Considerations For Implementing a Telerehabilitation Treatment Program For Individuals With Chronic Aphasia

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CONSIDERATIONS FOR IMPLEMENTING A TELEREHABILITATION TREATMENT
PROGRAM FOR INDIVIDUALS WITH CHRONIC APHASIA

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Abstract

The purpose of this research project is to identify the considerations that speech-language pathologists (SLPs) need to review before beginning to use telerehabilitation services to treat patients with chronic aphasia. This research will specifically target therapy treatments for patients with chronic aphasia and the technology adaptations and adjustments necessary for this population. This research project includes a systematic literature review as well as an in-service presentation. As telerehabilitation will continue to develop and grow, practicing SLPs need to have a foundational understanding of what teletherapy is, the patients suitable for services, and the benefits it has the potential to provide. This research project serves to provide SLPs with the foundational information necessary when beginning to learn about telerehabilitation services.

Keywords: telerehabilitation, teletherapy, telepractice, telespeech, speech teletherapy, chronic aphasia

Interest in incorporating telerehabilitation services into speech therapy has grown immensely as technology has developed and improved. SLPs are still learning and exploring new ways for telepractice services to benefit a wide number of clients with a variety of diagnoses from school-age children to the elderly population. The term, telerehabilitation, indicates that rehabilitation services are delivered via technology where the provider and patient do not have to be in the same physical location to conduct a therapy session. Interest in providing telehealth services across long distances has been investigated as early as the 1950s, when psychologists utilized telehealth services to provide psychiatric evaluations when geographically over 100 miles away from the psychiatric hospital (Houston, 2013). In the 1970s, the Department of Veterans Affairs helped to provide services to veterans without access to hospitals using telehealth services (Houston, 2013). The first exposure that the field of speech-language pathology had access to telepractice was when Dr. Vaughn, an audiologist, developed a supplementary program to help patients receive treatment over the telephone (Houston, 2013). Other professionals, such as nurses, physicians, and doctors have, and continue to utilize telehealth services to provide diagnoses and treatments to their patients (Houston, 2013). As technology continues to improve, develop, and become more accessible to the general public, the potential for telerehabilitation services has also increased (Pitt, Hill, Theodoros, Russell, 2018). Telerehabilitation services have the potential to provide easier, more convenient access to patients seeking to receive speech and language services (Choi, Park, Ahn, Son, Paik, 2015). Face-to-face (FTF) therapy sessions that all SLPs are accustomed to, can be supplemented or replaced by telerehabilitation services. Small-scale research studies have shown that telerehabilitation services are viable service delivery models for assessing and treating people with aphasia (Hall, Boisvert, Steele, 2013; Choi, Park, Ahn, Son, Paik, 2015; Simic, Leonard,

Laird, Cupit, Hobler, Rochon, 2016; Hill, Breslin, 2016; Zhou, Lu, Zhang, 2018). Research is currently exploring the efficacy of SLPs providing telerehabilitation services for patients that have been diagnosed with aphasia.

This research project was created in hopes to streamline information for interested SLP providers. Right now, there is no single document or resource that can provide SLPs with a wide range of information regarding telerehabilitation services for the aphasia population. For this research project, all articles used were published in peer-reviewed journals. A search for studies was done through the following databases: PubMed, PsycINFO, ComDisDome, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) as well as a search through ASHA – using the term "Aphasia" paired with "Tele", "Telehealth", "Telemedicine", "Teletherapy", "Telepractice", "Telerehabilitation", "Protocol", "Videoconferencing", "Computer", "Computer therapy", "Computerized intervention", "Asynchronous", "Synchronous", "Mobile", "Applications", and "YouTube". Search terms were developed and used after initial searches were completed to better narrow the literature. Abstracts of these searches were reviewed for relevance prior to inclusion in the research project. To be included in the literature review, studies had to be published within the last decade (2009-2019), in English, and in peer-reviewed journals. This review was conducted in two months in February and March of 2019.

See Table 1 for a table documenting the results found from this systematic search aspect of this research project.

Table 1
Studies from Systematic Search

Authors	Participants	Technology Used	Service Rendered	Results
Agostini, Garzon, Benavides-Varela, De Pellegrin, Bencini, Rossi, …. & Tonin (2019)	5 patients with chronic aphasia	Intel laptops, Windows 7, Skype	Picture naming within ten seconds on a digital screen or FTF therapy. If unanswered in ten seconds, progressive phonemic cues were provided.	**Results:** No difference was found between the results of anomia treatment in FTF versus teletherapy.
Choi, Park, & Paik (2016)	8 patients with chronic poststroke aphasia ranging from 37-62 years of age.	"iAphasia" Application for an iPad	Asynchronous study with daily feedback from SLP. The Korean Western Aphasia Battery was given pre- and post-treatment. Patient recordings (voice and touch patterns) sent to SLP for review. Therapy targeted: auditory comprehension, reading comprehension, repetition, naming, writing, verbal fluency	**Results**: This study showed that using a mobile device is a feasible therapy option considering improvement maintained in a 1-month follow-up.
Choi, Park, Ahn, Son, & Paik (2015)	30 patients with stroke and aphasia	Mobile Aphasia Screening Test (MAST)	iPad application was used to assess aphasia in patients remotely with providers having access to a website with protected data.	**Results**: This study showed the MAST is a valid and reliable tool for detecting aphasia in patients following a stroke.
Getz, Snider, Brennan, & Friedman (2016)	2 patients with aphasia	Computer with videoconferencing software pre-downloaded	Teletherapy specific to improving phonologic alexia. Telerehabilitation was conducted three times per week for 45-60 minutes with work to complete outside of therapy sessions.	**Results:** Oral reading of trained items improved after telerehabilitation services were conducted.

Hill & Breslin (2016)	5 patients diagnosed with aphasia, ages 67-78 and 3-19 years poststroke.	tablet PC with Windows 7/8, mobile broadband device, laptops	Asynchronous services provided. SLPs would design tasks, remotely monitor, and update tasks.	**Results**: Acceptance of eSALT for asynchronous telerehabilitation platform for therapy was rated by patients and clinicians.
Hill, Theodoros, Russell, Ward, & Wootton (2009)	32 patients with aphasia ages 21-80.	BDAE-3 and BNT in electronic format on computers	Assessment via telepractice and in-person using the BDAE and BNT.	**Results**: Severity of aphasia does not impact accuracy of assessment but did impact the ability to assess naming and paraphasias. Assessment scores were comparable to face to face therapy.
Isaki & Farrell (2015)	3 adults with aphasia	iPad and videoconferencing through FaceTime, secure encrypted password-protected wireless network was developed	Videoconferencing in the same building was completed while the graduate student clinician and patient were in separate rooms. Qualitative and quantitative data was taken.	**Results**: Telepractice videoconferencing allowed patients to meet the majority of their goals. Additional research is needed to ensure validity and reliability.
Kurland, Liu, & Stokes (2018)	21 patients with chronic aphasia	iBooks Author software, iPad	Home practice for the following tasks: recognizing, matching, and naming pictures of actions and objects. Program provided semantic, phonemic, and orthographic visual & auditory cues. Pictures, videos, and words were used to target the above skills. Weekly telepractice meetings were arranged with the SLP	**Results**: Home practice supported the maintenance of posttreatment gains and asynchronous practice can improve the naming ability of untreated pictures.

Kurland, Wilkins, & Stokes (2014)	8 patients diagnosed with aphasia ages 55-81 and at least 8 months poststroke	iBooks Author software, iPads	Asynchronous home practice programs were given to the patients. SLPs had weekly videoconferencing meetings with patients to check in and provide feedback.	**Results**: This program enabled maintenance and improvement over 6 months, but more research needs to be completed.
Macoir, Sauvageau, Boissy, Tousignant, & Tousignant (2017)	20 patients with chronic poststroke aphasia	Promoting Aphasics' Communicative Effectiveness (PACE)	PACE, a speech teletherapy software was developed for this study. The general goal was to encourage alternative communication strategies through technology.	**Results**: Telespeech therapy focusing on multimodal functional communication is suitable for patients with a variety of aphasia diagnoses.
Manasco, Barone, & Brown (2010)		YouTube	Examines benefits and limitations to using YouTube in asynchronous telerehabilitation therapy services.	**Results**: YouTube could be feasible for errorless therapy, socialization, and rehabilitation of anomia.
Meltzer, Baird, Steele, & Harvey (2017)	44 patients with aphasia or cognitive—linguistic communication disorder	WebEx, TalkPath	Treatment consisted of tablet-based homework exercises and individualized treatment plans. Weekly 1-hour videoconferencing sessions were completed with the therapist for 10 weeks. Prior to therapy, a training session was utilized.	**Results**: Clinician-guided computer-based treatment is effective in providing language/communication gains poststroke.
Pitt, Hill, Theodoros, & Russell (2018)	3 SLP gave input on teletherapy.	TeleGAIN	Group therapy delivered via videoconferencing between an SLP and 3-4 patients with aphasia.	**Results**: SLPs can successfully provide aphasia group therapy through telepractice. SLP implementation of TeleGAIN is feasible and needs to be studied

				in a greater number of SLPs and patients.
Pitt, Theodoros, Hill, & Russell, (2018)	19 patients with chronic aphasia	TeleGAIN	Videoconferencing group teletherapy provided to assess communication, participation, and quality of life of patients with chronic aphasia.	**Results**: Online delivery for group intervention with people with aphasia is feasible for improving participation in daily life activities, aphasia severity, and quality of life.
Simic, Leonard, Laird, Cupit, Hobler, & Rochon (2016)	6 patients following a stroke with mild-moderate aphasia	Phonological Components Analysis (PCA)	PCA therapy was completed with the PhonoCom application. The effectiveness of PhonoCom was examined with the use of teletherapy when compared to previous FTF results.	**Results**: This study found that internet based PCA is feasible and an easy alternative to use for therapy.
Steele, Baird, McCall, & Haynes (2014)	9 patients 6-months post aphasia diagnosis	WebEx and GoToMeeting	Hybrid therapy model that incorporated FTF therapy visits in addition to teletherapy sessions. Asynchronous data was gathered for SLPs to later examine data.	**Results**: It is feasible to use videoconferencing in individual and group therapy in patients with aphasia.
Swales, Hill, & Finch (2016)	10 SLPs	Survey, computer-based aphasia therapy (CBAT)	SLP preferences were gathered regarding therapy services provided through computer-based technology. The experience of SLPs was widely spread.	**Results**: This study provides comprehensive features SLPs consider essential to an ideal CBAT program.
Wall, Cumming, Koenig, Pelecanos, & Copland (2017)	96 stroke patients (35 with aphasia, 29 without) and 32 control patients	Pen and paper tasks, tablet-based applications (Cognitive Assessment for Aphasia App)	The assessment process included traditional pen-and-paper tests followed by technological tests. A virtual reality program was utilized to assess cognition	**Results:** This study found that the Cognitive Assessment for Aphasia App is a feasible cognitive assessment means for stroke survivors with and without aphasia.

			and executive function skills.	
Woolf, Caute, Haigh, Galliers, Wilson, Kessie, … & Marshall (2016)	21 patients with aphasia	Videoconferencing, PC	8 therapy sessions were conducted to examine the effectiveness of word finding therapy.	**Results**: Word finding therapy can be delivered through videoconferencing. Remote therapy did not threaten treatment fidelity.
Zhou, Lu, Zhang, Sun, Li, & Zhu (2018)	40 patients with aphasia following a stroke	Computerized speech-language and cognitive training module	Computerized interventions were provided to patients with aphasia in inpatient units and telerehabilitation to discharged patients. Therapy for both groups was provided two times a day. Speech-language modules were combined with cognitive modules to assess targeting together in programs.	**Results**: Combining speech-language and cognitive training programs can promote recovery of patients with aphasia. This was feasible when administered from remote locations.

