

Review Article

FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING: EXPERIENCE AT THE NATIONAL REHABILITATION HOSPITAL (2019 - 2025)

Nguyen Manh Linh^{1,*}

1. National Rehabilitation Hospital

* Corresponding author: Nguyen Manh Linh ✉ manhlinh021084@gmail.com

ABSTRACT: Dysphagia is increasingly recognized due to higher survival rates after central nervous system injuries, head and neck cancer treatment, and in healthy elderly individuals. It leads to severe consequences including prolonged hospitalization, delayed recovery, recurrent pneumonia, and even mortality. Bedside clinical tests alone are insufficient for diagnosis. Fiberoptic Endoscopic Evaluation of Swallowing (FEES) is one of the gold standards in dysphagia assessment, proven to be safe, effective, and feasible worldwide. However, FEES has not been widely adopted in Vietnam. Objective: To report the implementation and clinical experience of FEES at the National Rehabilitation Hospital (2019–2025). Methods: Literature review and clinical experience. More than 700 FEES procedures were performed. Results: FEES allowed direct visualization of swallowing physiology, identification of penetration/aspiration, and guided compensatory strategies. No serious complications occurred. Conclusion: FEES is an effective and safe diagnostic tool for dysphagia and should be expanded in Vietnam.

Keywords: Dysphagia; Fiberoptic Endoscopic Evaluation of Swallowing; Rehabilitation; FEES; Vietnam.

1. INTRODUCTION

With advances in medicine, survival after severe diseases such as cardiac arrest, stroke, traumatic brain injury, and head and neck cancers has significantly improved. However, these patients often live with sequelae, among which dysphagia remains one of the most disabling. Dysphagia is reported in 42–67% of post-stroke patients, and while many recover within two weeks [1], a subset develop persistent swallowing disorders with serious implications.

In the United States, 300,000–600,000 people are affected annually, and approximately 15% of the elderly (even without neurological insults) suffer from dysphagia, most of them above 60 years of age [2]. Previously, nasogastric tube feeding was thought to reduce aspiration risk; however, Langmore and colleagues demonstrated that exclusive non-oral feeding leads to swallowing muscle atrophy and does not prevent aspiration pneumonia, as patients may aspirate their own secretions. Early swallowing assessment is therefore crucial to determine when oral feeding can be resumed safely and what compensatory strategies may help.

In Vietnam, dysphagia evaluation still mainly relies on bedside tests, whereas the two gold-standard instrumental methods—FEES and videofluoroscopic swallowing study (VFSS)—remain underutilized due to logistical barriers. The National Rehabilitation Hospital adopted FEES in 2019, and this article shares our clinical experience with over 700 cases conducted until 2025.

2. DYSPHAGIA

2.1. Physiology of Swallowing

Swallowing is a semi-voluntary, semi-automatic process divided into four phases [3]:

- Oral preparatory phase: voluntary, food bolus formation.
- Oral phase: voluntary, tongue propulsion of the bolus posteriorly.
- Pharyngeal phase: involuntary, soft palate closure, laryngeal elevation, upper esophageal sphincter opening.
- Esophageal phase: involuntary, peristalsis and gravity transport bolus into the stomach.

The pharyngeal phase is the most crucial, as penetration and aspiration typically occur here. FEES allows detailed observation of abnormalities during this phase before, during, and after the swallow.

2.2. Etiologies of Dysphagia

The major causes include [4]:

- Tumors of the pharynx, esophagus, and head and neck region.
- Post-surgical or post-radiation sequelae in head and neck cancer patients.
- Neuromuscular disorders such as Parkinson's disease, myasthenia gravis.
- Central nervous system lesions: stroke, traumatic brain injury, encephalitis, brain tumors, cerebral palsy.
- Side effects of medications such as antidepressants.
- Age-related swallowing decline.

2.3. Consequences of Dysphagia

Dysphagia can lead to:

- Fear of eating, malnutrition, and delayed recovery.

