Accuracy of Parental Perception of nighttime breathing in children with Down Syndrome after adenotonsillectomy

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Background

Down syndrome (DS) is the most common chromosomal diagnosis in the United States with 6,000 babies being born with the condition each year. The craniofacial manifestations of this disorder predispose children with DS to obstructive sleep apnea (OSA):

- Midface and mandibular hypoplasia
- Higher incidence of tonsillar and adenoid hypertrophy • Macroglossia
- Retrognathia

Over 80% of children with DS are affected by OSA, compared to the 2% of the general pediatric population. Clinical practice guidelines recommend screening all children with DS for OSA with polysomnography (PSG) by age 4 years regardless of symptoms. Previous studies suggested parental history regarding OSA symptoms did not correlate to PSG findings. Persistent OSA following adenotonsillectomy (T&A) is common in children with DS and can be seen in as many as 50% of patients. The primary objective of this study is to identify accuracy of parental perception of nighttime breathing following T&A compared to preoperative assessment. We hypothesize that parental perception of nighttime breathing improves with experience.

Methods

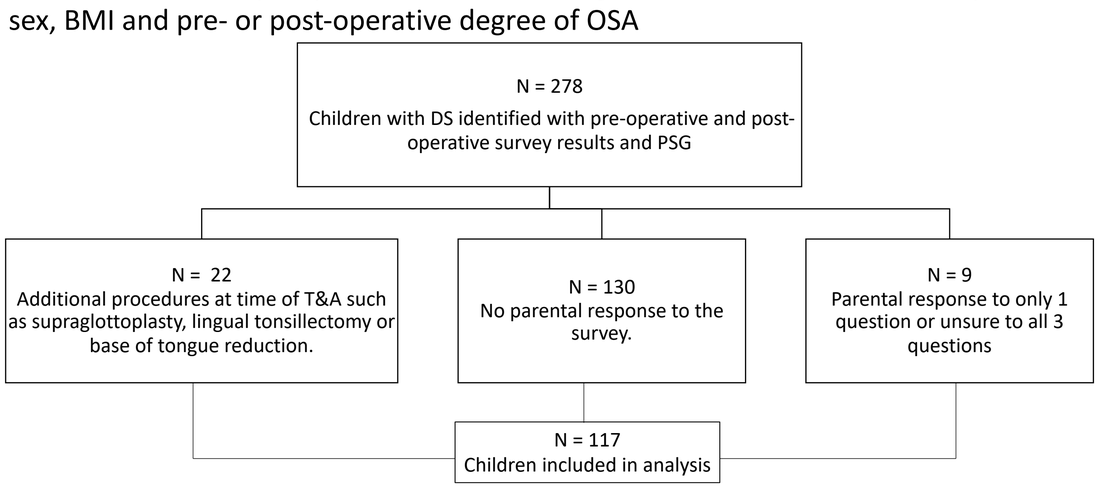
This was a case series with retrospective review of patients with DS who underwent T&A along with a PSG prior to and after the surgical procedure. Individuals were excluded if surgery included additional procedures such as supraglottoplasty, lingual tonsillectomy or base of tongue reduction. Parents completed a 3 question pre- and post-surgery survey regarding nighttime symptoms; including, stops breathing during sleep, snores and restless sleep. The responses were categorized into 4 groups:

Symptom	Definition
Frequent	At least 1 symptom ≥ 6 nights/week
Sometimes	At least 1 symptom 3-5 nights/week + at least 1 other symptom ≤ 5 nights/week
Infrequent	2-3 questions answered: all symptoms <3 nights/week
Unknown	Answered Unsure to 2 or all 3 of the questions

Demographic, clinical and PSG data was also collected.
The primary end point being the comparison between parent perceptions of breathing and OSA categorization based on postoperative PSG outcomes.
Group differences were tested via Chi Squared test.

Results

A total of 278 children were identified, of which 117 (46%) were included.
When comparing the 117 (46%) included children to the 139 (50%) excluded children due to lack of survey response, there was no significant difference in ethnicity, race, sex, BMI and pre- or post-operative degree of OSA



- There were 66 (56.4%) males and 51 (43.6%) females.
- Median age at time of procedure was 4.13 years.
- Post PSG BMI Category of overweight to severe obesity was 60 (57.1%)
- Adenoidectomy was completed in 113 (96.6%) of the patients

- For the secondary analysis, of the one hundred and one children that had an OAHI >1 preoperatively, 55 (47%) had persistent OSA despite T&A (Table 1).

