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Post-COVID dysphagia: systematic review of prevalence, recovery, and rehabilitation outcomes

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Abstract:

Background: Dysphagia after SARS-CoV-2 infection (post-COVID dysphagia, PCD) has emerged as a clinically relevant problem, particularly among hospitalized and critically ill patients. We performed a systematic review to synthesize prevalence estimates, recovery trajectories, risk factors, and rehabilitation outcomes, emphasizing studies that used objective swallowing assessment (FEES/VFS) and those with medium- to long-term follow-up.

Methods: We searched major databases from December 2019 to November 2, 2025 for studies of dysphagia associated with COVID-19, using terms for "COVID-19", "dysphagia", "swallowing", "intubation", "rehabilitation", and "long COVID". Included were cohorts, case series (n ≥10), prospective observational studies, intervention studies and systematic reviews that reported prevalence, outcome trajectories or rehabilitation effects. Data extracted included setting (community, ward, ICU), assessment method, timing, prevalence, risk factors, rehabilitation type and outcomes.

Results: Heterogeneity is substantial. Community cohorts report low rates of clinically significant dysphagia, whereas hospitalized cohorts commonly report prevalence in the **~20–40%** range and ICU/invasively ventilated cohorts report much higher rates (often **50–90%** during early post-extubation assessments). Many patients show rapid, clinically meaningful recovery during hospitalization or in the first weeks after discharge, but a consistent minority have persistent dysphagia at 3–12 months (reported in several studies at ~15–30%). Key risk factors include prolonged endotracheal intubation, tracheostomy, older age, neurologic complications and ICU-acquired weakness. Rehabilitation approaches (early screening, compensatory strategies, targeted exercise programmes, structured tracheostomy protocols, and adjunctive neuromuscular electrical stimulation in selected cases) are associated with improved oral intake, FOIS scores and reduced aspiration on instrumental testing in observational studies and small trials, but high-quality randomized evidence specific to PCD remains limited.

Conclusions: PCD is frequent among hospitalized and especially ICU cohorts. Early identification, use of instrumental assessment when indicated, and multidisciplinary rehabilitation are associated with better functional recovery. Research priorities include standardized, prospective multicentre cohorts with repeated instrumental assessment and randomized trials comparing specific rehabilitation strategies.

Introduction

Dysphagia is a disorder of swallowing with important sequelae — malnutrition, aspiration pneumonia, prolonged hospitalization, increased healthcare utilization and reduced quality of life. Early in the pandemic clinicians observed swallowing problems among patients with acute COVID-19 and during recovery, particularly in those requiring invasive respiratory support. Multiple mechanisms are biologically plausible for post-COVID dysphagia (PCD): direct viral neurotropism with cranial nerve or

brainstem involvement, systemic inflammatory and microvascular injury affecting central nervous system structures, hypoxic-ischemic damage, laryngeal/upper airway trauma related to prolonged intubation and tracheostomy, and ICU-acquired weakness or critical illness polyneuropathy/myopathy affecting the bulbar musculature. These mechanisms are not mutually exclusive and may act together in severe cases.[1–4]

Since 2019–2020 the clinical picture, treatments (e.g., proning, steroid use), vaccination status, viral variants and ICU practices have all evolved — each of which could influence both the incidence of PCD and the recovery trajectory. A focused synthesis that integrates medium- and long-term follow-up, objective instrumental assessments (FEES/VFS) and rehabilitation outcomes can guide clinicians planning screening and follow-up services and identify gaps for future trials.[5–7]

Methods

Search strategy and eligibility

We searched PubMed, PMC, Scopus, Web of Science and Google Scholar for articles published from December 1, 2019 through November 2, 2025 using combinations of the following terms: ("COVID-19" OR "SARS-CoV-2" OR "post-COVID" OR "long COVID") AND ("dysphagia" OR "swallow*" OR "oropharyngeal dysphagia") AND ("prevalence" OR "incidence" OR "rehabilitation" OR "treatment" OR "outcome" OR "FEES" OR "VFS" OR "videofluoroscopy" OR "tracheostomy" OR "intubation"). We supplemented electronic searches by reviewing reference lists of recent systematic reviews and key cohort studies and searched gray literature where relevant.

Inclusion/exclusion criteria

We included original cohort studies, prospective observational studies, case series (n ≥10), randomized or nonrandomized intervention trials, and prior systematic reviews/meta-analyses reporting prevalence, longitudinal outcomes (preferably ≥1 month follow-up) or rehabilitation with quantified swallowing outcomes. Excluded: single case reports, non-English reports without translation, studies without any swallowing assessment, and publications limited to voice or laryngeal findings without swallowing data.

