



# Bilateral Barotraumatic Involvement of the Infraorbital Nerve with Dehiscence and Ectopic Course: A Case Report

## Case Report

✉ Vural Akın<sup>1</sup>, ✉ Yusuf Çağdaş Kumbul<sup>1</sup>, ✉ Hasan Yasan<sup>1</sup>, ✉ Veysel Atilla Ayyıldız<sup>2</sup>, ✉ Erdoğan Okur<sup>1</sup>

<sup>1</sup>Department of Otorhinolaryngology and Head and Neck Surgery, Süleyman Demirel University Faculty of Medicine, Isparta, Turkey

<sup>2</sup>Department of Radiology, Süleyman Demirel University Faculty of Medicine, Isparta, Turkey

## Abstract

The infraorbital nerve is responsible for the sensory innervation of the lower eyelid, the lateral nose, the cheek, the upper lip, and the maxillary teeth. It passes along the infraorbital canal, which runs superior to the maxillary sinus. Dehiscence of the infraorbital canal and its ectopic course in the maxillary sinus is a rare variation. A nerve with these variations may be affected by pathologies in the maxillary sinus and this may constitute a rare cause of facial pain. In this report, we present the clinical symptoms of a 29-year-old male patient who had an infraorbital nerve with an ectopic course and dehiscence in light of the literature.

**Keywords:** Barotrauma, facial pain, maxillary nerve, nasal decongestants, trigeminal nerve diseases, case report

### ORCID IDs of the authors:

V.A. 0000-0002-0050-4837;  
Y.Ç.K. 0000-0002-0713-2933;  
H.Y. 0000-0002-5470-6784;  
V.A.A. 0000-0003-0252-9023;  
E.O. 0000-0003-4384-840X.

**Cite this article as:** Akın V, Kumbul YÇ, Yasan H, Ayyıldız VA, Okur E. Bilateral Barotraumatic Involvement of the Infraorbital Nerve with Dehiscence and Ectopic Course: A Case Report. *TurkArchOtorhinolaryngol*2023;61(3):134-137

### Corresponding Author:

Vural Akın;  
vuralakin92@gmail.com

**Received Date:** 09.03.2023

**Accepted Date:** 11.06.2023

©Copyright 2023 by Turkish Otorhinolaryngology-Head and Neck Surgery Society / Turkish Archives of Otorhinolaryngology is published by Galenos Publishing House

Licensed under Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0)



DOI: 10.4274/tao.2023.2023-3-4

## Introduction

Facial pain is one of the most common reasons for admission to the otorhinolaryngology outpatient clinics. Among the causes of facial pain, inflammatory pathologies of the nose and paranasal sinuses, dental pathologies, neurological causes such as migraine, ophthalmological disorders, and temporomandibular joint disorders can be listed (1). It is known that most pain in the facial region appears as reflected pain regardless of the pathology (1). Variations in the infraorbital nerve can also cause facial pain in this way. Infraorbital nerve dehiscence and ectopic course were reported to be a cause of facial pain

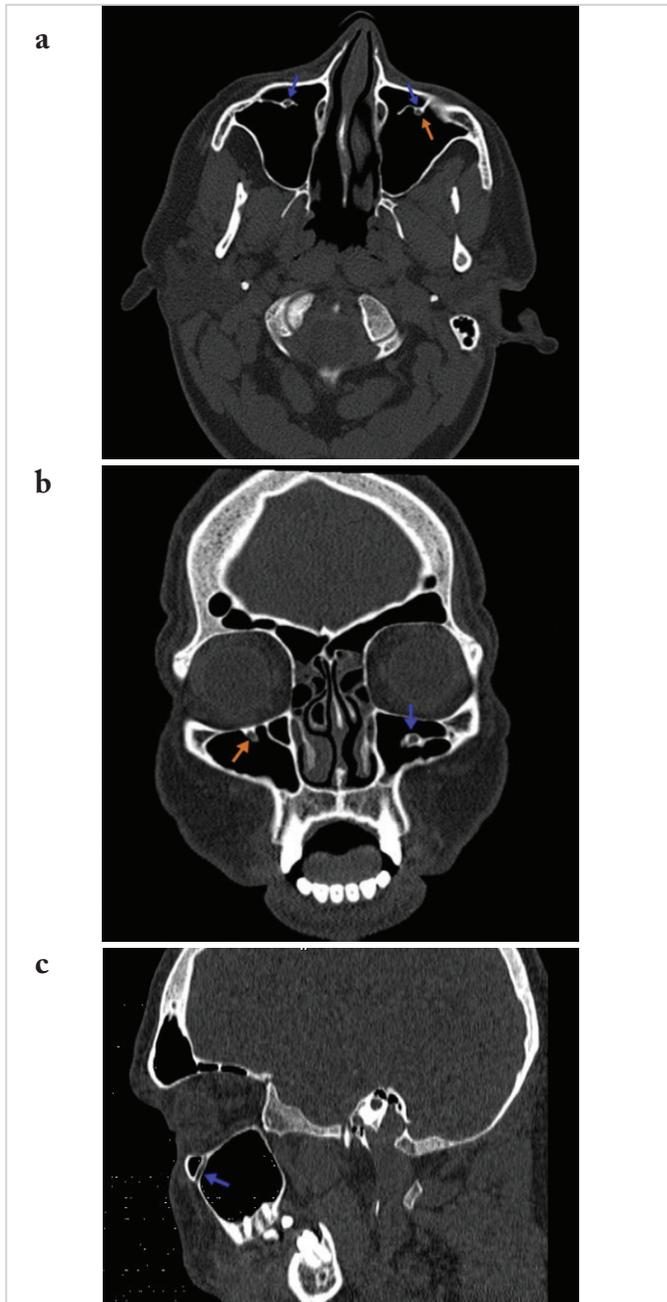
(2-6). In this report, we present the clinical characteristics of the infraorbital nerve with the ectopic course and dehiscence in a patient with facial pain and numbness triggered by airplane travel.

