis were evaluated. Medical treatment of contact point headaches was chosen by 19 patients and the rest of 26 patients were operated on due to the persistent contact point headache. Of the total number of patients, 24 patients were male (53.33%) and 21 were female (46.67%). The mean age of the patients was 39.17 + 5.35 years, with a range of 21 to 59 years. Among the operated patients, 16 had a mucosal contact between the nasal septum and inferior turbinate (surgery group 1), and 10 patients were found to had a mucosal contact between the nasal septum and middle turbinate (surgery group 2). There was no statistical difference between the surgery and nonsurgery groups regarding age, gender, and CP site (P ¼ .428, P ¼ .935, and P ¼ .550, respectively). Clinical characteristics of patients and types of interventions performed depending on the endoscopic finding are shown.

**Similar study conducted by Zhao J, et al (2023) (5)**here were 40 participants aged 20–29 years, 60 participants aged 30–39 years, 50 participants aged 40–49 years, 55 participants aged 50–59 years, and 35 participants aged 60 and older. There were 140 male participants and 100 female participantsMost of the patients did not have any co-morbidity (93.9%). 4 patients had diabetes mellitus and 1 patient had CKD.The most common anatomical variation found in the studied patients was DNS (71.95%) followed by septal spur (29.27%) and B/L Concha Bullosa (25.61%). The least frequent anatomical variation observed was malformed uncinate process (7.32%).

**Bilal et al (2013) (2)** reported that the mucosal contact site was most commonly identified between the nasal septum and inferior turbinate, which is also the case in our study. Rhinogenic headache can be caused by obstructive septal deviation or even septal spur. Surprisingly, septal spur causes more frequent and longer-lasting headaches than septal deviation, as it was reported by **Tosun et al.(3)**

In our study, mucosal contact with middle turbinate was associated with higher intensity and frequency of headaches. The exact reason is not completely clear, although the size of the mucosal contact has a key role. Some authors believe that mucosal contacts are not able to induce headache unless the CP is under pressure (4) mucosal edema may not be sufficient to cause the pain. On the other hand, hyperplasia of inferior or middle turbinate could make such a compression resulting in chronic headache.

**Similar study conducted by folic MM et al (2023) (1)**The middle turbinate pneumatization is frequent cause of wide mucosal contact with nasal septum. A drawback of this study is a lack of comparison between patients with concha bullosa and those with the contact of nasal septum and middle turbinate of other origins. Other possible reasons for the contact point headache occurrence are contact between the convex side of nasal septum and middle, upper turbinate or ethmoid cell, concha bullosa, paradoxical curvature of the middle turbinate, large bulla ethmoidalis, and contact between nasal septum and medial wall of posterior ethmoid cells.

The mean VAS pain score preoperatively, Postoperative 1$^{st}$ week and Postoperative 6$^{th}$ week were 5.60 ± 1.00, 1.93 ± 1.25 and 0.48 ± 0.69 respectively.**Similar study conducted by Zhao J, et al (2023) (5)**the average VAS pain score was 8.2 immediately after the procedure and decreased consistently over time to 6.0 at 24 h, 5.4 at 48 h, and 3.6 by 72 h. The mode and median scores demonstrated a similar decline, highlighting a consistent reduction in post-operative pain during the initial 72 h.

The mean VAS score for headache declined from preoperative period to post operative 1$^{st}$ week and this decline was highly significant (p <0.00001).**Similar study conducted by Zhao J, et al (2023) (5)** A Cohen's d value of 1.05 indicated the significant decrease in discomfort from immediate

post-operative period (0 h) to 24 h. Cohen's d value is a measure of effect size that represents the standardized difference between two means, commonly used to quantify the magnitude of group differences. Significant pain reduction continued from 24 to 48 h with Cohen's d of 1.21 and from 48 to 72 h with the Cohen's d of 1.27. All of these differences were statistically significant ($p < 0.05$).

There was highly significant decline in VAS Pain score for headache at Postoperative 6th week from the preoperative period (p <0.00001 )There was highly significant decline in VAS Pain score for headache at Postoperative 6th week from the Post operative 6th week period (p <0.00001).**Similar study conducted by folic MM et al (2023) (1)**Comparing VAS scores of headache intensity, as well as the frequencies of headache before surgery, we found a statistically significant difference between surgery group 1 and surgery group 2 (P ¼ .008 and P ¼ .003, respectively).

