

Assessing Swallowing Function is Important Upon Admission to Community-Based Integrated Care Wards. A Retrospective Observational Study

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Purpose: This study aimed to evaluate patients' swallowing ability at the time of admission to community-based integrated care wards and to assess the importance of this evaluation.

Patients and Methods: 77 older adult patients admitted to the wards between April 2023 and March 2024 participated in the study. Within 48 h of admission, an original screening tool and meal rounds were collaboratively administered by a multidisciplinary team to assess patients' oral and pharyngeal function and their mode of nutritional intake. Dysphagia diets were classified according to the Dysphagia Diet Classification 2021 and compared with the International Dysphagia Diet Standardization Initiative. Oral and pharyngeal function were assessed using the Food Intake LEVEL Scale (FILS) and standardized meal rounds. Fiberoptic endoscopic evaluation of swallowing was performed when necessary. Associations between changes in food intake routes and discharge destinations were analyzed using the chi-squared test, while changes in FILS scores were evaluated using the Wilcoxon signed-rank test.

Results: Aspiration pneumonia and cerebrovascular disorders were the most common illnesses. Many patients were safely transitioned from total or peripheral parenteral nutrition to oral intake, accompanied by significant improvements in FILS scores. The findings demonstrate the effectiveness of assessing swallowing ability and determining appropriate feeding routes in community-based integrated care wards.

Conclusion: This study could contribute to better establishing appropriate feeding methods and managing patient nutrition during hospitalization. By using multidisciplinary shared swallowing-assessment tools, safe transition to oral intake can be promoted without necessarily performing detailed examinations.

Keywords: deglutition, aging, community-based integrated care, dysphagia, nursing care, quality of life, swallowing ability

Introduction

Community-based integrated care wards are a medical system unique to Japan, designed to support patients in transitioning smoothly from acute treatment to home or other facilities, with the ultimate goal of promoting independent living following discharge. Established during the 2014 medical revision fees in response to Japan's super-aging society, these wards serve as an intermediary step between acute care and returning home.^{1,2} The system primarily targets older adults who have completed acute treatment but require additional medical care, rehabilitation, or support before returning home. Admission criteria are determined by medical category and activities of daily living assessments.³ Furthermore, discharge planning is strategically coordinated by a multidisciplinary team, and previous studies have highlighted collaboration not only among physicians, nurses, and rehabilitation specialists but also among dental practitioners, dental hygienists, and nutritionists.^{4,5}

However, the operational structure of community-based integrated care wards and the conditions of admitted patients vary by facility. Patients with diverse medical histories, including fracture surgery, disuse syndrome, cerebrovascular diseases, and

aspiration pneumonia, may be admitted. Without appropriate nutritional management and rehabilitation prior to discharge, the risk of readmission or post-discharge aspiration pneumonia increases, along with the care burden placed on family members or home-care staff.^{6–8}

Nutritional management is a key determinant of patients' quality of life after discharge. Aspiration prevention and appropriate selection of nutritional intake methods support stable oral food feeding, particularly in patients with dysphagia.⁹

Dysphagia is a condition in which food or liquid cannot be safely and smoothly transported from the pharynx to the stomach because of abnormalities in one or more of the oral, pharyngeal, or esophageal phases of swallowing. Its causes are diverse and include structural abnormalities (such as tumors or postoperative changes), neurological and neuromuscular disorders (e.g., stroke, Parkinson's disease, and myopathies), age-related functional decline, drug-induced effects, and disturbances of consciousness or cognition, which often interact in a multifactorial manner.

