COVID-19 AND THE MAD DASH TO TELEPRACTICE:

A TUTORIAL TO ESTABLISH COMMUNITY-BASED TELEREHABILITATION FOR APHASIA USING WEBEX VIDEOCONFERENCING

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— ABSTRACT —

Telepractice is an approach that has been used successfully to treat acute stroke in individuals residing in rural communities. Yet until very recently, progress in the use of telepractice approaches for aphasia has been slow to emerge. However, the recent COVID-19 pandemic has forced the field of Speech-Language Pathology (SLP) to rapidly develop and implement new models of service provision and particularly in the area of aphasia rehabilitation. A wealth of research has shown that telepractice approaches for aphasia rehabilitation or "telerehabilitation" can be utilized to provide evidenced-based treatment for aphasia while overcoming access to care issues for individuals with aphasia. Such approaches have never been so urgently needed given the dramatically changing landscape in field of SLP since the emergence of COVID-19 in the US. In this tutorial we describe the use of WebEx, a videoconferencing program, as one potential approach to provide comprehensive aphasia telerehabilitation treatment in a community-based setting.

Key words: aphasia, speech-language pathology, telerehabilitation

BACKGROUND

Aphasia is a disorder that occurs after stroke that reduces a stroke survivor's communication ability (language comprehension, language expression, reading, writing, attention, cognition) and frequently requires rehabilitative care (American Speech-Language-Hearing Association, 2018). A recent study showed that approximately 18% of individuals discharged from US hospitals with a primary diagnosis of stroke have aphasia (Ellis, Hardy, Lindrooth & Peach, 2017). Estimates indicate that more than 2.5 million Americans are currently living with aphasia (Simmons-Mackie, 2018). Aphasia is independently associated with worse stroke outcomes, and patients with aphasia experience longer hospital lengths of stay and at greater costs of care (Boehme, Martin-Schild, Marshall & Lazar, 2016; Lazar & Boehme, 2017). Individuals with aphasia require speech-language pathology services (along with physical therapy and occupational therapy) to have the best opportunity for a successful recovery.

Limited Rehabilitation Services in Rural Areas

Many individuals with aphasia who reside in rural areas have limited access to speech-language and other rehabilitation services. Speech-language service providers in rural regions are limited due to high vacancy rates, high turnover rates and lengthy delays in hiring speech-language pathologists (SLPs) (Brome, 2010). To accommodate the healthcare needs of individuals residing in rural areas, telemedicine approaches have been proposed as an approach to offer speech-language services (telerehabilitation) (Theodoros, 2008). Telemedicine approaches for speech-language services can offer individuals with aphasia: (a) equitable access to services, (b) greater time efficiency for the SLP and patients, (c) improved client focus due to increased frequency and intensity of treatment, (d) improved caseload management for clinicians and (e) reduced treatment costs and travel expenses (Hill & Miller, 2012). Evidence also suggests that telemedicine approaches can improve functional outcomes and enhance patient satisfaction and quality of life (McCue, Fairman, & Pramuka, 2010).

Utilization of Telepractice Approaches For Treatment of Aphasia

Telepractice, or the application of telemedicine technologies to provide rehabilitation treatments, has been shown to be efficacious in offering distant speech-language services to patients with aphasia, stuttering, voice disorders, laryngectomy, and swallowing (Cherney & van Vuuren, 2012; Theodoros, 2008; Weidner & Lowman, 2020). Studies outside of the US have shown that telepractice approaches can be utilized to reduce service inequities among individuals residing in rural areas (Bradford, Caffery, & Smith, 2016; Fairweather, Lincoln & Ramsden, 2016). A recent comprehensive review of telepractice approaches for adult speech-language services indicated that they may be successfully utilized to treat aphasia as well as other conditions such as primary progressive aphasia, dysphagia and communication disorders associated with Parkinson's disease. (Weidner & Loman, 2020). Regarding aphasia specially, Georgeadis, Brennan, Barker and Baron examined the impact of telerehabilitation compared to face-to-face treatment of story retelling among adults with left and right hemisphere stroke and TBI (Georgeadis, Brennan, Barker & Baron, 2005). The telerehabilitation was administered in a separate room but in the same building as the clinician, and results showed that there were no significant differences in outcomes between the face-to-face and the telerehabilitation delivery. Dechene and colleagues examined an in-home telerehabilitation approach with three patients with aphasia to improve naming (Dechene, et al., 2013). Patients demonstrated improvement in confrontational naming (naming pictures) and reported satisfaction with the approach. Although these preliminary studies demonstrate the potential use of telerehabilitation for speech-language services after stroke, overall the use of telerehabilitation for the treatment of aphasia has been slow to evolve. Additionally, the use of telerehabilitation as an approach for comprehensive aphasia treatment that addresses more than one language domain (expression, comprehension, reading, etc) has yet to emerge.

