AGMR
Annals of Geriatric Medicine and Research

Original Article
pISSN 2508-4798 eISSN 2508-4909
Ann Geriatr Med Res 2022;26(2):94-124
https://doi.org/10.4235/agmr.21.0145

Best Practice Recommendations for Geriatric Dysphagia Management with 5 Ws and 1H

Ebru Umay[1], Sibel Eyigor[2], Gulistan Bahat[3], Meltem Halil[4], Esra Giray[5], Pelin Unsal[4], Zeliha Unlu[6], Canan Tikiz[6], Meltem Vural[7], Asli Tufan Cincin[8], Serkan Bengisu[9], Eda Gurcay[10], Kemal Keseroglu[11], Banu Aydeniz[7], Elif Celik Karaca[12], Burak Karaca[13], Ahmet Yalcin[14], Cemile Ozsurekci[15], Dilek Seyidoglu[16], Ozlem Yilmaz[3], Sibel Alicura[11], Serhat Tokgoz[17], Barin Selcuk[18], Ekin Ilke Sen[19], Ali Yavuz Karahan[20], Ayse Yaliman[19], Serdar Ozkok[3], Birkan Ilhan[21], Merve Guner Oytun[4], Zeynel Abidin Ozturk[22], Sibel Akin[23], Betul Yavuz[24], Mazlum Serdar Akaltun[25], Aylin Sari[26], Murat Inanir[27], Meral Bilgilisoy[28], Zuhal Çaliskan[29], Guleser Saylam[11], Tugce Ozer[11], Yasemin Eren[30], Derya Hopanci Bicakli[16], Dilek Keskin[31], Zekeriya Ulger[32], Aylin Demirhan[33], Yalkin Calik[34], Bulent Saka[3], Zeynep Aykin Yigman[35], Erhan Arif Ozturk[1]

[1]Department of Physical Medicine and Rehabilitation, Ankara Diskapi Yildirim Beyazit Training and Research Hospital, University of Health Sciences Turkey, Ankara, Turkey
[2]Department of Physical Medicine and Rehabilitation, Ege University, Izmir, Turkey
[3]Division of Geriatrics, Department of Internal Medicine, Istanbul University, Istanbul, Turkey
[4]Division of Geriatrics, Department of Internal Medicine, Hacettepe University, Ankara, Turkey
[5]Department of Physical Medicine and Rehabilitation, Pendik Training and Research Hospital, Marmara University, Istanbul, Turkey
[6]Department of Physical Medicine and Rehabilitation, Celal Bayar University, Manisa, Turkey
[7]Department of Physical Medicine and Rehabilitation, Bakırköy Dr. Sadi Konuk Training and Research Hospital, University of Health Sciences, Istanbul, Turkey
[8]Department of Internal Medicine, Marmara University, Istanbul, Turkey
[9]Department of Speech and Language Therapy, Uskudar University, Istanbul, Turkey
[10]Gaziler Physical Medicine and Rehabilitation Training and Research Hospital, University of Health Sciences Turkey, Ankara, Turkey
[11]Department of Otolaryngology, Head and Neck Surgery, Ankara Diskapi Yildirim Beyazit Training and Research Hospital, University of Health Sciences Turkey, Ankara, Turkey
[12]Ministry of Health Eskisehir Provincial Health Directorate, Eskisehir, Turkey
[13]Ministry of Health Inonu Public Health Center, Eskisehir, Turkey
[14]Division of Geriatrics, Department of Internal Medicine, Ankara University, Ankara, Turkey
[15]Department of Physical Medicine and Rehabilitation, Trabzon Kanuni Training and Research Hospital, University of Health Sciences Turkey, Trabzon, Turkey
[16]Department of Dietitian, Ege University, Izmir, Turkey
[17]Department of General Surgery, Ankara Diskapi Yildirim Beyazit Training and Research Hospital, University of Health Sciences Turkey, Ankara, Turkey
[18]Department of Physical Medicine, Goztepe Medicalpark Hospital, Bahcesehir University, Istanbul, Turkey
[19]Department of Physical Medicine and Rehabilitation, Istanbul University, Istanbul, Turkey
[20]Department of Physical Medicine and Rehabilitation, Usak University, Usak, Turkey
[21]Department of Internal Medicine, Sisli Hamidiye Etfal Training and Research Hospital, University of Health Sciences, Istanbul, Turkey
[22]Department Internal Medicine, Gaziantep University, Gaziantep, Turkey
[23]Department Internal Medicine, Erciyes University, Kayseri, Turkey
[24]Department of Physical Medicine and Rehabilitation, Istanbul Training and Research Hospital, Istanbul, Turkey
[25]Department of Physical Medicine and Rehabilitation, Gaziantep University, Gaziantep, Turkey
[26]Istanbul Erenkoy Physical Medicine and Rehabilitation Hospital, Istanbul, Turkey
[27]Department of Physical Medicine and Rehabilitation, Kocaeli University, Kocaeli, Turkey
[28]Department of Physical Medicine and Rehabilitation, Antalya Training and Research Hospital, Antalya, Turkey
[29]Department of Gastroenterology, Umraniye Training and Research Hospital, University of Health Sciences Turkey, Istanbul, Turkey
[30]Department of Neurology, Ankara Diskapi Yildirim Beyazit Training and Research Hospital, University of Health Sciences Turkey, Ankara, Turkey
[31]Department of Physical Medicine and Rehabilitation, Kirikkale University, Kirikkale, Turkey
[32]Department of Internal Medicine, Kirikkale University, Kirikkale, Turkey
[33]Aylin Demirhan Physical Medicine and Rehabilitation Clinic, Izmir, Turkey
[34]Department of Physical Medicine and Rehabilitation, Bolu Izzet Baysal Training and Research Hospital, Bolu Turkey
[35]Department of Physical Medicine and Rehabilitation, Polatli City Hospital, Ministry of Health, Ankara, Turkey

Corresponding Author:
Ebru Umay, MD
Department of Physical Medicine and Rehabilitation, Ankara Diskapi Yildirim Beyazit Training and Research Hospital, University of Health Sciences Turkey, Ankara 06200, Turkey
E-mail: ebruumay@gmail.com
ORCID:
https://orcid.org/0000-0002-4137-7731

Received: December 25, 2021
Revised: April 11, 2022
Accepted: April 26, 2022

Background: Dysphagia is a geriatric syndrome. Changes in the whole body that occur with aging also affect swallowing functions and cause presbyphagia. This condition may progress to oropharyngeal and/or esophageal dysphagia in the presence of secondary causes that increase in incidence with aging. However, no study has been published that provides recommendations for use in clinical practice that addresses in detail all aspects of the management of dysphagia in geriatric individuals. This study aimed to answer almost all potential questions and problems in the management of geriatric dysphagia in clinical practice. **Methods:** A multidisciplinary team created this recommendation guide using the seven-step and three-round modified Delphi method via e-mail. The study included 39 experts from 29 centers in 14 cities. **Results:** Based on the 5W and 1H method, we developed 216 detailed recommendations for older adults from the perspective of different disciplines dealing with older people. **Conclusion:** This consensus-based recommendation is a useful guide to address practical clinical questions in the diagnosis, rehabilitation, and follow-up for the management of geriatric dysphagia and also contains detailed commentary on these issues.

Key Words: Oropharyngeal dysphagia, Esophageal dysphagia, Geriatrics, Consensus, Diagnosis, Rehabilitation

INTRODUCTION

In our aging world, human life expectancy is increasing with advances in medicine and improvements in living conditions. Consequently, the size of the older population is increasing worldwide.[1] This increase brings with it many new terms, situations, and challenges. With aging, progressive physical impairments and functional disabilities occur as a part of the natural process.[2]

As with all organ systems and tissues of the body, changes in swallowing occur with aging. Aging is an independent risk factor for dysphagia.[3] Dysphagia symptoms occur in approximately 1/3 of healthy older adults and 2/3 of hospitalized older people.[4-6] Presbyphagia is a condition characterized by structural and functional changes in the swallowing mechanism in healthy older individuals along with the normal aging process. All stages of swallowing are affected.[5-10] The changes observed in presbyphagia include reduced bolus control, preparation, and transport; delayed swallow triggering and initiation; delayed opening of the upper and lower esophageal sphincters (UOS and LOS, respectively); and decreased esophageal peristalsis and dysfunction.

Considering etiologic causes besides presbyphagia, the most common cause of dysphagia in older adults is secondary dysphagia due to neurogenic causes such as stroke.[3-5,11,12] The number of causes of secondary dysphagia increases with age. This further complicates swallowing function in older adults. Therefore, knowing, recognizing, and managing presbyphagia is important.

In recent years, research on dysphagia in older adults has increased.[3,12-23] However, recommendations for geriatric dysphagia management in the literature have generally comprised chapters in the management guidelines of secondary causes such as stroke for a single limited part of dysphagia such as diagnosis, for treatment from the point of view of a single discipline, or for a single stage of swallowing such as oropharyngeal dysphagia (OPD). Dysphagia is now defined as a geriatric syndrome, and physician/health care professionals caring for older patients require comprehensive and clinical practice recommendations for dysphagia diagnosis, treatment, and follow-up.[6,17,24-26] Moreover, dysphagia does not consist only of OPD because as esophageal dysphagia (ED) also occurs not uncommonly in older adults; however, no guidelines yet exist for the management of ED in the geriatric population.[3,23]

To address this gap, both in our country and worldwide, this study aimed to provide recommendations for clinical practice from the perspective of experienced multidisciplinary specialists, based on the questions "who, why, where, when, what, and how."

METHODS

This study was performed between February and May 2021 via e-mail using the three-round modified Delphi survey method.

Aim, Definitions, and Focus of the Recommendations

This study defined dysphagia as any disorder in the transfer of oral food to the stomach. Thus, the term included both OPD and ED. The recommendations are intended for all individuals 65 years of age and older, regardless of the presence of any specific disease. We developed recommendations for older adults, from diagnosis to

treatment and follow-up, under the headings of the 5Ws (who, why, what, where, and when) and 1H (how) question method. These recommendations are not specific to any disease and should not be applied to individuals under 65 years of age.

Methodology for Generating the Recommendations

A multidisciplinary expert group created the recommendations. We initially formed an expert task force comprising a geriatrician, a gastroenterologist, and two physiatrists, who then selected consultant experts. The selection criteria for the consultant experts included at least 5 years of experience in the care of geriatric patients or patients with dysphagia and active treatment or follow-up of these patients.[27] In addition, we required that the consultants have knowledge regarding the diagnosis and treatment of dysphagia from experts in fields not specifically focused on dysphagia. Moreover, experts from all regions of the country (north, south, east, and west) were recruited to avoid a single-region view. Thus, we invited 20 physiatrists, 20 geriatricians, 10 gastroenterologists, five neurologists, five otolaryngologists, five speech-language pathologists (SLPs), five dietitians, two dentists, two general surgeons, and two social workers to participate via e-mail.

We then formed a consultant expert group comprising the 48 invited experts (18 physiatrists, 14 geriatricians, five otolaryngologists, two gastroenterologists, two neurologists, two dietitians, two dentists, one SLP, one general surgeon, and one social worker) who agreed to answer each questionnaire from their perspectives as experienced professionals in geriatrics and/or dysphagia in 38 different centers in 14 cities. Although the study started with 48 professionals, different numbers participated in each Delphi round, from 48 experts in the first round, to 42 and 39 experts (29 centers and 14 cities) in rounds two and three, respectively.

We created consensus recommendations through a seven-step process. In the first step, the task force searched the main bibliographic databases (PubMed, EMBASE, and Cochrane Library) using the keywords "older," "older adult," and "dysphagia."

Guidelines, meta-analyses, systematic reviews, and randomized and nonrandomized comparative studies were first evaluated to establish appropriate question patterns. The abstracts of the identified literature were read, and the entire article was screened when necessary. The literature search included the last decade up to January 2021. Later, the task force team created six open-ended and unlimited commentary questions, suitable for the following 5Ws and 1H question patterns: "Who, why, where, when, with what, and how should dysphagia be evaluated and treated?"[28] These six-question words, also known as journalistic questions, allowed us to examine all aspects of the subject. This question model, which is also a creative thinking technique, was used to describe the problem.[29,30]

In the second step, the six-question survey created by the task force was sent via e-mail to the consultant expert group members who agreed to participate in the study. The purpose of this (first) Delphi round was to identify the management, diagnosis, rehabilitation, and follow-up of dysphagia in older adults to understand potential problems and make recommendations. For this reason, the experts were asked to submit their detailed and unlimited opinions and suggestions within 1 week.

In the third step, the suggestions and comments of the 48 consultant experts invited by the task force were collected and 429 items were created (who-why 120 items, when 20 items, where 7 items, with what 82 items, and how 200 items).

In the fourth step (second Delphi round), a draft of the survey containing the majority opinions was sent back to the consultant group by task force and the feedback of their opinions was expected within 4 weeks.

In the fifth step, the task force revised the survey according to the responses from the consulting experts. During the revision, we removed items defined as overall divergence (OD) and, when available, added suggested explanations to the items. In addition, the task force listed items in the risk factor/symptom-sign showing an overall consensus (OC) for both dysphagia and aspiration under the "who-why" heading. Finally, 328 items were created (who-why 115 items, when 7 items, where 5 items, with what 52 items, and how 149 items).

In the sixth step, the final version of the survey was shared with the consulting expert group (third Delphi round), with a 4-week period to respond. The experts were asked to reconsider questions that were particularly close to consensus.

In the seventh step, the task force created the final version of 216 items (who-why 7 items, when 7 items, where 5 items, with what 51 items, and how 146 items), based on the responses received from the consultant experts (Figs. 1, 2).

Strength and Classification of Recommendations

The consultant experts rated all recommendations on a 10-point scale (from 0 point "I totally disagree" to 10 point "I totally agree"). This 10-point scale was divided into three terms that indicated the strength of agreement in response to each statement. While many methods have been applied in the literature to evaluate the strength of recommendations, three measures—percentage (%), median value, and interquartile range [IQR]—were used to increase the strength of the recommendations according to each item.[31-33] The strengths of the recommendations were classified as OC (agreement rate between 8 and 10 points ≥80%, median value 9–10, and IQR ≤2); approaching consensus (AC), which indicated no

Fig. 1. Summary of the recommendation I. Recommendations for older adults, from diagnosis to treatment and follow-up, under the headings of the 5Ws (who, why, what, where, and when) and 1H (how) question method.

Summary of the recommendations-II

With what

Basic screening test: a trained health care professional (multidisciplinary team)
Clinical evaluation: SLP/physician/trained nurse (multidisciplinary team)
Instrumental evaluation: multidisciplinary team

Basic screening test

1. Risk factor+symptom/sign list
2. Simple screening test questions:
   "Do you have difficulty swallowing in solid foods/ liquids?"
   "Do you experience coughing, choking or obstruction during/after feeding in solid food/liquid?"
   "Do you think there is any difference or change in feeding in solid food/liquid compared to your younger self?"
3. Eating assessment tool (EAT-10)
4. Swallowing disturbances questionnaire (SDQ)
5. Observation of a meal (pandemic)

Clinical evaluation

1. Clinical evaluation of dysphagia should include detailed medical history (anamnesis) including questioning of risk factors and symptoms, general systemic examination, evaluation of dysphagia signs, and bedside swallowing test (BST).
2. The systemic examination should include examination of the neurological, cardiopulmonary, gastrointestinal, dental and musculoskeletal systems that may be associated with dysphagia.
3. The BST should be chosen individually and pathology-specific.
4. Suggested bedside swallowing test
   -Volume-viscosity swallowing test
   -Water swallow test with pulse oximetry
   -Gugging Swallowing Screen test
   -Observation of a meal (pandemic)

Instrumental evaluation

1. Multidisciplinary team
2. After suspicious clinical evaluation
3. For treatment selection and follow-up

Suggested Methods

Oropharyngeal Dysphagia

A. Flexible fiberoptic nasoendoscopy
B. Videofluoroscopy
C. Magnetic resonance, tomography, sintigraphy*

Esophageal Dysphagia

A. Videofluoroscopy
B. Pharyngoesophagography / esophagography
C. Upper gastrointestinal endoscopy
D. Manometry
E. Magnetic resonance, tomography, sintigraphy *

Sarcopenic Dysphagia

A. Magnetic resonance imaging

How

1. Multidisciplinary team (according to the existing facilities and possibilities of each center in terms of personnel and equipment)
2. Individual, pathology- and etiology-specific rehabilitation
3. Dysphagia characteristics should be defined before rehabilitation
4. Determination and solution of the underlying cause is the first-line treatment method in the rehabilitation (drugs/surgery/botulinum injection)
5. Compensatory and therapeutic combination therapy should be used

Oropharyngeal Dysphagia

First-line rehabilitation modalities
Environmental modification
Oral sensorial stimulation (Thermal, touch and pressure)
Second-line rehabilitation modalities

Swallowing maneuvers
Oropharyngeal exercises (ROM, Strengthening and CTAR)
Electrical stimulation (Oropharyngeal motor level)

Third-line rehabilitation modalities
Transcranial electrical stimulation
Transcranial magnetic stimulation
Electrical stimulation (Oropharyngeal sensorial level)
Biofeedback

Esophageal Dysphagia

First-line rehabilitation modalities
Education and information
Oral hygiene-oral care
Positioning and posture modification
Diet (Bolus volume, texture) modification
Feeding route modification (Artificial nutrition)
Dental care and prostodontic rehabilitation
Nutritional rehabilitation

Second-line rehabilitation modalities
Head and neck exercises (ROM and Strengthening)
Breathing exercises (inspiratory and EMST)
Psychological support (patient/caregiver)

Home program

Follow-up

The follow-up time may vary depending on the patient's personal characteristics, type and etiology of dysphagia.
Basic screening test, clinical evaluation, bedside screening test, flexible fiberoptic nasoendoscopy
Nutritional assessment and evaluation of rehabilitation modalities given

Pneumonia history	Pneumonia finding	Hospitalization history	Aspiration findings/symptoms	Alarm symptoms
Malnutrition	Dehydration	Weight loss	Cognitive dysfunction, delirium	Oral hygiene
Dental care	Sarcopenia			

*: it is for selected cases, it is not first option;
SLP, speech language pathologist; ROM, range of movement; CTAR, Chin Tuck Against Resistance; EMST, expiratory muscle strength training.