And it is usually found among older individuals due to various age-related diseases.¹⁰ When oral intake cannot be maintained, prolonged use of parenteral nutrition, such as total parenteral nutrition (TPN) or peripheral parenteral nutrition (PPN), increases the risk of catheter-related bloodstream infections (CRBSI) and metabolic complications. Conversely, when switching to enteral nutrition (eg, via a nasogastric tube or gastrostomy), new risks may arise, including aspiration pneumonia, gastroesophageal reflux, local subcutaneous infection at the insertion site, and tube obstruction. In addition, interruption of oral intake can lead to disuse-related decline in orofacial and pharyngeal muscle function, reduced salivary secretion, and deterioration of oral hygiene, which may in turn increase the risk of pneumonia and other infections. Therefore, when introducing enteral or parenteral nutrition, it is essential to provide comprehensive management that includes maintaining oral intake function and continuing oral care.¹¹ Several studies have been conducted on dysphagia in older adults and its impact on their daily living. Ohta et al examined the relationship between dysphagia and discharge to home in older patients in a rural rehabilitation unit. They found that the presence of dysphagia was negatively associated with home discharge, as effective interventions to manage multimorbidity are lacking.¹⁰ Mori et al's study found that severe dysphagia impacted caregiver well-being and recommended that new multidisciplinary approaches should be incorporated into dysphagia rehabilitation strategies.¹² A scoping review was conducted to assess nutritional assessment items in adult patients with oropharyngeal and esophageal dysphagia.¹³

However, evidence remains limited regarding optimal swallowing evaluation methods and multidisciplinary nutritional management strategies in community-based integrated care wards. In addition, no widely established or directly comparable swallowing screening tool exists.

Therefore, in this study, we aimed to examine whether a swallowing function assessment system consisting of screening tools and meal rounds, administered at the time of admission, can promote safe and appropriate oral intake, contribute to aspiration prevention, lower readmission risk, and reduce caregiving burdens at home. In addition, we propose an operational model for the effective implementation of this system in community-based integrated care wards. This study adds to the existing literature by introducing a novel system to support patients with dysphagia and their caregivers, which may serve as a basis for future approaches aimed at relieving physical discomfort associated with aspiration pneumonia and breathing, distress related to enteral nutrition, and the psychological suffering caused by loss of oral intake, as well as reducing caregiver burden.

Materials and Methods

Research Design

This study was a retrospective observational study conducted in accordance with the STrengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Participants

All patients admitted to the community-based integrated care ward of Yokohama Izumidai Hospital between April 2023 and March 2024 were eligible for inclusion, regardless of age, sex, medical history, primary diagnosis, or level of care at admission. Patients were excluded if they declined participation, were unable to undergo swallowing assessment within

48 h of admission due to medical circumstances (eg, rapid clinical deterioration or emergency discharge), or had severe restrictions on nutritional route changes, such as those admitted solely for palliative care.

Research Procedure

Within 48 h of admission, an original screening tool (developed by a multidisciplinary team and administered at the time of admission) and meal rounds were collaboratively administered by nutritionists, speech-language-hearing therapists, and dental hygienists to assess patients' oral and pharyngeal function and mode of nutritional intake (Figure 1). The professionals were certified by the Japanese Society of Dysphagia Rehabilitation, each with over 10 years of clinical experience.

Based on previous studies, meal rounds focused on mandibular movement during mastication (simple elevation/depression, weak rotational movements, or normal rotational movements) and observation of posterior occlusal support.^{14,15} In the present study, dysphagia diets were classified according to the Dysphagia Diet Classification 2021 (codes: 0t, 0j, 1j, 2-1, 2-2, 3, 4), originally established by the Japanese Society of Dysphagia Rehabilitation in 2013 and revised in 2021. We also examined the relationship between the Japanese Dysphagia Diet 2021 and the International Dysphagia Diet Standardization Initiative, an international standardized benchmark (Table 1).^{16,17} In cases where pharyngeal residue or silent aspiration was suspected, fiberoptic endoscopic evaluation of swallowing (FEES) was performed for detailed assessment of aspiration risk.¹⁸⁻²¹

Patient symptoms were shared among a multidisciplinary team, including physicians, dental practitioners, nurses, dental hygienists, speech-language-hearing therapists, and nutritionists, during weekly conferences, and interventions were implemented as needed.²² First, the mode of nutritional intake, such as pureed food (IDDSI Level 4), soft food, or thickened liquids, was selected and adjusted according to each patient's swallowing ability. Second, swallowing training and oral rehabilitation were provided to maintain and improve oral and tongue muscle strength. Third, toothbrushing instruction and thorough oral hygiene management were implemented. Fourth, for patients receiving TPN or PPN, transitions to oral intake were made when safety was confirmed through FEES and meal rounds. The primary evaluation items were: (1) types of nutrition delivery routes (oral intake, nasogastric tube feeding, PPN, or TPN); (2) changes in Food Intake LEVEL Scale (FILS) scores before and after the intervention; and (3) discharge destination (home, nursing facility, transfer to another medical institution, such as a rehabilitation or long-term care ward, or death). The FILS is a standardized scale for the quantitative and qualitative assessment of oral food intake, ranging from 1 to 10.²³

