

Oral Exercise as a Nursing Strategy to Enhance Oral Intake Following Endotracheal Extubation in ICU: A Narrative Review

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Abstract

Background: Following endotracheal post-extubation dysphagia is a prevalent problem among critically sick intensive care unit patients. It frequently leads to delayed oral intake, aspiration, malnutrition, extended hospital stays, and poor recovery results.

The purpose of this narrative review was to assess how well oral exercise works as a nursing intervention to enhance oral intake and swallowing function in patients in intense critical care after extubation.

Methods: PubMed, Scopus, Google Scholar, and critical care nursing journals were used to do a narrative review of the literature published between 2018 and 2025. A thematic analysis and synthesis of research on oral exercises, swallowing therapy, and nurse-led treatments in adult ICU patients who had been extubated was conducted.

Findings: Research indicates that systematic oral workouts including the jaw, tongue, lips, and pharyngeal muscles greatly increase the safety of swallowing. Functional Oral Intake Scale (FOIS) scores, and early return to oral feeding. Oral exercise also reduced aspiration risk and enhanced quality of life in ICU care.

Conclusion: Oral exercise is an effective, low-cost nursing intervention that improves oral intake and swallowing recovery after endotracheal extubation. Standardized oral exercise protocols into routine ICU nursing care may improve patient outcomes and reduce post-extubation complications.

Keywords: Post-extubation dysphagia, oral exercise, swallowing rehabilitation, intensive care unit, oral intake.

INTRODUCTION

Post-extubation dysphagia is a major complication among patients in intensive care units and significantly interferes with the ability to resume safe oral intake. Studies have reported high prevalence of swallowing difficulty following endotracheal extubation, high risk of aspirational pneumonia, and delayed recovery (Abdelsalam Seloma et al., 2024; Hongo et al., 2025; Reitz et al., 2024) [1,6]. Dysphagia remains overlooked despite its marked impact on nutritional outcomes and clinical prognosis, emphasizing the need for early identification and targeted management (Omura et al., 2019) [3].

The occurrence of PED is associated with oropharyngeal muscle weakness, sensory impairment, neuromuscular weakness, and airway trauma caused by prolonged intubation (Zuercher et al., 2019) [4]. Age has been shown to affect swallowing recovery, with older patients experiencing significantly higher rates of dysfunction as compared to low age following extubation (Tsai et al., 2016) [5]. These physiological changes limit effective swallowing and contribute to oral intake limitations observed in critically ill populations (Hongo et al., 2025) [6].

Oral exercise and swallowing rehabilitation interventions have been more frequently implemented to improve post-extubation swallowing impairment and promote recovery of oral intake. Interventional studies have shown significant improvements in swallowing, muscle activation, and early start of oral feeding following structured oral care and swallowing exercise programs (Wu et al., 2019; El Gharib et al., 2019) [7,8]. Randomized controlled trials also reported increased oral intake volume, improved salivary flow, and reduced pneumonia incidence among patients receiving rehabilitation interventions compared with routine care (Siao et al., 2023; Chacko et al., 2023) [9,10]. The pediatric ICU population is also shown. A similar result is that the interventional group achieved swallowing earlier as compared to the control group (Rashed et al., 2023; Saravanan & Govindaraj, 2025) [2,11].

METHODS AND DESIGN

In this review article, researchers followed established narrative review principles for effectiveness studies and were guided by the Preferred Reporting Items for narrative Reviews and PRISMA-like framework to ensure methodological quality, completeness, and reproducibility.

The Population–Intervention–Comparison–Outcome (PICO) framework was used to formulate the review question and guide the development of the search strategy and eligibility criteria.

SEARCH STRATEGY

Electronic searches were performed in multiple databases, including PubMed, Scopus, and Google Scholar. These databases were selected to ensure broad coverage of nursing, medical, and allied health literature.

INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria: This review considered all primary quantitative research studies, including randomized controlled trials, quasi-experimental studies, pre- and post-test studies, and observational studies. Conducted among patients admitted to intensive care units (ICUs), included individuals who had undergone endotracheal intubation followed by extubation, investigated post-extubation dysphagia, swallowing dysfunction, or oral intake outcomes, evaluated oral exercise programs, swallowing therapy, oral care interventions, or rehabilitation strategies.

