british association for paediatric otorhinolaryngology

British Association for Paediatric Otorhinolaryngology

Septoplasty and Septorhinoplasty in under 16s

Consensus Guideline

2026

british association for paediatric otorhinolaryngology
BRS The British Rhinological Society
ENTUK
GIRFT GETTING IT RIGHT FIRST TIME

Foreword

Historically, septal surgery in children has been avoided because of concerns regarding potential interference with nasal and midfacial growth. However, an expanding body of evidence now supports carefully selected surgical intervention when clinically indicated. In an era of increasing expectation for robust evidence to justify healthcare interventions, it is essential that clinicians critically appraise and synthesise the current literature and integrate this knowledge into clinical practice. By doing so, we can ensure the delivery of a safe, efficient, and evidence-based service that achieves optimal outcomes for all children and young people.

This, together with reports from some parts of the country of restricted access to nasal airway surgery in both adults and children led the British Association for Paediatric Otorhinolaryngology (BAPO) decision to establish a working group. The aim of this group was to develop a consensus guideline for Septoplasty and Septorhinoplasty in children under 16 years of age.

On behalf of BAPO, I would like to extend my sincere thanks to Grace Khong and all the clinicians in the group, representing both adult and paediatric rhinology, ensuring a balanced and comprehensive perspective. They contributed their time, expertise, and commitment within a very tight timescale to the development of this valuable document. I am confident that our members and the wider ENT community will find this guidance both helpful and informative. These guidelines are subject to review in light of evolving evidence and are not intended to replace clinician judgment.

I am also grateful to Annakan Navaratnam, BAPO liaison for the British Rhinological Society (BRS) and Ashok Rokade, President of BRS, for their invaluable input in reviewing, endorsing, and supporting the dissemination of this guidance, and we look forward to future collaboration.

Sujata De FRCS (ORL-HNS)

President BAPO 2025-2026

Working Group

This guideline has been developed following literature review and in conjunction with expert opinion of the working group representing the British Association for Paediatric Otolaryngology (BAPO) and reviewed and endorsed by the BAPO Council and the British Rhinological Society (BRS).

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Executive Summary

Background

Paediatric nasal obstruction is common and may contribute to poor quality of life, sleep-disordered breathing, impaired daytime functioning, and altered craniofacial development through chronic mouth breathing.

Septal and nasoseptal deviation are recognised causes of structural nasal airway obstruction in children.

Historically, septal surgery in children has been avoided because of concerns regarding interference with nasal and midfacial growth; however, emerging evidence supports carefully selected surgical intervention when clinically indicated.

Surgical decision-making should balance the potential functional benefits of improving nasal airflow with the need to preserve key nasal growth centres.

Initial Assessment

Children presenting with nasal obstruction should undergo a comprehensive clinical history and examination including nasal endoscopy.

Assessment should evaluate septal deviation, inferior turbinate hypertrophy, adenoidal hypertrophy, and external nasal deformity.

Quality of Life Assessment

The impact of nasal obstruction on quality of life should be a central factor in determining management.

At present there are no Patient Reported Outcome Measures (PROMS) that have been adequately validated for paediatric nasal obstruction.

Although the use of PROMS is encouraged, further evidence is needed for specific recommendations.

Objective Nasal Patency Measures

While objective measures of nasal airflow (e.g. rhinomanometry or peak nasal inspiratory flow) are not essential for decision making, they may be used where available as adjuncts to clinical assessment.

Medical Optimisation

Patients with suspected rhinitis or allergic disease should undergo appropriate medical therapy prior to consideration of surgery.

Medical therapy may include intranasal corticosteroids, antihistamines, allergen avoidance and desensitisation where appropriate.

Indications for Surgery

Surgeons who assess and perform surgery on paediatric septal and nasoseptal deviations should have knowledge and expertise of the nuances of these conditions and their surgical management in children as laid out in this guidance.

Surgical intervention may be considered when septal or nasoseptal deviation results in significant nasal obstruction and has an impact on quality of life.

Surgical planning should consider additional contributors to obstruction such as adenoidal hypertrophy or turbinate hypertrophy.

Patients and families should be counselled regarding risks to nasal growth, need for revision surgery and other complications.

Age Considerations

Patients aged 16 years and above may be managed according to adult septoplasty or septorhinoplasty principles.

Where clinically appropriate, deferral of surgery until 16 years of age should be considered.

Limited Septoplasty

Limited septoplasty should be considered when septal deviation occurs outside key growth areas and correction is likely to improve nasal airflow.

Surgical technique includes preservation of key growth areas and the structural support of the nasal framework.

Inferior turbinate reduction may be considered as an adjunct when turbinate hypertrophy contributes to obstruction.

Conventional Septoplasty

Conventional septoplasty may be considered when limited septoplasty is unlikely to sufficiently relieve obstruction and symptoms have a significant impact on quality of life.

Patients and families should be counselled regarding the possibility of future revision surgery, the risk of effects on facial growth and given the option of deferring till 16 years of age.

Nasoseptal Deviation

In children with combined external nasal deformity and septal deviation, in addition to deferral till 16 years of age, conservative options such as turbinate reduction and/or limited septoplasty should be discussed.

If septorhinoplasty is to be considered, counselling is essential to discuss risks to nasal growth, nasal support and skull base.

Postoperative Care

Postoperative care following septoplasty should include intranasal saline irrigation to reduce crusting and promote healing.

Topical nasal steroids may be considered postoperatively where inflammation contributes to persistent obstruction.

For septorhinoplasty, choice of splints, sutures and nasal packing will differ amongst surgeons. Absorbable sutures are recommended to avoid need for suture removal.

Follow-Up

All paediatric patients undergoing septoplasty or septorhinoplasty should receive follow-up to confirm symptomatic improvement, assess for complications, and determine the need for further intervention.