Statistical Analysis

Using the chi-square test, we examined changes in routes of nutritional supply before and after the intervention and their difference in discharge destinations based on the presence or absence of the intervention. Additionally, changes in FILS scores before and after the intervention were compared using the Wilcoxon signed-rank test. We calculated the effect size r from the Z -value in the Wilcoxon signed-rank test and Cramer's V in the chi-squared test. Statistical significance was set at $p < 0.05$.

Ethical Statement

The study protocol was approved by the Ethics Committee of Yokohama Izumidai Hospital (approval number: 20240805-1). Written informed consent was obtained from all participants or their legally authorized representatives following a full explanation of the study procedures.

Results

Descriptive Statistics

From April 2023 to March 2024, a total of 77 patients (mean age, 83.9 ± 7.4 years; 38 men and 39 women) admitted to the hospital's community-based integrated care ward were enrolled as study participants. Aspiration pneumonia (20.8%) was the most common illness, followed by cerebrovascular disorders (18.2%) (Table 2).

The results of the chi-square test revealed a significant association between the intervention and route of nutrition supply ($\chi^2(3) = 8.40$, $p < 0.05$, Cramer's $V = 0.23$). Based on swallowing evaluations and meal rounds performed collaboratively by multiple professionals, with interventions tailored to patient symptoms, numerous patients were

Evaluation date (YY/MM/DD)		Evaluation date (YY/MM/DD)		Evaluation date (YY/MM/DD)	
1. PATIENT INFORMATION					
Patient name	_____	Age	____ (Years)	Admission date	(YY/MM/DD)
Main illness	_____			Doctor-in-charge	_____
2. MEDICAL HISTORY					
Medical history	<input type="checkbox"/> Aspiration pneumonia	<input type="checkbox"/> Cerebrovascular disorder	<input type="checkbox"/> COPD	<input type="checkbox"/> Neurodegenerative disease	
	<input type="checkbox"/> Dementia	<input type="checkbox"/> Gastroesophageal reflux	<input type="checkbox"/> Cancer (___)	<input type="checkbox"/> Others (___)	
3. ADMISSION & DISCHARGE INFORMATION					
Mode of nutrition intake	Before admission: _____				
Expected destination	<input type="checkbox"/> Home	<input type="checkbox"/> Facility	<input type="checkbox"/> Long-term care	<input type="checkbox"/> Undetermined	<input type="checkbox"/> Other
4. COMMUNICATION & ORAL FUNCTION					
Communication	Understands gestures:	<input type="checkbox"/> Able	<input type="checkbox"/> Unable		
Oral cavity	Environment:	<input type="checkbox"/> Clean	<input type="checkbox"/> Unclean	<input type="checkbox"/> Phlegm	<input type="checkbox"/> Oral debris
		<input type="checkbox"/> Coated tongue	<input type="checkbox"/> Dryness	<input type="checkbox"/> Other (___)	
Molar occlusion		<input type="checkbox"/> Yes (<input type="checkbox"/> Unilateral <input type="checkbox"/> Bilateral)	<input type="checkbox"/> None		
Tongue movement		<input type="checkbox"/> Good	<input type="checkbox"/> Poor	<input type="checkbox"/> Asymmetry	
5. SWALLOWING ABILITY ASSESSMENT					
Route of nutrition		<input type="checkbox"/> Oral	<input type="checkbox"/> Gastronomy	<input type="checkbox"/> Nasogastric tube	<input type="checkbox"/> TPN / PPN
Phlegm at rest		<input type="checkbox"/> None	<input type="checkbox"/> Yes	Coughs on instruction:	<input type="checkbox"/> Able / Weak / Unable
Dietary form	Staple food:	<input type="checkbox"/> Rice	<input type="checkbox"/> Soft rice	<input type="checkbox"/> Well-cooked porridge	<input type="checkbox"/> Blended
	Side dish:	<input type="checkbox"/> Regular diet	<input type="checkbox"/> Bite-sized	<input type="checkbox"/> Shredded / Finely shredded	<input type="checkbox"/> Mousse / Blended
	Viscosity:	<input type="checkbox"/> None	<input type="checkbox"/> Weak	<input type="checkbox"/> Moderate	<input type="checkbox"/> Strong
Posture		<input type="checkbox"/> Chair	<input type="checkbox"/> Wheelchair	<input type="checkbox"/> End sitting	<input type="checkbox"/> Raised bed (___)
Symptoms	Chokes:	<input type="checkbox"/> None	<input type="checkbox"/> Yes (Before / While / After)	(Food / Water)	
	Wet hoarseness:	<input type="checkbox"/> None	<input type="checkbox"/> Yes		
	Oral debris:	<input type="checkbox"/> None	<input type="checkbox"/> Yes		
	Multiple swallows:	<input type="checkbox"/> None	<input type="checkbox"/> Yes		
	Nasal voice/runny nose:	<input type="checkbox"/> None	<input type="checkbox"/> Yes		
Other findings		<input type="checkbox"/> Neck extension	<input type="checkbox"/> Laryngoptosis	<input type="checkbox"/> RSST ___ times	
6. ADDITIONAL ASSESSMENT & INTERVENTION					
Comments	_____				

