



Review Article

Management of Dysphagia by a Speech Language Pathologist During the Covid-19 Pandemic: A Narrative Review

Manijeh Zarei Mahmood Abadi¹, MSc; Talieh Zarifian^{2*}, PhD; Lida Sharifi-Rad¹, MSc

¹Department of Speech Therapy, Pediatric Center of Excellence, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran

²Department of Speech Therapy, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

ARTICLE INFO

Article History:

Received: 22/11/2021

Revised: 24/12/2021

Accepted: 09/04/2022

Keywords:

Deglutition disorders

COVID-19

Speech therapies

Speech therapy

Management

Please cite this article as:

Zarei Mahmood Abadi M, Zarifian T, Sharifi-Rad L. Management of Dysphagia by a Speech Language Pathologist During the Covid-19 Pandemic: A Narrative Review. JRSR. 2022;9(3):97-103.

ABSTRACT

Reasons for dysphagia in patients with at-risk respiratory systems during the COVID-19 pandemic include muscle weakness. During this time, the rehabilitation program becomes a critical problem. The current narrative review purposed to answer the question, "What is the modified management of dysphagia in patients with COVID-19 by speech-language pathologists (SLPs)?" Medline, PubMed, Google Scholar, and Scopus databases were searched for information about COVID-19 and dysphagia using search terms such as "COVID-19 and dysphagia," "speech therapy and COVID-19," "COVID-19 and dysphagia speech and language pathologist." As this narrative review concentrated on the intervention of dysphagia throughout the Covid-19 pandemic, the reference lists of articles identified in the search were also examined, and those we considered relevant in keeping with the selected keywords were accepted. Among the 83 articles selected in the first round, 27 were considered for this review. The number of clinical or original articles fitting our criteria was very limited. The main topics in most of the published papers were dysphagia intervention, COVID-19 transmission risk, swallowing assessment and therapy in patients with COVID-19 by SLPs, dysphagia screening tools, swallowing treatments and sensory stimulation in patients with COVID-19, and swallowing exercises and maneuvers conducted by SLPs in COVID-19 cases. An instrumental evaluation of swallowing should be narrowed during the COVID-19 pandemic. SLPs should find different ways to appropriately manage patients with suspected dysphagia. Generally, dysphagia intervention should be reserved for tele-health.

2022© The Authors. Published by JRSR. All rights reserved.

Background

Coronavirus infection (COVID-19) is a transferable illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-COV-2), one of a large family of coronaviruses [2]. This disease has a broad range of clinical symptoms, including fever, headache, generalized weakness or fatigue, headache, myalgia or muscle pain, arthralgia, dyspnea, difficulty breathing, and myositis

[1-12]. Additionally, dysphagia is a common symptom of myositis experienced by 30% – 72% of COVID-19 cases [3].

Severe types of COVID-19 result in respiratory nonfunctioning accompanied by the malfunction of several organs and the need for respiratory support (invasive/noninvasive) in the intensive care unit (ICU) [5-7, 10, 11, 13]. Many otolaryngological symptoms are also seen in affected patients, such as dry cough [5-7, 10, 11], sore throat [5], postnasal drip [7], dysphonia [7-10], dysphagia [7, 14], anosmia [6-9, 12, 15] or ageusia [6, 8, 9, 12, 15], nasal obstruction [7], and hyolaryngeal excursion was often absent [2].

*Corresponding author: Talieh Zarifian, PhD;

Department of Speech Therapy, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran.

Email: t.zarifian@yahoo.com, ta.zarifian@uswr.ac.ir

Stroke and neurologic disorders in addition to ICU care in complicated cases cause swallowing impairment and dysphasia [4]. It is suggested that several neurologic problems experienced by COVID-19 patients might cause injury to the central and peripheral parts of the swallowing neural circuits, resulting in dysphagia [13]. Another reason for dysphagia in patients at risk for respiratory tract and muscle weakness as well as COVID-19 patients is mal-coordination at swallowing and breathing intervals [11, 14]. Prolonged intubation and gastrointestinal comorbidity are the most important risk factors for dysphagia [5, 11, 16]. An important symptom of dysphasia following COVID-19 is the bilateral absence of gag reflex [13, 15, 17]. COVID-19 patients often need a longer ventilation period, which can cause post-extubation dysphagia [18].

Dysphagia is difficulty in swallowing involving the oral cavity, pharynx, esophagus, or gastroesophageal junction. The severity of dysphagia may be affected by COVID-19 [19]. Untreated dysphagia following extubation in affected patients could cause aspiration pneumonia, low oxygen saturation, and dietary deficiency, leading to increased hospitalization and death rates [11, 14]. The prevalence of dysphagia among COVID-19 patients is high (almost 30%) [3, 20], and the prevalence of oropharyngeal dysphagia in elderly patients is also high [19, 21, 22].