The COVID-19 Pandemic and Urgent Need to Establish Telepractice Programs

In December 2019, no one could have seen how the coronavirus 2019 or COVID-19 (aka: novel coronavirus) pandemic would change the landscape of SLP service provision for conditions like aphasia. It was at this time that China reported a cluster of cases of pneumonia of an unknown cause. These cases were later diagnosed coronavirus disease (McMichael et al, 2020). In January 2020, the first case of COVID-19 was diagnosed in the US followed by a major outbreak of cases in Seattle, Washington in February, 2020 (McMichael et al, 2020). Since then, Americans have become very familiar with COVID-19 as many states have issued shelter-in-place mandates and required "social distancing" (physical distancing/physical separation) to limit the community spread of the contagious virus (Haffajee & Melo, 2020). Persons at high risk for severe illness from COVID-19 are those 65 years and older; those residing in nursing homes; people of all ages with underlying medical conditions

such as moderate to severe asthma, serious heart conditions, diabetes, and persons who are immuno-compromised (CDC, 2020). To date, the healthcare systems in cities like Seattle, New York, Los Angeles and New Orleans have been devastated by the sheer number of individuals with COVID-19 and the associated deaths. Moreover, early findings suggest that in some areas of the US, African Americans are contracting and dying from COVID-19 at higher rates than other racial/ethnic groups (Johnson & Buford, 2020).

Hospitals have not been alone in their significant burden. The rehabilitation disciplines like Speech-Language Pathology (SLP) have all become overwhelmed by the impact of social-distancing and shelter-in-place mandates that limit the human interaction; the centerpiece of rehabilitation. Not only providers, but also training programs have needed to seek alternative service delivery models such as telepractice to ensure individuals with communication disorders continue to receive the care they so desperately require to improve their communication abilities (American Speech Language Hearing Association, 2020a). Similarly, major healthcare plans who have been resistant to the reimbursement of telepractice approaches have changed course during the COVID-19 pandemic to extend reimbursement for telepractice approaches for the field (American Speech Language Hearing Association, 2020b).

The American Speech Language and Hearing Association has offered a substantial amount of information regarding telepractice approaches during this time of dramatic service provision reform (American Speech Language Hearing Association, 2020c). General guidelines to help clinicians get started with telepractice approaches have been made available (Andricks & Smith, 2020). Yet for some who are new to telepractice and teleconferencing in general, additional information is needed. Therefore, the purpose of this paper is to provide a template for the development and provision of SLP services via telepractice for aphasia rehabilitation using the WebEx teleconferencing program. WebEx is HIPPA compliant and offers a range of features needed for successful telepractice. This paper was designed to offer clinicians core information regarding the establishment of an aphasia telerehabilitation program particularly in light of the significant pressure being placed on clinicians to establish telepractice programs in the context of COVID-19. See Table 1 for a summary of key definitions related to the tutorial's contents.

Aphasia Telerehabilitation Platform: WebEx (http://www.webex.com/) is a cloud-based videocon-ferencing program that allows real-time exchange of video and audio for individuals at a distant location via a secure internet connection. WebEx offers both full-screen and side-by-side sharing views which allow the clinician and client collaborative sharing for the administration of aphasia treatment (See Figure 1).