Septoplasty and Septorhinoplasty in Children

Aims

To improve management of nasal obstruction in children resulting from deviation of the nasal septum (referred to as **septal deviation**) and surrounding bony cartilaginous framework (referred to as **nasoseptal deviation**), through synthesis of best available evidence and clinical expertise into accessible guidance for clinicians.

To outline concept of limited septoplasty and septorhinoplasty in a child

This guideline does not include recommendations for:

1. *Patients with cleft or craniofacial anomalies with nasal obstruction*
2. *Cosmetic septorhinoplasty*
3. *Specific surgical techniques to address various components of septal or nasoseptal deviations for eg nasal valve collapse.*

1.0 Background

Paediatric nasal obstruction is a common presenting complaint and can have substantial consequences for a child's health and development.

Upper Airway Anatomy of a Child vs Adult

Despite having smaller airways that are more prone to obstruction, the unique upper airway anatomy in children confers certain advantages. The superiorly positioned hyoid bone enables more efficient tongue protrusion via the genioglossus muscle, and features such as reduced nasomaxillary height and shorter pharyngeal dimensions create a more favorable anatomical configuration.(1,2) This explains why relieving nasal obstruction in children can effectively resolve sleep-disordered breathing, contrasting with adults in whom isolated nasal surgery rarely cures significant sleep apnoea.

Impact of Nasal Obstruction in Children

Quality of life (QoL) impact of septal deviation in children

Septal deviation in children can have a significant impact on quality of life. A case control study of children with septal deviation found that septal deviation had an impact on health-related QoL in domains such as Physical Fitness, Behavioral, Mental Health, Self-esteem, General Health Perceptions, Parental Impact Emotional and Time and Family Limitations in Activities.(3) Septal surgery has been shown to improve disease related quality of life as well as subjective and objective measurements of nasal patency.(4)

Sleep Disordered Breathing Leading to Impaired Psychomotor and Cognitive Development

Current literature on paediatric SDB include common conditions such as adenoidal hypertrophy and allergic rhinitis, both of which are highly prevalent in children. Although the specific contribution of a deviated nasal septum has not been individually reported, nasal obstruction is a recognised contributor to paediatric SDB, as it promotes increased upper airway resistance and mouth breathing.

Children with SDB are at increased risk of neurocognitive impairment. Abnormalities in blood gas exchange and sleep fragmentation impair daytime functioning, resulting in excessive daytime somnolence and associated poor concentration, hyperactivity, and behavioural disruption.(3) Specific neurocognitive deficits, including intelligence (most affected), attention/executive functions, memory, language, and visual spatial skills can lead to impaired academic performance.(5) Childhood Adenotonsillectomy Trial (CHAT) demonstrated that surgical intervention for OSA in children between ages 5-9 resulted in significantly greater improvements in behavioral, quality-of-life, and polysomnographic findings and SDB symptoms compared to no intervention, however, with no treatment-attributable improvement in attention or executive function.(6) Similiar results were found in a RCT of adenotonsillectomy versus watchful waiting for OSA in preschool children.(7)

Impact on Craniofacial Development from Mouth Breathing

Chronic nasal obstruction leads to mouth breathing, resulting in lower position of tongue, half opened lips, a lower position of mandible and reduced orofacial muscle tonicity to compensate for reduced nasal airflow. It is hypothesized that this disruption in the balance of forces exerted by orofacial muscles leads to abnormalities in dental and craniofacial parameters.(8)

Craniofacial effects of mouth breathing in children include:

- Increase in anterior facial height
- Open-mouth posture
- Protrusive maxillary incisors
- High-arched palate
- Narrow maxillary arch
- Angle class II malocclusion (overbite)
- Posterior crossbite(9)

A large cohort study in the UK of 15-year old children with and without sleep disordered breathing demonstrated increase in facial height, a decrease in mandibular prominence, decrease in nose prominence and width in children with SDB.(10) Linder-Aronson demonstrated improvement in craniofacial and dental parameters following restoration of nasal breathing after adenoidectomy over a 5 year period in a case control study of 7-12 year old children.(8) It is important to note that the literature pertaining to abnormal facial growth

in patients with nasal obstruction is based upon patients with adenoidal hypertrophy, rather than septal deviation. Total nasal obstruction, as seen in adenoidal hypertrophy, is rarely seen in patients with septal or nasoseptal deviation. Assessment of the patients presenting with nasal obstruction, and those with craniofacial abnormality, should include an airway assessment to assess for multilevel obstruction.

Development Of the Nose

In neonates, the septum is fully cartilaginous and is in contact with the sphenoid bone. The upper lateral cartilages and the septum form the main support of the nose and the nasal bones are separated by a midline suture. There are 2 growth spurts for the nose; 2-5 years old and at puberty. The cartilaginous septum reaches adult size at 2 years of age, after which the growth of septum is mainly bony (predominantly perpendicular plate of ethmoids through a slower endochondral ossification, and a faster intramembranous ossification of vomer).(11,12) Initially, the cartilaginous septum is primarily supported by the sphenoid, but this support shifts as the perpendicular plate of the ethmoid ossifies. Consequently, the junction between the cartilaginous septum and the perpendicular plate of the ethmoid is essential for structural support and nasal growth in both length and height, whereas the junction with the vomer does not contribute to these processes.

The neonatal cartilaginous septum has zones of thicker and thinner cartilage. There are two zones of thicker cartilage that are key growth areas of the septum (Figure 1):

- Sphenodorsal area: Extends from the sphenoid rostrum along the dorsum of the septum, controlling the height and length of the nasal dorsum
- Sphenospinal area: Extends from the sphenoid to the anterior nasal spine, controlling the forward growth of the maxilla

The zone of thinner cartilage lie anteriorly between the sphenodorsal and sphenospinal areas.

