REVIEW ARTICLE

Weight Gain Outcomes Following Surgical Management of Laryngomalacia in Pediatric Patients: A Systematic Review

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Abstract

Laryngomalacia is the most common congenital upper airway disorder in infants, characterized by dynamic supraglottic collapse, causing inspiratory stridor, feeding difficulties, and failure to thrive (FTT). While mild cases resolve spontaneously, severe cases often require surgical intervention. Supraglottoplasty, the gold-standard surgical treatment, alleviates airway obstruction, improves feeding efficiency, and promotes weight gain. However, outcome variability and methodological differences highlight the need for a systematic review. This review evaluates supraglottoplasty's efficacy and safety in severe laryngomalacia, focusing on weight gain, feeding efficiency, respiratory improvement, and complications. Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, PubMed and Cochrane Library were systematically searched for studies on pediatric patients undergoing supraglottoplasty. Data on weight gain, feeding, respiratory outcomes, and complications were extracted, and quality was assessed using the Newcastle–Ottawa scale. Thirteen studies (706 patients) were included. Mean age at surgery ranged from 2 weeks to 15.6 months. Weight gain improved significantly, with percentile increases of 15–26 points, particularly in infants <6 months. Feeding efficiency improved in 96% of cases, and respiratory symptoms resolved in >90%. Complication rates were low (<5%), with transient dysphagia being most common. No major adverse events were reported. Supraglottoplasty effectively improves weight gain, feeding, and respiratory outcomes in severe laryngomalacia, with a strong safety profile. Early intervention is crucial for optimal growth, especially in FTT cases. Further research, including randomized trials, is needed to standardize outcomes and refine techniques for complex cases.

Key words: Failure to thrive, feeding efficiency, laryngomalacia, pediatric airway surgery, respiratory outcomes, supraglottoplasty, weight gain

INTRODUCTION

Laryngomalacia is the most common congenital abnormality of the upper airway and is responsible for approximately 60% of cases of stridor in infancy.[1] This dynamic condition results in the collapse of the supraglottic structures during inspiration, causing varying degrees of airway obstruction.[2,3] The pathophysiology of laryngomalacia is multifactorial, but it is believed to be due to a combination of anatomical, neuromuscular, and developmental abnormalities.[4] The condition usually presents within the first 2 weeks of life, and its hallmark symptoms are inspiratory stridor, feeding difficulties, and failure to thrive (FTT).[5,6] Symptoms are self-limiting and resolve

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spontaneously as the airway matures in mild cases. However, about 10–20% of infants have more severe symptoms that require medical or surgical treatment.[7,8]

Severe laryngomalacia has repercussions beyond respiratory distress – compromising feeding efficiency and growth.[9] Infants with severe laryngomalacia often have difficulty with oral feeding because of aspiration, poor coordination of swallowing, and chronic respiratory effort.[10,11] These factors contribute to caloric deficits, leading to FTT, which can affect physical and neurodevelopmental growth.[12] In addition, the chronic hypoxia and respiratory effort associated with severe laryngomalacia may put additional metabolic stress on these reserves and contribute to growth failure.[13] These are reasons why effectively managing severe laryngomalacia is essential to prevent long-term complications.[14]

Surgical management of severe laryngomalacia has become the gold standard with supraglottoplasty.[15] This procedure corrects anatomical and functional abnormalities contributing to airway obstruction by removing redundant supraglottic tissue, dividing the aryepiglottic folds, or fixing other structural deficits.[16,17] Supraglottoplasty relieves airway obstruction, improves respiratory function, supports catch-up growth, and facilitates adequate feeding.[18] The procedure has been shown to resolve stridor, improve feeding efficiency, and improve weight gain dramatically.[19,20] However, variability in surgical techniques, patient populations, and outcome measures among these studies suggests the need for a systematic evaluation of the current evidence.[21]

Evaluating surgical outcomes for laryngomalacia mainly depends on weight gain.[22] It is a direct measure of recovery from FTT and is a surrogate marker for improvements in feeding efficiency and respiratory function.[23] There are consistent reports of significant weight gain after supraglottoplasty, with some reports of normalization of growth curves within a few months after surgery.[24] However, inconsistencies in the magnitude and timing of weight gain reported in studies raise the need to study the determinants of these outcomes in greater depth.[25]