FEES	<input type="checkbox"/> Not necessary	<input type="checkbox"/> Necessary	Purpose: _____	Date: (YY/MM/DD)	
FEES Results	_____				
Swallowing training	<input type="checkbox"/> Not necessary	<input type="checkbox"/> Necessary	Start date: _____		
Dental treatment	<input type="checkbox"/> Not necessary	<input type="checkbox"/> Necessary			

Note: This screening tool should be administered by a multidisciplinary team (nutritionists, speech-language-hearing therapists, dental hygienists) within 48 hours of admission.
 Abbreviations: FEES = Fiberoptic Endoscopic Evaluation of Swallowing; TPN = Total Parenteral Nutrition; PPN = Peripheral Parenteral Nutrition; RSST = Repetitive Saliva Swallowing Test; COPD = Chronic Obstructive Pulmonary Disease

Figure 1 Swallowing screening tool at the time of admission. This comprehensive screening tool was developed and administered by a multidisciplinary team of certified nutritionists, speech-language-hearing therapists, and dental hygienists within 48 hours of patient admission to community-based integrated care wards. The assessment comprises six main domains: (1) patient demographic and clinical information; (2) medical history screening for dysphagia-associated conditions; (3) nutritional intake mode before admission and expected discharge destination; (4) communication ability and oral function, including oral cavity environment, molar occlusion, and tongue movement; (5) comprehensive swallowing ability evaluation, including current nutritional intake route (oral, gastronomy, nasogastric tube, TPN, or PPN), dietary form, liquid viscosity requirements, feeding posture, and swallowing-related symptoms; and (6) clinical decision-making regarding FEES, swallowing training, and dental treatment. Multiple evaluation columns allow for serial assessments throughout the admission period. This systematic evaluation enabled identification of discrepancies between prescribed nutritional intake methods and actual swallowing capacity, facilitating appropriate interventions and safe transitions from parenteral nutrition to oral feeding.

Table 1 Correspondence of Posterior Occlusal Support and Mandibular Movements with JSDR and IDDSI Texture Levels

Posterior Occlusal Contact	Type of Masticatory Movements	JSDR code	Expected IDDSI Level score (for Reference)
None	Simple elevation/ depression	Code 2	Level 4 (Pureed) or Level 3 (Liquidized)
None	Weak rotational movements	Code 3	Level 5 (Minced & Moist)
None	Normal rotational movements	Code 4	Level 6 (Soft & Bite-Sized)
Yes	Simple elevation/ depression	Code 2	Level 4 (Pureed) or Level 5 (Caution required)
Yes	Weak rotational movements	Code 3	Level 5 (Minced & Moist)
Yes	Normal rotational movements	Code 4	Level 6 (Soft & Bite-Sized) or Level 7 (Easy to Chew)

Abbreviations: JSDR, Japanese Society of Dysphagia Rehabilitation; IDDSI, International Dysphagia Diet Standardisation Initiative.

