



## Original Article

### Is the septoplasty procedure recommended below age of 18 years?

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**Back ground and objectives:** *Septoplasty is conservative approach to nasal septal surgery. In this operation much of the septal framework is retained. Only the most deviated parts are removed, rest of septal framework is corrected and repositioned by plastic means. There is a wide concept that this surgery is usually done after the age of 18 years so as not to interfere with nasal skeleton growth, however if the a child has sever deviation causing marked nasal obstruction, septoplasty can be performed to provide a good airway.*

*This study was conducted prospectively to confirm whether this procedure can be done safely before age of 18 years and to postulate the different factors which may affect the outcomes of this surgery at particular this age group.*

**Patients and Methods:** *Seventy-five patients aged 6-65 years of different types of DNS, namely c-shaped, s-shaped, anterior caudal dislocation, and nasal spur with and without external deformities of the nose, presented with variable pictures of clinical presentation of DNS at ENT department – Althowra central hospital and Altarahom private center – Albyda city – Libya at period in between September 2005 to January 2013 who operated by septoplasty as closed technique. The patients were divided into two groups, group-A which was including twenty-five patients of age 6-17 years, and remaining fifty patients of ages 18-65 were classified as group-B. The outcomes of the surgery were studied and compared between the two groups in relation to different demographic, anatomical, pathological as well as surgical factors. The patients postoperatively were followed up for 3-6 months and assessed for outcomes of the surgery which are flap hematoma , flap abscess, flopping of flap, septal perforation, synaechia, degree of improvement, recurrence, atrophic rhinitis, and external nasal deformities.*

**Results:** *87% of young patients who underwent the septoplasty procedure got improvement of their representing symptoms, they followed from 3-6 months and no post-septoplasty complication discovered among them. On the other hand the other remaining 13% presented with recurrence as post- operative complication. All these results where correlated with multi-factorial presentations and compared with those of older ages.*

**Conclusion:** *Generally speaking, the outcomes of septoplasty at age before 18years are not significantly varying from those at older ages. Thus this procedure can be performed safely at younger ages.*

**Keywords:** *Septoplasty in children, deviated nasal septum in children, septorhinoplasty, postseptoplasty complications in children.*

## INTRODUCTION

Septoplasty is considered as one of the common surgical procedures in rhinology. Although for some extent this

procedure still confined for patients of ages after puberty, and this was reasoned by three main points: 1) the septoplasty among the children had been classified as

major procedure which cannot be tolerated by this age group and it might be associated with high rate of post-operative morbidities. 2) The children's noses are still at growing and developing stage of cranio-facial region including septo-nasal skeleton therefore any surgical intervention by septoplasty or rhinoplasty will be resulting in the abnormal growth of the nose as well as surrounding parts and subsequently this will lead to variable forms of oro-naso-facial deformities. 3) Generally speaking, the child-hood is characterized by high growth activity under the effect of significant increase in growth hormone level thus this will promote the fibroblastic activity which will raise significantly the rate of post-operative fibrosis, this can be manifested as post-operative deformity recurrence creation or post-operative synechia.<sup>(1-18)</sup>

Nasal obstruction is among the most prominent symptoms and signs of nasal disease. Although there is a wide spectrum of etiological factors of nasal obstruction which can be anatomical or functional but deviated nasal septum (DNS) is considered as one of the most common varieties of anatomical- structural causes. The obstructive symptoms and signs on top of DNS will become more obvious among the children as compared to adult and the persistent as well as sever nasal obstruction in the children may easily complicate into structural (cosmetic) sequel and functional (ventilatory) subsequences, these disorders can interfere with normal child's psychological, mental and physiological thrive thus in this circumstance the relief of structural nasal obstruction by correction of septal deviation is strongly indicated. For this reason it becomes very necessary to research for possibility of performance of septoplasty during child-hood. Furthermore, septal surgery is a major cause of legal controversy for otolaryngologists, plastic surgeons, and maxillofacial surgeons because of the possible morbidity and aesthetic consequences related to this surgical procedure.<sup>(1-20)</sup> In adult patients aesthetic changes, noted in up to 21% of patients who undergo septoplasty, represent one of the most common causes of reoperation in nasal surgery (1-19), in fact this risk is increased significantly among the children as compared to adults.