On an ASHA webpage, "Telepractice" (n.d.), information is provided to SLPs with guidelines and patient considerations to be aware of when selecting candidates for telepractice services, such as hearing, visual, and physical abilities of their patients. There are a variety of ways in which telerehabilitation services can be delivered, including computers, iPads, smart phones, and cameras with audio/video capabilities ("Telepractice", n.d.). Just like in FTF therapy, SLPs should be prepared with all necessary materials prior to beginning therapy with a new patient and should also ensure that the patient has received the necessary training to be able to fully participate in therapy. It is up to the discretion of the SLP to determine which mode of telerehabilitation is best suited for each individual client based on their specific clinical

presentation. SLPs should be aware of the different ways that telerehabilitation can be conducted, such as synchronous, asynchronous, or hybrid. SLPs should select a method that is best fit to their client's needs and is the most clinically appropriate.

Justification for Telerehabilitation

Incorporating telerehabilitation services into therapy is relatively new for practicing SLPs and is continuously being expanded as technology continues to develop and improve (Pitt, Hill, Theodoros, Russell, 2018). With the improvement, development, and accessibility of technology continuously increasing and become more accessible to the general public, the potential for telerehabilitation services has also increased. As technology continues to be develop and improve, it is likely that telerehabilitation services will continue to grow in popularity. Research is currently being done to explore what factors and services can be beneficial to patients diagnosed with aphasia. There is great potential for this type of service domain to benefit patients with chronic aphasia, though more research needs to be conducted before results can fully be generalized. Telerehabilitation services can provide easier access to a variety of different patients to allow them to receive the services they require, more conveniently for them (Choi, Park, Ahn, Son, & Paik, 2016).

Terminology

The term, telerehabilitation, for SLPs, indicates the type of treatment that is available, using technology, to provide services without having to be in the same physical location as the patient that is being treated. The root, "tele-" indicates something transmitted over a distance, while the suffix "-rehabilitation" refers to the type of treatment SLPs can provide, indicating that

SLPs are targeting skills that patients have previously had, but now need to be regained. In the case of this research, SLPs are working to help patients regain language abilities following a acquired language disorder diagnosis. The American Speech-Language Hearing Association (ASHA) has identified telespeech, speech teletherapy, and telepractice to all be acceptable terms to describe services that SLPs can provide with a technological domain ("Telepractice", n.d.). For the purpose of this research project, the above terms will all be used to discuss the treatment and therapy conducted through technology due to the slightness in variation of definitions. Studies that have been completed so far have used all of these terms to differentiate types of services. For example, telerehabilitation specifically refers to rehabilitation services, while teletherapy and telepractice are more interchangeable to discuss how services are delivered. Since all of these words include the root, "tele-", this is indicative of all being utilized with technology to provide services without being in a FTF therapy session.

When considering the implementation of a telerehabilitation program, it is important to be aware of the difference between synchronous and asynchronous delivery models. "Telepractice" (n.d.) defines synchronous telepractice as a real-time, interactive therapy session conducted with the use of technology. Synchronous telepractice is the most similar to the traditional, FTF therapy that SLPs are so accustomed to. The synchronous mode of teleservice allows for a back-and-forth conversation in real-time between provider and client. For example, if the SLP asks the client a question, the client can respond, and the SLP can then provide immediate feedback. On the other hand, ASHA continues to explain how asynchronous services can be shared between client and SLP using technology but occur at different times ("Telepractice", n.d.). The SLP can still collect data and have access to their client's performance regardless of not being able to have a real-time therapy session. For example, a computerized

therapy program may be utilized for a patient with aphasia. The SLP would have access to the

data taken from the program about the patient's performance and modifications could be made

based on the data received about the patient's performance. The distinct difference between

synchronous and asynchronous telepractice services, is with asynchronous, the SLP and client

are not in direct contact, like they can be with a synchronous model. A hybrid telepractice service

includes therapy that uses both synchronous and asynchronous therapy techniques. Hybrid

telepractice can also be a blend of including FTF therapy with the combination of utilizing

teleservices as well ("Telepractice", n.d.). For example, hybrid telepractice would be utilized if a

patient was seen in FTF therapy one time per week and given services through telepractice one

time per week. Or, another example of hybrid telepractice could include an SLP using

synchronous telepractice two times per week with one asynchronous telepractice session per

week.

Legal and Ethical Considerations

Before beginning to provide telerehabilitation services, it is essential for providers to

investigate their current state policies. Each state has different requirements and regulations, so it

is imperative that SLPs also research and learn about their state license to see how it can impact

what telerehabilitation services they are able to provide. SLPs need to ensure first and foremost

that the telerehabilitation services they provide are clinically appropriate and comparable to the

FTF services that more traditional therapy delivery models provide. For example, if the quality

of the therapy session delivered through teleservices is less than the quality of services provided

in FTF therapy, then speech teleservices are not ethical for an SLP to provide. SLPs must ensure

that they are following clinical and practice guidelines, state and federal laws/regulations, and

payer policies ("Reimbursement of Telepractice Services", n.d.). If unsure of current laws and

regulations, SLPs should first turn to state level information and resources, and then consult the

national governing body, ASHA, for further information. SLPs will be held to the same Code of

Ethics as FTF services when using telepractice services ("Telepractice", n.d.). SLPs should use

evidence-based clinical judgement to ensure that the clients being served through

telerehabilitation services are individually assessed and deemed appropriate for such services. To

incorporate evidence-based practice, SLPs need to consider client perspectives, clinical

expertise, and scientific evidence to provide high-quality services ("Evidence-Based Practice",

n.d.).

State Licensure

When SLPs provide telerehabilitation services, they must ensure that they are providing

services within a state of proper licensure, just like in FTF therapy. However, the difference for

telepractice is that SLPs can provide services in multiple states within the same day. For

example, if an SLP is licensed in Texas, Illinois, and Ohio, the SLP would legally be able to

provide services to a person living within any of these states without having to travel. This would

not be possible for the SLP to travel to three states and conduct FTF therapy sessions all in one

day. When providing any variation of telepractice services, SLPs must provide these services

within the state he or she is licensed in. So, both the patient and the SLP need to stay within the

state lines of where the SLP is licensed for the duration of therapy. If an SLP is only licensed in

Illinois, the patient needs to also be in Illinois for the therapy session. If the patient is on vacation

in Florida, it would not be legal or ethical for an SLP to provide services to this client, since it

would be across state lines. Just like how an SLP licensed in Illinois would not be able to provide

FTF therapy services to a client in Florida, the same applies for telepractice as well. It is up to the discretion of the clinician to be informed of regulations in the state they are practicing in and should continue to look for any changes made to policies ("Telepractice", n.d.). Currently, Illinois licenses mandate that SLPs may conduct therapy remotely with the use of video to help connect with patients and may use a variety of technology to connect with patients including fax, email, phone, and instant messaging. However, these additional technological connections may only be used in conjunction with video conferencing ("Telepractice", n.d.). There are currently no clear guidelines for SLPs in determining what type of videoconferencing should be used for teletherapy. With an Illinois license, SLPs can only provide telerehabilitation services if the results would be equivalent to in-person therapy services. For example, if an SLP believes that better therapy outcomes would result from FTF services when compared to teleservices, then teleservices would no longer be deemed appropriate or ethical to provide. SLPs will be accepted to hold the same standard of care for their patients, regardless of telerehabilitation services or traditional in-person services being delivered ("Telepractice", n.d.). Currently, Illinois does not permit student interns to provide telerehabilitation services, and currently does not have any laws or regulations for clinical fellows ("Telepractice", n.d.; "Illinois Telepractice Requirements for Audiologists and Speech-Language Pathologists", n.d.). See Appendix A for further details on the United States current regulations and to examine the wide variety of rules and regulations that each state currently holds.

Reimbursement

Illinois' current reimbursement policy for teleservices is not yet standardized, and up to the payer's discretion. Refer to Appendix A for state-by-state regulations for Medicare and Private

insurance providers. It is important for SLPs to contact payer sources to request information on whether teleservices will be covered ("Illinois Telepractice Requirements for Audiologists and Speech-Language Pathologists", n.d.). SLPs need to be aware that despite telepractice reimbursement regulations or laws being passed for their state, does not automatically equate that payers will reimburse the SLP for services ("Illinois Telepractice Requirements for Audiologists and Speech-Language Pathologists", n.d.). According to Medicare legislation, while some other medical and therapy providers are eligible to provide telepractice services, SLPs are currently not eligible to provide telepractice services to Medicare beneficiaries ("Reimbursement of Telepractice Services", n.d.).

Coding

Coding for telerehabilitation services uses the same CPT codes as in FTF therapy, as the delivery model for therapy does not impact the type of therapy provided. However, the biggest difference for telerehabilitation services are the modifiers used in conjunction with the CPT codes to indicate the mode of service delivered. Table 2 depicts a table of modifier codes that should be considered when reporting services ("Reimbursement of Telepractice Services", n.d.).

Table 2. Modifier Codes

Health Care Common Procedure Coding System (HCPCS) Codes	
GQ	Telehealth services via asynchronous communication
GT	Telehealth services via interactive audio and video
Current Procedural Terminology (CPT) Code	
95	Synchronous telemedicine services via real-time interactive audio and video telecommunication
Place of Service (POS) Code	
02	Location of services are provided or received through a telecommunication system.

HIPAA Compliance

One of the controversies that exists when selecting videoconferencing technology is how to ensure that the servers are compliant with the Health Insurance Portability and Accountability Act (HIPAA) regulations. As already mentioned, SLPs providing telerehabilitation services are held to the same standard of care as in FTF therapy, including upholding the standards of client protected health information (PHI). Videoconferencing technology such as FaceTime, Skype, or social media-based services are not automatically provided in accordance with HIPAA. While many preliminary studies have utilized FaceTime and Skype due to ease of access and familiarity to patients, these platforms are not sustainable in their current condition for telerehabilitation services. However, with extra security features put into place, applications like FaceTime and Skype could be made HIPAA compliant. Isaki and Farrell (2015) discuss that FaceTime was used in their study, but in conjunction with additional password-protected wireless networks to better align with HIPAA compliance policies. Due to the extra security features used, the improved application was more HIPAA compliant. In 2010, a checklist was introduced for service providers to use, ensuring that their interaction with clients will align with HIPAA policies (Watzlaf, Fahima, Moeini, & Firouzan, 2010). Watzlaf et al. (2010) investigated Voice over the Internet Protocol (VOIP) that looked at the security risks and HIPAA compliance of platforms that are used to provide videoconferencing and created a foundational checklist for providers. This checklist was designed for providers to ensure safety measures are put into place for any internet-based videoconferencing application, such as Skype, FaceTime, Adobe ConnectNow, ooVoo, and more. It was determined that there are three different security risks with teletherapy, including confidentiality, integrity, and availability. Confidentiality includes keeping personal health information protected and private. Integrity refers to keeping information from being

tampered or altered with by unauthorized users. Availability includes the places in a network that an unauthorized user could compromise (Watzlaf, et al., 2010). The checklist created by Watzlaf et al. (2010) provided all teletherapy providers with a foundation to begin to explore what aspects of the platform were already secure, and areas that could be improved upon. The checklist includes a series of questions for privacy under each of the following sections: Personal information, voicemail, requests for information from legal authorities, sharing of personal information in other countries, and linkage to other websites. The checklist also provided security questions under the following categories: encryption, anti-spyware and anti-virus protection, user's public profile, allowing/removing/blocking callers, audit system activity, security evaluation. This checklist provides SLPs with a great foundation in beginning to learn how to make platforms more secure and complaint with HIPPA regulations.

