

Abstract

Objective: To determine whether degree of lateral pharyngeal wall (LPW) obstruction on pediatric drug-induced sleep endoscopy (DISE) correlates with pre-procedure Brodsky tonsillar hypertrophy score on physical examination.

Methods: Retrospective review of 140 patients who underwent DISE at a single pediatric tertiary care center over a four-year period. Inclusion criteria were documentation of Brodsky score on pre-operative physical examination. Exclusion criteria were previous tonsillectomy. LPW obstruction was graded for each patient from 0 (no obstruction) to 3 (severe obstruction) using the validated Chan-Parikh (C-P) score, a pediatric scoring system for DISE. Data were analyzed using multivariate linear regression controlling for age at time of DISE and presence of comorbid conditions.

Results: Eighty patients met criteria for analysis. Median age at DISE was 6.1 years. A moderate positive correlation was calculated between Brodsky score and C-P LPW score, Spearman correlation coefficient 0.57, $p < 0.001$. Linear regression modeling determined that for every one-point increase in tonsil score, there was a 0.75-point increase in C-P LPW score (95% CI [0.45, 1]). Sensitivity analysis did not detect a difference in correlation between children with syndromic comorbid conditions and children who were otherwise in good health.

Conclusion: This study detected a moderate degree of correlation between Brodsky and LPW score. The majority of children with a Brodsky score of 1 did not demonstrate any LPW obstruction, and several children who did not have tonsillar hypertrophy demonstrated severe obstruction. This is further evidence that DISE serves as a useful method for evaluating airway obstruction contributing to sleep-disordered breathing.

Objective

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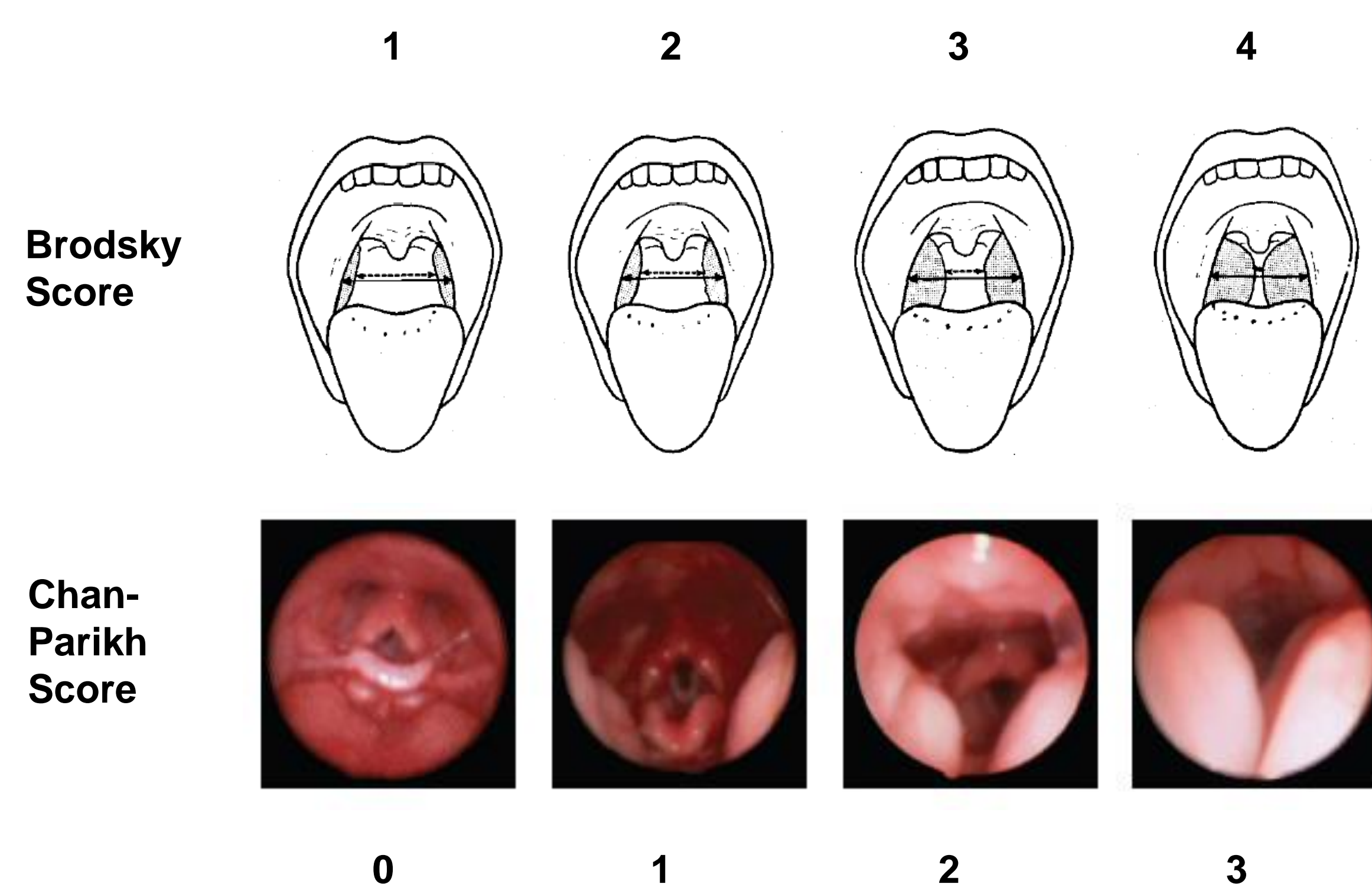


