http://dx.doi.org/10.18623/rvd.v23.n4.4866

# CLINICAL PRACTICE GUIDELINES FOR DYSPHAGIA MANAGEMENT IN INTENSIVE CARE UNIT: A SPEECH-LANGUAGE PATHOLOGIST'S FRAMEWORK

## *DIRETRIZES DE PRÁTICA CLÍNICA PARA O TRATAMENTO DA DISFAGIA EM UNIDADES DE TERAPIA INTENSIVA: UMA ESTRUTURA DE TRABALHO DO FONOAULFÓLOGO*

Article received on: 10/9/2025
Article accepted on: 1/9/2026

**Anum Ashraf***
*Riphah International University, Lahore, Pakistan
Orcid: https://orcid.org/0000-0002-3276-1803
anumslp@gmail.com

**Nazia Mumtaz***
*Riphah International University, Lahore, Pakistan
Orcid: https://orcid.org/0000-0002-3198-6744
nazia.mumtaz@riphah.edu.pk

The authors declare that there is no conflict of interest

**Abstract**
Objective: This study aims at assessing the feasibility of the involvement of speech language pathologists in the identification and intervention of dysphagia in ICU patients. This brings the need of making a comparison of the procedures and using of diagnostic instruments like the FEES and VFSS. The goal of the study is to assess the effects of early identification and assessment of aspiration pneumonia, to explore available therapeutic options like NMES and postural adjustments, as well as to determine how integrated interprofessional approach can help to improve the quality of dysphagia management within the ICU population. Methods: The development of Clinical Practice Guideline (CPG) was done with the assistance of a development committee and advisory committee. The CPG development group comprised three Neurophysicians, three Otolaryngologists, three Nurses and four Speech-Language Pathologists (SLPs). It was agreed that all members contributed to the identification of the evidence to be presented and deliberation of the recommendations in response to the Key Questions (KQs) to ensure that the guideline formulated is holistic and evidence based for use in the ICU in managing dysphagia. Then Literature review was done by an extensive search of papers using some of the most popular search databases including; Pubmed, Embase, and the Cochrane library. Specifically, research with patients in an adult ICU was considered and

***Resumo***
*Objetivo: Este estudo tem como objetivo avaliar a viabilidade do envolvimento de fonoaudiólogos na identificação e intervenção da disfagia em pacientes internados na UTI. Isso traz a necessidade de fazer uma comparação dos procedimentos e do uso de instrumentos de diagnóstico, como FEES e VFSS. O objetivo do estudo é avaliar os efeitos da identificação precoce e avaliação da pneumonia por aspiração, explorar as opções terapêuticas disponíveis, como NMES e ajustes posturais, bem como determinar como uma abordagem interprofissional integrada pode ajudar a melhorar a qualidade do tratamento da disfagia na população da UTI. Métodos: O desenvolvimento da Diretriz de Prática Clínica (CPG) foi feito com a assistência de um comitê de desenvolvimento e um comitê consultivo. O grupo de desenvolvimento da CPG foi composto por três neurofisiologistas, três otorrinolaringologistas, três enfermeiros e quatro fonoaudiólogos (SLPs). Foi acordado que todos os membros contribuíram para a identificação das evidências a serem apresentadas e para a deliberação das recomendações em resposta às Questões-Chave (KQs), a fim de garantir que a diretriz formulada fosse holística e baseada em evidências para uso na UTI no tratamento da disfagia. Em seguida, foi realizada uma revisão da literatura por meio de uma extensa pesquisa de artigos usando alguns dos bancos de dados*

considered to be meeting inclusion criteria. Results: Early dysphagia screening and evaluation with FEES yields improved patient performance. Electrical Stimulation and postural changes improved the efficacy of the swallow, leading to a highly significant benefit. In addition, the component that implements a multidisciplinary care model enhanced the general well-being of patients admitted in the ICU by doing away with factors such as aspiration pneumonia. Conclusion: This research underscore the importance of speech-language pathologists and interdisciplinary teams in the assessment and managements of dysphagia in ICU. Adoption of more limited diagnostic and therapeutic intervention in the individual patient as a means of patient safety and improved quality of care. Therefore, early intervention and multidisciplinary approach for critically ill patients reduce the time and cost of hospital stay.

**Keywords:** Dysphagia. Speech Language Pathologist. Postural Adjustment. Critical Care. Neuromuscular Electrical Stimulation (NMES).

*de pesquisa mais populares, incluindo: Pubmed, Embase e a biblioteca Cochrane. Especificamente, pesquisas com pacientes em uma UTI para adultos foram consideradas e consideradas como atendendo aos critérios de inclusão. Resultados: O rastreamento precoce da disfagia e a avaliação com FEES resultam em melhor desempenho do paciente. A estimulação elétrica e as mudanças posturais melhoraram a eficácia da deglutição, levando a um benefício altamente significativo. Além disso, o componente que implementa um modelo de atendimento multidisciplinar melhorou o bem-estar geral dos pacientes internados na UTI, eliminando fatores como pneumonia por aspiração. Conclusão: Esta pesquisa ressalta a importância dos fonoaudiólogos e equipes interdisciplinares na avaliação e no tratamento da disfagia na UTI. A adoção de intervenções diagnósticas e terapêuticas mais limitadas em cada paciente como forma de garantir a segurança do paciente e melhorar a qualidade do atendimento. Portanto, a intervenção precoce e a abordagem multidisciplinar para pacientes em estado crítico reduzem o tempo e o custo da internação hospitalar.*

***Palavras-chave:*** *Disfagia. Fonoaudiólogo. Ajuste Postural. Cuidados Intensivos. Estimulação Elétrica Neuromuscular (NMES).*

## 1 INTRODUCTION

Dysphagia refers to disturbed swallowing or digestion and is described as an impedance in the swallowing process. It commonly occurs in Intensive Care patients and might develop from various causes (1). This is a sensory and mechanical dysfunction of the swallowing process acknowledged more frequently in recent years in intensive care unit (ICU) attributed to improved identification techniques and hierarchy approach in clinical practice (2). Dysphagia in a critically ill patient can be due to the pneumatic volume, mouth muscle intolerance, pharyngo-laryngeal afferent or sensory alterations and larynx traumatism caused by endotracheal intubation or tracheotomy. Over the years, aspiration has been associated with this illness in regard to increased rates of aspiration pneumonia, poor quality of life, longer hospitalization, and malnutrition (3). Moreover, they may also develop dysphagia as a result of their treatment in the intensive care unit

making it iatrogenic. Another potential cause of dysphagia is an existing swallowing impairment. This condition might be associated with head and neck pathologies, radiation, or neurological discrepancies, or it could be preclinical and thus unidentified. Those in the second category may have difficulty swallowing, but their impaired swallowing reserve or incapacity to compensate for lost function may become evident upon admission to the intensive care unit(4).

Post-extubation dysphagia and post-stroke dysphagia are now common, impacting over 40% of individuals who endured mechanical ventilation and 80% of acute stroke individuals, accordingly(5). Dysphagia is acknowledged to correlate with heightened illness and death (6). Fiberoptic endoscopic evaluation of swallowing (FEES), which is regarded as the only gold standard examination of swallowing that can be performed at the bedside, is one of the instrumental evaluations of swallow function that both occupational therapists and speech-language pathologists use. Another technique is the Evans blue dye test(7), which evaluates the safety of swallowing for tracheostomy patients using blue dye. It is advisable to suspect aspiration to the airway if sputum appears colored below the cuff(7). The blue dye test has a modest sensitivity (38–95%) and a high specificity (79–100%), making it ineffective for detecting aspiration(8).

In several countries, speech-language pathologists (SLPs) assess and manage dysphagia using both clinical and mechanical evaluations of swallowing function, while offering compensating or rehabilitative therapies in close cooperation with those suffering and their family (9). SLTs are equally skilled in formulating and delivering several therapeutic approaches to target the defects that cause Dysphagia. These may work to strengthen or rehabilitate a particular problem e.g. reduced hyolaryngeal elevation. Rehabilitation procedures include such exercises for the lip and tongue movements and their range and strength, with the use of resistance training (10). Voice work may be applied for the improvement of laryngeal elevation and vocal cord adduction. Numerous swallowing exercises are designed for specific dysphagia types that include Shaker's maneuver, a Masako technique, Mendelsohn maneuver, Effortful swallow and Facial Oral Tract Therapy (11).

**Purpose of clinical practice guidelines (CPGs):** The CPGs intends to offer best practice and logically defendable recommendations to speech-language pathologists and other clinicians involved in the screening and management of dysphagia in the ICU. For

this reason, the CPG will help with decision making regarding dysphagia evaluation and treatment to improve its impact on the ICU patients. Further, it aims at achieving sustainability in the health system by improving the overall value and total health care.

