DOES SEPTOPLASTY HAVE ANY RISKS OR COMPLICATIONS IN CHILDREN?

META-ANALYTIC STUDY (A SYSTEMATIC REVIEW)
SUBMITTED FOR PARTIAL FULFILLMENT OF
MASTER DEGREE IN OTORHINOLARYNGOLOGY

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هل يوجد أخطار أَومضاعفات مترتبة على إجراء جراحة تقويم الحاجز الأنفي في الأطفال؟

رسالة توطئة للحصول على درجة الماجستير
في جراحة الأنف والأذن والحنجرة

مقدمة من
الطبيب/إبراهيم يوسف احمد الشافعي
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Introduction

Most children with nasal septal pathology have nasal obstruction, which is a nonspecific and common complaint .The differential diagnosis of pediatric nasal obstruction also includes sinusitis, allergic rhinitis, and adenoid hyperplasia, which may coexist with a septal problem. In addition to anterior rhinoscopy, the diagnostic evaluation may require rhinometry, flexible endoscopy, or imaging studies to determine the etiology of nasal obstruction. Nasal septal deviation in the pediatric age group uncommonly indicates surgical correction **(Crysdale, 1999).**Due to a great variability in their anatomy and healing ability, children younger than age 15 years should have surgery performed using the least destructive techniques to accomplish the surgical goal; nasal and septal cartilage should be reshaped and repositioned rather than removed. The pediatric septum differs in subtle ways from that of the adult. Growth of the nasal septum occurs in two phases: the cartilaginous septum reaching adult size by the time the child is 2 years old, and further enlargement is due to growth of the bony septum. The difference in the relative size of the quadrilateral cartilage as delineated by the osteocartilaginous suture lines in a 3-year-old patient and a 27-year-old patient is clearly seen when comparing sagittal sections of MRIs **(*Van Loosen et al, 1996*).**

Older teenagers (males age 16 years or older, females age 14 years or older) are treated no differently than adults because beyond this age there is very little significant facial skeletal growth. Adolescents being considered for aesthetic nasal surgery must also have psychological and emotional factors addressed with both themselves and their families **(*Woei-Shyang et al, 2005*).**

Septoplasty can either be completed using an internal approach or an external approach. The internal approach offers low morbidity, but is suitable only for pathology limited to the posterior inferior aspect of the nasal septum. The external approach has higher morbidity, but facilitates primary or revision surgery for all types of septal pathology, including large cartilaginous defects (i.e. necrosis after a septal abscess) **(*Crysdale, 1999*).**

Techniques that rely on sutures to reposition and control the nasal tip are often performed through the external approach, and are especially useful in pediatric rhinoplasty, owing to their non-destructive nature and reversibility. Bony osteotomies, when necessary, should be performed with small sharp osteotomes to minimize bone loss and trauma to surrounding tissues. The periosteum overlying the nasal bones should always be preserved to prevent collapse of the nasal bones with resultant pyriform aperture and internal nasal valve stenosis **(*Crysdale, 1999*).**

Outcomes of nasal septal surgery in the pediatric age group may be either functional or aesthetic. Surgery to correct nasal abnormalities in children has significant implications in the treatment of sleep disordered breathing, especially obstructive sleep apnea and snoring. Septal deformity can contribute to significant nasal obstruction, and failure to address this problem in the treatment of children with sleep disordered breathing will usually result in recurrence of symptoms ***(Woei-Shyang et al, 2005)*** Nasal shape changes (e.g., tip ptosis, dorsal nasal saddling) may result from over-resection of the caudal septum or the loss of dorsal nasal support **(*Myer, 1999*)**.

