Telehealth and its Use with Clinical Interventions

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"Telepractice is not a different service, but rather a different method of service delivery." -J.Brown, 2010

GENERAL OVERVIEW OF TELEPRACTICE

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What is Telepractice

"The use of electronic information and telecommunications technologies to support longdistance clinical health care, patient and professional health-related education, public health and health administration." (USDHHS, HRSA, 2012)

But, we need empirical data to support its efficacy.





Telehealth (Telepractice) in SLP

 Telepractice approved by ASHA as an appropriate service delivery in 2005

"Telepractice is an appropriate model of service delivery for the profession of speech-language pathology and audiology (ASHA 2005a, 2005b)."

- SIG 18 Emerged about recently years ago
- Telepractice for SLPs is likely to become an integral part of mainstream practice (Theodoros, 2011)
- ASHA 2015 has many short courses and presentations on Telepractice

Telepractice is a logical solution...

- There is a chronic shortage of SLPs, especially school-based SLPs in many regions nationwide
- The shortage is most pronounced in rural and geographically isolated areas (AAEE, 2008)



Prevalence of ASD / Public School Demographics

- ADDM Network tracked ASD among 8 year olds in 10 states in 2010
- According to the Community Report on Autism, CDC 2014 the following estimates of ASD were found:
 - 1:68 children
 - 1:42 boys
 - 1:189 girls
 - 1:63 white children
 - 1:81 black children
 - 1:93 Hispanic children
 - 1:81 Asian or Pacific Islander

Prevalence of ASD / Public School Demographics

"80% of children identified with ASD either had eligibility for autism special education services at school or had an ASD diagnosis. The remaining 20% of the children identified with ASD had documented symptoms , but had not received a formal diagnosis." (CDC, 2014)

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Use of Technology to Address the Shortage

 The increased need of direct SLP services and the critical shortage of SLPs has lead researchers and clinicians to turn toward telehealth models



Telehealth Enables Professionals to...



Benefits of Telehealth

- When appropriately implemented, a telehealth SLP service delivery model promotes:
 - Free and appropriate public education
 - Creates additional, more consistent direct and indirect service opportunities
 - Enables real-time collaboration
 - Complements traditional, on-site service delivery models and energizes student learning (Juenger, 2009)
 - Cost effective
 - Reduces geographical barriers
 - Extends clinical expertise







Benefits of Telehealth

There is empirical evidence that Telehealth models are effective in delivering SLP services, but more well-controlled studies are needed.

Project REMOTE at the Umass Amherst is focused on educating and training the next the generation of SLPs to deliver services using a TeleTx model and to demonstrate its Evidence-Based Practice with students on the spectrum.

Limitations to Telehealth

- **Space:** Dedicate or shared room is required;
- **Budget:** Telepractice equipment can be expensive;
- On-site Support: Paraprofessional staff and support may be required;
- Broadband: Need high-speed Internet;
- Security Concerns: Federal standards (HIPAA and FERPA).

Limitations to Telehealth

- Network Firewall: On-site firewalls may block videoconferencing site;
- Licensure Requirements: SLPs/AuDs are required to be licensed in each state they are practicing in;
- Community and Institutional Awareness
- Research
- Standardized Training Model

THE NEEDS ASSESSMENT

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What is a Needs Assessment?



Needs Assessment Steps

- Step 1: Scope, Purpose and Goal
 - Caseload size, needs, mission of TeleTx program, etc.
- Step 2: Assessment Team
 - Collaborators, e-Helpers, IT support
- Step 3: Recruitment of essential personnel
- Step 4: Assessment Approach
 - Confidentiality, Security of data
- Step 5: Gap Analysis
 - Step 5a: Gap Analysis Elements
- Step 6: Organizational Readiness
 - Step 6a: Organizational Readiness Features
- Step 7: Potential Barriers
- Step 8: Summary

Plan for Data Collection

Project REMOTE Data Collection										
Graduate Student Clinician:Date:										
School	School:Stud			ident C	ient Code Name:					
Goal #:Objective:										
Performance:						-				
+ Correct										
	Notes:									
	# of Ti	rials/# c	orrect		_ % C	orrect:		%of	Cues:	

Face to Face Store and forward Hybrid Approach **MODELS OF TELEHEALTH SERVICE DELIVERY**

Models of Telepractice

- Various platforms have been developed to support service delivery in telepractice, which fall under three broad headings:
 - Synchronous (in real-time)
 - Asynchronous (offline)
 - Hybrid

Synchronous Delivery Model

- Conducted with interactive audio and video connection in real time.
- Live, interactive videoconference session is one in which the specialist and the client are present at the same time, but not in the same location.
- Communication is facilitated by using secure digital videoconferencing.
- Specialist and the patient can conduct conversations in real time (i.e., live, interactive) for services.