Fig. 2. Summary of the recommendation II. Recommendations for older adults, from diagnosis to treatment and follow-up, under the headings of the 5Ws (who, why, what, where, and when) and 1H (how) question method.

OC but substantial support (agreement rate between 8 and 10 points of 65%–79%, median value 8–10, and IQR ≤ 3); and OD, which indicated significantly different opinions within the group (agreement rate between 8 and 10 points of < 65%, median value < 8, or IQR > 3). The recommendations in this paper were "recommended and should be" for OC (strong recommendation), "considered and may be" for AC (weak recommendation), and "not recommended and should not be used" for OD.

Statistical Analysis

IBM SPSS Statistics for Windows (version 25.0; IBM Corp., Armonk, NY, USA) was used to perform the statistical analysis. The strength of agreement was calculated for each item according to proportions (8%–10% response), median values, and IQR using the Kappa method.[34,35]

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the University of Health Sciences Turkey, Ankara Diskapi Training and Research Hospital (IRC No. 2021/103-02) and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. This study complied the ethical guidelines for authorship and publishing in the Annals of Geriatric Medicine and Research.[36] In addition, signed informed consent was obtained from each participant before study.

RESULTS

In the first Delphi round, a 429-item survey was prepared in line with the recommendations of the consultant expert group and answers to the six open-ended questions created by the task force. In the second Delphi round, 76.5% of these items were accepted as OC and AC and 101 items were removed. In the third Delphi round, 65.9% of these items were accepted as OC and AC, 112 items were removed, and 216 items were finalized. Tables 1–4 show the distributions of the strengths of the recommendations from the third Delphi round.

Of the recommendations in six sections, 144 were strong and 52 were weak, and 20 were not recommended: who-why section (7 strong recommendations), when section (5 strong and 2 weak recommendations), where section (5 strong recommendations), what section (37 strong recommendations, 5 weak recommendations, and 9 do not recommend), how section (90 strong recommendations, 45 weak recommendations, and 11 do not recommend).

Who-Why Sections

The three strong recommendations in the Who section included "dysphagia should be considered in older adults aged ≥ 80 years (regardless of symptoms/signs and risk factors), and aged ≥ 65 years with any risk factor for dysphagia AND/OR with any symptoms/signs associated with dysphagia." In the Why section, we created four lists for the dysphagia and aspiration-related risk factors and symptoms/signs specified in the Who section.

When Section

The five strong recommendations in this section were "Older people identified in the Who section should be screened at least once a year" and "For the diagnosis of dysphagia, screening tests and clinical evaluations should be performed at least once yearly in all older people aged ≥ 65 years with any severe risk factor AND/OR with any symptoms/signs associated with dysphagia."

Where Section

The five strong recommendations in this section were "While the dysphagia screening test can be performed in older adults at primary healthcare centers, clinical evaluation should be performed at secondary and tertiary health centers in older patients with dysphagia as a result of screening" and "To screened older adults for dysphagia starting from primary care, education on this subject should be included in the curriculum in medical faculties and all health-related faculties (such as emergency medical technician training and nursing)" as well as "The telehealth/telemedicine system can also be used to perform screening tests for dysphagia."

What Section

The 37 strong recommendations included diagnosis management, the definition of multidisciplinary teams, formal and non-formal screening tests that can be applied, the definition of clinical evaluation, swallowing tests that can be applied, and instrumental evaluation methods.

How Section

The 90 strong recommendations included rehabilitation management, the general characteristic of dysphagia rehabilitation, modalities (education and information, dietary modification, artificial route modification, and nutritional rehabilitation as first-line modalities for both OPD and ED and positioning, postural modifications, oral hygiene, oral/dental care, swallowing maneuvers and sensory stimulation as first-line modalities for OPD), follow-up management (team, methods, and follow-up lists) as well as sarcopenic dysphagia (SD) and frailty-related dysphagia (FRD) man-

Table 1. Distributions of the strength of the recommendations for the 3th Delphi Round-1

		8%-10%	IQR	Median	SOA
A. WHO-WHY	A1. All individuals ≥ 80 years old	89.2	2.0	10.0	OC
	A2. Elderly people aged ≥ 65 years with any dysphagia related-risk factor	97.3	0.0	10.0	OC
	A3. Elderly people aged ≥ 65 years with any dysphagia related-symptom/sign	91.9	1.0	10.0	OC
	Dysphagia-related risk factors				
	Progressive/non-progressive central neurological diseases				
	Connective tissue disease				
	Radiotherapy and surgery history of head, neck, anterior mediastinum and gastrointestinal tract				
	Conditions that cause cognitive dysfunction,	100	0	10	OC
	Recent history of tracheostomy, intubation and mechanical ventilation,				
	Presence of sarcopenia and frailty,				
	Drug use that may affect swallowing				
	Other risk factors assessed in Delphi Round-3				
	Cancer history of head, neck, anterior mediastinum and gastrointestinal tract	83.8	2.0	9.0	OC
	Lack of teeth that can affect chewing function	67.8	3.0	9.0	AC
	Presence of respiratory system disease (such as COPD, pulmonary fibrosis and asthma)	83.0	2.0	9.0	OC
	Temporomandibular joint problems, oral structural deformity and malocclusion	66.5	3.0	8.0	AC
	Presence of gastrointestinal tract diseases such as gastroesophageal reflux, peptic ulcer, achalasia	81.9	2.0	9.0	OC
	Multiple drug use (polypharmacy)	88.4	2.0	9.0	OC
	Recent long-term use of nasogastric tube	89.2	2.0	9.0	OC
	Hospitalization due to acute attacks of comorbidities	75.7	2.0	8.0	AC
	Prolonged hospital stay	83.8	2.0	9.0	OC
	Decreased hand grip-and general muscle-strength, difficulty getting out of bed and chair	78.4	2.0	9.0	AC
	Slow walking speed, difficulty climbing stairs	70.3	3.0	9.0	AC
	Decreased overall muscle mass and muscle wasting	79	2.0	9.0	AC
	Functional dependence, limitation in activities of daily living and immobilization	66.1	3.0	8.0	AC
	Tiredness and weakness in the last few months	65.4	2.0	8.0	AC
	Any reason to develop delirium	78.3	2.0	9.0	AC
	Aspiration-related (severe) risk factors				
	Progressive/non-progressive central neurological diseases				
	Cancer, radiotherapy and surgery history of head, neck, anterior mediastinum and gastrointestinal tract,				
	Conditions that cause cognitive dysfunction,	97.3	1.0	10.0	OC
	Recent history of tracheostomy, intubation and mechanical ventilation,				
	Recent long-term use of nasogastric tube,				
	Presence of sarcopenia and frailty				
	Other severe risk factors assessed in Delphi Round-3				
	Multiple comorbidities	78.8	2.0	9.0	AC
	Presence of respiratory system disease	78.4	3.0	8.0	AC
	Any reason to develop delirium	73.0	2.0	9.0	AC
	Presence of gastrointestinal tract diseases such as gastroesophageal reflux, peptic ulcer, achalasia	68.5	3.0	8.0	AC
	Dysphagia-related symptoms/signs				
	Change in eating habits,				
	Difficulty in chewing,				
	Spillage of food from the mouth during feeding,				
	Residual food in the mouth,	97.3	1.0	10.3	OC
	Drooling,				
	Coughing, choking and voice change during/after swallowing,				
	Increased need for throat clearing,				

(Continued to the next page)

Table 1. Continued

		8%-10%	IQR	Median	SOA
	Sticky feeling the throat during/after swallowing				
	Retrosternal obstruction/stuck/sticky feeling during/after feeding,				
	Painful swallowing,				
	Repeated swallowing and need for multiple swallowing,				
	Progressive swallowing difficulty,				
	Delayed pharyngeal phase,				
	Head and posture change during feeding,				
	Presence of signs of lower respiratory tract infection				
	Other dysphagia-related symptoms/signs assessed in Delphi Round-3				
	History of pneumonia more than 3 times a year	83.8	2.0	9.0	OC
	Presence of tachypnea	65.3	3.0	8.0	AC
	Involuntary weight loss	71.9	3.0	8.0	AC
	Movement disorder and weakness in the tongue and lip muscles	67.6	3.0	8.0	AC
	Low tongue pressure	72.9	3.0	8.0	AC
	Decreased oral sensation	75.7	3.0	8.0	AC
	General malaise/fatique, decreased muscle strength	67.6	2.0	8.0	AC
	Low body mass index, cachexia	79.2	2.0	8.0	AC
	Aspiration-related symptoms/signs				
	I. Weakened or absent voluntary cough reflex,				
	II. Coughing/choking and voice change during/after swallowing,				
	III. Shortness of breath/bruising,				
	IV. Drooling,	94.6	1.0	10.0	OC
	V. Increased need for throat clearing,				
	VI. Repetitive and multiple swallowing,				
	VII. Feeling of having something stuck in the throat while swallowing,				
	VIII. Decrease in laryngeal elevation,				
	IX. Presence of signs of lower respiratory tract infection				
	X. Decrease in oxygen saturation with pulse oximetry during/after feeding				
	Other aspiration-related symptoms/signs assessed in Delphi Round-3				
	Retrosternal obstruction/stuck/sticky feeling during/after feeding,	69.4	3.0	8.0	AC
	History of pneumonia more than 3 times a year	86.7	2.0	8.0	OC
	Weakness in chewing muscles	66.7	3.0	8.0	AC
	Decreased bite force, low bite pressure	65.4	2.0	8.0	AC
B. WHEN	B1. All elderly people aged ≥ 80 years should be screened for dysphagia at least once a year with a simple screening test (regardless of symptoms and risk factors).	94.6	1.0	10.0	OC
	B2. Screening time for dysphagia in the elderly should be determined individually.	75.2	2.0	9.0	AC
	B3. All elderly people aged ≥ 65 years, with any risk factor should be screened with a simple screening test for dysphagia at least once a year.	91.9	1.0	10.0	OC
	B4. All elderly people aged ≥ 65 years, with any dysphagia symptoms/signs should be screened for dysphagia at least once a year with a simple screening test.	91.8	1.0	10.0	OC
	B5. For the diagnosis of dysphagia, screening test and clinical evaluation should be performed at least once a year in all elderly people aged ≥ 65 years and with any severe risk factor.	89.2	2.0	10.0	OC
	B6. For the diagnosis of dysphagia, screening test and clinical evaluation should be performed at least once a year for all elderly people aged ≥ 65 years with any aspiration-related dysphagia symptoms and signs.	91.9	1.0	10.0	OC
	B7. All elderly people aged ≥ 65 years, hospitalized for any reason, should be questioned in terms of dysphagia during each visit.	70.3	3.0	8.0	AC

(Continued to the next page)

Table 1. Continued

		8%-10%	IQR	Median	SOA
C. WHERE	C1. All elderly people aged ≥ 65 years can be screened for dysphagia with a simple screening test in primary health care centers.	91.9	1.0	10.0	OC
	C2. Elderly people who are thought to have dysphagia as a result of screening in primary care should only be evaluated in a secondary and/or tertiary health center.	83.8	2.0	9.0	OC
	C3 In order for the elderly to be screened for dysphagia starting from primary care, education on this subject should be included in the curriculum in medical faculties.	89.2	2.0	10.0	OC
	C4. In order for the dysphagia screening test to be performed in the elderly starting from primary care, education on this subject should be included in the curriculum in all health-related faculties (such as emergency medical technician, nursing).	89.2	2.0	10.0	OC
	C5. The telehealth/telemedicine system can also be used in the screening test for dysphagia (this method should be used in special cases such as pandemics).	91.9	2.0	10.0	OC

IQR, interquartile range; SOA, strength of agreement; AC, approaching consensus; OC, overall consensus; OD, overall divergence.

Table 2. Distributions of the strength of the recommendations for the 3th Delphi Round-2

		8%-10%	IQR	Median	SOA
D. WHAT	**Diagnosis management**				
	D1. The screening test for dysphagia can be administered by a trained health care professional (for example, a trained rehabilitation nurse).	86.5	1.75	10.0	OC
	D2. Clinical evaluation for the diagnosis of dysphagia should be performed by a SLP, if possible, or if not available, by physicians and/or a trained nurse.	89.2	2.0	9.25	OC
	D3. If possible, screening for dysphagia by a trained team member assigned in a multidisciplinary team may facilitate diagnosis, treatment and follow-up.	83.9	2.0	9.0	OC
	D4. Although clinical and further evaluation for the diagnosis of dysphagia varies according to the conditions and possibilities of each center, it should be done in a multidisciplinary team.	91.9	1.0	10.0	OC
	D5. In the broadest form among the multidisciplinary team, primary care physician, home care services and health personnel in the elderly care center in primary care; neurologist, physiatrist, geriatrician, otolaryngologist, gastroenterologist, internal medicine, general surgery, radiology and psychiatry specialists in the secondary and tertiary care, dental physician, SLP, nurse, dietitian, psychologist, physiotherapist and social worker should be included. Family and caregivers should also be included in this team.	94.4	0.75	10.0	OC
	D6. If there is not a SLP in the multidisciplinary team, one of the branches of geriatrics, physical medicine and rehabilitation, neurology, otolaryngology and gastroenterology should take primary responsibility for the coordination and organization of the team, depending on the type of dysphagia (oral, pharyngeal, esophageal).	86.5	1.0	10.0	OC
	Screening tests				
	D1. Risk factor+ symptom/sign lists can be used as a screening test for dysphagia.	94.6	1.75	10.0	OC
	D2. The following 3 questions can be used as a dysphagia screening test in the elderly:	91.9	1.0	10.0	OC
	"Do you have difficulty swallowing in solid foods/liquids?"				
	"Do you experience coughing, choking or obstruction during/after feeding in solid food/liquid?"				
	"Do you think there is any difference or change in feeding in solid food/liquid compared to your younger self?"				
	D3. Eating assessment tool (EAT-10) can be used as a dysphagia screening tool.	81.1	1.0	10.0	OC
	D4. Swallowing disturbances questionnaire (SDQ) can be used as a dysphagia screening tool.	71.3	2.88	8.5	AC
	D5. Observation of mealtime can be used as a screening tool for dysphagia.	86.5	2.0	9.0	OC
	Clinical evaluation				
	D1. Clinical evaluation of dysphagia should include detailed medical history (anamnesis) including questioning of risk factors and symptoms, general systemic examination, evaluation of dysphagia findings, and bedside swallow test.	100	1.0	10.0	OC
	D2. General systemic examination should include examination of the neurological, cardiopulmonary, gastrointestinal, dental, and musculoskeletal systems that may be associated with dysphagia.	97.3	1.0	10.0	OC
	D3. Neurological examination should include consciousness and cranial nerve reflexes associated with swallowing, speech, voice, coordination, involuntary movement and motor planning.	100	1.0	10.0	OC