**Scope of CPG:** This CPG is aimed at evaluation and intervention strategies of dysphagia in the adult mechanically ventilated patients in the critical care environment. They reviewed SLPs data regarding dysphagia diagnosis and treatment to improve the patient's outcome. This recommendation should not apply to individuals that are under 18 years of age or those with extending neurological illnesses. This CPG does not limit the professional independence of a doctor, control the doctor's actions and decision or assess their quality of practice in health care.

## 2 METHODS

**CPGs development group:** The development of CPG was done with the assistance of a development committee and advisory committee. The CPG development group comprised of three Neurophysicians, three Otolaryngologists, three Nurses and four Speech-Language Pathologists (SLPs). It was agreed that all members contributed to the identification of the evidence to be presented and deliberation of the recommendations in response to the KQs to ensure that the guideline formulated is holistic and evidence based for use in the ICU in managing dysphagia.

**Key Questions (KQs):** This Clinical Practice Guideline (CPG) is centered on four important components of dysphagia management in the ICU settings – evaluation, therapy, nutrition support, and complications. The first category falls under identification of specific methodologies that are conducted in screening and diagnostic procedures and perhaps including fundamental physical examination and other instrumental assessments like FEES and VFSS. The second category deals with therapy actions such as therapeutic procedures, compensatory activity, and neurostimulation, as well as focusing on the personality and a type of disability together with the characteristics of a pathological state. The third domain is entitled with nutritional management. It focuses on the delivery of nutrition and intravenous therapies, monitored modified meals, and feeding. It determines when and how the dysphagic patient also ought to resume oral feeding to prevent side effects which are aspiration and malnutrition. The guideline ultimately examines

implementation barriers and other concerns such as aspiration pneumonia, reintubation, the need for a multidisciplinary team, and ethical considerations regarding patient safety and end-of-life care. The KQs were developed using the PICO framework, focusing on people in the ICU with confirmed or suspected oropharyngeal dysphagia. The examination of each KQ is deliberately designed to guide intervention strategies aimed at improving patient outcomes and ensuring continuity of treatment.

**Search strategy:** An extensive investigation was performed in PubMed, Embase, the Cochrane Library, and the KoreaMed database until November 2024. An extragrammatical technique has been used alongside grammatical terminology, integrating spontaneous language with controlled vocabulary. Only 'Medical Subject Headings' (MeSH) were used for PubMed, whereas both MeSH and Cochrane Library were employed, and 'Emtree' was applied for Embase. EndNote was used to handle the detected search results. Two researchers reviewed the papers by examining the title and abstract to eliminate ineligible items for each Key Question (KQ). Subsequent to full-text evaluations, post-title removal was conducted. Research involving individuals under 18 years of age and those concentrating on people with progressive neurological illnesses, including Parkinson's disease and dementia

Chosen papers were subjected to quality evaluation using validated instruments: For randomized controlled trials (RCTs), we used the updated Cochrane Risk of Bias tool (RoB 2.0); for non-randomized controlled trials (non-RCTs), we utilized an appropriate Risk of Bias tool; and for systematic reviews (SRs), we applied the AMSTAR 1.0 instrument. The evidence level was assessed through the Grading of Recommendation, Assessment, Development, and Evaluation (GRADE) methodology, as seen in Table 1 below.

**Table 1**

*Grading of Recommendations Assessment - Evidence Levels*

| Quality Level | Definition |
|---|---|
| **High** | We are certain whether the estimated impact closely approximates the real impact. |
| **Moderate** | The predicted magnitude of the impact seem to align closely with the actual impact, though they could show significant variability. |
| **Low** | The certainty regarding the projection of the impact is constrained. The true impact could vary considerably compared to the projected projection. |

| | |
|---|---|
| **Very Low** | The projection of the impact lacks substantial assurance. The true impact could vary considerably compared to the projected impact. |

Recommendations were assigned one of five possible strengths based on the level of evidence, clinical applicability, and other factors. These are detailed in Table 2 below.

**Table 2**

*Grading of Recommendations - Strength Levels*

| Strength of Recommendations | Definition |
|---|---|
| **Strong Recommendation** | The intervention or diagnostic test should preferably be used in all clinical practices due to the benefits obtained from the intervention outweighing the risks involved by many folds among clinicians. This incorporates the level of evidencing, the patient's preference inclinations and the available resources. |
| **Conditional Recommendation** | The intervention or diagnostic test is considered conditionally as its application implies the consideration of advantages and disadvantages. The decision integrates the evidence level, patient values, and preferences, and means. |
| **Against Recommendation** | The treatment or evaluation ought to be withheld due to the potential risks outweighing the benefits it may offer. The present suggestions is grounded in robust evidence, taking into account patient values, preferences, and available resources. |
| **Inconclusive** | The magnitude and direction of the suggestions cannot be determined due to the lack of sufficient verification or its complete absence, along with the ambiguity regarding the equilibrium of advantages and disadvantages, particular patient needs, and the available assets at hand. |
| **Expert Consensus** | The potential advantages and benefits of the treatment or screening test may be inferred from clinical observations or additional formal methodologies; however, there remains a notable absence of scientific trial verification, primarily due to insufficient randomized controlled trials to substantiate the findings. Throughout the entire procedure, the assessment includes dangers, verification degree, patient values, preferences, and available resources. |

For every KQ, the recommendations were examined and modified by at least 2 individuals of the development team. Feedback from advisory committees was incorporated through email and meetings, with consensus achieved when at least 75% of members agreed on a nine-point scale. The finalized CPG will be reviewed every five years, incorporating new evidence that may impact the management of dysphagia in ICU settings.

## 3 RESULTS

**Table 3**

*Summary of recommendations*

| | Evidence Level | Grade of Recommendation |
|---|---|---|
| Early Screening for Dysphagia in ICU Patients | High | Strong |
| Use of Standardized Screening Tools | Moderate | Strong |
| Comparison of VFSS and FEES in ICU Dysphagia Assessment | Moderate | Strong |
| Postural Adjustments | Low | Conditional |
| Respiratory Muscle Strength Training (RMST) | Moderate | Strong |
| Use of Neuromuscular Electrical Stimulation (NMES) | Moderate | Conditional |
| NMES combined with swallowing therapy | Moderate | Strong |
| TDCS in improving swallowing function | Moderate | Conditional |
| Texture modification of food and liquid | Low | Conditional |
| Implementation of the IDDSI Framework for Modified Diets | Moderate | Strong |
| Nutritional intervention improve nutritional status in dysphagia | Moderate | Strong |
| Oral Hygiene and Dental Care to Prevent Complications | Moderate | Strong |
| Family Education and Involvement in Dysphagia Care | Low | Conditional |
| Multidisciplinary Team Approach in Dysphagia Management | Moderate | Strong |

### 3.1 Assessment of dysphagia in ICU

#### *3.1.1 KQ 1. Does initial assessment enhance prognosis for individuals with dysphagia?*

Dysphagia refers to a health disorder that heightens the likelihood of problems, including dehydration, starvation, aspiration pneumonia, and airway blockage, potentially resulting in severe impairment or mortality (12-14). Multiple approaches have been used to assess individuals with dysphagia, and it is crucial to examine the efficacy of early screening instruments for dysphagia in enhancing prognosis and averting problems associated with the condition. A randomized controlled trial by Schmidt Leuenberger et al.(12) found a reduction in pneumonia prevalence among individuals who underwent preliminary testing for dysphagia following lung excision. Ten retrospective investigations involving those suffering from stroke, post-extubation dysphagia in an ICU, and severe cervical injuries shown a substantial reduction in respiratory problems after the initial assessment of dysphagia (12-21) . Given that the previous research demonstrated similar findings, early screening is advised for individuals with suspected dysphagia to mitigate the incidence of pneumonia. Early

screening and timely intervention for individuals with oropharyngeal dysphagia may avert severe consequences, including pneumonia.

Recommendation: initial diagnosis is highly advised to individuals with apparent dysphagia to mitigate the incidence of pneumonia, supported by substantial data.

*3.1.2 KQ 2. Are established assessment superior to just one assessment investigation for diagnosing dysphagia?*

Initial assessment and adequate therapy for dysphagia may mitigate the incidence of disease-related consequences. Numerous diagnostic methods for dysphagia are being established and are employed in medical settings (22). Individual diagnostic assessments, like the 3-ounce water swallow test or the volume-viscosity swallow test, are utilized for assessing aspiration by observing coughing, alterations in voice, and variations in oxygen saturation after direct ingestion of food (23). Typical diagnostic evaluations, including the Burke Dysphagia Screening Test (BDST), Gugging Swallowing Screening Test (GUSS), Standardized Swallowing Assessment (SSA), Toronto Bedside Swallowing Screening Test (TOR-BSST), and Clinical Functional Scale for Dysphagia, employ a clinical scale by integrating multiple clinical components (24, 25). Shin et al. (23) evaluated the diagnostic efficacy of the single screening test (3-oz water test) against conventional diagnostic instruments (GUSS, BDST, and SSA) in relation to VFSS results in patients with stroke. The findings indicated no substantial disparity in the screening efficacy of GUSS relative to different diagnostic assessments. Lopes et al.(26) analysis of the water test and GUSS revealed no differences in the occurrence of stroke-associated pneumonia, mortality rate, ICU admission rate, and functional status among both teams. Both trials indicated that there was no disparity in diagnostic accuracy or complication rates comparing standardized and individual screening tests. A systematic screening test instrument may assess individuals swallowing performance despite the need for actual food ingestion. Consequently, for high-risk individuals unable to effectively ingest saliva, a standardized screening test seems to be harmless than a singular test that necessitates swallowing water.