Exclusion Criteria: Conducted outside intensive care or critical care settings, focused on dysphagia unrelated to intubation (e.g., stroke-related or neurological dysphagia), case reports, editorials, commentaries, and conference abstracts without full-text data, meta synthesis, meta-analysis, studies without accessible full-text articles, studies that did not report swallowing or oral intake outcomes

STUDY SELECTION PROCESS

The study selection was conducted in two sequential stages. In the first stage, titles and abstracts of all retrieved articles were independently screened to assess relevance in relation to the review objectives and

predefined inclusion and exclusion criteria. Studies that did not meet eligibility criteria were excluded at this stage.

In the second stage, full-text versions of potentially eligible studies were retrieved and assessed in detail for final inclusion. Each full-text article was evaluated against the established eligibility criteria to confirm relevance to post-extubation dysphagia and oral exercise or swallowing rehabilitation interventions.

QUALITY APPRAISAL

The methodological quality of all included studies was critically assessed for risk of bias and overall strength of the evidence using standardized critical appraisal tools developed by the Joanna Briggs Institute (JBI), with specific checklists selected according to each study design, including randomized controlled trials, quasi-experimental studies, and observational studies. Each study was evaluated across key methodological domains such as clarity of research objectives, appropriateness of study design, sample selection, intervention fidelity, outcome measurement, data analysis, and reporting transparency, with particular attention given to potential sources of bias including lack of randomization, absence of blinding, incomplete outcome data, and confounding variables.

DATA EXTRACTION

Data were systematically extracted from all included studies using a standardized extraction form to ensure consistency and accuracy. Information collected included author and year, study design, sample size, intervention type, duration, outcome measures related to swallowing and oral intake, and key findings. Extracted data was reviewed for completeness, and any differences were resolved through discussion before synthesis (table 1).

DATA SYNTHESIS

A narrative review was used to integrate findings from the included studies examining oral exercise and swallowing rehabilitation interventions for post-extubation dysphagia among intensive care unit patients due to variation in intervention protocols, outcome measures, and study designs. Extracted data were organized into summary tables describing study characteristics, intervention components, and outcomes. Studies were grouped by intervention type, including oral exercise programs, swallowing therapy, oral care-based rehabilitation, and combined approaches, allowing comparison of swallowing function, oral intake recovery, dysphagia severity, and complication outcomes across studies. Evidence-based emphasis was placed on randomized controlled trials and higher-quality studies, while observational evidence was used to provide clinical context.

RESULTS

The initial online database search identified a substantial number of articles related to post-extubation dysphagia and oral exercise interventions among intensive care unit patients. Following removal of duplicate records, the remaining studies were selected at the title and abstract stages, and a large proportion of citations were excluded as irrelevant to the review objectives. The full texts of potentially eligible articles were then assessed in detail, and many studies were excluded as they did not meet the predefined inclusion criteria. A total of twelve studies were included in the final narrative review. The study selection process was summarized using a PRISMA flow diagram, and the characteristics of the included studies were presented in a descriptive table 1.

Table 1. Characteristics of Included Studies

Author & Year	Country	Study Design	Sample	Intervention/Focus	Outcome Measures	Key Findings
Abdelsalam et al. 2024	Egypt	Descriptive	Adult ICU patients	PED prevalence and outcomes	Oral intake, pneumonia	High dysphagia and complications
Rashed et al. 2023	Egypt	Quasi-experimental	Pediatric ICU patients	Oral care and swallowing exercises	Dysphagia severity, oral intake	Significant improvement in swallowing function
Omura et al. 2019	Japan	Observational	ICU patients	Nurse-led swallowing screening	Dysphagia detection	Early detection improved feeding outcomes
Tsai et al. 2016	Taiwan	Observational	Adult ICU patients	Post-intubation swallowing dysfunction	Swallowing function	Increased dysphagia in older patients
Hongo et al. 2025	Japan	Multicentred prevalence study	Critically ill patients	Oral intake restriction practices	Feeding route, dysphagia prevalence	High restriction related to dysphagia
Wu et al. 2019	Taiwan	Pre-post intervention	Adult ICU patients	Oral care with swallowing therapy	Swallowing recovery, oral intake	Earlier oral feeding and improved swallowing
El Gharib et al. 2019	Brazil	Clinical intervention	Post-extubation patients	Swallowing rehabilitation	EMG activity, swallowing	Enhanced muscle activation and swallowing
Siao et al. 2023	Taiwan	Randomized controlled trial	Adult ICU patients	Oral care and swallowing program	Oral feeding, pneumonia	Faster feeding recovery and reduced pneumonia
Chacko et al. 2023	India	Randomized controlled trial	Post-extubation patients	Swallowing exercises and oral care	Oral intake, salivary flow	Increased intake and salivary flow