- Aspiration pneumonia and recurrent lower respiratory tract infections.
- Depression, loss of quality of life.
- Complications of prolonged nasogastric tube feeding, including gastric ulcers, reflux, and tracheoesophageal fistula when combined with tracheostomy.

2.4. Diagnostic Methods

Diagnostic approaches include:

- Bedside screening tests such as MASA, GUSS, and the 90ml water swallow test. These serve for screening and identification of at-risk patients but are insufficient alone.
- Instrumental methods: FEES and VFSS, both considered gold standards. FEES provides direct endoscopic visualization, while VFSS offers dynamic radiographic imaging.
- Esophageal manometry may be employed for suspected esophageal phase dysfunction.

3. FIBEROPTIC ENDOSCOPIC EVALUATION OF SWALLOWING (FEES)

3.1. Historical Development

FEES was first described in 1988 by Susan Langmore and colleagues as a distinct procedure separate from conventional nasopharyngoscopy. Initially, it served as an alternative to VFSS when the latter was unavailable or contraindicated. Over more than 30 years, FEES has established itself as an independent and complementary gold standard technique alongside VFSS [5].

3.2. Procedure

The FEES protocol consists of several steps [6], [7]:

a. Pre-endoscopic assessment:

- Evaluate lip closure.
- Assess ability to open mouth and chew.
- Observe saliva control, drooling, and tongue strength and coordination.

b. Endoscopic assessment prior to oral trials:

- Assess soft palate mobility and velopharyngeal closure.
- Evaluate vocal fold mobility and ventricular fold closure.
- Assess secretion pooling, clearance, and presence of aspiration.
- Identify masses or structural abnormalities.

c. Test swallows with food and liquid:

- Colored liquids (green or blue).
- Semi-solid (e.g., yogurt).
- Soft solids (e.g., pudding).

Observations include premature spillage, delayed swallow initiation, penetration, aspiration, and residue.

d. Compensatory strategies:

- Chin tuck, head turn, supraglottic swallow techniques.

These maneuvers help determine whether the patient can safely eat orally.

If no protective reflex is observed, tactile stimulation of the laryngeal mucosa with the scope may be used to elicit a cough and clear material.

3.3. Scoring Systems

- Several validated scales are used during FEES:
- Boston Residue and Clearance Scale: evaluates pharyngeal residue [8].
 - Penetration Aspiration Scale (PAS): rates severity of penetration and aspiration [9].
 - Flexible Endoscopic Dysphagia Severity Scale (FEDSS): assesses dysphagia severity[10]
 - Functional Oral Intake Scale (FOIS): categorizes level of oral intake from tube dependence to full unrestricted oral diet [11].

4. RESULTS (2019–2025)

Between April 2019 and July 2025, over 700 FEES examinations were successfully performed at the National Rehabilitation Hospital. No major complications occurred. Minor issues included transient nasal discomfort or gagging. No local anesthetic was administered. Hundreds of patients received immediate counseling regarding optimal posture and diet modifications, which often resolved their dysphagia symptoms without requiring intensive therapy.

Table 1. The rate of complications

Complica- tions	Epi- staxis	Uncomfort- able	Uncon- scious	Laryn- gospasm causing breathing difficulty	Aspi- ration causing breath- ing diffi- culty	Proce- dure had to be stopped due to an emer- gency condition
Frequency	3/723	50/723	0	0	0	0
Percentage	0,4%	6,9%	0%	0%	0%	0%

5. DISCUSSION

Our data confirm that FEES is a safe, feasible, and highly informative diagnostic procedure for dysphagia. Its ability to be performed at the bedside provides significant advantages for acutely ill and immobile patients. The method not only diagnoses but also guides treatment by demonstrating the effect of compensatory strategies in real time.

Compared to VFSS, FEES avoids radiation exposure, allows repeated assessments, and provides better visualization of secretions and laryngeal structures. However, VFSS remains superior in evaluating the oral and esophageal phases. Ideally, both modalities complement each other.