**Recommendation:** A structured evaluation could be used to identify dysphagia in individuals with probable dysphagia (expert consensus).

*3.1.3 KQ 3. Which instrumental assessment, videofluoroscopic swallowing study (VFSS) or flexible endoscopic evaluation of swallowing (FEES), provides more comprehensive and effective evaluation for dysphagia in ICU patients?*

FEES and VFSS are considered conclusive assessments for dysphagia in ICU patients (27, 28). VFSS provides a comprehensive depiction of the swallowing process, including the oral phase, pharyngeal phase, and esophageal phase (29, 30). This is beneficial for assessing bolus flow, timing, and structural anomalies within the network. Nevertheless, VFSS requires patient transfer to the radiology department; the process includes radiation exposure and is inappropriate for severely sick patients(31).

Aviv (32) conducted another RCT to ascertain the efficacy of VFSS compared to FESS in 126 individuals with dysphagia. The research demonstrated that FEES was equivalent to VFSS, with no results that were statistically significant regarding the prevalence of aspiration pneumonia in patients. Wu et al. (33) in his study assessed that Flexible endoscopic evaluation of swallowing surpassed IOS in diagnosing polar permeation, aspiration, pharyngeal residue, and cough reflexes; while Fattori et al.(34) indicated that FESS was beneficial for those seeking to evaluate the extent of pharyngeal residue (35, 36).

In contrast, FEES is a portable and bedside assessment that may be conducted on severely sick or immobilized patients. It offers an instantaneous visual representation of the pharyngeal phase, voice cords, and their management of secretions. However, FEES does not assess the oral or pharyngeal phases, which may cause discomfort throughout the examination (37). Recent studies indicate that VFSS and FEES are comparably effective in detecting aspiration, however their use may vary according on the context. Given the meticulous and continuous evaluation necessary in the ICU, FEES is more advantageous for real-time assessment, whereas VFSS is beneficial for a more dynamic and comprehensive analysis (38).

***Recommendation:*** The statistics indicate a reasonable degree of efficacy for VFSS and FEES whenever used in conjunction. FEES must be used as a portable and real-time swallowing examination in ICUs, whereas VFSS should be employed where the patient's state allows for an in-depth examination of all stages of ingesting.

## 3.2 Treatment of Dysphagia in ICU

### *3.2.1 KQ 4. Do postural adjustments enhance swallowing activity among individuals with dysphagia?*

Postural adjustments are predominant compensatory strategies used in dysphagia therapy, aimed at modifying bolus flow and reducing aspiration risk (39-41). These strategies have particular importance in relation to their use in Intensive Care Units, which are susceptible to aspiration pneumonia (42). Benjapornlert et al. in 2020 Positioning patients at a forty-five degree angle during feeding has been shown to improve swallowing function and reduce instances of aspiration (43). In 2021, researchers Forbes and Humbert examined the influence of chin-down position on swallowing mechanics. Research demonstrated enhanced airway protection and reduced penetration-aspiration. A trial of this posture during swallowing demonstrated enhanced body alignment and decreased penetration-aspiration scores (44). In 2022, Matos et al. assessed the efficacy of the Mendelsohn maneuver and supraglottic swallow in ICU patients with dysphagia (45). Prior studies on using postural changes as a therapeutic intervention to enhance the safety and efficacy of swallowing in dysphagia patients have shown effectiveness, particularly among those admitted to the ICU. These are conservative procedures, i.e., cost-effective, and may be used in many clinical contexts to enhance swallowing mechanics.

**Recommendation:** It is strongly advised that postural changes, such as the chin tuck and supraglottic swallow, be used in dysphagic patients, since they enhance swallowing safety and thereby decrease the likelihood of aspiration in dysphagic ICU patients.

### *3.2.2 KQ 5: does respiratory muscle strength training (RMST) effectively enhance the ability to swallow and decrease the occurrence of pneumonia in individuals with dysphagia?*

The objective of RMST is to enhance swallowing by augmenting respiratory muscle strength, since inspiration and swallowing are interrelated (46-49). The choice

between inspiratory or expiratory muscle strength training is contingent upon the intended objective. Individuals with Parkinson's disease who have particular respiratory dysfunction, dysphagia, and diminished cough efficacy might benefit from enhancing expiratory muscle force production(50). An individual with paradoxical vocal fold will benefit from inspiratory muscular training to enhance the endurance of the diaphragm, external intercostal, and parasternal intercostal muscles[51].

In 2017, Patchett et al identified the feasibility of Expiratory Muscle Strength Training (EMST) for dysphagia treatment for COPD patients. This study also established that EMST enhanced respiratory function that may significantly assist in airway management and swallowing therapy (51). Wheeler et al in 2007 evaluated the external electromyographic activity of submental muscles during swallowing and expiratory volume threshold exercise activities. These result indicated that the implementation of EMST might increase the contralateral middle depressor muscle activity to optimize swallowing function (52).

Literature review indicated that RMST of which EMST is particularly relevant plays a role in enhancing dysphagia and may be used in reducing pneumonia. These procedures are therefore intended to strengthen the respiratory and swallowing muscles and therefore decrease the chances of aspiration.

**Recommendations**: It is strongly recommended to use inspiration and expiration strengthening when combined with RMST as effective in enhancing swallowing outcomes, and decreasing pneumonia rates in dysphagic patients. Clinicians have to consider intervening with RMST, depending on patient characteristics, circumstances and the degree of dysphagia.

### *3.2.3 KQ 6. does neuromuscular electrical stimulation (NMES) increase the functionality of swallowing and decrease the rate of pneumonia among individuals with dysphagia?*

Neuromuscular Electrical Stimulation (NMES) is another intercessing technique that applies electrical current to stimulate the muscles into contraction (53-56). The goal is to promote the grade of muscle control in the swallowing mechanism and thereby decrease complications like aspiration pneumonia (57). Wang et al. conducted the study to determine the effectiveness of NMES in treating dysphagia patients who have suffered

a stroke. Using NMES with traditional swallowing treatment increases the swallowing capacity and decreases potential swallowing complications. Tarihci Cakmak et al. aimed at evaluating whether traditional dysphagia treatment (TDT) alongside with neuromuscular electrical stimulation (NMES) enhances swallowing abilities in patients with post-stroke dysphagia. This work provided proof that the general enhancement of swallowing disorder and quality of life concerning swallowing was significantly higher in patients who undertook combined treatment rather than the subjects who only received TDT(58).

Systematic review of RCTs supports the NMES as an effective intervention in the dysphagia rehabilitation and may decrease the rate of pneumonia among patients with dysphagia. However, differences in the techniques of the performed studies and the enrolled groups of patients suggest the need for more high quality studies confirming the effectiveness.

**Recommendation:** While NMES may not be considered a standalone treatment for dysphagia, it can be utilized as an adjunct to traditional swallowing therapies to improve the patient's swallowing capacity and subsequently reduce the incidence of aspiration pneumonia. Clinicians are urged to modify this document and take into account patient and disease-specific criteria, as well as the prevailing data, while determining the use of NMES in clinical practice.

### *3.2.4 KQ 7. Does the combination of surface NMES and swallowing therapy yield improved outcomes for dysphagia among individuals in non-progressive neurological disease than swallowing treatment solitary?*

Traditional swallowing treatment encompass muscular training, compensatory techniques, sensory and tactile stimulation, and biofeedback (59). The U.S. Food and Drug Administration approved the application of NMES, specifically VitalStim® (Chattanooga Group, Hixson, TN, USA), for addressing dysphagia in year 2001. The rehabilitative method entails attaching electrodes to the skin and administering electrical impulses to the muscles involved in swallowing to induce contraction. A significant number of studies evaluated the combined effects of surface NMES, comprising 10 randomized controlled trials (57, 60-68) and two non- non-randomized controlled trials

(69, 70). In several trials, the integration of NMES with swallowing treatment markedly improved both objective and subjective measures of swallowing function. A randomized controlled trial by Lee et al. (63) showed the combination of NMES and traditional swallowing therapy resulted in a greater FOIS at 3 and 6 weeks post-treatment compared to conventional swallowing therapy alone. A randomized controlled trial by Terré and Mearin (67) indicated that the integration of neuromuscular electrical stimulation (NMES) with traditional swallowing treatment enhanced oral intake function and decreased aspiration in dysphagic individuals. A randomized controlled trial by Xia et al. (68) shown that the integration of neuromuscular electrical stimulation with traditional swallowing treatment facilitated recovery from post-stroke dysphagia. Ninety percent of research demonstrated similar findings, indicating that the integration of NMES and traditional swallowing treatment substantially improved swallowing questionnaire scores or test outcomes compared to conventional therapy alone. This therapeutic approach is deemed secure and efficacious. Consequently, NMES is advised with swallowing therapy for the management of dysphagia.

