

Coblation intracapsular tonsillectomy outcomes in paediatric obstructive sleep disordered breathing: A Singapore study

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ABSTRACT

Introduction: Coblation intracapsular tonsillectomy (ICT) may offer a more favourable post-operative morbidity profile compared with extracapsular tonsillectomy for paediatric obstructive sleep-disordered breathing (oSDB). Data from the Singapore paediatric population remain limited. This study examines the outcomes of coblation ICT in children with oSDB at a tertiary centre in Singapore.

Methods: This was a single-centre prospective cohort study of 102 consecutive children aged 21 months to 15 years undergoing coblation ICT for oSDB (April–October 2023). Concurrent adenoidectomy was performed in 98.0% of patients. Primary outcomes included complications and disease-specific quality of life (QoL) via the Obstructive Sleep Apnea-18 Quality of Life (OSA-18) questionnaire (where higher scores indicate greater symptom burden and poorer quality of life), assessed pre-operatively and at 3 months. Secondary outcomes included pain, analgesia, diet, and snoring resolution.

Results: No post-operative haemorrhage or major complications occurred. All 102 patients completed a 3-month review. The median OSA-18 score improved significantly from 74 (interquartile range [IQR] 54–89) to 29.5 (IQR 23–40) post-operatively ($P < 0.001$), representing a shift from the moderate to the minimal impact band. The mean change of 39.3 points exceeded twice the published minimal clinically important difference (standardised response mean 2.17). Perceived QoL score improved from median 5 (IQR 4–6.6) to 8 (IQR 8–9) ($P < 0.001$). At 3 months, 82.4% had no snoring. Post-operative pain was mild, with 75.5% requiring analgesia for 3 days or fewer.

Conclusion: In this uncontrolled single-arm cohort, coblation ICT with concurrent adenoidectomy was associated with low morbidity and clinically meaningful improvements in caregiver-reported outcomes. These hypothesis-generating findings warrant further investigation through multicentre comparative studies with longer follow-up.

Keywords: coblation, intracapsular tonsillectomy, otorhinolaryngology, paediatrics, quality of life, sleep apnoea

CLINICAL IMPACT

What is New

- To the authors' knowledge, this is the first Singapore data on coblation intracapsular tonsillectomy outcomes for paediatric obstructive sleep-disordered breathing in Singapore, benchmarked against international cohorts.
- Clinically meaningful OSA-18 quality-of-life improvement, with effect size well above published minimal clinically important difference, supporting larger, longer-term Singapore validation studies.

Clinical Implications

- Low morbidity in real-world use (zero haemorrhage, mild pain, rapid diet recovery), pending long-term validation.
- Reflects real surgical practice (98% concurrent adenoidectomy), useful for setting expectations pending comparative trials.
- Findings may guide patient selection: children with greater baseline symptom burden showed the largest gains, useful for counselling families.

INTRODUCTION

Obstructive sleep-disordered breathing (oSDB) in children, ranging from snoring to severe obstructive sleep apnoea (OSA), is associated with significant neurocognitive, behavioural, and cardiovascular sequelae.¹ While tonsillectomy remains the standard surgical intervention, it is sometimes complicated by significant post-operative pain, bleeding, and delayed recovery, particularly in paediatric populations.^{2,3} Coblation intracapsular tonsillectomy (ICT), which involves removal of tonsillar tissue while preserving the capsule, has emerged as a promising alternative that may reduce post-operative morbidity while

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maintaining clinical efficacy. The intracapsular approach is particularly suited to children with obstructive symptoms, as the preserved tonsillar capsule acts as a natural barrier to reduce pain and bleeding; in contrast, extracapsular tonsillectomy is generally preferred for recurrent tonsillitis, where complete removal of tonsillar tissue is required to reduce infection recurrence.³ However, data on its safety and effectiveness in the Singapore paediatric population remain limited.