Figure 1: Comparison between Brodsky tonsillar scoring and Chan-Parikh endoscopic scoring

Introduction

- Obstructive sleep apnea (OSA) affects 1-4% of children.
- Physical exam is commonly used to evaluate tonsil size using the Brodsky score (Figure 1).
- Brodsky score has demonstrated poor correlation with true tonsil volume.
- Current AAP guidelines suggest adenotonsillectomy (T&A) is first line therapy for OSA regardless of size.
- 15-20% of patients will have residual OSA after T&A.
- Drug induced sleep endoscopy (DISE) is a relatively new diagnostic tool used to evaluate the upper airway during pharmaceutically induced sleep.
- Chan-Parikh (C-P) score used to describe severity of obstruction at five different sites including lateral pharyngeal wall (Figure 1).
- If PE correlates well with DISE obstruction, physical exam may be predictive of failures, particularly for small tonsils.

Methods and Materials

- Retrospective review of 140 patients who underwent DISE at a single pediatric tertiary care center over a four-year period.
- Inclusion criteria
 - Documentation of Brodsky score on pre-operative physical examination.
- Exclusion criteria:
 - Previous tonsillectomy.
- LPW obstruction was graded from 0 (no obstruction) to 3 (severe obstruction) Chan-Parikh (C-P) score
- Data were analyzed using multivariate linear regression controlling for age at time of DISE and presence of comorbid conditions.

