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

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Abstract

**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.

**Objective:** 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.

**Conclusions:** 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; Geriatric; Recommendation; Diagnosis; Rehabilitation; Follow-up
1. 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.\textsuperscript{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.\textsuperscript{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.”

2. Methods

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

2.1. 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.

2.2. 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. 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, 5 neurologists, 5 otolaryngologists, 5 speech-language pathologists (SLPs), 5 dietitians, 2 dentists, 2 general surgeons, and 2 social workers to participate via e-mail.

We then formed a consultant expert group comprising the 48 invited experts (18 physiatrists, 14 geriatricians, 5 otolaryngologists, 2 gastroenterologists, 2 neurologists, 2 dietitians, 2 dentists, 1 SLP, 1 general surgeon, and 1 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?” 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.\textsuperscript{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) we sent a draft of the survey containing the majority opinions back to the consultant group and requested feedback 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 (Figures 1 and 2).

2.3. Strength and Classification of Recommendations

The consultant experts rated all recommendations on a 10-point scale (0–10; 0 points: “I totally disagree,” 10 points: “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. 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 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.

2.4. 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.

3. 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 health care 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) management (diagnosis and rehabilitation).

**4. 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.

4.1. 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.” 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. 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.

4.2. 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 (Figure 1). Accordingly, we created risk factor and symptom/sign lists for dysphagia and aspiration.

4.2.1. 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.\textsuperscript{10,14} The most feared complication of dysphagia is aspiration, pneumonia, and the associated 30\%–50\% increase in mortality.\textsuperscript{14,40,41} 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.\textsuperscript{3,4,6,17,20,42,43} 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).\textsuperscript{3,12,44}

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\%.\textsuperscript{12,45} Although it can vary regionally, the most common cause of ED is gastroesophageal reflux (GER).\textsuperscript{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.\textsuperscript{23,47}
In addition, conditions such as Parkinson’s 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’s 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.

4.2.2. 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.23,42

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.

4.3. 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 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. However, in recent years, these tests have been recommended to be completed with a comprehensive clinical examination for both OPD and ED. 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.\textsuperscript{52,53}

4.4. 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.

4.4.1. 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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.

\subsection*{4.4.2. 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:

- Lists of risk factors + symptoms/signs that can be used as a screening test for dysphagia.
- 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.⁶,³⁷,⁴⁸,⁵² 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.¹¹,¹¹¹ 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.¹¹,³⁷,⁵² 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.\textsuperscript{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.\textsuperscript{6,48} Since the present study aimed to evaluate both OPD and ED, we considered the EAT-10 to be suitable for screening.

4.4.3. 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 3 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.\textsuperscript{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.\textsuperscript{39,59,60} 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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{6,64} The WST with pulse oximetry has been recommended as a test of choice in patients with aspiration symptoms with liquid.\textsuperscript{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.\textsuperscript{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 recommended ruling out OPD primarily in patients with
dysphagia symptoms/signs. For these reasons, we recommended the GUSS, which also includes evaluation with solid food, as a swallowing test in patients with suspected ED.

4.4.4. Instrumental evaluation

The third Delphi resulted in 24 recommendations (15 strong, 1 weak, and 8 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. The choice of method depends on the advantages and disadvantages. 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). 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. 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.
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

4.5. 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.

4.5.1. 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).23,42 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).2,42,45 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). Combination therapy has been recommended in both older people and patients with OPD. 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. 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.\textsuperscript{23,39} Given the presence of prebysphagia in older adults, early treatment becomes even more important.

4.5.2. 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.

4.5.2.1. First-line treatment modalities

4.5.2.1.1. Education and information (OPD-ED)

Most older people lack information about their nutritional status and proper diet.\textsuperscript{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.\textsuperscript{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”

4.5.2.1.2. 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. Studies on oral hygiene are often based on OPD. However, GER, the most common cause of ED, also affects the oral region. 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.

**4.5.2.1.3. 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. 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. 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.

4.5.2.1.3. 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. In older adults with chronic dysphagia, texture modification such as pureeing and mincing, and thickened fluids such as nectar, honey, and pudding consistencies are moderately recommended. Studies in patients with neurogenic dysphagia and liquid aspiration have shown that viscosity changes reduce the risk of AP. Dietary modification is 96% effective in patients with ED, depending on the etiology.