Upon the review of literatures, Manning has presented a contemporary, unbiased review of the controversy surrounding the management of a young child with a severely deviated septum and airway obstruction. He showed in his view that nasal airway obstruction substantial enough to require septoplasty in a 3-year-old is a relatively rare occurrence. Craig added that a young child with substantial upper airway obstruction who has a nasal septal deviation should be thoroughly examined for other potential sources of obstruction (i.e., hypertrophied adenoids) prior to undergoing septoplasty. In accordance Ignacio, et al concluded to that septoplasty does not affect most aspects of nasal and facial growth, but it may negatively influence growth of the nasal dorsum. Also

Ramesh and Santosh claimed that Septoplasty in childhood does not produce any untoward events in terms of the growth and development of the nose and face. Although deviation of the septum has a tendency to recur after surgery, results of septoplasty are fairly satisfactory in children. In addition William S said that (I usually defer surgery until age 6 years for many reasons: First, at that age, one is able to perform a complete examination, including flexible endoscopy to determine the exact cause of the nasal obstruction. Second, hospitalization, packing removal, and suture removal are all better tolerated at that age).<sup>(16-18)</sup>

Recently speaking, during last decade there were a significant number of clinical trials that postulated the ability of the conduction of this procedure at young age groups. Hamdy, et al illustrated that appropriate nasal septal surgery involving excision and subsequent reinsertion of a remodeled segment of the quadrilateral cartilage has no deleterious effects on development of the nose and mid-face. On the other hand Tasca and Compadretti concluded to that Pediatric septoplasty may be indicated in selected cases of obstructing nasal septum deformities. The operation performed via endonasal approach, does not interfere with the normal growing nasal process. In the same manner, Rachael postulated that evidence exists to support that pediatric septoplasty can be performed without affecting most aspects of nasal and facial growth. Furthermore, not performing or delaying septoplasty when indicated may adversely affect nasal and facial growth with compounding adverse effects in terms of deformity and asymmetry. Indeed Perry van claimed that Rhinoseptoplasty can safely be performed after the age of 16 years in girls and 17 years in boys.<sup>(18-25,74-76)</sup>

Therefore this study was decided and planned as trial to clarify for some extent all these controversies as well as to confirm whether the septoplasty procedure can be performed safely among child-hood age groups as compared to adults. This study was conducted prospectively for these aims:

- I. To assess the demographic distribution of deviated nasal septum namely age and sex among young ages and their relation to outcomes of surgery.
- II. To present the most common variety of nasal septum deviation among young ages and the effect of this factor on outcomes of surgery.
- III. To demonstrate the most common possible causes of nasal septum deviation among young ages and the effect of this factor on outcomes of surgery.

## Is the septoplasty procedure recommended below age of 18 years?

- IV. To show main clinical presentation of nasal septum deviation cases and the degree of their improvement after surgery as compared to adult age group.
- V. To postulate the effect of the performed type of surgical technique on outcomes of surgery as compared to adult age group.

### PATIENTS AND METHODS

Seventy-five patients aged 6-65 years of different types of DNS, namely c-shaped, s-shaped, anterior caudal dislocation, and nasal spur with and without external deformities of the nose, presented with variable pictures of clinical presentation of DNS at ENT department – Althowra central hospital and Altarahom private center – Albyda city – Libya at period in between September 2005 to January 2013 who operated by septoplasty as closed technique. The patients were divided into two groups, group-A which was including twenty-five patients of age 6-17 years, and remaining fifty patients of ages 18-65 were classified as group-B. The outcomes of the surgery were studied and compared between the two groups in relation to different demographic, anatomical, pathological as well as surgical factors namely, 1) patients age, 2) sex, 3) type of clinical presentation, 4) cause of septal deviation, 5) type of DNS, 6) associated local pathology with deviation 7) recurrent or first attempt of surgery, 8) associated external deformity, and 9) surgical technique which was conducted. The patients postoperatively were followed up for 3-6 months and assessed for outcomes of the surgery which are flap hematoma, flap abscess, flopping of flap, septal perforation, synechia, degree of improvement, recurrence, atrophic rhinitis, and external nasal deformities in addition to the assessment for immediate postoperative general complications namely, air-way obstruction, vomiting, dehydration, pain, oro-facial edema, nutritional deficiencies, bleeding and hypovolemic shock. An informed consent was taken from the patients involved in the research prior to their participation.