To the authors' knowledge, this represents the first prospective study in Singapore examining the outcomes of coblation ICT for patients with oSDB at a paediatric otolaryngology practice, with a particular focus on post-operative outcomes, symptom resolution, and quality of life (QoL).

METHODS

Study design

This was a single-centre, prospective cohort study conducted at KK Women's and Children's Hospital in Singapore, from April 2023 to October 2023. All eligible patients underwent coblation ICT performed by a single, experienced surgeon, which reflects the current practice model at the institution where this technique was introduced and standardised during the study period. All eligible patients presenting during the study period were enrolled consecutively. No additional selection criteria were applied beyond the eligibility criteria stated below.

Inclusion and exclusion criteria

Children aged between 21 months and 15 years with oSDB and tonsillar hypertrophy undergoing coblation ICT were included in this study.

Exclusion criteria included children with a history of recurrent tonsillitis (to isolate oSDB as the primary indication for surgery), bleeding disorders (due to increased perioperative risk), previous tonsil surgery (to avoid confounding due to altered anatomy), or suspected malignancy (where complete tissue excision is needed for definitive histopathological assessment).

Surgical technique

All eligible patients with oSDB underwent coblation ICT performed by a single surgeon, under general anaesthesia. Adenoidectomy was concurrently performed in cases where adenoid hypertrophy was clinically relevant. Surgery was performed using the EVAC 70 XTRA coblator wand (Smith & Nephew, London, UK).

Outcome measures

Outcome measures were assessed before patients' discharge and at outpatient follow-ups 1 week and 3 months after surgery.

Primary outcomes of interest included: (1) perioperative and postsurgical complications (including haemorrhage and other adverse events requiring intervention), and (2) disease-specific QoL, assessed via the Obstructive Sleep Apnea-18 Quality of Life (OSA-18) questionnaire⁴ pre-operatively and at the 3-month post-operative visit. The OSA-18 is an 18-item disease-specific QoL instrument with a total score ranging from 18 to 126, where higher scores indicate greater symptom burden and poorer QoL.

Secondary outcomes included post-operative pain control (measured by the Wong-Baker FACES Scale⁵ [WBS]), time to resume diet (both soft and normal), snoring resolution (reported by caregivers), hospital readmissions, and any incidents of tonsil regrowth.

Statistical analysis was conducted using the Wilcoxon signed-rank test to compare pre- and post-operative OSA-18 and QoL scores, with significance set at $P < 0.05$. Change in OSA-18 score was calculated as the paired pre- to post-operative difference for each patient, and effect size was expressed as standard response mean (SRM), calculated as the mean change divided by standard deviation. All analyses were conducted using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp, Armonk, NY).

RESULTS

Demographics

A total of 102 children with oSDB secondary to adenotonsillar hypertrophy were enrolled in the study. The mean age was 6.0 ± 2.5 years (71.3 ± 31.7 months), with a median of 5.5 years (range: 21 months to 15.0 years). The majority were male (64.7%, $n=66$), with 35.3% female ($n=36$). The cohort was ethnically diverse, comprising 45.1% Chinese ($n=46$), 20.6% Malay ($n=21$), 15.7% Indian ($n=16$), 2.9% Caucasian ($n=3$), and 15.7% from other ethnic backgrounds ($n=16$) (Table 1).

Surgical indications and concurrent procedures

The primary indication for surgery was snoring without a formal diagnosis of OSA, accounting for 86.3% ($n=88$) of cases. Formal OSA, confirmed by polysomnography, was present in a minority: 3.9% ($n=4$) had mild OSA, 2.9% ($n=3$) had moderate OSA, and 6.9% ($n=7$) had severe OSA. All children meeting the American Academy of Otolaryngology–Head and

Table 1. Demographics and duration of hospital stay.