These results confirmed the greater intensity and frequency of headache in patients who had contact point between the nasal septum and the middle turbinate. A statistically significant reduction in headache intensity was observed in patients of both groups, 1 month after surgery compared to the period before surgery; however, this reduction was more pronounced in surgery group 2 (P ¼ .014 and P ¼ .000, respectively).

Reduction in headache intensity persisted during 6 months after surgery, especially in surgery group 2 (P ¼ .011 and P ¼ .000, respectively). In surgery group 2,made the reductive effect on the intensity of headache, which was of similar extent at 1 month and 6 months after surgery. A comparison of headache frequency in both operated groups before surgery and 1 month after surgery revealed a statistically significant reduction (P ¼ .009 and P ¼ .000, respectively). The reduction was also found in the patients 6 months after surgery.

Examining the frequency of headache in both surgery groups, no statistically significant difference was found 6 months after surgery compared with the period of 1 month after surgery (P ¼ .362 and P ¼ .662, respectively). there was no difference in VAS score 6 months after surgery compared to period of 1 month after surgery (P ¼ .081). Thus, rhinological intervention in patients in the surgery group 2(P ¼ .158 and P ¼ .218, respectively). Both types of treatment made a significant impact on the reduction of headache intensity at 1-month break point (nonsurgery group, P ¼ .012, and surgery group, P ¼ .000).

At the 6-month follow-up, pain intensity in the surgery group was significantly reduced (P ¼ .000), whereas nonsurgery group didn't reveal a significant reduction of pain intensity compared with the baseline level (P ¼ .114). Nonsurgical treatment made a significant reduction of headache frequency at the end of the first month of the post treatment period, as well as surgical treatment (P ¼ .031 and P ¼ .008, respectively). At 6-month follow-up, a significant reduction of headache frequency compared with baseline was found in a group of operated patients (P ¼ .000), but not in nonsurgically treated patients (P ¼ .088).

**Similar study conducted by Myles PSet al (2023) (6)**We enrolled 224 patients with varying degrees of postoperative pain and recovering from a broad range of surgical procedures; there were no refusals, but five were unavailable at the second postoperative visit The study examined pain levels using the visual analog scale (VAS) among patients at their first postoperative visit, categorized by the extent of surgery: minor (n=17), intermediate (n=103), and major (n=104). The mean VAS scores (±SD) were 19 (±24), 29 (±23), and 34 (±22) respectively, indicating higher pain scores with more extensive surgeries. Statistical analysis using the Kruskal-Wallis test revealed a significant difference across surgery categories (p=0.008), underscoring that patients undergoing major surgeries experienced significantly higher levels of pain compared to those undergoing minor or intermediate procedures. Patients undergoing more extensive surgery tended to have higher VAS scores Most patients improved their pain score ratings at the second postoperative visit The median pain VAS scores reduced from 26 (13–47) to 20 (11–36), P¼0.002. The distribution based estimates of the MCID for the VAS score were 6.9 (0.3 SD), 4.7 (5% range), and 12.4 (SEM).

The association between the change in pain VAS score and the global rating-of-change score was r ¼ 0.48, comparison of pain visual analog scale (VAS) scores among patients who rated their

recovery positively versus those who did not or were unsure at the second postoperative visit. Among patients who reported good recovery (n=177), the mean pain VAS score was 24 (SD=20), with a median of 20 (interquartile range, IQR: 10-33). In contrast, patients who did not rate their recovery positively (n=22) had significantly higher mean pain VAS scores of 45 (SD=27), with a median of 51 (IQR: 20-63). The difference in mean scores between these groups was 21 points (95% CI: 8.2-33), and statistical analysis using the Mann-Whitney U-test indicated a highly significant p-value of 0.002, suggesting that those who reported good recovery experienced significantly lower pain intensity compared to those who did not or were unsure about their recovery status.

