



## Bifid inferior turbinate: a report of two cases

### Bifid alt konka: İki olgu sunumu

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Nasal turbinates are functionally important structures which extend from the lateral nasal walls to the nasal cavity. Lateral nasal wall anomalies are usually asymptomatic lesions which are incidentally detected. The most common variation of the lateral nasal wall is the pneumatization of turbinates. Anatomical variations of paranasal structures may present confusing intranasal landmarks. This may cause challenges in endoscopic sinus surgery. Bifid inferior turbinate is an extremely rare condition. In this article, we present two cases with bifid inferior turbinate. This variation should be kept in mind as a rare cause of nasal obstruction.

**Keywords:** Bifid; nasal cavity; turbinate; variation.

Nazal konkalar, dış burun duvarından burun boşluğuna doğru uzanan fonksiyonel olarak önemli yapılardır. Dış burun duvarı anomalileri genellikle tesadüfen saptanan asemptomatik lezyonlardır. En sık görülen dış burun duvarı varyasyonu, konka pnömotizasyonudur. Paranasal yapıların anatomik varyasyonları, burun içi yön bulma işaretlerinin karıştırılmasına neden olabilir. Bu da endoskopik sinüs cerrahisinde zorluklara neden olmaktadır. Bifid alt konka çok nadir görülen bir durumdur. Bu yazıda, iki bifid alt konka olgusu sunuldu. Bu varyasyon nadir bir burun tıkanıklığı nedeni olarak akılda tutulmalıdır.

**Anahtar Sözcükler:** Bifid; burun boşluğu; konka; varyasyon.

Nasal turbinates are functionally important structures that extend from the lateral nasal walls to nasal cavities. The middle, superior and, in some cases, supreme turbinates are part of the ethmoid bone, while the inferior turbinates are a pair of independent bones. Lateral nasal wall anomalies are generally incidentally detected asymptomatic lesions. The most common variation of the lateral nasal wall are pneumatizations of turbinates.<sup>[1]</sup> Bifid inferior turbinate is an extremely rare condition. There are only four reported cases of bifid inferior turbinate in the literature.<sup>[2-5]</sup> In this article, we present two new

cases of bifid inferior turbinate, of which one is bilateral. To our knowledge, these are the fifth and sixth cases of bifid inferior turbinate in the literature. Furthermore, one of them is the third reported case with bilateral bifid inferior turbinate.

### CASE REPORT

**Case 1**– A 53-year-old male patient was admitted to our outpatient clinic with nasal obstruction. He had no history of trauma or previous nasal surgery. Physical examination revealed nasal septal deviation towards the right side



and bilateral inferior turbinate hypertrophy on anterior rhinoscopy. The paranasal sinus computed tomography (CT) showed nasal septal deviation and bilateral bifid inferior turbinate. The uncinate processes were missing bilaterally (Figure 1a, b). Endoscopic nasal examination revealed bilateral bifid inferior turbinates and nasal septal deviation. We recommended septoplasty and inferior turbinate radiofrequency application to the patient but he refused to have the operation so we prescribed local decongestant therapy.

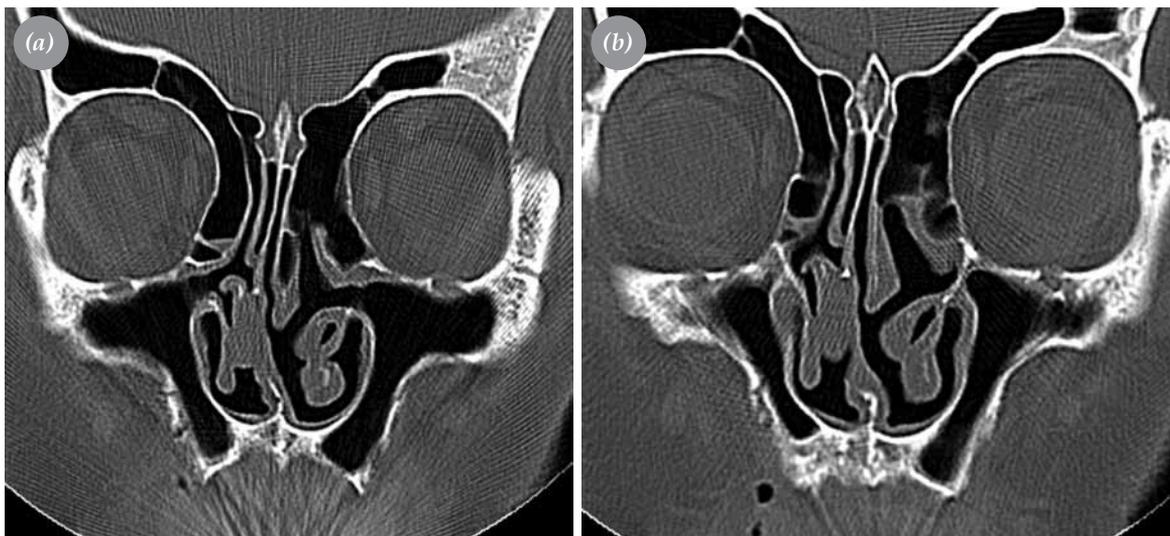
**Case 2-** A 54-year-old female patient was admitted to our outpatient clinic with mild nasal obstruction, especially at night. She denied any nasal trauma and had no history of nasal surgery. On physical examination, there was a hypertrophic inferior turbinate in the left nasal cavity on anterior rhinoscopy. Paranasal sinus CT revealed the left bifid inferior turbinate. The uncinate process was missing on same side (Figure 2a, b). Endoscopic nasal examination showed bifid inferior turbinate on the left nasal cavity and bilateral atrophic middle turbinates. We recommended turbinectomy but she refused the operation because of other systemic diseases.