(Continued to the next page)

Table 2. Continued

	8%-10%	IQR	Median	SOA
D4. Cardiopulmonary examination should include auscultation, pulse and respiratory rate, and cough reflex.	94.4	1.0	10.0	OC
D5. Gastrointestinal examination should include inspection, bowel auscultation, palpation assessment for localized tenderness, palpable mass and lymphadenopathy.	91.9	1.0	10.0	OC
D6. Dental examination should include evaluation of oral hygiene, teeth, denture fit, malocclusion, tone and sensation of muscles and soft tissues in the oral cavity.	94.6	1.0	10.0	OC
D7. Musculoskeletal examination should include assessment of posture, mobility, oropharyngeal and postural structures, range of motion, muscle strength and tone of the temporomandibular joint and extremities.	94.6	1.0	10.0	OC
D8. Bedside swallow test should be chosen individually and according to the pathology, based on the suspected OPD or ED with the screening test.	97.3	0.75	10.0	OC
D9. Volume-Viscosity Swallowing Test (VVST) can be used as a bedside screening test after the examination.	94.6	1.88	10.0	OC
D10. The Sydney Swallow Questionnaire (SSQ) can be used as a bedside screening test after the examination.	69.4	2.38	8.0	AC
D11. The Yale Swallowing Protocol can be used as a bedside screening test after the examination.	69.4	2.88	8.0	AC
D12. The 3 oz water swallow test can be used as a bedside screening test after the examination.	77.8	2.0	9.0	AC
D13. Water swallow test with pulse oximetry can be used as bedside screening test after examination.	81.1	1.75	10.0	OC
D14. The Gugging Swallowing Screen test (GUSS) can be used as a bedside screening test after the examination.	81.1	2.0	9.5	OC
D15. Observation of mealtime can be used as a clinical assessment (for the Pandemic process).	81.8	2.0	9.0	OC
Instrumental evaluation				
D1. Instrumental evaluation should be made after clinical evaluations.	97.3	0.0	10.0	OC
D2. Instrumental evaluation is not required for all patients. It should be done if there is any doubtful clinical evaluation.	94.6	1.0	10.0	OC
D3. If the patient has a serious risk factor and/or symptom-sign for dysphagia, further evaluation should be performed after clinical evaluation.	97.3	0.0	10.0	OC
D4. The choice of advanced evaluation method should be decided by a multidisciplinary team.	97.3	0.0	10.0	OC
D5. The choice of advanced evaluation method should be decided according to the underlying pathology, dysphagia, and the patient's current characteristics.	94.6	0.75	10.0	OC
D6. The choice of the advanced evaluation method should be decided according to the facilities and conditions of the center performing the evaluation.	94.4	0.75	10.0	OC
D7. FEES is an effective method for OPD.	94.4	0.75	10.0	OC
D8. Evaluation of VF swallowing is an effective method for OPD.	89.2	0.75	10.0	OC
D9. Evaluation of electrophysiological dysphagia limit is an effective method for OPD.	47.6	3.75	7.75	OD
D10. Ultrasonographic evaluation of oropharyngeal structures is an effective method for OPD.	37.1	4.25	7.0	OD
D11. Accelerometric evaluation is an effective method for OPD.	22.9	2.75	6.0	OD
D12. Tongue pressure measurement is an effective method for the diagnosis of OPD.	38.9	3.75	7.0	OD
D13. Magnetic resonance imaging, computed tomography and scintigraphy may be effective methods in the diagnosis of OPD; they may not be suitable for every patient and are not the first-line methods.	88.9	1.75	10.0	OC
D14. VF evaluation is an effective method for ED.	83.8	1.75	10.0	OC
D15. Barium swallow pharyngoesophagography/esophagography is an effective method for ED.	86.5	1.38	10.0	OC
D16. Upper gastrointestinal endoscopy is an effective method for ED.	83.8	1.0	10.0	OC
D17. Manometry is an effective method for ED. If possible, high-resolution manometry should be used.	81.1	1.0	10.0	OC
D18. Muscle ultrasonography is an effective method for ED.	13.9	3.0	5.25	OD
D19. Endoscopic ultrasonography and ultrasound elastography are effective methods for ED.	44.4	3.0	8.0	OD
D20. Magnetic resonance imaging, computed tomography and scintigraphy may be effective methods in the diagnosis of ED; they may not be suitable for every patient, and they are not the methods of choice in the first-line.	86.5	1.88	10.0	OC

(Continued to the next page)

Table 2. Continued

		8%-10%	IQR	Median	SOA
	D21. For SD, imaging of muscle wasting with magnetic resonance imaging is an effective method for diagnosis.	69.4	3.0	9.25	AC
	D22. For SD, imaging of muscle wasting with computed tomography is an effective method for diagnosis.	51.4	5.0	7.25	OD
	D23. For SD, imaging of muscle wasting with ultrasonography is an effective method for diagnosis.	55.6	4.63	8.0	OD
	D24. Advanced assessment methods can also be used for treatment selection and follow-up.	97.2	1.0	10.0	OC

IQR, interquartile range; SOA, strength of agreement; AC, approaching consensus; OC, overall consensus; OD, overall divergence; ENMG, electroneuromyography; VF, videofluoroscopy; FEES, fiberoptic endoscopic evaluation of swallowing; OPD, oropharyngeal dysphagia; ED, esophageal dysphagia; SD, sarcopenic; SLP, speech language pathologist.

Table 3. Distributions of the strength of the recommendations for the 3th Delphi Round-3

		8%-10%	IQR	Median	SOA
E. HOW	**Rehabilitation management**				
	E1. A management algorithm (in terms of diagnosis and treatment) created by a multidisciplinary team should be used in the management of both OPD and ED in the elderly.	97.2	0	10.0	OC
	E2. The tools/methods used in this algorithm may change in accordance with the current facilities and possibilities of each center in terms of personnel and equipment.	88.9	0	10.0	OC
	E3. Patients who do not have dysphagia but have more than one serious risk factor should also be included in a rehabilitation program that includes oral hygiene, compensatory methods such as modifications and a follow-up program.	86.1	1.0	10.0	OC
	E4. Both OPD and ED rehabilitation should be personalized.	97.2	0	10.0	OC
	E5. Both OPD and ED rehabilitation should be pathology specific. Dysphagia characteristics should be well defined before rehabilitation.	94.4	0	10.0	OC
	E6. Rehabilitation of both OPD and ED should be specific to the etiology.	80.6	2.0	10.0	OC
	E7. Determination and treatment of the underlying cause is the first-line method in the rehabilitation of both OPD and ED.	97.2	0	10.0	OC
	E8. Treatment of the underlying cause should include elimination of correctable risk factors for dysphagia.	100	0	10.0	OC
	E9. Treatment of the underlying cause of ED may be drugs and may be the first-line method.	100	1.0	10.0	OC
	E10. Treatment of the underlying cause of ED may be a surgical method and may be the first-line method.	94.4	1.0	10.0	OC
	E11. Treatment of the underlying cause of ED may be botulinum injection and may be the first-line method.	94.4	1.0	10.0	OC
	E12. Treatment of the underlying cause of OPD may be a surgical method and may be the first-line method.	94.4	1.0	10.0	OC
	E13. Treatment of the underlying cause of OPD may be a medical drug and may be the first-line method.	94.4	1.0	10.0	OC
	E14. Treatment of the underlying cause of OPD may be botulinum injection.	88.9	1.88	10.0	OC
	Rehabilitation-compensatuar methods				
	EA1. EDUCATION AND INFORMATION is an effective treatment method in the rehabilitation of OPD.	100.0	0	10.0	OC
	EA2. Education and information is the first-line treatment method for OPD.	100.0	0.75	10.0	OC
	EA3. Education and information is an effective treatment method for ED.	100.0	1.0	10.0	OC
	EA4. Education and information is the first line treatment method for ED.	100.0	1.38	10.0	OC
	EA5. In the rehabilitation of dysphagia in the elderly, education and information should include the patient, patient relatives and caregivers.	100.0	0	10.0	OC
	EA6. Active participation of the patient, their relatives and caregivers should be ensured in the rehabilitation of dysphagia in the elderly.	100.0	1.0	10.0	OC
	EA7. POSITIONING AND POSTURAL MODIFICATIONS are effective methods in the rehabilitation of OPD.	100.0	0.75	10.0	OC
	EA8. Positioning and postural modifications are the first-line treatment method for OPD.	89.5	2.0	10.0	OC

(Continued to the next page)

Table 3. Continued

	8%-10%	IQR	Median	SOA
EA9. Positioning and postural modifications are effective methods in the rehabilitation of ED in the elderly.	73.7	2.75	8.5	AC
EA10. Positioning and postural modifications are the first-line treatment method for ED.	73.5	2.75	8.0	AC
EA11. ENVIRONMENTAL MODIFICATION is an effective method in the rehabilitation of OPD.	65.4	3.0	8.0	AC
EA12. Environmental modification is the first line treatment method for OPD.	65.2	3.0	8.0	AC
EA13. Environmental modification is an effective method in the rehabilitation of ED in the elderly.	52.6	3.75	6.0	OD
EA14. DIETARY MODIFICATION is an effective method in the rehabilitation of OPD.	100.0	0.75	10.0	OC
EA15. Dietary modification is the first line treatment for OPD.	91.2	1.0	10.0	OC
EA16. Dietary modification is an effective method in the rehabilitation of ED.	81.5	2.0	9.0	OC
EA17. Dietary modification is the first line treatment method for ED.	80.6	2.0	9.0	OC
EA18. SWALLOWING MANEUVERS are effective methods in the rehabilitation of OPD.	94.1	2.0	10.0	OC
EA19. Swallowing maneuvers are the second line treatment method for OPD.	76.4	2.0	9.0	AC
EA20. Swallowing maneuvers are effective methods in the rehabilitation of ED.	61.1	3.0	8.0	OC
EA21. ARTIFICIAL ROUTE MODIFICATIONS are effective methods in the rehabilitation of OPD.	100.0	1.0	10.0	OC
EA22. Alternative feeding route modification is the first line treatment method for OPD.	94.4	1.0	10.0	OC
EA23. Alternative feeding route modification is an effective method in the rehabilitation of ED.	88.9	1.0	10.0	OC
EA24. Alternative feeding route modification is the first line treatment method for ED.	85.3	2.0	9.5	OC
EA25. ORAL HYGIENE AND ORAL CARE are effective methods in the rehabilitation of OPD.	85.3	2.0	9.0	OC
EA26. Oral hygiene and oral care is the first line treatment method for OPD.	94.3	1.0	10.0	OC
EA27. Oral hygiene and oral care are effective methods in the rehabilitation of ED.	66.1	2.0	10.0	AC
EA28. Oral hygiene and oral care is the first line treatment method for ED.	77.8	2.75	9.0	AC
Rehabilitation-therapeutic methods				
EB1. DENTAL CARE AND PROSTODONTIC REHABILITATION are effective methods in the rehabilitation of OPD.	100.0	1.0	10.0	OC
EB2. Dental care and prosthodontic rehabilitation are the first line treatment method for OPD.	88.9	2.75	8.0	AC
EB3. Dental care and prosthodontic rehabilitation are effective in rehabilitation of ED.	66.7	2.75	8.0	AC
EB4. Dental care and prosthodontic rehabilitation are the first line treatment method for ED.	66.1	3.0	8.0	AC
EB5. SENSORY STIMULATIONS INCLUDING THERMAL, TACTILE AND PRESSURE are effective methods in the rehabilitation of OPD.	100.0	1.0	10.0	OC
EB6. Sensory stimulation is the first line treatment method for OPD.	88.9	1.75	8.0	OC
EB7. JOINT RANGE OF MOVEMENT (OROPHARYNGEAL) EXERCISES are effective methods in the rehabilitation of OPD.	90.9	2.0	9.5	OC
EB8. Joint range of movement exercises are the second line treatment method for OPD.	77.8	3.0	8.0	AC
EB9. OROPHARYNGEAL MUSCLE STRENGTHENING and RESISTANT EXERCISES (including CTAR) are effective modalities in rehabilitation of OPD.	100.0	1.75	10.0	OC
EB10. Oropharyngeal muscle strengthening and resistance exercises are the second line treatment methods for OPD.	75.8	3.0	8.0	AC
EB11 HEAD AND NECK (CERVICAL SPINE) JOINT RANGE OF MOVEMENT EXERCISES are effective methods in the rehabilitation of OPD.	69.3	3.0	8.0	AC
EB12. Head and neck range of motion exercises are the second line treatment method for OPD.	67.6	3.0	8.0	AC
EB13. Head and neck range of motion exercises are an effective method in the rehabilitation of ED.	67.0	3.0	8.0	AC
EB14. Head and neck range of motion exercises are the second line treatment method for ED.	65.1	3.0	8.0	AC
EB15. HEAD AND NECK (CERVICAL SPINE) STRENGTHENING EXERCISES are effective methods in the rehabilitation of OPD.	65.6	3.0	8.0	AC
EB16. Head and neck strengthening exercises are the second line treatment method for OPD.	68.1	3.0	8.0	AC
EB17. Head and neck strengthening exercises are effective methods in the rehabilitation of ED.	65.6	2.75	8.0	AC
EB18. Head and neck strengthening exercises are the second line treatment method for ED.	68.1	3.0	8.0	AC
EB19. EXPIRATORY MUSCLE STRENGTHENING EXERCISES are effective methods in the rehabilitation of OPD.	88.9	1.0	10.0	OC

(Continued to the next page)

Table 3. Continued

	8%-10%	IQR	Median	SOA
EB20. Expiratory muscle strengthening exercises are the second line treatment method for OPD.	85.3	2.75	9.5	AC
EB21. Expiratory muscle strengthening exercises are effective methods in the rehabilitation of ED.	87.1	2.0	9.0	AC
EB22. Expiratory muscle strengthening exercises are the second line treatment method for ED.	65.6	3.0	8.0	AC
EB23. INSPIRATORY RESPIRATORY MUSCLE STRENGTHENING EXERCISES are effective methods in the rehabilitation of OPD.	89.1	2.0	10.0	OC
EB24. Inspiratory respiratory muscle strengthening exercises are the second line treatment method for OPD.	67.8	3.0	8.0	AC
EB25. Inspiratory respiratory muscle strengthening exercises are effective methods in the rehabilitation of ED.	65.3	3.0	8.5	AC
EB26. Inspiratory respiratory muscle strengthening exercises are the second line treatment method for ED.	68.9	2.75	8.0	AC
EB27. OROPHARYNGEAL MOTOR NEUROMUSCULAR ELECTRIC STIMULATION is an effective method in rehabilitation of OPD.	88.9	1.25	10.0	OC
EB28. Oropharyngeal motor neuromuscular electrical stimulation is the second line treatment method for OPD.	77.8	2.25	9.5	AC
EB29. TRANSCRANIAL ELECTRIC STIMULATION is an effective method in the rehabilitation of OPD.	69.6	3.0	9.0	AC
EB30. Transcranial electrical stimulation is the third line treatment method for OPD.	66.7	2.75	9.0	AC
EB31. Transcranial electrical stimulation is an effective method in the rehabilitation of ED.	52.6	4.0	6.0	OD
EB32. SENSORY NEUROMUSCULAR ELECTRIC STİMULATİON is an effective method in the rehabilitation of OPD.	72.2	3.0	10.0	AC
EB33. Oropharyngeal sensory neuromuscular electrical stimulation is the third line treatment for OPD.	83.3	2.0	9.0	AC
EB34. TRANSCRANIAL MAGNETIC STIMULATION is an effective method in the rehabilitation of OPD.	66.7	3.0	8.0	AC
EB35. Transcranial magnetic stimulation is the third line treatment method for OPD.	72.2	3.0	8.0	AC
EB36. Transcranial magnetic stimulation is an effective method in the rehabilitation of ED.	47.8	3.75	5.0	OD
EB37. BIOFEEDBACK is an effective method in the rehabilitation of OPD.	66.7	3.0	8.0	AC
EB38. Biofeedback is the third line treatment method for OPD.	72.2	2.75	9.0	AC
EB39. Biofeedback is an effective method in the rehabilitation of ED.	48.1	4.5	5.0	OD
EB40. ACUPUNCTURES are effective methods in the rehabilitation of OPD.	57.8	5.0	5.5	OD
EB41. Acupuncture is an effective method in the rehabilitation of ED.	46.5	6.0	5.5	OD
EB42. KINESIO TAPING is an effective method in the rehabilitation of ED.	44.7	5.5	5.0	OD
EB43. DRUG THERAPY is an effective method in the treatment of OPD and ED.	45.5	4.5	5.0	OD
EB44. Nutritional rehabilitation is an effective method in the treatment of OPD.	94.1	1.0	10.0	OC
EB45. Nutritional rehabilitation is the first line treatment method for OPD.	88.2	1.0	10.0	OC
EB46. Nutritional rehabilitation is an effective method in the treatment of ED.	89.1	1.5	10.0	OC
EB47. Nutritional rehabilitation is the first line treatment for ED.	88.3	0.5	10.0	OC
EB48. All elderly people with suspected both OPD and ED should be nutritionally evaluated.	97.1	1.0	10.0	OC
EB49. Every elderly person diagnosed with both OPD and ED should be evaluated nutritionally.	94.3	0.5	10.0	OC
EB50. Nutritional evaluation can be done by a dietitian, if possible, or by physicians and other trained health personnel; if possible, within the multidisciplinary team that programs dysphagia management.	94.2	1.0	10.0	OC
EB51. A formal test should be used for nutritional assessment.	97.1	1.0	10.0	OC
EB52. In the rehabilitation of OPD, compensatory and therapeutic methods should be used together as a combination therapy.	98.2	0	10.0	OC
EB53. In the rehabilitation of ED, compensatory and therapeutic methods should be used together as a combination therapy.	94.3	0.5	10.0	OC
EB54. PSYCHOLOGICAL SUPPORT-REHABILITATION for the patient is an effective method in the treatment of OPD.	77.8	2.5	10.0	AC
EB55. Psychological support-rehabilitation for the patient is the second line method for OPD.	68.5	3.0	8.0	AC

