

## SPECIAL REPORT

### SPEECH-LANGUAGE PATHOLOGISTS' ROLE IN THE MULTI-DISCIPLINARY MANAGEMENT AND REHABILITATION OF PATIENTS WITH COVID-19

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**Respiratory and neurological complications in patients in various stages of COVID-19 emphasize the role of speech-language pathologists in the assessment and management of swallowing and communication deficits in these patients. The speech-language pathologist works within a multidisciplinary team to identify these deficits, and aims to improve swallowing, nutrition, hydration, speech, and quality of life in the medical settings. This paper describes the unique symptoms and complications associated with COVID-19 that require speech-language pathologist services in medical (acute care, inpatient, and outpatient rehabilitation) facilities. The speech-language pathologist is primarily responsible for dysphagia screening and diagnosis in the acute care units, dysphagia and tracheostomy management in the inpatient units, and swallowing, speech and voice rehabilitation and neurocognitive management in the outpatient units. This paper also discusses the current therapeutic services and the precautions that speech-language pathologists must take to reduce transmission of the virus.**

*Key words:* COVID-19; speech-language pathologist; swallowing; communication; aerosol precaution; tele-practice.

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The novel Coronavirus disease 2019 (COVID-19) pandemic has created a significant shift in the way healthcare services are provided. According to the World Health Organization (WHO), there have been 7,145,539 confirmed cases and 408,025 deaths from COVID-19 as

#### LAY ABSTRACT

The role of speech-language pathologists in assessing and managing swallowing, cognition, and communication in patients with COVID-19 is not yet widely understood. This paper provides a perspective of the field, and the role of speech-language pathologists in providing services in healthcare facilities to patients tested positive for coronavirus. The paper also explains the unique symptoms and complications associated with COVID-19 that require speech-language pathologists' services in medical facilities. It also describes the current procedures and guidelines for speech-language pathologists in order to reduce contraction and transmission of the virus, and highlights current alternative platforms, such as tele-medicine, for therapeutic services.

of 10 June 2020 (1). This infectious disease is caused by the severe acute respiratory syndrome associated coronavirus 2 (SARS-CoV-2). People infected by the virus often develop fever, cough, shortness of breath, mild-to-severe respiratory disease, and/or pneumonia. In critically ill patients, the infection can result in acute respiratory distress syndrome (ARDS), characterized by sudden breathlessness, rapid breathing, dizziness, tachycardia, and excessive sweating. It can further lead to multiple organ failure and hypoxic respiratory insufficiency (2). The virus gradually spreads to the brain from the respiratory tract, and possibly the gut through swallowing. In addition to respiratory symptoms, COVID-19 infection can also result in impaired olfactory and gustatory perception and gastrointestinal symptoms (3). COVID-19 is likely to have a more severe effect in elderly people and those with concomitant illnesses, such as cardiovascular

and pulmonary diseases, diabetes, and stroke. Many healthcare professionals, including physicians, nurses, respiratory therapists, and other medical staff are working very hard to provide immediate and necessary services to patients affected by COVID-19.

Speech-language pathologists (SLPs) play a critical role in the care of patients with COVID-19 (4, 5). SLPs within healthcare facilities (acute care, inpatient and outpatient rehabilitation) in the United States collaborate with a clinical care team, including primary physicians, neurologists, otolaryngologists, nurses, dietitians, social workers, case managers, respiratory therapists, pharmacists, physical therapists, and other rehabilitation professionals, in the treatment and rehabilitation of patients with COVID-19. Referrals to SLP can be made by any member of the care team who observes signs of swallowing, cognitive, and/or communication deficits. Swallowing impairment (dysphagia) is one of the major complications of ARDS secondary to COVID-19 (6). ARDS compromises the respiratory system, which can result in incoordination of respiratory-swallowing systems (7). Oropharyngeal dysphagia, which includes food residue in the throat and aspiration into the airway, causes further deterioration of ventilatory functions (8) and is considered a major risk factor for aspiration pneumonia among frail and immunocompromised older adults (9). Patients with severe ARDS may be intubated for mechanical ventilation (10). Short- and long-term intubation may result in laryngeal injury, which affects swallowing and voice (11), and up to 62% of patients who are extubated may be at risk of dysphagia (12). Post-extubation dysphagia has been associated with poor outcomes, such as risk of developing pneumonia, need for feeding tubes, malnutrition, longer hospital stays, and in-hospital mortality (13).