While there is currently no platform that is completely HIPAA compliant in nature, there are measures that need to be put into place to ensure that HIPAA regulations are upheld during telepractice. Even with a secure HIPAA compliant platform, a provider may use that information in a way that is not HIPAA compliant ("Telepractice", n.d.). The provider plays more of a role in ensuring that the teletherapy session is HIPAA compliant than the platform itself. Dependent on how the SLP uses the platform will determine how well the therapy sessions are able to stay HIPAA compliant. The patient and the SLP must ensure that both locations are HIPAA compliant. For example, if a client is currently living in a skilled nursing facility, and uses a computer found in the building, other people may have access to the location of the room or the computer if it is in network and this can cause a breach of personal health information, since there is not a pre-determined therapy room or an electronic security system in place. If electronic

documentation is being used to track patient progress, this also should fall into HIPAA

compliance in a secure online system.

Beneficial Patient Scenarios

There are a variety of scenarios in which telerehabilitation services can be used to offer

services to a greater number of patients in need. Telerehabilitation services, according to Choi,

Park, & Paik (2016), are ideal for clients living in rural areas who may have difficulty accessing

transportation to clinics for outpatient services. Other candidates for telerehabilitation services

also include those that have overall poor health, and individuals that have difficulty with

mobility, patients that have difficulty with balance that could interfere with transportation to the

clinic (Choi, Park, & Paik, 2016). Telerehabilitation services for patients with aphasia could

provide equally effective treatment when compared to FTF therapy but could be a more

convenient way for the patient to receive services. Without having to leave their home, patients

do not have to work around external barriers such as distance, mobility, or transportation. While

teletherapy can be appropriate for many populations that SLPs serve, this research project is

focused specifically on the feasibility of teletherapy in patients with aphasia. In fact, providing

telerehabilitation services is a feasible way to conduct group therapy sessions to individuals with

aphasia (Manasco, Barone, Brown, 2010; Steele, Baird, McCall, Haynes, 2014; Pitt, Theodoros,

Hill, & Russell, 2018). Pitt et al. (2018) report the previous success that FTF aphasia group

therapy has had on patients with aphasia, including improvements in their communication,

quality of life, and participation in their community. However, Pitt et al. (2018) report on their

preliminary study investigating how well aphasia group therapy could be provided through

telepractice. Results from the study indicated that patients with aphasia, following telepractice

group therapy reported a higher quality of life, increased socialization, and decreased aphasia severity, consistent with a positive impact across multiple dimensions (Pitt et al., 2018). A limitation of this study conducted by Pitt et al. (2018) was the lack of a control group, or a comparison group receiving FTF therapy. These results indicate that patients with aphasia can benefit from both FTF and telepractice group therapy sessions. This may be particularly important for patients with aphasia who may have limited access to therapy due to geographical distance, transport difficulties, mobility difficulties, or lack of local services.

Materials Required

When implementing telerehabilitation services, both the service provider and the patient need to be in correspondence regarding the necessary technology for successful therapy. In order for both parties to have a successful videoconference session, both will need technology hardware that has a camera capability, such as personal computers, tablets, or iPads. However, even if a device comes with a built-in camera, an additional camera accessory may be used to help improve audio and picture quality. Additionally, microphone accessories may be used to help with clarification of sound. When using a web-based videoconference program, both parties will need a strong Wi-Fi connection in the location they will be in for the duration of telerehabilitation services. Wi-Fi signal strength can be measured in decibel milliwatts and only given in negative values (Tumusok & Newth, 2018). Tumusok & Newth (2018) determine that a reliably strong Wi-Fi signal is measured as -67dBm to -30dBm, with -30dBm being the maximum signal strength. SLPs should strive to ensure that the Wi-Fi connection be as close to -30dBm as possible. To enhance telerehabilitation services, an alternative connection point, such as a phone call or emailing, can be used in conjunction with videoconferencing. This way, if

there are connectivity technological issues with videoconferencing, a phone call or additional

connection point can help re-establish connection. In addition to using videoconferencing, other

features can be used to make telerehabilitation services more personal and interactive. With

capabilities to screen-share, send digital messages, digitally write on a screen, and record

messages, the connection between the service provider and the client will be enhanced

("Telepractice", n.d.). These additional features may be familiar to SLPs, as these are commonly

used in FTF therapy. However, the difference with teletherapy, is having the ability to multitask

and manipulate the technology for the patient to get the most out of the session as possible.

        When selecting a web-based videoconferencing server, it is important to learn what type

of videoconference classification it is – business class, software-based, or public domain

("Telepractice", n.d.). The distinction between these 3 servers is critical when remaining HIPAA

compliant. For example, public domain servers, such as Facetime or Skype are easily accessible,

but is not fully secure. Business class videoconferencing servers require additional costs and is

typically used in large facilities. Business class videoconferencing typically would apply to

medical centers or large universities, and unlikely to be used by just one SLP for one client. Ease

of access should not be the sole factor in determining which videoconferencing server is utilized

in telerehabilitation services. While ease of access is an important variable in selecting a server,

so is protecting personal client information. To provide more security when using

telerehabilitation videoconferencing services, some servers do allow for passwords, meeting

numbers, and provide firewalls. These security settings help to ensure that the therapy being

provided via videoconferencing is protected. Learning about the encryption capabilities of all

functions of a server is important before selection for use in therapy services. For example, the

videoconference aspect of a server may be well-encrypted, and prevent unauthorized users from

accessing the video stream, where the history of the videoconference is stored, or corresponding instant messages may not be stored in a well-encrypted area of the server.

As part of the process in implementing telerehabilitation services, before patients and families feel comfortable using the above technology, training will be required. Having in-person training sessions with patients and their families can help yield more successful outcomes and decrease troubleshooting difficulties once telerehabilitation services are implemented. Dechêne et al. (2019) utilized teletherapy with patients with aphasia. The study revealed that elderly patients accepted teletherapy as a service delivery method. "After minimal training, all participants were able to function independently with the technology. In addition, they mentioned that the platform was easy to use even though the majority did not have any knowledge about computers" (Dechêne et al., 2019).

Patient Considerations

Before engaging in telerehabilitation services, it is important for SLPs to consider if their patients would be good candidates. Hill & Breslin (2016), report the importance that patient self-motivation and training can have on creating a positive telerehabilitation experience. If a patient is unmotivated to learn to use the technology for teletherapy services, it is unlikely that telerehabilitation would be a good fit. Other important considerations include the physical characteristics of the technology used regarding the individual patient. Additionally, a patient's individual cognitive and communicative characteristics as well as their access to using technology are important to evaluate prior to the suggestion of telerehabilitation services.

Cognitive and Linguistic Considerations for Technology Use in Older Adults

First and foremost, it is important to highlight the normal aging process and how this may impact one's ability to learn to use technology. For patients with aphasia, the ability to use technology is likely to be even more difficult with a diagnosed difficulty with language. The population of adults 65 and older have been shown to steadily increase their technology and internet use over the last two decades (Hunsaker & Hargittai, 2018). However, Hunsaker & Hargittai (2018), report from other studies, that there are clear distinctions between the age of individuals and their self-rated comfortability with using technology. For example, while 82% of individuals aged 65-69 used the internet, only 44% of individuals that were 80+ were internet users. There are clear barriers for the older population to use technology if they report having little to no confidence in technology, which could be as much as 34% of the older population according to Anderson & Perrin (2017). Anderson & Perrin (2017) report that 48% of older internet users will need help implementing or utilizing a new electronic device. Mitzner et al. (2010) investigated barriers for the older population to accept technology into their daily life. Mitzner et al. (2010) examined a wide range of different types of technology for this study, so only the relevant data and findings are used for this research project. Some of the largest barriers to using technology in the home were reported to be financial expense, effort, and programming options. It was found that it was sometimes difficult for older adults to use technology when there were too many options or features to choose from. This should be kept in mind, since telerehabilitation services will utilize a tablet or computer that have many additional features in addition to the ones required for therapy. In a study completed by Jayroe and Wolfram (2013), when given specific tasks to do using the internet, researchers examined the difficulties that older adults had in completing the given tasks. Results of the study showed barriers included

unfamiliarity with webpages, tasks, and the technology. The patients reported in this study, that

having a non-tactile keyboard made it more difficult to type on a tablet, and the sudden

disappearance and reappearance of the keyboard on the tablet was difficult for them to

understand. Participants in the Jayroe & Wolfram (2013) study indicated with practice, the

barriers would likely be easier to overcome.

Access

Before determining that telerehabilitation services are an appropriate therapy service

delivery model, it is critical to assess the patient's access. The patient must have access to the

predetermined technology components, discussed earlier. Clients will need access to a

technology device, likely a computer or iPad, in addition to WiFi services, and any additional

accessories required. Further considerations that will need to be addressed by the client, will be

to ensure that there is an environment conducive to therapy services ("Telepractice", n.d.). The

client will be responsible for finding a quiet area with minimal distractions when receiving

telerehabilitation services. On the other hand, SLPs are responsible for finding an appropriate

environment to conduct therapy in. Room selection should be chosen to provide confidentiality,

minimal distractions, and a quiet area. The SLP should help the clients, caregivers, and family

determine if they are properly equipped to follow directions and troubleshoot if technology

issues do arise ("Telepractice", n.d.). The SLP can provide the client and family or caregivers

with information on how to troubleshoot technology issues that may arise before or during

telerehabilitation services are conducted. The SLP would have conducted training sessions for

the patient and/or family and caregivers prior to the beginning of teletherapy. Through these

sessions, the SLP would be able to provide pre-made resources on common troubleshooting

issues that arise during teletherapy. This way, the family, caregivers, and patients would have

access to a hard copy troubleshoot guide. The SLP may invest time in creating materials prior to

these training sessions to ensure that the patients and families receive the best possible support.

In addition, as described in a study conducted by Getz, Snider, Brennan, & Friedman (2016),

proactive measures were taken to ensure their patients had full access to the technology utilized,

and therefore, the therapy session. Getz et al. (2016) utilized picture icons rather than text-based

designs in addition to the software being fully controlled by the SLP, minimizing the patient's

need to interact with the technology and limit the language use needed to interact with

technology. Finally, a remote-control application software was installed to allow the SLP to help

log the patient in without having the patient need to type passwords and assist with reading error

messages (Getz et al., 2016).

Physical Characteristics

Before beginning telerehabilitation services with a patient, it is important to ensure that

the client would benefit from this type of service delivery. As mentioned before,

telerehabilitation services may only be used if it is clinically appropriate and comparable to FTF

therapy. The clinician may screen a patient and trial the technology that will be used in

teletherapy sessions. Patient motivation and training are both critical to having a successful

experience with teletherapy. This helps ensure that the patient will be capable and willing to

participate. The clinician is responsible for determining if telerehabilitation services are

appropriate for each individual client recommended for therapy. Telerehabilitation services

involve the use of technology, so first, the clinician must assess the patient's physical and

sensory characteristics to evaluate efficacy of services. For example, it is important to learn of

the patient's current capabilities of hearing, vision, and dexterity ("Telepractice", n.d.). If a patient is expected to utilize technology to receive rehabilitative services, it should be ensured that all visual icons on the screen and all buttons are easily seen by the patient. If icons on a normal desktop are too small to see, modifications should be implemented to better assist the patient, such as enlarging the size of icons and screen size. Icons can easily be made larger, typically through a device's settings menu. Visual modifications to accommodate the patient can improve the success of teletherapy. For example, determining the appropriate size of the screen for the patient to use is critical. If a larger computer screen is easier for a patient to see than an iPad Mini © screen, the appropriate selection should be made. If videoconferencing is being used to complete telerehabilitation services, the patient's hearing capability should also be considered. If a client has a predetermined hearing loss that is left intreated, this will impact the success of therapeutic services delivered through videoconferencing. Compensatory strategies to consider with a client that has a hearing loss would be determining if additional accessories are needed, such as external speakers to allow the client to hear at an appropriate level for successful therapy, or hearing aids if needed. Videoconferencing, like conversation, requires back and forth communication. However, if an individual has been diagnosed with an aphasia, either expressively or receptively, videoconferencing may prove to be a challenge for the patient to reciprocate conversation. Another physical characteristic that is imperative to consider before implementing telerehabilitation services for a client, is ensuring that manual dexterity is accounted for. For patients with aphasia, it is common to be the result of a stroke or other acquired injury. It is well known that with strokes, it is possible for patients to experience hemiparesis or hemiplegia on one side of their body. This is an important factor to consider, as it could play a role in how the patients are able to access and manipulate technology.

