Research Articles Cited

**MOUTH BREATHING AND ASTHMA**

1. We speculate that asthmatics may have an increased tendency to switch to oral breathing, a factor that may contribute to the pathogenesis of their asthma.

http://chestjournal.chestpubs.org/content/116/6/1646.full


3. In the first step of a study of the relation of nasal and oral breathing during moderate treadmill exercise to the onset of bronchoconstriction in young patients with perennial bronchial asthma, it was observed that most subjects spontaneously
breathed with their mouths open when instructed to breathe “naturally.” Subsequently, when they were required to breathe only through the nose during the exercise, an almost complete inhibition of the postexercise bronchoconstrictive airway response was demonstrated. When instructed to breathe only through the mouth during exercise, an increased bronchoconstrictive airway response occurred, as measured by spirometry, flow-volume relationships, and body plethysmography. These findings suggest that the nasopharynx and the oropharynx play important roles in the phenomenon of exercise-induced bronchoconstriction.


HELPFUL REFERENCES

1. Snoring, mouth breathing, or apnea early in life may predict later behavioral and emotional problems, researchers found. http://www.medpagetoday.com/Pediatrics/GeneralPediatrics/31477


Primary snoring in school children: prevalence and neurocognitive impairments.

Brockmann PE, Urschitz MS, Schlaud M, Poets CF.

Source

Working Group on Paediatric Sleep Medicine, Department of Neonatology, University Children's Hospital, University of Tuebingen, Tuebingen, Germany.

Abstract

PURPOSE:
We aimed to investigate the prevalence of primary snoring (PS) and its association with neurocognitive impairments.

METHODS:
Data from a community-based study in 1,114 primary school children were used to identify children who never (N = 410) or habitually snored (N = 114). In order to separate children with PS from those with upper airway resistance syndrome (UARS) or obstructive sleep apnoea (OSA), home polysomnography was conducted in all habitually snoring children. Neurocognitive impairments and poor school performance were compared between children who never snored, PS, and UARS/OSA.

RESULTS:
Polysomnography was successfully conducted in 92 habitual snorers. Of these, 69 and 23 had PS and UARS/OSA, respectively. Prevalence [95% confidence interval (95% CI)] of PS was 6.1% (4.5-7.7). Compared to children who had never snored, children
with PS had more hyperactive (39% vs. 20%) and inattentive behaviour (33% vs. 11%), as well as poor school performance in mathematics (29% vs. 16%), science (23% vs. 12%), and spelling (33% vs. 20%; all P values <0.05). PS was a significant risk factor (odds ratio; 95% CI) for hyperactive behaviour (2.8; 1.6-4.8), inattentive behaviour (4.4; 2.4-8.1), as well as daytime sleepiness (10.7; 4.0-28.4). PS was also an independent risk factor for poor school performance in mathematics (2.6; 1.2-5.8), science (3.3; 1.2-8.8), and spelling (2.5; 1.1-5.5). Odds ratios throughout were similar to the UARS/OSA group.

CONCLUSIONS:
Children with non-hypoxic, non-apnoeic PS may exhibit significant neurocognitive impairments. Consequences may be similar to those associated with UARS or OSA. If confirmed, PS is not "benign" and may require treatment. Children with non-hypoxic, non-apnoeic PS may exhibit significant neurocognitive impairments. Consequences may be similar to those associated with UARS or OSA. If confirmed, PS is not "benign" and may require treatment.

3. [www.med.umich.edu/opm/newspage/2006/sleep.htm](http://www.med.umich.edu/opm/newspage/2006/sleep.htm)

   **April 3, 2006**

   Kids behave and sleep better after tonsillectomy, University of Michigan study finds

   Hyperactivity, attention deficit, sleepiness, and ADHD often improved - whether or not sleep studies showed sleep apnea before surgery


   **Obstructive sleep disordered breathing in children: beyond adenotonsillectomy.**

   Praud JP, Dorion D.

   **Source**

   Respiratory Medicine Division, Department of Pediatrics, Université de Sherbrooke, Québec, Canada. jean-paul.praud@usherbrooke.ca

   **Abstract**

   Traditionally, adenotonsillectomy (AT) has long been the treatment of choice for obstructive sleep disordered breathing (SDB) in children. AT is usually considered a safe procedure, which cures 80% of children with SDB. Accumulated data have however challenged this overly simplistic view. Indeed, AT is invariably associated with significant morbidity, post-operative pain, and a mortality rate which, though low, cannot be ignored. In addition, aside from a recurrence of SDB at adolescence in an unknown percentage of cases, some recent results suggest that complete SDB cure is not
achieved in as much as 75% of cases after AT. Interestingly, several treatment options have been recently proposed for replacing or complementing AT. Continuous positive airway pressure (CPAP) is now suggested in children with remaining SDB after AT; however, compliance and suitability of equipment remain important hurdles, especially in small children and infants. Anti-inflammatory treatments, including nasal glucocorticoids and/or the anti-leukotriene montelukast, appear to hold great promise. Finally, orthodontic treatments are an appealing option, with recent results in children suggesting that it is possible to improve or perhaps even cure SDB in a durable manner by enlarging the nasal passages and/or the oropharyngeal airspace. In conclusion, while we are currently in the midst of an exciting time with several new treatments being developed for childhood SDB, randomized controlled trials are urgently needed to delineate their indications. In the meantime, it appears that systematic detection of orthodontic anomalies and better collaboration with maxillofacial specialists, including orthodontists and/or dentists, is needed for deciding the best treatment options for childhood SDB.


**Rapid maxillary expansion in children with obstructive sleep apnea syndrome.**

Pirelli P, Saponara M, Guilleminault C.