They are also crucial in the widespread adoption of supraglottoplasty because of the safety and complication rates.[26] Although most studies describe low rates of adverse events, comorbidities and different forms of surgical technique may influence procedural outcomes.[27] These factors must be understood so that appropriate patient selection and intervention can be optimized and tailored to the needs of individuals.[28]

This systematic review aims to synthesize the evidence regarding the surgical management of laryngomalacia, including weight gain and other clinical outcomes. This review evaluates the efficacy and safety of supraglottoplasty across various patient populations and clinical settings to inform best practices and to guide future research in this area. The results will be important for understanding the potential role of timely surgical intervention in improving the growth and development of infants with severe laryngomalacia.

This systematic review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure methodological rigor and transparency. The process involved the search strategy, inclusion and exclusion criteria, study screening, data extraction, and quality assessment.

SEARCH STRATEGY

A comprehensive search was performed across three significant databases. The review included PubMed and the Cochrane Library. In the search, studies of surgical management of laryngomalacia were searched to identify studies that evaluated outcomes, including weight gain, improved feeding efficiency, and improved respiratory status. The search strategy included medical subject headings terms and free-text keywords. Search terms were "laryngomalacia," "supraglottoplasty," "surgical management," "weight gain," "failure to thrive," and "feeding difficulties." The results were refined using Boolean operators (AND, OR), and the search strategy was adapted to each database to maximize coverage. The search was not restricted by publication year or language and was completed in December 2024.

Inclusion and exclusion criteria

Studies were included if they met the following criteria:

1. Population: Pediatric patients (aged <18 years) diagnosed with laryngomalacia
2. Intervention: Surgical management, specifically supraglottoplasty, or related surgical techniques
3. Outcomes: Reporting post-operative outcomes such as weight gain, feeding improvements, respiratory symptom resolution, or quality of life
4. Study design: Randomized controlled trials, cohort studies, case–control studies, or retrospective case series.

Exclusion criteria included

1. Studies focused solely on conservative management without surgical intervention
2. Case reports, editorials, or opinion pieces
3. Studies with insufficient or incomplete outcome data
4. Non-English language studies where translations were unavailable.

STUDY SCREENING

All retrieved citations were imported into a reference management system, and duplicates were removed. Two

independent reviewers screened the titles and abstracts for relevance. Full-text articles were then assessed for eligibility based on the inclusion and exclusion criteria. Any disagreements between reviewers were resolved through discussion or by consulting a third reviewer.

DATA EXTRACTION

Data were extracted independently by two reviewers using a standardized data extraction form. Extracted data included the following:

1. Study characteristics: Author names, publication year, study location, and study design
2. Population characteristics: Sample size, mean age at intervention, and patient demographics
3. Intervention details: Surgical technique type, surgery indication, and follow-up duration
4. Outcomes: Weight gain, feeding improvements, resolution of respiratory symptoms, and complication rates.

Discrepancies in extracted data were resolved through consensus. To ensure accuracy, a third reviewer's data extraction process was cross-validated.

QUALITY ASSESSMENT

The methodological quality of the included studies was assessed independently by two reviewers using the Newcastle–Ottawa scale (NOS). The scale evaluates three domains: Selection of participants, comparability of study groups, and ascertainment of outcomes. Studies were scored out of a maximum of nine points, with higher scores indicating higher methodological quality. Disagreements in quality assessments were resolved through discussion or consulting a third reviewer.

STUDY SELECTION

A comprehensive search across PubMed and the Cochrane Library identified 418 studies. After removing duplicates, titles, and abstracts were screened, reducing the number of studies to 187 eligible for full-text review. Following the application of rigorous inclusion and exclusion criteria, 13 studies met the requirements for this systematic review. These studies focus on the surgical management of laryngomalacia and emphasize weight gain as a primary outcome. The PRISMA flow diagram presents the detailed study selection process [Figure 1]. Table 1 summarizes the search strings and results retrieved from each database.

Illustrated in the PRISMA flow diagram [Figure 1].