Compensatory strategies for manual dexterity difficulties may be used to help patients better access technology. For example, if a touch screen is more difficult for a patient to use due to hemiparesis, a mouse/keyboard combination may yield more successful attempts. If both are difficult for the client, an additional person can be present with the client to assist in setting up the technology used for the therapy session. While this may require engagement of family members to help assist a patient in therapy, in this case, it would still be ethical to provide services if the patient is able to interact and reliably respond to stimuli.

Cognitive Characteristics

After considering any physical barriers that may interfere with telerehabilitation services, cognitive barriers should also be considered. Dependent on the exact type of etiology and location of damage of the client's aphasia, additional cognitive deficits may be present. For example, memory, attention, and executive function skills can be impacted and co-occur with a client's diagnosis of aphasia ("Aphasia", n.d.). The use of technology will engage memory, attention, and executive function skills. For example, the patient will need to have an intact memory system to help encode and retrieve memories on how to use and access the technology needed for therapy. A client will need to have sustained attention while using technology for teletherapy in order to stay engaged in the session. To use teletherapy services, patients will need to use executive function skills to ensure that they are able to plan and organize the steps needed to begin a therapy session. While an exact definition of chronic aphasia has not been established, the contrasting difference from acute aphasia is the increased length of time since the onset of aphasia. Clients enter a chronic aphasia state when their impairments are stable, which usually occurs about 6 months after the onset of the incident (Johnson et al., 2019). When providing

chronic aphasia therapy through telerehabilitation services, the SLP will likely know what cognitive barriers, if any, accompany the aphasia diagnosis. These additional cognitive barriers are important to consider when designing a telerehabilitation program. Attention, memory, and executive function deficits have consistently been found to co-occur with aphasia diagnoses (Villard & Kiran, 2017). Each of these cognitive characteristics will play a role in how the patient processes, encodes, and manipulates the stimuli presented in therapy. To be successful in receiving telerehabilitation services, clients and their families or caregivers will need to be willing to participate and assist in therapy sessions and help compensate for any cognitive characteristics that would otherwise prevent a patient from completing telerehabilitation ("Telepractice", n.d.). Clients may require additional assistance from a caregiver or family member to fully participate in the telerehabilitation therapy service.

Communication Characteristics

Since aphasia is a diagnosis of a language deficit, it is important for an SLP to recognize a client's strengths and weaknesses related to communication before beginning telerehabilitation services. Communication characteristics to consider include a client's auditory comprehension, literacy, and speech intelligibility ("Telepractice", n.d.). All of these communication skills will impact how therapy is given through telerehabilitation services and should provide the SLP with foundational information on what goals to target. The SLP can isolate one of these communication skills to target for therapy, but when not being targeted, consideration and compensatory strategies should be used to assist the client. For example, if a client has auditory comprehension difficulties, it will be important for the SLP to provide more visual cues through videoconferencing instead of relying on back-and-forth communication. If a client has difficulty

with literacy, this can be compensated with verbal instruction or visual cues. If a patient's speech intelligibility is poor, videoconferencing services may not be appropriate. With videoconferencing, there is an expectation that there will be a conversation back and forth. If a client is unintelligible, it may not feasible to provide synchronous videoconferencing services. However, telerehabilitation services can still be used asynchronously or in conjunction with FTF therapy sessions.

<div align="center">**Domains Targeted**</div>

Anomia and Repetition

It is known that anomia, or word-finding difficulty, is accompanied with an aphasia diagnosis. Whether a fluent or non-fluent aphasia diagnosis has been made, anomia will exist, however, the presentation of anomia may differ. Agostini et al. (2014) conducted the first study of its kind to compare the effect between FTF and telerehabilitation services. It was reported that in a study specifically targeting anomia, the mode of service delivery did not differ significantly, indicating that FTF therapy and telerehabilitation services can both improve word-finding difficulties in patients with chronic aphasia (Agostini et al., 2019). In a study conducted by Agostini et al. (2019), two interfaces were used; one for the patient and one for the SLP. The SLP's interface included control over the patient's screen. Both the patient and the SLP were able to see one another in a corner of the screen. A series of pictures were presented to the patient and if unable to recall the name of the picture being shown, the SLP was able to provide only progressive phonemic cues through the telerehabilitation interface (Agostini et al., 2019). In this case, videoconferencing was utilized to target anomia in chronic aphasic patients. In another study examining telerehabilitation services for treating anomia, Dechêne et al. (2019) designed

individual anomia videoconferencing treatment for patients. Results concluded that on trained

stimuli, patients were able to rapidly improve during the intervention process. This study reports

teletherapy as an efficacious way to provide therapy, as the pre- and post-intervention changes

noted, in addition to the improvement in trained stimuli. In addition, satisfaction from the

patients from using videoconferencing was high. Despite being unfamiliar with computers,

patients still mentioned that the programs used were user-friendly and required minimal training

(Dechêne et al., 2019). While the software program interface was not discussed in this study, it

was explained that both a tablet PC and 20inch LCD screen were utilized (Dechêne et al., 2019).

Anomia was targeted through confrontation naming, delayed repetition, spelling, reading, and

sequencing (Dechêne et al., 2019). While both studies mentioned utilized videoconferencing to

target anomia in therapy, SLPs can also design asynchronous programs for patients to complete

at home in between sessions as additional home practice. For example, by creating a pre-made

video on YouTube, the SLP can individualize assignments for at-home practice. While the SLP

would not be present or available to give progressive cues to help identify naming objects in

pictures, the SLP can build in time for the client to produce the word, and then offer a delayed

repetition exposure in the video. This would not be a service that is billed for, but rather an

opportunity for patients to get additional exposure and additional practice and work without

having to physically see an SLP. Providing at-home exercises can help patients to better

generalize the skills that are being targeted in therapy.

Alexia

Phonologic alexia is a reading disorder that often a patient can demonstrate after a left

hemisphere stroke (Getz, Snider, Brennan, & Friedman, 2016). Patients with phonologic alexia

may demonstrate a heightened difficulty with reading function words, verbs, novel words, words with little to no semantic content, and pseudowords (Getz et al., 2016). Getz et al. (2016) conducted a study that examined two patients presenting with severe non-fluent aphasia. The study utilized synchronous telerehabilitation services to provide the patients with "live" feedback from the clinician. The clinicians were able to control the participants' screens remotely as well as video chat in real-time. Since language, and more specifically, reading was impaired in both patients, minimal words were used for instructions and instead picture-based instructions were utilized (Getz et al., 2016). The telerehabilitation software was designed to correlate homophones and associated pictures with the target words. For example, if the target word was "not", on the right side of the screen, a picture of a "knot" and the word were listed below for the patient following an incorrect attempt at reading the target word (Getz et al., 2016). If the patient was still unable to read the word, the clinician read the word aloud and asked the patient to repeat it. At the end of the 45-60-minute telerehabilitation session, the clinician assigned the patient home practice work to be completed by the next session. The home practice work was identical to the work done synchronously with the clinician. However, at the end of the home practice session, data was sent to the clinician to review before the next video chat session (Getz et al., 2016). Concluding this study, both patients improved their oral reading after receiving telerehabilitation services (Getz et al., 2016). These results suggest that telerehabilitation therapy was successful in providing therapy to patients with concurrent aphasia and alexia.

Cognitive Training

Cognitive training can be incorporated into speech and language services provided by an SLP to patients with aphasia. Oftentimes, patients diagnosed with aphasia can have difficulties

with executive functioning, attention, memory, and other cognitive skills, which all impact both language and technology use. Executive function, attention and memory all play a role in language and communication, and therefore are justified to target alongside language. Zhou, Lu, Zhang, Sun, Li, & Zhu (2018), conducted a study combining aphasia intervention and cognitive training that were delivered via teleservices. This study examined the difference between patients with aphasia in an inpatient facility as well as discharged patients with aphasia serviced through telerehabilitation. This study determined that targeting cognitive training and speech and language together in patients with aphasia improved their overall speech and communication skills. Zhou et al. (2018), concluded that computerized training could effectively improve the communication in both inpatient and at-home patients with aphasia. The conclusions of this study are based on the results depicting that no significant difference between the inpatient and at-home, discharged patients was noted. In fact, this study found that for inpatient and discharged patients, the computerized version of the training program promoted better aphasia recovery than the traditional FTF therapy (Zhou et al., 2018). The authors of this study do not offer any insight into how this result may have occurred but can determine that teletherapy is a viable option for patients with aphasia.

Natural Speech targeted through Group Therapy

In a study, Pitt, Theodoros, Hill, & Russell (2018), examined how group therapy could be targeted to improve communication, participation, and quality of life in patients with chronic aphasia through using teleservices. Nineteen participants were selected to participate with the goal of improving communication as it related to their quality of life. The specific goals of the study were to, "(1) create opportunities for communicative success, (2) share personal life

history, and (3) provide support for living successfully with aphasia through networking with others" (Pitt et al., 2018, p. 4). Groups of two to four patients with aphasia were virtually grouped together for a therapy session with an SLP, all from remote locations. When selecting the groups, the SLPs attempted to group people with similar interests, gender, life stage, and availability. The SLPs did not form groups based around age, aphasia severity, or the time since the aphasia diagnosis to be more representative of a typical outpatient aphasia group (Pitt et al., 2018). When designing the program, TeleGAIN, considerations for all components of the International Classification of Functioning, Disability, and Health, were utilized to ensure that the program would target meaningful aspects of the participant's communication (Pitt et al., 2018). TeleGAIN, according to the study, is a "holistic aphasia group intervention that can be delivered via telepractice" (Pitt et al., 2018, p.1). TeleGAIN encouraged meaningful participation, regardless of the individual's severity of aphasia, to help engage patients in conversation. To make sure that all participants in the group therapy session were participating, the clinician had a wide range of materials to cater to each individual's needs, such as providing graphic supports, labels, and photos. These individualized supports helped to compensate for different severity levels and encouraged more participation from all who were involved. A benefit of group therapy, delivered as a teleservice, is that each patient involved has the SLP and group members that they are able to scaffold from to increase their communicative confidence (Pitt et al., 2018). As a result, Pitt et al. (2018) found that group therapy, delivered through telepractice, was an effective way to increase communication in chronic aphasic patients. It was determined that this specific program had a positive multi-dimensional impact on the participant's self-reflection of their language, engagement in social activities, and wellbeing (Pitt et al., 2018). By providing a variety of expressive language opportunities, participants were able

to practice conversing in debates, narrative storytelling, and role play, which is unique to a group

setting since it is more natural than in a FTF therapy session. Pitt et al. (2018) report that there

were unexpected gains through providing TeleGAIN to the nineteen participants. An increase in

the ability and function of reading and writing was noted but was likely due to the

communication support and individualized intervention materials for each participant. All in all,

Pitt et al. (2018) determined that a multi-dimensional group intervention is possible to deliver via

telepractice to people with aphasia. This study is a positive indicator that teletherapy programs

have the potential to improve the severity aphasia diagnoses, increase patients' participation in

activities of daily life, and increase patients' quality of life.