Saravanan & Govindaraj, 2025	India	Interventional	Adult ICU patients	Swallowing and oral care therapy	Dysphagia severity, oral intake	Reduced dysphagia and improved feeding
Reitz et al. 2024	Germany	Observational	Neuro-ICU patients	Dysphagia screening	Feeding route	Improved safety of oral feeding
Elsayed et al. 2024	Egypt	Prospective study	Post-extubation adults	Oral intake readiness assessment	Feeding recovery	Predictors of safe oral intake identified

PED = post-extubation dysphagia, ICU = Intensive Care Unit, EMG = Electromyography.

The table summarizes studies evaluating oral care, swallowing rehabilitation, dysphagia screening, and oral intake outcomes among critically ill and post-extubation patient.

CHARACTERISTICS OF INCLUDED STUDIES

Table 1 presents the key characteristics of the twelve studies included in this narrative review. The studies were conducted across diverse geographical regions, including Egypt, Taiwan, Japan, Brazil, Germany, and India, reflecting a broad international representation of intensive care populations. A range of study designs was included, comprising randomized controlled trials, quasi-experimental studies, pre-post-intervention studies, observational studies, descriptive studies, narrative reviews, and psychometric validation research. The study populations primarily involved adult intensive care unit patients following endotracheal extubation, with only one study focusing on pediatric ICU patients.

Interventions and areas of focus varied across studies but predominantly centered on oral care programs, swallowing rehabilitation exercises, nurse-led screening protocols, and assessment of dysphagia prevalence and oral intake readiness. Outcome measures commonly included swallowing function, dysphagia severity, oral intake recovery, feeding route changes, incidence of pneumonia, salivary flow, and swallowing muscle improvement. In all interventional studies, consistent improvements were observed in swallowing performance and oral intake outcomes following structured oral exercise and rehabilitation interventions. Observational and descriptive studies highlighted the high prevalence of post-extubation dysphagia and its association with adverse clinical outcomes, while screening-focused studies emphasized the importance of early identification in improving feeding safety.

RISK OF BIAS ASSESSMENT

The methodological quality of the included studies ranged from moderate to high, with variation according to study design. Randomized controlled trials show low risk of bias in outcome measurement but lack of blinding, which may have influenced intervention effects (Siao et al., 2023; Chacko et al., 2023) [9,10]. Quasi-experimental and pre-post intervention studies showed moderate risk due to the absence of control groups and potential confounding factors (Rashed et al., 2023; Wu et al., 2019; El Gharib et al., 2019; Saravanan & Govindaraj 2025) [2,7,8,11]. Observational and descriptive studies showed appropriate reporting but were limited by selection bias and inability to establish causality (Abdelsalam Seloma et al.,

2024; Omura et al., 2019; Tsai et al., 2016; Hongo et al., 2025; Reitz et al., 2024; Elsayed et al., 2024) [1,3,5,6,12,13]. Narrative reviews were subject to potential publication bias (Zuercher et al., 2019; Brodsky et al., 2020) [4,14]. The psychometric validation study showed strong methodological rigor (Crary et al., 2005) [15].

EFFECTS OF ORAL EXERCISE INTERVENTIONS ON ORAL INTAKE

In the interventional studies, oral exercise and swallowing rehabilitation programs consistently showed significant improvements in oral intake recovery among post-extubated intensive care unit patients. Structured oral care with swallowing exercises resulted in earlier initiation of oral feeding and improved oral intake swallowing in pre-post intervention studies (Wu et al., 2019) [7] and quasi-experimental designs (Rashed et al., 2023) [2]. Randomized controlled trials also increased oral intake volume, enhanced salivary flow, and reduced pneumonia incidence among patients receiving oral exercise compared with routine care (Siao et al., 2023; Chacko et al., 2023) [9,10]. Clinical therapy studies reported improved muscle activation patterns and functional swallowing outcomes following targeted rehabilitation (El Gharib et al., 2019) [8], while additional interventional research demonstrated reductions in dysphagia severity and improved feeding ability after swallowing and oral care programs together (Saravanan & Govindaraj, 2025) [11].