(Continued to the next page)

Table 3. Continued

	8%-10%	IQR	Median	SOA
EB56. Psychological support-rehabilitation for the patient is an effective method in the treatment of ED.	66.7	3.0	8.0	AC
EB57. Psychological support-rehabilitation for the patient is the second line method for ED.	66.3	3.0	8.0	AC
EB58. PSYCHOLOGICAL SUPPORT-REHABILITATION for the caregiver is an effective method in the treatment of OPD.	78.2	2.0	9.5	AC
EB59. Psychological support-rehabilitation for the caregiver is the second line method in treatment for OPD.	68.8	2.75	9.0	AC
EB60. Psychological support and rehabilitation for the caregiver is an effective method in the treatment of ED.	69.4	3.0	8.0	AC
EB61. Psychological support-rehabilitation for the caregiver is the second line method in treatment for ED.	66.3	3.0	8.5	AC
EB62. Rehabilitation applications in the form of a home program are an effective method in the treatment of OPD.	78.0	2.75	9.0	AC
EB63. Rehabilitation applications in the form of a home program are an effective method in the treatment of ED.	67.6	3.0	8.0	AC
Follow-up				
EA1. In general, the follow-up time in elderly patients with dysphagia should be arranged according to the patient's personal characteristics, type and etiology of dysphagia, so the follow-up period may vary from person to person.	100.0	0	10.0	OC
EA2. The follow-up time and follow-up method in elderly patients with dysphagia should be decided by a multidisciplinary team.	94.1	0	10.0	OC
EA3. In the follow-up of elderly patients with dysphagia, tests applied for screening can be used.	85.0	2.0	10.0	OC
EA4. Clinical evaluation methods can be used in the follow-up of elderly patients with dysphagia.	81.3	0.25	10.0	OC
EA5. Bedside swallow tests can be used for follow-up in elderly patients with dysphagia.	90.2	1.25	10.0	OC
EA6. FEES as the instrumental methods, can be used for follow-up.	86.7	0.25	10.0	OC
EA7. Videofluoroscopy, as the instrumental methods, can be used for follow-up.	44.1	3.25	8.0	OD
EA8. Ultrasonography, one of the advanced evaluation methods, can be used for follow-up.	42.9	3.75	8.0	OD
EA9. If the elderly patient with dysphagia, who is taken to rehabilitation program with therapeutic methods, is hospitalized, swallowing difficulty should be questioned at each visit, weekly clinical evaluation, and instrumental evaluation method at admission and discharge.	95.2	0.25	10.0	OC
EA10. If the elderly patient with dysphagia, who is admitted to the rehabilitation program with therapeutic methods, is an outpatient, the swallowing difficulty should be questioned before each treatment, a weekly clinical evaluation, and an instrumental evaluation method at the beginning and end of the treatment should be followed up.	100.0	0	10.0	OC
EA11. Patients who were included in the rehabilitation program with compensatory methods, are evaluated according to the patient's compliance with the treatment, stabilization of dysphagia, risk of developing complications, frequency of complications and level of control; first once a week, then every 15 days, then monthly or at 2 months, then at 3-6 monthly intervals. It can be followed up with clinical evaluation in the short-term follow-up period and instrumental evaluation methods in the long-term follow-up periods.	95.6	0.25	10.0	OC
EA12. In elderly patients with dysphagia treated with surgical methods (in- and out-patient), follow-up intervals should be decided according to the surgical method applied and personal characteristics.	95.2	0	10.0	OC
EA13. In elderly patients with dysphagia treated with chemodenervation method, follow-up intervals should be decided according to the patient's condition.	95.0	0.25	10.0	OC
EA14. In elderly patients with dysphagia treated with drug therapy, follow-up intervals should be decided according to the patient's condition.	100.0	0.25	10.0	OC
EA15. In all elderly patients included in the rehabilitation program, the follow-up of dysphagia and the follow-up of nutritional status should be combined.	100.0	0	10.0	OC
EA16. A formal test can be used to monitor nutritional status.	90.5	0	10.0	OC
EA17. Eating-nutritional characteristics such as appetite status, 3-day food consumption record, number of meals, and hydration status can be questioned to monitor nutritional status.	81	0.5	10.0	OC
EA18. Follow-up should include reassessment of the continuation and modification of compensatory modalities such as diet, posture modification, maneuvers, and alternative feeding.	95.2	0.25	10.0	OC

(Continued to the next page)

Table 3. Continued

		8%-10%	IQR	Median	SOA
	EA19. Follow-up should question and evaluate the risk of silent aspiration.	100.0	0	10.0	OC
	EA20. Follow-up should include questioning and evaluation of possible complications of dysphagia.	97.3	0	10.0	OC
	Follow-up list				
	History of pneumonia				
	Pneumonia symptom/signs				
	Hospitalization history	100.0	0	10.0	OC
	Aspiration symptoms/signs				
	Alarm symptoms				
	Malnutrition				
	Dehydration				
	Weight loss				
	Cognitive dysfunction, delirium				
	Oral hygiene				
	Dental care				
	Sarcopenia				
	Other items evaluated in Delphi Round-3				
	Muscle weakness	65.7	1.5	9.0	AC
	Functional independence, state of mobilization	71.4	1.25	9.0	AC

IQR, interquartile range; SOA, strenght of agreement; AC, approaching consensus; OC. overall consensus; OD, overall divergence; OPD, oropharyngeal dysphagia; ED, esophageal; FEES, Fiberoptic endoscopic evaluation of swallowing

Table 4. Distributions of the strength of the recommendations for the 3th Delphi Round-4

		8%-10%	IQR	Median	SOA
E. HOW-Special	**Sarcopenıa related dysphagıa**				
	S1. Definition: SD is the presence of dysphagia in the presence of generalized sarcopenia (imaging confirming the loss of swallowing muscles, exclusion of other causes other than sarcopenia as the cause of dysphagia, and specifying sarcopenia as the main cause of dysphagia even if other causes accompany). Definite, probable and/or possible sarcopenic dysphagia should be rehabilitated.	100.0	0	10.0	OC
	S2. Since isolated dysphagia rehabilitation will not be sufficient in SD rehabilitation, additional rehabilitation applications are required.	97.1	0.5	10.0	OC
	S2a. Rehabilitation components of SD should consist of patient education, increasing physical activity, muscle strengthening exercises and nutritional support.	100.0	0	10.0	OC
	S2b. Muscle strengthening should include oropharyngeal and generalized muscle strengthening exercises.	100.0	0	10.0	OC
	S2c. Measures such as ensuring oral hygiene to increase oropharyngeal muscle strength, treatment of periodontal diseases and use of appropriate prostheses should be added to the rehabilitation program.	100.0	0	10.0	OC
	S2d. Neuromuscular electrical stimulation method can be added to the treatment when the exercise program for muscle strengthening is insufficient.	94.1	0.75	10.0	OC
	S3. Nutritional support should include providing adequate calorie and protein intake, vitamin D supplementation, and the use of nutritional supplements that are likely to increase protein synthesis in suitable patients.	97.5	0	10.0	OC
	Frailty-related dysphagia				
	K1. Since frailty includes the effects on physical, psychological, cognitive and social functions, cognitive dysfunction, psychological dysfunction such as depressive mood, dependence in daily living activities and social isolation may predispose to the development of dysphagia.	97.1	0.75	10.0	OC
	K1a. In the presence of frailty (feeling of fatigue/burnout, low muscle strength, involuntary weight loss, slowing of walking speed, decrease in physical activity), oral phase dysphagia which includes dysfunction in chewing functions, may be observed. This potentiates each other with presbysphagia.	100.0	0	10.0	OC
	K1b. Frailty can be due to many reasons such as cognitive, psychological, multiple diseases, polypharmacy. Frailty screening tests should be performed, followed by a comprehensive geriatric evaluation.	100.0	1.25	10.0	OC

(Continued to the next page)

Table 4. Continued

	8%-10%	IQR	Median	SOA
K2. In the presence of frailty, additional rehabilitation applications are required as isolated dysphagia rehabilitation will be insufficient.	100.0	0	10.0	OC
K2a. Methods for correctable causes, such as special treatments of the components of frailty, prevention of polypharmacy and inappropriate drug use, should be the primary treatment.	100.0	0.25	10.0	OC
K3. In the presence of frailty-related dysphagia, cognitive rehabilitation and psychological support should be added to the dysphagia rehabilitation program if necessary.	100.0	0.25	10.0	OC
K4. In the presence of frailty-related dysphagia, increasing physical activity, muscle strengthening exercises and nutritional support should be added to the dysphagia rehabilitation program.	100.0	0.25	10.0	OC
K5. Muscle strengthening should include oropharyngeal and generalized muscle strengthening exercises.	100.0	0.25	10.0	OC
K6. Measures such as ensuring oral hygiene to increase oropharyngeal muscle strength, treatment of periodontal diseases and use of appropriate prostheses should be added to the rehabilitation program.	100.0	0.5	10.0	OC
K7. Nutritional support should include protein, vitamin and calorie support (to be determined according to the needs of the patient).	100.0	0.25	10.0	OC

IQR, interquartile range; SOA, strenght of agreement; AC, approaching consensus; OC, overall consensus; OD, overall divergence. OD, oropharyngeal dysphagia; ED, esophageal dysphagia; SD, sarcopenic dysphagia.

agement (diagnosis and rehabilitation).

DISCUSSION

This study presents the opinions and recommendations regarding "geriatric and dysphagia" from experienced multidisciplinary experts from many regions of Turkey. We collected and analyzed expert opinions according to the three-round Delphi method to determine the extent of consensus on the content and effectiveness of management methods in older adults with both OPD and ED. We divided this study into sections and subsections based on the 5Ws and 1H question pattern, including detailed diagnosis, treatment, and follow-up. Moreover, the 216-item recommendations were designed to be as detailed as possible and shed light on almost all potential questions and problems in clinical practice.

Who

In the "who" section, we sought to answer the question "who should be considered for dysphagia?" Accordingly, we created three strong recommendations: "*dysphagia should be considered in all older adults aged ≥ 80 years (regardless of symptoms/signs and risk factors), and in those ≥ 65 years of age with any risk factor for dysphagia AND/OR with any symptoms/signs associated with dysphagia.*" We added an explanation to avoid the use of unnecessary, excessive and/or wrong methods: "These recommendations primarily suggest a simple screening test. However, this does not mean that clinical evaluation and further evaluation are unnecessary."

Depending on the decrease in reserves with aging, anatomical, physiological, and functional changes in swallowing functions and in the systems of the whole body are defined as "presbyphagia."[35] These changes in swallowing function begin at 65 years of age. Although the rate of presbyphagia varies according to the diagnosis method, dysphagia occurs in 15%–70% of adults aged > 65 years, with the highest rate in adults aged ≥ 80 years.[3,5,12,20,37-40] Therefore, we recommended a simple screening test for all older people aged ≥ 80 years with a high risk of dysphagia.

In this study, the recommendation that "dysphagia should be considered regardless of the symptoms and signs in older people aged ≥ 65 years" was also considered, but it was decided that was not suitable for clinical practice. However, presbyphagia may become pathological and progress to dysphagia due to various disorders/diseases, the incidence of which increases with age. Therefore, we also recommended the screening of individuals aged ≥ 65 years with onset of swallowing disorders, dysphagia-related risk factors, and/or dysphagia-related symptoms and signs.

Why

In this section, we to answer the questions "why should dysphagia be considered in older adults, which conditions pave the way for this disorder, and which conditions make us think of it?" Since this paper prioritized practical use, the recommendation list included only risk factors and symptoms/signs accepted by the OC (Fig. 1). Accordingly, we created risk factor and symptom/sign lists for dysphagia and aspiration.

Risk factors associated with dysphagia and aspiration

Presbyphagia, which is age-related, is a natural physiological condition. The secondary causes of dysphagia complicate this situation.[10,14] The most feared complication of dysphagia is aspiration, pneumonia, and the associated 30%–50% increase in mortali-

ty.[14,41,42] Therefore, it is important to be aware of the dysphagia-related risk factors that may complicate presbyphagia. Among the causes of dysphagia, the most common causes of OPD are neurological diseases, particularly stroke.[3,4,6,17,20,43,44] Disorders causing cognitive dysfunction, the presence of malignancy, history of radiotherapy/surgery, respiratory diseases such as chronic obstructive pulmonary disease (COPD), and medical factors such as the use of tracheostomy and mechanical ventilation have a high sensitivity in predicting aspiration pneumonia (AP).[3,12,19]

ED occurs 16% less often than OPD and its incidence increases with age. In some cases, such as esophageal cancer, this rate rises to 70%.[12,45] Although it can vary regionally, the most common cause of ED is gastroesophageal reflux (GER).[45,46] In addition, structural and inflammatory problems of the gastrointestinal tract (GIT), such as stricture, web, ring, malignancy, esophagitis, and/or motility disorders, can cause ED in older people.[23,47]

In addition, conditions such as Parkinson disease, myotonic dystrophy, and myasthenia gravis; infectious conditions such as candida; some connective tissue diseases; multiple comorbidities; multiple drug therapy (polypharmacy); and the use of swallowing-related drugs can cause both OPD and ED.[6,48,49]

The present study defined the following as dysphagia-related risk factors by OC: *progressive/non-progressive central neurological diseases (stroke, dementia, Parkinson disease, myasthenia gravis, multiple sclerosis, motor neuron disease, and neuromuscular diseases); connective tissue diseases (scleroderma, systemic lupus erythematosus, polymyositis, dermatomyositis, Sjogren's syndrome); respiratory system diseases (COPD, lung fibrosis, and asthma); history of head, neck, anterior mediastinum, and GIT cancer and radiotherapy and surgery to these regions; high comorbidity burden; multiple comorbidities; polypharmacy; drug use that may affect swallowing; recent history of tracheostomy, intubation, and mechanical ventilation; recent long-term use of nasogastric tube; conditions that cause cognitive dysfunction; the presence of sarcopenia and frailty; GIT diseases such as GER, peptic ulcer, and achalasia; and prolonged hospitalization.*

The same risk factors were also assessed for their relationships with aspiration. *Progressive/non-progressive central neurological diseases; history of head, neck, anterior mediastinum, and GIT cancer and radiotherapy and surgery to these regions; recent history of tracheostomy, intubation, and mechanical ventilation; recent long-term use of a nasogastric tube; conditions that cause cognitive dysfunction; and presence of sarcopenia and frailty* were accepted as OC as aspiration-related risk factors. These factors are also reported in the literature as predictors of aspiration.[6,50]

SD and FRD, which are among the risk factors for both dysphagia and aspiration, are discussed in detail in the "How" section.