## Case Presentation

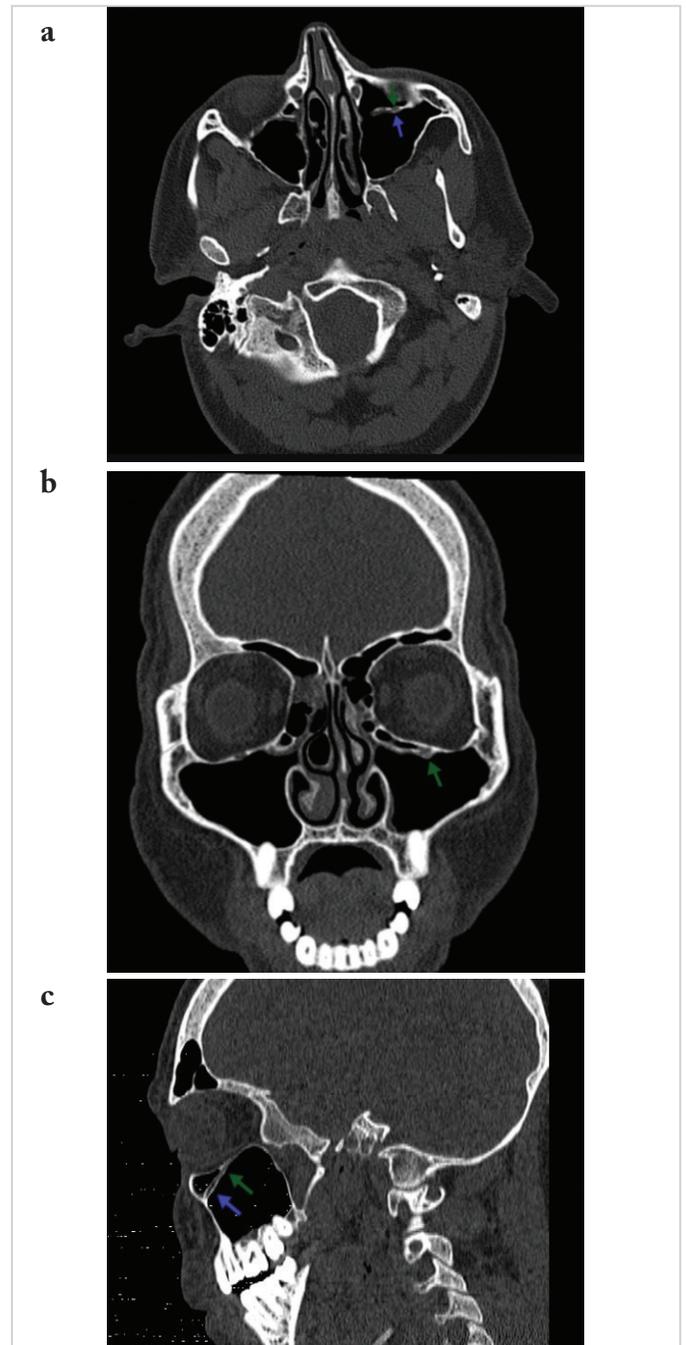
A 29-year-old male patient presented to our clinic with the complaint of pain and numbness in the cheek area on both sides, more often on the left side, when traveling by plane. He stated that he experienced the pain for the last three years every time he traveled by plane, especially during landing, and that the pain resolved within 1-2 hours after getting off the plane. He had no other complaints such as nasal

