

**PEDIATRIC SEPTOPLASTY:
WHEN TO INTERVENE AND WHAT TO DO
ESSAY**

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Introduction and aim of the work

Structure of nasal septum is well known to otolaryngologists. The septum of a child differs from that of an adult.⁽¹⁾ (*Van Loosen et al., 1996*).

The growth of septal cartilage is completed at 5 to 6 years of age, where the vomer and perpendicular lamina grow until adolescence.⁽²⁾ (*D'Ascanio and Manzini, 2009*).

Septoplasty is an operation to improve function of the nose by removing nasal obstruction related to anatomical abnormalities of the quadrilateral cartilage and related bony structures. There is a concern about correction of nasal septal deformities before or during adolescence.⁽³⁾ (*Crysdale and Tatham, 1985*).

The effects of performing nasal surgery on the growing nose comes back to the 1950s, when Gilbert and Segal published their warning against resecting the quadrilateral cartilage, due to its responsibility in development of cartilaginous vault.⁽⁴⁾ (*Gilbert and Segal, 1958*).

Farrior and Connelly echoed the sentiment after a review of literature in 1970, stating that nasal surgery in children should be delayed if possible until growth is complete.⁽⁵⁾
(Farrior and Connelly, 1970).

A recent study by El-Hakim and colleagues followed the anthropometric measurements of children who underwent septoplasty through external approach with autotransplantation of the quadrilateral cartilage and compared their craniofacial development to that of age. There were no effects on development of nose or midface.⁽⁶⁾
(El Hakim et al., 2001).

Children with obligate mouth breathing due to nasal septum deformities show facial and dental anomalies in comparison to children with normal nasal breathing.⁽⁷⁾
(D'Ascanio et al., 2010).

Indications for septoplasty in pediatric patient include; septal abscess, septal hematoma, severe deformity secondary to acute nasal fracture, dermoid cyst, cleft lip nose, and severely deviated septum causing nasal air way obstruction.⁽⁸⁾
(Christophel and Gross, 2009).

Several surgical techniques have been suggested;

Closed septal repositioning: A flat elevator of surgeon's choice is inserted into the nasal cavity that is narrowed by septal displacement & the septum is reduced. ⁽⁸⁾ ***(Christophel and Gross, 2009).***

Targeted endoscopic resection of spurs without flap elevation: This approach using endoscopes and a microdebrider will leave only a small area of exposed cartilage at the base of the spur which mucosalizes quickly. ⁽⁹⁾ ***(Giles et al., 1994).***

Cartilage weakening without resection: This is done by incisions on the convex side of deviation allowing septum to return to midline. This need elevation of mucoperichondrial flap on convex side of septal deviation. ⁽⁸⁾ ***(Christophel and Gross, 2009).***

Cartilage resection: If the conservative techniques failed. The cartilage is resected and appropriate manipulations is done to straighten it or trim excess length that causes bowing before its reimplantation. ⁽⁶⁾ ***(El Hakim et al., 2001).***

After all causes have been ruled out and unless obstruction is secondary to severe septal deformity, it is preferred to wait until the child is 5 or more years old.⁽⁸⁾
(Christophel and Gross, 2009).

There is a controversy about when to intervene with septoplasty in a child. Also which surgery to do. That's why we adopted this review of literature.

Aim of the Work

To review the literature about surgical techniques in pediatric septoplasty clarifying the indications, advantages and disadvantages of each, and to determine the suitable age for the operation.

Methodology

The search was limited to articles published in English language conducted on human subjects in pubmed – medline (medscape) in the last 30 years.

Key Words:

- Pediatric septoplasty.
- Endoscopic septoplasty in children.
- Deviated septum in children.
- Nasal obstruction in children.
- Nasal surgeries in children.

Development and Anatomy of Nasal Septum

The nose is the central distinguishing feature of the human face.⁽¹⁰⁾ (*Lee and Koltai, 2003*).

The tissue that gives rise to nasal structures derives from three different embryonic sources: the ectoderm, the neural crest, and the mesoderm.⁽¹¹⁾ (*Carlson, 1994*).

The development of the nose depends on two crucial steps. The first, is the formation of the neural tube from the ectoderm, which occurs at the fetal dorsal surface during the third week of gestation. The neural tube then gives rise to the neural crest cells. The second step, is the correct migration of these cells into the mesenchyme. The neural crest cells mature to form aspects of the bony and cartilaginous structures of the face.⁽¹²⁾ (*Larson, 1993*).

At the end of the fourth week of gestation, paired thickenings of ectoderm appear on the frontonasal prominence superior and lateral to the stomodeum. Oval placodes develop into the nose and nasal cavities. During the fifth week,

mesenchymes on the periphery of the nasal placodes proliferate to form horse shoe elevations. The lateral and medial limbs are termed nasolateral and nasomedial processes respectively.⁽¹³⁾ (*Neskey et al., 2009*).

The nasomedial processes then merge with each other, forming the intermaxillary segment and displacing the frontonasal prominence posteriorly. The intermaxillary segment is the precursor to several structures, including the primary palate, the tip and crest of nose, and a portion of the nasal septum.⁽¹²⁾ (*Larson, 1993*).

The nasal septum grows inferiorly from the nasofrontal prominence to the level of the palatal shelves following fusion to form the secondary palate. Anteriorly the septum is contiguous with the primary palate originating from the nasomedial processes.⁽¹⁴⁾ (*Markus et al., 1992*).

The nasal septum starts out as a thick membranous structure. Soon two plates of mesenchymal condensation become evident. By the middle of the third month of fetal life cartilage extends into the septum from the body of the sphenoid. Two cartilaginous plates are thus formed, each in

juxta position to the other, which usually fuse into one.⁽⁴⁾
(Gilbert and Segal, 1958).

At this stage, the septum is beginning to thin out. Further thinning takes place during the first year of postfetal life due to ossification beginning in the cephalic portion of the cartilaginous nasal septum which forms the lamina perpendicularis of the ethmoid and this ossification extends into the crista galli and the cribriform plate.⁽⁴⁾ ***(Gilbert and Segal, 1958).***

The nasal cartilaginous septum (quadrilateral cartilage) is surrounded by the end of the first year of post fetal life by the following bones: the frontal and the ethmoid above, the sphenoid behind, the vomer and the maxillary crest and spine below. The vomer develops bilaterally on each side of the posterior inferior margin of the cartilaginous septum. It begins to ossify at the eighth week of fetal life as nuclei appearing on each side of the midline below the nasal septum.⁽⁴⁾***(Gilbert and Segal, 1958).***

During the third month, the ossification of the vomer proceeds in a forward direction and invades the posterior end