Early intervention by a speech language pathologist (SLP) can help prevent aspiration and related complications in many cases [5, 17].

The treatment of dysphagia requires a wide range of clinical and physical evaluations. It can include droplets,

aerosols, and osculation by viral particles as well. Despite the importance of dysphagia, little is known about the length of the course of recovery after hospital discharge [23, 24]. In cases of dysphagia during the COVID-19 pandemic, speech therapy programs are very important. As COVID-19 is a new illness, approaches to the clinical examination and management of dysphagia should be modified. Accordingly, a routine dysphagia rehabilitation program requires alteration.

The current paper purposed to answer the question, "What is the modified management of dysphasia by SLPs in COVID-19 cases?" This narrative review focuses on common documentation of COVID-19 transmission with emphasis on routine dysphagia-linked screening, diagnostics, and intervention and the recognition of risks to frontline healthcare employees in addition to recommendations for SLPs in order to reduce transfer in this area, provide convenient referrals, and offer early suitable interventions.

Methods

All English-language papers published in international peer-reviewed journals were considered for this review. Abstracts without the full text of the articles were excluded. Participants infected with COVID-19 and suffering dysphasia were considered regardless of age or gender.

Information Sources and Study Selection

Medline, PubMed, Google Scholar, and Scopus databases were searched for information about 'COVID19 and dysphagia,' using search words such as "COVID19 and

Table 1: Main topics of articles about the management of dysphagia by speech language pathologists during the COVID-19 pandemic

Main topics in articles	Key points of the results
Possibility of dysphagia intervention and COVID-19 transmission	<ul style="list-style-type: none"> ● SLP management can consist of respiratory tract function (speaking, breathing, feeding) ● Oropharyngeal dysphagia evaluations are extremely ● Coughing is known as an origin for aerosol droplet emissions and is commonly generated during dysphagia evaluation ● All clinical and interventional evaluation of swallowing may be due to cough, gag, or sneeze, and maybe following aerosolization.
Swallowing evaluation in patients with COVID-19	<ol style="list-style-type: none"> 1. Cough testing Cough reaction evaluation should be excluded in all patients with COVID-19. 2. Dysphagia instrumental evaluations VFSS is a safer choice at this time. VFSS is best used only when there is a risk of aspiration and dysphagia.
Dysphagia screening tools	<ul style="list-style-type: none"> ● Seirei dysphagia screening questionnaire ● Yale Swallow Protocol ● Eating Assessment Tool-10 ● The above-named tests for dysphagia can be performed over cell phone or video call. ● Repetitive saliva swallowing test, cervical auscultation of swallowing, water swallow assessment, and food tests are simple screening tests for dysphagia.
Swallowing treatments for COVID-19 patients	<ol style="list-style-type: none"> 1. Expiratory muscle strength training SLP should remain at a minimum distance of 1.5 m from patient during the intervention. 2. Dietary texture modification Conservative management of dysphagia such as diet modification is used as a first choice treatment in place of active exercise.
Swallowing exercises	<ul style="list-style-type: none"> ● Neck stretching ● Movement of tongue and lip, neck, lip, tongue, cheek ● Jaw movements ● Tongue-holding maneuver ● Shaker exercises are routinely performed for patients with dysphagia. These exercises are considered low risk for infection.
Swallowing maneuvers	Supraglottic swallowing can cause volitional coughing and should be avoided throughout the COVID-19 pandemic.
Sensory stimulation	Sensory stimulation (cold and sour) puts patient at risk of infection. Do not use these practices in COVID-19 cases.

dysphagia,' 'speech therapy and COVID19,' 'COVID19 and dysphagia speech and language pathologist.' As this narrative review focuses on interventions for dysphagia during the COVID-19 pandemic, those articles recognized by this search strategy and related to the keywords were carefully chosen. Eligibility was assessed independently by the reviewer who screened paper titles and abstracts. In all, only 83 articles were considered for this review, as the number of clinical or original articles regarding this

topic was limited.

Results

The main topics in articles about the management of dysphagia by speech language pathologists during the COVID-19 pandemic are presented in Table 1. Table 2 presents the characteristics of the articles that were considered in this study.