STUDY QUALITY ASSESSMENT

The methodological quality of the included studies was evaluated using the NOS. Scores ranged from 7 to 9, indicating moderate to high quality across all studies. Most studies demonstrated robust patient selection processes, clear intervention definitions, and sufficient follow-up durations. However, certain studies exhibited limitations in addressing potential confounders, particularly in comorbid conditions. Table 2 provides a detailed breakdown of the quality assessment for each survey, underscoring their reliability for inclusion in this review.

Study characteristics

The 13 included studies encompassed 706 pediatric patients undergoing surgical intervention for laryngomalacia. The mean age at surgery ranged from 2 weeks to 15.6 months, with most surgeries performed in infancy to address severe symptoms such as stridor, FTT, feeding difficulties, and respiratory distress. Supraglottoplasty was the primary surgical intervention using CO_2 laser or cold steel instruments. Adjunct procedures, including aryepiglottic fold release, partial arytenoidectomy, and epiglottopexy, were also reported in several studies. Follow-up durations varied significantly from 1 month to 5 years, allowing for both short- and long-term outcome evaluations. A detailed overview of the study characteristics, including patient demographics, surgical techniques, and outcomes, is presented in Table 3.

Weight gain outcomes

A central measure of success was weight gain in all 13 studies, with substantial improvements noted after surgery. These improvements show that surgical interventions, such as supraglottoplasty, can improve FTT in infants and young children with laryngomalacia.

Using data presented in the study by Czechowicz and Chang (2015), we see that the body mass index (BMI)percentile increased from 34 to 51 within 275 days after surgery. The most pronounced improvements were seen in infants under 6 months, with average weight percentile gains of 18–22 points in this subgroup.[29] Therefore, this reiterates the importance of early surgical intervention. Neiner and Gungor (2016) also saw an average increase in weight percentile of 26 points in their 3 years. After the first 3 months post-surgery, rapid recovery and sustained nutritional benefits were evident. This study also reported the normalization of weight percentiles in children previously diagnosed with severe FTT.[30] Holinger and Konior (1989) observed an 18-point increase in weight percentiles over a 14-month follow-up period. Patients in this study who presented with cyanosis and stridor at baseline showed significant improvements in both respiratory function and weight gain, with cyanosis resolution