congestion, nasal discharge, or postnasal drip. He had no history of chronic disease, medication use, or surgery in the head and neck region. No pathology was detected in the otorhinolaryngological physical examination. The patient was evaluated with maxillofacial computed tomography (CT). In the axial, coronal, and sagittal sections, it was observed that the bilateral infraorbital canal had an ectopic course in the maxillary sinus septum. In addition, dehiscence was observed in the bilateral infraorbital canal, more prominent on the left (Figures 1, 2). The CT images showed

no additional pathologies that would explain his complaints. Since the area where the patient’s complaints occurred was compatible with the distribution area of the infraorbital nerve, we reckoned that the infraorbital nerve, which showed an ectopic course and had dehiscence areas, was affected by the pressure differences experienced during flight. The patient was prescribed a nasal spray containing oxymetazoline hydrochloride (Iliadin Merck 0.05% Dosage Spray, Santa Farma, İstanbul, Turkey) to use before the flight by spraying



**Figure 1.** The ectopic course of the infraorbital nerve (blue arrows) and dehiscence areas (orange arrows) prominent on the right side: a) axial section, b) coronal section, c) sagittal section of paranasal sinus computed tomography



**Figure 2.** The ectopic course of the infraorbital nerve (blue arrows) and dehiscence areas (green arrows) prominent on the left side: a) axial section, b) coronal section, c) sagittal section of paranasal sinus computed tomography

two times in each nostril. The patient was recommended to return for a follow-up examination two months later. The patient stated that he used the oxymetazoline hydrochloride nasal spray on two flights in two months and his complaints were almost completely gone.

Informed consent was obtained from the patient for this report.

## Discussion

The maxillary nerve is part of the trigeminal nerve and its largest cutaneous branch is the infraorbital nerve (5-7). The infraorbital nerve branches from the maxillary nerve in the pterygopalatine fossa and travels through the inferior orbital fissure to enter the orbit. After traveling on the orbit floor, it enters the infraorbital canal (7). The infraorbital canal runs superior to the maxillary sinus, inferior to the orbit, and posterior to anterior (6, 7). The nerve leaves the canal through the infraorbital foramen and provides sensory innervation to the lower eyelid, the lateral nose, the cheek, the upper lip, and the maxillary teeth (4, 6, 7). The sensory innervation of this region may be impaired in maxillofacial fractures, blunt trauma to the cheek, surgery of this region, and rarely due to tumor infiltration (7). In our presented patient, sensory innervation deterioration occurred as pain and numbness in the facial region. That the deterioration in sensory innervation was not due to one of the above-mentioned classical reasons, this case report is remarkable.

The antral wall of the infraorbital canal is thinner than the other walls and has an average thickness of 0.2 mm. The thickness of this wall may vary according to age and the pneumatization of the maxillary sinus (4, 6). Although dehiscence is rare in the antral wall, the rate of dehiscence was reported between 2–16% (2, 6, 8). In a cadaveric study conducted in Thailand, infraorbital canal dehiscence was detected in 15 of 79 cadavers. While seven cases of canal dehiscence were on the right, eight of them were on the left (3). In our case, dehiscence was observed bilaterally. This is not a very common possibility considering cadaveric and radiological studies.

Ectopic course of the infraorbital nerve is a different entity from dehiscence, and ectopic nerve course is also very rare. This rare variation increases the risk of infraorbital nerve injury in sinus surgeries (5). Ference et al. (9) classified the relationship of the infraorbital nerve course with the maxillary sinus into three types: type 1 if the nerve travels completely within the sinus roof, type 2 if the nerve canal is at the inferior edge of the roof and adjacent to the roof, and type 3 if the nerve is inside the lumen and hanging on the septa or the lamella of the infraorbital ethmoid cell. In the same study, the course of the infraorbital nerve of 100 patients (200 nerves) was analyzed and type 1 course was found in 60.5%, type 2 in 27% and type 3 in 12.5%.

Our patient had a bilateral type 3 infraorbital nerve course according to this classification. Ectopic course and dehiscence of the infraorbital canal may cause the infraorbital nerve to be affected by pathologies in the sinus (5, 6). Pain from the involvement of the infraorbital nerve is more pronounced in conditions that cause ipsilateral airway obstruction (8). In our patient, there was no pathology such as apparent deviation of the septum or polypoid tissues arising from the ostiomeatal complex, which would cause obstruction in the airway and/or the maxillary sinus. However, there was bilateral facial pain due to barotraumatic nerve involvement. In cases of dehiscence and ectopic course of the infraorbital nerve, well-planned clinical studies are required to prove which etiologic factor causes more pain.

Sharma et al. (4) reported the case of a patient who experienced recurrent pain and paresthesia in the right infraorbital nerve distribution during flight and whose symptoms regressed 30 minutes after landing. In their case, there was a polyp and antral cyst in the middle meatus with ipsilateral infraorbital nerve dehiscence. After surgical treatment, the patient's complaints regressed, and the patient did not experience any symptoms on flights after the treatment. With the presence of dehiscence of the infraorbital nerve, as well as an obstructive nasal pathology, facial pain often benefits from surgical procedures. The patients whose treatment is more challenging are those who do not have obstructive nasal pathology, who do not benefit from medical treatment, and who complain of facial pain. In such cases, infraorbital neuropexy as practiced by Whittet (8) comes to mind as a good option. In this surgical application, the dehiscence is closed artificially by filling the fatty tissue between the mucosa and the nerve.