Table 2 Distribution of Main Illnesses Among Patients Admitted to the Community-Based Integrated Care Wards

Main Illness	Number of Patients
Aspiration pneumonia	16
Cerebrovascular disorder	14
COVID-19	7
Pneumonia	4
Urinary tract infection	2
Chronic renal failure	2
Influenza	3
Parkinson's disease	2
Cancer	3
Other	24

transitioned to oral intake following FEES and oral rehabilitation. Considering the adjusted residual values among the changes in route of nutrition supply before and after intervention, TPN decreased while oral intake increased. (Table 3).

Of the 77 patients screened, 62 (81%) had their FILS modified. This indicates a mismatch between prescribed diets and actual swallowing ability. After the intervention, the median FILS score improved from Level 4 (restricted oral

Table 3 Changes in Route of Nutritional Supply Before and After Intervention

	Before-Intervention	Post-Intervention
PPN	15 (19.5%, 1.6)	8 (10.4%, -1.6)
TPN	13 (16.9%, 2.0)	5 (6.5%, -2.0)
Tube feeding	15 (19.5%, 0.0)	15 (19.5%, 0.0)
Oral intake	34 (44.2%, -2.4)	49 (63.6%, 2.4)

Note: The data is presented as the number of patients (proportion, adjusted residual).

Abbreviations: PPN, Peripheral parenteral nutrition; TPN, Total parenteral nutrition.

intake requiring supplemental nutrition) to Level 7 (three oral meals per day with easily consumable foods) ($Z=5.757$, $p<0.05$, $r=0.66$). The number of patients who do not require supplemental nutrition has increased. (Table 4).

The results of the chi-square test revealed a significant association between the intervention and discharge outcomes ($\chi^2(3)=24.04$, $p<0.01$, Cramer's $V =0.38$). Considering the adjusted residual values for the presence or absence of intervention and differences in discharge destinations, the intervention group had fewer transfers to other hospitals and more discharges to home. For comparison, a non-intervention group was also evaluated. This group consisted of 88 patients who had been admitted to the same community-based integrated care ward during the corresponding period one year earlier (April 2022–March 2023), before the introduction of the current multidisciplinary swallowing-assessment intervention. Their discharge outcomes were compared with those of the intervention group. (Table 5).

Table 4 Changes in Food Intake LEVEL Scale Scores Before and After Intervention

FILS Score	Before-Intervention	After-Intervention
1	29 (37.7%)	5 (6.5%)
2	2 (2.6%)	4 (5.2%)
3	0 (0.0%)	0 (0.0%)
4	11 (14.3%)	15 (19.5%)
5	1 (1.3%)	4 (5.2%)
6	10 (13.0%)	8 (10.4%)
7	19 (24.7%)	21 (27.3%)
8	5 (6.5%)	19 (24.7%)
9	1 (1.3%)	2 (2.6%)
Median of FILS score	4 (1–7)	7 (4–8)

Note: The FILS score is shown as the number of patients (proportion), and the median FILS score is shown as the value (interquartile range).

Abbreviation: FILS, Food Intake LEVEL Scale.

Table 5 Difference in Discharge Destinations Based on the Intervention Presence

	Non-Intervention Group	Intervention Group
Death	41 (46.6%, 1.7)	26 (33.8%, -1.7)
Transferred to other hospital	21 (23.9%, 3.3)	4 (5.2%, -3.3)
Admitted to facility	21 (23.9%, -1.6)	27 (35.1%, 1.6)
Home	5 (5.7%, -3.6)	20 (26.0%, 3.6)

Note: The data is presented as the number of patients (proportion, adjusted residual).

Discussion

Our study revealed a very high rate (81%) of diet–texture mismatches, highlighting a substantial clinical gap between the physician- or nurse-ordered diet and patients’ actual swallowing ability at admission. This finding suggests that, even when oral intake has already been initiated, a swallowing assessment may identify the need for texture modification or safer routes of intake. Our discrepancy rate appears substantially higher than adjustment rates reported in previous studies. For instance, Martino et al found that a considerable proportion of acute stroke patients required modification of their prescribed diet or feeding route following swallowing screening (Martino R et al, 2005). Similarly, Beck et al reported that although texture-modified diets and thickened liquids are widely used among adults with dysphagia, the evidence supporting their clinical appropriateness remains limited (Beck AM et al, 2018).

