

# Overview on Deviated Nasal Septum: Simple Review

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## Abstract

**Background:** Nasal septum deviation (NSD) is a common problem in otolaryngology clinics and constitutes one of the healthy adults' most common anatomical variations. NSD may result in a deviation of either the bony or cartilaginous septum or both, leading to a disruption of the nose's physiological function and a distortion of its shape. **Aim:** In this review, we will look into the etiology, classification, management, and complications of nasal septum deviation. **Methodology:** Medline, Google Scholar, EMBASE, and PubMed database searches were performed for articles about the most significant recent developments in classification, etiology, and management updates of the deviated nasal septum, published in English around the world. **Conclusion:** NDS's have a critical role in functional and effective nasal breathing. Diagnostic modalities as rhinomanometry, acoustic rhinometry, as well as nasal spectral sound analysis can come in handy in identifying DNS. Though common, there are concerns that the benefits of nasal septal surgery might be mainly cosmetic. However, there is a debate on the effectiveness of adult septoplasty for nasal obstruction.

**Keywords:** Nasal septum deviation, classification, complications, Septoplasty, Management, Nasal septal surgery

## INTRODUCTION

The nasal airway acts as the primary path for inspired air to enter the lower respiratory tract. The results of ecogeographic evolution have created significant individual differences in human nose size and shape <sup>[1]</sup>.

The nasal septum is a cartilaginous nasal cavity structure of the midline bony. It has functional and aesthetic functions that help the underlying nose structure, preserve its form, and control nasal airflow and respiration <sup>[2]</sup>. The straight nasal septum promotes laminar airflow and helps maximize it by heating and humidifying the influenced air for the exchange of gases <sup>[3]</sup>.

Healthy lifestyle behaviors are not only aimed at preventing a disease or illness but also at improving the overall health of a person <sup>[4-7]</sup>. Nasal septum deviation (NSD) is a common problem in otolaryngology clinics and constitutes one of the healthy adults' most common anatomical variations. Deviation of the nasal septum may result in a deviation of either the bony or cartilaginous septum or both, leading to a disruption of the nose's physiological function and a distortion of its shape <sup>[8]</sup>. NSD leads to coughing, snoring, and nasal deformity outside of the mouth.

It also affects nasal cavity airflow dynamics and unsuitable paranasal sinus aeration contributing to sinusitis <sup>[9]</sup>. Disturbed mucociliary dysfunction, lymphocytic penetration, and squamous metaplasia are other modifications that are seen caused by the alterations of

airflow dynamics. These changes have been reported on both sides; however, they are more extreme on the concave side <sup>[10]</sup>.

Septal deviations have a critical role in the etiology of diseases of paranasal sinuses as incidences of sinusitis, osteomeatal complex obstruction and mucociliary dysfunction also increases <sup>[11]</sup>. In addition to obstruction of the airway, NSD applies pressure on the surrounding structures. This can disturb the drainage pathways, impair mucosal ciliary function by contact, as well as cause obstruction, retention, and secondary infection that involves all the sinuses by disturbing normal mucus drainage. The majority of these mucosal abnormalities were reported in the maxillary sinus area <sup>[12]</sup>.

Severe NSD cases can be managed mainly by an operation

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known as septoplasty. Wang *et al.* developed a novel operation called nasal endoscopic three minus septoplasty that is based on the patient's NSD biomechanical characteristics [13].

### Aim and objectives

In this review, we will look into the etiology, classification, management, and complications of nasal septum deviation.

### METHODOLOGY:

Study Design: Simple review article. Study duration: Data was collected during the period from 1 January – 29 February 2020. Data collection: Medline, Google Scholar, EMBASE, and PubMed database searches was performed for articles about the most significant recent developments in classification, etiology, and management updates of the deviated nasal septum, published in English around the world. The keyword search headings included "NSD, prevalence, classification, complications", and a combination of these was used. References list of each included study will be searched for further supportive data.

### Classification:

Vidigal *et al.* used classification for NSD that is based on the relationship of the inferior turbinate to the nasal septum.

Degree I: NSD did not extend to the inferior turbinate, Degree II: NSD continued to the inferior turbinate, and Degree III: the NSD extended to the lateral wall and caused compression on the inferior turbinate [14]. On the other hand, Rao *et al.* and Mladina [15, 16] used a very precise system to classify the commonest types of deviations reported in clinical practice.

