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Review articles

Training for fiberoptic endoscopic evaluation of swallowing parameter analysis: a scoping review protocol

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ABSTRACT

Purpose: to present a scoping review protocol to identify and map available evidence on training for fiberoptic endoscopic evaluation of swallowing parameter analysis.

Methods: the protocol follows the method proposed by the Joanna Briggs Institute and the PRISMA-P guidelines for review protocol reports. The survey will be made in MEDLINE, Cochrane Library, Embase, Web of Science, Scopus, CINAHL, and grey literature. A search strategy has been developed for MEDLINE, which will be adapted for each database. Two independent reviewers will screen the articles by title and abstract. Then, they will read the full text of the included articles, considering the eligibility criteria. The data will be extracted with a standardized form. The results will be presented in a flowchart and narrative summary, following the PRISMA-ScR guidelines.

Literature Review: there is a scarcity of research describing visual-perceptual training methods to analyze FEES parameters and inconsistent data to guide clinical decision-making. This review will provide comprehensive information on developing training for this type of analysis.

Conclusion: this scoping review protocol will present the overall state of research on the topic and identify existing gaps in the base of evidence.

Keywords: Deglutition; Deglutition Disorders; Endoscopy; Education; Teaching

INTRODUCTION

The fiberoptic endoscopic evaluation of swallowing (FEES) was developed based on the possibility of visualizing anatomical structures, during the pharyngeal phase of swallowing[1]. The procedure was described in 1988[2] and updated in 2017[1]. It enables real observation of the laryngopharyngeal region before and after swallowing[1,2].

FEES has the advantages of showing real images of the laryngopharyngeal region without submitting the patient to radiation, assessing the patient's capacity to respond to excessive secretion, directly assessing the laryngeal sensory function, testing rehabilitation strategies without worrying about the exposure time, and being used as a biofeedback resource[1].

Regarding the identification of swallowing-related parameters, FEES enables the visualization of posterior oral escape (POE), presence of pharyngeal residues, laryngeal penetration (LP), and/or laryngotracheal aspiration (LA)[2-6]. Severity classification scales have been developed and submitted to reliability analyses to classify the presence of food residues after swallowing in the pharyngeal regions[7-11]. The Yale Pharyngeal Residue Severity Rating Scale (YPRSRS)[9] is one of the most used[12,13]. The Penetration-Aspiration Scale (PAS)[14], with already determined reliability indices[6,15,16], was developed for the parameter that investigates the risk of LP and/or LA, which is closely related to swallowing safety. POE refers to food escape from the oral cavity to the hypopharynx before bolus propulsion[1,11,17] and is likewise a risk to swallowing safety[18]. Measuring this parameter with FEES is being studied[11,19] and the reliability of a scale with this purpose has already been verified[20].

Although these parameters can be identified with FEES, the analysis is visual-perceptual and therefore subjective, as it depends considerably on the examiner's detection and interpretation. Thus, it is necessary to use analysis and classification instruments for these parameters and conduct reliability studies for these measures. Even though analysis methods for visual-perceptual parameters have already been proposed, the literature describes a degree of variation in the way FEES is interpreted[21,22]. The challenges of training people to make a more robust analysis are mainly related to the interpretation of anatomical structures, classification of pharyngeal residues, and interpretation of penetration and aspiration episodes[23]. Hence, there is an emerging need for standardized FEES analysis methods and visual-perceptual skill training for the examiners who will interpret the examinations, thus increasing its reliability.

Therefore, this manuscript aims to present a scoping review protocol to identify and map the available evidence on visual-perceptual skill training to analyze swallowing parameters that can be evaluated with FEES. The following steps will be taken to reach the objective of this review:

Identify the currently existing training methods to analyze FEES and which parameters are usually approached in the training.

Assess the examination characteristics usually analyzed in the training (populational groups, standardized utensils, volume, and consistencies, coloring use and characteristics, anesthetics use, and protocol or scale use).

Explore the training content (phases/stages, evaluators' profile, participation criteria, definition of references, learning strategies, and platforms used).

Identify the indicators of diagnostic precision related to FEES training, summarizing the available evidence.

Point out gaps on the topic and the most urgent issues to be solved in future research.

The scoping review will focus on the following question: "How are health students and professionals trained to analyze FEES made in adults with oropharyngeal dysphagia?".

METHODS

This scoping review protocol will follow the methodology proposed by the Joanna Briggs Institute (JBI) for scoping reviews[31] and the development recommendations by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P)[32]. Given the iterative nature of this type of review, there may be some methodological changes in the protocol, which will be reported in the scoping review.

The population, concept, and context (PCC)[31] strategy will be used to include studies regarding a) population: individuals who have been trained to analyze FEES in adults; they can be speech-language-hearing therapists, otorhinolaryngologists, neurologists, phoniatricians, general practitioners, and undergraduate and postgraduate students of one of these specialties; b) concept: training for FEES parameter analysis; training is defined here as an educational procedure whose objective is to train people, through instruction or guidance, to carry out an activity; c) context: studies conducted in training

environments, including clinics, hospitals, institutions, virtual settings, and so forth.