## SLP SERVICES IN REHABILITATION OF PATIENTS WITH COVID-19

The role of the SLPs in acute and rehabilitation units is determined primarily by the needs of the patients. While there are limited evidence-based intervention guidelines for patients with COVID-19, the following are drawn from current clinical practice in patients with COVID-19 and other respiratory disorders with concomitant dysphagia (such as in ARDS and chronic obstructive pulmonary disease) (Fig. 1).

### Intensive and acute care units

In intensive care units (ICU) and acute care units, the primary role of the SLP is the identification and diagnosis of dysphagia.

*Dysphagia screening and assessment.* Post-extubation dysphagia screening is a recommended practice in the management of patients with COVID-19, owing to the increased incidence of dysphagia in severe and critically ill patients with COVID-19 (14). The American Association of Critical Care Nurses recommends obtaining a swallowing evaluation prior to initiating oral feeding in patients intubated for longer than 2 days (15). While nurses use post-extubation dysphagia screening tools (e.g. the dysphagia screening tool developed by Johnson et al. (16)), SLPs typically perform clinical bedside screenings that include assessment of the patient’s medical history, examination of the structure and function of the oropharynx, and trial swallows of food and liquids.

### Inpatient Rehabilitation units

Once the patient is medically stable, he/she is transferred to an inpatient unit within the hospital or a transitional

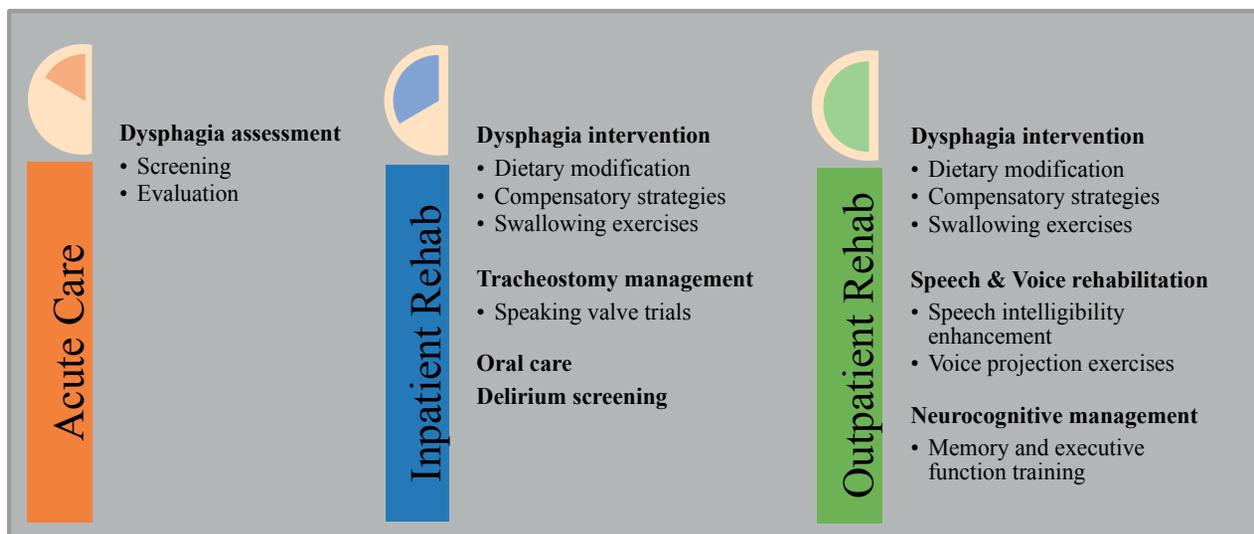


Fig. 1. Speech-language pathologists’ rehabilitative services for patients with COVID-19

rehabilitation unit. In these rehabilitation units, the SLP's primary management goals for COVID-19 patients with dysphagia are to eliminate or reduce the risk of aspiration pneumonia and to maintain nutrition and hydration through dietary modification and behavioural interventions. Dysphagia intervention services depend on various factors, such as lung function, patient's age, extent of laryngeal trauma, and comorbid conditions.

**Dietary modification.** Many patients who have been intubated in the ICU will be on nasogastric or enteral feeding for nutrition and hydration (17). In collaboration with the primary physician, dietitian, nurse, gastroenterologist, respiratory therapist, and pulmonologist, the SLP determines the safety of oral feeding and recommends the least restrictive food and liquid diet to minimize the risk of aspiration. Collaboration with the dietitian is also important for any patient with oropharyngeal dysphagia (regardless of oral or non-oral feeding status), as this condition has been consistently associated with malnutrition and dehydration (18).

