



## Predictor of rehabilitation outcome for dysphagia



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### ABSTRACT

**Objective:** Predicting whether dysphagia will resolve is very difficult, but is obviously important for patients and their families as well as for physicians. This study retrospectively evaluated potential prognostic indicators for dysphagia in order to examine the feasibility of predicting the outcome.

**Methods:** Data on 123 patients who received initial treatment for dysphagia between April 2008 and March 2010 were reviewed. The patient population included 63 men and 60 women, with a mean age of 81.4 years. All the patients underwent physical examination and video-endoscopy (VE) at the initial assessment, and video-fluorography (VF) was also done if necessary. We used the “Food Intake Level Scale” (FILS) to classify the severity of dysphagia as follows: “no oral intake” (FILS score: 1–3), “oral intake and alternative nutrition” (FILS score: 4–6), and “oral intake alone” (FILS score: 7–10). The patient’s age, primary disease, cognitive ability, and general condition were evaluated as potential factors associated with the severity of dysphagia. Each patient underwent assessment at every 2 weeks to evaluate the progress of their dysphagia.

**Results:** Forty-six patients were classified as “no oral intake” (FILS score: 1–3) at the initial examination and subsequently showed improvement to “oral intake and alternative nutrition” (FILS score: 4–6) or “oral intake alone” (FILS score: 7–10). They were compared with 43 patients who were also “no oral intake” at the second examination after training in swallowing. The combination of stroke and cognitive dysfunction showed a sensitivity of 75.9% (22/29) and specificity of 78.3% (18/23) for predicting no improvement of dysphagia, and was a statistically significant parameter. The presence of disuse syndrome showed a sensitivity of 66.0% (31/47) and specificity of 71.4% (30/42) for predicting no improvement of dysphagia, and this was also a significant parameter.

**Conclusion:** The results of this study suggest that a combination of factors other than stroke, including cognitive dysfunction and a decrease in activity of daily living (ADL) influence the outcome of dysphagia. It is not rare for patients who resume oral intake to be readmitted within a year for symptoms such as fever. Therefore, effective rehabilitation programs should be developed for the impairments of elderly patients and common disabilities such as dysphagia.

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## 1. Introduction

Patients who are unable to take food orally are deprived of an important source of pleasure. Efforts to treat dysphagia are meaningful to support our patients’ dignity [1]. Elderly people

are often susceptible to dysphagia for a variety of reasons [2]. The common causes include central nervous system disorders such as cerebrovascular disease (stroke) and Parkinson’s disease. Less frequent causes include chronic respiratory failure and the bedridden state in elderly persons who sustain injuries. About 30–50% of patients with stroke experience dysphagia accompanied by aspiration in the acute phase, but this decreases to about 5% in the chronic phase [3]. However, silent aspiration can be observed in 28–38% of patients for 2–3 months after the occurrence of stroke [4].

It has also been reported that 20% of stroke patients who experience dysphagia die of pneumonia, suspected to be due to aspiration, within 5 years [5]. Furthermore, the mortality rate of aspiration pneumonia increases rapidly with age in elderly people

**Abbreviations:** VE, video-endoscopy; VF, video-fluorography; FILS, Food Intake Level Scale; ADL, activity of daily living; CDR, Clinical Dementia Rating Scale; MRS, Modified Rankin Scale.

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**Table 1**  
Grouping of Food Intake Level Scale (FILS).

Food Intake Level Scale
No oral intake
Level 1: No swallowing training is performed except for oral care
Level 2: Swallowing training not using food is performed
Level 3: Swallowing training using a small quantity of food is performed
Oral intake and alternative nutrition
Level 4: Easy-to-swallow food less than the quantity of a meal (enjoyment level) is ingested orally
Level 5: Easy-to-swallow food is orally ingested in one to two meals, but alternative nutrition is also given
Level 6: The patient is supported primarily by ingestion of easy-to-swallow food in three meals, but alternative nutrition is used as a complement
Oral intake alone
Level 7: Easy-to-swallow food is orally ingested in three meals. No alternative nutrition is given
Level 8: The patient eats three meals by excluding food that is particularly difficult to swallow
Level 9: There is no dietary restriction, and the patient ingests three meals orally, but medical considerations are given
Level 10: There is no dietary restriction, and the patient ingests three meals orally (normal)

[6]. These reports indicate that accurate assessment and control of dysphagia are essential. Elderly patients often have various impairments, depending on their primary disease, such as dementia, while aging also leads to general functional impairment. This makes diagnosis and assessment more difficult. Previous attempts at the assessment of dysphagia have employed the Logemann scale [7] and the 8-point penetration-aspiration scale [8]. While these scales give some insight into the pathology of aspiration, they do not indicate the clinical severity of dysphagia. We considered that a scale for the overall assessment of dysphagia should integrate a number of factors, including the severity, frequency of complications, and difficulty of treatment. Accordingly, we employed the Food Intake Level Scale (FILS), which is commonly used in Japan, for the present study. This scale allows the severity of dysphagia to be assessed in a simple manner, which should make it clinically useful (Table 1) [9]. In the present study, we explored the factors associated with the prognosis of dysphagia.