	n	%
Age (years)		
Mean	6.0	
Median	5.5	
Standard deviation	2.5	
Minimum	1.7 (21 months)	
Maximum	15.0	
Sex		
Male	66	64.7
Female	36	35.3
Ethnicity		
Chinese	46	45.1
Malay	21	20.6
Indian	16	15.7
Caucasian	3	2.9
Others	16	15.7
Indications for ICT		
Snoring	88	86.3
Mild OSA	4	3.9
Moderate OSA	3	2.9
Severe OSA	7	6.9
Adenoid size (Grade)		
1	3	2.9
2	32	31.4
3	45	44.1
4	22	21.6
Tonsil size (Brodsky scale grades)		
1	1	1.0
2	35	34.3
3	49	48.0
4	17	16.7
Days of hospitalisation		
0 (day surgery)	8	7.8
1	84	82.4
2	10	9.8
Total	102	100

ICT: intracapsular tonsillectomy; OSA: obstructive sleep apnoea

Days of hospitalisation: Day 0 = day-surgery discharge;

Day 1 = post-operative day 1 discharge;

Day 2 = post-operative day 2 discharge

Neck Surgery's high-risk criteria underwent pre-operative polysomnography. In the remaining snoring-only cases, the decision to operate was based on the clinical assessment of significant adenotonsillar hypertrophy and caregiver-reported symptoms, without routine pre-operative polysomnography, consistent with guideline-concordant practice for uncomplicated presentations (Table 1).

Concurrent procedures were performed in 36.3% (n=37) of patients. The most common was myringotomy with ventilation tube insertion (50.0%), followed by inferior turbinate (IT) diathermy alone (31.6%). Additional procedures included Little's area diathermy for epistaxis (5.3%, n=2), and isolated cases of microlaryngobronchoscopy, diagnostic laryngoscopy, tongue-tie release, and drug-induced sleep endoscopy (2.6% each, n=1).

Concurrent adenoidectomy was performed in the majority of cases (98.0%, n=100), reflecting real-world clinical practice. The outcomes reported represent combined surgical effect, consistent with how coblation ICT is delivered in a specialist paediatric otolaryngology setting. The 2 patients who did not receive adenoidectomy represent too small a subgroup for meaningful stratified analysis.

Tonsil and adenoid grading

Adenoid and tonsil hypertrophy were assessed clinically and intraoperatively. The majority of patients had moderate to severe adenoid enlargement, with Grade 3 (44.1%, n=45) being the most common, followed by Grade 2 (31.4%, n=32), Grade 4 (21.6%, n=22), and Grade 1 (2.9%, n=3).

Tonsil size was graded separately for each side using the Brodsky scale (Grades 1–4). The mean tonsil grade was Grade 3 bilaterally, and the most frequent grade per side⁶ was Grade 3 (48.0%, n=49), followed by Grade 2 (34.3%, n=35), Grade 4 (16.7%, n=17), and Grade 1 (1.0%, n=1). These findings reflect a study population predominantly exhibiting moderate to severe adenotonsillar hypertrophy—consistent with the surgical indication for coblation ICT in paediatric oSDB (Table 1).

Duration of hospital stay

The majority of patients (82.4%, n=84) were discharged after 1 day, with 7.8% (n=8) of patients discharged as day cases, and 9.8% (n=10) requiring 2-day stays. All patients who stayed for 2 days were elective admissions without complications (Table 1).

Postsurgical complications and quality of life (primary outcomes)

No episodes of post-operative haemorrhage requiring surgical intervention were reported. At 3 months, there were no readmissions for morbidity, recurrent tonsillitis, or further significant complications. Two

cases of small tonsil fossa clots were observed, which both resolved with conservative management without the need for surgical intervention. One case of focal tonsil regrowth in the left superior pole was noted, but this did not lead to any clinical symptoms or require intervention (Table 2).