Asynchronous Delivery Model

- Store-and-Forward consultation
- Information is captured and "stored" in a digital file at one location and then transmitted or "forwarded" to another location for evaluation (Telehealth Resource Center, 2013)
- Examples include transmission of voice clips, audiologic testing results, outcomes of client/patient practice.





Hybrid Delivery Model

- Use components of both live, interactive and storeand-forward consultations
- Has the advantage of making better use of all technologies available to diagnose, treat and consult client and team and is not limited to a single communications channel.
- Examples of hybrid approaches include:
 - Remote Monitoring
 - Distance Supervision
 - Active Consultation



FERPA IRB Approval SECURITY ISSUES

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HIPAA

Video Companies and Services

Please note: We are not promoting or endorsing any one of these services or products

Video Companies Reporting HIPAA Compliance

- TeleMental Health Institute lists twenty-seven (27) video companies that claim HIPAA compliance
 - CarePaths & Soltrite
- Citrix GoToMeeting
 - Complies with HIPAA security standards
- Companies that offer Business Associate Agreements* (not certain if SLP, Psychiatric Services are approved)
 - Virtual Therapy Connect;
 - thera-LINK;
 - Secure Video;
 - Secure Telehealth

"Video Companies Claiming HIPAA Compliance" – TeleMental Health Institute

Informed Consent / Confidentiality

- The American Telemedicine Association provides general forms that can be used in the delivery of telemedicine services
 - Consent to Treatment + Release of Information
 - Consent to Participate in a Telemedicine Consultation

 Project REMOTE at the Umass Amherst has established it's own consent and assent forms.

MINIMAL SPECIFICATIONS

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Hardware

- Windows 8/XP
 - 2 GB RAM with 2GHZ processor
- Windows Vista
 - 3 GB RAM with 3GHZ processor
- Mac OSX 10.4 or higher
 - 2 GB RAM, 2GHZ processor
- Large monitor
- Web camera with at lease 15 FPS
 - Consider remote control of client camera
- Headset
- In-room telephone
- Surge protector

Other Specifications

- Internet Connection
 - Reliable, fast internet connection of at least 900 kbps (<u>http://speedtest.comcast.netL</u>)
- Additional Peripherals
 - Additional Monitors
- Physical Location
 - Room size + location, ports, outlets, lighting
 - Security + privacy
- Acoustic Environment
 - Sound absorption + minimal reverberations
 - Microphones + headsets

Client/Patient Selection

"Candidacy for receiving services via telepractice should be assessed prior to the initiation of services." (ASHA, 2015)

Client/Patient Selection

- The following factors could impact an individual's ability to benefit from telepractice services:
 - Physical and sensory characteristics
 - e.g., hearing and visual abilities
 - Cognitive, behavioral, and/or motivational characteristics
 - e.g., ability to maintain attention / sit in front of a camera
 - Communication characteristics
 - e.g., speech intelligibility, cultural/linguistic variables
 - Support resources
 - e.g., availability of technology, appropriate environment
 Telepractice Overview. ASHA 2015

"The use of Telepractice to deliver Speech Language Pathology services has skyrocketed; however, we need to establish its evidence-based practice"

(Andrianopoulos, 2012)

EVIDENCE BASED PRACTICE

Telepractice in SLP for Voice and Fluency

	Disorder			
	Voice Fluency			
Group Design				
Randomized control trials (RCT)	3	0		
Single subject design				
AB Design	3	3		
Pilot Study	0	1		



Telepractice for Voice + Fluency



Telepractice for Neurogenic Communication Disorders



	AOS	Dysarthria	Dysphagia	Aphasia	TBI	ALD	Mixed	Brain Injury
Experiment and Control Group					1			
Randomized Control Trial						1		1
Single Group	1	2	5	1	1			2
Multiple Groups		1					1	
Case Study	1	1		1				

Telepractice for Audiology

Research Design	Number of Studies
ABA design	1 (Hughes)
Single group	3 (Mantokoudis, Goehring, Hayes)
Retrospective Study	2 (Constantinescu, McElveen)
Multiple Groups	1 (Wesarg)

Research Design



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Levels of EBP for Interventions for ASD