Table 2: Characteristics of the reviewed articles

Authors and year	Participants	Study purpose	Study Design	Main results
Ekwueme. et al., 2020	None experimental	Provide guidance for rehabilitation healthcare during the COVID-19 crisis.	Review	<ol style="list-style-type: none"> 1. Reduction of spread of COVID-19 2. No contact with the patient when possible 3. Specific form of PPE 4. How to include patients with disorders 5. Easy documentation
Falvey, J. R. et al., 2020	None experimental	Description of physical therapy during COVID-19	Viewpoint	<ol style="list-style-type: none"> 1. Encourage all therapists to work as an essential member of healthcare team 2. Performane of telehealth visits. 3. Meet patients' needs by providing limited face-to-face visits 4. Use of PPE.
Dziewas. et al., 2020	None experimental	How several problems of COVID-19 may impair central and peripheral parts of the swallowing system.	Letters to editor	Description of dysphagia pathophysiology in COVID-19 patients
Dawson, C. et al., 2020	736	Diagnosis and management of COVID-19	Clinical	<ol style="list-style-type: none"> 1. 28.9% of patient were evaluated for swallow problems 2. 102 patients were hospitalized in ICU 3. 82 patients were tracheostomized.
Coutts, K. A., 2020	None experimental	Relationship between dysphagia and COVID-19	Brief overview	This is a new area needing further research.
Fong et al., 2020	None experimental	Dysphagia management strategies during COVID-19 pandemic	Review	Methods of dysphagia therapy
Brodsky et al., 2020	None experimental	Re-evaluation of swallowing in patients after COVID-19 pandemic	Viewpoint	Suggestion of the best methods for re-evaluation of dysphagia after COVID-19 pandemic
Frajkova et al., 2020	None experimental	Brief review of available data on possible mechanisms of post-intubation dysphagia in COVID-19 patients.	Contemporary review	<ol style="list-style-type: none"> 1. Telemedicine suggestion 2. Observe distance 3. Weaker performance of FEES and VFSS
Bolton et al., 2020	None experimental	Dysphagia assessment and risk of transmission	Rapid review	To present strong theoretical reasons to support that dysphagia evaluation is considered an AGP.
Aoyagi, Y. et al., 2020	A 70-year-old male	Case report of man with oropharyngeal dysphagia and COVID-19.	Case Report	<ol style="list-style-type: none"> 1. Glossopharyngeal and vagal neuropathy possibly due to dysphagia following COVID-19. 2. Subsequent aspiration pneumonia might be overlooked in severe respiratory infection during COVID-19.
Aoyagi, Y. et al., 2021	None experimental	Safe and efficient strategies for management of dysphagia	Narrative review	<ol style="list-style-type: none"> 1. Suggestion to use tele-rehabilitation 2. Use of a PPE
Fernández-Ruiz, V. E. et al., 2021	33 Patients	Telehealth consultation during COVID-19 pandemic.	Observational study	<ol style="list-style-type: none"> 1. The mean age of patients was 83.5±7.6 years. 2. 51.5% of patients had neurodegenerative disease followed by cerebrovascular disease. 3. Mean total score of SWAL-QOL increased to 75.1±16.4 points.
Zanon, A. et al., 2021	72-year-old man	Description of case with COVID-19 pneumonia.	Case report	Post-intubation dysphagia might become neurosensory dysphagia
Fritz, M. A. et al., 2021	None experimental	To introduce a practical algorithm for dysphagia clinicians	Review	<ol style="list-style-type: none"> 1. To provide a schematic dysphagia evaluation and treatment 2. Suggestion of telemedicine 3. Dysphagia intervention
Longobardi, Y. et al., 2021	84 patients	Voice prosthesis complications management	Prospective cohort study	<ol style="list-style-type: none"> 1. In 62.16% of cases, a video call was sufficient to manage the problem. 2. Cases showed significant reduction in levels of anxiety and depression after video call. 3. Video call approach is a viable support method in rehabilitation.
Ishkanian, A. and Mehl, A., 2020	A 58-year-old woman)	Description of a COVID-19 case with a history of diabetes	Case report	<ol style="list-style-type: none"> 1. The patient had myositis. 2. The patient had persistent pharyngeal dysphagia. 3. Hyolaryngeal excursion was often absent.