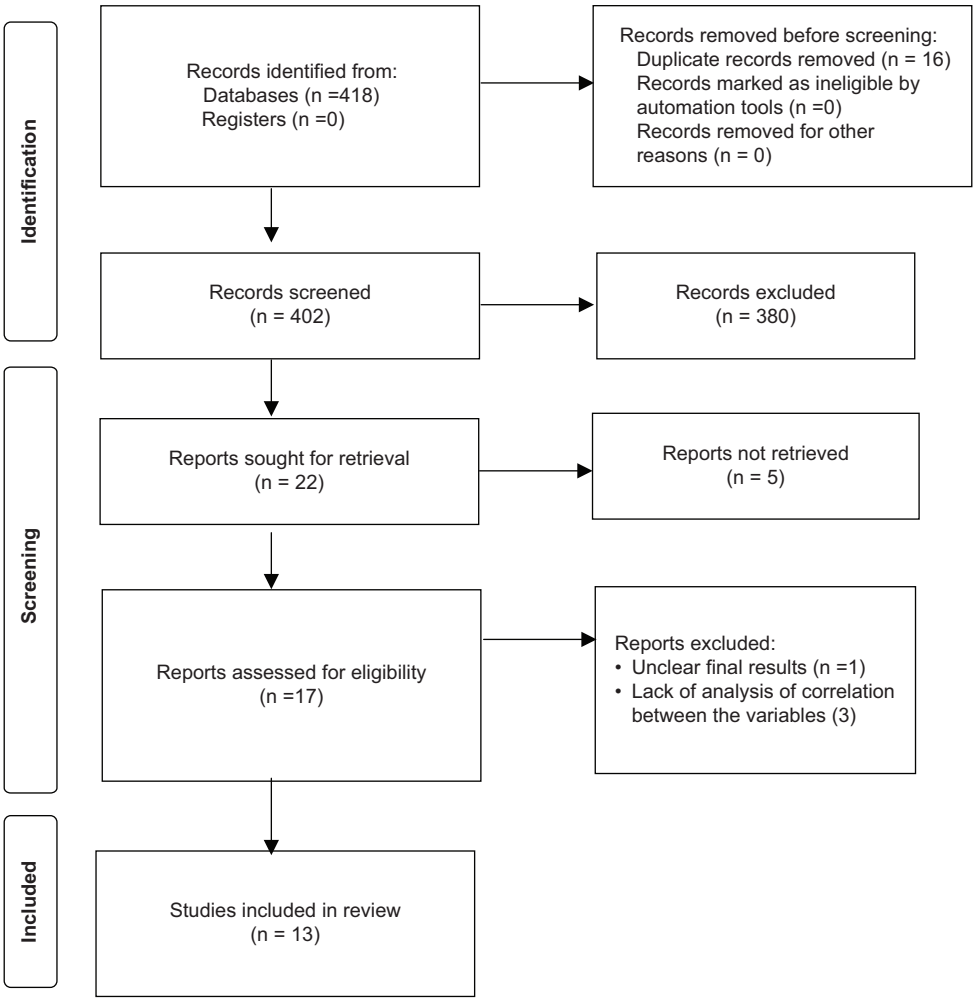

Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram of included studies

Table 1: Search strings across different databases, along with the retrieved results

Database	Search string	Results retrieved
PubMed	("Laryngomalacia" [All Fields] OR "Airway Obstruction" [All Fields]) AND ("Supraglottoplasty" [All Fields] OR "Surgical Treatment" [All Fields] OR "Surgical Management" [All Fields]) AND ("Weight" [All Fields] OR "Failure to Thrive" [All Fields] OR "Feeding Difficulties" [All Fields] OR "Respiratory" [All Fields])	402
Cochrane library	(Laryngomalacia OR Airway Obstruction) AND (Supraglottoplasty OR Surgery OR Surgical Treatment OR Surgical Management) AND (Weight OR Weight Gain OR Failure to Thrive OR Feeding OR Respiratory)	16

positively correlating with nutritional recovery.[31] Meier *et al*. provided additional insights into long-term weight gain outcomes, reporting significant improvements in z-scores within 3 months (P = 0.009). Accelerated "catch-up" growth was particularly evident in younger infants, with long-term follow-up revealing sustained normalization of growth curves. Weight percentiles improved by an average of 15–20 points, further supporting the efficacy of surgical intervention.[32] This trend was consistent across studies with longer follow-up durations, as illustrated in Figure 2.

The weight percentile increased by approximately 20 points over an average 8-month follow-up period in Eustaquio *et al*. This improvement was associated with significant improvements in feeding efficiency and stridor resolution, consistent with a full recovery of affected infants.[33] Infants normalized their weight percentile within 1 month post-surgery, according to Vandjelovic *et al*. The weight gain was accompanied by significant improvement in quality of life, and most patients reached growth curves similar to those of the general pediatric population.[34]

Table 2: Newcastle–Ottawa scale table for the 13 included studies

Authors	Selection (Max ★★★★)	Comparability (Max ★★)	Outcome (Max ★★★)	Total (Max 9)
(Loke *et al*., 2001)	★★★★	★★	★★★	9
(Czechowicz and Chang, 2015)	★★★★	★★	★★★	9
(Cohen *et al*., 2020)	★★★★	★★	★★	8
(Neiner and Gungor, 2016)	★★★	★★	★★★	8
(Eustaquio *et al*., 2011)	★★★★	★	★★★	8
(Zainal *et al*., 2011)	★★★	★	★★	6
(Sousa *et al*., 2025)	★★★★	★★	★★★	9
(Meier *et al*., 2011)	★★★★	★★	★★★	9
(Faria and Behar, 2014)	★★★	★	★★	6
(Holinger and Konior, 1989)	★★★	★	★★	6
(Scott *et al*., 2019)	★★★★	★★	★★★	9
(Vandjelovic *et al*., 2018)	★★★★	★★	★★★	9
(Eustaquio *et al*., 2011)	★★★★	★★	★★★	9