Finally, the septospinal ligament connecting the cartilaginous septum and the premaxilla gives traction to the maxilla inducing osteogenesis (nasal traction model).(13)

As the child grows, bony septum increases with the ossification of perpendicular plate of ethmoid and vomer, to reach almost 60% of septum in adults. However, the pattern of thicker and thinner zones of cartilage can still be recognized in the remaining adult cartilaginous septum.

Several anthropometric studies have examined nasal growth patterns, including growth velocity and age of maturation. A straightforward definition of age of maturation is the age at which nasal growth ceases. However, studies have demonstrated that nasal growth continues to at least 20 years of age in females and 25 years in males and may even persist into older age.(14–16) Consequently, age of maturation may also be defined as the point at which the nasal growth velocity curve reaches its steepest descending slope.

A systematic review from the Netherlands published in 2007 reported that several nasal parameters—including nasal bridge length, nasal height, and nasal protrusion—reached maturation at a mean age of 13.4 years in girls and 14.7 years in boys. The authors further postulated that if the age of maturity follows a normal (bell-curve) distribution, approximately 98% of girls would attain nasal maturity by 15.8 years and boys by 16.9 years. It should be noted that this systematic review included four studies and excluded non-white anthropometric populations.(17) A cephalometric study from Turkey reported that the mature dimensions of the bony and cartilaginous nasal framework are reached at approximately 15 years of age in males and 13 years in females.(18)

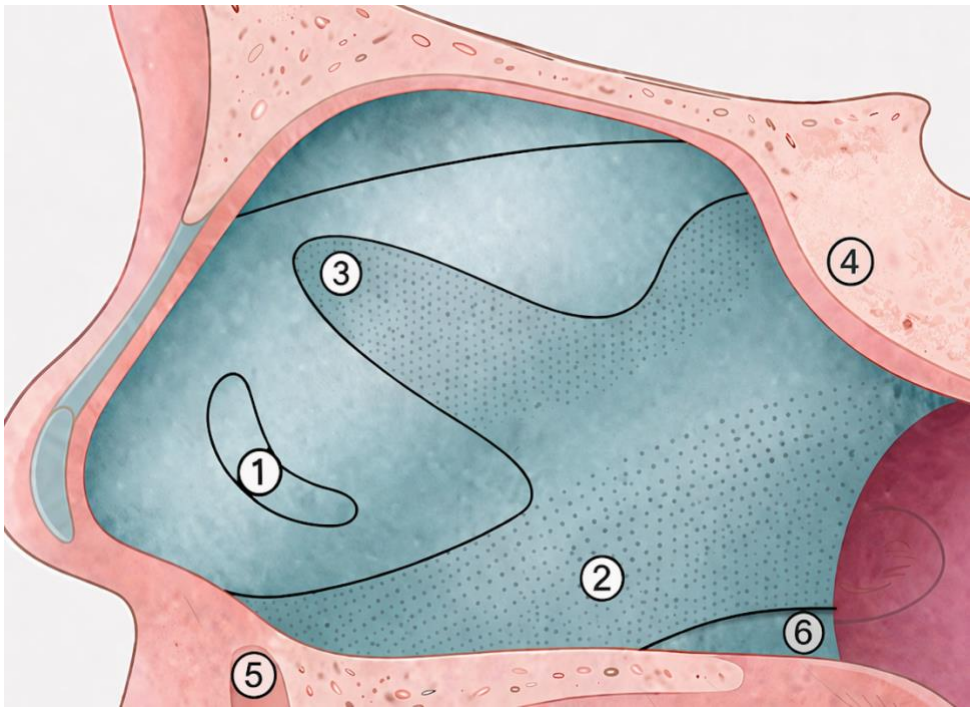

Figure 1- Schematic diagram of the neonatal cartilaginous septum

1. Area of thinner cartilage 2. Sphenospinal zone 3. Sphenodorsal zone 4. Sphenoid 5. Anterior nasal spine 6. Vomer anlage

Controversies of Nasoseptal Surgery in Children

Evidence on Surgical Outcomes

Traditional teaching has long discouraged septal surgery in children based on theoretical concerns regarding impairment of midfacial growth. This conservative paradigm is now being reconsidered in light of accumulating evidence supporting its judicious use.

Anthropometric Outcomes:

A systematic review by Howard et al. examined studies reporting anthropometric outcomes in children (<18 years of age) who underwent septoplasty, including both external and endonasal approaches. The review found that the seven included papers did not report any significant distortion of midfacial growth following septoplasty performed for nasal obstruction. One study demonstrated improvement in nasal tip projection, nasal length, and dorsal height. However, there were no statistical analysis included and the authors noted that larger prospective studies with long-term follow-up are still required to confirm these findings. (19)

Objective Outcomes:

A series of 111 paediatric patients (age range 6-13 years) reported by Ori et al showed statistically significant improvement in acoustic rhinometry values with 'quick' septoplasty (This technique describes specific sequence of elevation of mucoperichondrium and detachment from the maxillary crest).(20) Fuller et al reported similar outcomes using peak nasal inspiratory flow rate in 39 adult patients (mean age 37.3) (.(21)

Patient-Reported Outcomes:

Although there are no patient-reported outcome measures (PROMs) that have been validated specifically for paediatric nasal obstruction, current evidence show significant improvement using NOSE, SN-5, and Visual Analogue Scale (VAS) scores, including findings from a systematic review by Kais et al.(4)

Despite evidence of safety and positive clinical and objective outcomes in the past decade, a recent UK survey of ENT surgeons on paediatric septoplasty revealed considerable variation in practice, with many respondents expressing a need for national guidelines to clarify the appropriate role and scope of septal surgery in children.(22) Development of paediatric specific PROMs for nasal obstruction would provide more clarity in decision-making for these patients.