Standardized swallowing screening tools and meal rounds were jointly administered by professionals from multiple disciplines, and patient symptoms were further evaluated during multidisciplinary conferences. The results demonstrated that oral food intake in community-based integrated care wards could be initiated early, with improvements in safety. Although community-based integrated care wards play an important intermediary role in supporting patients’ smooth transition to home or care facilities following acute treatment, operational practices vary across wards, and methods for evaluating swallowing ability and modes of food intake have not been fully standardized.^{6–8}

In the present study, through meal rounds, more appropriate dietary intake modes were selected, and when necessary, FEES and rehabilitation programs were implemented to enhance the safety of oral intake. These interventions supported the transition from TPN and PPN to oral feeding and contributed to improvements in FILS scores. Stable oral intake not only helps prevent aspiration pneumonia but also reduces caregiver burden after discharge.²⁴ In addition, it is likely to lessen the psychological burden on family members and contribute to lower medical costs.¹¹

This study had several limitations. First, this was a retrospective, observational study conducted at a single facility. To improve generalizability to patients with diverse backgrounds, future prospective studies across multiple facilities are warranted. In addition, the validity and reliability of the unique screening tool used were not assessed against other standardized evaluation methods; thus, further research is required to confirm its reproducibility and to follow patients longitudinally after discharge. Nevertheless, in community-based integrated care wards, where patients with various conditions receive intensive care over a short period of time, this tool may support comprehensive evaluations of swallowing ability and facilitate the selection of appropriate dietary intake methods. This may, in turn, contribute to higher rates of patients returning home and lower rates of death prior to discharge. Moreover, the tool has potential to reduce the burden on family members and staff providing in-home nursing care. Multidisciplinary approaches, such as those applied in the present study, highlight the importance of nutritional management and swallowing rehabilitation following acute care, particularly in aging societies. As community-based integrated care wards are unique to Japan, cross-institutional studies should be conducted in these wards and comparable facilities, ideally through collaboration between Japanese and international researchers. Standardization and stronger evidence may ultimately support the development of a global care model for swallowing management.

Our current study suggests that using a multidisciplinary shared swallowing-assessment tool can promote a safe transition to oral intake without the need for detailed instrumental examinations. This approach was associated with improvements in FILS scores and may also help increase rates of discharge to home or care facilities, reduce mortality-related discharges, prevent aspiration pneumonia and readmissions, and lessen caregiver burden. However, further research is needed to confirm these potential benefits.

Conclusions

In the present study, professionals from multiple disciplines administered swallowing screening tools and meal rounds to patients in community-based integrated care wards. Swallowing ability at admission was assessed and, together with interventions planned during multidisciplinary conferences, supported transition from TPN or PPN to oral intake. This method appears feasible for supporting the early and safe initiation of oral food intake. It may help to reduce the risk of aspiration pneumonia and readmission, increase the likelihood of discharge to home or other facilities, and ease caregiver burden; however, these potential benefits should be interpreted with caution. Further evaluation of the effectiveness and

reproducibility of such multidisciplinary approaches in prospective, multicenter collaborative studies would therefore be desirable. In addition, efforts are needed to refine their implementation in community-based integrated care wards and to strengthen the evidence base for these practices. Taken together, our findings suggest that a standardized, multidisciplinary assessment of swallowing function at the time of admission to community-based integrated care wards may be a useful approach for promoting a safe and appropriate transition to oral intake.

Declaration

This study adhered to the principles of the Declaration of Helsinki.

Abbreviations

FEES, fiberoptic endoscopic evaluation of swallowing; FILS, Food Intake LEVEL Scale; IDDSI, International Dysphagia Diet Standardisation Initiative; JS DR, Japanese Society of Dysphagia Rehabilitation; TPN, total parenteral nutrition; PP, peripheral parenteral nutrition.

Data Sharing Statement

Additional unpublished data related to this study are available from the corresponding author upon reasonable request. These data are not currently deposited in a public repository but can be shared individually upon reasonable request.

Ethics Approval and Informed Consent

This study was approved by the Ethics Committee of Yokohama Izumidai Hospital (approval number: 20240805-1). Written informed consent was obtained from all participants or their legally authorized representatives following a full explanation of the study procedures.

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Disclosure

The authors report no conflicts of interest in this work.

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