Symptoms/signs associated with dysphagia and aspiration

The strongly recommended (OC) symptoms/signs suggestive of dysphagia were: *change in eating habits (volume and consistency modification); difficulty in chewing; spillage of food from the mouth during feeding; food residue in the mouth; drooling, coughing, choking, and change of voice during/after feeding; increased need for throat clearing; choking while swallowing; sticky feeling; retrosternal obstruction/stuck/sticky feeling after swallowing; painful swallowing; repeated swallowing; need for multiple swallowing; progressive swallowing difficulty; prolonged swallowing time; delayed pharyngeal phase; head and posture changes during feeding; the presence of signs of lower respiratory tract infection; and a history of > 3 cases of pneumonia per year.*

Among these symptoms/signs, retrosternal obstruction/stuck/sticky feeling, painful swallowing, and progressive swallowing difficulty especially after swallowing were characteristic of ED. Recommendation studies stated that painful swallowing should be considered an important symptom of ED.[23,43]

We also compiled the following strongly recommended list of symptoms/signs that may be associated with aspiration: *weakened or absent voluntary cough reflex, coughing/choking during/after feeding, change of voice (wet and hoarse voice) during/after feeding, shortness of breath/bruising, drooling, increased need for throat clearing, repetitive and multiple swallowing, feeling that something is stuck in the throat during swallowing, decrease in laryngeal elevation, presence of signs of lower respiratory tract infection (fever, cough, increased sputum, tachypnea), decreased oxygen saturation by pulse oximetry during/after feeding, and a history of pneumonia > 3 times a year.*

When-Where

In these sections, we sought answers to the question "when and where should dysphagia be screened/evaluated in older people?" We made seven and five recommendations in response to "when" and "where," respectively. Among these recommendations, 10 were strong and 2 were weak. Consistent with the answer to the "who" question, "*all older people aged ≥ 80 years regardless of the presence of symptoms and/or risk factors, and those aged ≥ 65 years with risk factors and/or dysphagia symptom-signs should be screened once a year with a simple screening test for dysphagia*" was accepted as a strong recommendation. In addition, we also recommended that "*screening test and clinical evaluation should be performed at least once a year in people aged ≥ 65 years with severe aspiration-related risk factors and/or symptoms/signs.*"

In recent years, annual wellness visits have been recommended for people aged ≥ 65 years, especially as a cancer screening and prevention strategy[51] to potentially reduce mortality and morbidity. Considering the impact of dysphagia on morbidity and mortality, screening should be performed at least once a year when adding

screening for dysphagia to these annual well-being visits.

In this paper, we rejected the recommendation for screening two and four times a year due to the potential increase in workload. Instead, we added a weak recommendation that the screening time could be individually adjusted.

However, a screening test alone is not sufficient in patients with aspiration-related risk factors/symptom-signs; thus, clinical evaluation should be added to examinations in these patients. Screening tests are considered the first-line method for diagnosis in the literature.[3,4,12,45] However, in recent years, these tests have been recommended to be completed with a comprehensive clinical examination for both OPD and ED.[23,45] Since the present paper is intended for application in clinical practice, we recommended clinical evaluations in addition to screening tests only in cases accompanied by aspiration-related parameters.

In addition, we strongly recommended screening tests in primary health care centers, while clinical and instrumental evaluations should be performed in secondary and tertiary care centers.

Many medical branches such as general practitioners, dentists, social workers and geriatrics, gastroenterology, neurology, otolaryngology, physical medicine and rehabilitation, and surgery may encounter older patients, from general practices, which are primary health centers, to tertiary hospitals. Therefore, screening is the first-line recommendation to both detect vulnerable patients and prevent unnecessary/excessive referrals to secondary and tertiary centers.

An important point here is to reveal the need for dysphagia education in all health professionals caring for geriatric patients. The experts in the present study expressed hesitations about where and by whom the evaluations would be done. In the literature, the need for education on the diagnosis, treatment, and possible complications of dysphagia is a general problem; moreover, all experts strongly accepted the recommendation for more education on this issue.[52,53]

What

This section sought to answer the question "what should be evaluated in older adults with dysphagia?" to create recommendations for methods for diagnosing dysphagia. Accordingly, the diagnosis of dysphagia was evaluated under four subsections: management principles, screening tests, and clinical and instrumental evaluations.

Management principles

Since aging is a natural process of life, it is practically impossible to carry out a detailed evaluation in all older people to identify presbyphagia and dysphagia. Therefore, the proposed diagnosis algorithm in the present study was first-line screening tests, second-line clinical evaluation, and third-line instrumental evaluation.[3,4,12,45]

Because swallowing is a sensorimotor complex behavior that involves many systems, starting from the central nervous system to the stomach, and is shaped by the sequential coordinated movement of these systems, many medical branches and healthcare professionals in clinical practice may encounter older people with dysphagia. Guidelines on dysphagia management, as well as meta-analyses and reviews, suggest the need for multidisciplinary team efforts.[54,55] In the present study, although the team members in each center could change according to circumstances and capabilities, we suggested the establishment of a multidisciplinary team and formulated six strong recommendations. However, since multidisciplinary teams are not universal in clinical practice for the first-line simple screening for dysphagia, we created a recommendation that "*if possible, performing the dysphagia screening test by a trained team member assigned in a multidisciplinary team may provide convenience in terms of diagnosis, treatment, and follow-up*." In addition, since dysphagia is not only a condition involving the patient but also a social health problem involving caregivers, we strongly recommended including patients and their relatives in the management team.

In addition, SLPs specialized in dysphagia are primarily responsible for dysphagia management worldwide.[5,12,56] However, other health specialists play a more active role due to their low number in some places such as our country. For this reason, we recommended that other medical specialists may play an active role in the absence of SLPs both in terms of clinical evaluation and primary responsibility.

Screening tests

Among 25 initial items for simple screening tests, based on the recommendations of the consultant experts, five of the items were accepted at the end of the third Delphi round (four strong and one weak). Thus, we recommended three informal/subjective screening tests and two formal/objective tests:

(1) Lists of risk factors + symptoms/signs that can be used as a screening test for dysphagia.
(2) Three questions that can be used as a screening test for dysphagia:
- "Do you have difficulty in swallowing solid foods/liquids?"
- "Do you experience coughing, choking, or obstruction during/after feeding with solid food/liquid?"
- "Do you think there is any difference or change in feeding with solid food/liquid compared to your younger self?"

Almost all studies in older adults have reported changes in eating habits (reduced volume, changed consistency, and increased meal times) with increasing age.[6,38,48,52] Bolus formation and chewing ability especially decrease owing to age-related changes in swallowing function, in addition to changes in the choice of food consistency.[11] Therefore, we accepted that the symptom of changes in eating habits and difficulty with solid foods/liquids, especially in older adults, may be appropriate screening questions for the diagnosis of geriatric dysphagia. In addition, changes in eating habits are an important symptom of OPD and presbyphagia and are an alarm symptom in severe esophageal pathologies such as peptic stricture and esophageal cancer in ED. Thus, we included this symptom in our three-question survey. This survey can be used when assessing the signs/symptoms of dysphagia in older people. In addition, we also added a key finding suggesting bolus aspiration, "coughing, choking and feeling of obstruction during/after feeding," a question sentence. This question is also important because studies in older adults reported coughing and choking during feeding as the most common symptoms of aspiration.[11,38,52] We also strongly recommended "observation of a patient's mealtime in their natural home environment can be used as a screening test" in special conditions such as pandemic conditions, in which patients cannot come to centers or in which distancing is required. Observation of mealtime, foods that he/she can eat or avoid, food selection, and whether there are signs of aspiration during feeding can suggest the presence of dysphagia.

Among the evaluated objective screening tests, the Eating Assessment Tool-10 (EAT-10) was strongly recommended.[13,57] The EAT-10 is a self-administered, questionnaire-based test that evaluates dysphagia symptoms and severity without any food intake. This test is commonly applied as a screening test in older adults; besides evaluating the symptoms of OD, it also includes questions related to painful swallowing, the feeling that something is stuck in the throat, and difficulty in swallowing solid food, which are among the symptoms of ED. Therefore, the tool is also valid for ED.[6,47] Since the present study aimed to evaluate both OPD and ED, we considered the EAT-10 to be suitable for screening.

Clinical evaluation

In this subsection, the experts voted on 24 recommendations in the first Delphi round. Among the 15 recommendations created in the third Delphi round, 12 were strong and three were weak.

According to the World Health Organization (WHO); clinical evaluation involves the organized and targeted assessments of all components that comprise a function such as swallowing, as well as their relationships with each other.[58] Thus, the goal of the clinical evaluation of swallowing functions is to understand the nature of swallowing functions. Therefore, we strongly recommended that "*the clinical evaluation of dysphagia should include a detailed medical history (anamnesis) with questions about risk factors and symptoms, general systemic examination, evaluation of dysphagia signs, and a bedside swallowing test (BST)*" and "*the general systemic examination should include an examination of the neurological, cardiopulmonary, gastrointestinal, dental and musculoskeletal systems that may be associated with dysphagia*." We also detailed the symptoms/signs to be evaluated in systems related to swallowing to facilitate use in practice.

Seven of the 15 recommendations in this subsection are related to BSTs. BSTs are often used for the diagnosis of OPD. Researchers have frequently used various questionnaire screening tests including aspiration symptoms/findings and the water-swallow test (WST) in dysphagia studies among healthy older people.[40,59,60] In this paper, we strongly recommended the volume viscosity swallowing test (VVST), Gugging Swallowing Screen test (GUSS), and WST with pulse oximetry. The VVST is performed with three different volumes (5, 10, and 20 mL) and three different viscosities (liquid, mildly thick, and extremely spoon-thick), while the GUSS test applies different food consistencies (solid, semisolid, and liquid) and amounts of food/liquid.[13,61,62] These two tests are among the best BSTs as they resemble real swallowing functions with foods consumed in daily life (solid, semisolid, and liquid) and minimize the risk of aspiration during the evaluation.[3,63] The VVST can be used in patients with potential difficulty in swallowing liquids of different viscosities, while the GUSS can be used in patients with potential difficulty in swallowing liquids and solid foods. Although the guidelines for patients with stroke recommend the GUSS, some reviews on OD in older adults have recommended the VVST.[6,64] The WST with pulse oximetry has been recommended as a test of choice in patients with aspiration symptoms with liquid.[65] Although the WST is relatively easy to perform compared to other tests and is often used in the literature, other tests are recommended owing to the lower specificity and sensitivity of the WST and risk of aspiration compared to other tests.[66]

In addition, we strongly recommended that "*the BST should be chosen individually and pathology-specifically, according to the suspected OPD or ED with the screening test*." As mentioned above, any of these three tests can be selected based on the symptoms/signs reported in the patient's history and the examination features. We did not describe a specific BST for ED. This is because in OPD, symptoms occur during or immediately after swallowing, whereas in ED, symptoms such as delayed passage into the esophagus and a sensation of obstruction in the throat, chest, and/or epigastrium/retrosternal occur after the bolus is swallowed. Studies have rec-

ommended ruling out OPD primarily in patients with dysphagia symptoms/signs.[23] For these reasons, we recommended the GUSS, which also includes evaluation with solid food, as a swallowing test in patients with suspected ED.

Instrumental evaluation

The third Delphi resulted in 24 recommendations (15 strong, one weak, and eight non-recommendations). As a general recommendation, instrumental evaluation for dysphagia was recommended in suspected cases after clinical evaluation (such as the presence of severe risk factors and/or aspiration-related symptoms/signs). We strongly recommended that "*the choice of instrumental method should be determined within a multidisciplinary team based on the characteristics of the underlying pathology, the type of dysphagia, the patient, and the center performing the evaluation*" and that "*these instrumental methods would be useful in treatment selection and follow-up*." This subsection also discussed instrumental methods in detail.

Videofluoroscopy (VF) and flexible fiberoptic endoscopic evaluation of swallowing (FEES) are the most widely studied and recommended gold standard methods in the diagnosis of OPD.[2,48,58] The choice of method depends on the advantages and disadvantages.[43] We recommended both FEES and VF as first-line methods for OPD diagnosis.

In contrast, the recommended methods of assessment in ED include barium swallow pharyngoesophagography/esophagography, upper gastrointestinal system endoscopy, and manometry (high-resolution manometry if possible).[2,43] Guidelines and meta-analyses recommend barium radiography first to rule out structural and inflammatory causes, followed by manometry to assess motility disorders. Endoscopy has been proposed as a first-line modality in instrumental evaluation, especially in patients with symptoms of persistent dysphagia.[2,12,23,45] In the present study, we added the VF as this method allows evaluation of the mouth to the LES, including the observation of UES patency and bolus transport. In addition, the American College of Radiology recommends the VF for dysphagia.[67]

As in other guidelines, we recommended magnetic resonance imaging (MRI), computed tomography (CT), and scintigraphy as non-first-line methods in difficult cases for both dysphagia types.[23]

How

This section sought answers to the question "how should dysphagia be treated and followed up?" Dysphagia treatment was categorized as management/general principles and rehabilitation modalities.

Management/general principles

This subsection included 14 strong recommendations.

The primary goal in the management of dysphagia is to prevent the development of dysphagia. Thus, the first-line treatment is the elimination of factors that can cause dysphagia before using rehabilitation modalities.[45,48] In OPD, first-line modalities include surgery (in the presence of tumors and cervical osteophytes), medical treatment (in cases such as myasthenia gravis and oral candidiasis), and botulinum injection (in the presence of sialorrhea and dystonia).[23,43] Similarly, the use of antiviral, antifungal, and antibiotic drugs in infectious esophagitis causing ED and medical treatment of GER and gastroparesis are first-line treatment modalities.[23,45] The use of proton pump inhibitors for 4 weeks, especially in GER, reduces the incidence of GER worldwide and the incidence of ED as a result of this decrease.[23] Similarly, the first-line treatment modalities include surgical treatment (cricopharyngeal myotomy and dilatation in stenosis, obstruction and neural relaxation disorder of UES, and resection of diverticulum and tumors) and botulinum toxin injection (application into the cricopharyngeal muscle to reduce UES pressure and facilitate bolus passage).[2,43,45] In this study, we accepted as a strong recommendation that "*determination of the underlying cause and its treatment should be the first-line treatment modality in the rehabilitation of both OPD and ED, and the treatment of the underlying cause should include the elimination of correctable risk factors for dysphagia*."

Another special point of this study was that we separately evaluated rehabilitation modalities that can be applied for both OPD and ED in detail. OPD management has been evaluated in detail due to aspiration complications and recommendations have been made for OPD. The aim of the rehabilitation modalities used in these guidelines is to improve the speed, strength, and range of movement (ROM) of the swallowing muscles (therapeutic methods) and to modify swallowing mechanics to improve bolus transfer and prevent or minimize aspiration (compensatory methods).[11,68] Combination therapy has been recommended in both older people and patients with OPD.[2,11,12,25,48] For example, in patients who cannot be fed orally, nutritional support may be provided using alternative feeding methods; however, oral stimulation and salivary swallowing exercises may also be combined with this therapy to stimulate swallowing function. Moreover, in patients who can be partially orally fed, a combination of compensatory methods such as diet and postural modification may be used, while both compensatory and therapeutic methods may form the treatment components in patients who can be fully orally fed. The treatment of dysphagia may vary individually and may change according to structural, functional, and/or anatomic dysfunction.[63] For these reasons, "the selection of rehabilitation modalities '*using*

a management algorithm created by a multidisciplinary team may vary based on the existing facilities and facilities at each center in terms of personnel and equipment; considering the person's general physical condition, cognitive and respiratory functions, and motivation as well as specific factors related to the person, pathology, and etiology,' and dysphagia characteristics (such as affected areas, severity and prognosis) should be well defined" were accepted as strong recommendations. Moreover, we also recommended that "*older people without dysphagia but with more than one severe risk factor should be included in a rehabilitation program that includes compensatory methods such as oral hygiene and some modifications, and a follow-up program.*" Studies on neurologic dysphagia have reported greater effects of multidisciplinary and early treatment compared to mid- and late-term treatment, as well as significantly reduced AP.[23,40] Given the presence of presbyphagia in older adults, early treatment becomes even more important.

Rehabilitation modalities

In this subsection, we generated 91 recommendations (35 strong, 45 weak, and 11 non-recommendations) for both OPD and ED. We then evaluated these modalities separately and defined each as first-, second-, and third-line methods to create a treatment algorithm.

While most of the recommended modalities for OPD were strong recommendations, most of the recommendations for ED were weak. The reason for this may be that rehabilitation modalities for ED are not widely used and that in our country and worldwide, recommendations for rehabilitation modalities for this situation are lacking.