Data extraction and definitions

From each eligible study we extracted: country and setting, sample size, patient severity (community/mild, hospitalized, ICU, invasively ventilated), methods of swallowing assessment (clinical bedside screen, validated screening tools, FEES, VFS/MBSS), timing of assessment relative to illness and extubation, prevalence of dysphagia (by method), recovery trajectories (timing of reassessments and proportion recovered), risk factors and details of rehabilitation interventions (type, intensity, comparator, outcome measures such as FOIS, PAS, clinical swallow scales, time to decannulation). Where possible we standardized prevalence reporting to the timepoint of the first post-acute assessment (e.g., within 7–14 days of extubation or discharge) and to medium (3 months) and longer (≥6 months) follow-up.

Quality assessment

Observational studies were appraised using a modified Newcastle-Ottawa framework (selection, comparability, outcome ascertainment). Intervention studies and small trials were assessed for randomization, blinding (where possible), attrition and outcome reporting. The overall evidence base is dominated by observational designs and small single-centre reports; many studies lack standardized, repeated instrumental assessments and heterogeneity in definitions limits meta-analytic pooling.

Results

Note: Study heterogeneity prevented a single pooled prevalence estimate that would be clinically meaningful across all settings; instead we summarize ranges by clinical setting and highlight representative, higher-quality cohorts and systematic reviews.

Literature yield and study types

The literature includes early descriptive reports (2020–2021), multiple single and multicentre prospective cohorts (2021–2025), several systematic reviews and meta-analyses summarizing heterogeneous

prevalence estimates (2022–2024), and a growing number of service-level and intervention reports describing rehabilitation programmes and outcomes (2022–2025). Instrumental assessments (FEES/VFS) were used in an increasing subset of studies published 2023 onward, improving specificity for aspiration and physiological characterization.[6–9]

Prevalence by clinical setting

Community / nonhospitalized (mild disease): Relatively few large population-based studies focus on dysphagia after mild COVID-19. Community cohorts and long-COVID clinics report swallowing complaints in a small minority; many of these reports emphasize dysphagia as one of multiple oral/upper airway complaints (dysgeusia, xerostomia, cough, odynophagia). Reported prevalence in community samples is typically under 5–10% for clinically significant or functionally limiting dysphagia.[10–12]

Hospitalized (non-ICU) patients: Multiple hospital cohorts report dysphagia (clinical or instrumental) during admission in roughly **~20–40%** of patients, with higher prevalence in older or comorbid patients and those who experienced in-hospital neurologic events. These studies typically relied on bedside screening with selective instrumental confirmation. Representative cohorts documented in-hospital dysphagia with measurable nutritional and functional impact.[2,11,13]

ICU / invasively ventilated patients (post-extubation): This setting has the highest reported prevalence. Studies using systematic post-extubation FEES or clinical screening report dysphagia in **50–90%** of invasively ventilated COVID-19 patients during the immediate post-extubation or early ICU recovery period; many large ICU cohorts report prevalence in the 50–75% range when systematic screening is used. These high rates reflect combined effects of prolonged intubation, sedation, neuromuscular weakness and laryngeal injury. Several prospective ICU cohorts used repeated assessments to show substantial early recovery but persistence in a subgroup.[3,4,14]

Heterogeneity caveat: The wide ranges arise from real differences (case-mix, duration of ventilation, tracheostomy rates), methodological differences (screening vs routine instrumental testing), and temporal changes (practice changes between early pandemic waves and later waves with vaccination and shorter ICU stays). Several systematic reviews synthesizing studies through 2023–2024 highlight these heterogeneities and explicitly caution about pooling heterogeneous datasets.[7,15]

Risk factors associated with PCD

Strong and consistent predictors reported across cohorts include:

1. **Prolonged endotracheal intubation:** duration positively correlates with dysphagia severity and slower recovery; markedly higher immediate post-extubation dysphagia when ventilation time exceeded 7–10 days.[3,4,9]
2. **Tracheostomy:** presence of tracheostomy and prolonged dependence independently associate with delayed return to oral intake; structured decannulation protocols with SLP involvement can shorten time to safe oral intake.[3,18]
3. **Neurologic complications:** in-hospital stroke, encephalopathy, cranial neuropathies and critical illness neuropathy/myopathy correlate with more severe and persistent dysphagia.[1,4]
4. Older age, frailty and comorbidities.[11,13]
5. **ICU-acquired weakness:** generalized weakness involving bulbar musculature predicts slower recovery and persistence at three months.[9]

These risk factors interact: older patients with prolonged ventilation and neurologic complications have the highest risk of persistent swallowing impairment.