**Recommendations:** The integration of superficial neuromuscular electrical stimulation with swallowing therapy is recommended to improve swallowing capabilities in patients with non-progressive neurological signs.

*3.2.5 KQ 8. Are transcranial direct current stimulations efficient for enhancing swallowing operation and decreasing the likelihood of aspiration pneumonia, and enhancing dietary intake?*

Transcranial Direct Current Stimulation (tDCS) is a novel neuro-enhancement approach that uses weak direct current stimulation to increase the excitability of neurons in cortical networks. Studied have pointed out its benefits in the therapy of language, motor, and cognitive deficits in stroke(71).Jefferson et al. (72) were among the first authors who studied the impacts of anodal tDCS on the pharyngeal motor cortex in dysphagic patients. The positive effect on post-stroke dysphagia has been postulated by the subsequent researches. Kumar et al. (73) conducted an RCT for the application of anodal tDCs at the pharyngeal motor cortex contralateral to the lesion in patients who had dysphagia due to subacute stroke. Essentially, the Dysphagia Outcome and Severity Scale

(DOSS) results of the research demonstrated that there was a major enhancement in seven patients in anodal tDCS as compared to seven patients in sham tDCS. Subsequent RCTs have again shown that anodal tDCS enhances the swallowing function over sham tDCS (74-78). Sawan et al.(79), in his recently conducted RCT demonstrated the effectiveness of anodal tDCs in enhancing the process of swallowing, when combined with conventional rehabilitation for five days by gaining significant improvements in the VFSS and DOSS scores compared to sham tDCS. A recent randomized controlled trial by Wang et al. (80) study also showed a comparatively significant improvement in swallowing function when anodal tDCS was used concurrently with traditional swallowing therapy along with catheter balloon dilation for patients with dysphagia due to cerebral palsy post brainstem stroke (81). tDCS is an intervention that uses low-intensity direct current in order to stimulate the cerebral cortex. As stated it is easy to control and most users do not experience any side effects with only small sensations of skin burning, numbness or itching where the stimulation is applied. In conclusion, with respect to swallowing therapy, tDCS over the contralateral- or bilateral-hemisphere improves swallowing outcome in dysphagia.

**Recommendation:** tDCS is advised to be used in the case of stroke for enhancing the functional swallowing capacity in patients with non-progressive brain disorders presented in ICU's.

### 3.3 Nutritional management in dysphagia

#### *3.3.1 KQ 9. Does altering the texture of food or liquids influence the clinical progression (nutritional status or dehydration) in individuals with dysphagia?*

When a person with oropharyngeal dysphagia is unable to control the food bolus in their mouth during the chewing stage, or does not trigger an adequate pharyngeal swallowing reaction through the stage of pharyngeal swallowing, aspiration may occur. Challenges can arise when the strength of the oral muscles is reduced or when the necessary synchronized movements for swallowing are not executed properly, resulting in complications with bolus formation or the oral transit of food. The aspiration of thin liquids, such as water, is a concern for individuals with neurogenic oropharyngeal

dysphagia due to impaired bolus control, diminished lingual propulsion, or delayed swallowing response during the pharyngeal phase (82). Aspiration during swallowing can actually predispose the patient to malnutrition and dehydration and hence aspiration pneumonia (83). In an effort to compensate for dysphagia, studies regarding modifications in the viscosity of food and liquid have produced some evidence. Five randomized controlled trials (RCTs) compared the efficacy of texture modification in relation to the specific outcome of aspiration and of preventing aspiration pneumonia. Diniz et al.(84) performed an RCT using spoon-thick consistency to show the difference in the risk of aspiration; it was reduced when compared to liquid consistency in 61 stroke patients having dysphagia. Kyodo et al. (85) revealed that patients with moderate to severe dysphagia could benefit from the mashed meals with gelling agents and reducing the risk of aspiration pneumonia through enhancing pharyngeal residue time. Robbins et al. (86) observed that modification of texture had no effect on the rate of aspiration pneumonia. Lastly, in a study that involved 515 patients with dementia and Parkinson's disease who aspirated on liquids, both nectar-thick and honey-thick liquids, as well as the chin-down posture failed to significantly lower the three-month cumulative pneumonia incidence. Specifically, 50% of the patients who were on thickened liquids demonstrated symptoms of dehydration while 16 of the patients with the chin down method were consuming regular liquids. The thickened liquid fed patients independently were more dehydrated, had higher urinary tract infection, and fever than the other groups.

Although there were differences in the patients' conditions, the texture changes, and the outcomes that were measured in all of these studies, clinical improvements following texture alteration for dysphagia patients seem to be fairly significant especially in reduction of aspiration. A mere fact that texture modification is relatively inexpensive and very easy to implement, it should be applied according to the level of dysphagia experienced by a patient in order to achieve the best possible result.

**Recommendation:** Modify viscosity of foods and liquids according to degree of dysphagia in order to enhance beneficial effects such as nutritional status and hydration for ICU patients.

*3.3.2 KQ 10: Does the adoption of the International Dysphagia Diet Standardization Initiative (IDDSI) guidelines enhance patient outcomes and safety in the management of dysphagia?*

IDDSI guidelines establishes universally accepted terms and explanations for reformed foods and liquids regarding texture and viscosity, thereby enhancing the safety and care of individuals with dysphagia (87). Cichero et al.(88) further on the theoretical foundation of IDDSI in 2017, emphasizing its worldwide applicability and subsequent implementation for dysphagia diets. Wu et al. in 2022 (89) Wu et al. evaluated the feasibility of using the IDDSI paradigm to assess the effectiveness of introducing texture-modified diets in elderly care facilities, noting enhanced compliance and staff understanding. The research conducted by Xiong et al. in 2024 (90) analyzed the association between the IDDSI Flow Test and consistometric measurements to assess the practicality of this theoretical framework in clinical settings. The IDDSI framework has shown potential in standardizing practices and reducing hazards associated with dysphagia. The findings present substantial data and support the implementation of the IDDSI framework to improve patient outcomes and safety in dysphagia therapy.

**Recommendations** The IDDSI framework for modified meals is strongly recommended for personalized dietary modifications to enhance safety, facilitate communication in clinical environments, and improve dysphagia management, resulting in superior standardized patient outcomes.

*3.3.3 KQ 11. Can nutrition therapy enhance consumption or levels of nutrition in individuals suffering from dysphagia?*

Nutrition therapy involves creating precise objectives to address the individual nutritional issues and formulating and implementing strategies for nutritional management. The rehabilitation goal of dysphagia management is to boost quality of life by effecting an advantageous dietary change and seeking to optimize nutritional status (91). Recurrent malnutrition in post-stroke patients can be observed after hospitalization with reduced strength indicators, decreasing muscle mass and body weight, and low levels of blood protein in comparison with healthy individuals. Swallowing and oral dysfunction

can lead to decreased oral intake of food and fluids and thus malnutrition is predisposed (92). Better nutritional care could therefore lessen adverse outcomes, hospitalization, length of stay, cost of care, and increased death (93). there is the need to involve other disciplines in addressing the diet complications arising from oropharyngeal dysphagia. Eight studies (92, 94-100) Eight articles (92, 94–100) described consequences of nutritional interventions in the case of dysphagia that include 3 RCTs, 5 non-randomized interfering studies. A randomized controlled trial by Germain et al. (94) carried out an RCT indicating that elderly patients following a dysphagia-specific nutrition care program had greater weight, calorie, and protein intake than the control subjects. Reyes-Torres et al. (95) also reported that patients who consumed a modified consistency diet (that is nectar or custard viscosity) for 12 consecutive weeks recorded relative increase in their Body Weight, Energy and Protein intake and Hand grip strength compared to control group. A further randomized controlled trial by Taylor and Bar (96) shown that nutritional intervention including short and periodic meals correlated with enhanced fluid consumption.

**Recommendation:** A dietary intervention is advised to enhance intake or nourishment in individuals suffering from dysphagia.

### 3.4 Complications and multidisciplinary team approach

#### *3.4.1 KQ 12. Does the oral care program demonstrate effectiveness in enhancing oral health and food intake?*

Maintaining hygiene standards in the oral cavity prevents dental cavities and dryness, enhancing dental wellness and swallowing by increasing oral feeling and salivation. Normal oral swallowing activity may avert pharyngeal stage swallowing issues by effectively masticating and amalgamating saliva with food to create a suitable bolus that progresses into the airway (101, 102). A randomized controlled trial by Chen et al. (103) showed the individuals participating in the oral care program exhibited substantial enhancements in the oral health assessment instrument, but not in the Functional Oral Intake Scale (FOIS), compared to those receiving standard oral care. Chipps et al.(104) conducted a randomized controlled trial, revealing a reduction in

bacterial growth following the oral care regimen. 2 investigations were identified regarding the effectiveness of the dental care regime; however, it appears that there are no noticeable risks or negative impacts linked to the implementation of the oral care scheme, and it is simple to carry out. Implementing the oral treatment regimen may reduce bacterial growth in the oral cavity and improve dental health and swallowing performance.