A study by Chow (1) reported that symptoms occurred during flight and elevator use in a case with stenosis of the maxillary sinus ostium and infraorbital nerve dehiscence. In the article of Whittet and Quiney (2), symptomatic cases were treated surgically by ventilation of the maxillary sinus. McMurray (10) showed that pressure changes occur in the antrum with respiration and these changes decrease as the ostium size increases. It was suggested that the negative pressure effect from stenosis in the paranasal sinus ostia and the subsequent release of local pain mediators such as substance P could cause pain (8). This supports the relief with nasal decongestants in our case. With the use of nasal decongestants, the mucosal edema around the maxillary sinus ostium regresses, thus leading to better ventilation of the maxillary sinus. We believe that a well-ventilated maxillary sinus will better tolerate pressure changes. Surgical treatments applied to the cases in the literature also sought this purpose. In patients who do not respond to nasal decongestants, surgical methods such as uncinctomy may be preferred to increase maxillary sinus ventilation.

## Conclusion

Dehiscence and/or ectopic course of the infraorbital canal is rare. We report that dehiscence and/or ectopic infraorbital nerve may cause chronic and recurrent facial pain due to pressure changes. In these cases, we recommend nasal decongestants as a first-line treatment option.

**Informed Consent:** Informed consent was obtained from the patient for this report.

**Peer-review:** Externally and internally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: V.A., Y.Ç.K., H.Y., V.A.A., E.O., Concept: V.A., Y.Ç.K., H.Y., V.A.A., E.O., Design: V.A., Y.Ç.K., H.Y., V.A.A., E.O., Data Collection and/or Processing: V.A., Y.Ç.K., H.Y., V.A.A., E.O., Analysis and/or Interpretation: V.A., Y.Ç.K., H.Y., V.A.A., E.O., Literature Search: V.A., Y.Ç.K., H.Y., V.A.A., E.O., Writing: V.A., Y.Ç.K., H.Y., V.A.A., E.O.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

## Main Points

- Dehiscence and/or ectopic course of the infraorbital canal is rare.
- Dehiscence and/or ectopic infraorbital nerve may cause chronic and recurrent facial pain due to pressure changes.
- If no concomitant nasal pathology can be detected in facial pain originating from the infraorbital nerve, nasal decongestants may be the first choice in the treatment.

## References

1. Chow JM. Rhinologic headaches. *Otolaryngol Head Neck Surg* 1994; 111: 211-8. [Crossref]
2. Whittet HB, Quiney RE. Dehiscence of the infraorbital nerve as a new cause of facial pain. *Br Med J (Clin Res Ed)* 1988; 296: 18-9. [Crossref]
3. Chaisiwamongko K, Itarat W, Vatanasapt P, Thanaviratnanich S, Rhumsaitong S. The prevalence of infraorbital canal dehiscence in Thai cadaveric skull: a preliminary report. *Srinagarind Med J* 2003; 18: 216-22. [Crossref]
4. Sharma N, De M, Pracy P. Recurrent facial paraesthesia secondary to maxillary antral cyst and dehiscence of infraorbital canal: case report. *J Laryngol Otol* 2007; 121: e6. [Crossref]
5. Elnil H, Al-Tubaikh JA, El Beltagi AH. Into the septum I go, a case of bilateral ectopic infraorbital nerves: a not-to-miss preoperative sinonasal CT variant. *Neuroradiol J* 2014; 27: 146-9. [Crossref]
6. Kim JK, Yang SK, Shin DB, Nam JG. Dehiscence of the infraorbital canal with the maxillary antral empyema: a new cause of facial pain. *J Craniofac Surg* 2015; 26: e227-9. [Crossref]
7. Yanagisawa E, Yanagisawa K. Endoscopic view of the infraorbital nerve. *Ear Nose Throat J* 1999; 78: 226-8. [Crossref]
8. Whittet HB. Infraorbital nerve dehiscence: the anatomic cause of maxillary sinus "vacuum headache"? *Otolaryngol Head Neck Surg* 1992; 107: 21-8. [Crossref]
9. Ference EH, Smith SS, Conley D, Chandra RK. Surgical anatomy and variations of the infraorbital nerve. *Laryngoscope* 2015; 125: 1296-300. [Crossref]
10. McMurray J. The intra-antral air pressure incident to the respiratory excursion and its effect on antral drainage. *Arch Otolaryngol* 1931; 14: 581-5. [Crossref]