Post-operative recovery and pain management (secondary outcomes)

Post-operative pain assessment was completed in 94.1% (n=96) of patients. Pain scoring was limited in 6 patients due to age-related or developmental challenges—3 were aged 24 months or younger, 1 had autism spectrum disorder, and 2 had Down syndrome. Pain was evaluated using the WBS, and was generally mild. On post-operative days 0–1 (POD 0–1), 43.8% (n=42) of patients reported no pain (WBS 0), while 35.4% (n=34) reported minimal pain (WBS 2). Only 2.1% (n=2) experienced severe pain (WBS 8 or 10). The median pain score on POD 0–1 was 2 (IQR 0–2), indicating generally mild pain. By the first outpatient review on POD 7, 85.4% (n=82) of patients reported no pain (Table 3).

Analgesia use was brief in most cases, with 75.5% (n=77 of 102) requiring pain relief for 3 days or fewer. Dietary recovery was similarly rapid: by POD 0–1, 94.1% (n=96 of 102) of patients were able to tolerate at least half portions of a soft diet. By POD 7, 84.3% (n=86 of 102) had resumed a normal diet, while the remaining 15.7% (n=16 of 102) transitioned to a normal diet between POD 7 and 14 (Table 3).

Snoring resolution (secondary outcome)

Snoring showed significant improvement by POD 7, with 66.7% (n=68) of patients reporting no snoring and 16.7% (n=17) experiencing a reduction in snoring intensity. The remaining 16.7% (n=17) were still experiencing snoring at a level comparable to pre-operative levels at POD 7 (Table 3).

All 102 enrolled patients completed the 3-month review with complete outcome data. At 3 months, 82.4% (n=84) of patients were no longer observed to be snoring. Of the remaining 18 patients, 11.8% (n=12) had minimal residual snoring occurring predominantly during respiratory tract infections, and 5.9% (n=6) had stable snoring comparable to pre-operative levels (Table 3).

Importantly, oSDB in children is often multifactorial in aetiology. Contributing factors beyond adenotonsillar hypertrophy include obesity, significant allergic rhinitis with associated nasal obstruction, and craniofacial anomalies. These comorbidities may independently affect symptom severity and surgical outcomes and should be considered when interpreting results. In this study's cohort, patients with concurrent IT hypertrophy—suggestive of allergic rhinitis based on clinical history and nasal endoscopic findings—were identified and managed with concomitant IT diathermy where clinically indicated. Patients with significant obesity or syndromic conditions were not specifically excluded but represented a minority of cases; these are acknowledged as potential confounders of post-operative outcomes.

A significant improvement was observed in both the OSA-18 and QoL scores. The median pre-operative OSA-18 score was 74 out of 126 (interquartile range [IQR] 54–89), which decreased significantly to 29.5 (IQR 23–40) post-operatively ($P<0.001$). Similarly, the perceived QoL score—a single global item rated on a scale of 0 to 10, where 0 represents the worst and 10 the best perceived QoL—demonstrated a statistically significant improvement, with the median pre-operative score of 5 (IQR 4–6.6) increasing to 8 (IQR 8–9) postsurgery ($P<0.001$). This represented a shift from the moderate OSA-18 impact band (score 60–80) pre-operatively to the minimal impact band (score <60) post-operatively.⁴ The mean change of 39.3 points (standard deviation 18.1) substantially exceeded the

Table 2. Postsurgical complications (primary outcome)—POD 0 to 3 months.

Complication	n	%
Post-operative haemorrhage requiring intervention	0	0.0
Observed tonsil fossa clots (monitored, conservative management) ^a	2	2.0
Morbidity-related readmissions	0	0.0
Recurrent tonsillitis	0	0.0
Recurrence of snoring ^b	0	0.0
Tonsil regrowth	1	1.0

POD: post-operative day

^a Tonsil fossa clots resolved with conservative management; no surgical intervention required.

^b Recurrence of snoring refers to snoring that resolved, then recurred (distinct from residual/persistent snoring, defined as snoring that never fully resolved after surgery).