Kimura, Y. et al., 2020	None experimental	Assessment and management of COVID-19	Review	New management methods for patients with COVID-19.
Korupolu, R. et al., 2020	None experimental	Rehabilitation challenges in patients with COVID-19	Review	Rehabilitative recommendation for reduction of long-term complications
Mattei, A. et al., 2020	None experimental	Provide clinical guidelines for dysphagia and dysphonia management in COVID-19 pandemic	Viewpoint	1. Vocal rehabilitation is not urgent in the current epidemic context. 2. Management of swallowing disorders is main concern. 3. Teleconsultation is a good management practice.
McNeary, L. et al., 2020	None experimental	Navigation of coronavirus disease	Viewpoint	Recommendation to use the CAN model during natural disasters.
Miles, A. et al., 2020	None experimental	COVID-19 transmission during dysphagia practical management	Review	Drawing evidence for dysphagia interventions, including dysphagia screening and telehealth
Mohan, R. and Mohapatra, B., 2020	None experimental	Risk and problems of oropharyngeal dysphagia in patients with COVID-19	Review	1. Incoordination between respiratory and swallowing can cause oropharyngeal dysphagia.
Osbeck Sandblom, H. et al., 2020	None experimental	COVID-19 transmission during practical dysphagia management	Review	Recommendation of dysphagia screening by telehealth
Schindler, A. et al., 2020	None experimental	Swallowing disorders in clinical practice during the COVID-19 pandemic	Review	1. Assessment of dysphagia is an aerosol-generating procedure. 2. PPE should be worn. 3. Telepractice is encouraged. 4. Recommend compensatory treatments
Soldatova, L. et al., 2020	None experimental	Modified dysphagia evaluation	Viewpoint	To provide an algorithm for the assessment and diagnosis of COVID-19 in patients with dysphagia symptoms.
Traugott, M. et al., 2020	A 71-year-old female patient	Report of a case with severe neurogenic post-extubation dysphagia	Case report	Pharyngeal electrical stimulation is an effective treatment in this case.
Zaga, C. J. et al., 2020	None experimental	Safe patient evaluation	Review	1. Warning for tracheostomy care during COVID-19 pandemic 2. Type of PPE for reduction of risk

Discussion

Dysphagia Intervention and COVID-19 Transmission Risk

In the past, practical consideration of SLP procedures that may generate aerosols or cause infections did not exist [25]. SLP management involves functions of the respiratory system (breathing, feeding, speaking) [18]. It is reported that 96% of patients with COVID-19 suffer from dysphagia [14].

Oropharyngeal dysphagia evaluations are extremely convenient and may include a broad range of interventions. These evaluations include clinical swallowing assessment, preparation of remedial oral attendance, fibrotic endoscopic assessment of swallowing, video fluoroscopy swallowing examination, and cough reflex testing [26]. Dysphagia assessment for a patient's ability to swallow can be performed in acute care and speech therapy clinics [26].

Coughing is known to originate from aerosol droplet emissions and is commonly generated during dysphagia evaluation. Secretions exhaled during forceful coughing are important routes for virus transfer [22, 26]. Therefore, several components of which voluntary cough and swallowing observation in addition to different food textures are considered for this problematic condition [5].

All clinical and interventional assessments of swallowing, such as the video fluoroscopic swallow study (VFSS) [5, 8, 9, 18, 25], flexible endoscopic evaluation of swallowing (FEES) [5, 6, 8, 9, 13, 18, 25], rigid stroboscopy [6], manometry and trans-nasal endoscopy (TNE) [5, 6, 8], nasogastric tube insertion and removal [5, 6, 9], and the modified barium swallow study (MBSS) [8] may increase the instance of cough, gag, and sneeze

following aerosolization [4-6]. In addition, the inability of patients to wear face masks or coverings during testing presents a significant risk as AGPs for speech-language pathologists engaged in this field [5, 6].

Generally, reflexive coughing caused by the inhalation of food into the respiratory system is a common condition during dysphagia assessment [27, 28].

Dysphagia frequently causes aspiration pneumonia in patients with oral, pharyngeal, and laryngeal weakness (secondary to intubation, ICU acquired disability, or neurological disorder). It can also reduce patients' ability to manage his/her oral secretions and protect the airway [1, 15, 18, 26]. Therefore, patients with COVID-19 and dysphagia are prone to cough more because of the aspiration of saliva, food, or liquids [14, 26].

Swallowing Assessment in Patients with COVID-19

The best evidence the middle of publication was considered to advise practical clinical evaluation and treatment of swallowing during COVID-19 pandemic [18, 19].

Cough Testing

It is suggested that cough reflex assessment should be eliminated for all patients with COVID-19 [10, 22, 29], and the initial swallowing evaluation and performance of the first therapeutic management should be applied on a case-by-case basis [27]. Close contact with COVID-19 positive patients should be reduced [10]. The literature recommends that in evaluating swallow in cases of suspicious or known COVID-19 infection, the assessor should use personal protective equipment (PPE) [13, 22, 29, 30].

Dysphagia Instrumental Evaluations

Dysphagia instrumental evaluations are utilized to

identify the disorder and distinguish the therapy program and exercises for developing swallowing physiology (i.e., strength, duration, and coordination of swallowing movements), recovering bolus flow, and advice for diet consistencies/modifications with oral or non-oral routes [4, 30]. VFSS and FEES are both appropriate exams for evaluating dysphagia; however, workers need to be aware of the relative risks with these methods during the COVID-19 pandemic [12, 13, 31]. It is suggested that VFSS is a safer option than FEES at this time [12, 31]. In addition, VFSS is better used only when there is an increased risk of aspiration and dysphagia [10]. During COVID-19, VFSS is preferable to FEES, because VFSS does not involve invasive tools, and SLPs can be supported at a greater distance from the patient during the test [12]. It is suggested that full PPE (N95 mask, gown, a head cover, eye protection, and a face shield) should be worn if AGPs are attempted, with proper COVID-19 screening and testing done before the examination [3, 8, 13, 29]. It is further suggested that the earliest date for FEES is 7–10 days after extubation in cases with COVID-19 [15].