Data were expressed by using descriptive analysis as means + standard error of mean (s. e. m) and percentages, test of significance was carried out, using Chi-square test and two way analysis of variance. A probability less than 0.05 was considered as significant, the degree of significance was determined by using level of standard deviation test. Student -t- test was used for dependent sample, as well as contingency coefficient was calculated as measurement of association between nominal variables.

### RESULTS

As shown in (Table I) the age was correlated to the sex, it was found that the females among group-A were

significantly appearing with larger number as compared to males ( $P < 0.05$ ), on the other hand, at group-B the number of males were significantly more than females ( $P < 0.05$ ). As illustrated in (Table II) c-shaped verity of deviation was presented with higher percentage (88% and 60%) among group-A and B consecutively, followed by anterior caudal dislocation (8% and 23%) among group-A and B consecutively, as compared to s-shaped DNS (0% and 10%) as well as nasal spur (4% and 7%) among group-A and B consecutively. As demonstrated in (Table III) the trauma was commonest cause of DNS at adult-hood as compared to congenital- developmental predisposition which was the commonest etiological factor at child-hood, the posttraumatic DNS was constituting (20% and 83%) among group-A and B consecutively, while the deviation of nasal septum due to congenital- developmental predisposition was representing (80% and 17%) among both groups consecutively. As can be seen in (Table IV) the commonest clinical presentation of deviated nasal septum was in form of upper air way obstructive symptoms (100% and 90%) among both groups consecutively, followed by persistent mal-occlusion deformity of teeth (80%) among the children, and chronic headache, facial pain, chronic pharyngitis, and facial disfigurement, (39%), (27%), (30%), (29%) consecutively at adult age group. On the other hand, (Table V) shown the incidence of possible co-existing local pathologies associated with DNS. As can be seen the adenoid enlargement and hypertrophied palatine tonsils constitute the commonest obstructive upper air way disorders associated with DNS at child-hood. In accordance, chronic hypertrophic rhinitis as well as allergic rhinitis has the higher incidence as co-existing pathologies with DNS among adult patients. (Table VI) demonstrated the relationship between nasal septal deviation and accompanied external nasal deformities as comparative illustration between both studied groups. As can be recognized the rate of external nasal deformity in association with DNS has been significantly higher among group-B as compared to group-A ( $P < 0.05$ ). From other aspect, the risk of intra-operative complications during septoplasty performance on patients with ages below eighteen years is significantly lesser than that due to conduction of same procedure among older age groups as can be observed from (Table VII) ( $P < 0.001$ ). In the same manner, (Table VIII) represented the risk of variable forms of early post-operative complications (i.e. complications appear within first two weeks after the surgery). As can be elucidated the risk of early post-operative complications after septoplasty is significantly increased among group-B as compared to group-A ( $P < 0.001$ ). In addition, (Table IX) showed same results. As can be postulated the risk of late post-operative complications (i.e. complications appear after two weeks from the surgery) is significantly increased by performance of this procedure at older patients as compared to child-hood patients ( $P < 0.001$ ).

**Table I Demographic factors distribution as sex in relation to age among the both groups (P < 0.05)**

	Group-A (6-17years)	Group-B (18-65)	Total
<b>Male</b>	8	31	39
<b>Female</b>	17	19	36
<b>Total</b>	25	50	75

**Table II Comparative illustration of both studied groups in relation to the type of septal deviation (P > 0.1)**

	Group-A (n=25)		Group-B (n=50)		Total (n=75)	
	N	%	N	%	N	%
Anterior caudal dislocation	2	8	11	23	13	18
c-shaped	22	88	30	60	52	70
s-shaped	0	0	5	10	5	6
Nasal spur	1	4	4	7	5	6
Total	25	100	50	100	75	100

**Table III Comparative illustration of both studied groups in relation to the underlying cause (P < 0.05)**

	Group-A (n=25)		Group-B (n=50)	
	N	%	N	%
Developmental	20	80	8	17
Post-traumatic	5	20	42	83
Total	25	100	50	100