Table 3. Post-operative recovery outcomes (secondary outcomes).

	n	%
Pain (POD 0/1) — WBS		
WBS 0 (no pain)	42	43.8
WBS 2 (minimal)	34	35.4
WBS 4	11	11.5
WBS 6	7	7.3
WBS 8	1	1.0
WBS 10 (severe)	1	1.0
Total assessed	96	100
Pain (POD 7) — Wong-Baker FACES Scale^a		
WBS 0 (no pain)	82	85.4
WBS 2 (minimal)	12	12.5
WBS 4	2	2.1
WBS 6	0	0.0
WBS 8	0	0.0
WBS 10 (severe)	0	0.0
Total assessed	96	100
Analgesia requirement		
≤3 days	77	75.5
>3 days	25	24.5
Total assessed	102	100.0
Diet		
Tolerated at least ½ portion soft diet (POD 0–1): Yes	96	94.1
Tolerated at least ½ portion soft diet (POD 0–1): No	6	5.9
Total assessed	102	100.0
Return to normal diet (POD 7): Yes	86	84.3
Return to normal diet (POD 7): No	16	15.7
Total assessed	102	100.0
Snoring (POD 7)		
No snoring	68	66.7
Yes (improved, minimal)	17	16.7
Yes (stable, comparable to pre-op)	17	16.7
Total assessed	102	100.0
Snoring (3 months)		
No snoring	84	82.4
Yes (improved, minimal)	12	11.8
Yes (stable, comparable to pre-op)	6	5.9
Total assessed	102	100.0

POD: post-operative day; WBS: Wong-Baker FACES Scale (0 = no pain, 10 = worst pain)

^a Pain scoring was completed in 96 of 102 patients; 6 patients were unable to complete scoring due to age or developmental factors.

published minimal clinically important difference (MCID) of 15–18 points for the OSA-18,⁴ and the standardised response mean (SRM) of 2.17 indicates a very large effect size by conventional thresholds (Table 4).

DISCUSSION

In this uncontrolled single-arm cohort, ICT—performed with concurrent adenoidectomy in 98.0% of patients and additional nasal or middle-ear procedures in 36.3%—was associated with low post-operative morbidity and significant caregiver-reported improvements in symptom burden and QoL. Most participants experienced low to minimal pain, an early return to normal diet, and significant post-operative improvements in both OSA-18 symptom scores and overall QoL. The magnitude of OSA-18 improvement is clinically meaningful, not merely statistically significant: the cohort moved from the moderate to the minimal impact severity band, the mean change of 39.3 points exceeded twice the published MCID threshold, and the SRM of 2.17 reflects a very large effect size—indicating substantial caregiver-perceived improvement in disease-specific QoL.

These findings are consistent with those reported by Amin et al., whose large cohort study of 1257 paediatric patients found significant improvements in health-related QoL across all domains, with a median analgesia requirement of 6 days, no returns to theatre for post-operative haemorrhage, rapid recovery, and a low revision rate of 2.6%—primarily due to tonsillar regrowth. Patients in that study had a median direct follow-up of 101.5 days, with longer-term outcomes estimated over a median of 1419 days based on patient age at entry and anticipated follow-up duration (as reported by Amin et al.).⁷ A recent single-arm pooled-proportion meta-analysis by Lin et al. (14 studies, 9821 patients) reported a post-tonsillectomy haemorrhage rate of 1.0% (95% confidence interval [CI] 0.5–1.6) and a rate of further tonsil surgery of 1.4% (95% CI 0.6–2.2) following coblation ICT, providing a useful benchmark against which the zero haemorrhage rate may be contextualised.⁸ This study was not designed as a head-to-head comparison with extracapsular techniques and does not establish superiority of the intracapsular approach.