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. However, these modifications may negatively affect quality of life, especially in older patients. 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. 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.74

4.5.2.1.4. 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.”

4.5.2.1.5. 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.\textsuperscript{75} 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 \((<20 \text{ kg/m}^2)\).\textsuperscript{76} 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).\textsuperscript{23,69,76} 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.\textsuperscript{77}

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.\textsuperscript{76,77} 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.\textsuperscript{69,75} We recommended ONS to improve the nutritional status of older adults with dysphagia and to supplement deficiencies in appropriate patients in a team setting.

\textit{4.5.2.1.6. 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. 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 increasing oral awareness. 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.

4.5.2.2. Second-line treatment modalities

4.5.2.2.1. 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. 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. Moreover, lingual weakness is associated with muscle weakness in the head and neck muscles. 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 is that physical fitness should also be considered as it can cause trauma and fatigue in older patients.

4.5.2.2.2. 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 begins in the expiratory phase of respiration at a rate of 75–95%, 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.81 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.82 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.

4.5.2.2.3. 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.\textsuperscript{83} Although evidence for their effectiveness is insufficient, these interventions are recommended in combination therapy for dysphagia.\textsuperscript{5} Implementation and adaptation difficulties negatively affect the implementation of maneuvers.\textsuperscript{84} 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.\textsuperscript{85} 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.

4.5.2.4. 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.\textsuperscript{84} 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\textsuperscript{86} 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.\textsuperscript{19,48} In
addition, strengthening exercises of the swallowing muscles in the oropharyngeal areas provide formation and control of the bolus and reduce the risk of aspiration. Additionally, CTAR exercises to strengthen the suprathyroid muscles have been applied in recent years for treating dysphagia. This type of exercise is performed to strengthen the suprathyroid 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.

4.5.2.6. 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).

Neuromuscular electrical stimulation (NMES) is increasingly used for treating dysphagia in recent years. It is also often used for treating neurologic OPD and is considered to increase muscle strength and achieve muscle contraction by stimulating motor nerves. Although studies and guidelines have reported its positive effect on the oropharyngeal phase, the efficacy findings are inconsistent because of the lack of standardization in practice. While suprathyroid and infrathyroid region applications are reportedly effective in the oral phase, the effect on the pharyngeal phase alone is not sufficient. Besides these transcutaneous applications, the effectiveness of stimulations applied directly to the pharyngeal region has not been demonstrated. This decrease in muscle fiber size causes progressive skeletal muscle loss, atrophy, weakness, and functional disability. 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.

4.5.2.3. Third-line treatment modalities

Third-line treatment modalities have been described only for older adults with OPD.
4.5.2.3.1. 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. 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.

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

4.5.2.3.3. 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. It is effective in combination treatments in patients with OPD. In addition, a recent study in patients with amyotrophic lateral sclerosis and ED showed that biofeedback is a promising method. 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.

4.5.3. 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. 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.

4.5.4. 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. 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, 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.

4.5.5. 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 7 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. Sarcopenia affects up to 50% of older people. 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.

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.7,76,80 That is, just as sarcopenia and frailty are risk factors for dysphagia, dysphagia is also a risk factor for sarcopenia and frailty.7,98 The present study defined the presence of sarcopenia and frailty as both dysphagia- and aspiration-related risk factors.

4.5.5.1. 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.98 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.99 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.68,98 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.100 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. 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). 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. 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. 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. Recent geriatric studies there
have reported that the dietary supplementation of protein and amino acids is effective in improving muscle mass.\textsuperscript{104,105} 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.

\textbf{4.5.5.2. 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.\textsuperscript{106} This condition mutually reinforces presbyphagia and may result in oropharyngeal residue, laryngeal penetration, and aspiration.\textsuperscript{106,107} 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.\textsuperscript{107} Morbidity and mortality rates increase by approximately 3–4-fold in the presence of FRD, regardless of physical frailty status.\textsuperscript{106} 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.\textsuperscript{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.\textsuperscript{106} 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.\textsuperscript{108,109} 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.\textsuperscript{71,75,108}

4.6. Limitations

We did not follow a systematic review approach. As systematic review 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.

5. 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.

Competing Interest

All participants declared that there was no individual conflict of interest according to the rules of the International Committee of Medical Journal Editors (ICMJE).

Compliance with Ethical Standards

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee (IRC:2021/103-
02) and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.