Assessment

In a study conducted by Theodoros, Hill, Russell, Ward, & Wootton (2008), it was

identified that conducting aphasia assessments through teleservices is an acceptable service

delivery model. No significant differences were found between assessment scores found in FTF

therapy when compared to online assessments, when conducted simultaneously. This study

allowed patients with a previously diagnosed aphasia to be assessed, although the severity and

type of aphasia was not known information to the SLPs conducting the assessments. All

participants were assessed by two SLPs – one in a FTF session, and one online at the same time.

One of the SLPs, either the FTF SLP or online SLP, led the assessment, while the other observed

and recorded the data on the patient. This study examined the efficacy of conducting the short

forms of the Boston Diagnostic Aphasia Examination, 3rd edition and the Boston Naming Test

(Theodoros et al., 2018). Results of the study concluded that standardized aphasia assessments

are feasible to be delivered through videoconferencing software. There was not a significant

difference between the results found between the FTF and online assessment of the BDAE-3 or

BNT. Therefore, online assessments are just as valid as FTF assessments in assessing aphasia

severity and aphasia type. Additionally, in a systematic review conducted by Hall, Boisvert, &

Steele (2013), results of the systematic review reveal that when aphasia assessments are

conducted via telepractice and in-person, no significant difference exists. All four studies that

were examined in this systematic review, reveal that standardized assessments yielded similar

results to those delivered in FTF therapy. One study that was reported did note that paraphasias

were more difficult to assess in telepractice assessments when compared to FTF assessments.

Patient Satisfaction

Much of the research in the realm of telerehabilitation services for patients with aphasia

have high remarks for patient satisfaction. Most patients enjoy the flexibility that

telerehabilitation services provide. In a 2008 study conducted by Theodoros, Hill, Russell, Ward,

& Wootton, it was found that patients with aphasia that received telerehabilitation services had

high satisfaction with the online assessment process. This study included a questionnaire to learn

of the patients' overall satisfaction with the online assessment. In a sample of thirty-two

participants with an age range of 21 to 80 years old, results showed, "…100% of participants

indicating that they were at least satisfied with the service…67% of the cohort was more than

satisfied or very satisfied…Ninety-three percent of the cohort reported that they were

comfortable with the online process and were confident with the results obtained" (Theodoros et

al., 2008, p. 557). These results included input directly from patients with aphasia, and

determined that online assessments are both feasible and can be a positive experience. Patient

satisfaction was assessed in part of the study conducted by Woolf, Caute, Haigh, Galliers,

Wilson, … & Marshall (2016). When aphasia patients were interviewed regarding their satisfaction with the teleservices, positive feelings were noted. The study found that most of the patients involved in treatment were able to navigate and master how to use the technology needed for teleservices. The patients remarked that they were overall satisfied with the visual and audio connections and did not run into detrimental technological issues (Woolf et al., 2016). Patients in the Woolf et al. (2016) study also had the opportunity to self-rate their level of competency for using technology, satisfaction of the intervention, and the ease and quality of transmission, all of which were found to be rated highly among the patients. Some obstacles that were involved in this study were technological issues, although all were resolved and did not interfere with the long-term study. Recommendations from Woolf et al. (2016) moving forward, include exploring more conversational tasks to help promote better generalization of expressive language, rather than only investigating naming tasks, but acknowledged a larger study was needed to solidify results. Another study conducted by Tousignant, Macoir, Martel-Sauvageau, Boissy, Corriveau, …& Pagé (2018), explored patient satisfaction following a three-week, at home, telerehabilitation program for patients with chronic aphasia. Twenty patients filled out a fifteen-question survey following the three-week treatment. With the highest possible score of a 75, meaning great satisfaction with the treatment, the average score was a 70/75, indicating that the participants highly regarded the teleservices provided to them. In addition, patients also highly rated their satisfaction with their functional communication after the treatment was finished (Tousignant et al., 2018). Despite not being in a traditional FTF therapy session with an SLP, the patients with aphasia reported that they felt their contact with the SLP was still good, indicating that the audio and visual aspects of teleservices did not negatively impact their experiences. Eighteen of the twenty patients reported that they would, "…highly recommend

speech therapy through teletreatment to a friend or family member" (Tousignant et al., 2018). Tousignant and colleagues (2018) are confident in stating that the feasibility and efficacy of telerehabilitation services are acceptable to patients with aphasia as a viable treatment option. Tousignant et al. (2018) report that the participants were not randomly selected and may have been more inclined to have positive feelings about modern technology and previous technology experience was not included as a factor that was reported on. Another limitation included that there was no comparison group, so results were not compared to FTF therapy results. On a much smaller study scale, Simic, Leonard, Laird, Cupit, Höbler, & Rochon (2016), completed a study with 6 patients with aphasia who also rated their experience as overall positive. After minimal technology training, patients with aphasia felt comfortable using technology to access their SLP and their therapy services. The training session consisted of the patients getting a chance to become familiar with the application used in the study. All patients were given an aphasia-friendly training manual and informational guide for how to log into the computer and get to the therapy application (Simic et al., 2016). Patients expressed the benefit of receiving therapy from their homes, without having to leave, through the utilization of the telerehabilitation services. Simic et al. (2016) investigated the clinician's satisfaction with using teletherapy and results showed that clinician satisfaction was lower than the patient satisfaction. Due to the clinicians' reported difficulty with building rapport and lack of direct eye contact as well as not interpreting body language cues contributed to the teletherapy feeling less natural. In an asynchronous telerehabilitation study by Hill & Breslin (2016), at the conclusion, members of the study were asked a series of questions about the usability and acceptability of the program. Patients agreed that training and self-motivation were important factors in creating the positive experience. The study designers provided one-on-one technology training and a training at each of the

participants' homes to help with proactive troubleshooting prior to treatment beginning. As a result of the study, the participants were again, highly satisfied with an online service provider when compared to FTF therapy. Demonstrated in the study, "All of the participants expressed high levels of satisfaction…and all stated that they would like the opportunity to continue using it for therapy" (Hill & Breslin, 2016, p. 10). The patients in this study appreciated that the therapy was delivered online and able to be accessed from their home. Because of this therapy approach, they felt that more intensive practice was able to be provided when compared to FTF therapy.

Conclusion

It is clear from the research that has already been completed, that telerehabilitation has the potential to be a feasible, reliable, and valid way to provide therapy to patients diagnosed with aphasia. Before implementing or establishing telerehabilitation services, it is important for SLPs to ensure that this therapy selection is in the best interest of the client. SLPs should uphold all legal and ethical policies throughout the entire telerehabilitation therapy process. Many of the studies that have focused on telerehabilitation with patients with aphasia acknowledged that small sample sizes were limitations of the studies. Larger samples need to be studied and more universal training programs should be standardized. Most studies created their own platform to use for therapy, such as designing the interface or application that was used. By creating a more standardized platform to provide telerehabilitation therapy, further research can be done to examine what domains of language, and what deficits are best to target with particular programs. Telerehabilitation is still a developing field that is being explored and gaining popularity for SLP use in assessing and treating patients with aphasia. While further research needs to be continued

to be conducted, results so far have shown that telerehabilitation is a viable alternative to

traditional FTF speech therapy.

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    speech-language and cognitive training effectively promoted recovery in aphasia patients.

    Frontiers in Psychology, 9(2312), 1-7.

**Appendix A: United States Map & Current Regulations**

A1: Licensure Board Telepractice Requirements Audiology & Speech-Language Pathology
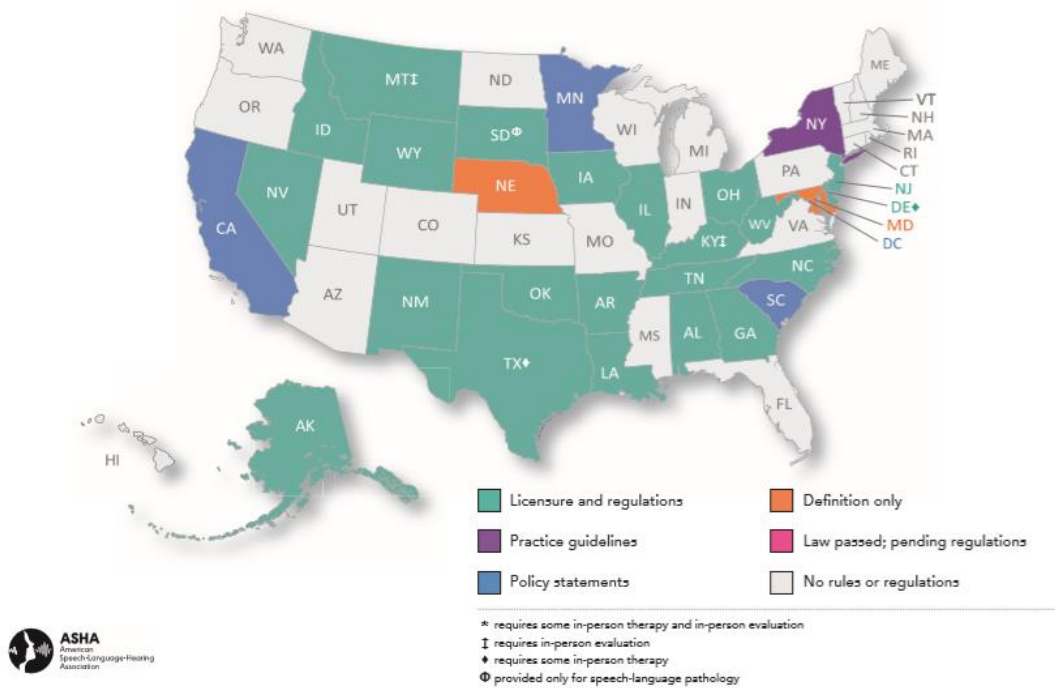
Licensure and regulations

Practice guidelines

Policy statements

Definition only

Law passed; pending regulations

No rules or regulations

* requires some in-person therapy and in-person evaluation

‡ requires in-person evaluation

♦ requires some in-person therapy

Φ provided only for speech-language pathology

Licensure Board Telepractice Requirements Audiology & Speech-Language Pathology. (n.d.)

Retrieved from https://www.asha.org/uploadedFiles/Telepractice-Requirements-and-

Reimbursement.pdf.

A2: Private Insurance Laws and Regulations Telepractice Reimbursement Audiology & Speech
   Language Pathology

Private Insurance Laws and Regulations Telepractice Reimbursement Audiology & Speech

   Language Pathology. (n.d.) Retrieved from

   https://www.asha.org/uploadedFiles/Telepractice-Requirements-and-Reimbursement.pdf.
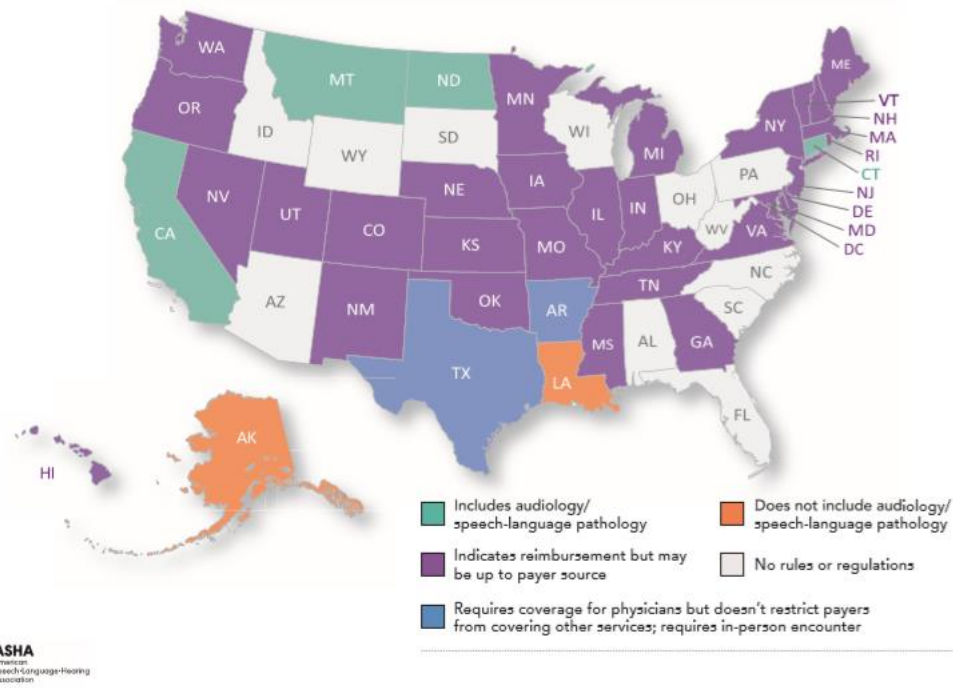
A3: Medicaid Laws & Regulations Telepractice Reimbursement Audiology & Speech-Language
    Pathology