Rehabilitation Activities

Rehabilitation activities and admissions of “classical” patients should be stopped or reduced [5]. If high-risk procedures cannot be delayed for a COVID-19 patient, they should be performed with the least number of persons and with adequate PPE [3, 13, 31].

Dysphagia Screening Tools

A recent paper reported that screening tools for dysphagia, such as the Seirei questionnaire of swallowing [31], Yale swallow protocol, and eating assessment tool-10 [8, 11, 13, 31] can be used to detect dysphagia [31] through a cell phone or video call [8]. Additionally, simple screening tests, comprising the repetitive saliva swallowing test, and the eating assessment tool 10, are applied for dysphagia screening. It is suggested that assessment tests for dysphagia screening by the ICU staff would also be useful where SLPs might not be available [13]. Also, patients can also be asked to do self-management of swallow screening using a standard screening order [8]. With this approach, the assessor can see and communicate directly with patients and/or staff from an isolated place [30, 32]. Results of a new study showed that televisits could decrease anxiety/depression in patients with laryngectomy during the pandemic [29, 32].

It is noteworthy that the validity of dysphagia assessment is higher in patients with clinical swallow assessment than virtual assessment [8, 22, 33]. When a case break down the screening, a virtual assessment with an SLP can be performed to advise diet modifications, use distinguishing indications for emergency instrumental swallow examination, and to perform virtual treatment courses [8]. The benefit of virtual screening during the COVID-19 pandemic is that some of the data can be discerned from a patient’s medical history, reducing the duration of communication and risk of virus transfer [10, 25, 29]. A recent study recommended that once a patient fails the swallowing screening, the use of an NG rather

than a PEG tube would be suggested [10]. This is a very important recommendation to reduce the risk of virus transfer for both cases and clinicians [10].

AGPs are defined as tools for sensory testing of pharynx or flexible endoscopic assessment of swallowing. They are very high risk tests and require different PPE [31]. A regional cranial nerve examination should also be performed, focusing on the labial and lingual range of motion as well as coordination [8]. The posture of the head-neck and its spontaneous movements should be observed [8]. Strength of cough, quality of voice, and ability to clear secretions should be evaluated virtually [8]. Urgent imaging and endoscopic evaluation are needed when dysphonia is present or laryngeal and other head and neck pathology is suspected [8].

The repetitive saliva swallowing test (RSST), cervical auscultation of swallowing, water swallow assessment, and type of food test are all simple screening tests for dysphagia [31]. RSST and cervical auscultation of swallowing is recommended for cases using a mask without oral intake, so the risk of aerosol generation will be extremely low [22, 31].

Other Swallowing Assessments

Tongue pressure, pharyngeal manometry, and swallowing imaging are all AGPs, and they are not commonly advised [13, 31]. On the other hand, voice rehabilitation is not urgent at this time [9]. Therefore, these suggestions for intervention of swallowing disorders during pandemic may be high-risk for the patient [9].

Swallowing Treatment in Cases with COVID-19

SLPs perform dysphagia treatments in close proximity with cases and are at high for transmission of the COVID-19 virus [29, 31]. Direct contact with a case’s oral mucosa and secretions could occur because of coughing and sneezing during the performance of both indirect (non-swallowing) and direct (swallowing) exercises. Thus, if the SLP or patient is an asymptomatic or pre-symptomatic carrier of COVID-19, the virus may be transferred between them [31]. It is strongly advised that standard methods for AGPs, such as use of PPE, hand washing, and disinfection equipment, be used during swallowing treatment [13, 19, 22, 31].

It is reported that the risk of COVID-19 transmission depends on the way that an exercise is performed [31].

Expiratory Muscle Strength Training

Expiratory muscle strength training (EMST) is performed to improve swallowing in dysphagia patients [13, 22, 29]. As EMST involves blowing air into a device, the SLP should avoid advising this procedure for high risk patients [22, 29]. EMST is performed only for patients who have undergone a standard level of care, and the SLP should remain at a minimum distance of 1.5 m from the patient during the intervention [22].

Dietary Texture Modification

Dysphagia management in at-risk patients is done confidentially with diet alteration and swallowing

maneuvers [3]. Direct interventions should be performed when these at-risk patients are cleared after quarantining in the care facility [17]. Sometimes, conservative management of dysphagia, such as diet modification, is used as a first choice treatment instead of active exercise [3, 13, 21].