Figure 1. Depiction of Client's Active View of WebEx Aphasia Telerehabilitation Session
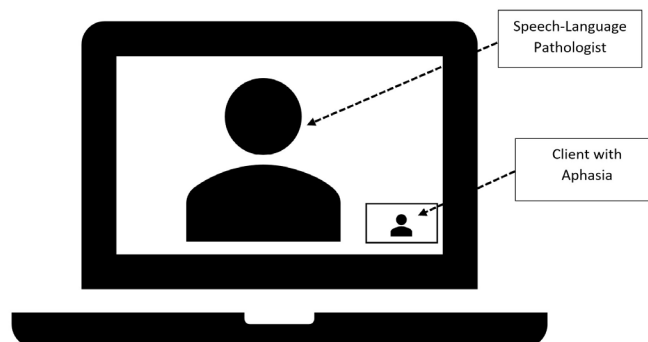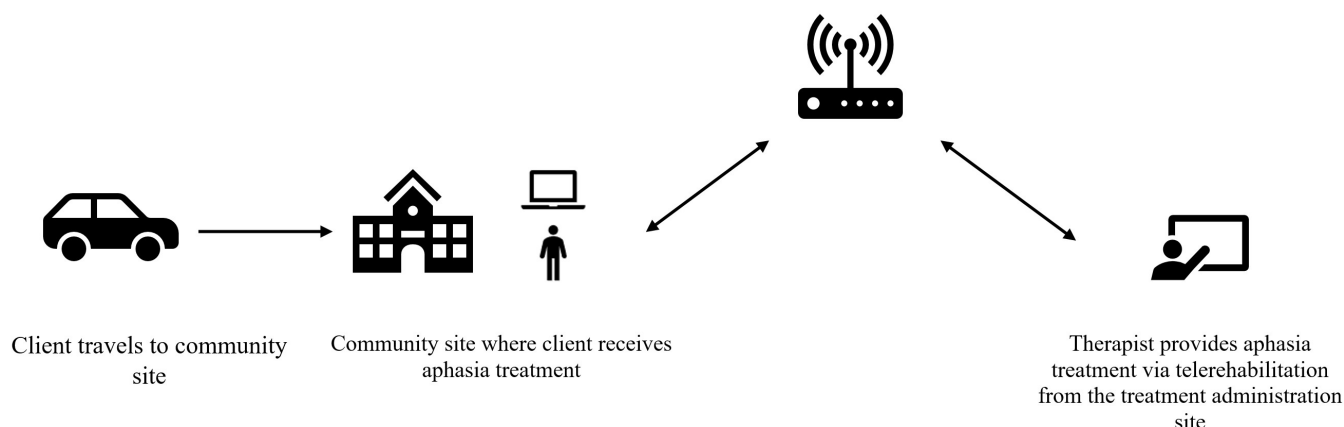

The collaborative sharing feature provides a means for the clinician to share and utilize the treatment materials required for the administration of the aphasia treatment. WebEx also allows the client to see the clinician and treatment stimuli simultaneously, thereby enhancing the patient's experience similar to in-person treatment. Additionally, the features of WebEx allow treatment provision via a laptop computer in a community setting.

Traditional Telerehabilitation Approach

Aphasia Pre-Treatment Evaluation: Aphasia client evaluations are completed prior to commencing telerehabilitation services at the treatment administration site. Traditional pretreatment evaluation procedures are completed which include: a comprehensive aphasia evaluation, a functional communication measure, a motor speech examination and a measure of telerehabilitation treatment credibility. The evaluator must decide whether the individual with aphasia is a candidate for aphasia telerehabilitation based on a range of factors including: aphasia severity, extent of treatment needs, transportation availability to a remote treatment site and willingness/ability to receive treatment via telerehabilitation at a remote treatment site.

Telepractice Connection between Treatment Administration Site and Remote Treatment Site: Clients report to the remote treatment site at the scheduled day and time (See Figure 2).

Figure 2. Aphasia Telerehabilitation Approach

Client travels to community site

Community site where client receives aphasia treatment

Therapist provides aphasia treatment via telerehabilitation from the treatment administration site

Clients are met at the remote treatment site by a student facilitator who leads them to the treatment room. Student facilitators are either master's level or doctoral level students enrolled in a communication sciences and disorders program. Student facilitators serve a primary role to connect with the treatment administration site via WebEx and troubleshoot any observed problems.