**Recommendations**: It is recommended that the oral health care program be improved to better support oral health and nutritional intake for individuals experiencing dysphagia.

*3.4.2 KQ 13: What is the impact of family education and involvement on the management and outcomes of dysphagia?*

Dysphagia, or swallowing difficulty, is a disease that may significantly restrict nutritional intake, perhaps leading to respiratory infections and adversely affecting overall well-being (105). Management is often multimodal and incorporates family members as essential players in implementing management concepts (106). In 2022, Shune et al. investigated the potential benefits of multidisciplinary family-centered treatment for patients with chronic dysphagia, asserting that family integration into the processes may enhance the success of interventions (107). Rangira et al. (108) performed a research that substantiates the second purpose, asserting that dysphagia exacerbates carer strain and identifies potential causes of this burden that doctors may target in dysphagia therapy to assist carers. Further progress is required to distinctly identify load sources and particular etiologies connected to dysphagia in order to effectively address patient requirements. Current data suggest that family education and involvement might influence the experience and prognosis of dysphagia. Nevertheless, the evidence is graded as poor, necessitating the execution of more high-quality research investigations to provide complete guidance.

**Recommendations:** Experts advocate the roles of family education and engagement in dysphagia treatment to enhance patient outcomes. The evidence supporting this is minimal, resulting in a conditional recommendation

*3.4.3 KQ 14. Does the multidisciplinary team approach (including doctors, nurses, therapists, etc.) effectively reduce complications (such as death, pneumonia, and other respiration diseases) among individuals suffering from dysphagia?*

The multidisciplinary rehabilitation team consists of healthcare experts that work together alongside patients and family members to evaluate and address dysphagia. The interdisciplinary team typically comprises physicians, speech-language pathologists, dietitians, and nurses. Prosthodontists and dentists occasionally engage in identifying structural problems related to swallowing, whereas social workers may play a role in scheduling discharge. The aim of the team-based strategy is to recognize individuals vulnerable to dysphagia, evaluate the extent of dysphagia, and deliver appropriate treatment (109-111). A Randomized Controlled Trail by Zheng et al. (112) demonstrated substantial improvements in swallowing capacity among acute stroke patients who received a multidisciplinary team strategy, compared to the control group that received standard care. Four observational studies indicated that individuals managed by a multidisciplinary team showed a significant decrease in the likelihood of dysphagia, pneumonia, and the necessity for respiratory support. Additionally, these individuals reported greater satisfaction regarding their swallowing function when compared to those undergoing traditional therapy (113, 114). Although there is limited information available, adopting a multidisciplinary team approach is recommended, as it has the potential to improve the effectiveness of swallowing and reduce the occurrence of pneumonia. The multidisciplinary team strategy seems to have effectively reduced the incidence of pneumonia during the recovery process of dysphagia.

**Recommendations:** It is advisable to adopt a multidisciplinary team approach that encompasses physicians, nurses, therapists, and other professionals to mitigate the risks of adverse outcomes such as death, pneumonia, and various respiratory infections in individuals suffering from dysphagia.

## 4 DISCUSSION

The comprehensive review sought to locate literature on the management of dysphagia in ICU settings, emphasizing the role of speech-language pathologists and the

efficacy of various treatment methods. The results indicate consistent clinical procedures for early assessment, integrated evaluation, and management of swallowing issues, employing staff members as essential in the assessment of swallowing dysfunction. Dysphagia should ideally be diagnosed promptly in accordance with clinically validated guidelines, particularly by screening methods such as VFSS and FEES. Such techniques are particularly pertinent in the ICU context, since patients in this situation face an increased risk of aspiration pneumonia necessitating intubation or other comorbidities. This research revealed that early management not only improves swallowing results but also decreases the incidence of pulmonary complications, as recommended by early safety screening recommendations. Furthermore, therapy modalities such as NMES, pharyngeal muscle workouts, and compensatory swallowing techniques have shown encouraging gains in swallowing efficiency. The findings thus endorse a personalized strategy for the development of rehabilitative therapies for neurological patients.

The integration of our findings with previous research identified both parallels and differences present in the current study. Previous studies on multidisciplinary engagement and cooperation in the treatment of critical care patients have shown a correlation with favorable outcomes, such as a decreased risk of pneumonia episodes and a shortened duration of stay in the ICU. Nonetheless, information exists about the efficacy and procedural distinctions of certain preventative measures, including NMES and sensory stimulation approaches.

Certain studies reported functional alterations, while others determined that clinical results were essentially equivalent to standard care. These variations allow the formulation of individualized targeted treatment, taking into account patient features such as dysphagia severity and the presence of comorbidities.

This scoping review offers a comprehensive analysis of dysphagia care in the ICU setting, synthesizing data from diverse demographics and associated risks. We believe that one potential benefit is the systematic approach to conducting an investigation, which, although including a broad scope, yet allows for considerable depth. The emphasis on delivering solutions makes the research relevant to doctors seeking optimal practices in care management. Nonetheless, there are certain limits that must be considered. The presence of several included studies complicates meta-analysis owing to variations in the types of interventions and outcomes used. However, several domains lack an adequate

quantity of high-quality randomized controlled trials (RCTs); for instance, the effectiveness of various pharmacological agents or novel technologies such as TMS stimulation. Future research should focus on enhancing methodologies and exploring under-researched techniques to address these gaps.

The implications of this assessment are very intricate. It underscores the significance of evaluation and intervention efforts for dysphagia in the ICU and the crucial role of Speech-Language Pathologists (SLPs). Their expertise in executing VFSS and formulating individualized treatment enhances patient care, aligning with best practices in the discipline. Secondly, research on organized dental care and nutritional management not only results in improved swallowing outcomes but also enhances the patient's overall well-being. Thus, the texture-modification diet tailored for individuals with dysphagia, according to the IDDSI framework, has shown efficacy in reducing the incidence of aspiration and malnutrition. PEC is particularly beneficial in the ICU since several patients confront complex aspiration concerns stemming from swallowing difficulties.

The review emphasizes the need of interdisciplinary teamwork. Consequently, collaborative teamwork among speech-language pathologists, doctors, nutritionists, and nursing staff is essential due to the complexity of dysphagia. Integrated patient care smooths the process of establishing and delivering all round care that is responsive to the patient’s needs. This review gives a clear understanding of many areas that could be explored for future research. First, there is a clear and pressing need for further high-quality, adequately powered, randomized controlled trials in order to evaluate the efficacy of new approaches, such as brain stimulation technologies and more biofeedback at a later stage. Such studies should concentrate on developing a protocol of this procedure and trying to recognize the subpopulation for whom these therapies appear to be the most effective.

Moreover, understanding the time spans of dysphagia interventions and the costs associations of different management strategies could help in establishing resource utilization in the ICU. Since there are high costs related to dysphagia in patients, including pneumonia and malnutrition, there is a need to analyze different access points of an intervention approach. Finally, the exploratory and non-medical forthcoming studies should expand into dysphagia technology applied in the therapy. The implementing State

will be able to acquire effective technologies such as the diagnostic tools that rely on artificial intelligence and tele-travel systems in reaching out pocket-friendly health care within the State as well as obtain superior health care. Future work, therefore, should assess the applicability and benefits of these technologies in routine care practice.

## REFERENCES

1. Likar R, Aroyo I, Bangert K, Degen B, Dziewas R, Galvan O, et al. Management of swallowing disorders in ICU patients-a multinational expert opinion. Journal of critical care. 2024;79:154447.

2. Santana-Padilla Y, Linares-Pérez T, Santana-López B, Santana-Cabrera L. Dysphagia management by nurses in Spanish intensive care units. Enfermería Intensiva (English ed). 2024.

3. Armas-Navarro L, Santana-Padilla Y, Mendoza-Segura L, Ramos-Díaz M, Santana-López B, Alcaraz-Jiménez J, et al. Dysphagia in intensive care, a real problem: analysis of risk factors. Enfermería Intensiva (English ed). 2023;34(3):115-25.

4. Zielske J, Bohne S, Brunkhorst FM, Axer H, Guntinas-Lichius O. Acute and long-term dysphagia in critically ill patients with severe sepsis: results of a prospective controlled observational study. European Archives of Oto-Rhino-Laryngology. 2024;271:3085-93.

5. Hongo T, Yamamoto R, Liu K, Yaguchi T, Dote H, Saito R, et al. Association between timing of speech and language therapy initiation and outcomes among post-extubation dysphagia patients: a multicenter retrospective cohort study. Critical Care. 2022;26(1):98.

6. Hongo T, Yumoto T, Liu K, Nakamura K, Kawauchi A, Tsunemitsu T, et al. Prevalence and Management of Oral Intake Restrictions in Critically Ill Patients: Insights from a Multicenter Point Prevalence Study. Dysphagia. 2024:1-12.