(1) First-line treatment modalities

- **Education and information (OPD-ED):** Most older people lack information about their nutritional status and proper diet.[69] Reviews and studies have reported that patient perception, motivation, willingness to change, technical knowledge, and health literacy affect treatment compliance in patients with dysphagia.[11,12,14] Thus education is important in the rehabilitation of dysphagia. Therefore, we strongly recommended that: "*education and information involving patients and their relatives are effective rehabilitation modalities for older adults with both OPD and ED and are recommended as a first-line treatment method.*"
- **Oral hygiene-oral care and dental care-prosthodontic rehabilitation (OPD-ED):** "*Oral hygiene, dental care, and prosthodontic rehabilitation are effective rehabilitation modalities and are recommended as a first-line treatment methods for older adults with both OPD and ED*" (strong recommendation strength for OPD, weak recommendation for ED) (OPD: oral hygiene is a strong recommendation, dental care is a weak recommendation; ED: both weak recommendations).

Regular oral hygiene and dental care reduce the colonization of virulent bacteria and the incidence of AP, increase sensory sensitization, and improve the sensitivity of the cough reflex.[48,70] Studies on oral hygiene are often based on OPD. However, GER, the most common cause of ED, also affects the oral region.[71] The major oral symptom of GER is dental erosion. In addition, it can also cause tonsillitis, oral mucosa atrophy, glossitis, xerostomia, and dysgeusia. Moreover, in the presence of GER, microaspiration of bacteria into the oral flora along with saliva contents may occur due to esophageal dysmotility, damaged swallowing coordination, and decreased sensitivity of pharyngeal and laryngeal protective reflexes. Therefore, regardless of the pathology of dysphagia, we recommended oral hygiene and oral/dental care.

- **Positioning and posture modification (OPD-ED):** "*Positioning and postural modifications are effective rehabilitation modalities and are recommended as first-line treatment methods for older adults with both OPD and ED*" (strong recommendation for OPD, weak recommendation for ED).

A supine position of at least 60°, and ideally 90°, can prevent residual, penetration, and aspiration by altering swallowing structures to protect the respiratory tract and also affects the esophageal phase with gravity.[12,23,26,43,48,52] However, no study has provided strong evidence for positioning. Therefore, our recommendations are important to the literature.

Our consultant experts recommended positioning patients with OPD in a sitting position as much as possible and using head and posture modifications for OPD. The most common postural modification considered to be effective is the chin-tuck position (98%), which prepares the airway for swallowing by reducing the rate of bolus passage, especially in patients with preterm escape.[48] In contrast, our experts recommended the use of trunk modification for ED, most commonly an upright sitting position (91%). Lifting the head while lying down and remaining in a sitting position for at least 30 minutes after meals were among the recommendations for postural modification in patients with GER.

- **Dietary (bolus volume, texture, consistency) modification (OPD-ED):** "*Dietary modifications are effective modalities for older adults with both OPD and ED and are recommended as a first-line treatment method*" (strong recommendation).

Dietary modifications are the most recommended compensatory methods for treating dysphagia. Modifications such as volume, viscosity, bolus, and texture changes are common methods, especially for OPD.[2,14,23,26,48,52,69] In older adults with chronic dysphagia, texture modification such as pureeing and mincing, and thickened fluids such as nectar, honey, and pudding consistencies are moder-

ately recommended. Studies in patients with neurogenic dysphagia and liquid aspiration have shown that viscosity changes reduce the risk of AP.[40]

Dietary modification is 96% effective in patients with ED, depending on the etiology.[43,45] Modifications such as reduced portions and increased meal numbers, providing bite-sized food, removing problematic food (such as hard solids) from the meal, eating slowly, and drinking liquid with each bite can also be implemented in these patients.[63]

However, these modifications may negatively affect quality of life, especially in older patients.[43,52] In fact, dietary modification is an unconscious compensatory method used by older adults against changes observed in presbyphagia. Studies have shown that older adults have difficulty swallowing, especially solid food, and that patients unconsciously eliminate solid food from their diets and modify it by prolonging the meal time or consuming less.[71] We believe that if this is done under the supervision of a health professional, the effects reported as negative will disappear. In support of this, nutritional management guidelines also strongly recommend the use of dietary modifications to ensure adequate and balanced nutrition in older patients.[73]

- **Feeding route modification (artificial feeding) (OPD-ED):** "*Feeding route modification is effective and is recommended as a first-line treatment method for older adults with both OPD and ED*" (strong recommendation).

The main task of the swallowing function is the intake of necessary and sufficient macro- and micro-nutrients, energy, and calories for the body. Although the oral route is the priority, the natural oral route may not always be able to meet the body's needs or the use of this route may involve a risk of aspiration.[2] Nasogastric (NG), percutaneous endoscopic gastrostomy, or jejunostomy (PEG/PEJ) tubes can be used as life-extending procedures. Guidelines and reviews have reported that their use in patients with OPD greatly reduces the incidence of AP and ensures adequate and balanced nutrition.[12,14,23,69] NG should be chosen in patients who require short-term tube feeding (2–4 weeks), while PEG/PEJ should be used in patients who require or are expected to require enteral feeding long-term (>28 days). This study recommended the use of enteral feeding tubes for both types of dysphagia, as needed.[14,69] However, to avoid overuse/unnecessary use, this method has been conditioned to be useful for "patients with severe dysphagia and/or high dysphagia risk and/or malnutrition/malnutrition risk and/or patients with >25% residue and/or >10% aspiration in all volumes and liquids/ nutrients."

- **Nutritional rehabilitation (OPD-ED):** "*Nutritional rehabilitation is an effective modality and is recommended as a first-line treatment method for older adults with both OPD and ED*" (strong recommendation).

Malnutrition and dehydration are major complications of dysphagia that are associated with morbidity and mortality.[12,69] Although protein and energy requirements decrease with age, they may increase with disease, inflammation, fever, and physical activity and cause increased morbidity and mortality.[74] This situation should not be seen only as a nutritional deficiency; thus, the experts strongly recommended that "*nutrition should be evaluated and treated in a multidisciplinary team, with a dietitian if possible; if there is no dietitian, this should be done by physicians or trained health personnel.*"

Malnutrition is defined as unintentional weight loss >10% in 6 months or markedly reduced BMI (<20 kg/m^2).[75] Therefore, malnutrition can be evaluated with measurements such as weight and BMI. However, guidelines recommend the use of a formally validated test for nutritional assessment; among these tests, the most commonly used and recommended is the Mini Nutritional Assessment-Short Form (MNA-SF).[23,69,75] This study recommended the use of the MNA-SF at a rate of 95.3%. The Nutrition Risk Score-2002 (NRS-2002) and Global Leadership Initiative on Malnutrition (GLIM) tests were also recommended at rates of 92%, while the Malnutrition Universal Screening Tool was recommended at a rate of 87%. The GLIM is a combination of at least one phenotype criterion (i.e., involuntary weight loss, low BMI, or decreased muscle mass) and one etiology criterion (i.e., reduced food intake/malabsorption or severe inflammatory disease). Recent guidelines recommend the GLIM criteria.[76]

Although there is no definitive evidence regarding the effect of oral nutritional supplements (ONS), ONS added to the hospital diet affects functional recovery in older adults and patients with stroke, malnutrition, and cancer.[75,76] In addition, recent guidelines published in recent years report that ONS can be used to increase nutritional intake and achieve nutritional goals in older people with malnutrition or at risk of malnutrition.[69,74] We recommended ONS to improve the nutritional status of older adults with dysphagia and to supplement deficiencies in appropriate patients in a team setting.

- **Oral sensory stimulation (thermal, touch, and pressure) (OPD)** "*Oral sensory stimulation is an effective modality and is recommended as a first-line treatment method for older adults with OPD*" (strong recommendation).

A loss of sense of taste, decreased numbers of sensory receptors, and changes in salivary rheology occur with aging regardless of OPD.[77] The goal of oral sensory stimulation is to increase the sensitivity of these receptors and to initiate and accelerate the oropharyngeal swallowing response. Cold and tactile stimulation can improve the transition from the oral to the pharyngeal phase by in-

creasing oral awareness.[78] Almost all experts in this study (97.5%) recommended cold stimulation. Considering that there may be changes related to age, we strongly recommend the application of oral sensory stimulation in older adults with dysphagia/dysphagia risk.

(2) Second-line treatment modalities

- Head and neck exercises (ROM and Strengthening) (OPD-ED)

"*Head and neck exercises (ROM and strengthening) can be effective modalities for older adults with both OPD and ED and can be tried as a second-line treatment method*" (weak recommendation).

Exercises are inherently more active and effective methods than compensatory mechanisms. Head and neck ROM and strengthening exercises can be effective in creating the correct feeding posture for both OPD and ED.[6,12,13,23,43,48] Among these, cervical flexion strengthening exercises (Shaker exercise) improve hyoid and laryngeal elevation, increase UES opening, reduce pharyngeal residuals, and improve dysphagia symptoms, especially in patients with neurogenic OPD.[19] Moreover, lingual weakness is associated with muscle weakness in the head and neck muscles.[79] The experts in the present study weakly recommended exercises as second-line treatment methods because older people with cognitive problems could find exercising difficult. For this reason, our experts requested that all exercise recommendations include the statement "applicable to patients with adequate awareness and cognitive function." Another important point here is that physical fitness should also be considered, as extreme exercise can cause trauma and fatigue in elderly patients.

- Breathing exercises (inspiratory and expiratory muscle strengthening exercises (EMST)) (OPD-ED)

"*Breathing exercises (inspiratory and EMST) are effective modalities for older adults with both OPD and ED (strong recommendation for OPD, weak recommendation for ED) and can be tried as a second-line treatment method*" (weak recommendation).

Swallowing and breathing are closely related because they share the same anatomical pathways. Swallowing often (75-95%) begins during the expiratory phase of respiration, inspiration is suppressed during bolus transport and continues with expiration after swallowing. This is a natural aspiration inhibitor. The cough reflex is another pillar of the anti-aspiration mechanism.[80] Both of these aspiration protective mechanisms deteriorate with age, the cough reflex weakens, and inspiration instead of expiration following swallowing is observed three times more often compared to young people.[48] In addition, lung elasticity and both inspiratory and expiratory muscle strength decrease, and compliance increases with age. Therefore, both inspiratory and expiratory muscles should be strengthened not only in patients with dysphagia but in all older people. Recent studies have assessed EMST applications, especially in patients with OPD. EMST increases the physiological load and strengthens the expiratory and suprahyoid muscles.[81] While EMST may be effective compared to conventional treatments in improving the pharyngeal phase in patients with OPD, strong evidence is lacking.[5,12,19] The present study recommended adding breathing exercises to dysphagia rehabilitation in all geriatric dysphagia patients, as permitted by cognitive functions, to maintain healthy oxygenation throughout the body.

- Swallowing maneuvers (OPD)

"*Swallowing maneuvers are an effective modality for older adults with OPD* (strong recommendation) *and can be tried as a second-line treatment method*" (weak recommendation). "*It is not an effective modality and is not recommended for older adults with ED.*"

Swallowing maneuvers are behavioral interventions used to establish safe and effective swallowing.[82] Although evidence for their effectiveness is insufficient, these interventions are recommended in combination therapy for dysphagia.[5] Implementation and adaptation difficulties negatively affect the implementation of maneuvers.[83] In the present study, we asked our experts about the maneuvers they found most effective; 82% of them stated that the Mendelsohn maneuver can be effective in older patients, similar to the literature.[84] This maneuver involves the voluntary holding of hyolaryngeal elevation during the peak phase of swallowing. However, it can cause muscle fatigue in older adults. The present study recommended the Mendelsohn maneuver in cognitively and physically fit patients.

- Oropharyngeal exercises (ROM, strengthening, and chin tuck against [CTAR]) (OPD)

"*Oropharyngeal exercises (ROM, strengthening, and CTAR) are modalities that can be used in older adults with OPD (strong recommendation) and can be tried as a second-line treatment method*" (weak recommendation).

Exercises have long been used for treating dysphagia. ROM exercises are recommended, especially for patients with head and neck cancer, to prevent impairments secondary to surgery and radiotherapy.[83] These exercises may be effective in older adults with OPD due to the loss of elasticity in the tissues with aging. Recent studies have evaluated the effectiveness of tongue muscle strengthening exercises[85] as tongue propulsion strength and squeezing pressure against the palate are closely related to swallowing disorders. Tongue strengthening exercises improve swallowing phase intervals and food intake in older patients.[19,48] In addition, strengthening exercises of the swallowing muscles in the oropharyngeal areas provide formation and control of the bolus and re-

duce the risk of aspiration.[86] Additionally, CTAR exercises to strengthen the suprahyoid muscles have been applied in recent years for treating dysphagia.[87] This type of exercise is performed to strengthen the suprahyoid muscles. However, there is not yet strong evidence regarding its effectiveness. As with all exercises, the present study recommended that these exercises should be added to treatment in suitable older adults.

- Electrical stimulation (oropharyngeal motor level) (OPD)

"*Neuromuscular electrical stimulation (NMES) (motor level) is a modality that can be applied in older adults with OPD* (strong recommendation) *and can be tried as a second-line treatment method*" (weak recommendation).

NMES is increasingly used for treating dysphagia in recent years.[88] It is also often used for treating neurologic OPD and is considered to increase muscle strength and achieve muscle contraction by stimulating motor nerves.[83] Although studies and guidelines have reported its positive effect on the oropharyngeal phase, the efficacy findings hare inconsistent because of the lack of standardization in practice. While suprahyoid and infrahyoid region applications are reportedly effective in the oral phase, the effect on the pharyngeal phase alone is not sufficient.[89] Besides these transcutaneous applications, the effectiveness of stimulations applied directly to the pharyngeal region has not been demonstrated. While there is a decrease in type II muscle fibers with aging, type I fibers are not much affected by age. This decrease in muscle fiber size causes progressive skeletal muscle loss, atrophy, weakness, and functional disability.[90] NMES targets these type 2 fibers. Thus, transcutaneous NMES at the motor level has been accepted as a method that can be applied in older patients with OPD.

(3) Third-line treatment modalities

Third-line treatment modalities have been described only for older adults with OPD.

- Electrical stimulation (Oropharyngeal sensory level) (OPD)

"*Neuromuscular electrical stimulation (NMES) (sensory level) is a modality that can be tried in older adults with OPD and can be tried as a third-line treatment method*" (weak recommendation).

Sensory nerve fiber stimulation affects swallowing function through stimulation of the afferent sensory nerves and has an indirect effect on the swallowing muscles. This stimulation has been frequently studied in stroke patients and is reportedly more effective than motor-level applications.[90] In addition, there remains no standardized application method such as motor-level applications. However, we recommended that this stimulation can be tried in patients who cannot tolerate NMES at the motor level.

- Transcranial electrical stimulation and repetitive transcranial magnetic stimulation (rTMS) (OPD)

"*Transcranial electrical stimulation and rTMS are modalities that can be tried as a third-line treatment method in older adults with OPD*" (weak recommendation).

Transcranial applications for treating dysphagia focus on adaptation, compensation, repair, and reorganization in the brain.[22]

Although it is reportedly a safe treatment method in patients with neurological dysphagia, results regarding its effectiveness are conflicting.[14,89] Another method based on the same mechanism, rTMS, has shown increased popularity in recent years.[91] Unlike other electrical stimulation applications, rTMS is reportedly particularly effective in the pharyngeal phase.[13,14] However, as it requires special and costly equipment, this method was recommended to be tried in patients with OPD after other methods.

- Biofeedback (OPD)

"*Biofeedback is a modality that can be tried as a third-line treatment method in older adults with OPD*" (weak recommendation). "*It is thought to be ineffective in patients with ED and is not recommended.*"

Biofeedback is the training of the ability to provide coordination and timing of swallowing with visual, auditory, or sensory signals during swallowing muscle activity.[92] It is effective in combination treatments in patients with OPD.[22,92] In addition, a recent study in patients with amyotrophic lateral sclerosis and ED showed that biofeedback is a promising method.[93] However, our experts made a weak recommendation in the presence of OPD because of the requirement for special training and equipment and serious patient cognitive skills. Among other modalities, it can be used in the presence of suitable conditions and patients.

Home program (OPD-ED)

This study weakly recommended that "*home programs can be applied in older adults with OPD and ED.*"

Home programs are widely used methods in clinical practice to maximize the benefits of rehabilitation. These programs apply personalized compensatory and therapeutic methods based on patient needs and are reportedly effective in adults.[12] However, in geriatric patients, the effectiveness may vary depending on the patient's cognitive and physical dysfunction, treatment compliance, and the presence of social support. Therefore, albeit with a weak recommendation, we believed that personalized home programs for older people will increase the continuum of treatment. Because changes in aging are progressive conditions, albeit slow, long-term rehabilitation will not occur with only expert-provided therapies.