Eligibility criteria

The inclusion criteria will be as follows: studies related to training for FEES analysis offered to undergraduate and postgraduate health students and professionals, published in any language – to encompass all sources in the national and international literature – since 1988, using FEES performed in adults aged 18 years or older. The chosen period refers to the year when the FEES procedure was formally described[2]. Data collected from multiple sources will be considered, as expected from scoping review designs[33]. Peer-reviewed journals, textbooks, editorials, annals of congresses, and dissertations/theses will be included to properly extract published and unpublished evidence on the topic. Studies that did not describe the training, but instead presented only their results, or that assessed esophageal dysphagia will be excluded. No restriction will be applied regarding the publication status. The inclusion criteria for this review are specified in detail regarding population, concept, context, and types of sources of evidence (Chart 1).

Chart 1. Study eligibility

	Inclusion criteria
Population	Undergraduate or postgraduate health students and professionals who have participated in training to analyze the FEES parameters.
Concept	Training for the analysis of FEES parameters using examinations made in people aged 18 years or older.
Context	Studies conducted in training environments, including clinics, hospitals, institutions, virtual settings, and so forth.
Types of sources of evidence	Peer-reviewed journals, textbooks, editorials, annals of congresses, and dissertations/theses, published in any language – to encompass all sources of national and international literature – since 1988 in the predetermined databases.

FEES = fiberoptic endoscopic evaluation of swallowing.

Search strategy and sources of information

The search strategy will be centered on finding published and unpublished studies. The words present in titles and abstracts and article keywords relevant to the topic comprised the search strategy for MEDLINE (Chart 2), which will be adapted for each database. The references in the retrieved articles will also be examined. The following databases will be surveyed: MEDLINE, Cochrane Library, Embase, Web of Science, Scopus, and CINAHL. The sources of unpublished studies and grey literature include Google Scholar, ProQuest, and MedNar. No filter or language limitation will be applied in the survey.

Chart 2. Search strategy – Medline via PubMed (surveyed on October 20, 2021)

Search	Keywords	Records found
#1	("Dysphagia" OR "Swallowing disorders" OR "Deglutition" OR "Deglutition Disorders" OR "Swallowing")	59,341 results
#2	("FEES" OR "Flexible nasal endoscope" OR "Instrumental evaluation of swallowing" OR "Fiberoptic endoscopic evaluation of swallowing" OR "Transnasal endoscopy" OR "Flexible endoscopic evaluation of swallowing" OR "Fiber Optic Technology*" OR "Swallowing assessment*" OR "Swallowing assessment")	88,227 results
#3	#1 AND #2	1,259 results
#4	("Training" OR "Training program" OR "Training curriculum" OR "Professional training" OR "Consensus training" OR "Training sessions" OR "Curriculum" OR "Accreditation program" OR "Accreditation*" OR "Workshops" OR "Courses" OR "Education" OR "Education program" OR "Medical education" OR "Recommendations" OR "Standardized implementation" OR "Competence" OR "Competencies" OR "Trainee" OR "Trainers" OR "raters" OR "Pedagogy" OR "Procedural skills" OR "Training programme" OR "Learning" OR "Learning curve" OR "Simulation" OR "Simulation training" OR "Human patient simulation" OR "Computational simulation" OR "Virtual reality" OR "Simulator" OR "Simulator-based training" OR "University programs" OR "Teaching" OR "Simulated learning" OR "clinical education")	3,050,498 results
#3 AND #4		236 results

Study selection

After obtaining the search results, a series of stages will be followed:

1. The articles identified will be imported to EndNote reference management software (Clarivate Analytics, PA, USA). The software will identify and remove duplicate papers.
2. The studies will be imported to Rayyan (Qatar Computing Research Institute, Doha, Qatar), free online application software for the web and mobile phones. It enables blind cooperation between reviewers and improved data screening.
3. Two reviewers blinded to one another's judgments will classify each article by title and abstract for inclusion or exclusion.
4. Records of the decisions will be stored on the platform.
5. The full text of the included abstracts will be retrieved and considered for the review.

These stages will be independently carried out in the beginning by two reviewers. If they disagree concerning either the abstracts or the full texts, the conflicts will be discussed and solved. If they cannot reach an agreement, a third reviewer will participate. The research results will be published in full in the product of the scoping review and presented in a scoping review flowchart, as instructed by the PRISMA extension for scoping reviews (PRISMA-ScR)[34]. The article authors will also be consulted for information when necessary, during the study selection process.

Data extraction

The scope assessment will be made by two or more independent reviewers with the data extracted from the included articles using a data extraction tool developed by the reviewers (Chart 3). The data will include specific details on the type of training, information on the individuals who participated in the training, methodology used to assess their learning, year of study publication, and so on. Data on the FEES procedure and the patients will also be extracted. The tool developed to extract the data will be modified and reviewed as necessary during the data extraction process, according to each selected source of evidence. The modifications will be reported in detail in the scoping review.