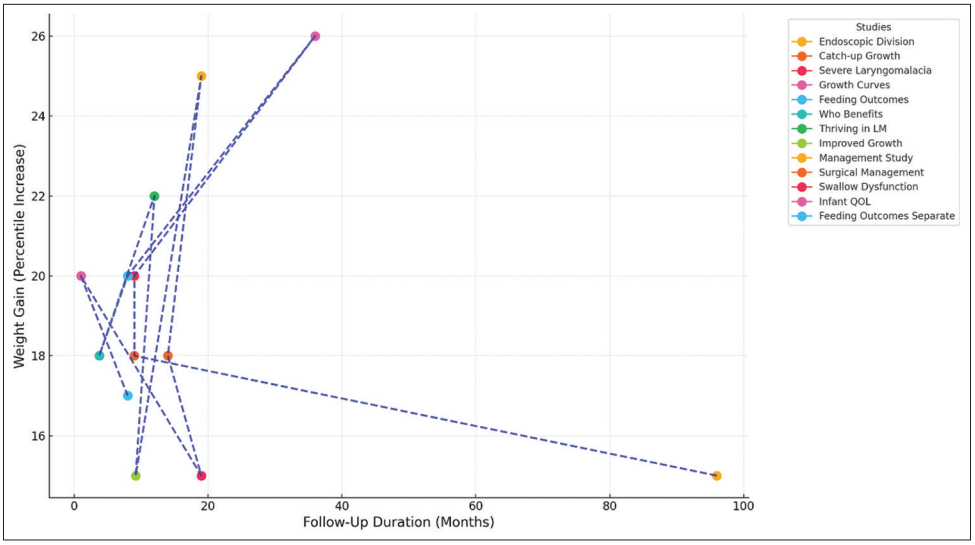

Figure 2: Trends in weight gain (percentile increase) relative to follow-up duration across included studies. Bubble sizes indicate study sample sizes

According to Sousa *et al*., younger patients had a faster recovery and a weight percentile gain of 12–22 points. Interestingly, improvements in feeding ability and respiratory efficiency were strongly associated with weight gain trends, indicating the holistic benefits of surgical intervention.[35] The surgical group, as demonstrated by Faria and Behar (2014), gained 25 points in the weight percentile, exceeding the results of the medically managed cohort. This demonstrates the surgical superiority of treating FTT in laryngomalacia.[36]

Studies by Zainal *et al*., Scott *et al*., and Eustaquio *et al*. showed the same trend in weight gain with the percentiles increasing by 15–20 points over follow-up periods ranging from 6 months to 8 years.[33,37,38] Loke *et al*. reported that weight gain improved by 15 percentile lines.[39] These outcomes confirm the importance of surgical intervention in preserving the possibility of sustained nutritional recovery.

Other clinical outcomes

In addition to weight gain, feeding efficiency, respiratory symptoms, and quality of life were improved in the included studies. For example, Eustaquio *et al*. showed that 96% of patients had an improved oral intake after surgery, with stridor resolution in all cases.[33] Cohen *et al*. (2020) also found that respiratory symptoms improved in 70% of patients without comorbidities, so supraglottoplasty effectively relieves airway obstruction.[40]

Table 3: Detailed study characteristics of included studies

Study title	Authors	Year	Location	Study type	Sample size	Age at surgery
Endoscopic division of the aryepiglottic folds	(Loke *et al*., 2001)	2001	Sheffield, UK	Retrospective case series	33	Mean: 6.5 months
Catch-up growth in infants after supraglottoplasty	(Czechowicz and Chang, 2015)	2015	Stanford, USA	Retrospective chart review	76	Median: 6 months
Supraglottoplasty for severe laryngomalacia	(Cohen *et al*., 2020)	2020	Jerusalem, Israel	Retrospective cohort study	10	Median: 4 months
Evaluation of growth curves after supraglottoplasty	(Neiner and Gungor, 2016)	2016	Shreveport, USA	Retrospective chart review	20	2 weeks to 3 years
Feeding outcomes after supraglottoplasty	(Eustaquio *et al*., 2011)	2011	Oklahoma, USA	Case series	75	2 weeks to 12 months
Supraglottoplasty for laryngomalacia: who benefits?	(Zainal *et al*., 2011)	2011	Kuala Lumpur, Malaysia	Retrospective case review	Eight patients (10 procedures)	Mean: 15.6 months
Supraglottoplasty and thriving in laryngomalacia	(Sousa *et al*., 2025)	2024	Porto, Portugal	Observational cohort study	32	Mean: 10.5 months
Improved growth curve measurements	(Meier *et al*., 2011)	2011	Charleston, USA	Retrospective case–control	115 (64 surgical)	<2 years; mean: 3.9 months
Medical and surgical management	(Faria and Behar, 2014)	2014	Buffalo, USA	Case–control study	51	Mean: 2.8 months
Surgical management of severe laryngomalacia	(Holinger and Konior, 1989)	1989	Chicago, USA	Retrospective case series	46	Mean: 6.2 months
Laryngomalacia and swallow dysfunction	(Scott *et al*., 2019)	2019	Portland, USA	Retrospective cohort study	44	Median: 96 days
Infant supraglottoplasty on quality of life	(Vandjelovic *et al*., 2018)	2018	Detroit, USA	Prospective cohort study	39	Mean: 4 months
Feeding outcomes in infants after supraglottoplasty	(Eustaquio *et al*., 2011)	2011	Oklahoma, USA	Case series	75	2 weeks to 12 months