The clinician at the treatment administration site logs into WebEx via a university defined login process using a username and password. Once logged in, the clinician at the treatment administration site starts the treatment session by starting a "WebEx meeting" by pressing the start meeting button. After the WebEx meeting is started, the treatment administration site initiates the connection with the remote treatment site by using the WebEx invite function. The WebEx invite function allows entry of an email address to invite participants to a meeting initiated by the treating clinician at the treatment administration site.

To create an efficient, consistent process for connection with the treatment site, the team uses a Gmail email account, specifically created for the telerehabilitation project to send out session invitations. The invite from the treatment administration site is transmitted and received in the Gmail account created for the project. The email inviting the remote treatment site to a WebEx meeting is then received and the student facilitator opens the email and clicks the "start meeting" button. A connection is initiated with the treatment administration site and the session then begins.

Treatment Approach: The general aphasia treatment approach used was the Language-Oriented Treatment (LOT) (Bandur & Shewan, 2008; Shewan & Bandur, 1986). LOT is designed to address a range of language issues among individuals with aphasia. The LOT approach is highly structured and offers important advantages with regard to treatment fidelity and replication. Treatment targets for receptive deficits include: improving discrimination of speech sounds, improving access to word meanings and changing the individual's communication environment to support auditory comprehension. Treatment targets for expressive deficits include: semantic processing (e.g., semantic cueing, semantic judgments, categorization and word-to-picture matching) and accessing phonological word forms such as phonemic cueing, cueing spoken output with written letters, repetition and reading aloud. Treatment materials are identified and created to address receptive and expressive skills as outlined in LOT.

Screen share feature: Specific treatment tasks for aphasia are administered via the WebEx share-screen feature. The share-screen feature allows the use of internet websites or materials created specifically for the unique needs of the client. WebEx's interface offers two options to initiate screen sharing. The first option is found on the WebEx's top toolbar, which screen sharing is accessed by selecting the tab entitled "Share" and then "My Screen" (WebEx, 2018). The second option for initiating screen sharing is found among the several meeting controls, found on the bottom, center of the screen. These meeting controls are hidden when not in use and then appear again when the user's cursor is moved (Cisco WebEx, 2018). Among these controls, the "Share content" button can be initiated by selecting the corresponding up-arrow labeled icon. When selected, the "Share content" button displays a thumbnail view of active screens and available applications from the meeting's host computer (Cisco, 2018). At any point during the

session, the meeting's host can discontinue screen sharing. The screen sharing utility offers clinicians the capability of using a variety of resources during the therapy session that otherwise may not be accessible on the remote treatment site's computer (Cisco WebEx, 2018). This feature allows the clinician a plethora of options for the provision of individualized treatment, to address the unique difficulties experienced by each client.

Some patients also have related motor speech production disorders (apraxia and dysarthria) that result in difficulty producing speech due to muscle weakness, incoordination and sequenced movements (Duffy, 2005). Although motor speech disorders are not the primary focus of the telerehabilitation treatment, treatment of motor speech production disorders are guided by the Mayo Clinic approach for treatment of motor speech disorders, which is a systematic treatment approach that emphasizes: (a) slowing the rate of speech, (b) improving the breath support to enhance loudness and (c) increasing tongue and lip movement. Aphasia telerehabilitation treatment sessions typically lasted 45-60 minutes.

Aphasia Post-Treatment Evaluation: Post-treatment client evaluations is completed at either the treatment administration site or the remote treatment site. The comprehensive aphasia evaluation, functional communication measure, and motor speech examination are completed post-treatment. In addition, treatment acceptability, credibility and satisfaction scales are completed (Atkinson & Greenfiled, 2004; Devilly & Brokovec, 2000). Finally, a post-treatment exit interview is completed to allow patients and family members to provide their perceptions of the benefits (or harms) of the clinical methods applied and their perceptions of how to more effectively deliver the telerehabilitation treatments.