7. Bechet S, Hill F, Gilheaney O, Walshe M. Diagnostic accuracy of the modified Evan's blue dye test in detecting aspiration in patients with tracheostomy: a systematic review of the evidence. Dysphagia. 2016;31:721-9.

8. Nielsen AH, Kaldan G, Nielsen BH, Kristensen GJ, Shiv L, Egerod I. Intensive care professionals' perspectives on dysphagia management: A focus group study. Australian Critical Care. 2023;36(4):528-35.

9. Brodsky MB, Mayfield EB, Gross RD, editors. Clinical decision making in the ICU: dysphagia screening, assessment, and treatment. Seminars in speech and language; 2019: Thieme Medical Publishers.

10. Kim H, Choi J, Yoo S, Chang M, Lee S, Park J. Tongue-to-palate resistance training improves tongue strength and oropharyngeal swallowing function in subacute stroke survivors with dysphagia. Journal of oral rehabilitation. 2017;44(1):59-64.

11. Manduchi B, Fitch MI, Ringash JG, Howell D, Hutcheson KA, Martino R. Exploring the Acceptability of Behavioral Swallowing Interventions for Head and Neck Cancer Patients During Radiotherapy: A Qualitative Study of Patients' Experience. Dysphagia. 2024;39(4):593-607.

12. Leuenberger JMS, Hoksch B, Luder G, Schmid RA, Verra ML, Dorn P. Early assessment and management of dysphagia after lung resection: a randomized controlled trial. The Annals of thoracic surgery. 2019;108(4):1059-64.

13. Posillico SE, Golob JF, Rinker AD, Kreiner LA, West RS, Conrad-Schnetz KJ, et al. Bedside dysphagia screens in patients with traumatic cervical injuries: an ideal tool for an under-recognized problem. Journal of trauma and acute care surgery. 2018;85(4):697-703.

14. Wangen T, Hatlevig J, Pifer G, Vitale K. Preventing aspiration complications: implementing a swallow screening tool. Clinical Nurse Specialist. 2019;33(5):237-43.

15. Hinchey JA, Shephard T, Furie K, Smith D, Wang D, Tonn S. Formal dysphagia screening protocols prevent pneumonia. Stroke. 2005;36(9):1972-6.

16. Yeh S-J, Huang K-Y, Wang T-G, Chen Y-C, Chen C-H, Tang S-C, et al. Dysphagia screening decreases pneumonia in acute stroke patients admitted to the stroke intensive care unit. Journal of the neurological sciences. 2011;306(1-2):38-41.

17. Sørensen RT, Rasmussen RS, Overgaard K, Lerche A, Johansen AM, Lindhardt T. Dysphagia screening and intensified oral hygiene reduce pneumonia after stroke. Journal of Neuroscience Nursing. 2013;45(3):139-46.

18. Titsworth WL, Abram J, Fullerton A, Hester J, Guin P, Waters MF, et al. Prospective quality initiative to maximize dysphagia screening reduces hospital-acquired pneumonia prevalence in patients with stroke. Stroke. 2013;44(11):3154-60.

19. Schrock JW, Lou L, Ball BA, Van Etten J. The use of an emergency department dysphagia screen is associated with decreased pneumonia in acute strokes. The American journal of emergency medicine. 2018;36(12):2152-4.

20. Teuschl Y, Trapl M, Ratajczak P, Matz K, Dachenhausen A, Brainin M. Systematic dysphagia screening and dietary modifications to reduce stroke-associated pneumonia rates in a stroke-unit. PloS one. 2018;13(2):e0192142.

21. Taveira I, Silva S, Bonança Í, Parreira D, Antunes C. Recognizing dysphagia: implementation of an in-hospital screening protocol. Irish Journal of Medical Science (1971-). 2021;190:605-8.

22. Hammond CAS, Goldstein LB. Cough and aspiration of food and liquids due to oral-pharyngeal dysphagia: ACCP evidence-based clinical practice guidelines. Chest. 2006;129(1):154S-68S.

23. Shin JC, Kim DY, Heo JH, Song W, Yi SH. Comparison between Gugging Swallowing Screen and other dysphagia screening tests. Brain & Neurorehabilitation. 2009;2(2):146-54.

24. Perry L. Screening swallowing function of patients with acute stroke. Part one: Identification, implementation and initial evaluation of a screening tool for use by nurses. Journal of Clinical Nursing. 2001;10(4):463-73.

25. Trapl M, Enderle P, Nowotny M, Teuschl Y, Matz K, Dachenhausen A, et al. Dysphagia bedside screening for acute-stroke patients: the Gugging Swallowing Screen. Stroke. 2007;38(11):2948-52.

26. Lopes M, Freitas E, Oliveira M, Dantas E, Azevedo N, Rodrigues P, et al. Impact of the systematic use of the Gugging Swallowing Screen in patients with acute ischaemic stroke. European journal of neurology. 2019;26(5):722-6.

27. Spronk PE, Spronk LE, Egerod I, McGaughey J, McRae J, Rose L, et al. Dysphagia in intensive care evaluation (DICE): an international cross-sectional survey. Dysphagia. 2022;37(6):1451-60.

28. Helliwell K, Hughes V, Bennion C, Manning-Stanley A. The use of videofluoroscopy (VFS) and fibreoptic endoscopic evaluation of swallowing (FEES) in the investigation of oropharyngeal dysphagia in stroke patients: a narrative review. Radiography. 2023;29(2):284-90.

29. Barbiera F, La Seta F, Berritto D, Iacobellis F, Codella U, Solazzo A, et al. Dysfunctional Disorders of the Pharynx and the Esophagus: VFSS and VFMSS. Geriatric Imaging. 2013:713-40.

30. Jones-Rastelli RB, Tang X, Harel D, Molfenter SM. Anterior–Posterior View Acquisition During Videofluoroscopy: A Survey Study Exploring Influential Factors on Speech-Language Pathologists' Practice Patterns. Journal of Speech, Language, and Hearing Research. 2024:1-23.

31. Re GL, Vernuccio F, Di Vittorio M, Scopelliti L, Di Piazza A, Terranova M, et al. Swallowing evaluation with videofluoroscopy in the paediatric population. Acta Otorhinolaryngologica Italica. 2019;39(5):279.

32. Aviv JE. Prospective, randomized outcome study of endoscopy versus modified barium swallow in patients with dysphagia. The Laryngoscope. 2000;110(4):563-74.

33. Chih-Hsiu W, Tzu-Yu H, Jiann-Chyuan C, Yeun-Chung C, Shiann-Yann L. Evaluation of swallowing safety with fiberoptic endoscope: comparison with videofluoroscopic technique. The Laryngoscope. 1997;107(3):396-401.

34. Fattori B, Giusti P, Mancini V, Grosso M, Barillari M, Bastiani L, et al. Comparison between videofluoroscopy, fiberoptic endoscopy and scintigraphy for diagnosis of oro-pharyngeal dysphagia. Acta Otorhinolaryngologica Italica. 2016;36(5):395.

35. Kelly AM, Leslie P, Beale T, Payten C, Drinnan M. Fibreoptic endoscopic evaluation of swallowing and videofluoroscopy: does examination type influence perception of pharyngeal residue severity? 1. Clinical Otolaryngology. 2006;31(5):425-32.

36. Kelly AM, Drinnan MJ, Leslie P. Assessing penetration and aspiration: how do videofluoroscopy and fiberoptic endoscopic evaluation of swallowing compare? The Laryngoscope. 2007;117(10):1723-7.

37. Dziewas R, auf dem Brinke M, Birkmann U, Bräuer G, Busch K, Cerra F, et al. Safety and clinical impact of FEES–results of the FEES-registry. Neurological Research and Practice. 2019;1:1-8.

38. Güngör V, Akyol MU, Demır N, Arslan SS, Süslü N. Comparison of Videofluoroscopic Swallowing Study and Fiberoptic-Endoscopic Evaluation of Swallowing Findings in Pediatric Patients. Middle Black Sea Journal of Health Science. 2020;6(3):390-6.

39. Lazarus CL. History of the use and impact of compensatory strategies in management of swallowing disorders. Dysphagia. 2017;32(1):3-10.

40. Chen S, Kent B, Cui Y. Interventions to prevent aspiration in older adults with dysphagia living in nursing homes: a scoping review. BMC geriatrics. 2021;21:1-14.

41. Solazzo A, Monaco L, Del Vecchio L, Tamburrini S, Iacobellis F, Berritto D, et al. Investigation of compensatory postures with videofluoromanometry in dysphagia patients. World Journal of Gastroenterology: WJG. 2012;18(23):2973.

42. Ortega O, Guidotti L, Yoshimatsu Y, Sitges C, Martos J, Miró J, et al., editors. SWALLOWING AND ASPIRATION: HOW TO EVALUATE AND TREAT SWALLOWING DISORDERS ASSOCIATED WITH ASPIRATION PNEUMONIA IN OLDER PERSONS. Seminars in Respiratory and Critical Care Medicine; 2024: Thieme Medical Publishers, Inc.