**Is the septoplasty procedure recommended below age of 18 years?**

**Table IV Comparative postulation of both studied groups in relation to the pre-operative clinical presentation of DNS (P < 0.05)**

Clinical presentation	Group-A (n=25)		Group-B (n=50)	
	N	%	N	%
Nasal obstruction and mouth breathing.	25	100	45	90
Sleep disorders (obstructive snoring and sleep apnea attacks).	15	60	30	60
Persistent headache.	3	12	20	40
Persistent facial pain.	1	4	15	30
Chronic and recurrent sinusitis.	5	20	25	50
Chronic and recurrent chest infection.	2	8	10	20
Chronic and recurrent laryngo-pharyngitis.	0	0	15	30
Persistent mal-occlusion deformity of teeth.	20	80	3	6
Persistent Eustachian tube dysfunction and recurrent attacks of otitis media with effusion.	4	16	10	20
Uncontrolled chronic ear (Chronic suppurative otitis media or chronic dry drum perforation).	1	4	3	6
Oro-naso-facial disfigurement	3	12	0	0
Recurrent epistaxis	2	8	10	20

**Table V Comparative demonstration of both studied groups in relation to the possible co-existing local nasal pathology with DNS (P < 0.05)**

	Group-A (n=25)		Group-B (n=50)	
	N	%	N	%
Allergic rhinitis	3	12	35	70
Hypertrophic rhinitis	2	8	40	80
Atrophic rhinitis	0	0	0	0
Adenoid enlargement	5	20	1	2
Hypertrophied tonsils	5	20	20	40
Palatal flatter and uvular abnormalities	0	0	5	10
Migraine	0	0	10	20

**Table VI Comparative elucidation of both studied groups in relation to the co-existing external nasal deformity with DNS (P < 0.05)**

External nasal deformity	Group-A (n=25)		Group-B (n=50)	
	N	%	N	%
Yes	2	8	15	30
No	23	92	35	70
Total	25	100	50	100

**Table VII Comparative presentation of both studied groups in relation to the suggested intra-operative difficulties and complications (P < 0.001)**

Intra-operative complications	Group-A (n=25)		Group-B (n=50)	
	N	%	N	%
Uncontrolled adrenalin induced arrhythmias	0	0	0	0
Collamellar injury	0	0	2	4
Alar cartilage injury	1	4	7	14
Difficult flap dissection	2	8	20	40
Flap injury	2	8	25	50
Difficult manipulation of septal cartilage	1	4	15	30
Septal cartilage injuries	2	8	10	20
Ethamoidal perpendicular plate injury	0	0	0	0
Cribiform plate injury	0	0	0	0
Uncontrolled bleeding	0	0	1	2
Inferior and middle turbinate injury	0	0	3	6
Difficult flap repair	1	4	5	10

**Is the septoplasty procedure recommended below age of 18 years?**

**Table VIII Comparative presentation of both studied groups in relation to the suggested early post-operative complications (within first two weeks post-operatively) (P < 0.5)**

Early post-operative complications	Group-A (n=25)		Group-B (n=50)	
	N	%	N	%
Oro-naso-facial pain	3	12	50	100
Nausea and vomiting	0	0	20	40
Dehydration	0	0	20	40
Metabolic disturbances	0	0	15	30
Oro-facial edema	5	20	30	60
Air-way obstruction	0	0	4	8
Nasal vestibulitis	0	0	1	2
Flap infection	0	0	2	4
Flap necrosis	0	0	2	4
Septal perforation	0	0	7	14
Septal hematoma\ seroma	0	0	0	0
Septal abscess	0	0	0	0
Uncontrolled epistaxis	0	0	1	2

**Table IX Comparative presentation of both studied groups in relation to the suggested late post-operative complications (after two weeks post-operatively) (P < 0.5)**

Late post-operative complications	Group-A (n=25)		Group-B (n=50)	
	N	%	N	%
Persistent septal perforation	0	0	7	14
Flopping of nasal septum	0	0	2	4
Supra-tip depression deformity	0	0	2	4
Saddle -shaped deformity	0	0	2	4
Recurrence of DNS	1	4	3	6
Persistent nasal obstruction	1	4	3	6
Persistent olfactory impairment	1	4	3	6
Persistent parasthesia at upper lip and upper jaw	0	0	5	10
Induction or aggravation of allergic rhinitis	1	4	4	8
Atrophic rhinitis	0	0	6	12
Synaechia formation	0	0	5	10