**Compensatory training.** In order to support safe oral intake of food and liquids, SLPs recommend various compensatory strategies, including postural changes, such as chin tuck, head turn, and/or reclining sitting positions. These postures reduce the risk of aspiration, by affecting the speed and direction of bolus flow away from the laryngeal valve (19, 20). Certain swallowing manoeuvres that require modifying airway closure duration, such as supraglottic swallow, may be initiated only when respiration has improved. During the process, SLPs coordinate with physical and occupational therapists to determine appropriate body positioning during mealtimes, and with nurses and other medical staff to monitor the effectiveness of these compensatory strategies. Furthermore, SLPs may recommend behavioural changes, such as taking small bites when eating, in order to overcome physiological deficits, and reducing environmental distractions to promote safe and intentional control of the food bolus in the mouth (21, 22).

**Swallowing exercises.** In patients requiring mechanical ventilation, neuromuscular weakness and reduced oropharyngeal sensitivity may be observed due to laryngeal trauma from long-term intubation, and muscle weakness and atrophy from prolonged non-use of oropharyngeal structures (22). As respiratory functions improve post-extubation, SLPs recommend swallowing exercises to improve the strength and range of motion of the pharyngeal and laryngeal structures. Some commonly used approaches to improve swallowing functions in post-extubated patients are: effortful swallowing to increase the strength of oropharyngeal muscle contraction and Mendelsohn manoeuvre to increase laryngeal elevation, and consequently duration of upper oesophageal sphincter opening during swallowing (23).

**Tracheostomy management.** Critically ill patients with COVID-19 needing prolonged mechanical ventilation may

receive a tracheostomy to facilitate weaning of ventilation. Extended intubation time and delays in the decision to tracheostomize COVID-19 patients can lead to muscular atrophy, changes in vocal fold and hyolaryngeal movements, and laryngeal trauma that can further impact speech and swallowing. As a result, tracheostomy with and without mechanical ventilation has been associated with aspiration (24), with up to 82% of patients aspirating silently (25). After discharge from the ICU to the inpatient ward, SLPs may evaluate swallowing (prior to initiating an oral diet), and along with the rehabilitation team, determine the eligibility for use of a speaking valve. Speaking valve use in patients with tracheostomy reduces the risk of aspiration, and improves swallowing physiology and olfaction (26, 27). SLPs consult with the physician, otolaryngologist, pulmonologists, and the respiratory team, to discuss the management of swallowing and speech in these patients.

**Oral care and hygiene.** Another common observation in previously intubated patients is bacterial colonization in the oropharynx, due to factors such as increased intake of medications, reduced intake of food or liquids orally, dry mouth, and old age (28). Oropharyngeal colonization may further increase the risk of aspiration pneumonia in patients with COVID-19. Therefore, SLPs work with nurses and occupational therapists to educate the patient about oral hygiene and consistent oral care, such as daily and frequent brushing, moistening of the oral mucosa, and management of oral secretions to prevent aspiration pneumonia, especially among intubated patients and older adults (29).

**Delirium screening.** Due to prolonged invasive respiratory management, sedation and social isolation in hospital wards, patients with COVID-19 are confused, disoriented, and sometimes delirious (30). During these instances, medical staff can use delirium checklists (e.g. the Short Confusion Assessment Method (31), Confusion Assessment Method- Intensive Care Unit (32), and Intensive Care Delirium Screening Checklist (33)) to identify symptoms of inattention, disorganized thinking, inappropriate speech or mood, disorientation, altered levels of consciousness, and sleep/wake cycle disturbances. SLPs can reduce the risk of delirium in patients during other therapy activities by orienting them to time, place, people and situation, and engaging them in cognitively stimulating activities (34).

### **Outpatient rehabilitation units**

In outpatient rehabilitation settings (e.g., specialized clinics, university centres, private practice, and home health therapy), SLPs continue to provide dysphagia intervention services that have already been initiated during inpatient rehabilitation, including modified oral diet, compensatory strategies, and swallowing exercises. In addition, they address some of the long-term outcomes of the problems associated with dysphagia and respiratory distress on voice and cognition by offering intervention and clinical support to improve the patient's quality of life.