2.0 Initial assessment of nasal obstruction

Initial assessment of patients presenting with nasal obstruction should include a detailed history and clinical examination. Any concern regarding external shape of the nose, impact on sleep and sequala of SDB or OSA, and history of rhinitis should be elicited. Examination should involve anterior rhinoscopy and endoscopic evaluation of the nasal cavity and post nasal space using a rigid or flexible nasendoscope. In paediatric patients, a low threshold for the use of topical local anaesthetic is important to allow a thorough assessment of the nasal cavity and post nasal space; however, assessment of the turbinates is best undertaken both pre and post the use of any topical decongestants.

Assessment should include:

Areas of nasoseptal deviation and its contribution to obstruction

- Columella or caudal dislocation
- Anterior/cartilaginous or posterior/bony deviation Involvement of key growth areas (see section 4.1)
- High deviations
- External and internal nasal valve collapse

Inferior turbinates:

- Hypertrophy and/or contribution to obstruction, including Cottle's test

Adenoids:

- Assessment for hypertrophy

Evaluating Quality of Life (QoL) Impact

Evaluating the impact on the patient's QoL is a central element in developing an appropriate management plan for paediatric patients:

1. Determination of the timeline or urgency of surgical intervention if needed
2. Counselling for prognosis of surgical intervention
3. Objective measurement of medical and/or surgical intervention

Evidence on Patient Reported Outcome Measures (PROMS)

There are no Patient Reported Outcome Measures (PROMS) that have been designed specifically for the assessment of paediatric nasal obstruction. (23) Tools such as the Sinonasal-5 and Modified Sinonasal Outcome Test-20 Young Persons Questionnaire (MSYPQ) have been inadequately designed and are not recommended for use. SNOT-22 has been validated in the paediatric population for chronic rhinosinusitis, but no such validation exists for patients with septal deviation.(24)The NOSE score has been recently validated for use in paediatric patients with septal obstruction,(25) however with only 38 patients in the validation cohort, further studies are required before this can be recommended for general use in the paediatric population.

The usefulness of adult specific PROMS in paediatric patients remains uncertain, particularly in very young children, where their applicability is unclear.

Based on current evidence, there is no specific recommendation of which existing PROM should be used and there is a need for development of paediatric specific PROMs for nasal obstruction.

Objective Nasal Patency Measures

Objective nasal patency measures are a useful adjunct in the perioperative assessment of paediatric patients undergoing septoplasty and septorhinoplasty; however, their routine use in day-to-day clinical practice is limited.

A recent systematic review demonstrates that rhinomanometry correlates with significant anterior septal deviation, although there is limited correlation with mid and posterior septal deviation.(26) While objective nasal patency measures are not an essential element of the assessment of paediatric patients with septal deviation, they can provide a helpful addition to clinical evaluation in this patient group where available. Alternative diagnoses should be considered in patients where objective nasal patency measures are normal.

Rhinitis Optimisation

Allergy testing can be considered in patients whose history or clinical assessment suggests a rhinitic or allergic presentation. For these patients including those diagnosed with allergic rhinitis, medical optimisation with treatments such as nasal steroid sprays, antihistamines and desensitisation treatment as per ARIA guidelines should be undertaken before operative intervention is considered.(27)

2.1 Additional considerations in nasoseptal deviation

It is imperative that assessment of children with nasoseptal deviation is in line with that commonly practiced for adults.

Although the Getting It Right First Time (GIRFT) Nasal Airway Surgery Pathway 2026 including a functional septorhinoplasty consent form were designed for adults, it may be referred to wherever/however deemed applicable.(28)

Psychosocial impact

Assessment of the psychosocial impact of nasoseptal deviation and deformity is an important component of evaluating paediatric patients being considered for functional septorhinoplasty. Bullying related to cosmetic deformity can significantly influence a child's social development.(29,30) It is therefore essential to determine the extent of this impact when counselling patients and parents about the potential benefits of addressing such concerns during operative management. Patients should also be screened for body dysmorphic disorder (BDD), using questionnaires and/or psychological assessment where appropriate. The approach should be tailored to the patient's age and maturity, at the clinician's discretion, and should include consideration of parents or guardians for possible 'BDD by proxy' where relevant.

Photodocumentation

Children with nasoseptal deviation in whom operative management is being considered should undergo comprehensive photodocumentation in all key rhinoplasty views. These include standardized frontal, lateral, oblique, and basal views, to allow detailed assessment of perioperative nasal anatomy. Preoperative and postoperative photodocumentation is essential in facilitating accurate preoperative analysis, supports operative planning including counselling and provides an objective basis for postoperative comparison. Facial measurements should be considered as part of the preoperative assessment to establish baseline facial proportions and to evaluate the position of the nose within the context of overall facial growth. These measurements help to determine the relationship between nasal dimensions and surrounding midfacial structures and support operative planning.

Sleep Studies

Sleep studies — including overnight pulse oximetry and polysomnography (PSG) — have a role in the assessment of children with nasal septal deviation where SDB is clinically suspected and a positive study strengthens the surgical case. However, a negative sleep study does not indicate that nasal obstruction is absent or without clinical consequence. Sleep studies evaluate nocturnal respiratory physiology only — they provide no information about the impact of nasoseptal deviation on facial growth, cognitive development, educational attainment, or daytime quality of life, all of which are well-evidenced harms of untreated nasal obstruction in children. The indication for septoplasty rests on comprehensive clinical assessment across all of these domains. A negative sleep study should not, therefore, be used in isolation to deny or defer surgical intervention.

3.0 Surgical considerations (Figure 2)

Surgeons who assess and perform surgery on paediatric septal and nasoseptal deviations should have knowledge and expertise of the nuances of these conditions and their surgical management in children as laid out in this guidance.

