

A child who snores

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This is one of a series of articles on common problems for the general otolaryngologist. Contributions and suggestions for future topics are welcome. Please contact the series editor (haytham.kubba@yorkhill.scot.nhs.uk)

A three-year-old boy attends with his mother, who says that she is worried because he snores heavily at night.

What you should cover in the history

Physiological hyperplasia of the adenoids and tonsils occurs between the ages of approximately 18 months and 6 years. As a result, snoring is very common in young children.

- *Comorbidities* such as Down syndrome, micrognathia, and craniofacial syndromes are commonly associated with a degree of upper airway obstruction, and these children are more at risk of significant obstructive sleep apnoea. Children with a repaired cleft palate are at risk of velopharyngeal insufficiency if the adenoids are removed.
- *Obesity* is less common as a cause of snoring in children than in adults but is increasing in prevalence
- *Coexisting ear, nose and throat problems such as hearing impairment, ear infections and sore throats* can influence the decision to proceed to surgery.
- *Evidence of obstructive sleep apnoea (OSA)*. This is the key issue. The most useful predictor of OSA in clinical practice is a history of heavy snoring with disturbed sleep, respiratory pauses and snort arousals. OSA may be associated with night terrors and enuresis. Daytime fatigue is rare in children because they return much more quickly to the refreshing, deep levels of sleep (stages 3 and 4 slow wave sleep) after each episode of arousal: poor sleep quality leads paradoxically to hyperactivity and behavioural problems. Difficulties with concentration and learning ensue – a large number of observational studies have shown an association between sleep disordered breathing and measures of hyperactivity, inattention, problem behaviour and poor cognitive function, although long-term studies are absent. Pulmonary hypertension and cor pulmonale are late effects in severely affected children and are rare, except in children with an underlying disorder such as Down syndrome.

What you should cover on examination

In the pre-school age group, adenoid hyperplasia is much more likely as a cause of nasal symptoms than allergic

rhinitis. Of course, in school-age children the converse is true.

- *Examination of the nose* with an otoscope or a head-light. Only occasionally are the adenoids visible directly through the nose. There may be thick secretions which accumulate in the nose when the choanae are obstructed by adenoids, and turbinate hyperplasia due to a secondary rhinitis. Rarely, there may be evidence of nasal polyps (suggesting cystic fibrosis) or a tumour (such as rhabdomyosarcoma).
- *Assessment of nasal airflow* by looking for misting on a cold spatula.
- *Examination of the oropharynx* particularly with regard to the palate and uvula.
- *Engage the child in conversation* to assess voice quality, particularly resonance (hyponasality and hypernasality).

What treatment should you offer

- *Overnight pulse oximetry* provides information as to the degree of oxygen desaturation which may be useful in guiding decisions about which children should be nursed post-operatively in a high dependency ward environment. It cannot, however, exclude significant sleep disordered breathing in children¹ and cannot be used to decide on who does or does not merit adenotonsillectomy. For this, full polysomnography is required, but this scarce resource is best reserved for selected subgroups of children for whom the information is most helpful: syndromic children, who are most at risk of severe desaturations and residual symptoms; those with residual symptoms after adenotonsillectomy; the very young; and those where the diagnosis is unclear.
- *Where there is evidence of OSA in the history and examination, adenotonsillectomy should be recommended on clinical grounds alone*. Published evidence for the efficacy of adenotonsillectomy consists of a few case series that document improvement in both obstructive symptoms²⁻⁴ and cognitive and behavioural deficits⁵ after surgery: there are no controlled trials. In the very young child (under 18 months of age), the tonsils may not appear to be particularly large and adenoidectomy alone may offer

relief of the obstruction without the additional risks of tonsillectomy. About a quarter of these children will go on to require a tonsillectomy over the next 2 or 3 years for continuing obstruction or a new problem of sore throats. In the majority of children over 18 months of age, however, concurrent adenoidectomy and tonsillectomy are required to overcome the obstructive symptoms.

- *In those with simple snoring and recurrent tonsillitis* who meet the standard criteria for tonsillectomy, concurrent adenoidectomy would seem reasonable.

- *In children with snoring and also evidence of persistent bilateral OME with a significant hearing impairment, and for whom you are considering the insertion of ventilation tubes (grommets), data from the TARGET trial suggest that adenoidectomy should also be performed in children over the age of 3 years.* Adenoidectomy in these circumstances is likely to lead to long-term benefits in ear health and hearing as well as in respiratory health (nasal obstruction, rhinorrhoea, snoring) and quality of life. Below the age of 3 years, there is some evidence that the adenoids are still making a meaningful contribution to immune function and should not be removed unless the benefits clearly outweigh the risks (such as in OSA).

- *For most children, simple snoring without evidence of OSA is currently believed by most surgeons to be a benign, self-limiting phenomenon that requires no treatment other than parental reassurance.*⁶ Having said that, evidence is emerging that some children with simple snoring in the absence of OSA have cognitive and behavioural sequelae.⁷ We have not yet reached the point where many surgeons would recommend surgery for simple snoring alone.

- *Topical nasal steroids* may have an effect in reducing adenoid size, but it is not yet clear whether the proportion of children gaining enough symptomatic benefit to avoid surgery justifies exposing all these children to steroid medications.⁸

- *The risks of adenotonsillectomy should be discussed with parents.* These will include pain and bleeding (return to

theatre rate 1–2%). You may also wish to discuss the risk of post-operative breathing difficulties: these occasionally occur in children with underlying syndromes or cerebral palsy, in the very young and those with severe OSA. The most common problem is a period of a few hours of hypoventilation for which the child requires ventilatory support.

References

- 1 Brouillette R.T., Morielli A., Leimanis A. *et al.* (2000) Nocturnal pulse oximetry as an abbreviated testing modality for pediatric obstructive sleep apnea. *Pediatrics* **105**, 405–412
- 2 Guilleminault C., Li K.K., Khamatsov A. *et al.* (2004) Sleep disordered breathing: surgical outcomes in prepubertal children. *Laryngoscope* **114**, 132–137
- 3 Greenfeld M., Tauman R., DeRowe A. *et al.* (2003) Obstructive sleep apnea syndrome due to adenotonsillar hypertrophy in infants International. *Journal of Pediatric Otolaryngology* **67**, 1055–1060
- 4 Nieminen P., Tolonen U. & Lopponen H. (2000) Snoring and obstructive sleep apnea in children: a 6-month follow-up study. *Archives of Otolaryngology Head and Neck Surgery* **126**, 481–486
- 5 Ali N.J., Pitson D. & Stradling J.R. (1996) Sleep disordered breathing: effects of adenotonsillectomy on behaviour and psychological function *European Journal of Pediatrics*. **155**, 56–62
- 6 Anuntasree W., Kuasirikul S. & Suntornlohanaku I.S. (2005) Natural history of snoring and obstructive sleep apnoea in Thai school-age children. *Pediatric Pulmonology* **39**, 415–420
- 7 O'Brien L.M., Mervis C.B., Holbrook C.R., Bruner J.L., Klaus C.J., Rutherford J., Raffield T.J. & Gozal D. (2004) Neurobehavioral implications of habitual snoring in children. *Pediatrics* **114**, 44–49
- 8 Alexopoulos E.I., Kaditis A.G., Kalamouka E. *et al.* (2004) Nasal corticosteroids for children with snoring. *Pediatric Pulmonology* **38**, 161–167

Information sources

This article is based on evidence from a computerised literature search using Ovid Medline, last performed on the 5th of June 2006.