Study title	Surgical intervention	Indications for Surgery	Primary outcome results	Weight gain outcome	Complications	Follow-up duration
Endoscopic division of the aryepiglottic folds	Endoscopic division (microscissors/CO_2 laser)	Severe stridor, cyanosis, FTT	68.7% resolution; 3.1% tracheostomy	Weight gain improved by 15 percentile lines	No major complications	8 years
Catch-up growth in infants after supraglottoplasty	Supraglottoplasty	Severe FTT, sleep apnea, and feeding issues	BMI percentile rose from 34 to 51	Younger infants gained 12–20 percentile lines	No major complications	275 days
Supraglottoplasty for severe laryngomalacia	CO_2 laser supraglottoplasty	Dyspnea, comorbidities	70% improvement in respiratory outcomes	Healthy patients gained 20 percentile lines; comorbid cases gained 10	No major complications	9 months

(Contd...)

Table 3: *(Continued)*

Study title	Surgical intervention	Indications for Surgery	Primary outcome results	Weight gain outcome	Complications	Follow-up duration
Evaluation of growth curves after supraglottoplasty	Laryngeal microscissors/CO_2 laser	Severe FTT, respiratory distress	Weight percentile rose by 26 points	Weight improvement in all cases by 15 percentile lines	No major complications	3 years
Feeding outcomes after supraglottoplasty	Bilateral CO_2 laser supraglottoplasty	Stridor, feeding difficulties, oxygen desaturation	96% improved oral intake; significant respiratory improvement	Weight percentile increased by 20 points	Minor dysphagia in comorbid cases	8 months
Supraglottoplasty for laryngomalacia: who benefits?	CO_2 laser or cold steel supraglottoplasty	Severe laryngomalacia, FTT	50% complete resolution; comorbid cases saw poor outcomes	Weight improved by 18 percentile lines in four patients	Six ICU admissions, no direct complications	15 weeks
Supraglottoplasty and thriving in laryngomalacia	Cold steel instruments; epiglottopexy	Severe FTT, respiratory distress	72% improved across weight percentiles	Weight gain of 12–22 percentile lines	No major complications	12 months
Improved growth curve measurements	Aryepiglottic fold incision; CO_2 laser	Severe FTT, feeding issues	Significant improvement in z-scores within 3 months	Weight percentile normalized by 6 months	No major complications	9.2 months
Medical and surgical management	CO_2 laser supraglottoplasty	Moderate-to -severe FTT	Both groups exited FTT; the surgical group reduced respiratory issues	The surgical group gained 25 percentile lines	Four surgical complications were reported	19 months
Surgical management of severe laryngomalacia	Cold instruments and electrocautery	Severe laryngomalacia	91% improvement; cyanosis resolved in all non-comorbid patients	18 percentile improvement in weight	Two transient aspiration cases	14 months
Laryngomalacia and swallow dysfunction	Supraglottoplasty with airway reconstruction	Severe stridor, dysphagia	92% resolution of dysphagia; respiratory improvements	Median weight gain of 12–15 percentile lines	No major complications	19 months
Infant supraglottoplasty on quality of life	Aryepiglottic fold release, partial arytenoidectomy	Severe/ moderate feeding difficulties	Significant QOL improvement in most metrics	Post-operative weight gain normalized compared to the general population	No complications; ICU observation for most patients	1 month
Feeding outcomes in infants after supraglottoplasty	CO_2 laser supraglottoplasty	Severe stridor, feeding difficulties	96% improved oral intake; stridor resolved in all cases	Weight gain increased by an average of 17 percentile lines	No major complications reported	Mean: 8 months