Swallowing Exercises

Neck stretching, movement of oral organs (tongue, lip, cheek), and jaw exercises without contact with the patient's oral cavity, the tongue-holding maneuver and head-lifting exercises (Shaker exercise) are all exercises that are routinely performed for patients with dysphagia. These exercises are considered to have a low risk for infection, but clinicians are advised to use proper PPE and maintain a suitable distance from the patient during rehabilitation [3, 13, 31].

During the performance of exercises (strengthening of the lip, tongue, cheek, gum, and jaw), the SLP puts their fingers into the oral cavity of the patient and touches the mucosa that has a potential risk for infection [31]. Exercises with a potentially high risk of infection are those stimulating the cough reflex (aerosol-generating procedures), thermal-tactile stimulation, tube-swallowing exercises, and ice-chip swallowing exercise [31]. Other swallowing exercises that can be considered are tracheostomy and laryngectomy intervention, oral strength therapy using the Iowa oral performance instrument, high-resolution manometry, pharyngeal electrical stimulation, and expiratory muscle strength training.

Straight exercises, such as correction of posture and compensatory swallowing maneuvers, can affect patients with infection. Therefore, the SLP should select a suitable regimen level for dysphagia, posture of the patient, and swallowing maneuvers so that the patient does not clear their throat or cough during dysphagia rehabilitation [31].

Oral motor tests and swallow trials are AGPs [22], and the SLP should reduce their risk of exposure by decreasing their involvement in the performance of AGPs [22].

Swallowing Maneuvers

Several swallowing maneuvers, e.g., the supraglottic swallow, can result in voluntary coughing after swallowing to clear food from the airway [22, 29]. The mentioned maneuvers should be avoided during the COVID-19 pandemic in order to decrease the risk of infection during the AGP and the risk of its transmission to other patients as well [22, 29].

The use of a mirror or a tablet is recommended for giving instructions and feedback to cases. Additionally, providing a self-education program and showing exercises by pictures or movies have been advised to decrease the risk of contamination during swallowing therapy during the COVID-19 pandemic [31].

Sensory Stimulation

It has been shown that cold and sour stimulants may trigger gagging and coughing responses in patients, and the SLP is close to the patient while performing such maneuvers [22]. Therefore, sensory stimulation carries a

higher risk of transfer of infection [22]. These situations should be totally avoided in cases with COVID-19, because they are at risk and should be totally avoided in patients at the standard degree of care [22].

Compensatory Strategy

Different scales, shapes, and models of services are used as other compensatory plans in applying CSE and dysphagia therapy. Tools for food and containers were frequently changed to create disposable options so as to reduce the risk of infection during the Covid-19 pandemic. Therefore, the use of services and containers as a compensatory plan for dysphagia therapy should be reduced [22, 29].

General Recommendations for SLP in COVID-19

Dysphagia rehabilitation and indication of treatment in the COVID-19 pandemic differ from the usual. They are more complex and difficult and should be done according to the updated recommendations from the fast-developing scientific knowledge base [4]. It is acknowledged that a significant risk is associated with delaying treatment in patients with swallowing disorders; therefore, the importance of dysphagia evaluation and treatment duration should not be underestimated [4, 13]. It should be kept in mind that there is a risk of virus transfer by aerosol emissions, so SLPs should wear proper personal protective equipment when in contact with patients with COVID-19 [27].

Standard precautions that should be considered during COVID-19 pandemic are 1) physical distancing, 2) hand hygiene, 3) use of PPE, 4) goggles or disposable face shield for eye protection, and 5) gloves [4, 6, 22, 30]. No member of a rehab team should share PPE or tools with their colleagues or reuse PPE if it has not been properly sterilized [30]. All rehabilitation team members should be trained on how to prevent or control infection, the use of PPE, and other provisory and safety policies [13, 22, 30, 34].

SLPs must understand the transmission risk of COVID-19 and the proper use of PPE [3, 6, 13, 22].

A distance of at least 1.5 m should be maintained, and hand cleanliness procedures should be followed prior to and after contact with patients and surrounding environmental surfaces as well as after removing PPE [13, 22, 31]. An impermeable long-sleeved gown should be used for physical protection, a surgical cap should be used for head exposure protection, and after affixing the cap, the hair should not be exposed. Removal of PPE may inadvertently spread the infection [31].

Different criteria comprising a patient's situation (e.g., viral load), juncture of device, flow rate, size of room, air confusion, room temperature, and particle size are affected by the quantity, release, period, and contents of medical aerosols. Gains in treatment and knowledge of which PPE should be used in each setting are influenced by knowledge of viable pathogens in aerosols [6]. It should also be considered that patients with COVID-19 need to self-isolate for a 14-day period [12]. Newer technology such as tele-rehabilitation systems can be useful options [13, 19, 21, 22, 29, 35].