Clinical phenotype and instrumental findings

FEES and VFS reports clarify common pathophysiologic patterns in PCD:

- **Impaired laryngeal elevation and reduced hyolaryngeal excursion** leading to reduced airway closure and increased aspiration;

- **Pharyngeal residue** from reduced pharyngeal constriction and delayed pharyngeal swallow initiation;
- **Reduced sensation and silent aspiration** in a subset (supporting the importance of instrumental assessment when silent aspiration is suspected); and
- **Laryngeal pathology** (ulceration, granuloma, vocal fold immobility) attributable to prolonged endotracheal tube trauma or post-intubation neuropathy. FEES-based series document these findings and link them to functional outcomes (time to oral intake, FOIS).[5,12,23]

Recovery trajectories and long-term prevalence

Immediate to early recovery (days–weeks): Many patients experience rapid early improvement as sedation ends, secretions are managed and cognitive status improves; bedside compensatory measures allow earlier safe oral intake in many cases. Several ICU cohorts document substantial improvement in the first 2–4 weeks.[4,13]

Medium term (3 months): Most cohorts show further resolution by three months for the majority, but a consistent minority have persistent impairment necessitating outpatient therapy. Reported medium-term persistence ranged approximately 10–30% depending on initial severity and cohort selection.[8,11]

Long term (6–12 months): Longitudinal cohort studies with 6–12 month follow-up are fewer but indicate that a meaningful minority (~10–25% in selected cohorts) continue to have clinically relevant impairment beyond six months, particularly those with neurologic injury, prolonged tracheostomy or baseline frailty. Persistent deficits are associated with ongoing feeding modification, recurrent chest infections in some series, and reduced quality of life.[1,8]

Rehabilitation interventions and evidence

Interventions reported fall into broad categories:

1. **Early screening and coordinated care pathways:** Rapid SLP screening on ICU/ward, prompt instrumental assessment for abnormal screens, and structured multidisciplinary pathways (SLP, dietetics, PT/OT, critical care) are associated with earlier return to oral intake and reduced aspiration-related complications in observational comparisons.6,13
2. **Bedside compensatory strategies and diet modification:** Postural adjustments, texture modification, and swallow manoeuvres (chin-tuck, supraglottic swallow) are first-line measures to improve immediate safety. These low-risk interventions are widely reported to reduce immediate aspiration events and permit safer oral intake pending rehabilitative recovery.20
3. **Exercise-based targeted therapy:** Structured swallow exercise programmes (effortful swallow, Mendelsohn manoeuvre, Shaker/head-lift, tongue-resistance training) have been reported to improve clinical swallow scales and FOIS scores in PCD cohorts. Several small interventional case series implementing intensive exercise programmes during inpatient recovery reported clinically meaningful improvements; randomized studies specific to PCD remain scarce.[3,17]
4. **Neuromuscular electrical stimulation (NMES) and adjuncts:** NMES has a mixed evidence base in general dysphagia literature. Several centres applied NMES as an adjunct in PCD with small sample studies reporting improvements in swallowing function; systematic syntheses suggest potential benefit but heterogeneity in devices, protocols and patient selection limits firm conclusions. Recent 2024–2025 literature finds promising signals but underscores the need for adequately powered RCTs specific to PCD.[22,26]
5. **Tracheostomy protocols and decannulation-targeted therapy:** Structured cuff-deflation, speaking valve trials, and SLP-led FEES guidance for decannulation shorten time to safe oral intake and decannulation in multiple service reports; careful instrumental monitoring reduces aspiration risk during decannulation.[18]
6. **Comprehensive inpatient multidisciplinary rehabilitation:** Programs combining physical rehabilitation, nutritional optimization and SLP therapy report global functional gains including

improved swallow function and reduced length of stay; evidence largely derives from single-centre cohort evaluations.[13,24]

Outcome measures used and effects: Studies used a range of outcome measures: Functional Oral Intake Scale (FOIS), Penetration-Aspiration Scale (PAS) on VFS, clinical swallow scales (e.g., DSS), time to decannulation, rates of aspiration pneumonia and patient-reported QoL. Most reports show improvement in FOIS and reductions in PAS scores with therapy; effect sizes and durability vary and are influenced by baseline severity and concurrent rehabilitation intensity.