## DISCUSSION

Now a day the septoplasty in children is considered as one of big controversy issues in rhinology. Although many surgeons still restrict to a concept of absolute contraindication of septoplasty at child-hood. However, septoplasty was proved via many studies that can be performed successfully before age of eighteen years (3). Hence from the anatomical as well as physiological point of view the children are more susceptible for the development of sever obstructive sequels of DNS as compared to adult therefore it becomes very necessary to interfere for the purpose of relief of this obstruction by septoplasty.<sup>(1-27)</sup>

One of main causes that make the septoplasty contraindicated during child-hood is the consideration of this procedure as a major procedure among children. This can be reasoned by: a) technical factor, i.e. the performance of septoplasty for young patients is described technically as difficult procedure because of many facts as narrow and very limited surgical access, very thin muco-perichondrial and muco-periosteal flaps that make their dissection more difficult, as well as mal-developed septal cartilage that make its manipulation, separation, and correction difficultly achieved. And b) pathological factor, i.e. the septoplasty among children is associated with higher risk of post-operative morbidities and handicapping as compared to the adult, this can be either in form of general or local complications.<sup>(1-15)</sup> But still we need to balance between the risk of sustaining of sever nasal obstruction due to DNS at one side and the risk of the surgery itself at the other side. During child-hood which constitutes an active developing- growing period the persistence of nasal obstruction will affect significantly the somatic as well as functional thrive of the child. In the same time clinically speaking, the nasal obstruction due to DNS will be manifested more sever among children as compared to the adult. This can be explained by many anatomical, functional as well as pathological factors for instance: 1) at early life, the children are obligatory nasal breathers, for this reason any nasal obstruction may significantly affect the respiratory function. 2) The size of the nasal cavity among the children is insufficient than that of the adult thus any minimal obstructive lesion will cause a significant rising in the nasal resistance. It was found that the obstruction of one-third of nasal lumen among young children may elevate the nasal resistance by eighty-one times of the normal. 3) The size of the oropharynx and hypopharynx at children is inadequate as compared to the adult therefore they will become unable to compensate any obstruction that may occur at the level of nose. 4) The incidence rate of adenoid enlargement with or without chronically hypertrophied palatine tonsils is significantly higher at children population as compared to adults. This may exaggerate the obstructive manifestations due to DNS

among children as compared to adults. 5) As it is well-established that the child-hood constitutes the main period for somatic development of different facial, branchial and thoracic anatomical structures therefore chronic nasal obstruction at this particular age group may result in variable cosmetic- morphological abnormalities in relation to these regions due to persistent mouth dependent breathing and over use of accessory cervical as well as thoracic respiratory muscles. 6) Physiologically speaking, the respiratory cycle among the children is shorter than that among the adults thus the compensation of upper air way obstruction during child-hood will be more difficult and insufficient due to decreased tidal volume as compared to adults. 7) The alveolar surface area at child's lungs is smaller than that at adult's lungs thus the oxygen-carbon dioxide exchange capacity of the lungs among the children will be lesser than that among the adults. This will increase the difficulties for compensation of any upper air way obstruction during the child-hoods as compared to older ages. 8) Anatomically speaking, the Eustachian tube among the children is shorter and present in horizontal plane this will increase the risk of persistent as well as recurrent otitis media in the presence of co-existing DNS as compared to adults. And 9) the child-hood is considered as active period regarding the physical activities as well as body and mental thrive therefore the oxygen requirements at this age group will be more as compared to adults. This needs a probably maintained air way to provide all these demands sufficiently.<sup>(28-40)</sup>