### Mladina categorized NSD into seven different types:

Type one is when the unilateral vertical septal ridge in the valve region did not reach or disturb the function of the nasal valve itself. Type two is when the unilateral crest touches and disrupts the function of the nasal valve causing +ve Cottle's symptom after raising the nostril. Type three is when the unilateral crest is deeper, reaching the head of the middle concha. Type four is S-shaped, where one crest is reaching the middle conchal head, and the other disturbs the valve functions. Type five is a nearly horizontal septal spur. Type six is the presence of a massive unilateral bone spur. Type seven is the presence of a variation of these types from one to six [15].

Rao [16] also classified NSD into seven types: Type one is the presence of mild deviations in the horizontal or vertical planes. Type two is the presence of a vertical deviation anteriorly. Type three is the presence of a vertical deviation posteriorly. Type four is the presence of an S-shaped septum. Type five is the presence of a unilateral horizontal spur. Type six is the presence of a unilateral horizontal spur with a deep groove on the concave side. Type seven is a combination of type two to six.

Jin *et al.* [17], proposed only four types but in a very similar

manner to the classifications done by Rao and Mladina. Type one is a localized NSD including crest, spine, or caudal dislocation. Type two is an angulated deviation of localized features. Type three is a curved deviation associated with localized deviation. Type four is an angulated deviation that is associated with an external nasal deformity.

### Etiology:

The etiology of NSD can be classified into three categories: traumatic, congenital, infection, different genetic factors [18], or even the effect of a nasal neoplasm. The most common known cause is the impact of trauma [19]. Studies show an association between NSD and genetic connective tissue diseases, as Homocystinuria, Marfan syndrome, and Ehlers–Danlos syndrome [20].

### Diagnosis

Diagnosis of NSD includes many tests that have been recognized in the literature to assess NSD as acoustic rhinometry (AR), rhinomanometry (RMM) as well as nasal spectral sound analysis (NSSA) [21]. AR is used to assess nasal patency. It depends on testing the acoustic reflection of a sound signal using structures inside the nasal cavity. RMM assesses nasal volume airflow and transnasal pressure, which are used for calculating nasal resistance. NSSA provides an indirect method for dynamically determining nasal airflow by examining the noise produced by turbulent nasal airflow in the nasal cavity [22]. While AR offers a static view of the nasal cavity, a dynamic physiological assessment of the nose is given by rhinomanometry (RMM).

It quantifies nasal ventilation according to the laws of fluid dynamics by calculating transnasal pressure as well as nasal volume airflow to measure nasal resistance [22]. Unlike AR and RMM, NSSA does not necessitate any nasal cannulation as it can distort the nasal cavity, and skew the measurements. To measure this noise reliably, NSSA must be performed in a quiet room, a slight disadvantage of this test which is also observed incidentally with AR.

Unlike AR and RMM, it is important to independently evaluate each side of the nasal cavity, so that side variations can be noted [21, 23]. Management and treatment: Medical treatment with nasal sprays, including decongestants, antihistamines, or nasal corticosteroid sprays, is typically first attempted before a surgical solution to correct nasal septum deviation is considered [24].

Septoplasty is a corrective surgical procedure done to straighten an NSD [25]. However, the annual septoplasty rates vary across countries. Between 2012 and 2013, over twenty thousand septoplasties have been performed in England, i.e. 3.8 septoplasties per 10,000 inhabitants [26]. In 2010, ten thousand septoplasty plants in the Netherlands, i.e. six septoplasties per ten thousand inhabitants, were performed as a single procedure or in conjunction associated

with turbinate surgery [27]. Septoplasty should not proceed in an acute infection of the nasal or sinus. It should also be avoided if the person has diabetes, serious hypertension, or diathesis with bleeding [28].

### Complications of septoplasty

Septoplasty can lead to many complications as nasal obstruction, septal hematoma, septal abscess, epistaxis, and acute or chronic rhinitis. In some cases, due to surgical trauma or manipulation of mucoperichondrial flaps that are opposite to each other can lead to nasal septal perforation. Septoplasty can also be complicated with saddle nose. It is caused by the over-resection of the dorsal wall of the septal cartilage. Synachiae and adhesions can occur between the mucosa of the septum and lateral nasal wall. Resection of the caudal margin can lead to the dropped nasal tip. The overall prevalence of all these complications is less than 1 % of all cases and many of which can resolve without additional treatment [29].

### CONCLUSION

NSD is a common pathology presented in otolaryngology clinics. Diagnostic modalities are useful in identifying NSD and the main curative operation is septoplasty. The effectiveness of septoplasty for nasal obstruction in adults with a deviated nasal septum remains uncertain. Many complications of septoplasty have been described and reported in the literature, but the prevalence of most complications is less than 1%.

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