Conclusion

As instrumental assessments/evaluations of swallowing should be reduced during the COVID-19 pandemic, SLPs and dysphagia clinicians should find different ways to achieve appropriate evaluation and treatment of patients with suspected dysphagia. Compensatory treatments should be considered. Tele-health is one assessment method for performing a clinical evaluation during the pandemic. Clinical swallowing rehabilitation examinations should be done with basic PPE, even for those whose COVID tests are negative. As there is a high risk for infection during FEES exams, the modified barium swallow test should be used during the COVID-19 pandemic.

Generally, swallowing therapy should be done by tele-health whenever possible to reduce the possibility of infection transfer. Additionally, tele-health or other new technology-based options, such as mobile applications, can be used when available. SLPs should try to adjust their virtual visits to provide the highest possible care level.

Conflict of Interest: None declared.

References

- Traugott M, Hoepler W, Kitzberger R, Pavlata S, Seitz T, Baumgartner S, et al. Successful treatment of intubation-induced severe neurogenic post-extubation dysphagia using pharyngeal electrical stimulation in a COVID-19 survivor: a case report. *J Med Case Rep.* 2021;15(1):1-8.
- Ishkanian A, Mehl A. Clinical Conundrum: Dysphagia in a Patient with COVID-19 and Progressive Muscle Weakness. *Dysphagia.* 2020;1-2.
- Dawson C, Capewell R, Ellis S, Matthews S, Adamson S, Wood M, et al. Dysphagia presentation and management following coronavirus disease 2019: an acute care tertiary centre experience. *J Laryngol Otol.* 2020;134(11):981-6.
- Fritz MA, Howell RJ, Brodsky MB, Suiter DM, Dhar SI, Rameau A, et al. Moving forward with dysphagia care: implementing strategies during the COVID-19 pandemic and beyond. *Dysphagia.* 2021;36(2):161-9.
- Kiekens C, Boldrini P, Andreoli A, Avesani R, Gamna F, Grandi M, et al. Rehabilitation and respiratory management in the acute and early post-acute phase. "Instant paper from the field" on rehabilitation answers to the Covid-19 emergency. *Eur J Phys Rehabil Med.* 2020;06305-4.
- Miles A, Connor NP, Desai RV, Jadcherla S, Allen J, Brodsky M, et al. Dysphagia care across the continuum: a multidisciplinary Dysphagia Research Society Taskforce report of service-delivery during the COVID-19 global pandemic. *Dysphagia.* 2020;1-13.
- Lechien JR, Chiesa-Estomba CM, Cabaraux P, Mat Q, Huet K, Harmegnies B, et al. Features of Mild-to-Moderate COVID-19 Patients with Dysphonia. *J Voice.* 2020.
- Soldatova L, Williams C, Postma GN, Falk GW, Mirza N. Virtual Dysphagia Evaluation: Practical Guidelines for Dysphagia Management in the Context of the COVID-19 Pandemic. *Otolaryngol Head Neck Sur.* 2020;0194599820931791.
- Mattei A, de la Bretèque BA, Crestani S, Crevier-Buchman L, Galant C, Hans S, et al. Guidelines of clinical practice for the management of swallowing disorders and recent dysphonia in the context of the COVID-19 pandemic. *Eur Ann Otorhinolaryngol Head Neck Di.* 2020;137(3):173-5.
- Frajkova Z, Tedla M, Tedlova E, Suchankova M, Geneid A. Postintubation dysphagia during COVID-19 outbreak-contemporary review. *Dysphagia.* 2020;35(4):549-57.
- Mohan R, Mohapatra B. Shedding Light on Dysphagia Associated With COVID-19: The What and Why. *OTO Open.* 2020;4(2):2473974X20934770.
- Ku PK, Holsinger FC, Chan JY, Yeung ZW, Chan BY, Tong MC, et al. Management of dysphagia in the patient with head and neck cancer during COVID-19 pandemic: Practical strategy. *Head & Neck.* 2020.
- Aoyagi Y, Inamoto Y, Shibata S, Kagaya H, Otaka Y, Saitoh E. Clinical manifestation, evaluation, and rehabilitative strategy of dysphagia associated with COVID-19. *Am J Phys Med Rehabil.* 2021;100(5):424.
- Osbeck Sandblom H, Dotevall H, Svennerholm K, Tuomi L, Finizia C. Characterization of dysphagia and laryngeal findings in COVID-19 patients treated in the ICU—An observational clinical study. *Plos one.* 2021;16(6):e0252347.