The choice of intracapsular versus extracapsular tonsillectomy depends on the primary indication for surgery. The intracapsular approach is particularly well-suited to children with oSDB, as preservation of the tonsillar capsule reduces exposure of the pharyngeal musculature, thereby limiting post-operative pain and bleeding risk. In contrast, extracapsular tonsillectomy remains the preferred approach for recurrent tonsillitis, where complete removal of tonsillar tissue is necessary to prevent recurrent infection.³

Importantly, no major post-operative complications, including secondary haemorrhage, were observed in this study's cohort. Tonsillar capsule preservation and reduced thermal damage have been proposed in the literature as mechanisms underlying the favourable morbidity profile observed with this technique, potentially contributing to faster recovery and reduced analgesic requirements.^{7–11} The authors acknowledge, however, that this study's cohort comprised cases performed by a single, experienced surgeon, which may have contributed to the low complication rate. This potential selection bias should be considered when interpreting these results, and multicentre data including surgeons at varying stages of the learning curve would be necessary to fully characterise the safety profile of this technique.

Children with greater pre-operative symptom burden—reflected in higher OSA-18 scores and lower baseline QoL—experienced the most substantial gains following surgery. These results are consistent with the existing literature suggesting that children with more pronounced oSDB symptoms derive the greatest functional and QoL gains from surgical intervention,^{3,4} and support the internal consistency and construct validity of the OSA-18 as a disease-specific outcome measure.⁵

A subset of patients demonstrated persistently elevated post-operative OSA-18 scores and suboptimal QoL outcomes. Post-operative OSA-18 scores were negatively correlated with both post-operative QoL and degree of QoL improvement, suggesting that residual symptoms after surgery continue to meaningfully affect caregiver-perceived well-being. These patients were more likely to harbour concomi-

Table 4. Pre- and post-operative OSA-18 and QoL scores.

	Pre-operative median (IQR)	Post-operative median (IQR)	P value
OSA-18 total score	74 (54–89)	29.5 (23–40)	<0.001
Perceived QoL score	5 (4–6.6)	8 (8–9)	<0.001

IQR: interquartile range; OSA-18: Obstructive Sleep Apnea-18 Quality of Life questionnaire; QoL: quality of life
Wilcoxon signed-rank test was performed using SPSS version 29.0; $P < 0.05$.

tant risk factors for oSDB beyond tonsillar hypertrophy, including obesity and significant allergic rhinitis, the latter reflected by the need for IT diathermy. It is also relevant that the majority of patients in this cohort underwent surgery on the basis of caregiver-reported snoring and clinical examination findings without pre-operative polysomnography, and may therefore include children in whom the true severity of oSDB was not formally quantified pre-operatively. This is a recognised limitation of clinically driven surgical decision-making in this population, and may contribute to the residual symptom burden observed in a subset of patients. Identifying such patients pre-operatively is therefore clinically important, as they may benefit from additional or alternative interventions alongside or instead of surgery, including weight management, intranasal corticosteroid therapy, or further sleep investigations. These findings underscore the importance of pre-operative counselling regarding realistic surgical expectations in children with complex or multifactorial oSDB, and may help refine patient selection for coblation ICT. Formal identification of independent predictors of residual symptoms was beyond the scope of this study. Future larger multicentre studies should prospectively investigate predictors of surgical outcome following coblation ICT.

The improvement in snoring observed at both POD 7 and 3 months is encouraging, though the durability of this benefit beyond 3 months—and in particular the rates of tonsillar regrowth and revision surgery—cannot be determined from the present study. Given that snoring is often the most distressing symptom for caregivers, its improvement significantly affects perceived surgical success and family well-being.

Despite this subset of patients with residual symptoms, the overall results support the broader utility of coblation ICT in paediatric oSDB. The short length of stay and rapid return to normal diet observed in this cohort may have favourable cost implications, though no formal economic analysis was performed in this study. This warrants evaluation in future research.

Limitations

Despite the strengths of this study's prospective design and comprehensive outcome assessment, several limitations merit consideration. First, as this was a single-centre study conducted by a single, experienced surgeon at a tertiary paediatric hospital, the generalisability of the findings may be limited. The low complication rate may partly reflect the surgeon's experience and the centre's established perioperative protocols, rather than being solely attributable to the technique itself. Broader adoption of coblation ICT across surgeons with varying experience levels and across different institutions would be needed to confirm the generalisability of these

safety outcomes. Future multicentre studies, ideally including a comparison arm of standard extracapsular tonsillectomy, would provide more robust evidence.