BMI: Body mass index, QOL: Quality of life, ICU: Intensive care unit

In 92% of cases, Scott *et al*. (2019) have demonstrated significant resolution in dysphagia and increases in weight gain and feeding coordination.[38] Complementary findings were provided by Vandjelovic *et al*., who found significant quality-of-life improvements in domains including physical ability, growth, and caregiver emotional impact.[34]

In general, complication rates were low in studies. For instance, Holinger and Konior (1989) and Meier *et al*. stated no major surgical complications but <5% transient dysphagia.[31,32] The relationship between complication rates and sample sizes is visualized in Figure 3, which shows the safety and efficacy of surgical interventions for laryngomalacia.

Thirteen studies on the surgical management of laryngomalacia are synthesized in this systematic review, primarily focusing on post-operative weight gain and associated clinical outcomes. Findings show that supraglottoplasty effectively improves weight gain, resolves feeding problems, and eliminates respiratory distress, making supraglottoplasty a cornerstone intervention for severe laryngomalacia. The key findings, implications for clinical practice, and limitations of the included studies are elaborated upon in this discussion, as well as directions for future research.

Weight gain as a critical outcome

Consistent results indicate that weight gain is primarily improved across all studies, indicating its usefulness as a primary marker of successful intervention. Infants who underwent supraglottoplasty showed rapid and sustained improvement in weight percentiles, with the amount gained ranging from 15 to 26 points in the various reports. For example, Neiner and Gungor (2016) found a 26-point jump in 3 years and significant gains as soon as 3 months after surgery.[30] Furthermore, Czechowicz and Chang (2015) also showed BMI percentile improvement from 34 to 51 after 275 days, especially in younger infants.[29] These results are consistent with the known pathophysiology of laryngomalacia: airway obstruction and feeding inefficiency resulting in decreased caloric intake and growth. These problems are solved effectively by surgical intervention and allow catch-up growth.

Interestingly, studies such as Meier *et al*. and Vandjelovic *et al*. showed that weight percentiles normalized to match the general pediatric population within a relatively short follow-up time (e.g., 1–3 months).[32,34] This implies that early surgical intervention may reverse the long-term developmental deficits associated with severe FTT. In addition, weight gain, in the setting of improved respiratory function, emphasizes the need for early treatment of laryngomalacia to maximize nutritional and developmental outcomes.

Feeding and respiratory outcomes

Significant improvements in feeding efficiency and weight gain were also observed across all studies. According to Eustaquio *et al*., 96% of patients had improved oral intake post-surgery,[33] and Scott *et al*. (2019) reported that in 92% of the cases, dysphagia resolved.[38] These outcomes are essential because feeding difficulties are a characteristic of laryngomalacia and a significant cause of FTT. Vandjelovic *et al*. provide evidence that the resolution of dysphagia allows for caloric intake and improves caregiver-reported quality of life.[34]

Respiratory outcomes were equally compelling, with most studies reporting stridor, cyanosis, and respiratory distress reduced by similar amounts. For example, Holinger and Konior (1989) reported complete resolution of cyanosis in all non-comorbid patients,[31] and Cohen *et al*. showed respiratory