- Zanon A, Cacciaguerra L, Martelli G, Filippi M. Neurosensory dysphagia in a COVID-19 patient. *J Neurol.* 2021;1-3.
- Korupolu R, Francisco GE, Levin H, Needham DM. Rehabilitation of critically ill COVID-19 survivors. *The Journal of the International Society of Physical and Rehabilitation Medicine.* 2020;3(2):45.
- Aoyagi Y, Ohashi M, Funahashi R, Otaka Y, Saitoh E. Oropharyngeal Dysphagia and Aspiration Pneumonia Following Coronavirus Disease 2019: A Case Report. *Dysphagia.* 2020;1-4.
- Coutts KA. Dysphagia services in the era of COVID-19: Are speech-language therapists essential?. *S Afr J Commun Disord.* 2020;67(1):1-6.
- Eyigör S, Umay E. Dysphagia management during COVID-19 pandemic: A review of the literature and international guidelines. *urk J Phys Med Rehabil (2587-1250).* 2021;67(3).
- Marchese MR, Ausili Cefaro C, Mari G, Proietti I, Carfi A, Tosato M, et al. Oropharyngeal Dysphagia After Hospitalization for COVID-19 Disease: Our Screening Results. *Dysphagia.* 2021;1-7.
- Fernández-Ruiz VE, Paredes-Ibáñez R, Armero-Barranco D, Sánchez-Romera JF, Ferrer M. Analysis of Quality of Life and Nutritional Status in Elderly Patients with Dysphagia in Order to Prevent Hospital Admissions in a COVID-19 Pandemic. *Life.* 2021;11(1):22.
- Fong R, Tsai KC, Tong MC, Lee KY. Management of Dysphagia in Nursing Homes During the COVID-19 Pandemic: Strategies and Experiences. *SN Compr Clin Med.* 2020;2(9):1361-5.
- Brodsky MB, Gilbert RJ. The Long-Term Effects of COVID-19 on Dysphagia Evaluation and Treatment. *Arch Phys Med Rehabil.* 2020.
- Brodsky MB, Huang M, Shanholtz C, Mendez-Tellez PA, Palmer JB, Colantuoni E, et al. Recovery from dysphagia symptoms after oral endotracheal intubation in acute respiratory distress syndrome survivors. A 5-year longitudinal study. *Ann Am Thorac Soc.* 2017;14(3):376-83.
- Zaga CJ, Pandian V, Brodsky MB, Wallace S, Cameron TS, Chao C, et al. Speech-Language Pathology Guidance for Tracheostomy During the COVID-19 Pandemic: An International Multidisciplinary Perspective. *Am J Speech Lang Pathol.* 2020;1-15.
- Bolton L, Mills C, Wallace S, Brady MC, COVID LTR, Group A. Aerosol generating procedures, dysphagia assessment and COVID-19: A rapid review. *Int J Lang Commun Disord.* 2020.
- Dziewas R, Warnecke T, Zürcher P, Schefold JC. Dysphagia in COVID-19—multilevel damage to the swallowing network?. *Eur J Neurol.* 2020.
- Falvey JR, Krafft C, Kornetti D. The essential role of home- and community-based physical therapists during the COVID-19 pandemic. *Physical therapy.* 2020;100(7):1058-61.
- Schindler A, Bajens LW, Clave P, Degen B, Duchac S, Dziewas R, et al. ESSD commentary on dysphagia management during COVID pandemic. *Dysphagia.* 2020;1-4.
- Ekwueme A, Rockson A, Soliloye O, Fanfon T, Agoriwo M, Anekwu E, et al. Rehabilitation of patients with COVID-19 in African Settings: Guidance for Community Based Rehabilitation Workers". 2020.
- Kimura Y, Ueha R, Furukawa T, Oshima F, Fujitani J, Nakajima J, et al. Society of swallowing and dysphagia of Japan: Position statement on dysphagia management during the COVID-19 outbreak. *Auris Nasus Larynx.* 2020;47(5):715-26.
- Longobardi Y, Galli J, D'Alatri L, Savoia V, Mari G, Rigante M, et al. Patients with voice prosthesis rehabilitation during the COVID-19 pandemic: analyzing the effectiveness of remote triage and management. *Otolaryngol Head Neck Surg.* 2021;164(2):277-84.
- Ward EC, Burns CL, Theodoros DG, Russell TG. Impact of dysphagia severity on clinical decision making via telerehabilitation. *Telemed J E Health.* 2014;20(4):296-303.
- McNeary L, Maltser S, Verduzco-Gutierrez M. Navigating coronavirus disease 2019 (Covid-19) in psychiatry: a CAN report for inpatient rehabilitation facilities. *PM & R: the journal of injury, function, and rehabilitation.* 2020.
- Mills CS, Michou E, Hanratty A, Gibson A, Bellamy MC. The adaptation of the Leeds Post-Extubation Dysphagia Screen: Lessons learned during the COVID-19 pandemic. *J Intensive Care Soc.* 2021;1751143721998140.