Second, the follow-up period was limited to 3 months postsurgery. All 102 enrolled patients completed the 3-month review. While this timeframe captures early post-operative recovery and short-term symptom resolution, it is insufficient to assess the outcomes on which the intracapsular technique is most contested—specifically tonsillar regrowth and revision surgery. The principal long-term concern specific to intracapsular techniques is regrowth of preserved tonsillar tissue with recurrent obstruction requiring revision. Amin et al. reported a revision rate of 2.6% accruing over a median estimated follow-up of 1419 days, with younger age, severe OSA, and severe comorbidity identified as independent risk factors.⁷ The present study's cohort includes children with precisely these risk profiles—including a child aged 21 months, 7 with severe OSA, and children with Down syndrome—yet the 3-month follow-up window is too short for meaningful regrowth or revision data to have accrued. The single case of asymptomatic focal regrowth identified at 3 months and the absence of revision surgery in this cohort should therefore not be interpreted as evidence of long-term durability; these outcomes cannot yet be assessed. The authors are committed to the extended follow-up of this cohort and recommend that future studies prospectively report regrowth and revision rates over a minimum of 1 year.

Third, this is a single-arm observational study and lacks a concurrent comparison group receiving standard extracapsular tonsillectomy. The absence of a control arm limits the ability to directly attribute observed outcomes to the intracapsular technique rather than to the natural history of oSDB or non-specific effects of surgery. The authors acknowledge that concurrent adenoidectomy was performed in 98.0% of patients and other additional procedures in 36.3%. However, the authors believe that this reflects real-world practice where coblation ICT is seldom performed in isolation. The outcomes reported therefore represent the combined effect of the surgical package, which is consistent with how this procedure is delivered clinically. While the independent contribution of the ICT component cannot be isolated from this design, this pragmatic approach strengthens the external validity and clinical applicability of the findings.

This study also relied on caregiver-reported measures for key outcomes—such as snoring frequency and QoL—which introduce the potential for subjective bias. While objective assessments such as post-operative polysomnography would provide a more robust evaluation of surgical efficacy, routine pre- or post-

operative polysomnography is not standard practice for children with uncomplicated oSDB. The reliance on caregiver reports therefore reflects current clinical practice and aligns with real-world management, though it remains a limitation in terms of objective outcome measurement.

As noted above, comorbidities such as obesity and allergic rhinitis—which were not formally characterised in all patients—may have independently influenced symptom severity and post-operative outcomes. Future studies should incorporate systematic documentation of these comorbidities to better isolate the effect of surgical intervention.

Finally, pain assessment using WBS proved challenging in some younger children and those with developmental delays, which may have affected the accuracy of reported pain scores. These limitations should be addressed in future multicentre studies with extended follow-up and incorporation of objective outcome measures.

CONCLUSION

In this uncontrolled single-arm cohort, coblation ICT was associated with low post-operative morbidity and significant improvement in caregiver-reported symptom and QoL scores. Further investigation through multicentre, comparative studies with longer follow-up periods is warranted to validate the long-term efficacy of coblation ICT and to establish its role relative to traditional extracapsular tonsillectomy.

Supplementary material

Fig. S1. Participant flow diagram.

Ethics statement

This study was approved by the SingHealth Centralised Institutional Review Board (2023/2287). Written informed consent was obtained from the legal guardian of each participant prior to enrolment. This study did not receive external funding and was conducted

independently of the device manufacturer (Smith & Nephew, London, UK); the manufacturer had no role in study design, data collection, analysis, or reporting.

Declaration

The authors declare that they have no other affiliations or financial involvement with any commercial organisation with a direct financial interest in the subject or materials discussed in the manuscript.

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