Complications may occur, including, but not limited to the following: persistence in the subjective complaint of nasal obstruction, infection, septal perforation, septal hematoma, nose bleed, reaction to the anesthesia, and change in the shape of the nose (rare). Short-term side effects of surgery may include: nose will feel puffy, nose may ache, dull headache, small amount of bleeding in first few days **(*Handler, 2006*)**. The main histological alterations of the growing nose after septoplasty include: scar formation with possible inhibition of the growing cartilage, mucosal atrophy, alterations of the vascular and nerve supply with disturbance of nasal reflexes (hyperplasia of the turbinate), cartilage necrosis, fibrous replacement, new cartilage formations sometimes ectopic, bone resorption, fibrous or bony union of fracture lines and hypoplasia or hyperplasia (crests, hump) ***(Pirsig, 1977).***

Contrary to certain widely held beliefs, nasal surgery can be performed safely at almost any age if appropriate cartilage-sparing and suture-control maneuvers are employed. Failure to treat symptomatic pathology because of concerns over interrupting facial growth can prolong functional and aesthetic problems. Whereas a healthy respect for facial growth centers should accompany any otolaryngologic intervention in children, surgical correction of structural nasal obstruction and deforming injuries should not be “deferred” until the late teen years **(*Crysdale, 1999*).**

Performing a septoplasty on a pediatric patient is often viewed with fear by many practitioners. The main concern that causes hesitation is the potential for altering or stunting the growth of the nose or midface. Although the evidence pendulum appears to be swinging toward allowing the operation, which should not result in long-term sequelae if done using the proper techniques, it should still be approached with some fear. The surgeon must always evaluate the child thoroughly to ensure the correct diagnosis and determine the exact location of the anatomic pathology. Absolute indications for the operation are rare, and thus the strength of the relative indications (e.g. severely deviated septum) must be weighed when discussing the risks with parents. Using the techniques described and giving consideration to the varied approaches, from least to most invasive, will allow the surgeon to safely correct the patient's problem with excellent results and the least concern for affecting growth. The surgeon's comfort level with performing pediatric septoplasty will rise dramatically with the first few cases. Once the fear of operating on the pediatric nose is overcome, the surgeon's knowledge of anatomy and comfort with patient selection will be freeing: the procedure can be done safely, and results need not be compromised**(*Christophel and Gross, 2009*).**

We seek to find the best available evidence in the published literature on whether different surgical approaches open or close; to the pediatric nasal septum have any effect on facial growth.

Aim of the study

This study uses systematic reviewing to evaluate the effect on facial growth and complications of septoplasty in children up to 18 years of age with septal deviations.

Material and Methods

This study was achieved using systematic reviewing to evaluate the effect of nasal septal surgery in children on nasal and facial growth, as well as nasal patency.

The fulfillment criteria of systematic reviewing necessitated going through the following steps in the study:

1) Determination of the target questions:

Do different surgical approaches, open or close, to the pediatric nasal septum have any effect on nasal and facial growth and nasal patency? Also what is the incidence of complications?

2) Identification and location of articles:

Studies included published medical articles concerning the effect of nasal septal surgery in children on nasal and facial growth through the respective website (http://www.pubmed.com) using the following keywords: Nose surgery, children, complications, septoplasty, anthropometric measurements, and facial growth.

3) Screening, evaluation and collection of articles:

The following criteria were used to choose which articles retrieved by search are suitable for analysis. Only articles fulfilling the criteria of screening were included for further steps of data collection, analysis, and reporting.

Inclusion criteria:

- Published in English.
- Reporting on:

A- Pediatric patients (below 18 years old) with septal deformities.
B-surgical correction by septoplasty or septorhinoplasty either open or closed technique.
C-functional outcome (whether improving, stationary or complicating by clinical, and rhinomanometry).
D-facial aesthetic outcome , anthropometric linear measurements and indices of the face and nose preoperatively and postoperatively.

The anthropometric linear measurements and the indices calculated from their values indicate some aspects of nasal and facial growth. Although the linear measurements are individual dimensions in their own right, the indices demonstrate the harmony between these dimensions. The variables used as outcome measures are (See Fig. 8):

Anthropometry landmarks: *(Farkas et al,1986).*

1-Nasion (n): is the most important bony profile landmark, hardly visible on lateral views, it is located at the midline in the nasofrontal suture and always higher than the level of eye fissures.

