Snoring sound energy as a potential biomarker for disease severity and surgical response in childhood obstructive sleep apnea: a pilot study

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Objective: To investigate the relationship between baseline snoring sound energy (SSE) and disease severity, changes in SSE after adenotonsillectomy (T&A), and the predictors of surgical success in children with obstructive sleep apnea (OSA).

Methods: This prospective cohort study was conducted in a tertiary referral sleep center and included 32 consecutive children with OSA (median age 9 years [interquartile range: 6–10], median body mass index 19.0 [interquartile range: 16.3–21.0], and median apnea-hypopnea index [AHI] 13.2 [interquartile range: 2.7–24.1]). T&A was performed in all participants. Snoring sound analysis and polysomnography were performed at baseline and six months after T&A. Surgical success was defined as postoperative AHI less than 1.5

Results: In multivariate logistic regression, baseline tonsil size IV (odds ratio 15.7 [95% CI: 1.5–166.3]) and SSE of 801–1000 Hz >21.9 dB (odds ratio 32.3 [95% CI: 2.6–396.6]) were significantly related to severe OSA. Following T&A, AHI decreased significantly (effect size = 0.62, $P < 0.001$,). SSE of 41–200 Hz, 201–400 Hz, and 801–1000 Hz also decreased significantly after surgery (effect size = 0.27, 0.3, and 0.4, respectively; $P = 0.04$, 0.01, and 0.006, respectively). Baseline SSE of 801–1000 Hz <8.5 dB significantly predicted surgical success (odds ratio 11.0 [95% CI: 1.4–85.2]).

Conclusion: Our findings elucidate the potential utility of SSE of 801–1000 Hz to screen severe OSA, predict surgical success, and measure therapeutic outcome. Specific baseline SSE may represent a potential biomarker for childhood OSA.