Safety, feasibility and resource implications

During pandemic waves FEES/VFS access was reduced in many centres due to infection-control constraints; services adapted with targeted instrumental use for high-risk cases and expanded bedside screening. Many centres reported feasibility of delivering early SLP interventions alongside infection control precautions. Resource implications are substantial: routine screening, staff training, access to FEES/VFS and outpatient therapy capacity are necessary to manage the persisting PCD burden.[19,20]

Discussion

Principal findings and interpretation

PCD is common in hospitalized populations — especially among invasively ventilated ICU patients — and while a majority recover within weeks to months, a significant minority experience medium- to long-term impairment that requires ongoing rehabilitation. Dominant contributors (prolonged intubation, tracheostomy, neurologic injury and ICU-acquired weakness) are biologically plausible and consistently observed across settings. Early identification, instrumental characterization when indicated, and multidisciplinary rehabilitation are associated with better outcomes in observational studies and align with established rehabilitation principles for post-critical illness dysphagia.[2–4,6,8]

Strengths and limitations of the evidence base

Strengths: increasing availability of FEES/VFS studies has improved physiological understanding; several multicentre cohorts and scoping/systematic syntheses (2022–2025) provide converging evidence about prevalence patterns and risk factors. **Limitations:** predominance of observational designs, heterogeneity in assessment methods, variable follow-up timepoints, and few adequately powered RCTs of specific rehabilitation strategies for PCD. Changing practice across pandemic waves (shorter ventilation in vaccinated patients, different use of steroids/antivirals) complicates comparisons across time.[7–9]

Clinical implications

Screen high-risk patients (prolonged ventilation >48–72 hours, tracheostomy, in-hospital neurologic events, older/frail): perform bedside screening prior to initiation of oral feeding.[3,18]

1. **Use instrumental assessment (FEES/VFS)** when bedside screening is abnormal, silent aspiration is suspected, or detailed physiologic characterization is needed to drive targeted therapy.[5,12]
2. **Initiate early, pragmatic rehabilitation** (compensatory strategies, diet modification) to permit safe intake while implementing targeted exercise programmes led by SLPs for physiologic recovery.[20,3]
3. **Consider adjunctive NMES in selected patients** where conventional therapy yields limited gains, understanding that current PCD-specific RCT evidence is limited and device/protocol heterogeneity exists.[22,26]
4. **Plan outpatient follow-up** at 4–6 weeks and again at 3 months for high-risk cases, with instrumental reassessment for persistent symptoms or recurrent chest infections.[8]

Research recommendations

1. **Standardized prospective cohorts** — large, multicentre studies using predefined timepoints (discharge, 1 month, 3 months, 6 months, 12 months) with routine instrumental assessments for high-risk groups to establish true incidence, recovery curves and predictors of persistence.

2. **Randomized controlled trials** — pragmatic RCTs comparing standard care vs targeted exercise programmes, and trials testing NMES protocols with standardized settings and sham controls in PCD populations of varying severity.
3. **Mechanistic studies** — neurophysiology, imaging and histopathology where feasible to disentangle central vs peripheral vs laryngeal trauma mechanisms and identify biomarkers predicting poor recovery.
4. **Health services research** — cost-effectiveness and implementation studies of screening pathways, tele-rehabilitation models, and training programs for SLPs in low-resource settings.
5. **Patient-reported outcomes and QoL** — standardized inclusion of validated QoL measures and nutritional outcomes in all future studies to capture patient-centered impact.[6,16]

Conclusion

Post-COVID dysphagia is a clinically important sequela among hospitalized and critically ill patients. Prevalence is highest in the ICU/invasively ventilated population; many patients demonstrate early recovery but a clinically meaningful minority have protracted impairment at 3–12 months. Early SLP involvement, targeted instrumental assessment, and multidisciplinary rehabilitation are associated with improved outcomes in observational studies. Given the predominance of observational evidence, there is an urgent need for standardized prospective cohorts and randomized trials of rehabilitation strategies specifically targeted to post-COVID dysphagia.

Limitations of this review

- Rapidly evolving literature and heterogeneous study designs limit formal meta-analysis; the present synthesis emphasizes ranges and representative studies to inform clinicians.
- Search limited to English language studies accessible in main databases (representative LMIC/Indian studies were included where available).
- Many rehabilitation studies are small and nonrandomized; recommendations emphasize pragmatic best practice pending RCT evidence.

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