Outcomes of Adenotonsillectomy in Children with Down Syndrome and Obstructive Sleep Apnea

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Background

- Obstructive sleep apnea (OSA) affects 66–76% of children with Down syndrome (DS) vs. 1–4% of the general pediatric population.
- The American Academy of Pediatrics recommends adenotonsillectomy (T&A) as first-line treatment for pediatric OSA.
- Prior studies show only 12% achieve postoperative OAHI <1, and 50% retain OAHI >5 within 6 months.
- Aim: To evaluate postoperative outcomes of T&A in a larger DS cohort at Children's Hospital Colorado (CHCO).

Methods

- Retrospective chart review of children with DS who underwent T&A at CHCO.
- Inclusion: Pre- and postoperative polysomnography (PSG) within 12 months.
- Outcomes measured:
  - Obstructive apnea–hypopnea index (OAHI)
  - Mean Oxygen saturation (SpO_2)
  - End-tidal carbon dioxide ($EtCO_2$)
  - Heart rate
  - Total sleep time (TST)
- Statistical analysis: Wilcoxon Rank-Sum, Fisher's Exact, and linear regression (adjusted for age, sex, BMI percentile).

Results

- Cohort: 418 children underwent T&A; 236 met inclusion criteria

Age at Surgery (y)	**5.12 [0.5, 18.14]**
Sex	
Male	123 (52.1%)
Female	113 (47.9%)
Race	
White	143 (60.6%)
Black/African American	14 (5.9%)
Asian	4 (1.7%)
Other	60 (25.4%)
Unknown	3 (1.3%)
More than one race	12 (5.1%)
Prematurity	72 (31.6%)
Comorbidities	
Pulmonary Hypertension	70 (29.7%)
History of Pneumonia	2 (0.8%)
Hypothyroidism	93 (39.4%)

Table 1. Demographics and Comorbidities (T-A only, N = 236)

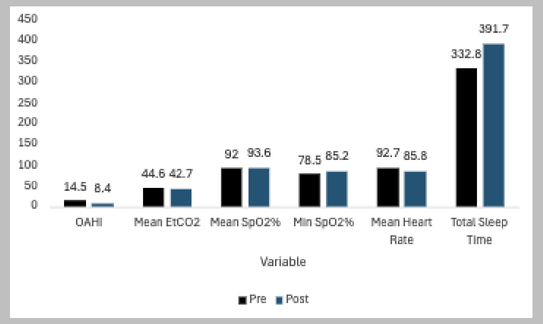

Figure 1. changes in polysomnographic numbers

OAHI <1 (16)	0.43 (0.31)	4 (25%)	10 (62.5%)
Mild (54)	2.93 (1.13)	20 (37.04%)	25 (46.3%)
Moderate (49)	7.16 (1.55)	30 (61.22%)	9 (18.37%)
Severe (93)	27.53 (9.25)	70 (75.27%)	4 (4.3%)

Table 2.OSA Severity Pre and Post T-A (T-A only)

Conclusions

- T&A improves breathing and sleep in children with Down syndrome, but many still have residual OSA.
- Patients with moderate/severe OSA benefit the most, showing large reductions in OAHI.
- Improvements in oxygenation and heart rate suggest reduced stress on the body during sleep.
- Some children continue to experience OSA postoperatively, highlighting the need for ongoing monitoring and follow-up care.

Implications

- T&A remains the first-line surgical option for DS-associated OSA.
- Postoperative PSG is critical to detect persistent OSA and guide additional therapy.
- Preoperative OSA severity can help predict outcomes and set realistic expectations for families.
- Findings reinforce the need for individualized follow-up and management after surgery.

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