Indications for surgical intervention in septal or nasoseptal deviation:

Surgical considerations in paediatric patients presenting with nasal obstruction should aim to correct the structural abnormality while taking into account the impact on the patient's quality of life and impact on facial growth.

Contributions from adenoidal hypertrophy or inferior turbinate hypertrophy should be considered and managed operatively, where appropriate, either before or at the time of surgical intervention.

In adult patients (16 years and above), recent GIRFT guidance recommends abnormal PROMs, defined as a NOSE score greater than 50, as an indication for functional nasal surgery (28). In the absence of a validated paediatric PROM for nasal surgery and given the limitations of applying an adult PROM to patients across a broad range of educational and developmental milestones, it is not possible to define a fixed threshold for functional nasal surgery in paediatric patients. However, it is important to recognise that there may be older paediatric patients who could reliably complete the PROMS and interpretation/reliability of results should be at the discretion of the clinician.

3.1 Septal deviation

Septoplasty is offered when septal deviation is contributing to the nasal obstruction and correction of the deviation is deemed to improve nasal airway. High septal deviations and obstruction contributed by valve collapse will require a septorhinoplasty approach.

Surgical Options

Surgical options for septal deviation include limited septoplasty or conventional septoplasty. Adjunct procedures include adenoidectomy and turbinate reduction. The decision on which procedures to include depends on the estimated contribution from these structures.

Age Considerations

Taking into account variation in age of maturation related to sex, ethnicity, and normal population variability in growth and maturation (as described in Section 1.0 Development of the nose), and the definition of an adult in the UK as 16 years and above, the working group reached a consensus on an age threshold of 16 years.

Anatomical Considerations

The anatomical site of septal deviation plays a crucial role in planning septoplasty in paediatric patients. There are key growth areas that must be preserved to avoid long-term disturbances in nasal length, height, projection, and maxillary development (see section 4.1 for details on limited septoplasty).

Management Approach

When deviation is confined to non-key growth/support areas:

- Limited septoplasty should be offered as an appropriate operative option (see **section 4.1**)
- Inferior turbinate surgery may also be considered as an adjunct to further improve nasal airflow. Paediatric inferior turbinate surgery options are varied and not within the scope of this document.
- The aim is to maximise postoperative nasal patency and achieve the best possible functional outcome

- Counselling should include the potential need for further revision surgery

When limited septoplasty would not improve obstruction:

- The impact on quality of life should be discussed
- Conventional septoplasty may be discussed with emphasis on potential impact on facial growth and requirement for revision surgery

3.2 Nasoseptal deviation

Nasoseptal deviation in children refers to the combination of external nasal deformity and septal deviation and is a recognised cause of nasal obstruction in this patient group. Operative management aims to address the functional consequences of the deformity and its impact on the child's quality of life.

Surgical Options

Limited Septoplasty

- Limited septoplasty with or without inferior turbinate reduction can be offered to improve nasal airflow while avoiding disruption of key facial growth areas with the plan for septorhinoplasty at age 16 and above if needed.
- If limited septoplasty is declined or is considered unlikely to sufficiently correct the deformity or improve nasal patency, conventional septoplasty can be considered if deemed to give better symptom improvement.
- Consider replacement of cartilage in septoplasty to preserve potential grafts for future rhinoplasty

Septorhinoplasty:

- In patients where septoplasty is not suitable and deferring treatment until 16 years of age is not appropriate due to impact on QoL., septorhinoplasty may be considered (see **section 4.2**)
- Detailed counselling with emphasis on risks involved i.e. facial growth, complications, revision surgery etc is essential.

3.3 Acquired neonatal nasopseptal deviation

Acquired nasoseptal deviation in neonates is a significant yet potentially transient pathology, with recent studies estimating an incidence between 12% and 20% depending on the mode of delivery and birth weight.(31,32) The clinical impact may be pronounced due to the neonate's obligate nasal breathing with significant obstruction potentially precipitating respiratory distress, cyanosis, and failure to thrive.(33,34) Distinguishing between mild positional deformities—which often resolve spontaneously or with external splinting (steri-strips)—and true cartilaginous dislocations is critical, as the latter may lead to persistent craniofacial asymmetry and chronic airway morbidity if untreated.(35)

Contemporary management algorithms emphasize a graded approach: conservative observation is appropriate for mild, asymptomatic deviations, where spontaneous correction rates of up to 73% have been reported within the first month of life.(32) However, for symptomatic infants or those with fixed dislocations, early closed reduction has been described. Evidence from long-term follow up suggests that reduction performed within the first week of life—before tissue fibrosis sets in—is safe and effective, yielding satisfactory functional outcomes at skeletal maturity without compromising nasofacial growth.(36,37) Recent data supports this intervention window, showing that immediate correction using simple elevation techniques leads to rapid symptoms resolution and anatomical normalization in majority of cases. (32,33, 35)