## CONCLUSION

The present prospective observational study aimed to assess the outcomes of surgical management for rhinogenic contact point headache caused by anatomical variations in the nose. Eighty-twopatients who attended the ENT outpatient department between August 2022 and February 2024 were included. Their main complaint was chronic, recurrent, severe, and/or disabling headache or facial pain, typically over the glabellar area and/or extending to the middle canthus region and/or supraorbital area, either unilaterally or bilaterally. There were no signs of inflammation, mass, or allergy in the nasal cavity or paranasal sinuses, as confirmed by nasal endoscopy or CT scans, regardless of age, sex, occupation, or religion.

Based on the results of our study, which included 82 patients presenting with headache or facial pain, several key findings emerged:

1. The mean age of the patients was 27.90 ± 5.89 years, with the majority (75.6%) falling within the 18-30 years age group.
2. Gender distribution was fairly balanced, with 52.44% male and 47.56% female patients.
3. All patients reported headache as a primary symptom, while 19.51% also experienced facial pain.
4. Most patients (93.9%) did not have any co-morbidities, with diabetes mellitus observed in 4.88% and chronic kidney disease in 1.22% of cases.
5. Anatomical variations in the nose were common, with deviated nasal septum (DNS) being the most prevalent (71.95%), followed by bilateral concha bullosa (25.61%) and septal spur (29.27%).
6. Less common variations included overpneumatized ethmoidal bulla (20.73%), agger nasi cell (18.29%), malformed uncinate process (7.32%), and paradoxical middle turbinate (10.98%).
7. Regarding pain scores measured on the Visual Analog Scale (VAS), there was a significant reduction from a preoperative mean score of 5.60 ± 1.00 to 1.93 ± 1.25 in the first week postoperatively ($p < 0.00001$). By the sixth week postoperatively, the mean score further decreased to 0.48 ± 0.69 ($p < 0.00001$). This demonstrates a substantial improvement in headache symptoms following surgical intervention.
8. In conclusion, surgical management targeting anatomical variations in the nose appears effective in alleviating rhinogenic contact point headache, as evidenced by significant reductions in VAS pain scores postoperatively. These findings underscore the importance of considering anatomical factors in the treatment of such conditions, potentially offering substantial relief to affected patients.

## REFERENCES

1. Folic MM, Barac AM, Ugrinovic AB, Jotic AD, Trivic AS, Milovanovic JP, Borozan NN, Peric AR, Stevanovic G, Krejovic-Trivic SB, Cvorovic L. Effectiveness of the treatment of Rhinogenic Headache caused by Intranasal Contact. Ear, Nose & Throat Journal. 2023 Sep;102(9):605-10.
2. Bilal N, Selcuk A, Karakus MF, Ikinciogullari A, Ensari S, Dere H. Impact of corrective rhinologic surgery on rhinogenic head1ache. J Craniofac Surg. 2013;5:1688-1691.
3. Tosun F, Gerek M, Ozkaptan Y. Nasal surgery for contact point hedaches. Headache 2000;40:237-240.