**Source**

Department of Odontological Sciences, University Tor Vergata, Rome Italy.

**Abstract**

**OBJECTIVE:**

To evaluate the effect of rapid maxillary expansion on children with nasal breathing and obstructive sleep apnea syndrome.

**METHOD:**

Recruitment of children with maxillary contraction, without adenoid hypertrophy, with a body mass index < 24 kg/m2, with obstructive sleep apnea syndrome demonstrated by polysomnography, and whose parents signed informed consent. Otolaryngologic and orthognathic-odontologic evaluation with clinical evaluation, anterior rhinometry and nasal fibroscopy, panoramic radiographs, anteroposterior and laterolateral telecephalometry were performed at entry and follow-up. Intervention: Rapid maxillary expansion (ie, active phase of treatment) was performed for 10 to 20 days; maintenance of device (for consolidation) and orthodontic treatment on teeth lasted 6 to 12 months.

**RESULTS:**

31 children (19 boys), mean age 8.7 years, participated in the study. The mean apnea-hypopnea index was 12.2 events per hour. At the 4-month follow-up, the anterior rhinometry was normal, and all children had an apnea-hypopnea index < 1 event per hour. The mean cross-sectional expansion of the maxilla was 4.32 +/- 0.7 mm. There was a mean increase of the pyriform opening of 1.3 +/- 0.3 mm.
CONCLUSION:
Rapid maxillary expansion may be a useful approach in dealing with abnormal breathing during sleep.

Rapid maxillary expansion in the treatment of nocturnal enuresis.
Timms DJ.
Source
Oral Surgery Department, Royal Preston Hospital, United Kingdom.
Abstract
There is growing consensus that upper airway obstruction is a causative factor in nocturnal enuresis. This phenomenon has an unhappy history, although some surgeons in the past have touched on its treatment through the relief of upper airway obstruction. Only recently have sleep laboratory investigations presented a clearer, though still incomplete, picture of the etiology of nocturnal enuresis through disturbed sleep patterns. The obstruction is usually an adenoidal hypertrophy or, less commonly, an anterior nasal stenosis. While the otolaryngologist can readily cope with the former, surgical difficulties make treating the latter problematic. In many cases, the constriction can be reduced by rapid maxillary expansion. In the ten cases examined in this study, nocturnal enuresis ceased within a few months of maxillary expansion.


The two distinct conditions of asthma and sleep apnea may indeed have a connection. A new study entitled “Association Between Asthma and Risk of Developing Obstructive Sleep Apnea” recently published in JAMA, suggests that adults who struggle with asthma face an increased risk for also developing sleep apnea. “Over the full study period, the team concluded that asthma patients faced an almost 40 percent greater risk for sleep apnea than asthma-free participants,” wrote Mozes. What’s more, the longer an individual had asthma, the greater their increased risk for developing OSA, investigators found.”

8. Enliven archive.org Sept. 6, 2014
Towards Restoration of Continuous Nasal Breathing as the Ultimate Treatment Goal in Pediatric Obstructive Sleep Apnea
Guilleminault, C., and Sullivan,S.
Abstract
The interaction between oral-facial structural growth and muscle activity starts early in development and continues through childhood. Chronic oral breathing is an important clinical marker of orofacial muscle dysfunction, which may be associated with palatal growth restriction, nasal obstruction, and/ or a primary disorder of muscular or connective tissue dysfunction. It is easily documented objectively during sleep.
Treatment of pediatric obstructive-sleep-apnea (OSA) and sleep-disordered-breathing (SBD) means restoration of continuous nasal breathing during wakefulness and sleep; if nasal breathing is not restored, despite short-term improvements after adenotonsillectomy (T&A), continued use of the oral breathing route may be associated with abnormal impacts on airway growth and possibly blunted neuromuscular responsiveness of airway tissues.
Elimination of oral breathing, i.e., restoration of nasal breathing during wake and sleep, may be the only valid end point when treating OSA. Preventive measures in at-risk groups, such as premature infants, and usage of myofunctional therapy as part of the treatment of OSA are proposed to be important approaches to treat appropriately SDB and its multiple co-morbidities.
Sleep Health Questionnaire – Current Sleep Symptoms

Name: ________________________________  Birthday: ____________________________

What allergies does your child have?
Drugs: ________________________________  Environmental: ________________________

Does your child have asthma?  Y  N

What diagnosed health conditions does your child have?
__________________________________________________________________________
__________________________________________________________________________

What surgeries has your child had?
__________________________________________________________________________
__________________________________________________________________________

Physician’s name: ________________________  Phone: ____________________________

<table>
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<tr>
<th>Symptom</th>
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<td>Morning headaches</td>
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<td>Learning issues</td>
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<td>Snores</td>
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<td>Resists going to bed</td>
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<td>Wets the bed</td>
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<td>Gets out of bed at night</td>
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<td>Nightmares</td>
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<td>Trouble getting up in the morning</td>
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<td>Screaming during sleep</td>
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<td>Behavioral issues – ADD/ADHD</td>
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<td>Kicks legs during sleep/uncomfortable</td>
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<td>Reports feeling unable to move when</td>
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<td>feeling in legs</td>
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<td>falling asleep</td>
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</table>
FACE OF A MOUTH BREATHER
Lips open at rest
Shortness of upper lip
Fullness/rotation of lower lip
Retrod chin/double chin
Nasal congestion
Flat nasal-sinus area
Droopy eye look
Alteration to jaw joint

NORMAL FACE
Lips closed
Nasal breathing
Well defined facial form
Eyes bright & alert

REVIEW FACIAL PICTURES
WHAT ARE THE DIFFERENCES?
SAY "I CHOOSE TO KEEP MY MOUTH CLOSED"