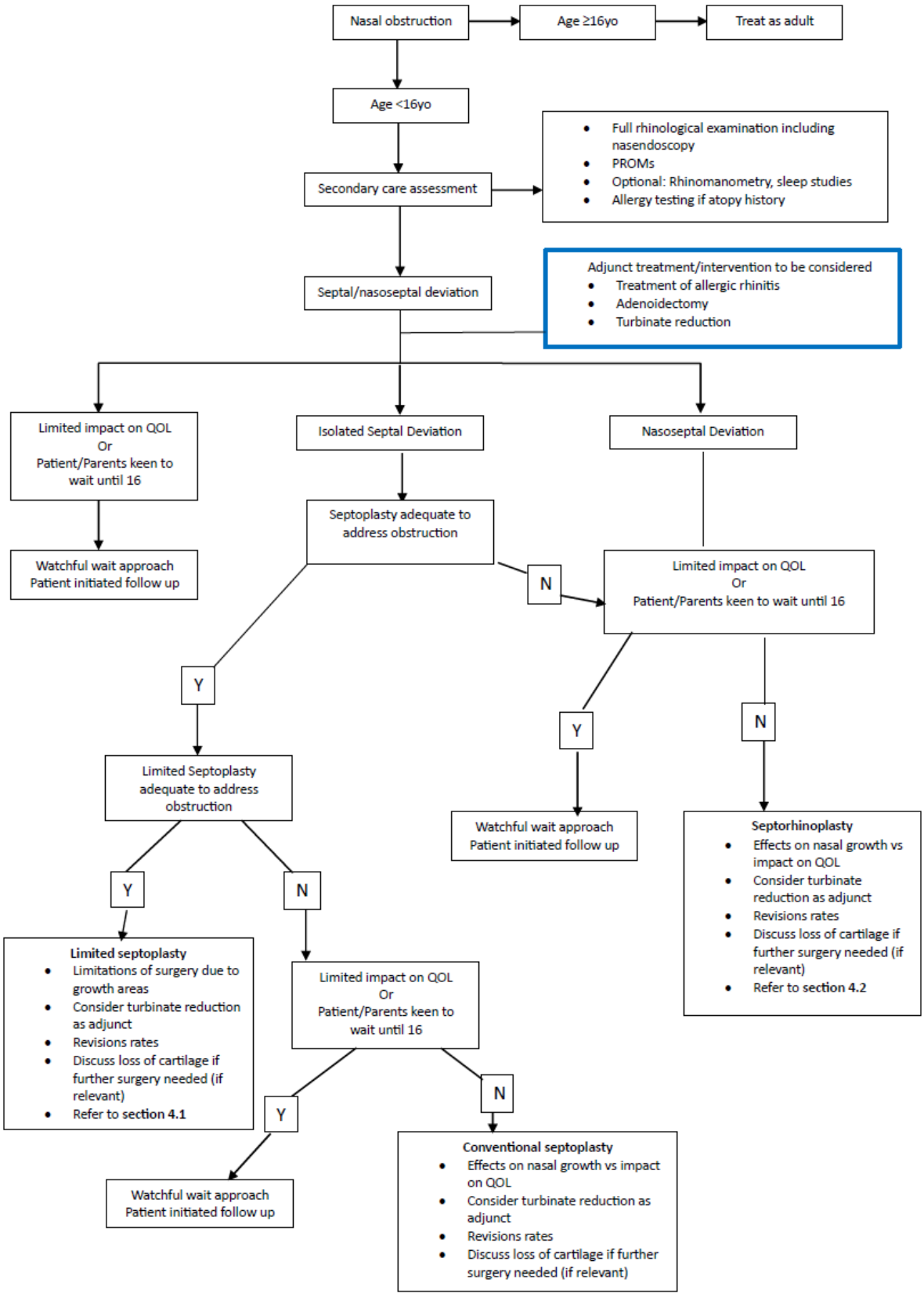

Figure 2: Flow diagram on management of septal and nasoseptal deviation in children

4.0 Operative procedures

4.1 Limited septoplasty

Limited septoplasty is a conservative approach that aims to correct symptomatic septal deviation while avoiding disturbance of key growth areas that are important for stability of the developing nose. The procedure focuses on treating deviations in parts of the cartilaginous septum that can be safely modified while preserving the surrounding support framework.

Areas to avoid (Figure 3)

1. Keystone area

   The keystone area, which represents the junction of the nasal bones, upper lateral cartilages, and dorsal septum, is essential for maintaining dorsal stability. Disruption here can result in saddle-nose deformity or impaired dorsal growth.

2. Junction of cartilaginous septum and perpendicular plate of ethmoids

   The perpendicular plate of ethmoids forms the main support of the cartilaginous septum and gives length and height to the growing nose. Avoid disrupting this junction i.e. posterior chondrotomy.

3. Sphenodorsal growth zone

   This is the area of thickened cartilage described in a neonatal cartilaginous septum to be extending from the posterior–superior junction of the septum and sphenoid to the dorsum of the nose. It functions as a major growth engine, contributing to the overall length and height of the nose. Resection or incision in this region can lead to a shortened nasal dorsum and loss of projection.

4. Sphenospinal growth zone

   This area is also described in a neonatal septum to be extending from the sphenoid to the anterior nasal spine contributing to the forward growth of maxilla.

5. Septospinal ligament

   The dorsal maxillary spine region provides anterior support and influences the forward projection of the upper jaw, so aggressive manipulation in this area risks altering maxillary growth.