Results

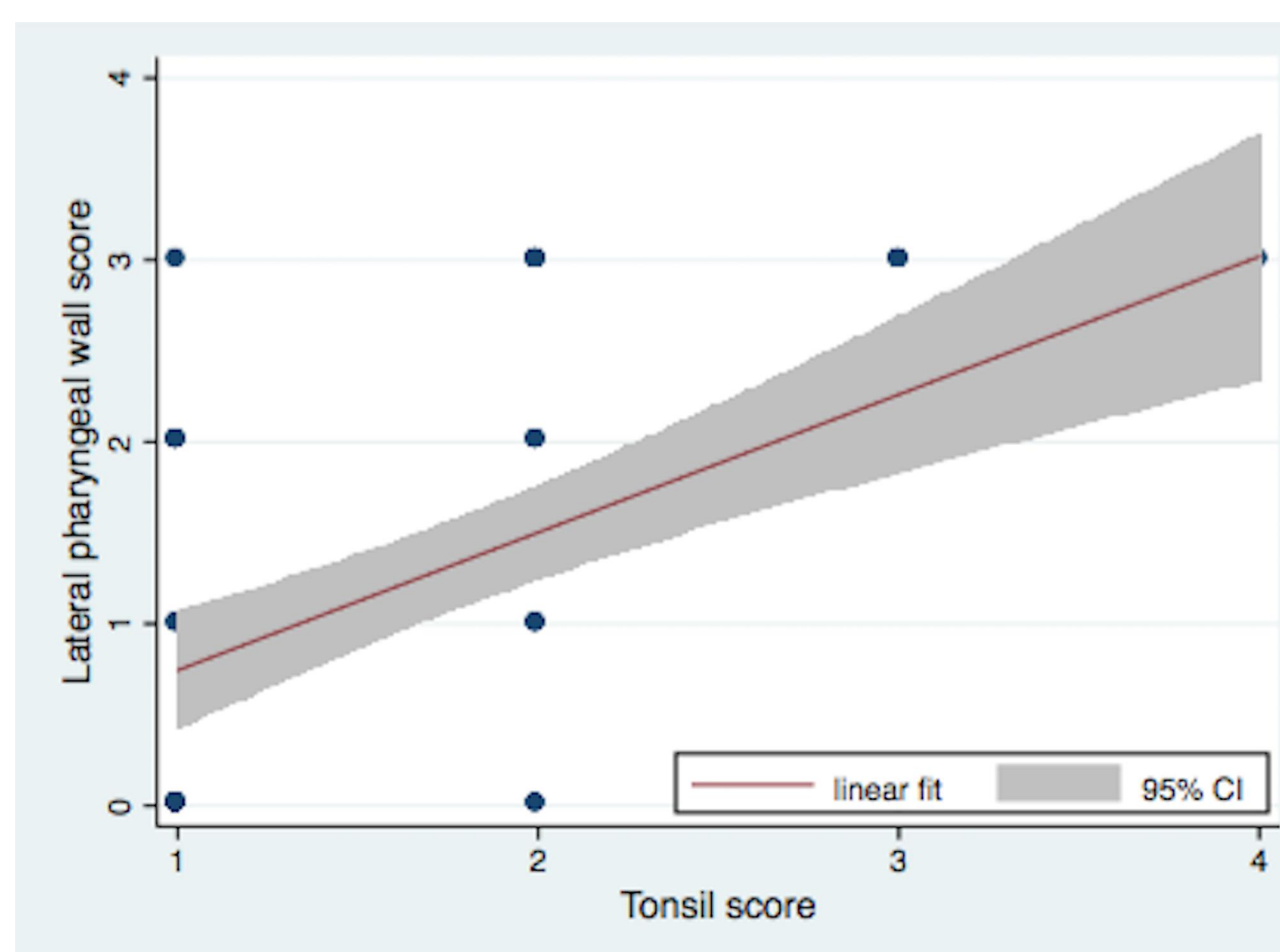


Figure 2: Correlation between Brodsky score and LPW. Spearman correlation coefficient 0.57, ($p < 0.001$)

- Eighty patients met criteria for analysis.
- Median age at DISE was 6.1 years.
- A moderate positive correlation was calculated between Brodsky score and C-P LPW score (Spearman correlation coefficient 0.57, $p < 0.001$)
- Linear regression modeling determined that for every one-point increase in tonsil score, there was a 0.75-point increase in C-P LPW score (95% CI [0.45, 1]).
- Sensitivity analysis did not detect a difference in correlation between children with syndromic comorbid conditions and children who were otherwise in good health.

	Number	Age in years [SD]	Mean AHI* [SD]	% with syndrome
Brodsky score				
1	40	10 [18]	15 [40]	43%
2	25	6 [5]	16 [26]	52%
3	14	14 [30]	19 [17]	71%
4	3	7 [6]	56 [71]	33%
Lateral pharyngeal wall score				
0	53	10 [16]	14.3 [36]	43%
1	11	8 [5]	8 [9]	45%
2	19	6 [3]	6 [5]	53%
3	23	12 [23]	26 [29]	61%

*Not all patients had polysomnography results available

Table 1: Demographics

Lateral Pharyngeal Wall

	0	1	2	3	Total	
Brodsky score	1	28	3	7	2	40
	2	3	5	5	10	23
	3	2	0	5	7	14
	4	1	0	0	2	3
Total	34	8	17	21	80	

Table 2. Agreement between Brodsky score and LPW. Weighted kappa analysis demonstrated a 73% agreement between LPW and Brodsky score ($\kappa = 0.358$, 95% CI [0.32-0.43])

Discussion

- With a 15-20% chance of having residual OSA after T&A in children, further diagnostic tools are necessary to determine anatomic sources of OSA.
- DISE is not the standard of care for children with OSA, but may be helpful in accurately identifying sources of obstruction in OSA.
- In this study, correlation of physical exam with DISE suggests that physical exam may be better than previously thought at predicting true tonsillar obstruction.
- This finding is particularly important in children with small tonsils as they may have alternate sources of obstruction.
- Limitations of this study include:
 - Lack of DISE after tonsillectomy
 - Other demographic measurements including BMI

Conclusions

- Physical examination of the tonsils correlates well with DISE severity of pharyngeal obstruction.
- This new finding challenges the paradigm that all tonsils should be removed in children with OSA regardless of size.
- Further investigation necessary to determine if concurrent DISE is helpful in children with small tonsils.

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References

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