	Infrequent (N=58)	Sometimes (N=31)	Frequent (N=28)	Total (N=117)	p-value
OSA (>5 OAHI) at Pre-Op					0.919
No	16 (30.8%)	9 (33.3%)	9 (34.6%)	34 (32.4%)	
Yes	36 (69.2%)	18 (66.7%)	17 (65.4%)	71 (67.6%)	
Pre-Op Degree OSA					0.178
None (<1)	2 (3.8%)	1 (3.7%)	1 (3.8%)	4 (3.8%)	
Mild (1 - <5)	14 (26.9%)	8 (29.6%)	8 (30.8%)	30 (28.6%)	
Moderate (5 - <10)	10 (19.2%)	10 (37.0%)	2 (7.7%)	22 (21.0%)	
Severe (10+)	26 (50.0%)	8 (29.6%)	15 (57.7%)	49 (46.7%)	
OSA (>5 OAHI) at Post-Op					0.528
No	28 (48.3%)	19 (61.3%)	15 (53.6%)	62 (53.0%)	
Yes	30 (51.7%)	12 (38.7%)	13 (46.4%)	55 (47.0%)	
Post-Op Degree OSA					0.739
None (<1)	10 (17.2%)	5 (16.1%)	5 (17.9%)	20 (17.1%)	
Mild (1 - <5)	18 (31.0%)	14 (45.2%)	10 (35.7%)	42 (35.9%)	
Moderate (5 - <10)	17 (29.3%)	4 (12.9%)	6 (21.4%)	27 (23.1%)	
Severe (10+)	13 (22.4%)	8 (25.8%)	7 (25.0%)	28 (23.9%)	

Table 1: Breakdown of changes in diagnosis and severity of OSA categorization Pre to Post-op.

There was no association between parent perception of symptoms and OSA categorization post- op (p>0.05) (Figure 1) or of parent perception of symptoms improving and OSA categorization improving post-op (p>0.05) (Figure 2).

OSA improvement in those parents who perceived an improvement, 15 (38.5%), was not significantly different from the OSA improvement in those who perceived no symptom improvement 26 (51%) (p = 0.33).

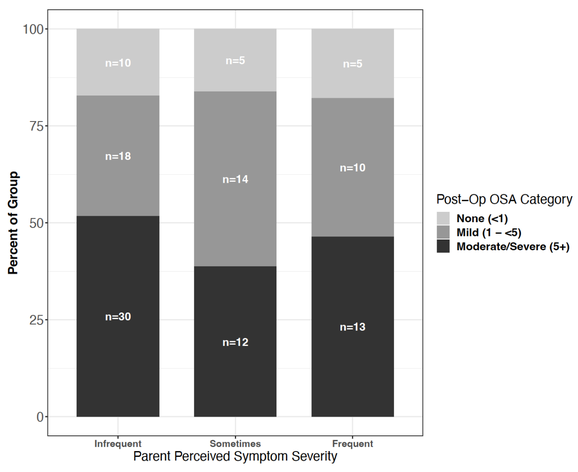


Figure 1. Comparison of Parent's Perception of sleep related symptoms and PSG measured OSA categorization Post-Op

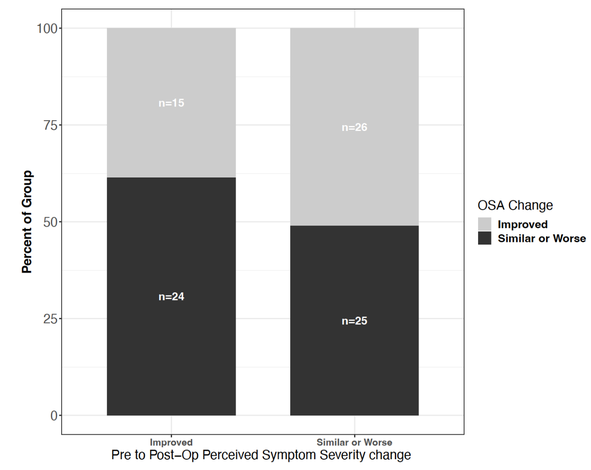


Figure 2. Comparison of Change Pre-to-Post surgery of parent perception of symptoms to change in OSA categorization.

Conclusions

Children with DS have a higher incidence of OSA than the general pediatric population and the initial surgical therapy recommended is T&A. However, there is a large proportion of these children who have persistent OSA despite surgical intervention.
Parental perception of nighttime breathing does not improve with experience.
There was no significant association between parent perception of symptoms and OSA categorization post-op.
Clinical history alone is insufficient to detect persistent OSA after T&A.
We recommend obtaining a PSG rather than relying on parental assessment to determine if a T&A has been successful.

Implications

Currently, there are no guidelines for post-T&A PSG in children with DS.
These results indicate one cannot rely on parent reported sleep symptoms to determine if the OSA has resolved.
Since children with DS frequently have persistent OSA, one should request a post-op sleep study to assess the success of surgery.
To optimize surveillance for OSA, providers should consider modifying either their surgery requests or postoperative orders, so a postoperative sleep study request is placed by default.
Further investigations are necessary to determine if there is a better screening tool that would predict surgical outcomes.

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