## 2. Materials and methods

The subjects were 123 new patients who presented to our hospital with dysphagia. Their mean age was 81.4 years and there were 63 men and 60 women. At the initial examination, 68 patients had cerebrovascular disease (stroke), 16 had neurodegenerative disorders, 12 had heart failure and chronic respiratory failure, 6 had malignant tumors of the digestive tract or other sites, 10 had head injury associated with multiple trauma, and 11 had other conditions. The swallowing team examined the patients and reviewed each patient's medical record and swallowing assessment sheet (Table 2) before performing video-endoscopy (VE). When the team decided that the assessment of the timing and the extent of laryngeal elevation or the patency of the cervical esophageal opening during the pharyngeal stage of deglutition was necessary, the patient underwent video-fluorography (VF) at the first and second examinations. At treatment, all patients received indirect and direct training in swallowing from speech therapists. Indirect training involved exercising the organs related to swallowing without food intake. This included exercising the neck, lips, and tongue; breathing exercises; throat clearing; induction of the swallowing reflex (e.g., ice massage of the mouth); elevation of the head; and supraglottic swallowing. Direct training was done with food intake. The patients swallowed gelatin jelly (to reduce food residue in the pharynx) in an easy-to-swallow

**Table 2**  
Assessment sheet in the examination.

Evaluation lists in the examination	Evaluation
Patient's name	
Diagnosis	
Eating before examination	Self-supported/partial assistance/total assistance/tube feeding/NPO
Lifestyle before examination	Independent ambulation/bedridden
Communications	Good/fair/slightly impaired/poor
Retention of sitting position	OK/requires support/impossible
Closing mouth	OK/weak but possible/impossible
Saliva in mouth	Dry/no/slight/much
Saliva in cervical esophagus	No/slight/much/present in the larynx
Cough reflex, glottal closure	Good/fair/impaired/no reflex/closure
Swallowing reflex	Good/fair/impaired/no reflex
Clearing throat	Good/fair/impaired/impossible
Water swallow test	Negative/positive Water: mL
Concurrent findings	Velopharyngeal dysfunction/premature pharyngeal entry/vocal cord paralysis
Overall assessment	
Food Intake Level Scale	Level

position. Patients also practised repetitive swallowing to prevent aspiration. At each visit, the swallowing team nurses gave oral care training involving brushing of the oral cavity, tongue, and teeth followed by aspiration (repeated two or three times per visit) according to the oral care guideline of our hospital. The mean days from the onset to a rehabilitation start are  $9.5 \pm 0.8$  (mean  $\pm$  SE) days. If necessary, VE and VF were performed at the second and third visits for further assessment of swallowing. Patients who were ready for oral nutrition started oral intake of food with the guidance and assistance of a speech therapist and nurses. The other patients started tube feeding (e.g., via gastrostomy or per nasal). Otolaryngologists and speech therapists played a central role in deciding the indication and goal of the swallowing rehabilitation in the hospital for each patient.

Dementia was rated (excluding patients with slightly impaired consciousness) by using the Clinical Dementia Rating Scale (CDR-J) [10,11] as none to mild dementia (CDR scale: 0, 0.5, or 1) or moderate to severe dementia (CDR scale: 2 or 3). ADL were graded on the Modified Rankin Scale (MRS) [12] as self-supporting (MRS score: 0–3), requiring partial assistance (MRS score: 4; patients who required some assistance with locomotion and ambulation), or requiring total assistance (MRS score: 5) based on locomotion and ambulatory ability [13]. Data were analyzed statistically with a non-parametric test.

## 3. Results

The dysphagia ratings of the 123 patients are shown in Table 3. The rating was no oral intake (FILS score: 1–3) in 85 patients, oral intake and alternative nutrition (FILS score: 4–6) in 14 patients, and oral intake alone (FILS score: 7–10) in 24 patients. Patients who were classified as “no oral intake” at the initial examination and subsequently improved to “oral intake and alternative nutrition” or “oral intake and alternative nutrition” after 2–4 weeks were compared with those who were “no oral intake” at the initial examination and showed no subsequent improvement. Among those who were “no oral intake” at the initial examination, 46 patients showed improvement at the second examination (24 were “oral intake and alternative nutrition” and 22 were “oral intake alone”), but 39 showed no change (Table 4). Four of those who were able to eat at the initial examination became “no oral intake” at a subsequent examination (three were “oral intake and alternative nutrition” and one was “oral intake alone” at the initial examination) (Table 4). Of 43 patients who showed temporary

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