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When Should Pediatric Septoplasty Be Performed for Nasal Airway Obstruction?

Natalie Justicz, MD; Sukgi Choi, MD, MBA

BACKGROUND
Historically, otolaryngologists have been concerned about the potential detrimental effects of pediatric nasal surgery on the nasoseptal growth process. Septal cartilage is important for the development of the midface, and pediatric septoplasty was reserved for patients with functional problems secondary to congenital anomaly, tumor, or septal hematoma/abscess. More recently, there has been mounting evidence that the septum can be repaired without compromising facial development. In fact, a deviated septum causing nasal airway obstruction (NAO) represents an increasingly compelling indication to perform septoplasty. Otolaryngologists report functional improvement and patients report quality-of-life (QOL) improvement following septoplasty. However, high-quality guidelines for when to perform pediatric septoplasty are lacking. This review seeks to evaluate the current evidence for pediatric septoplasty, focusing on the indications to perform septoplasty and the most appropriate timeline for surgical intervention.

LITERATURE REVIEW
Early treatment of septal deformity is a matter of ongoing deliberation. There is concern that surgical intervention on a developing structure can adversely affect the normal growth of the nose and face. Conversely, failure to correct a septal deformity might allow the condition to worsen and increase the risk of sinusitis or facial asymmetry. Indications for septoplasty have traditionally been divided into absolute and relative indications (Table I). Although NAO has been regarded as a relative indication, NAO is uncomfortable, can exacerbate oral breathing, and can worsen over time. The shortage of excellent clinical studies worsens the surgeon’s concern regarding the long-term ramifications of pediatric septoplasty. We review two anthropometric studies focused on anatomical considerations, as well as two retrospective studies and one review that examine the effects of septoplasty on NAO, nasal growth and development, and QOL.

Anthropometric studies have illustrated typical development of the pediatric nose. Akgüner et al. examined age-related changes in nasal architecture in 140 female and 140 male subjects. The authors found that nasal height and bridge length reached maturity at 15 years of age in males and 12 years in females. Upper and lower dorsum and anterior and posterior nasal depth became fully mature in males at 14 years of age compared to 12 years in females; nasal tip protrusion became fully mature in males at 15 years of age and in females at 13 years.

To further clarify the role and effect of intervention, Dispensa et al. performed a retrospective review of 46 patients ages 4 to 12 years with post-traumatic
The studies by Akguner et al.,2 Tasca and Compadretti,3 following pediatric septoplasty. Female patients reported

improvement in visual analog scale (VAS) (range, 0

Nasal tumor

Congenital anomalies such as cleft lip/palate

Severe nasoseptal deformity following trauma

Septal hematoma/septal abscess

Nasal airway obstruction

Progressive growth deformity

TABLE I.

Absolute and Relative Indications to Perform Pediatric Septoplasty

<table>
<thead>
<tr>
<th>Absolute Indications</th>
<th>Relative Indications</th>
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<tbody>
<tr>
<td>Septal hematoma/septal abscess</td>
<td>Nasal airway obstruction</td>
</tr>
<tr>
<td>Severe nasoseptal deformity following trauma</td>
<td>Progressive growth deformity</td>
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<td>Congenital anomalies such as cleft lip/palate</td>
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<tr>
<td>Nasal tumor</td>
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nasoseptal deviation, with a follow-up time of 10 years. Sixteen patients had septal deviation without nasal pyra-
mid alterations and underwent septoplasty alone. The remaining 30 suffered from both septal deviation and
nasal pyramid deformity. Sixteen underwent septoplasty alone, whereas the remaining 14 were managed by both
septoplasty and rhinoplasty (including osteotomies). The patients with isolated septal deviation had no growth def-
cit at follow-up. However, when only septoplasty was performed and a nasal pyramid deformity was present
but not corrected, deformity was accentuated in all patients at follow-up. The best results were obtained
when septoplasty and rhinoplasty were both performed together, irrespective of age, leading the authors to con-
clude that adolescent growth can cause further alteration of deviated structures.

In a review article by Cingi et al.5 which included the studies by Akguner et al.,2 Tasca and Compadretti,3
Dispenza et al.4 and four other studies, the authors advo-
cate for correction of septal deviation if the deformity
causes nasal stenosis, oral breathing, or other breathing
problems in children as young as 6 years of age. They
hypothesize that septal cartilage should not be separated
from the perpendicular plate because this area is impor-
tant for the growth of the nasal septum and dorsum.
Highlighting the change from prior ideology, Cingi et al.5
emphasize that early pediatric septoplasty may prevent
worsening of derangements to facial growth.

Against the backdrop of anthropometric data and
the potential to augment midface development, otolaryn-
gologists have begun to explore the QOL impact associ-
ated with pediatric septoplasty. Subjective QOL outcome
measures focus on patient-reported symptoms and may
not directly correlate with objective outcome measures.

Lee et al.1 studied 28 patients who underwent septo-
plasty for nasal trauma or NAO and found a significant
improvement in visual analog scale (VAS) (range, 0–10)
following pediatric septoplasty. Female patients reported

a more significant improvement in VAS when compared
with male patients (5.0 compared to 3.0, \( P = .007 \)). Eight
of the patients were under 13 years of age, though com-
parisons of change by age and surgical approach did not
differ. This significant improvement in QOL regardless of
age, in the context of minimal impact on facial growth,
suggests that earlier pediatric septoplasty might provide
additional years of QOL benefit.

BEST PRACTICE

Pediatric septoplasty may be safely performed with-
out significantly affecting future nasal and facial growth.
Septoplasty should be performed in patients with func-
tional problems related to congenital anomalies or
trauma, whereas a deviated septum causing NAO sym-
tomatology also represents a reasonable and supported
cause for early septoplasty in children as young as six
years of age. Endoscopic septoplasty has not been shown
to cause a change in postoperative nasolabial angle.
Anthropometric studies suggest nasal growth is com-
pleted around 14 years of age in females and 15 years of
age in males. However, in appropriate situations, pediat-
ric septoplasty should not be deferred until adolescence.
Some believe that conservative management of septal
deviations may lead to increased facial asymmetry. More
clinical studies are required to determine evidence for
best timeline for correction in younger children. Septo-
plasty has been shown to improve QOL measures on
VAS. Further research will likely focus on characterizing
patient-reported outcome measures of septoplasty.

LEVEL OF EVIDENCE

Lee et al.,1 Akgukar et al.,2 Dispenza et al.4 are level
4 studies. Tasca and Compadretti5 is a level 3 study (ret-
rospective review with a normative control group). Cingi
et al.5 is a review of level 3 and level 4 studies.

BIBLIOGRAPHY