Chart 3. Data extraction instrument

Article identification:	
Author(s):	
Authors' educational background:	
Country of origin:	
Institution(s) where the study was conducted:	
Source:	
POPULATION	
Population/sample size:	
Requirements for the participation of rained evaluators:	
CONCEPT	
Swallowing parameters assessed:	
Protocols and scores used in the assessment:	
Diagnosis(es) of the populational group(s) assessed:	
Utensil(s), volume(s), and consistency(ies) offered:	
Coloring use:	
Coloring characteristics:	
Anesthetics use:	
Profile of the evaluators who developed the training:	
Complementary FEES training on the part of the evaluators who developed the training:	
Phases/stages of the training:	
Number of examinations presented to the trained evaluators:	
Average hours taken to complete the training:	
Method used to assess the training result:	
Skill levels considered in the training:	
Learning curve considered in the training:	
Self-assessment considered in the training:	
Performance report:	
CONTEXT	
Environment where the training took place:	

Data analysis and presentation

The data will be analyzed to meet the objectives of the research, characterizing the study methodologies, and identifying similarities and differences between them. The analysis will involve quantitative (e.g., frequency analysis) and qualitative methods (thematic analysis). This process will identify gaps in the literature and reveal potential topics for future reviews.

The extracted data will be presented in a flowchart, as indicated for scoping analysis protocols. They will be presented in both written and visual content with a narrative summary and a discussion, which will describe the mapped results and how they relate to the research objective and question. This review protocol was registered in the Open Science Framework on November 10, 2021 (https://osf.io/4xst5/).

LITERATURE REVIEW

Training is an educational strategy that aims to improve people's performance with situations that facilitate the acquisition and retention of both theoretical and practical knowledge and skills. Due to new technologies, the training can take place not only in person but also in virtual environments, via computers. Some structured methods to train for FEES analyses, either based or not on simulation, are described in the literature. These training methods help develop the necessary competencies to do the procedures safely and reliably and interpret the findings more precisely. A study developed a structured method to classify pharyngeal residues, penetration, and aspiration with FEES, training individuals to implement the method with a visual-perceptual tool. Six experienced speech-language-hearing therapists set references for a

training approach to assess and classify the parameters. The approach involved pre-training, training, and post-training phases with a blind classification of 35 randomized videos. The results showed significantly improved precision of measure classification on the part of examiners with no previous experience in interpreting FEES. This study showed that the feasibility of training people to analyze FEES parameters is important to determine whether a standardized classification method can be adopted for both clinical use and future research.

Some studies aimed to establish elaborate training methods to improve health professionals' academic curricula, equipping them to diagnose dysphagia with FEES. A successful swallowing parameter evaluation and classification program, with a gradual increase in the learning curve, points out that a structured training curriculum can establish quality standards and contribute to the formality and high quality of FEES procedures, with the additional possibility of allocating trained people on different levels.

There is currently a scarcity of research describing visual-perceptual training methods to analyze FEES parameters and inconsistent data to guide clinical decision-making regarding the use of this instrumental evaluation of swallowing. The limited availability of published sources and grey literature can be verified, which includes annals of medical congresses held in various places of the world. A scoping review can fill gaps in the literature, providing a knowledge basis to develop a reliable standardized visual-perceptual training and apply it to the analysis of FEES in dysphagic patients with different diagnoses. The Cochrane Database of Systematic Reviews, JBI Evidence Synthesis, and PubMed were preliminarily surveyed on October 8, 2021, and did not reveal any existing scoping or systematic review on this topic.

The objective of this scoping review is to answer the research question, gathering evidence on training for FEES parameter analysis in adults. To the best of our knowledge, this will be the first scoping review with this objective. This process is intended to map the overall state of the evidence and thus identify where systematic reviews or primary research is needed. The previous publication of this review protocol will help better plan the study and disseminate the research to the scientific community.

This scoping review will provide encompassing information on the development of training for FEES analysis. The study will not focus on the examination procedures; rather, it will address the methods to analyze/evaluate swallowing parameters – which are considered controversial and subjective – and in which sense standardization through training will help minimize these problems. Moreover, mapping the evidence will help develop structured and standardized training to effectively equip health students and professionals to analyze FEES parameters.

The strength of disseminating this scoping review protocol is that it will publicize a clear and reproducible procedure. Every type of training with the said objective, aimed at any professional or students in the fields of health, will be approached, considering that FEES is performed in various parts of the world by professionals with different types of educational backgrounds. The paper will be useful to professionals involved in both clinical practice and academic settings. Since it is a scoping review, the studies' methodological quality and risk of bias will not be appraised. The search strategy may need adjustments in the process, due to the iterative method of scoping reviews.

The results of this study will be the starting point to establish a formal training method to equip health professionals with expertise in the diagnosis of dysphagia, considering parameters assessed with FEES.

CONCLUSION

This scoping review protocol was developed following the guidelines recommended for this type of study and is ready to be carried out. Once carried out, it will present the overall state of research on the topic and identify existing gaps in the base of evidence.

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