Medicaid Laws & Regulations Telepractice Reimbursement Audiology & Speech-Language

Pathology. (n.d.) Retrieved from https://www.asha.org/uploadedFiles/Telepractice-

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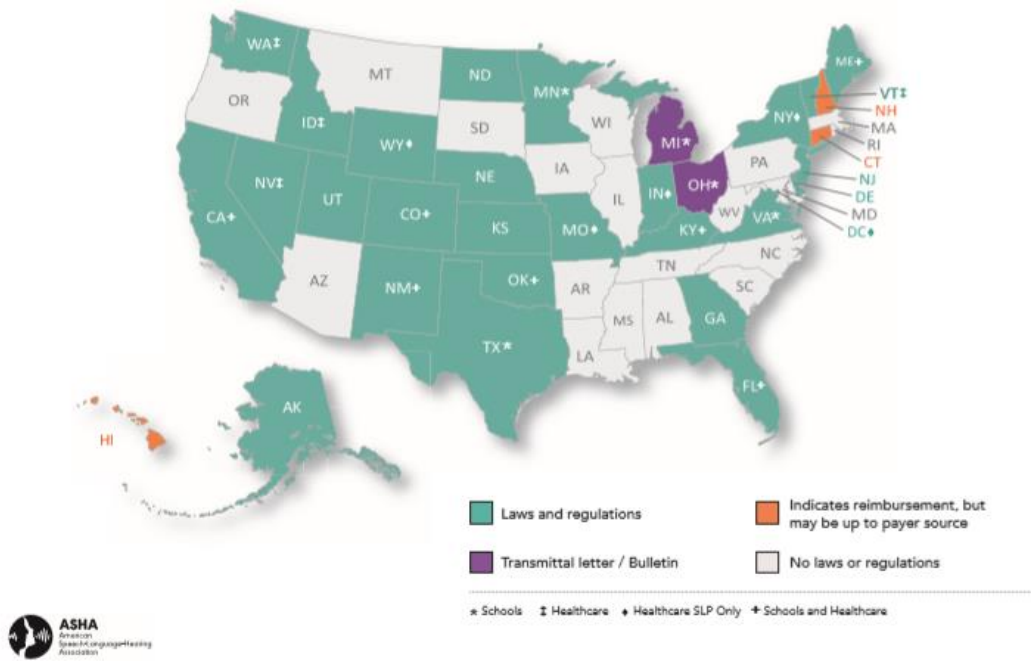
Appendix B: Presentation Notes

*NOTE: Elena Pivek used the following presentation notes to present an in-service to the

Clinical Educators at Illinois State University as well as to present a SIRCA Presentation at

ISHA in February of 2020. The text at the bottom depicts the presentation notes that were used.
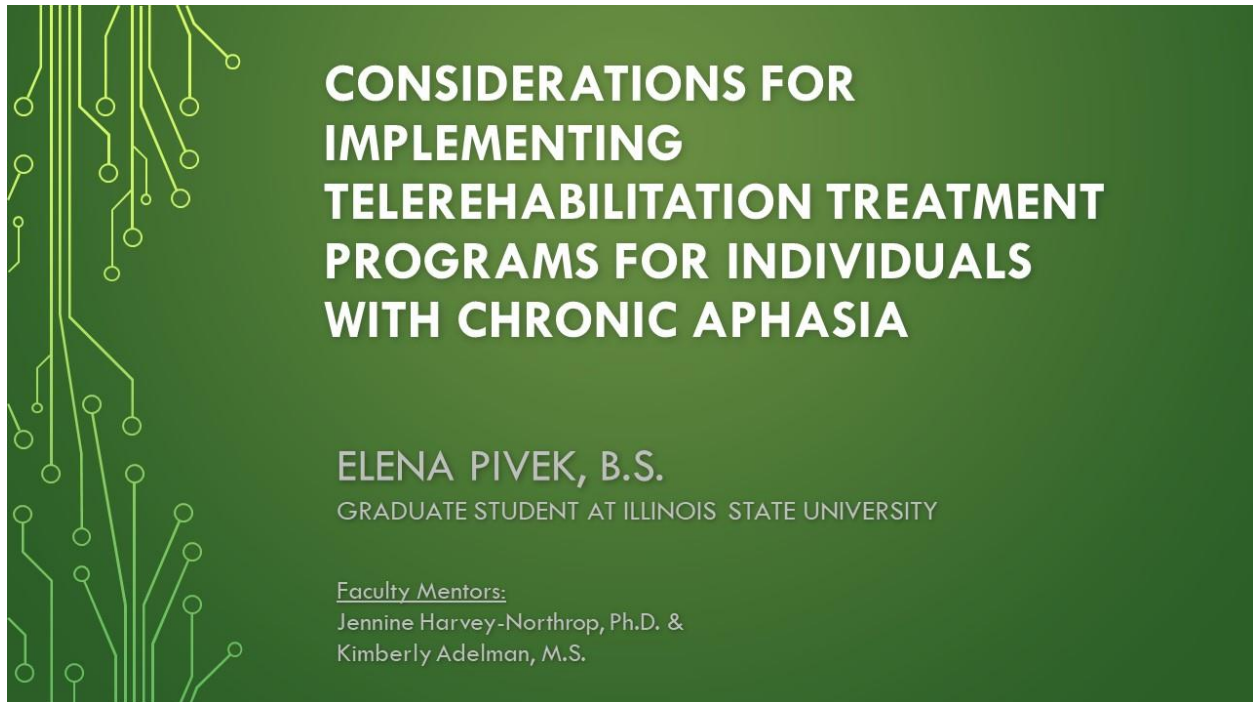
- Good afternoon, my name is Elena Pivek and I am a 2nd year graduate student at Illinois State University. Today I will cover a wide range of topics on telerehabilitation and important considerations that SLPs should be aware of prior to beginning teletherapy.
- I specifically chose the chronic aphasia population for this research project. Chronic aphasia refers to an aphasia diagnosis that a patient has received for about 6 months. For one, more research was conducted on the chronic aphasia population than aphasia. My thinking in choosing chronic aphasia relates to the impact of recovery. Usually after 6 months, patients have spontaneously recovered language abilities as much as they will be able to and have stronger language capabilities than directly after being diagnosed. With chronic aphasia, patients have stabilized and likely are no longer in the hospital. For acute rehabilitation patients, they will be in the hospital for other medical needs, and theoretically could benefit from teletherapy, but will have an SLP on site that would be able to see them for services.

- The purpose of this research is to 1) bring more awareness and advocacy to teletherapy and its benefits and 2) provide efficient, easy-to-access information on the foundational knowledge needed before SLPs begin to use telepractice to serve clients with aphasia.
- For this project, I conducted a systematic literature review across a variety of databases to find articles published within the last decade (2009-2019) to find the most relevant and new information. I read through the peer-reviewed articles to guide the direction of my work.
- As a result of my research, I wrote an in-depth paper on all of the topics I will cover today and created this presentation to summarize and share the most important findings.
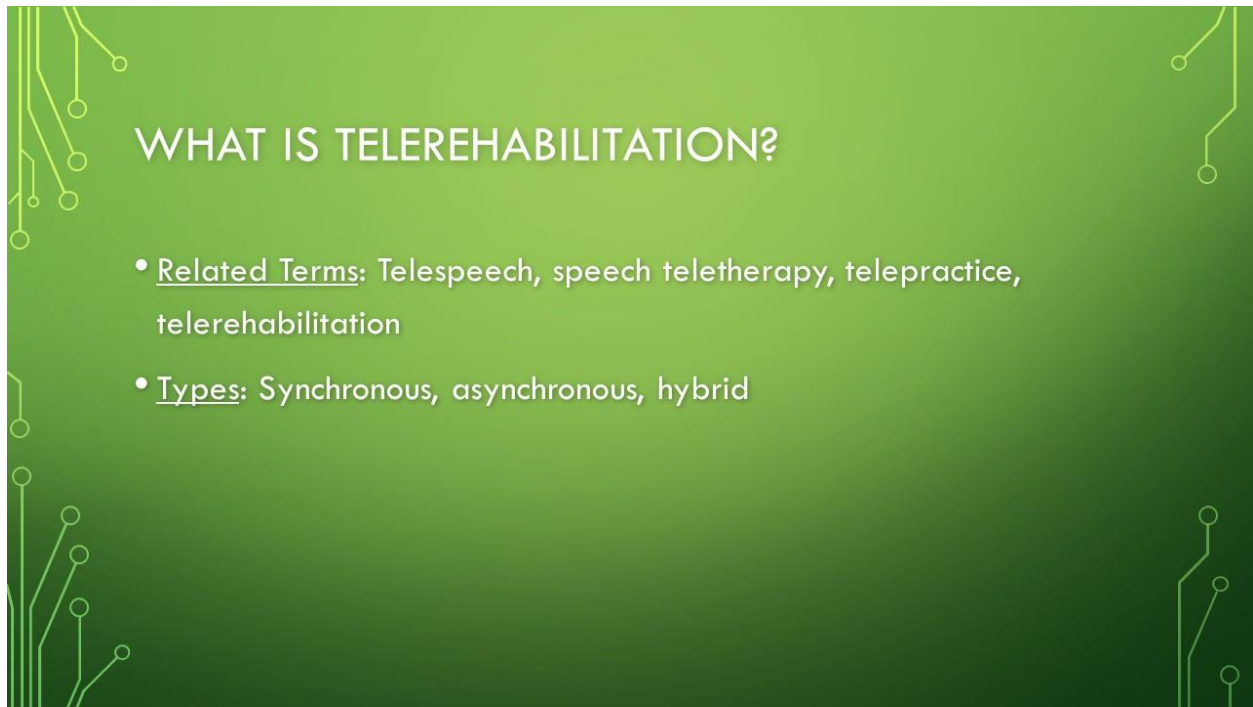
- ASHA has identified the use of "telespeech, speech teletherapy, telepractice, and telerehabilitation" as acceptable terms to describe therapy delivered with technology so that the SLP and patient do not have to be in the same physical location.
- Synchronous telepractice refers to real-time interactions between a patient and SLP. This is typically done through videoconferencing, where a conversation can be held back and forth.
- Asynchronous telepractice refers to telepractice done at different times between patient and SLP. The SLP can review the data the patient has completed at a different time, but no back and forth conversation is held.
- Hybrid telepractice refers to a combination of synchronous telepractice and either asynchronous or in-person services.

- State Licensure
    Throughout the service duration, both the SLP and the patient need to be within the state lines in which the SLP is licensed. Each state may have its own policies regarding telepractice, so it is up to the SLP to be informed about their licensed state.
    Telerehabilitation may only be used if service are equivalent to FTF therapy outcomes.
    Illinois currently does not permit student interns or SLP Assistants to provide telerehabilitation services, with no current laws or regulations for clinical fellows.
    For example, if an SLP is licensed only in Illinois, both the SLP and the patient need to be within the state lines of Illinois while the therapy session is conducted. If an SLP is licensed in Illinois and Wisconsin, patients must be in either one of these states while therapy is conducted.
- Currently, Illinois does not permit student interns or SLPAs to provide teleservices. There are no regulations for clinical fellows at this time.