4. Lou Z. The rhinogenic headache resulting from the contact point between inferior turbinate and septal spur. Am J Otolaryngol. 2019;40(6):102281
5. Qu M, Zhao J, Zhang Y, Xu Z, Ma C, Cui H. Utilizing the visual analogue scale (VAS) to monitor and manage pain in post-operative skin wounds after thoracic surgery. Int Wound J. 2023 Nov 15;21(3):e14503. doi: 10.1111/iwj.14503. Epub ahead of print. PMID: 37969025; PMCID: PMC10898399.
**6.** Myles PS, Myles DB, Galagher W, Boyd D, Chew C, MacDonald N, Dennis A. Measuring acute postoperative pain using the visual analog scale: the minimal clinically important difference and patient acceptable symptom state. BJA: British Journal of Anaesthesia. 2017 Mar 1;118(3):424-9.
7. Stammberger H, Wolf G. Headaches and sinus disease: the endoscopic approach. Ann Otol Rhinol Laryngol Suppl. 1988; 134: 3-23.
8. Tosun F, Gerek M, Ozkaptan Y. Nasal surgery for contact point headaches. Headache. 2000; 40: 237-240.
9. Morgenstein KM, Krieger MK. Experiences in middle turbinectomy. Laryngoscope. 1980; 90: 1596-1603.
10. Headache Classification Subcommittee of the International Headache Society. The International Classification of Headache Disorders: 2nd edition. Cephalalgia. 2004; 24:9-160.
11. Parsons DS, Batra PS. Functional endoscopic sinus surgical outcomes for contact point headaches. Laryngoscope. 1998; 108: 696-702.
12. Mishra D, Choudhury KK, Gupta A. Headache with autonomic features in a child: cluster headache or contact-point headache? Headache. 2008; 48: 473-4t5.
13. Clerico DM, Evan K, Montgomery L, Lanza DC, Grabo D. Endoscopic sinonasal surgery in the management of primary headaches. Rhinology. 1997; tt: 98-102.
14. Behin F, Behin B, Behin D, Baredes S. Surgical management of contact point headaches. Headache. 2005; 45: 204-210.
15. ABeWas D, Alioglt Z, A～ol N, Ural A,Bahadir O,CaylanR. Surgicaloutcomes for rhinogenic contact point headaches. Med Prine Pract. 2011; 20: 29-33.
16. Abu-Bakra M, Jones NS. Prevalence of nasal mucosal contact points in patients Bmpared with patients witl tOtol. 2001; 115: 629-632.
17. Giacomini PG, Alessandrini M,DePadova A. Septoturbinal surgery in contact point headache syndrome: long-term results. Cranio. 2003; 21: 130-135.
18.Yazici ZM, Cabalar M, Say in I, Kayhan FT, Gurer E, Yayla V. Rhinologic evaluation in patients with primary headache. J Craniofac Surg. 2010; 21: 1688-1691.
19. Behin F, Lipton RB, Bigal M. Migraine and intranasal contact point headache: is there any connection? Curr Pain Headache Rep. 2006; 10: 312-315.
20. Blumenthal HJ. Headaches and sinus disease. Headache. 2001; 41: 883888.
21. Behin F, Behin B, Bigal ME, Lipton RB. Surgical treatment of patients with refractory migraine headaches and intranasal contact points. Cephalalgia. 2005; 25: 439-443.
22. Welge-Luessen A, Hauser R, Schmid N, Kappos L, Probst R. Endonasal surgery for contact point headaches: a 10-year longitudinal study. Laryngoscope. 2003; 113: 2151-2156.
23. Clerico DM. Sinus headaches reconsidered: referred cephalgia of rhinologic origin masquerading as refractory primary headaches. *Headache* 1995;35:185-192
24. Anselmo-Lima WT, De Oliveira JA, Speciali JG, et al. Middle turbinate headache syndrome. *Headache* 1997;37:102-106
25. Albirmawy OA, Elsherif HS, Shehata EM, et al. Middle turbinate evacuation conchoplasty in management of contact-point rhinogenic headache in children. *Int J Clin Pediatr* 2010;1:115-123
26. Swain SK, Behera IC, Mohanty S, et al. Rhinogenic contact point headache—frequently missed clinical entity. *Apollo Med* 2016;13:169-173
27.Peric A, Baletic N, Sotirovic J. A case of an uncommon anatomic variation of the middle