Follow-up

While there were 45 recommendations in the first Delphi round, 21 items were accepted as strong recommendations at the end of the third Delphi round. The follow-up subsection was detailed as

much as possible to facilitate clinical practice. Nearly all management guidelines suggest follow-up time and methods specifically for individual patients.[21] The present study recommended that the follow-up time and methods may vary according to individual patient characteristics, dysphagia pathology, and etiology and that decisions should be made according to these situations.

We recommended the use of screening tests, clinical evaluation methods, bedside swallow tests, and FEES from instrumental methods for follow-up. VF was not recommended to avoid radiation exposure in patients with repeated applications.

Decision-making requires a multidisciplinary team based on treatments such as surgery, chemodenervation, or medical treatment. Moreover, the follow-up intervals should be decided based on these varying circumstances. We recommend that patients receiving rehabilitation should be first evaluated together with nutritional rehabilitation and formal testing or evaluation of feeding-nutrition characteristics such as appetite status, food consumption record for 3 days, number of meals, and hydration status.

In addition, we detailed follow-up recommendations for rehabilitation modalities. Patients undergoing rehabilitation with compensatory methods should be followed up based on patient compliance, dysphagia progression, risk of developing complications, and severity of existing complications. Clinical and instrumental evaluations should be performed for short and long terms, respectively: initially once weekly, then every 15 days, then monthly or every 2 months, and finally at 3–6-month intervals. Furthermore, we recommended follow-up of inpatients who underwent rehabilitation programs with therapeutic methods by asking about swallowing difficulties at each visit, weekly clinical evaluations, and instrumental evaluation methods at admission and discharge. In contrast, we recommended follow-up of outpatients who underwent rehabilitation with therapeutic methods by asking about their symptoms/signs of swallowing difficulties before each treatment session as well as weekly clinical evaluations and instrumental evaluations at the beginning and end of the treatment. The recommended follow-up intervals varied for almost any application, especially the application of rehabilitative modalities,[6] as compensatory methods are not curative modalities for dysphagia, and they still carry the risk of dysphagia, whereas therapeutic methods are likely to lead to changes in the nature of dysphagia for better or worse.

Apart from these principal recommendations, this study also included some symptoms/signs/risk factors that should be on a follow-up list. We recommended that the complications of dysphagia, especially the risk of silent aspiration, should be questioned and evaluated in terms of treatment continuity and modification. In addition, all members strongly recommended the inclusion of aspiration signs/symptoms, pneumonia history and/or signs, cognitive dysfunction, delirium, recent hospitalization history, alarm symptoms, malnutrition, dehydration, weight loss, oral hygiene, dental care, and sarcopenia as parameters on a follow-up list.

How-special

"Sarcopenia" and "frailty" are terms that have been introduced in recent years with respect to geriatric syndrome and have shown increasing importance for older people. Therefore, the need arose in our study to create a special section for SD and FRD. Twenty strong recommendations were made, including seven for SD and 13 for FRD.

Sarcopenia is characterized by a progressive and generalized loss of skeletal muscle mass in the whole body accompanied by a loss of either muscle strength or physical performance or both. The loss of muscle mass and strength in sarcopenia results in physical impairment, functional dependence, and maladaptation to stress and diseases.[79] Sarcopenia affects up to 50% of older people.[94] In addition to this increased sensitivity to stress and maladaptation, when many systems become deficient due to the effect of aging, a different multidimensional geriatric clinical syndrome called "frailty" develops.[95]

Recent publications have highlighted the association between sarcopenia and frailty and dysphagia. The impairments and deficiencies in all systems that occur in sarcopenia and frailty naturally affect swallowing functions and cause dysphagia. Dysphagia itself can also cause these two conditions. Malnutrition and dehydration, the main complications of dysphagia, cause sarcopenia, immune system dysfunction, increased functional disability, and frailty.[7,75,79] That is, just as sarcopenia and frailty are risk factors for dysphagia, dysphagia is also a risk factor for sarcopenia and frailty.[7,96] The present study defined the presence of sarcopenia and frailty as both dysphagia- and aspiration-related risk factors.

SD is the presence of dysphagia (with imaging confirmation of the loss of swallowing muscles, exclusion of causes other than sarcopenia that may cause dysphagia, and specification of sarcopenia as the main cause of dysphagia, even with other accompanying causes) in the presence of generalized sarcopenia.[96]

Similar to our article, the literature for the diagnosis of SD recommends a screening test (EAT-10) within the recommended steps for generalized dysphagia, followed by a detailed clinical examination and a BST such as the WST with pulse oximetry, GUSS, or VVST.[25] In the evaluation of swallowing muscles, the EWSGOP stated that dual-energy X-ray absorptiometry (DEXA), bioelectrical impedance analysis (BIA), MRI, CT, and ultrasound can be used.[69,96] The present study did not recommend the evaluation of the swallowing muscles with CT and ultrasound due to lack of

standardization, and weakly recommended the use of MRI, which is sensitive to the evaluation of soft tissues. DEXA and BIA were dropped after the first Delphi round because they are not universally available in clinical practice and require specialized equipment and personnel.

Based on the presence/absence of the parameters in the definition of SD, we created descriptions including definite-, probable- and/or possible-SD.[7] Sarcopenia itself is associated with physical disability, poor quality of life, and even death.[97] If dysphagia is added to this, it can be predicted that the complications of dysphagia will compound the complications of sarcopenia, resulting in increased morbidity and mortality. Therefore, the experts accepted the recommendation that "*everyone should be rehabilitated, regardless of probable-, possible- or definite-SD*." However, since SD is a systemic condition, treatment applications are needed for both sarcopenia and dysphagia, just as treatment is applied for both dysphagia rehabilitation and loss of motor function in the extremities in patients with stroke.[96] Our experts recommended that "*the rehabilitation program should include patient education, increase in physical activity, muscle strengthening (exercises and oral-dental care), and nutritional support*." The muscle strengthening methods include strengthening exercises for both oropharyngeal (head-neck, tongue, and chewing muscles) and general muscles (the lower extremities, anti-gravity, postural muscles, and respiratory muscles). Increasing oropharyngeal muscle strength requires precautions such as ensuring oral hygiene, treating periodontal diseases, and using appropriate prostheses. When the exercise program for muscle strengthening is insufficient, the rehabilitation program was further elaborated with the NMES method. In addition, treatments should also include nutritional rehabilitation, including adequate calorie and protein intake (1.2–1.5 kg/day), the use of dietary supplements that are likely to increase protein synthesis, and vitamin D support when needed. Although aging is most commonly reported in the etiology of sarcopenia (primary sarcopenia), it can also develop as a result of conditions such as physical inactivity; malnutrition; organ failure; and malignant, endocrine, and metabolic diseases (secondary sarcopenia).[98] Aging also paves the way for the development of secondary sarcopenia by increasing the risk of serious diseases such as cancer and causing both inactivity and malnutrition with presbyphagia in older patients with or without sarcopenia.[99] Since the changes that occur with age are a natural consequence of life, it is important to treat the causes of secondary sarcopenia that can be corrected. Exercise plays a role in both the prevention and treatment of physical inactivity by increasing muscle strength throughout the body.[100] In addition, malnutrition has a serious negative effect on type 2 muscle fibers, which provide rapid contraction in the swallowing muscles. Therefore, nutritional support is recommended in SD.[25] Recent geriatric studies there have reported that the dietary supplementation of protein and amino acids is effective in improving muscle mass[101,102] Additionally, vitamin D plays a key role in muscle function and strength. Therefore, we recommend its use to increase muscle mass for treating SD in patients with vitamin D deficiency.

FRD is the presence of dysphagia in patients with frailty. In particular, in the presence of physical frailty syndrome (feeling of exhaustion/fatigue, low muscle strength, involuntary weight loss, reduced walking speed, and decreased physical activity), oral phase dysfunction, including chewing dysfunction (oral frailty) may occur.[103] This condition mutually reinforces presbyphagia and may result in oropharyngeal residue, laryngeal penetration, and aspiration.[103,104] As frailty affects physical, psychological, cognitive, and social functions, cognitive and psychological dysfunction such as depressive mood, social isolation, and dependence in activities of daily living also pave the way for the development of OPD.[104] Morbidity and mortality rates increase by approximately 3–4-fold in the presence of FRD, regardless of physical frailty status.[103] Therefore, the recognition and treatment of frailty is important. Studies recommend screening tests as a first-line method for the detection of frailty, consistent with our general recommendations, and comprehensive geriatric evaluations as a second-line method.[6]

As with SD, additional rehabilitation is required in the presence of FRD. Because frailty is a biological syndrome with a complex and multifactorial etiology, occurring due to the decline of physiological reserves as a result of disease, malnutrition, and changes that occur with aging.[103] Therefore, in addition to treating the cognitive, psychological, and social effects that constitute frailty, treatment of the correctable causes in the etiology such as obesity, polypharmacy, and multiple comorbidities should be included as a first-line method in rehabilitation programs.[105,106] Because sarcopenia plays a key role in frailty, we also recommended adopting the recommendations for SD in these patients, including increased physical activity, muscle strengthening exercises, oral and dental care, and nutritional rehabilitation.[71,74,105]

Limitations

We did not follow a systematic review approach. As systematic reviews should have specified inclusion and exclusion criteria and should include a detailed analysis and interpretation of the literature, this method is the subject of an article in itself. We could not follow the systematic review method in this study due to the desire to provide detailed recommendations formed as a common opinion of experts with clinical practice experience.

Conclusion

Despite the many recommendations and reviews worldwide on the management of dysphagia in geriatric patients, no study has evaluated all aspects of dysphagia in detail. This study applied a multidisciplinary approach to attempt to answer all potential questions and problems encountered in clinical practice regarding geriatric dysphagia. We discussed oropharyngoesophageal dysphagia in detail, from diagnosis to treatment, and created a 216-item recommendation list for the management of geriatric dysphagia, SD, and FRD.

ACKNOWLEDGMENTS

CONFLICT OF INTEREST

The researchers claim no conflicts of interest.

FUNDING

None.

AUTHOR CONTRIBUTIONS

Conceptualization: EU; Data curation: EU, SE, GB; Investigation: EU, SE, GB, MH; Methodology: EU, SE, GB, MH; Project administration: EU, SE; Supervision: EU;Writing-original draft: EU; Writing-review & editing: EU, SE, GB, MH, EG, PU, ZU, CT, MV, ATC, SB, EG, KK, BA, EÇK, BK, AY, CO, DS, OY, SA, ST, BS, EIS, AYK, AY, SO, BI, MGO, ZAO, SAk, BY, MSA, AS, MI, MB, ZÇ, GS, TO, YE, DHB, DK, ZU, AD, YÇ, BS, ZAY, EAO.

REFERENCES

1. Bhattacharyya N. The prevalence of dysphagia among adults in the United States. Otolaryngol Head Neck Surg 2014;151:765-9.
2. Nawaz S, Tulunay-Ugur OE. Dysphagia in the older patient. Otolaryngol Clin North Am 2018;51:769-77.
3. Estupinan Artiles C, Regan J, Donnellan C. Dysphagia screening in residential care settings: a scoping review. Int J Nurs Stud 2021;114:103813.
4. Abu-Ghanem S, Chen S, Amin MR. Oropharyngeal dysphagia in the elderly: evaluation and prevalence. Curr Otorhinolaryngol Rep 2020;8:34-42.
5. Sura L, Madhavan A, Carnaby G, Crary MA. Dysphagia in the elderly: management and nutritional considerations. Clin Interv Aging 2012;7:287-98.
6. Baijens LW, Clave P, Cras P, Ekberg O, Forster A, Kolb GF, et al. European Society for Swallowing Disorders - European Union Geriatric Medicine Society white paper: oropharyngeal dysphagia as a geriatric syndrome. Clin Interv Aging 2016;11:1403-28.
7. Wakabayashi H. Presbyphagia and sarcopenic dysphagia: association between aging, sarcopenia, and deglutition disorders. J Frailty Aging 2014;3:97-103.
8. Namasivayam-MacDonald AM, Riquelme LF. Presbyphagia to dysphagia: multiple perspectives and strategies for quality care of older adults. Semin Speech Lang 2019;40:227-42.
9. Liesenborghs C, Dejaeger E, Liesenborghs L, Tack J, Rommel N. [Presbyphagia: the influence of primary aging on swallowing function]. Tijdschr Gerontol Geriatr 2014;45:261-72.
10. McCoy YM, Varindani Desai R. Presbyphagia versus dysphagia: identifying age-related changes in swallow function. Perspect ASHA Spec Interest Groups 2018;3:15-21.
11. Thiyagalingam S, Kulinski AE, Thorsteinsdottir B, Shindelar KL, Takahashi PY. Dysphagia in older adults. Mayo Clin Proc 2021;96:488-97.
12. McGinnis CM, Homan K, Solomon M, Taylor J, Staebell K, Erger D, et al. Dysphagia: interprofessional management, impact, and patient-centered care. Nutr Clin Pract 2019;34:80-95.
13. Di Pede C, Mantovani ME, Del Felice A, Masiero S. Dysphagia in the elderly: focus on rehabilitation strategies. Aging Clin Exp Res 2016;28:607-17.
14. Wirth R, Dziewas R, Beck AM, Clave P, Hamdy S, Heppner HJ, et al. Oropharyngeal dysphagia in older persons: from pathophysiology to adequate intervention: a review and summary of an international expert meeting. Clin Interv Aging 2016;11:189-208.
15. Fairfield CA, Smithard DG. Assessment and management of dysphagia in acute stroke: an initial service review of international practice. Geriatrics (Basel) 2020;5:4.
16. Archer SK, Wellwood I, Smith CH, Newham DJ. Dysphagia therapy in stroke: a survey of speech and language therapists. Int J Lang Commun Disord 2013;48:283-96.
17. Smithard DG. Dysphagia management and stroke units. Curr Phys Med Rehabil Rep 2016;4:287-94.
18. Rumbach A, Coombes C, Doeltgen S. A survey of Australian dysphagia practice patterns. Dysphagia 2018;33:216-26.
19. Dziewas R, Allescher HD, Aroyo I, Bartolome G, Beilenhoff U, Bohlender J, et al. Diagnosis and treatment of neurogenic dysphagia: S1 guideline of the German Society of Neurology. Neurol Res Pract 2021;3:23.
20. Ortega O, Martín A, Clave P. Diagnosis and management of oropharyngeal dysphagia among older persons, state of the art. J Am Med Dir Assoc 2017;18:576-82.
21. National Stroke Programme. Recommendations for the management of nutrition and hydration in patients with stroke: a guidance document [Internet]. Dublin, Ireland: Health Service Ex-