Telehealth Empirical Studies - ASD

Study	ASD Participants	Services	Outcomes
Barretto et al. [2006]	1 male, 5 yrs old	Functional Analysis, Teachers training	Functional analyses differed
Gibson et al. [2010]	1 male, 4 yrs old,	Parent Training	On going teacher feedback
Machalicek et al. [2009]	2 females, 7+11 yrs old	Functional Analyses	TeleTx reduced bad behavior
Machalicek et al. [2012]	2 males, 5+7 yrs ASD; plus 1 male, age 34 mos	University Tx for Behavior	Preference fo TeleTx
Machalicek et al. [NR]	4 males, 2 females,	University based	Skilled maintained
Rule et al. [2005]	1 preschool age child	University based for IEP	Teacher -Teacher
Savin et al. [2005]	3 children	Psychiatric	Longer to establish rapport
Vismara et al. [2009]	N=29; 2-4 yrs	University based ESDM	No Difference

Telehealth Empirical Studies - ASD

Study	ASD Participants	Services	Outcomes
Vernon et al. [2012]	N=3	Behavior Training	Social Reward Enhancement
Vismara et al. [2012]	N= 36	Telehealth P-ESDM	Parent Fidelity
Vismara et al. [2013]	N=8	Telehealth P-ESDM	Parent Fidelity
Rogers & Vismara [2012]	RCT, N=98 21 months (14–24 mos)	Parent Training vs. No Parent Training	Parent Delivered DESM, Both improved

Early Start Denver Model (ESDM)

- Intensive model of early intervention
 - Applied behavior analysis
 - Play-based relationship-focused strategies
- Focuses on interpersonal exchange, joint attention, and positive affect

Webb et al., 2014

ESDM: Vismara, Young, & Rogers (2012)

 Purpose: Sought to find if parent-child learning could be supported by telehealth deliver of Early Start Denver Model (N=9, mean age = 29 mos)

Methods/Procedure:

- Hybrid Telepractice Model
- Sessions took place in families' home
- Duration = 1 hour / week for 12 weeks
- Internet-based, password protected video-conferencing program was used

ESDM: Vismara, Young, & Rogers (2012)

- Findings/Conclusions:
 - The use of telehealth might be just as effective as inperson services
 - Parent and child behaviors can improve via telepractice, in the absence of receiving in-person therapy

"Studies indicate that computer based instruction typically results in benefits such as increased motivation, decreased inappropriate behavior, and increased attention and sometimes results in increased learning compared to traditional methods." Goldsmith & Leblanc, 2004

ASD INTEREST IN TECHNOLOGY

SMART Notebook



Telepractice research at UMass Amherst

- Use of technology (such as computerassisted instruction, video modeling) is reinforcing for many children with ASD.
 - Increase of appropriate behavior during Tx (Shukla- Mehta, Miller, & Callahan, 2010)



Our research supports that student outcomes using Telepractice are at least equivalent to On-site services

(Boisvert, Andrianopoulos, Boscardin, & Kurland, 2012)

Telepractice research at UMass Amherst

The following sections include a pilot study we conducted with six (6) students in an Elementary School. The results of this study supportive of Telepractice as a service delivery method

In collaboration with the Chicopee Public Schools, we are now conducting a larger experimental study. Thank you for you participation.

REMOTE Study 1 (Boisvert, Andrianopoulos, Boscardin, & Kurland, 2012)

Telepractice vs. Onsite Services for Students with Autism

- Research question: Is there a difference in Treatment outcomes when comparing on-site to telepractice services for delivering SLP interventions
- Hypothesis: Students with Autism will exhibit equivalent outcome data in both treatment conditions

Participants:

- Six (6) elementary school children with Autism
- Age range: 5.6-11.11 yrs; Mean=8.5; SD=2.7; 86% were male.
- Received other special education services on an IEP (i.e., academic support, OT, PT)

Study 1: Procedures

Treating Clinicians

- Trained 4 first year graduate students to deliver Telepractice: each worked with 1 or 2 children
- Supervised at all times by a certified and licensed SLP with expertise in telepractice

Repeated probe assessments

(pre/post treatment session)

5 sets of data points per objective collected for each condition.

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Study 1: RESULTS

- All 6 students showed improvement in first session (range: 66 – 100%)
- Improvements were maintained or further improved in the 2nd treatment session, regardless of service delivery method (onsite or telepractice)
- Five (5) out of the six (6) students showed no significant differences between the intervention conditions (On-site = Telepractice Tx)
- 1 student responded more favorably to telepractice intervention.