- Every state has different reimbursement policies and has not yet been nationally standardized for speech pathology.
- On this slide in the table depicts the different codes that are specific to the billing process for speech teletherapy.
- Medicare currently does not recognize SLPs as eligible providers for teleservices. Medicare restricts which providers can use telepractice, so there are other professions that are currently eligible and able to provide services
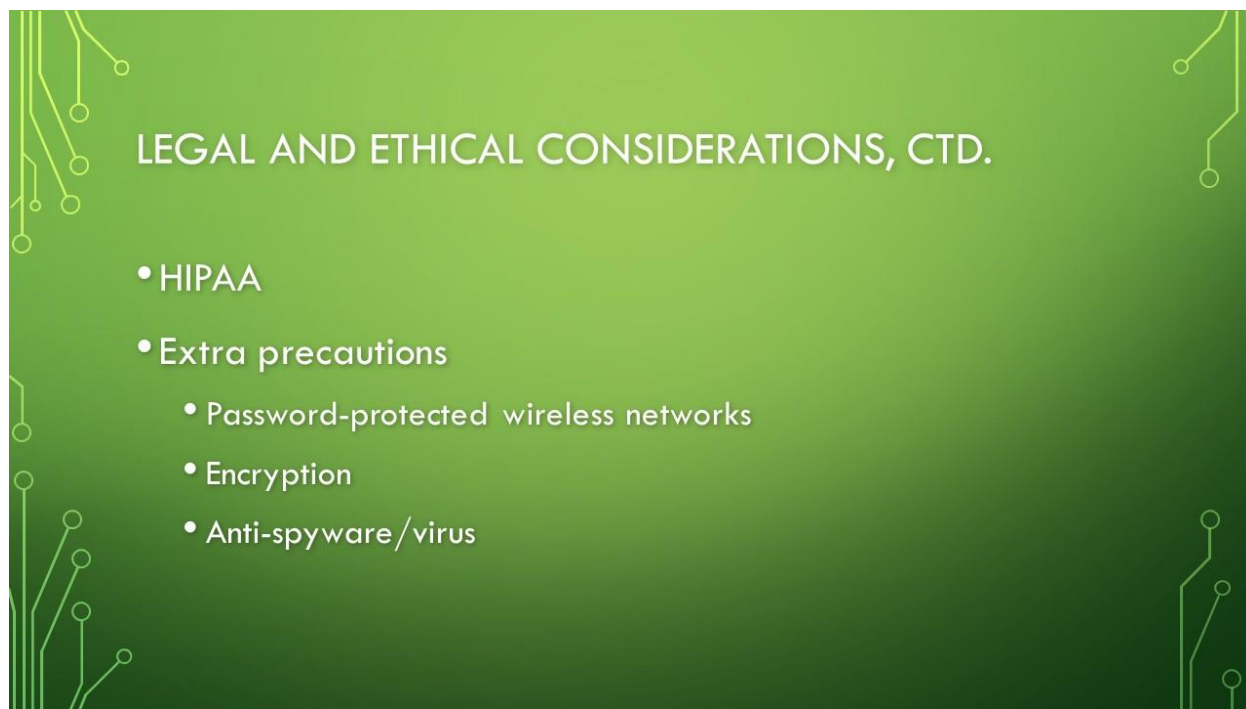
- SLPs are required to remain compliant with HIPAA when providing teletherapy services to patients, just as they would be in FTF therapy.
- There is no platform that is HIPAA compliant in nature since it is the SLP that upholds these standards in the way that platforms are used for therapy. It is up to providers to use clinical judgment to ensure that they are remaining compliant with where/how therapy is conducted. For example, a secure connection may be established for a teletherapy session, but if the SLP conducts therapy from their computer in a public setting, HIPAA data may be breached.
- However, extra precautions may be taken to ensure that all client protected health information remains in compliance in conjunction with applications or programs used for teletherapy. Since wireless connections are utilized, extra precautions can include password-protected wireless networks, encryption, anti-spyware/virus that are proactive in protecting client PHI.

WHO COULD BENEFIT FROM TELEREHABILITATION?

- Overall poor health
- Mobility Barriers
- Transportation Barriers
- Geographic Barriers
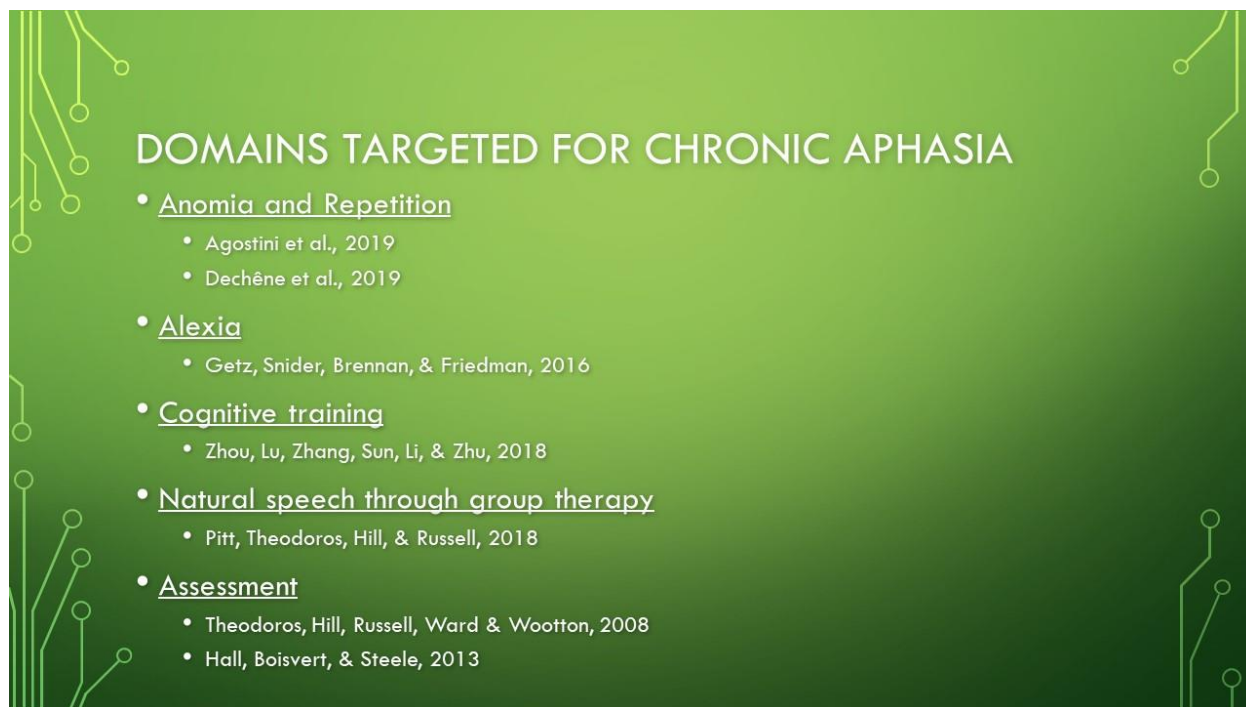- Group Therapy