43. Benjapornlert P, Kagaya H, Inamoto Y, Mizokoshi E, Shibata S, Saitoh E. The effect of reclining position on swallowing function in stroke patients with dysphagia. Journal of Oral Rehabilitation. 2020;47(9):1120-8.

44. Forbes J, Humbert I. Impact of the chin-down posture on temporal measures of patients with dysphagia: A pilot study. American Journal of Speech-Language Pathology. 2021;30(3):1049-60.

45. Matos KC, de Oliveira VF, de OLIVEIRA PLC, Neto PB. An overview of dysphagia rehabilitation for stroke patients. Arquivos de Neuro-psiquiatria. 2022;80(01):84-96.

46. Sapienza C, Hoffman B. Respiratory muscle strength training: Plural Publishing; 2020.

47. Liaw M-Y, Hsu C-H, Leong C-P, Liao C-Y, Wang L-Y, Lu C-H, et al. Respiratory muscle training in stroke patients with respiratory muscle weakness, dysphagia, and dysarthria–a prospective randomized trial. Medicine. 2020;99(10):e19337.

48. Arnold RJ, Bausek N. Effect of respiratory muscle training on dysphagia in stroke patients—A retrospective pilot study. Laryngoscope Investigative Otolaryngology. 2020;5(6):1050-5.

49. Zhang W, Pan H, Zong Y, Wang J, Xie Q. Respiratory muscle training reduces respiratory complications and improves swallowing function after stroke: a systematic review and Meta-analysis. Archives of Physical Medicine and Rehabilitation. 2022;103(6):1179-91.

50. Miloro KV. Take my breath away: Expiratory muscle strength training to improve deglutition and cough functions.

51. Patchett KK, Hausenblas HA, Sapienza CM. Expiratory muscle strength training for dysphagia in chronic obstructive pulmonary disease: A meta-analysis and systematic review. Journal of Preventive Medicine and Healthcare. 2017;1(3):1013-22.

52. Wheeler KM, Chiara T, Sapienza CM. Surface electromyographic activity of the submental muscles during swallow and expiratory pressure threshold training tasks. Dysphagia. 2007;22:108-16.

53. Diéguez-Pérez I, Leirós-Rodríguez R. Effectiveness of different application parameters of neuromuscular electrical stimulation for the treatment of dysphagia after a stroke: a systematic review. Journal of clinical medicine. 2020;9(8):2618.

54. Alamer A, Melese H, Nigussie F. Effectiveness of neuromuscular electrical stimulation on post-stroke dysphagia: a systematic review of randomized controlled trials. Clinical interventions in aging. 2020:1521-31.

55. Assoratgoon I, Shiraishi N, Tagaino R, Ogawa T, Sasaki K. Sensory neuromuscular electrical stimulation for dysphagia rehabilitation: A literature review. Journal of oral rehabilitation. 2023;50(2):157-64.

56. Wang Z, Xiao Z, Shen Q, Zhao N, Zhang W. Neuromuscular electrical stimulation for post-stroke dysphagia treatment: a systemic evaluation and meta-analysis of randomized controlled trials. Dysphagia. 2024;39(3):424-32.

57. Guillén-Solà A, Messagi Sartor M, Bofill Soler N, Duarte E, Barrera MC, Marco E. Respiratory muscle strength training and neuromuscular electrical stimulation in subacute dysphagic stroke patients: a randomized controlled trial. Clinical rehabilitation. 2017;31(6):761-71.

58. Tarihci Cakmak E, Sen EI, Doruk C, Sen C, Sezikli S, Yaliman A. The effects of neuromuscular electrical stimulation on swallowing functions in post-stroke dysphagia: A randomized controlled trial. Dysphagia. 2023;38(3):874-85.

59. González-Fernández M, Ottenstein L, Atanelov L, Christian AB. Dysphagia after stroke: an overview. Current physical medicine and rehabilitation reports. 2013;1:187-96.

60. Zhang M, Tao T, Zhang Z-B, Zhu X, Fan W-G, Pu L-J, et al. Effectiveness of neuromuscular electrical stimulation on patients with dysphagia with medullary infarction. Archives of physical Medicine and Rehabilitation. 2016;97(3):355-62.

61. Carnaby GD, LaGorio L, Silliman S, Crary M. Exercise-based swallowing intervention (McNeill Dysphagia Therapy) with adjunctive NMES to treat dysphagia post-stroke: A double-blind placebo-controlled trial. Journal of Oral Rehabilitation. 2020;47(4):501-10.

62. Konecny P, Elfmark M. Electrical stimulation of hyoid muscles in post-stroke dysphagia. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2018;162(1):40-2.

63. Lee KW, Kim SB, Lee JH, Lee SJ, Ri JW, Park JG. The effect of early neuromuscular electrical stimulation therapy in acute/subacute ischemic stroke patients with dysphagia. Annals of rehabilitation medicine. 2014;38(2):153-9.

64. Lim K-B, Lee H-J, Lim S-S, Choi Y-I. Neuromuscular electrical and thermal-tactile stimulation for dysphagia caused by stroke: a randomized controlled trial. Journal of rehabilitation medicine. 2009;41(3):174-8.

65. Jung S-H, Kim Y-A, Hwang N-K, Park J-S, Kim Y-H. Effects of neuromuscular electrical stimulation in combination with saliva or dry swallowing in stroke patients with dysphagia. Journal of the Korean Dysphagia Society. 2018;8(2):103-9.

66. Sproson L, Pownall S, Enderby P, Freeman J. Combined electrical stimulation and exercise for swallow rehabilitation post-stroke: a pilot randomized control trial. International journal of language & communication disorders. 2018;53(2):405-17.

67. Terré R, Mearin F. A randomized controlled study of neuromuscular electrical stimulation in oropharyngeal dysphagia secondary to acquired brain injury. European journal of neurology. 2015;22(4):687-e44.

68. Xia W, Zheng C, Lei Q, Tang Z, Hua Q, Zhang Y, et al. Treatment of post-stroke dysphagia by vitalstim therapy coupled with conventional swallowing training. Journal of Huazhong University of Science and Technology [Medical Sciences]. 2011;31:73-6.

69. Kushner DS, Peters K, Eroglu ST, Perless-Carroll M, Johnson-Greene D. Neuromuscular electrical stimulation efficacy in acute stroke feeding tube–

dependent dysphagia during inpatient rehabilitation. American journal of physical medicine & rehabilitation. 2013;92(6):486-95.

70. Toyama K, Matsumoto S, Kurasawa M, Setoguchi H, Noma T, Takenaka K, et al. Novel neuromuscular electrical stimulation system for treatment of dysphagia after brain injury. Neurologia medico-chirurgica. 2014;54(7):521-8.

71. Baker JM, Rorden C, Fridriksson J. Using transcranial direct-current stimulation to treat stroke patients with aphasia. Stroke. 2010;41(6):1229-36.

72. Jefferson S, Mistry S, Singh S, Rothwell J, Hamdy S. Characterizing the application of transcranial direct current stimulation in human pharyngeal motor cortex. American Journal of Physiology-Gastrointestinal and Liver Physiology. 2009;297(6):G1035-G40.

73. Kumar S, Wagner CW, Frayne C, Zhu L, Selim M, Feng W, et al. Noninvasive brain stimulation may improve stroke-related dysphagia: a pilot study. Stroke. 2011;42(4):1035-40.

74. Ahn YH, Hyun-Joo S, Jin-Sung P, Ahn TG, Shin YB, Minsu P, et al. Effect of bihemispheric anodal transcranial direct current stimulation for dysphagia in chronic stroke patients: A randomized clinical trial. Journal of Rehabilitation Medicine (Stiftelsen Rehabiliteringsinformation). 2017;49(1).

75. Pingue V, Priori A, Malovini A, Pistarini C. Dual transcranial direct current stimulation for poststroke dysphagia: a randomized controlled trial. Neurorehabilitation and Neural Repair. 2018;32(6-7):635-44.

76. Shigematsu T, Fujishima I, Ohno K. Transcranial direct current stimulation improves swallowing function in stroke patients. Neurorehabilitation and neural repair. 2013;27(4):363-9.

77. Suntrup-Krueger S, Ringmaier C, Muhle P, Wollbrink A, Kemmling A, Hanning U, et al. Randomized trial of transcranial direct current stimulation for poststroke dysphagia. Annals of neurology. 2018;83(2):328-40.

78. Yang EJ, Baek S-R, Shin J, Lim JY, Jang HJ, Kim YK, et al. Effects of transcranial direct current stimulation (tDCS) on post-stroke dysphagia. Restorative neurology and neuroscience. 2012;30(4):303-11.

79. Sawan SAE, Reda AM, Kamel AH, Ali MAM. Transcranial direct current stimulation (tDCS): its effect on improving dysphagia in stroke patients. The Egyptian Journal of Neurology, Psychiatry and Neurosurgery. 2020;56:1-7.