Hence the nasal obstruction due to DNS among the children is more severe as compared to adults this will give a significant excuse for the trials of initiation of septoplasty performance during early life period. The severity of this obstruction can be elucidated by the manifestation of two important conditions: dys-ventilation syndrome which is mainly based upon the mal-function situation of normal ventilation mechanism i.e. the nasal obstruction due to DNS at child age groups resulting in mal- ventilation via the upper respiratory tract this will lead to multiple failures for proper local, regional as well as systemic ventilation in form of: 1) The lack of proper ventilation to the para-nasal sinuses which will predispose for sinusitis. 2) The insufficient ventilation of Eustachian tubes this will create a high risk of persistent as well as recurrent otitis media with its variable pathological forms. 3) The mal-ventilation through the vocal tract may result in voice disorders. 4) The inadequate air flow during the child's sleep can be manifested as obstructive snoring, and\ or sleep apnea attacks, and\ or upper air way resistance syndrome. 5) Nocturnal enuresis. 6) The ill-established air supply to the lungs may lead to compensatory dilatation of alveolar spaces this will increase the incidence of pulmonary edema, and spontaneous rupture of dilated alveoli. In addition the failure of enough alveolar ventilation may cause insufficient oxygen- carbon dioxide exchange which subsequently results in persistent hypoxemia and

## Is the septoplasty procedure recommended below age of 18 years?

respiratory failure. 7) The chronic nasal obstruction and co-existing persistent mouth breathing will be associated with recurrent chest infection and bronchospasm this is due to the loss of normal respiratory nasal function as humidification, purification, moistening, and warming of inhaled air. 8) The lack of proper systemic oxygenation will act as a main etiological factor for child's somatic as well as mental failure to thrive. On the other hand, the other condition which concerned with the severity of DNS among children as compared to adult is the multiple regional cosmetic disfigurements in form of: 1) Oro-facial disfigurements as mal-occlusion deformity of the teeth, shortening of upper lip, hypoplasia of the maxilla, thinning and mal-development of the nose, and prominence of upper incisor teeth. 2) Cervical region related disfigurements which mainly associated with overuse of the neck muscles as accessory muscles to overcome the breathing difficulties due to persistent nasal obstruction on top of DNS and from cosmetic point of view this can be presented as increase in the bulk of cervical muscles. 3) Thoracic region related disfigurements which is also correlated with the chronic nasal obstruction with co-existing respiratory distress at child-hood somatically dynamic ages this will result in variable aesthetic chest cage morphological changes as in drawing as well as widening of intercostal spaces in addition to sternal bone disfigurements as pacts excavatum and pacts carinatum. 4) Abdominal region related disfigurements; this can be in form of persistent abdominal distension due to uncontrolled mouth dependent breathing situations and subsequent frequent air swallowing.<sup>(22-58)</sup>

In accordance among the children, at certain specific circumstances the septoplasty procedure may become strongly required and obligatory to be done during childhood as in cases of co-existing DNS with nasal impacted foreign bodies, deep uncontrolled epistaxis, and when other nasal procedures which need wide surgical access are significantly indicated to be performed as atrectomy of choanal atresia and endoscopic sinus surgery. These indications have been increased in recent decades.<sup>(58-63)</sup>

Thus we can conclude to that the septoplasty procedure is not limited to adults only but it can be conducted safely for children too and this was confirmed via this presenting study.

It was found that the females with DNS among children are more than males. This was opposite to adults' related demographic presentation. This can be explained by the demographic distribution of Libyan population i.e. the ratio of male: female new born is 1: 2-3. On the other hand, among the adult patients males are more exposed to oro-naso-facial traumatic lesions as compared to females and as it was noted from the results of this presenting study that the trauma constitutes main predisposing etiological factor for DNS at adult age group and this was

mainly as the sequel of either road traffic accidents or fighting which common at this sex with this age group. These results were supported by results of other studies which show same findings.<sup>(64-70)</sup>

As it was postulated from this presenting study, the c-shaped DNS constitutes the commonest variety of DNS among both children as well as adult age groups followed by the anterior caudal dislocation pattern this can be explained by the pathological fact that these two forms of DNS are significantly associated with the traumas as main causative predisposing factor and as can be elucidated from the results of this current study that oro-facial traumas show highest incidence of DNS as compared to developmental cause. These results were in agreement with other mimic studies. Although there are proved thoughts that the main etiological factor of DNS among children is developmental rather than traumatic but still this mal-developmental factor at child-hood can be correlated to antenatal as well as natal traumas by contracting uterine wall over oro-facial region. Gray reported that in 58% of 2380 children studied a septal deviation was present. Trauma is the most common cause for naso-septal deviation during childhood. Apart from this, cranio-facial growth irregularity may also cause the formation of a ridge between septal cartilage and vomeral bone, often associated with turbino-septal contact. Connate septal deformity due to trauma during intrauterine life or during transit in birth canal has also been reported as a cause for septal deviation in the literature.<sup>(64-72)</sup>

