

Science & Research  
on Breathing



## *For Asthma (adults and children)*

**Oral breathing may play a role in the pathogenesis of acute asthma exacerbations.**

*Hallani et al. Enforced mouth breathing decreases lung function in mild asthmatics. 2008*

**Enhanced perception of nasal loading may trigger increased oral breathing in asthmatics.**

**Potentially enhancing exposure to non-conditioned inhaled gas and contributing to occurrence and/or severity of bronchoconstrictive exacerbations.**

*Hallani et al. Initiating oral breathing in response to nasal loading. 2008*

**The instruction to breathe only through the nose during exercise led to an almost complete inhibition of the post-exercise bronchoconstrictive airway response.**

*Shturman-Ellstein et al. The beneficial effect of nasal breathing on exercise-induced bronchoconstriction. 1978*

**Significant bronchoconstriction was induced in asthmatic children by voluntary hyperventilation of 3 minute and 10 minute duration.**

*Zeballos et al. The role of hyperventilation in exercise-induced bronchoconstriction. 1978*



*For Asthma (adults and children) continued...*

**In both hyperventilation and exercise, nasal breathing inhibited the bronchoconstrictive response. Whereas mouth breathing potentiated the bronchoconstrictive response.**

*Zeballos et al. The role of hyperventilation in exercise-induced bronchoconstriction. 1978*

**Airway dehydration triggers exercise-induced bronchoconstriction in virtually all patients with active asthma.**

*Moloney et al. Airway dehydration - a therapeutic target in asthma. 2002*

### **Buteyko Trial results for Asthma**

At 12 weeks using the Buteyko Breathing Technique (BBT)

- 70% less symptoms
- 90% less need for reliever medication
- 49% less need for inhaled corticosteroids (ICS)
- Lung function - no change

Control Group

- No change

Minute Volume pre-trial

- BBT - 14 litres per minute
- Control Group - 14.2 litres per minute

At 3 months

- BBT - 9.6 litres per minute
- Control group - 13.3 litres per minute
- The relative reduction in a beta2-agonist use in BBT group was related to proportionate reduction in minute volume

*Bowler et al. Buteyko breathing techniques in asthma. 1998*



*For Asthma (adults and children) continued...*

## **Buteyko Trial results for Asthma**

Results at 6 months in Buteyko Breathing Group

- Beta agonist decrease 85%
- Inhaled corticosteroids decrease 50%

Results at 6 months in Control Group  
(general asthma education and relaxation techniques)

- Beta agonist decrease 37%
- No change in Inhaled corticosteroids

*McHugh et al. Buteyko breathing technique for asthma: an effective intervention. 2003*

## **Buteyko breathing technique and asthma in children**

Results at 6 months

- Bronchodilators use decrease 66%
- Inhaled steroids use decrease 41%

*McHugh et al. Buteyko breathing technique and asthma in children: a case series. 2006*



## *For Adults & Children (asthma and OSA)*

**Approximately 74% of asthmatics experience nocturnal symptoms of airflow obstruction secondary to reactive airways disease.**

*Bonekat et al. Severe upper airway obstruction during sleep. 2003*

**Undiagnosed or inadequately treated obstructive sleep apnea may adversely affect control of asthma and vice versa.**

*Prasad et al. Obstructive sleep apnea and asthma. 2014*

**In 472 asthmatic patients with poorly controlled asthma, there was a 3x increase in the risk of obstructive sleep apnea.**

*Teodorescu et al. Association of OSA risk with asthma control in adults. 2010*

**Prevalence between asthma and OSA ranges from 38% to as high as 70%.**

**Based on current concepts of bi-directional relationship of OSA and asthma, it is sensible to assume that treating one disorder will result in the others better control & vice versa.**

*Razak & Chirakalwasan. Obstructive sleep apnea & asthma. 2016*



*For Adults & children (asthma and OSA) continued...*

**Clinical studies indicate the majority of patients with asthma have rhinitis. One study showed that 100% of subjects with severe (steroid requiring) asthma and 77% of subjects with mild to moderate asthma had abnormal results on CT scan of the sinuses.**

*Alkhalil et al. Obstructive sleep apnea and asthma: what are the links?. 2009*

**Inflammation in the nasal mucosa results in lower airway inflammation and vice versa.**

*Bartley & Wong. Nasal physiology & pathophysiology of nasal disorders. 2013*



## *For Adults (Obstructive Sleep Apnea/OSA)*

**Approximately 2.5 fold increase in upper airway resistance during sleep while mouth breathing compared with nasal breathing in normal subjects.**

*Fitzpatrick et al. Effect of nasal or oral breathing on upper airway resistance during sleep. 2003*

**9% of women and 26% men aged 30-49 years diagnosed with OSA**

**27% of women and 43% men aged 50-70 years diagnosed with OSA**

*Subramani et al. Phenotypes of obstructive sleep apnea. 2017*

**Primary care physicians may not be prompted to explore an early diagnosis of OSA - especially true if patient does not present with sleepiness and classically high BMI.**

**Up to 50% of people with OSA are not obese.**

**25% of individuals with moderate OSA have neither objective or subjective sleepiness.**

*Osman et al. Obstructive sleep apnea: current perspectives. 2018*



## *For Adults (Obstructive Sleep Apnea/OSA) continued...*

### **Risk of mortality:**

**5712 participants, 1290 deaths occurred over 11 years of follow up.**

**Individuals with shortest duration of events had a significant hazard ratio for all cause mortality.**

**This relationship was observed in men & women, strongest in those with moderate OSA.**

**Short respiratory event duration predicts mortality in men & women.**

*Butler et al. Apnea-hypopnea event duration predicts mortality in men and women in the sleep heart health study. 2018*

### **Percentage of total time with oxygen saturation levels <90%**

- **Mouth breathing 36.41**
- **Oronasal breathing 15.97**
- **Nasal breathing 5.76**

**Mouth breathing was significantly associated with worse oxygen desaturation and increased degree of upper airway collapse.**

*Yin-Bin Hsu et al. Association between breathing route, oxygen desaturation and upper airway morphology. 2020*