80. Wang Z-Y, Chen J-M, Lin Z-k, Ni G-X. Transcranial direct current stimulation improves the swallowing function in patients with cricopharyngeal muscle dysfunction following a brainstem stroke. Neurological Sciences. 2020;41:569-74.

81. Pascual-Leone A, Valls-Solé J, Wassermann EM, Hallett M. Responses to rapid-rate transcranial magnetic stimulation of the human motor cortex. Brain. 1994;117(4):847-58.

82. Ambrosi D, Lee Y-T. Rehabilitation of swallowing disorders. Braddom's Physical Medicine and Rehabilitation: Elsevier; 2021. p. 53-67. e2.

83. Murray J, Doeltgen S, Miller M, Scholten I. Does a water protocol improve the hydration and health status of individuals with thin liquid aspiration following stroke? A randomized controlled trial. Dysphagia. 2016;31:424-33.

84. Diniz PB, Vanin G, Xavier R, Parente MA. Reduced incidence of aspiration with spoon-thick consistency in stroke patients. Nutrition in Clinical Practice. 2009;24(3):414-8.

85. Kyodo R, Kudo T, Horiuchi A, Sakamoto T, Shimizu T. Pureed diets containing a gelling agent to reduce the risk of aspiration in elderly patients with moderate to severe dysphagia: a randomized, crossover trial. Medicine. 2020;99(31):e21165.

86. Robbins J, Gensler G, Hind J, Logemann JA, Lindblad AS, Brandt D, et al. Comparison of 2 interventions for liquid aspiration on pneumonia incidence: a randomized trial. Annals of internal medicine. 2008;148(7):509-18.

87. Brewsaugh AM, Brust LJ, Hartman J. Implementing the international dysphagia diet standardization initiative: opportunities for change. 2022.

88. Cichero JA, Lam P, Steele CM, Hanson B, Chen J, Dantas RO, et al. Development of international terminology and definitions for texture-modified foods and thickened fluids used in dysphagia management: the IDDSI framework. Dysphagia. 2017;32(2):293-314.

89. Wu XS, Miles A, Braakhuis A. An evaluation of texture-modified diets compliant with the International Dysphagia Diet Standardization Initiative in aged-care facilities using the Consolidated Framework for Implementation Research. Dysphagia. 2022;37(5):1314-25.

90. Xiong M, Ng N, Siu B, Ng ML. Relationship between IDDSI Flow Test and Consistometric Measures for Consistency Classification-An Examination of Thickened Liquids Prepared Using Starch-Based and Xanthan Gum-Based Thickening Agents. Folia phoniatrica et logopaedica: official organ of the International Association of Logopedics and Phoniatrics (IALP). 2024.

91. Teggart K, Phillips S, Ganann R, Moore C, Sihota D, Neil-Sztramko S, et al. Group-based nutrition interventions for community-dwelling older adults: a systematic review to inform community co-design. The Annals of Family Medicine. 2022;20(Supplement 1).

92. Shimazu S, Yoshimura Y, Kudo M, Nagano F, Bise T, Shiraishi A, et al. Frequent and personalized nutritional support leads to improved nutritional status, activities of daily living, and dysphagia after stroke. Nutrition. 2021;83:111091.

93. Tappenden KA, Quatrara B, Parkhurst ML, Malone AM, Fanjiang G, Ziegler TR. Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition. Journal of the Academy of Nutrition and Dietetics. 2013;113(9):1219-37.

94. Germain I, Dufresne T, Gray-Donald K. A novel dysphagia diet improves the nutrient intake of institutionalized elders. Journal of the American Dietetic Association. 2006;106(10):1614-23.

95. Reyes-Torres CA, Castillo-Martínez L, Reyes-Guerrero R, Ramos-Vázquez AG, Zavala-Solares M, Cassis-Nosthas L, et al. Design and implementation of modified-texture diet in older adults with oropharyngeal dysphagia: a randomized controlled trial. European journal of clinical nutrition. 2019;73(7):989-96.

96. Taylor KA, Barr SI. Provision of small, frequent meals does not improve energy intake of elderly residents with dysphagia who live in an extended-care facility. Journal of the American Dietetic Association. 2006;106(7):1115-8.

97. Shimizu A, Fujishima I, Maeda K, Wakabayashi H, Nishioka S, Ohno T, et al. Nutritional management enhances the recovery of swallowing ability in older patients with sarcopenic dysphagia. Nutrients. 2021;13(2):596.

98. Zanini M, Bagnasco A, Catania G, Aleo G, Sartini M, Cristina ML, et al. A Dedicated Nutritional Care Program (NUTRICARE) to reduce malnutrition in institutionalised dysphagic older people: A quasi-experimental study. Journal of clinical nursing. 2017;26(23-24):4446-55.

99. Wright L, Cotter D, Hickson M. The effectiveness of targeted feeding assistance to improve the nutritional intake of elderly dysphagic patients in hospital. Journal of Human Nutrition and Dietetics. 2008;21(6):555-62.

100. RN LM, MA TC, BPT MS. Effects of a multidisciplinary management program on neurologically impaired patients with dysphagia. Dysphagia. 1990;5:147-51.

101. Sumi Y. The significance of oral care in dysphagia patients. Nihon Ronen Igakkai zasshi Japanese journal of geriatrics. 2013;50(4):465-8.

102. Toniolo L, Cancellara P, Maccatrozzo L, Patruno M, Mascarello F, Reggiani C. Masticatory myosin unveiled: first determination of contractile parameters of muscle fibers from carnivore jaw muscles. American Journal of Physiology-Cell Physiology. 2008;295(6):C1535-C42.

103. Chen H-J, Chen J-L, Chen C-Y, Lee M, Chang W-H, Huang T-T. Effect of an oral health programme on oral health, oral intake, and nutrition in patients with stroke and

dysphagia in taiwan: A randomised controlled trial. International journal of environmental research and public health. 2019;16(12):2228.

104. Chipps E, Gatens C, Genter L, Musto M, Dubis-Bohn A, Gliemmo M, et al. Pilot study of an oral care protocol on poststroke survivors. Rehabilitation Nursing Journal. 2014;39(6):294-304.

105. Smith R, Bryant L, Hemsley B. The true cost of dysphagia on quality of life: The views of adults with swallowing disability. International Journal of Language & Communication Disorders. 2023;58(2):451-66.

106. De Luca E, Cosentino C, Cedretto S, Maviglia AL, Bucci J, Dotto J, et al. Multidisciplinary team perceptions of the Case/Care Managers' role implementation: a qualitative study. Acta Bio Medica: Atenei Parmensis. 2022;93(3).

107. Shune SE, Linville D, Namasivayam-MacDonald A. Integrating Family-Centered Care Into Chronic Dysphagia Management: A Tutorial. Perspectives of the ASHA Special Interest Groups. 2022;7(3):795-806.

108. Rangira D, Najeeb H, Shune SE, Namasivayam-MacDonald A. Understanding burden in caregivers of adults with dysphagia: A systematic review. American Journal of Speech-Language Pathology. 2022;31(1):486-501.

109. Bai AV, Agostini F, Bernetti A, Mangone M, Fidenzi G, D'Urzo R, et al. State of the evidence about rehabilitation interventions in patients with dysphagia. European Journal of Physical and Rehabilitation Medicine. 2021;57(6):900-11.

110. Kelley RE, Borazanci AP. Stroke rehabilitation. Neurological research. 2009;31(8):832-40.

111. Kristensen MB, Isenring E, Brown B. Nutrition and swallowing therapy strategies for patients with head and neck cancer. Nutrition. 2020;69:110548.

112. Zheng L, Li Y, Liu Y. The individualized rehabilitation interventions for dysphagia: a multidisciplinary case control study of acute stroke patients. International Journal of Clinical and Experimental Medicine. 2014;7(10):3789.

113. Aoki S, Hosomi N, Hirayama J, Nakamori M, Yoshikawa M, Nezu T, et al. The multidisciplinary swallowing team approach decreases pneumonia onset in acute stroke patients. PLoS One. 2016;11(5):e0154608.

114. Gandolfi M, Smania N, Bisoffi G, Squaquara T, Zuccher P, Mazzucco S. Improving post-stroke dysphagia outcomes through a standardized and multidisciplinary protocol: an exploratory cohort study. Dysphagia. 2014;29:704-12.

**Authors' Contribution**
All authors contributed equally to the development of this article.

**Data availability**

All datasets relevant to this study's findings are fully available within the article.

**How to cite this article (APA)**

Ashraf, A., & Mumtaz, N. (2026). CLINICAL PRACTICE GUIDELINES FOR DYSPHAGIA MANAGEMENT IN INTENSIVE CARE UNIT: A SPEECH-LANGUAGE PATHOLOGIST'S FRAMEWORK. Veredas Do Direito, 23(4), e234866. https://doi.org/10.18623/rvd.v23.n4.4866