Despite these advantages, FEES adoption in Vietnam has been limited due to equipment costs, lack of training, and awareness. Our experience demonstrates that with proper training, FEES can be implemented effectively in stroke units, rehabilitation centers, oncology clinics, and geriatric facilities. Wider dissemination could significantly improve dysphagia management nationwide.

6. CONCLUSION

FEES is an invaluable tool in the evaluation and management of dysphagia. It enables accurate identification of swallowing impairments, informs individualized rehabilitation strategies, and enhances patient safety by guiding oral feeding decisions. Given its safety, effectiveness, and bedside applicability, FEES should be expanded across Vietnamese healthcare institutions.

REFERENCES

- [1] González-Fernández M, Ottenstein L, Atanelov L, Christian AB. Dysphagia after Stroke: an Overview. *Curr Phys Med Rehabil Rep*. 2013 Sept;1(3):187–196. PMID: PMC4066736
- [2] Sura L, Madhavan A, Carnaby G, Crary MA. Dysphagia in the elderly: management and nutritional considerations. *Clin Interv Aging*. 2012;7:287–298. PMID: PMC3426263
- [3] Physiology, Swallowing - StatPearls - NCBI Bookshelf [Internet]. [cited 2025 Sept 14]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK541071/>
- [4] Azer SA, Kanugula AK, Kshirsagar RK. Dysphagia. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 Sept 14]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK559174/> PMID: 32644600
- [5] Langmore SE. History of Fiberoptic Endoscopic Evaluation of Swallowing for Evaluation and Management of Pharyngeal Dysphagia: Changes over the Years. *Dysphagia*. 2017 Feb;32(1):27–38. PMID: 28101663
- [6] Jimenez-Dominguez R, Manzano-Aquihuatl C, Jimenez-Dominguez R, Manzano-Aquihuatl C. Fiberoptic endoscopic evaluation of the swallowing in neurogenic dysphagia: A proposal of an algorithm for fiberoptic endoscopic evaluation of the swallowing in neurology hospitals in Mexico. *Revista mexicana de neurociencia. Academia Mexicana de Neurología A.C.*; 2021 Oct;22(5):208–217.
- [7] Warnecke T, Teismann I, Oelenberg S, Hamacher C, Ringelstein EB, Schäbitz WR, Dziewas R. The safety of fiberoptic endoscopic evaluation of swallowing in acute stroke patients. *Stroke*. 2009 Feb;40(2):482–486. PMID: 19074481
- [8] Kaneoka AS, Langmore SE, Krisciunas GP, Field K, Scheel R, McNally E, Walsh MJ, O'Dea MB, Cabral H. The Boston Residue and Clearance Scale: preliminary reliability and validity testing. *Folia Phoniatr Logop*. 2013;65(6):312–317. PMID: 25033761
- [9] Butler SG, Markley L, Sanders B, Stuart A. Reliability of the penetration aspiration scale with flexible endoscopic evaluation of swallowing. *Ann Otol Rhinol Laryngol*. 2015 June;124(6):480–483. PMID: 25586947
- [10] Warnecke T, Teismann I, Oelenberg S, Hamacher C, Ringelstein EB, Schäbitz WR, Dziewas R. Towards a basic endoscopic evaluation of swallowing in acute stroke - identification of salient findings by the inexperienced examiner. *BMC Med Educ*. 2009 Mar 10;9:13. PMID: PMC2657144
- [11] Ninfa A, Pizzorni N, Eplite A, Moltisanti C, Schindler A. Validation of the Italian Version of the Functional Oral Intake Scale (FOIS-It) Against Fiberoptic Endoscopic Evaluation of Swallowing and Nutritional Status. *Dysphagia*. 2022 Feb;37(1):137–147. PMID: PMC8844182
- [12] Helliwell K, Hughes VJ, Bennion CM, 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 (Lond)*. 2023 Mar;29(2):284–290. PMID: 36640583