ecutive, National Stroke Programme; 2019 [cited 2022 May 10]. Available from: https://www.hse.ie/eng/about/who/cspd/ncps/stroke/resources/recommendations-for-the-management-of-nutrition-and-hydration-in-patients-with-stroke.pdf.
22. Smith EE, Kent DM, Bulsara KR, Leung LY, Lichtman JH, Reeves MJ, et al. Effect of dysphagia screening strategies on clinical outcomes after stroke: a systematic review for the 2018 guidelines for the early management of patients with acute ischemic stroke. Stroke 2018;49:e123-8.
23. Malagelada JR, Bazzoli F, Boeckxstaens G, De Looze D, Fried M, Kahrilas P, et al. World Gastroenterology Organisation Global Guidelines: dysphagia: global guidelines and cascades update September 2014. J Clin Gastroenterol 2015;49:370-8.
24. Jukic Peladic N, Orlandoni P, Dell'Aquila G, Carrieri B, Eusebi P, Landi F, et al. Dysphagia in nursing home residents: management and outcomes. J Am Med Dir Assoc 2019;20:147-51.
25. Payne M, Morley JE. Editorial: Dysphagia, dementia and frailty. J Nutr Health Aging 2018;22:562-5.
26. Melgaard D, Westergren A, Skrubbeltrang C, Smithard D. Interventions for nursing home residents with dysphagia: a scoping review. Geriatrics (Basel) 2021;6:55.
27. Skulmoski GJ, Hartman FT, Krahn J. The Delphi method for graduate research. J Inf Technol Educ 2007;6:1-21.
28. Harlacher J. An educator's guide to questionnaire development [Internet]. Washington, DC: Institute of Education Sciences; 2016 [cited 2022 May 10]. Available from: https://ies.ed.gov/ncee/edlabs/projects/project.asp?projectID=4496.
29. Pecjak V. Poti do novih idej: Tehnike kreativnega mišljenja [Ways to new ideas: the creative thinking techniques]. Piran, Beograd: New Moment; 2001.
30. Cancer V. Criteria weighting by using the 5Ws & H technique. Bus Syst Res 2012;3:41-8.
31. Kottner J, Audige L, Brorson S, Donner A, Gajewski BJ, Hrobjartsson A, et al. Guidelines for Reporting Reliability and Agreement Studies (GRRAS) were proposed. J Clin Epidemiol 2011;64:96-106.
32. American Society of Anesthesiologists Task Force on Chronic Pain Management; American Society of Regional Anesthesia and Pain Medicine. Practice guidelines for chronic pain management: an updated report by the American Society of Anesthesiologists Task Force on Chronic Pain Management and the American Society of Regional Anesthesia and Pain Medicine. Anesthesiology 2010;112:810-33.
33. Nair R, Aggarwal R, Khanna D. Methods of formal consensus in classification/diagnostic criteria and guideline development. Semin Arthritis Rheum 2011;41:95-105.
34. Chmura Kraemer H, Periyakoil VS, Noda A. Kappa coefficients in medical research. Stat Med 2002;21:2109-29.
35. Vach W. The dependence of Cohen's kappa on the prevalence does not matter. J Clin Epidemiol 2005;58:655-61.
36. Noh JH, Jung HW, Ga H, Lim JY. Ethical guidelines for publishing in the Annals of Geriatric Medicine and Research. Ann Geriatr Med Res 2022;26:1-3.
37. Wirth R, Lueg G, Dziewas R. Orophagyngeal dysphagia in older persons: evaluation and therapeutic options. Dtsch Med Wochenschr 2018;143:148-51.
38. de Lima Alvarenga EH, Dall'Oglio GP, Murano EZ, Abrahao M. Continuum theory: presbyphagia to dysphagia?: functional assessment of swallowing in the elderly. Eur Arch Otorhinolaryngol 2018;275:443-9.
39. Jardine M, Miles A, Allen J. A systematic review of physiological changes in swallowing in the oldest old. Dysphagia 2020;35:509-32.
40. Royal College of Speech and Language Therapy. Guidance on the management of dysphagia in care homes [Internet]. London, UK: Royal College of Speech and Language Therapy; 2018 [cited 2022 May 10]. Available from: https://www.rcslt.org/wp-content/uploads/media/Project/RCSLT/guidance-on-the-management-of-dysphagia-in-care-homes.pdf.
41. Western Australia Country Health Service. Adult dysphagia screening and assessment: clinical practice standard [Internet]. Sydney, Australia: Western Australia Country Health Service; 2019 [cited 2022 May 10]. Available from: https://www.wacountry.health.wa.gov.au/~/media/WACHS/Documents/About-us/Policies/Adult-Dysphagia-Screening-and-Assessment-Clinical-Practice-Standard.pdf?thn=0.
42. Patel DA, Krishnaswami S, Steger E, Conover E, Vaezi MF, Ciucci MR, et al. Economic and survival burden of dysphagia among inpatients in the United States. Dis Esophagus 2018;31:1-7.
43. Kaindlstorfer A, Pointner R. An appraisal of current dysphagia diagnosis and treatment strategies. Expert Rev Gastroenterol Hepatol 2016;10:929-42.
44. Jardine M, Miles A, Allen J. Spotlight on older adults in swallowing research. OBM Geriat 2020;4:12.
45. Chan MQ, Balasubramanian G. Esophageal dysphagia in the elderly. Curr Treat Options Gastroenterol 2019;17:534-53.
46. Adkins C, Takakura W, Spiegel BM, Lu M, Vera-Llonch M, Williams J, et al. Prevalence and characteristics of dysphagia based on a population-based survey. Clin Gastroenterol Hepatol 2020;18:1970-9.
47. Madhavan A, LaGorio LA, Crary MA, Dahl WJ, Carnaby GD. Prevalence of and risk factors for dysphagia in the community dwelling elderly: a systematic review. J Nutr Health Aging 2016;20:806-15.

48. Cavallero S, Dominguez LJ, Vernuccio L, Barbagallo M. Presbyphagia and dysphagia in old age. Geriatr Care 2020;6:9137.
49. Chen S, Cui Y, Ding Y, Sun C, Xing Y, Zhou R, et al. Prevalence and risk factors of dysphagia among nursing home residents in eastern China: a cross-sectional study. BMC Geriatr 2020;20:352.
50. Hoffmann S, Harms H, Ulm L, Nabavi DG, Mackert BM, Schmehl I, et al. Stroke-induced immunodepression and dysphagia independently predict stroke-associated pneumonia: the PREDICT study. J Cereb Blood Flow Metab 2017;37:3671-82.
51. Shimizu T, Bouchard M, Mavriplis C. Update on age-appropriate preventive measures and screening for Canadian primary care providers. Can Fam Physician 2016;62:131-8.
52. Engh MC, Speyer R. Management of dysphagia in nursing homes: a national survey. Dysphagia 2022;37:266-76.
53. Hsiang CC, Chang CM, Chen CH, Hwu YJ. Effects of training on the knowledge and skills of long term care workers in managing clients with dysphagia. Ann Otolaryngol Rhinol 2018;5:1210.
54. Royal College of Physicians, Intercollegiate Stroke Working Party. National clinical guideline for stroke. 5th ed. London, UK: Royal College of Physicians; 2016.
55. Hebert D, Lindsay MP, McIntyre A, Kirton A, Rumney PG, Bagg S, et al. Canadian stroke best practice recommendations: stroke rehabilitation practice guidelines, update 2015. Int J Stroke 2016;11:459-84.
56. Howells SR, Cornwell PL, Ward EC, Kuipers P. Understanding dysphagia care in the community setting. Dysphagia 2019;34:681-91.
57. Igarashi K, Kikutani T, Tamura F. Survey of suspected dysphagia prevalence in home-dwelling older people using the 10-Item Eating Assessment Tool (EAT-10). PLoS One 2019;14:e0211040.
58. Wilson JM, Jungner G. Principles and practice of screening for disease. Geneva, Switzerland: World Health Organization; 1968.
59. Sarabia-Cobo CM, Perez V, de Lorena P, Dominguez E, Hermosilla C, Nunez MJ, et al. The incidence and prognostic implications of dysphagia in elderly patients institutionalized: a multicenter study in Spain. Appl Nurs Res 2016;30:e6-9.
60. Umay E, Eyigor S, Karahan AY, Gezer IA, Kurkcu A, Keskin D, et al. The GUSS test as a good indicator to evaluate dysphagia in healthy older people: a multicenter reliability and validity study. Eur Geriatr Med 2019;10:879-87.
61. Jorgensen LW, Sondergaard K, Melgaard D, Warming S. Interrater reliability of the Volume-Viscosity Swallow Test; screening for dysphagia among hospitalized elderly medical patients. Clin Nutr ESPEN 2017;22:85-91.
62. 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;38:2948-52.
63. Abdel Jalil AA, Katzka DA, Castell DO. Approach to the patient with dysphagia. Am J Med 2015;128:1138.
64. Penalva-Arigita A, Prats R, Lecha M, Sansano A, Vila L. Prevalence of dysphagia in a regional hospital setting: acute care hospital and a geriatric sociosanitary care hospital: a cross-sectional study. Clin Nutr ESPEN 2019;33:86-90.
65. Cardoso MC, da Silva AM. Pulse oximetry: instrumental alternative in the clinical evaluation by the bed for the dysphagia. Int Arch Otorhinolaryngol 2010;14:231-8.
66. Britton D, Roeske A, Ennis SK, Benditt JO, Quinn C, Graville D. Utility of pulse oximetry to detect aspiration: an evidence-based systematic review. Dysphagia 2018;33:282-92.
67. Expert Panel on Gastrointestinal Imaging, Levy AD, Carucci LR, Bartel TB, Cash BD, Chang KJ, et al. ACR Appropriateness Criteria® dysphagia. J Am Coll Radiol 2019;16(5S):S104-15.
68. Christmas C, Rogus-Pulia N. Swallowing disorders in the older population. J Am Geriatr Soc 2019;67:2643-9.
69. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, et al. ESPEN guideline on clinical nutrition and hydration in geriatrics. Clin Nutr 2019;38:10-47.
70. Ortega O, Parra C, Zarcero S, Nart J, Sakwinska O, Clave P. Oral health in older patients with oropharyngeal dysphagia. Age Ageing 2014;43:132-7.
71. Teramoto S. Clinical significance of oral care and oral management on the treatment and prevention of aspiration pneumonia in the elderly: evidences and pitfalls. Dent Oral Biol Craniofacial Res 2020;3:2-5.
72. Umay E, Eyigor S, Karahan AY, Keskin D, Karaca G, Unlu Z, et al. Which swallowing difficulty of food consistency is best predictor for oropharyngeal dysphagia risk in older person? Eur Geriatr Med 2019;10:609-617.
73. Morilla-Herrera JC, Martin-Santos FJ, Caro-Bautista J, Saucedo-Figueredo C, Garcia-Mayor S, Morales-Asencio JM. Effectiveness of food-based fortification in older people: a systematic review and meta-analysis. J Nutr Health Aging 2016;20:178-84.
74. Vranesic Bender D, Krznaric Z. Nutritional issues and considerations in the elderly: an update. Croat Med J 2020;61:180-3.
75. Gaddey HL, Holder K. Unintentional weight loss in older adults. Am Fam Physician 2014;89:718-22.
76. Cederholm T, Jensen GL. To create a consensus on malnutrition diagnostic criteria: a report from the Global Leadership Initiative on Malnutrition (GLIM) meeting at the ESPEN Congress 2016. Clin Nutr 2017;36:7-10.

77. Pushpass RG, Pellicciotta N, Kelly C, Proctor G, Carpenter GH. Reduced salivary mucin binding and glycosylation in older adults influences taste in an in vitro cell model. Nutrients 2019;11:2280.
78. Malik SN, Khan MS, Ehsaan F, Tul-Ain Q. Effectiveness of swallow maneuvers, thermal stimulation and combination both in treatment of patients with dysphagia using functional outcome swallowing scale. Biomed Res 2017;28:1479-82.
79. Fujishima I, Fujiu-Kurachi M, Arai H, Hyodo M, Kagaya H, Maeda K, et al. Sarcopenia and dysphagia: position paper by four professional organizations. Geriatr Gerontol Int 2019;19:91-7.
80. Ebihara S, Sekiya H, Miyagi M, Ebihara T, Okazaki T. Dysphagia, dystussia, and aspiration pneumonia in elderly people. J Thorac Dis 2016;8:632-9.
81. Verin E, Clave P, Bonsignore MR, Marie JP, Bertolus C, Similowski T, et al. Oropharyngeal dysphagia: when swallowing disorders meet respiratory diseases. Eur Respir J 2017;49:1602530.
82. Speyer R, Baijens L, Heijnen M, Zwijnenberg I. Effects of therapy in oropharyngeal dysphagia by speech and language therapists: a systematic review. Dysphagia 2010;25:40-65.
83. Bath PM, Lee HS, Everton LF. Swallowing therapy for dysphagia in acute and subacute stroke. Cochrane Database Syst Rev 2018;10:CD000323.
84. Langmore SE, Pisegna JM. Efficacy of exercises to rehabilitate dysphagia: a critique of the literature. Int J Speech Lang Pathol 2015;17:222-9.
85. Milazzo M, Panepinto A, Sabatini AM, Danti S. Tongue rehabilitation device for dysphagic patients. Sensors (Basel) 2019;19:4657.
86. Steele CM, Bayley MT, Peladeau-Pigeon M, Nagy A, Namasivayam AM, Stokely SL, et al. A randomized trial comparing two tongue-pressure resistance training protocols for post-stroke dysphagia. Dysphagia 2016;31:452-61.
87. Park JS, An DH, Oh DH, Chang MY. Effect of chin tuck against resistance exercise on patients with dysphagia following stroke: a randomized pilot study. NeuroRehabilitation 2018;42:191-7.
88. Simonelli M, Ruoppolo G, Iosa M, Morone G, Fusco A, Grasso MG, et al. A stimulus for eating: the use of neuromuscular transcutaneous electrical stimulation in patients affected by severe dysphagia after subacute stroke: a pilot randomized controlled trial. NeuroRehabilitation 2019;44:103-10.
89. Konecny P, Elfmark M. Electrical stimulation of hyoid muscles in post-stroke dysphagia. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub 2018;162:40-2.
90. Nilwik R, Snijders T, Leenders M, Groen BB, van Kranenburg J, Verdijk LB, et al. The decline in skeletal muscle mass with aging is mainly attributed to a reduction in type II muscle fiber size. Exp Gerontol 2013;48:492-8.
91. Michou E, Mistry S, Rothwell J, Hamdy S. Priming pharyngeal motor cortex by repeated paired associative stimulation: implications for dysphagia neurorehabilitation. Neurorehabil Neural Repair 2013;27:355-62.
92. Tang Y, Lin X, Lin XJ, Zheng W, Zheng ZK, Lin ZM, et al. Therapeutic efficacy of neuromuscular electrical stimulation and electromyographic biofeedback on Alzheimer's disease patients with dysphagia. Medicine (Baltimore) 2017;96:e8008.
93. Tomik J, Sowula K, Ceranowicz P, Dworak M, Stolcman K. Effects of biofeedback training on esophageal peristalsis in amyotrophic lateral sclerosis patients with dysphagia. J Clin Med 2020;9:2314.
94. Cruz-Jentoft AJ, Landi F, Schneider SM, Zuniga C, Arai H, Boirie Y, et al. Prevalence of and interventions for sarcopenia in ageing adults: a systematic review. Report of the International Sarcopenia Initiative (EWGSOP and IWGS). Age Ageing 2014;43:748-59.
95. Cruz-Jentoft AJ, Michel JP. Sarcopenia: a useful paradigm for physical frailty. Eur Geriatr Med 2013;4:102-5.
96. Wakabayashi H, Kishima M, Itoda M, Fujishima I, Kunieda K, Ohno T, et al. Diagnosis and treatment of sarcopenic dysphagia: a scoping review. Dysphagia 2021;36:523-31.
97. Wakabayashi H, Takahashi R, Murakami T. The prevalence and prognosis of sarcopenic dysphagia in patients who require dysphagia rehabilitation. J Nutr Health Aging 2019;23:84-8.
98. Bauer J, Morley JE, Schols AM, Ferrucci L, Cruz-Jentoft AJ, Dent E, et al. Sarcopenia: a time for action: an SCWD position paper. J Cachexia Sarcopenia Muscle 2019;10:956-61.
99. Flanagan D, Fisher T, Murray M, Visvanathan R, Charlton K, Thesing C, et al. Managing undernutrition in the elderly: prevention is better than cure. Aust Fam Physician 2012;41:695-9.
100. Saggini R, Carmignano SM, Cosenza L, Palermo T, Bellomo RG. Rehabilitation in sarcopenic elderly. In: Dionyssiotis Y, editors. Frailty and sarcopenia-onset, development and clinical challenges. Rijeka, Croatia: IntechOpen; 2017.
101. Rondanelli M, Cereda E, Klersy C, Faliva MA, Peroni G, Nichetti M, et al. Improving rehabilitation in sarcopenia: a randomized-controlled trial utilizing a muscle-targeted food for special medical purposes. J Cachexia Sarcopenia Muscle 2020;11:1535-47.
102. Ganapathy A, Nieves JW. Nutrition and sarcopenia: what do we know? Nutrients 2020;12:1755.
103. Tanaka T, Takahashi K, Hirano H, Kikutani T, Watanabe Y, Ohara Y, et al. Oral frailty as a risk factor for physical frailty and mortality in community-dwelling elderly. J Gerontol A Biol Sci

Med Sci 2018;73:1661-7.
104. Nishida T, Yamabe K, Honda S. Dysphagia is associated with oral, physical, cognitive and psychological frailty in Japanese community-dwelling elderly persons. Gerodontology 2020;37:185-90.
105. British Geriatrics Society. End of life care in frailty: dysphagia [Internet]. London, UK: British Geriatrics Society; 2020 [cited 2022 May 10]. Available from: https://www.bgs.org.uk/resources/end-of-life-care-in-frailty-dysphagia.
106. Morris JE, Hollwey F, Hansjee D, Power RA, Griffith R, Longmore T, et al. Pilot of a charter to improve management of medicines and oral care for residents with dysphagia in care homes. Geriatrics (Basel) 2018;3:78.