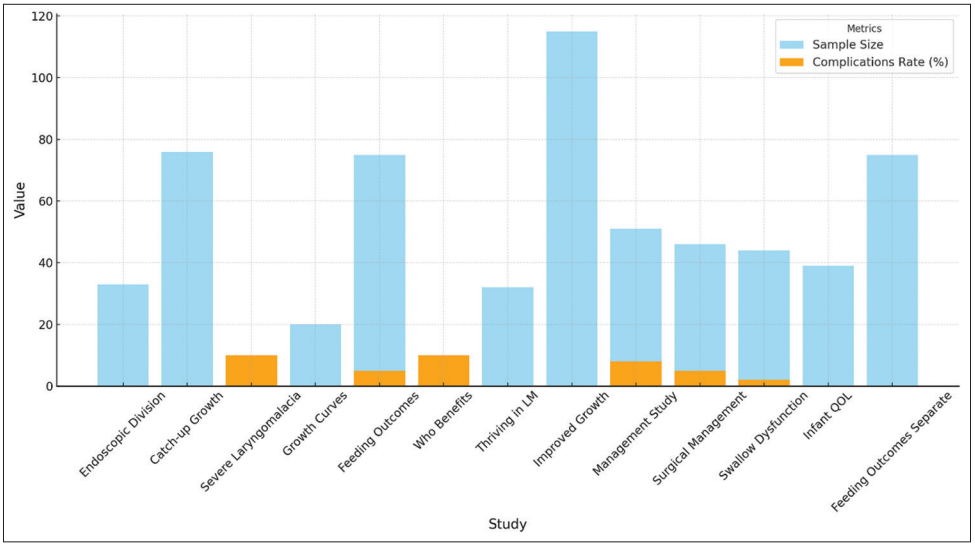

Figure 3: Relationship between complication rates and sample sizes across studies. Complication rates are represented by orange bars, whereas sample sizes are shown as a blue line

improvement in 70% of patients.[40] These findings are clinically significant since unresolved respiratory symptoms may cause chronic hypoxia and associated outcomes.

Safety profile and complications

All studies reported a favorable safety profile of supraglottoplasty with consistently low complication rates. A small subset of cases (<5%) reported minor complications, such as transient dysphagia and aspiration, as noted in studies by Holinger and Konior (1989) and Meier *et al*.[31,32] It is noteworthy that the most extensive studies with larger sample sizes (e.g., 115 patients in Meier *et al*. [2011]) reported no significant complications supporting supraglottoplasty as a safe procedure.[32] In Figure 3, the number of complications was examined against sample size, and likewise, no appreciable rise in adverse events is seen when considering the larger cohorts.

Implications for clinical practice

These findings have several important implications for clinical practice. First, the consistent improvement in weight gain and feeding outcomes underscores the need for early identification and intervention in infants with severe laryngomalacia. Delayed treatment may exacerbate FTT and respiratory distress, leading to prolonged hospitalization and increased morbidity. Second, the procedural safety of supraglottoplasty, coupled with its efficacy, supports its use as a first-line surgical intervention for severe cases. Tailoring the surgical approach to individual patient needs, particularly in those with comorbid conditions, remains critical to optimizing outcomes.

Limitations and future directions

Despite the robust findings, this review has limitations. The heterogeneity in study designs, surgical techniques, and follow-up durations presents challenges in directly comparing outcomes. Moreover, several studies lacked comprehensive data on long-term weight gain and developmental milestones, limiting the ability to assess sustained benefits. In addition, the underrepresentation of comorbid populations in many studies may lead to overestimating procedural efficacy in these groups.

Future research should focus on standardized outcome measures, including long-term growth and developmental assessments. Multi-center randomized controlled trials would provide high-quality evidence to validate the findings of this review. Furthermore, exploring the role of adjunct therapies, such as nutritional support or respiratory management, in conjunction with surgery may yield additional insights.

CONCLUSION

This systematic review shows that supraglottoplasty is a safe and effective intervention for managing severe laryngomalacia in the pediatric population. Across the included studies, we found consistent and significant improvements in weight gain, feeding efficiency, and respiratory outcomes, highlighting the importance of early surgical intervention in preventing FTT and complications. An average increase in weight percentiles of 15–26 points occurred, with many infants returning to typical growth trajectories within months of surgery. In addition, resolving feeding and respiratory issues improved patients' and caregivers' quality of life.

Most studies documented a well-documented safety profile of supraglottoplasty, with low complication rates and no significant adverse events reported. These findings demonstrate that the procedure is reliable and may serve as a first-line surgical option for severe cases. Study design variation reinforces the need for standardized outcome reporting and investigation of longer-term growth and developmental outcomes.

Future research should aim at multicenter randomized controlled trials and focus on improving care for infants with comorbidities where unique surgical approaches and adjunct therapies may be needed. Filling these gaps in laryngomalacia management will further define the understanding of the approach to management, leading to better outcomes for all patients with laryngomalacia. In line with other reports in the literature, the present review confirms the vital need for early surgical intervention for infants with severe laryngomalacia to maximize growth and development.

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