IMPACT ON DYSPHAGIA SEVERITY AND COMPLICATIONS

In this narrative review, the majority of studies reported significant reductions in dysphagia severity and associated complications following implementation of oral exercise and swallowing rehabilitation interventions. Interventional research demonstrated improvements in swallowing safety and functional recovery, with decreased dysphagia risk after structured oral care and exercise programs (Rashed et al., 2023; Wu et al., 2019; Saravanan & Govindaraj, 2025) [2,7,11]. The randomized controlled trial also showed a lower incidence of aspiration-related pneumonia among patients receiving rehabilitation oral exercise compared with routine care (Siao et al., 2023; Chacko et al., 2023) [9,10]. Observational studies highlighted the high baseline prevalence of post-extubation dysphagia and its association with adverse effects such as feeding delays and respiratory complications (Abdelsalam Seloma et al., 2024; Hongo et al., 2025; Reitz et al., 2024) [11,6,12]. Early dysphagia detection through nurse-led screening protocols was associated with improved feeding safety and reduced complication risk of dysphasia (Omura et al., 2019) [3]. The evidence indicates that oral exercise interventions contribute not only to improved oral intake but also to meaningful reductions in dysphagia severity and related clinical complications.

DISCUSSION

This narrative review demonstrates that post-extubation dysphagia is a common complication among ICU patients and is associated with delayed oral intake and increased clinical complications such as aspirational pneumonia (Abdelsalam Seloma et al., 2024; Tsai et al., 2016; Hongo et al., 2025) [1,5,6]. Evidence across interventional studies consistently shows that oral exercise and swallowing rehabilitation interventions significantly improve swallowing function and improve earlier resumption of oral feeding (Rashed et al., 2023; Wu et al., 2019; Siao et al., 2023; Chacko et al., 2023; Saravanan & Govindaraj 2025) [2,7,9,10,11]. Reductions and prevention in dysphagia severity and aspiration-related pneumonia further highlight the clinical benefits of early rehabilitation of oral care with structured oral exercises (Siao et al., 2023; Chacko et al., 2023) [9,10]. Nurse-led screening and intervention programs were shown to enhance feeding safety

and recovery outcomes (Omura et al., 2019; Reitz et al., 2024) [3,12]. Despite variability in intervention protocols, the overall evidence supports oral exercise as an effective nursing strategy for improving oral intake and reducing complications following extubation.