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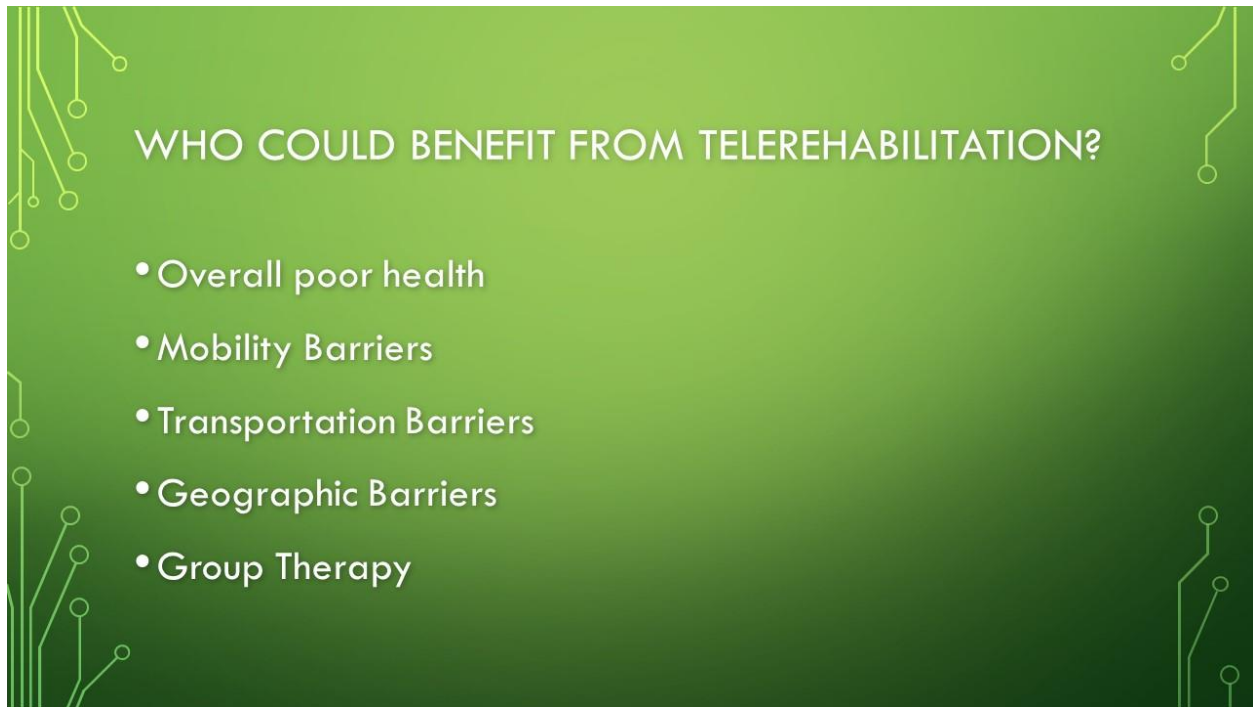
- There are a number of scenarios that telerehabilitation could be utilized for. Telerehabilitation can be beneficial for the following scenarios.
- If a patient is in overall poor health and is difficult to leave their home, telerehabilitation services can prove to be an alternative, effective way for them to still receive services.
- Barriers such as mobility, transportation, and geographic can make attending a FTF therapy session difficult. If a patient lives in a rural area and does not have appropriate services nearby, telerehabilitation can be incredibly beneficial. If a patient has difficulty with mobility or transportation that would interfere with getting to in-person therapy services, telerehabilitation can be a way for patients to receive services in a more cost-effective, efficient, way for them.
- Group telerehabilitation services can provide social engagement among people with similar diagnoses where geographic location is not a factor.
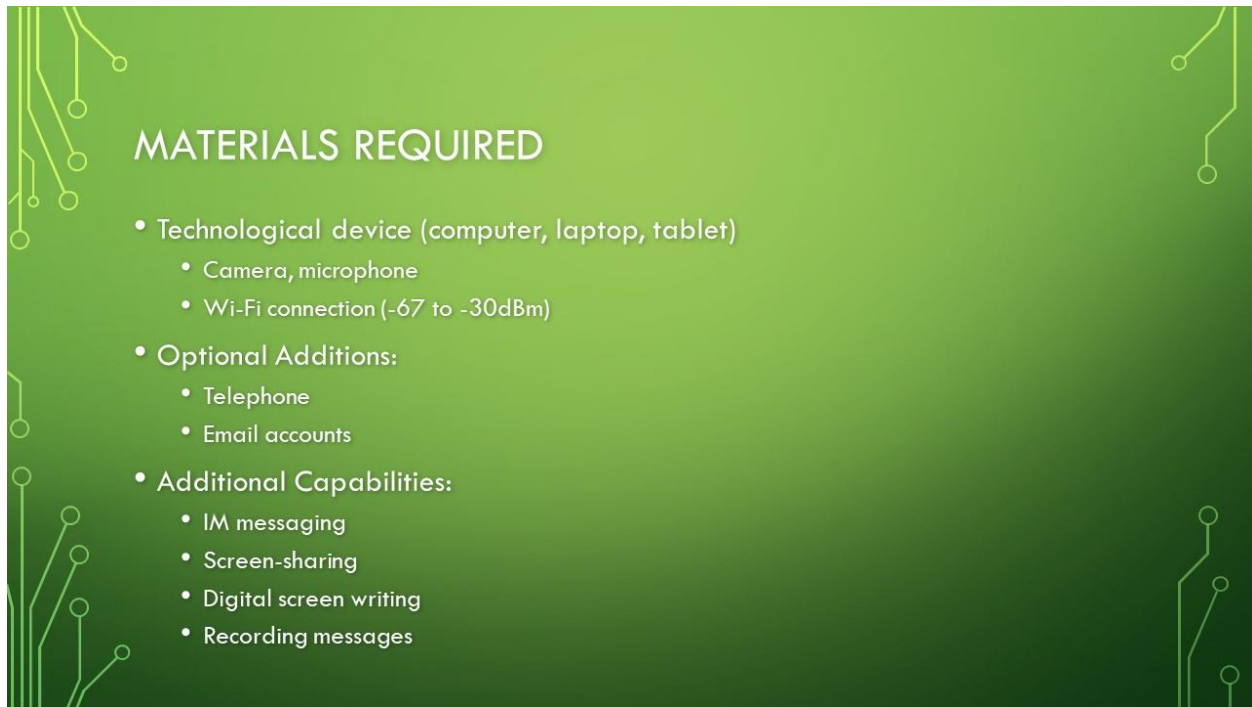
- For a teletherapy session, both provider and client will need access to a technological device that will be used for the duration of therapy. A computer, laptop, or tablet device can be used. However, both a microphone and camera will need to be required by both parties for the session. If a computer or laptop does not have camera or microphone capabilities, or poor quality audio and visual, additional accessories may be purchased separately.
- Since teletherapy is a therapy model delivered from separate remote locations, both provider and client will need access to a strong Wi-Fi connection in order to host a videoconference session or asynchronous teletherapy sessions.
- Additional technology connections may be established between provider and client to help with troubleshooting if a technology error were to arise. For example, a phone call may help a provider troubleshoot with a patient how to establish a Wi-Fi connection, or with accessing the program
- Additional capabilities may be beneficial to use in conjunction with videoconferencing, such as having access to the following features: IM messaging, screen-sharing, digital screen writing, and recording messages.
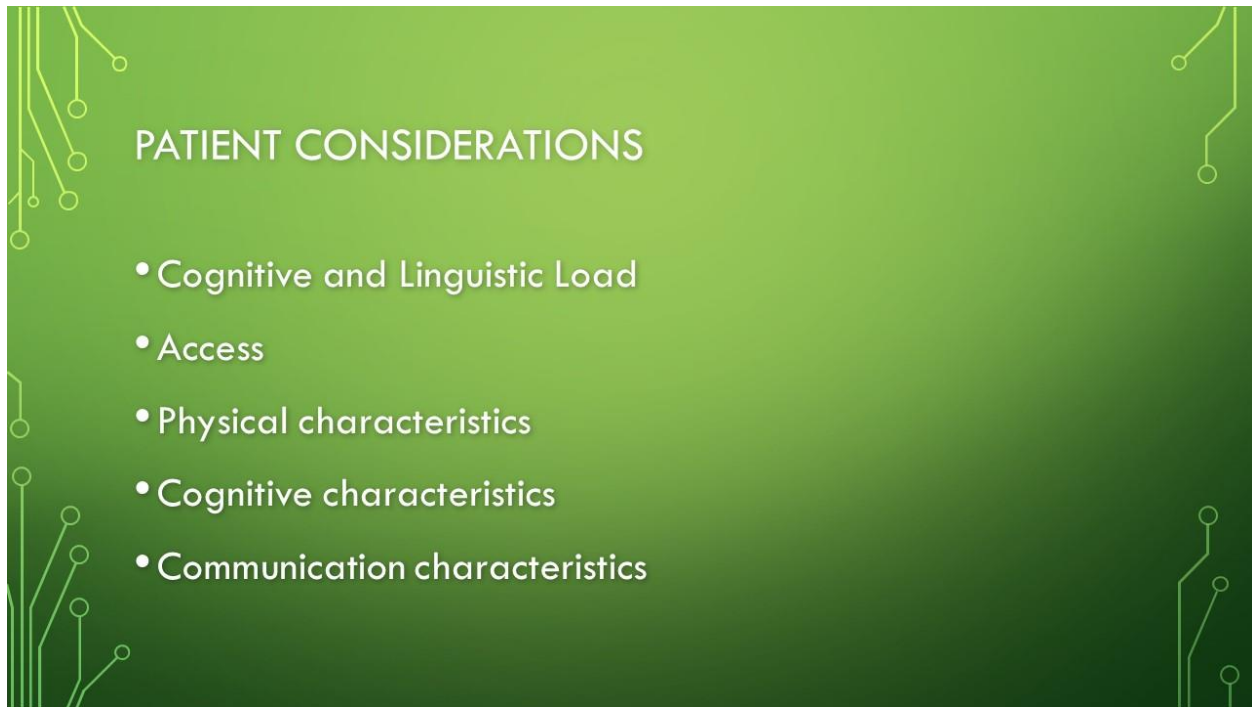
- It is important to recognize the cognitive and linguistic load that typically developing older adults have when using technology. In fact, there are many older adults that have never used technology such as computers or tablet devices, that are primary devices for teletherapy. It is important to consider the patient's stimulability with using these devices and if training with the device will lead to success.
- Patients must have access to a tablet or computer for teletherapy and a strong Wi-Fi connection at the location patients plan to be for the duration of the sessions.
- It is important to consider current patient levels of hearing, vision, and dexterity prior to beginning teletherapy and explore accommodations that can be made to assist with current patient level. For example, making icons or screen dimensions larger and easier to see. With stroke, it is common for patients to present with hemiparesis or hemiplegia. Accommodations for these patients should be considered as well, such as determining if touch screen, mouse/keyboard or additional accessories will be best for the patient to use.
- Patients with aphasia may also present with other cognitive deficits related to the etiology and location of damage, attention, memory, and EF skills may be negatively impacted. Technology use engages these cognitive skills and may impact the way a patient is able to interact with and use technology.
- The way communication is used through teletherapy should be individualized and appropriate for each patient that is seen via teletherapy. SLPs should be cognizant of patient communication strengths and weaknesses. For example, for a patient with literacy difficulties or poor auditory comprehension, pictures and visual cue use by the SLP may help to accommodate these skills.
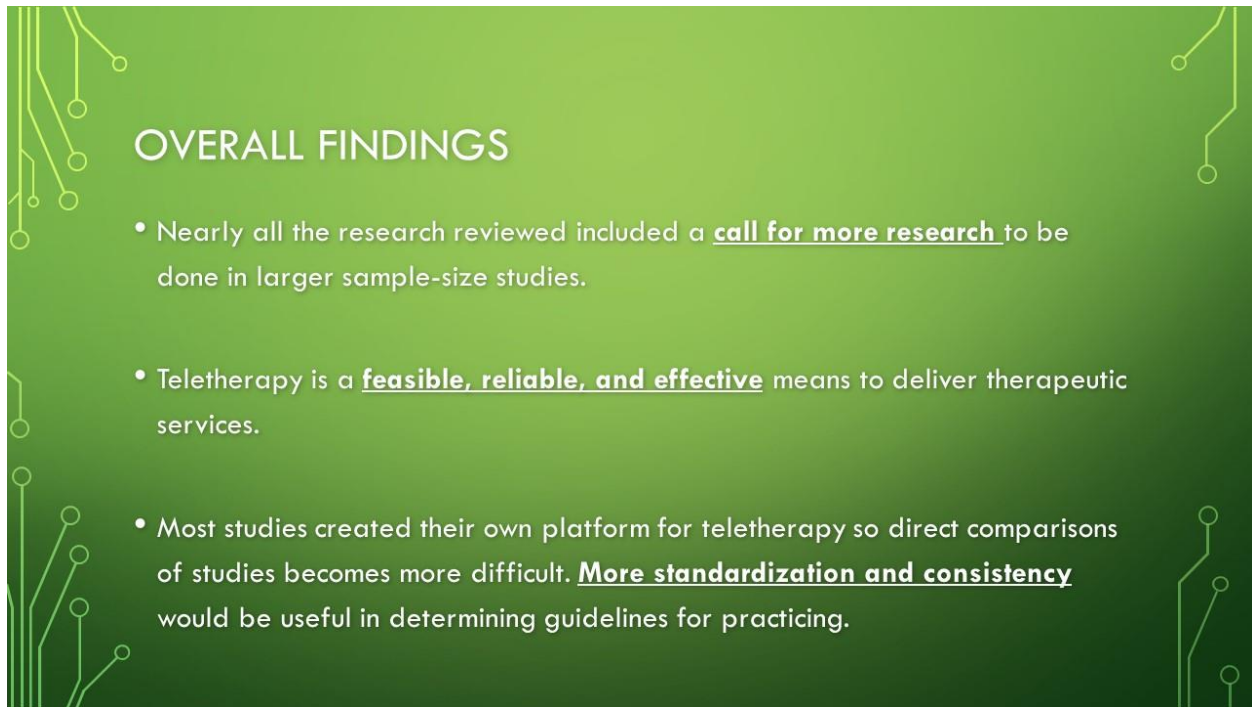
- Studies have shown that telerehabilitation services may benefit and improve patient skills in: anomia and repetition, alexia, cognitive training, natural speech, and aphasia assessments.
- Anomia therapy that has been conducted has included targeting word-finding through confrontational naming, delayed repetition, spelling, reading, and sequencing.
- Group therapy can help to provide socialization and conversational language skills in a more natural setting than just with an SLP in an individual session. Results from the study listed have shown that patients following aphasia group therapy have an increased quality of life, increased socialization, and decreased aphasia severity.
- The studies reviewed share commonalities: a call for more research to be done with larger sample sizes, and no significant difference between FTF and teletherapy in these domains.

- From all the studies reviewed, positive notions have resulted from both patients and their treating SLPs. It is important to note that in one study, self-motivation and training were found to be essential in conducting teletherapy sessions.
- SLPs do report it more difficult to build rapport with patients and more difficult to interpret body language cues. However, it is expected with a new service delivery method for therapy, that SLPs will make adaptations to their practices. Although this was reported, it should not deter SLPs from exploring teletherapy for their patients.

- A common theme across the studies reviewed for this research project included a call for more research to be done. The sample sizes of the studies that were reviewed were small. The results indicated that teletherapy is feasible, reliable, and effective, BUT more studies need to be done on larger skills before generalized into everyday practice.
- Teletherapy is on an upward trend. I did not find any studies that did not recommend teletherapy. It is important that SLPs begin to learn more about telepractice, as it could continue to prove to be a useful alternative to face to face therapy.

RESOURCES

- Find your state's current telepractice regulations: https://www.asha.org/advocacy/state/
- ASHA information on Telepractice: https://www.asha.org/Practice-Portal/Professional-Issues/Telepractice/
- ASHA General Overview of Telepractice: https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589934956&section=Key_Issues

- The websites listed on this slide could prove to be useful starting points for SLPs to learn more about telepractice. At this time, I have found ASHA to have the most information, and the most accurate information on telepractice. ASHA is a reliable, credible source that is well-trusted for SLPs to gather information.

- At this time, Elena will address and answer questions that the audience may have.

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