2-Pronasale (prn): is the most protruded point of the tip of the nose with the head in rest position; it is located in the midaxis of the apex nasi.

3-Subnasal (sn): located in the midpoint of the columella base at the columella-labial junction.

4-Apex of columella(c): located at the level of nostril tips.

5-Gnathion (gn): the lower most point on chin.

6-Zygion (zy): located at one zygomatic bone.

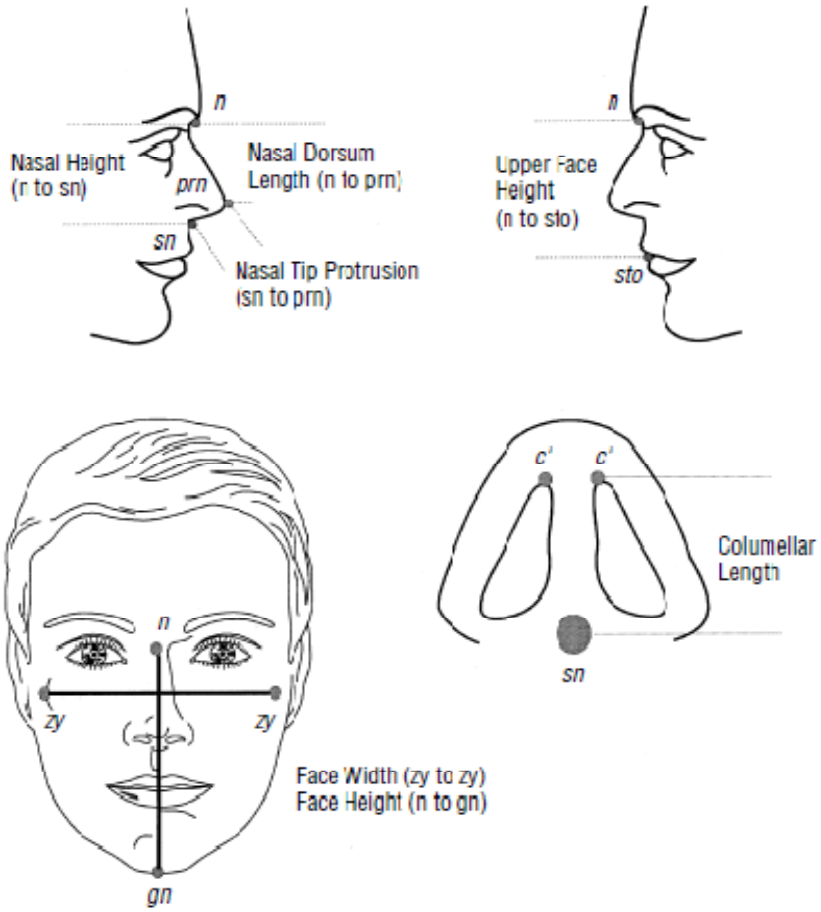
7-Stomion (sto): located in the middle of upper lip.

1-nasal index or (n to prn)/ (n to sn), i.e., the nasal dorsum length (nasion [n] to pronasale [prn]) divided by the nasal dorsum height (n to sub nasale [sn])

2-columellar length nasal tip protrusion index or (sn to c)/ (sn to prn), i.e., the relationship between the columellar length (sn to apex of columella [c_]) and the nasal tip protrusion (sn to prn)

3-facial index or (n to gn)/(zy to zy), i.e., the relationship between the facial height (n to gnathion [gn]) and the face width (distance from one zygion [zy] to the other)

4- nose upper face height index or (n to sn)/ (n to sto), i.e. ,the relationship between the nasal height (n to sn) and the upper face height (n to sto). All measurements are in millimeters.



(Fig. 1) Anatomical landmarks for linear anthropometric measurements. n, nasion; prn, pronasale; sn, subnasale; sto, stomion; zy, zygion; gn, gnathion; and c_, apex of columella.***(El-Hakim et al, 2001).***