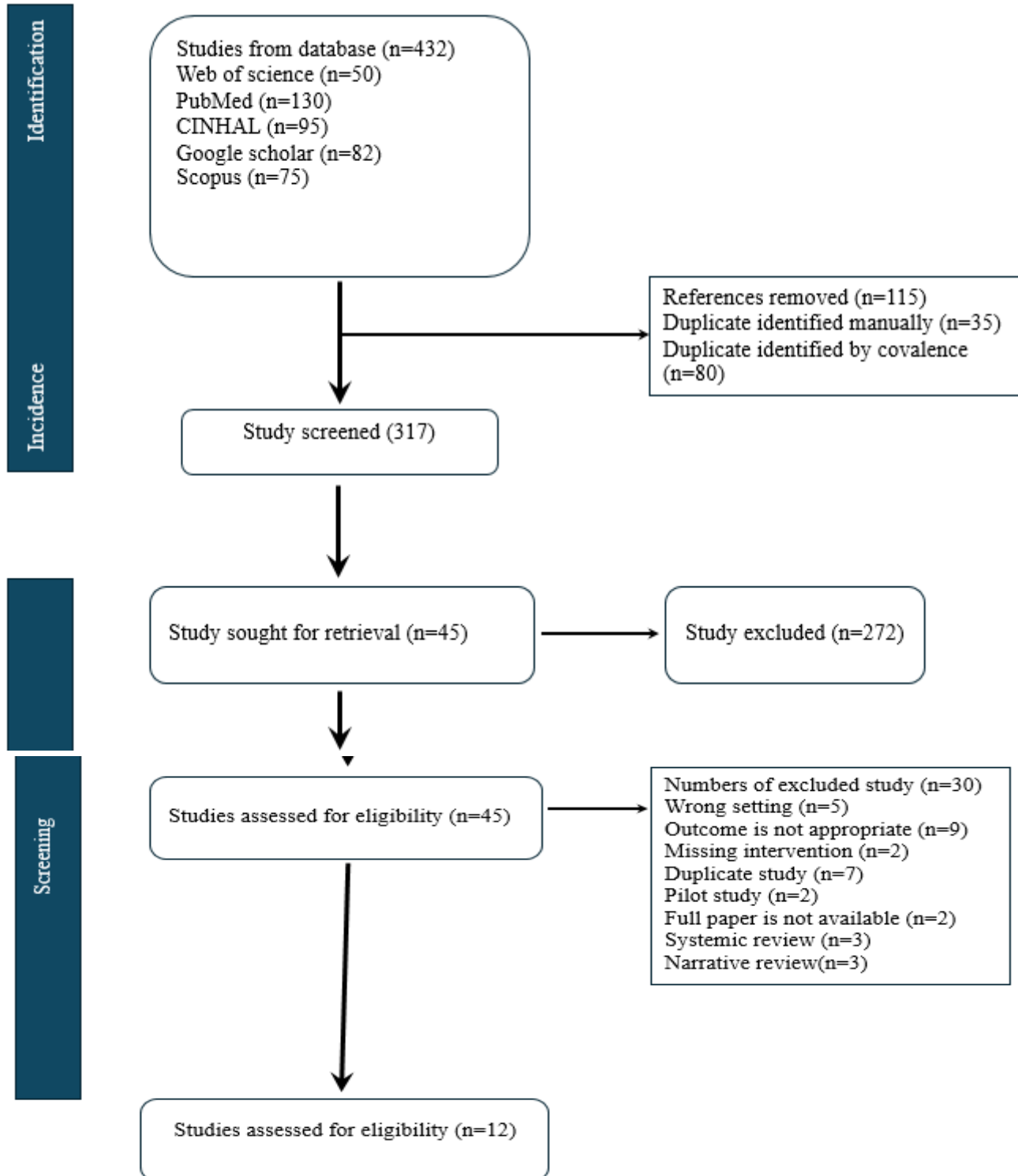


Figure 1 PRISMA flow Diagram.

LIMITATIONS

This narrative review is limited by heterogeneity across included studies in terms of intervention components, duration, outcome measurement tools, and patient populations, which restricted direct comparison of findings. Some studies employed quasi-experimental or observational designs without control groups, increasing the potential for bias and limiting causal inference. Sample sizes in some interventional studies were relatively small, and long-term follow-up outcomes were rarely reported. And on the other hand, inclusion of narrative reviews may have introduced publication bias. These limitations should be considered when interpreting the overall effectiveness of oral exercise interventions.

IMPLICATIONS FOR NURSING PRACTICE

The findings of this narrative review support the integration of oral exercise and swallowing rehabilitation oral care with structured oral exercise interventions into routine post-extubation intensive care unit patient care. Nurses should perform early dysphagia screening, initiate structured oral care and swallowing exercises, and monitor oral intake recovery to improve feeding safety and reduce complications that have occurred after post-extubation. Implementation of standardized nurse-led rehabilitation protocols may promote early nutritional recovery, decrease risk of aspiration pneumonia, and improve overall patient outcomes. Ongoing training of nursing staff in dysphagia assessment and intervention delivery is essential to ensure consistent and effective clinical practice in the ICU.

CONCLUSION

This narrative review provides strong evidence that oral exercise and swallowing rehabilitation interventions are effective nursing strategies for improving oral intake and reducing risk of dysphagia and severity of dysphasia among intensive care unit patients following endotracheal extubation. Consistent improvements in swallowing function, earlier resumption of oral feeding, and decreased risk of complication rates were observed across interventional studies. Despite methodological variability, the overall findings support early nurse-led rehabilitation as a key component of post-extubation care. The implementation of structured oral exercise programs into routine nursing practice has the potential to improve nutritional recovery and improve clinical outcomes in critically ill patients.

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