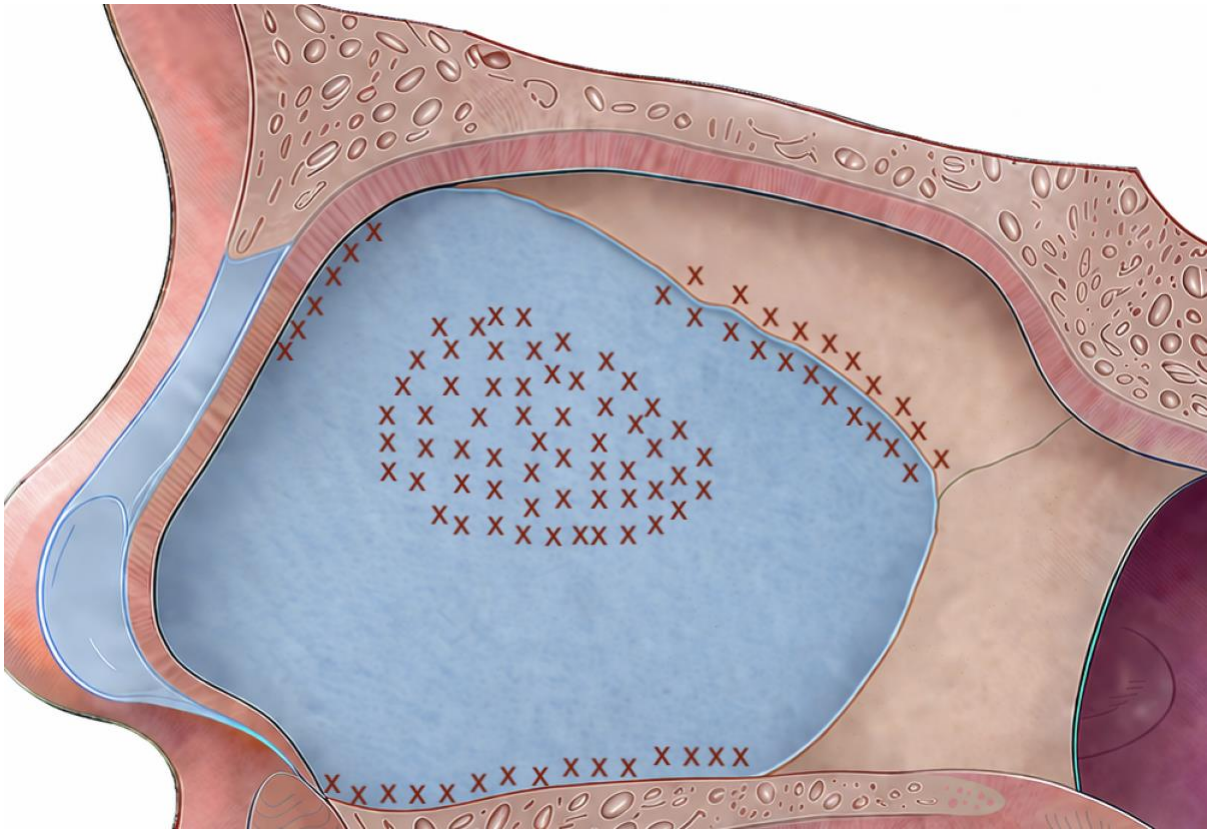

Figure 3: Schematic diagram of a paediatric nasal septum. Cross hatches denote approximate key growth and support areas and is intended as a guide to identify areas to be preserved in a limited septoplasty.

NB: This diagram is based on interpretation of current evidence of growth and support areas of a neonatal septum (Figure 1) and does not include areas preserved in common practice e.g. dorsal L strut.

Deviations in areas apart from those described above may be corrected through limited scoring, reshaping, or small excisions, provided the mucoperichondrium is preserved. Removed cartilage can be repositioned.

Limited septoplasty is therefore designed to relieve obstruction while avoiding interventions that might compromise nasal stability and development. Inferior turbinate reduction may also be considered at the same time to maximise improvement in nasal airflow.

4.2 Septorhinoplasty in children

Paediatric septorhinoplasty may be considered in carefully selected patients when substantial nasoseptal deviation results in impaired airflow and a demonstrable reduction in quality of life.

Anatomical considerations on the developing nose:

1. Upper lateral cartilage and the septum form main support to the nose
2. Upper lateral cartilage may extend below the nasal bones up to the skull base
3. Superior portion of septum may extend to the skull base

Surgical Recommendations

We acknowledge that there is a large variation in anatomy between neonates and older children that are included in paediatric rhinoplasty. These recommendations are based on the developing nose and is to be considered as a guide when planning surgery.

- Medial and lateral osteotomies – Although osteotomies do not interfere with the growth zones, it may cause disruption of support of the nose (upper lateral cartilages) and injuries to the skull base due to variation in ossification.
- Hump reductions and spreader grafts may cause disruption of the main support (junction between upper lateral cartilages and septum) and sphenodorsal growth zone.

- Caution when manipulating the superior septum due to variation in skull base ossification
- Tip work – When considering relationship with the growth zones, tip work theoretically does not disrupt these areas (provided septospinal ligament is preserved). A study on 106 paediatric rhinoplasty patients (51 who had surgery at the age of 6-16 years old) in the Netherlands concluded that tip work such as tip suturing and onlay grafts do not disrupt nasal growth.(38) However, there is lack of strong evidence on this and there are a few points to be considered:
    - In manipulation of the nasal tip, avoid disrupting the septospinal ligament .
    - Cartilaginous wound healing leads to development of a fibrous layer which can subsequently cause deviation of the nasal framework which then change the tip appearance and position during growth. (11)

4.3 Risks of Complications

Complications in paediatric septoplasty and septorhinoplasty are similar to those when performed on adults.

A systematic review of septoplasty and septorhinoplasty in paediatric patients (<18 years of age) published in 2024 by Howard et al demonstrated overall (19):

- Similar rates of epistaxis (4.2%)
- Lower rates (1/650 patients) of infection and septal perforation compared to adults

In 2026, a systematic review and meta-analysis on outcomes of paediatric septoplasty and septorhinoplasty by Patel et al showed overall complication rates for septoplasty and septorhinoplasty of 3.82% (pain 5.69% and epistaxis 2.28%) and 16.8% respectively (39). However, it is important to note that this included persistent septal deviation which was 8.93% for septorhinoplasty.

