



# Capitol Sleep Medicine Newsletter

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## Obstructive Sleep Apnea in Children with Down Syndrome

Obstructive sleep apnea (OSA) is a common medical condition that has been estimated to occur in one in four American adults as per the results of the 2005 National Sleep Foundation Sleep in America poll.<sup>1</sup> What may be overlooked is that children with Down syndrome frequently have OSA. In a study of fifty-three subjects with Down syndrome, overnight polysomnogram studies were abnormal in 100%, with obstructive sleep apnea (OSA) in 63%, hypoventilation in 81%, and oxygen desaturation in 56%. OSA may contribute to the unexplained pulmonary hypertension seen in children with Down syndrome.<sup>2</sup> In these patients higher body mass index is significantly associated with a higher apnea index, a lower SaO<sub>2</sub> level, and poor sleep quality.<sup>3</sup>



Children with Down syndrome are prone to develop OSA for a combination of reasons, including small upper airway, midfacial hypoplasia, micrognathia and muscular hypotonia. In one study the prevalence of OSA in Down syndrome children was 59%. Interestingly, nearly 40% of Down syndrome children with OSA did not have habitual snoring.<sup>4</sup> Although clinically many children with Down syndrome do very well with continuous positive airway pressure (CPAP) therapy, there is very little data to date regarding the efficacy of CPAP therapy in this patient group.

What about oropharyngeal surgery as a treatment for OSA in patients with Down syndrome? A retrospective review of 16 patients with Down syndrome who underwent a tonsillectomy and adenoidectomy revealed that symptoms were resolved in 69% of this patient group.<sup>5</sup> However, in some patients with Down syndrome routine tonsillectomy and adenoidectomy does not reverse obstructive respiratory patterns.<sup>6</sup> As compared with control subjects, children with Down syndrome have different size and shape relationships among tissues composing the upper airway, which may predispose them to obstructive sleep apnea. A magnetic resonance imaging study has shown that subjects with Down syndrome had a smaller mid and lower face skeleton. Interestingly, adenoid and tonsil volume may

actually be smaller in the subjects with Down syndrome.<sup>7</sup>

Secondary cardio-respiratory complications of OSA such as pulmonary hypertension may be found at the time of initial diagnosis.<sup>8</sup> In a relatively small study of seven children with Down syndrome looked at using a more aggressive surgical approach to the treatment of obstructive sleep apnea consisting of a combination of tongue reduction, tongue hyoid advancement, uvulopalatopharyngoplasty, and maxillary or midface advancement, the mean preoperative apnea index and respiratory disturbance index were 34.00 and 52.46 compared with mean postoperative values of 1.62 and 6.46, respectively. Clinically, all patients were improved symptomatically

in terms of snoring, noisy breathing, and oxygen requirements. Importantly, preoperative cardiac ultrasonography may be required to determine the presence of right-sided heart failure, which may be an indication for cardiac catheterization to determine pulmonary venous pressures.<sup>9</sup>

In a relatively large study of seventy-one pediatric patients with Down syndrome who had more significant upper airway obstruction, patients underwent surgical procedures including tonsillectomy, adenoidectomy, tonsillar pillar plication, uvulopalatopharyngoplasty, anterior tongue reduction, tonguehyoid suspension, laryngotracheoplasty, and tracheotomy. Of the 55 surgical patients who had mild obstructive symptoms, most improved after tonsil or adenoid surgery. Caution is indicated in the surgical treatment plans of these patients as in this study five deaths occurred. Further, residual symptoms of airway obstruction are common after surgery.<sup>10</sup> CPAP therapy may be a more benign treatment plan for many of these patients. Don't forget that Down syndrome children are special needs patients who have a high risk of OSA.

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4 [Singapore Med J](#), 2006 Sep;47(9):774-9.

5 [Int J Pediatr Otorhinolaryngol](#), 1995

Oct;33(2):141-8.

6 [Laryngoscope](#), 1986 Dec;96(12):1340-2.

7 [Am J Respir Crit Care Med](#), 2001 Mar;163 (3 Pt 1):731-6.

8 [J Otolaryngol](#), 1988 Dec;17(7):398-403.

9 [Plast Reconstr Surg](#), 1997 Mar;99(3):629-37.

10 [Arch Otolaryngol Head Neck Surg](#), 1996 Sep;122(9):945-50.

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