turbinate associated with headache. *Acta Otorhinolaryngol Ital* 2010;30:156-159
28. Badran HS. Role of surgery in isolated concha bullosa. *Clin Med Insights Ear Nose Throat* 2011;4:13-19
29. Cady RK, Schreiber CP. Sinus problems as a cause of headache refractoriness and migraine chronification. *Curr Pain Headache Rep* 2009;13:319-325
30. Lipton RB, Stewart WF, Sawyer J, et al. Clinical utility of an instrument assessing migraine disability: the Migraine Disability Assessment (MIDAS) questionnaire. *Headache* 2001;41:854-861
31. Sadeghi M, Saedi B, Ghaderi Y. Endoscopic management of contact point headache in patients resistant to medical treatment. *Indian J Otolaryngol Head Neck Surg* 2013;65:415-420
32. Fokkens WJ, Lund VJ, Mullol J, et al. European position paper on rhinosinusitis and nasal polyps 2012. *Rhinol Suppl* 2012;3:1-298
33. Denholm SW, Sim DW, Sanderson RJ, et al. Otolaryngological indicator operations: one year' s experience. *J R Coll Surg Edinb* 1993;38:1-3
34. Sanderson RJ, Rivron RP. The effect of septal surgery on nasal symptoms. *Rhinology* 1992;30:17-20
35. Parson DS, Batra PS. Functional endoscopic sinus surgical outcomes for contact point headaches. *Laryngoscope* 1998;108:696-702
36. Cantone E, Castagna G, Ferranti I, et al. Concha bullosa related headache disability. *Eur Rev Med Pharmacol Sci* 2014;19: 2327-2330
37. Madani SA, Hashemi SA, Morshedzadeh SA. Results of functional endoscopic sinus surgery in patients with mucosal contact points suffering from chronic daily headache non-responding to medications. *Acta Fac Med Naiss* 2013;30:159-164
38. Tosun F, Gerek M, Ozkaptan Y. Nasal surgery for contact point headaches. *Headache* 2000;40:237-240
39. Bektas D, Alioglu Z, Akyol N, et al. Surgical outcomes for rhinogenic contact point headaches *Med Princ Pract* 2011;20:29-33
40. Mohebbi A, Memari F, Mohebbi S. Endonasal endoscopic management of contact point headache and diagnostic criteria. *Headache* 2010;50:242-248
41. Harrison L, Jones NS. Intranasal contact points as a cause of facial pain or headache: a systematic review. *Clin Otolaryngol* 2013;38:8-22
42. Abu-Samra M, Gawad OA, Agha M. The outcomes for nasal contact point surgeries in patients with unsatisfactory response to chronic daily headache medications. *Eur Arch Otorhinolaryngol* 2011;268:1299-1304
43. Welge-Luessen A, Hauser R, Schmid N, et al. Endonasal surgery for contact point headaches: a 10-year longitudinal study. *Laryngoscope* 2003;113:2151-2156
44. Giacomini PG, Alessandrini M, DePadova A. Septoturbinal surgery in contact point headache syndrome: long-term results. *Cranio* 2003;21:130-135
45. West B, Jones NS. Endoscopy-negative, computed tomographynegative facial pain in a nasal clinic. *Laryngoscope* 2001;111:581-586
46. Sessle BJ. Acute and chronic craniofacial pain: brainstem mechanisms of nociceptive transmission and neuroplasticity, and their clinical correlates. *Crit Rev Oral Biol Med* 2000;11:57-91
47. Patel ZM, Setzen M, Poetker DM, DelGaudio JM. Evaluation and management of “sinus headache” in the otolaryngology practice. Otolaryngol Clin North Am 2014;47(2):269-287
48. Marmura MJ, Silberstein SD. Headaches caused by nasal and paranasal sinus disease. Neurol Clin 2014;32(2):507-523
49. Roozbahany NA, Nasri S. Nasal and paranasal sinus anatomical variations in patients with rhinogenic contact point headache. Auris Nasus Larynx 2013;40(2):177-183
50. Stammberger H, Wolf G. Headaches and sinus disease: the endoscopic approach. Ann Otol Rhinol Laryngol Suppl 1988; 134:3-23

51. Herzallah IR, Hamed MA, Salem SM, Suurna MV. Mucosal contact points and paranasal sinus pneumatization: Does radiology predict headache causality? Laryngoscope 2015;125(9): 2021-2026
52. Eweiss AZ, Lund VJ, Barlow J, Rose G. Do patients with chronic rhinosinusitis with nasal polyps suffer with facial pain? Rhinology 2013;51(3):231-235
53. Andrade GC, Fujise LH, Fernandes AM, Azoubel R. Rhinosinusal polyposis and inverted papilloma: a morphometric comparative study. Int Arch Otorhinolaryngol 2015;19(3):196-199
54. Wolff HG. The nasal, paranasal, and aural structures as sources ofheadache and other pain. In: WolffHG editor. Headache and other head pain. New York: Oxford University Press; 1948. p. 532-560.
55. Peric A, Sotirovic J, Baletic N, Kozomara R, Bijelic D, Rasic D. [Concha bullosa and the nasal middle meatus obstructive syndrome]. Vojnosanit Pregl 2008;65(3):255-258