As for revision rates, the 2024 systematic review showed an overall rate of 5.6%, which is similar to adults, although some studies showed higher revision rates for younger children, and Patel et al reported 2.8% for septoplasty and 6.5% for septorhinoplasty. This should be discussed during counselling, including:

- The potential 'loss' of cartilage that could be used in future surgeries
- The risk of needing more complex surgery in the future

5.0 Post operative care

Postoperative regimens will vary between surgeons; however, their primary purpose is to optimise healing and minimise postoperative nasal obstruction. In addition to the guidance below, we recommend referring to the GIRFT Nasal Airway Surgery Pathway especially for older children.(28)

Intranasal saline Irrigation:
For septoplasty, intranasal saline can be delivered as a spray (low volume, low pressure) or irrigation (high volume, low pressure). No clear data outlines a benefit of one over the other, but saline irrigations are well tolerated in the paediatric population.(40) Intranasal saline constitutes a key component of postoperative care in paediatric septoplasty. It presents minimal risk and offers meaningful benefit by alleviating obstruction related to crusting and local inflammatory change.
Additional Therapies:
Additional postoperative therapies, including topical nasal steroids, may be employed to further reduce inflammation and thereby limit the likelihood of persistent obstruction.

Follow-up
All paediatric patients undergoing septoplasty or septorhinoplasty should receive structured postoperative follow-up in 6 weeks to 3 months to:
- Confirm symptomatic improvement (repeat PROM if used before surgery)
- Evaluate for potential complications
- Determine the need for any further medical or surgical intervention

Choice of splints, skin sutures and nasal packing will differ between surgeons.
If nasal splints were used, to be removed 1–2 weeks postoperatively.
The use of absorbable sutures should be considered, particularly where there is a potential for difficulty with patient cooperation during suture removal.

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Appendices

Appendix 1 – Assessment tools and patient reported outcome measures

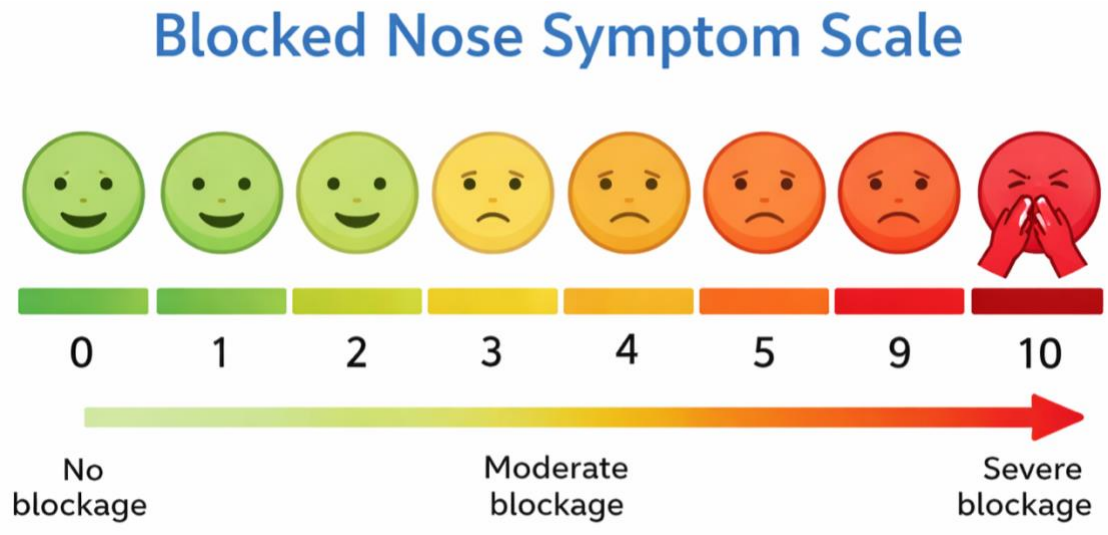
NOSE score

Over the past *ONE* month, how much of a problem were the following conditions for you?

Please circle the most correct response

	Not a Problem	*Very Mild Problem*	*Moderate problem*	*Fairly Bad Problem*	*Severe problem*
1. Nasal congestion or stuffiness	0	1	2	3	4
2. Nasal blockage or obstruction	0	1	2	3	4
3. Trouble breathing through my nose	0	1	2	3	4
4. Trouble sleeping	0	1	2	3	4
5. Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4

VAS score



SNOT-22 score

Sino – Nasal Outcome Test 22

Below you will find a list of symptoms and social/emotional consequences of your nasal disorder. We would like to know more about these problems and would appreciate you answering the following question to the best of your ability.
There are no right or wrong answers, and only you can provide us with this information.
Please rate your problems, as they have been over the **past two weeks**.

Please answer **all** the questions below:	**No problem**	**Very mild problem**	**Mild or slight problem**	**Moderate problem**	**Severe problem**	**Problem as bad as it can be**
1. Need to blow nose	0	1	2	3	4	5
2. Sneezing	0	1	2	3	4	5
3. Runny nose	0	1	2	3	4	5
4. Cough	0	1	2	3	4	5
5. Post nasal discharge (dripping at the back of your nose)	0	1	2	3	4	5
6. Thick nasal discharge	0	1	2	3	4	5
7. Ear fullness	0	1	2	3	4	5
8. Dizziness	0	1	2	3	4	5
9. Ear pain/ pressure	0	1	2	3	4	5
10. Facial pain/ pressure	0	1	2	3	4	5
11. Difficulty falling asleep	0	1	2	3	4	5
12. Waking up at night	0	1	2	3	4	5
13. Lack of a good night's sleep	0	1	2	3	4	5
14. Waking up tired	0	1	2	3	4	5
15. Fatigue during the day	0	1	2	3	4	5
16. Reduced productivity	0	1	2	3	4	5
17. Reduced concentration	0	1	2	3	4	5
18. Frustrated/ restless/ irritable	0	1	2	3	4	5
19. Sad	0	1	2	3	4	5
20. Embarrassed	0	1	2	3	4	5
21. Sense of taste/ smell	0	1	2	3	4	5
22. Blockage/ congestion of nose	0	1	2	3	4	5
	TOTAL:					
				GRAND TOTAL:		