Computer and internet specifications: The aphasia telerehabilitation treatment is provided via Lenova Thinkpad T570 laptop computers at both the aphasia treatment site and the aphasia remote site. The ThinkPad computers have Intel Core i7-7600U Processors with a 15.6 full high definition FHD (1920x1080) display screen. The computers operate with Windows 10 64-bit operating systems. Both sites use internal computer microphones and speakers. WebEx recommends broadband/high speed internet with minimum connections of 1.5mbps minimum/3mbps. The minimum internet specifications are available at both sites.

Troubleshooting: Problems occurring during the telerehabilitation process have been primarily limited to internet connectivity issues, prompting poor audio and video transmissions. On occasion, the internet is down or running at slower speeds at the remote sites. In such cases, the student facilitator can reconnect to WebEx using an IPhone hotspot or dedicated hotspot device purchased for the project. Similarly, slower than usual internet speed can also result in poor video quality or signal buffering requiring the same approach for resolution. Finally, when the video does not connect automatically, the video is connected using the video symbol in the lower center portion of the screen. Audio problems occur on occasion and are related to the audio not connecting automatically. In such cases, the audio connection is connected using the audio symbol in the lower center portion of the screen. Whether video or audio connection issues, the treating clinician at the treatment administration site can see the absence of audio or video connection in the "Participants" panel on the right side of the screen. Finally, WebEx has a chat function which allows the two sites to communicate even in the absence of audio and video connections. Additional minor issues may arise that are specific to the host and remote settings, such as placement of seating to optimize natural and artificial lighting and consideration of surrounding environment of both sites to minimize noise distractions.

DISCUSSION

This tutorial has discussed the potential use of WebEx to provide comprehensive aphasia treatment in a telerehabilitation format. The process described here could easily be restructured using other HIPPA compliant teleconferencing programs given that most have very similar features. Additionally, the process could be tailored to a home environment where the facilitator at the community-based site could easily be replaced by a caregiver at the client's home. The benefits of operating a telerehabilitation program from a community-based site is to promote reintegration to social contexts. When this is not an option, or the client is not yet ready to reintegrate socially, this approach can be applied to the home setting. Not to be lost in this discussion is the fact that graduate student clinicians-in-training at university programs can use WebEx to provide telerehabilitation services to clients with aphasia and thus meet portions of their academic clinical education requirements. In summary, the use of telerehabilitation has the potential to reduce: a) delays in receiving services, b) the inconvenience of accessing services at distant urban facilities and c) costs to patients related to travel to receive services, particularly among rural residing residents. Early evidence shows that individuals with aphasia are satisfied with receiving aphasia treatment via telerehabilitation approaches

and believe that it is an acceptable and credible approach to treatment. Finally, we believe that telerehabilitation offers a safe and viable service delivery option for persons with aphasia and speech-language pathologists in the face of the COVID-19 pandemic.

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Table 1. Key Definitions

Terms	Definitions
Aphasia	Language disorder resulting from stroke or other neurological disorder or injury
Language Oriented Treatment	Language focused approach to the treatment of aphasia
Remote Treatment Site	Location where client with aphasia goes to receive treatment from a treating therapist at the treatment administration site.
Telerehabilitation	Use of technology that allows a clinician to provide rehabilitation services to a client at a different location
Treatment Acceptability	Client's report of acceptance of a treatment
Treatment Credibility	Client's report of whether a treatment approach is credible
Treatment Administration Site	Location where treating therapist will administer aphasia treatment via WebEx to a client with aphasia who is at a different (remote) location
Treatment Satisfaction	Client's report of satisfaction with treatment
Videoconferencing	Transmission of video and audio via the internet that allows video and audio communication between two different locations
WebEx	Videoconferencing program used to provide aphasia telerehabilitation treatment
WebEx Remind & Invite	WebEx videoconferencing feature that is sent to the remote treatment site to allow videoconference connection with treatment administration site
WebEx Screen Sharing	WebEx videoconferencing feature that allows the treating therapist to share the contents of their screen with the client with aphasia at the remote treatment site

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