*Speech intelligibility enhancement.* For patients with a tracheostomy, swallowing management may involve any of the methods discussed above. SLPs train the patients to swallow and speak by digitally occluding the tracheostomy or using a one-way speaking valve. Speech therapy using a one-way speaking valve has been found to improve speech intelligibility and quality of life in patients with a tracheostomy with or without the use of a mechanical ventilator (35).

*Voice rehabilitation.* Post-intubation dysphonia, characterized by hoarseness of voice and frequent throat clearing, has been commonly observed in patients with prolonged endotracheal intubation (36, 37), which is likely to hinder verbal communication in patients with COVID-19. While the voice may improve with physical recovery of the vocal structures post-extubation, assessment of vocal parameters will be required in patients with persistent dysphonia. Following assessment, the SLPs educate patients about vocal hygiene and provide strategies to improve voice projection and quality (38).

*Neurocognitive management.* In the long term, ARDS survivors have been observed to demonstrate neurocognitive deficits, such as impaired memory, reduced attention, executive dysfunction, global intellectual decline (39), and impaired verbal fluency (40). These symptoms have been observed to persist as long as 2 years post-injury (41). Such deficits could significantly impact overall disability and reduce a person's quality of life (41, 42). While there are no current reports of these deficits in patients with COVID-19, it is important to monitor patients for neurocognitive impairments. To detect these problems, initial cognitive screening (using Montreal Cognitive Assessment or Frontal Assessment Battery (14) or any other appropriate cognitive tests) is recommended. Subsequently, detailed assessments in each cognitive domain and appropriate cognitive training exercises will be necessary. In the process, SLPs can collaborate with psychologists and cognitive-behavioural therapists to provide adequate services.

### CURRENT PRECAUTIONARY MEASURES IN PRACTICE

In general, dysphagia and speech evaluations require SLPs to perform various upper airway procedures that generate aerosolized particles and increase the risk of contamination through saliva and induced coughing. Some of these include oral mechanism evaluation, cough reflex testing, bedside administration of food and liquids, and nasoendoscopic and videofluoroscopic evaluations. However, best-practice guidelines for COVID-19 recommended by the American Speech-Language-Hearing Association include delaying endoscopic and videofluoroscopic evaluations whenever possible (43),

and following guidelines for airborne precautions when aerosol-generating procedures are required (44).

The close interaction of SLPs with infected patients necessitates infection control precautions to reduce transmission of the virus. SLPs are required to follow guidelines for droplet and airborne precautions, maintain adequate protection, reduce the generation of aerosolized particles and subsequent transmission, provide services in airborne infection isolation rooms, and follow disinfection and sterilization guidelines (44). Many medical facilities recommend discontinuing group and concurrent therapy, cleaning therapy equipment thoroughly, suspending therapy services if it is not critical for the client, using personal protective equipment and/or protective gear as required, avoiding inclusion of non-essential personnel and family members during sessions, and conducting video chat or phone calls to address concerns (45). In addition, social distancing within clinical facilities, limiting movement in buildings, and self-isolating when symptomatic further reduces transmission of infections.

SLPs are also currently exploring alternatives to in-person care through virtual assessments and intervention, such as tele-practice in the US, UK, and Australia (5, 46, 47). However, before considering tele-practice, the SLP must ensure the appropriateness of tele-practice for meeting the needs of the patient, use an end-to-end encryption videoconferencing platform to offer tele-services, adhere to professional ethical standards and scope of practice in speech-language pathology, be aware of the state, federal, and professional licensing laws, protect the patient's privacy and confidentiality within the Health Insurance Portability and Accountability Act and the Family Educational Rights and Privacy Act, or other country-specific laws, and consider payment and insurance coverage for these services (48, 49).

### CONCLUSION

“Dysphagia and alterations of cognitive functions in COVID-19 patients are still being evaluated, however, their presence in a large number of hospitalized patients suggests, as well as in other neurological conditions, that their management is fundamental for social reintegration” (2). Consequently, SLPs play a major role in treating patients who are at high-risk or those with suspected COVID-19; they are essential to the patient's care plan. A comprehensive program for patients with COVID-19, which includes early screening and evaluation, individualized treatment goals for dysphagia and speech rehabilitation, and patient education will prove beneficial for patients with COVID-19. As patients become medically stable and recover from COVID-19, SLPs will continue to play a major role in the management of swallowing, cognition, and communication, and in providing neuropsychological support, promoting safe discharge to home, and training family members to support the patient's independence and improve their quality of life.

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