Study 1: Summary of Visual Analysis

- 3 (50%) of students showed a higher level of variability in the on-site session
- 3 (50%) students showed a higher level of variability in the telepractice session





Study 1: Telepractice Qualitative Behavioral Outcomes

- Some students exhibited high levels of independence, focused and sustained attention during the telepractice condition
- We hypothesized that certain variables, high interest in technology computers and screen media or reduced competing stimuli, may have contributed to students' perceived motivation.





Study 1: Investigate Differences in Behavior in 1 Student

Telepractice vs. On-site

Purpose: To study the differences in behavior when services are delivered via Telepractice vs. On-site to 1 student using an ABC behavioral analysis

Hypothesis: Student with autism will exhibit similar behavioral patterns during both treatment conditions





Study 1: Overview

Student 1's Treatment Focus:

 Student demonstrated difficulty engaging in conversations while maintaining a topic and partaking in turn-taking exchanges

IEP Treatment Goals and Objectives:

- To improve social pragmatic communication skills:
 - Topic Maintenance
 - Event Sequencing
 - Explicitness, Referencing
 - Conjunctive Cohesion Focused Attention
 - Fluency

Study 2: Overview of SLP Outcomes



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Study 1: Variables (Please see hand-out)

Variables:

- Independent variables:
 - intervention setting (telepractice vs. on-site)
- Dependent variables:
 - **TSR=** Latency time (seconds)
 - Time it took for the student to respond after question or stimulus was presented
 - **TR=** Therapist reinforcement (frequency of occurrence)
 - Number of reinforcements during Tx session
 - **SD** = Student distraction (frequency of occurrence)
 - Number of reinforcements during Tx session

Study 1: Behavioral Observations in Student 1

ABC Analysis



	Analysis of Behavior	TELEPR	ACTICE Tx	ON-SITE Tx	
		Total:	Total: 4 Sessions		4 Sessions
		Total	Average	Total	Average
1.	Total # Verbal Questions/Comments	153	38.25	147	36.5
	administrated by SLP to student for all 4 sessions combined	Questions	Per session	Questions	Per session
2.	Total # Answers/Comments given by the	153	38.25	146	38
	student to SLP for all 4 sessions combined	Answers	Per session	Answers	Per session
3.	Total Duration of student's verbal	913	5.96	1605	10.99
	response	Seconds	Seconds per answer	Seconds	Seconds per answer
4.	Time needed for SLP to formulate a	560.5	3.66	897.5	6.10
	complete verbal response administered to	Seconds	Seconds per	Seconds	Seconds per
	student		question		question
5.	Time taken by the student to verbalize a	982	6.41	1506.5	10.31
	complete answer/comment in response to	Seconds	Seconds per	Seconds	Seconds per
	SLP's question/stimulus		answer		146 answers
6.	Time taken by SLP to verbalize a	72.5	1.12	805.5	5.47
	complete question/response related to the	Seconds	Seconds per	Seconds	Seconds per
	reinforcement administrated to student		question		question
7.	Time taken by student to verbalize a	66	0.43	408.5	2.79
	complete answer or response related to	Seconds	Seconds per	Seconds	Seconds per
	reinforcement administrated by SLP		answer		answer
8.	# of SLP Reinforcements	31	7.75	171	42.75
		Events	Per session	Events	Per session
9.	Triggered external event: Student				
	distracted by other external variables	3	0.75	8	2
	during therapy	Events	Per session	Events	Per session
10	. Triggered internal event: Student				
	distracted by variable related to personal	2	0.5	12	3
	behavior during therapy	Events	Per session	Events	Per session

What Does this Suggest?

Although using telepractice to deliver SLP has great potential in improving student outcomes, research is significantly lacking regarding the short and long-term benefits of it.

More research is needed to support that delivering SLP services to students with speech/language needs is just as good, and in some cases better, when services are delivered using the telepractice method compared to on-site face-to-face services.





CASE STUDIES

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Acknowledgements

This research program was supported by:

U.S. DOE OSEP Research-to-Practice Grants

- H325K054199 (2005-2009)
- H325D080042 (2008-2012)
- H325K090328 (2009-2013)
- H325K120327 (2012-2018)

This research was supported by the U.S. Department of Education awarded to Drs. Mary Andrianopoulos, Mary Lynn Boscardin, Shelley Velleman, and Elena Zaretsky at the University of Massachusetts-Amherst. However, the contents of this presentation do not necessarily represent the policy of the U.S. DOE, and you should not assume endorsement by the Federal Government.