### DISCUSSION

In order to understand and analyze the confusing anatomy of the lateral nasal wall and its anomalies, it is crucial to understand the embryological development of the ethmoid bone and turbinates.

The morphological development of the lateral nasal wall starts prenatally at 38-40 days. Six major furrows develop and these furrows are separated by ridges. The adult inferior turbinate finally results from fusion, thereby obliterating some furrows and ridges. The inferior turbinate represents an individual bone that has nothing in common with the ethmoidal turbinates. The uncinate process originates from the descending portion of the first ethmoidal turbinate. The middle turbinates develop from the second ethmoturbinal, and the superior turbinate develops from the third ethmoturbinal. The fusion of the fourth and fifth ethmoturbinal forms the supreme turbinate. The uncinate process is a thin sickle-shaped structure and the distance between its posterior edge and the lamina papyracea varies between 1.5 mm and 5 mm. If this distance is more than 5 mm, it is considered to be a medial deviation of the uncinate process. Because it bends medially and folds anteriorly, this may give the impression that two middle turbinates are present; in this case, it is called an 'accessory middle turbinate'.<sup>[6]</sup>

With widespread usage of endoscopic examination and CT, numerous anatomical variations of nasal turbinates can now be identified. Among the observed anatomic variations of the turbinates, pneumatization is the most prevalent. Pneumatization of the middle turbinate is relatively common compared to pneumatization of the superior and inferior



**Figure 1.** (a, b) Computed tomography scan shows nasal septal deviation, bilateral bifid inferior turbinates and absence of bilateral uncinate process.



Figure 2. (a, b) Computed tomography scan shows left bifid inferior turbinate without uncinata process and bilateral atrophic middle turbinates.

turbinates. Other variations are secondary and accessory turbinates and paradoxical middle turbinate that can mimic middle turbinate, and bifid inferior turbinate which is an extremely rare condition. Ozcan et al.<sup>[1]</sup> retrospectively evaluated paranasal sinus CT scans of 384 patients admitted to their clinic with various nasal complaints. They found concha bullosae in 185 patients (48.1%), pneumatization of superior turbinate in 47 (12.2%), pneumatization of inferior turbinate in nine (2.2%), paradoxical middle turbinate in 35 (9.1%), secondary inferior turbinate in 55 (14.3%), accessory inferior turbinate in 26 (6.8%) and bifid inferior turbinate in one patient (1%).

Bifid inferior turbinate was first identified by Aksungur et al.<sup>[3]</sup> Uncinate process was absent as a primary ethmoturbinal developmental anomaly in this case. Spear et al.<sup>[4]</sup> reported a case with bifid inferior turbinate which was determined incidentally while investigating the etiology of a neck mass. They represented absence of uncinata processes with an enlarged ethmoid bulla. Selcuk et al.<sup>[5]</sup> reported a case with bifid inferior turbinate that had been confirmed by both endoscopic examination and CT. They performed septoplasty and concha electrocauterization on this patient. Unlike other cases in the literature, Lee and Koh<sup>[2]</sup> reported a case with both uncinata process and bifid inferior turbinate, so they suggested that their case was the original bifid inferior turbinate case and it would be a misuse of the term if it were applied to other cases that would

more accurately be classified as uncinata process anomalies. To date, all but one bifid inferior turbinate case reported in the literature displayed absent uncinata processes, so that the patient presented by Lee and Koh<sup>[2]</sup> is accepted as the first real ethmoturbinal anomaly.

While most nasal cavity and paranasal sinus variations are asymptomatic, some can cause nasal obstruction and inflammation. Bifid inferior turbinate can cause nasal obstruction because the inferior turbinate is bigger than normal size. However, it is usually asymptomatic and diagnosed incidentally. As for the symptoms among the reported literature cases, the case reported by Aksungur et al.<sup>[3]</sup> had unknown clinical features because they were reviewed retrospectively by CT. However, the case reported by Spear et al.<sup>[4]</sup> was discovered incidentally while the two cases reported by Selcuk et al.<sup>[5]</sup> and Lee and Koh<sup>[2]</sup> involved patients who came to their clinic with complaints of nasal obstruction. Both our patients were symptomatic as well. Like the reported cases in the literature, we recommended surgical treatment to our patients but because of health situations or patient preferences we could not perform the surgery.

### Conclusion

Bifid inferior turbinate is an extremely rare anatomical variation of turbinates. It must be kept in mind in patients with nasal obstruction as a rare reason. Furthermore anatomical variations

of paranasal structures may present confusing landmarks. This may cause challenges in endoscopic sinus surgery. Thus the surgeon must be informed of the presence of these variations prior the surgery.

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