On the other hand, clinically speaking, as can be determined from the results of this study that the obstruction related manifestations appear with higher incidence among children as compared to adults. This can be discussed in relation to two main points: 1) the limitation of space at child's nose makes any minimal nasal obstruction clinically significant and 2) the child-hood is considered as growing and developmental- hood therefore the persistent nasal obstruction and subsequent chronic mouth breathing will create significant oro-facial disfigurements mainly in form of teeth mal-occlusion deformities. Hence the nasal cavity size among adults is wider as compared to children thus the paranasal sinuses related disorders rather than the obstructive manifestations are considered as commonest clinical presentation of DNS at adult patients as compared to child-hood patients.<sup>(64-72)</sup>

It is well-established that 20% of children with DNS related nasal obstruction have co-existing adenoid enlargement as well as chronically hypertrophied palatine tonsils therefore they may need concomitant adenotonsillectomy in association with septoplasty to resolve their sleep related breathing difficulties. On the other hand 20% of adult patients with DNS related headache and

facial pain have co-existing migraine thus we must suggest that they will not improve completely after septoplasty unless their migraine is controlled too.<sup>(1-13)</sup>

Surgery for deformities of the nasal pyramid and septum during childhood is shrouded with controversies. Every surgical procedure of the nose at this young age may cause developmental arrest. Even the results may not be long lasting in time, as the nose is growing structure. A review of literature showed that there is neither any solution to this problem nor any guidelines for management, yet. Surgical correction of septal deviation is indicated, irrespective of age, if such deformity causes nasal stenosis and oral breathing. Conservative management may worsen the nasal morphology, because deviated nasal septum may exert traction during growth, to normal alar and triangular cartilages not involved in previous trauma. Natural history of nasal trauma in early years demonstrates that, effect of a misdiagnosed trauma can appear during developmental age, and a nasal deformity due to unmanaged fracture becomes worse during growth. Cartilaginous arch involvement may cause narrowing of the nostril and height and/or length asymmetry of nasal pyramid. Delayed management of these alterations requires difficult surgical procedures with not always good results. Moreover the impaired nasal patency may exert negative effect on other systems and organs that play a role in the somatic and psychic development of the little patient. Such effects are seen mainly on the maxillo-facial skeleton and rib cage, but also seen as dysventilatory syndrome of middle ear and paranasal sinuses, vocal tract disorders and difficulty in sleep.<sup>(1-20)</sup>

Septonasal deviations are a normal variant in human nasal anatomy. Most do not cause airway problems unless they obliterate at least 50% to 60% of the anterior inferior part of the nasal airway.<sup>(72,73)</sup>

Although the septal surgery is not advisable before age of 18 years, in the same time it is known that nasal septum plays an important role in the harmonic growth of the face. Compelled oral breathing due to nasal obstruction during childhood, disrupts the normal development of skull base angle and consequently the normal maxillo-facial growth. This in turn can cause malocclusion and protrusion of maxillary bone, leading to a condition called as class II skeletal deformity, comparable to "facies adenoidea" and in this situations early septoplasty is required to be done. This may increase the incidence of complications after septal reconstruction at this age group as compared to adult age group. Regarding this aspect our study showed significantly the complications appeared with higher incidence at adult age group as compared to age below eighteen years, this confirm the fact that age doesn't play any important role in the determination of the incidence of post-septoplasty

complications if the proper surgical techniques are conducted.<sup>(1-23)</sup>

So the last but not the least I would like to recommend for performance of septoplasty at ages before puberty safely, and at the same time I would like to recommend for long time patients postoperative follow-up program which may extend after puberty just to confirm whether the performance of this type of surgery during developmental ages have any significant aesthetic effect regarding external nasal morphology or no.

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## Is the septoplasty procedure recommended below age of 18 years?

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