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The Efficacy of Telepractice in the Assessment and Treatment of Speech Disorders: A Systematic Review

Elizabeth Cooley B.S., Emily Glover B.A., & Jillian Thompson B.S.



Background

- A speech disorder is any deficit in voice, fluency, or the production of speech sounds.
- Individuals with speech disorders are at an increased risk for social, emotional, and academic shortcomings.
- Numerous barriers restrict access to SLP services.
- Telepractice offers a possible solution to the challenges associated with traditional face-to-face therapy.
- Telepractice is the remote delivery of speech and language services via telecommunication systems.
- No systematic review has investigated the broader topic of treating or assessing speech disorders with telepractice using a direct comparison of telepractice to face-to-face-service delivery.

Objectives

The purpose of this systematic review is to understand the validity and reliability of telepractice in the assessment and treatment of speech disorders in children and adults.

Methods

- Sources/Databases: Ovid MEDLINE, PsychInfo, and CINAHL
- Inclusion Criteria: (a) all ages, (b) speech disorder diagnosis, (c) RCT and non-RCT, (d) compared face-to-face and telepractice delivery, (e) objective outcome measures, (f) submitted for publication between 2003 and 2019, and (g) ongoing or concluded studies
- Exclusion Criteria: (a) language, phonological, orofacial myofunctional, or a non-speech disorder, (b) telepractice used to augment treatment, and (c) self-reported measures only

Results

Figure 1. PRISMA flowchart of articles identified in this systematic review

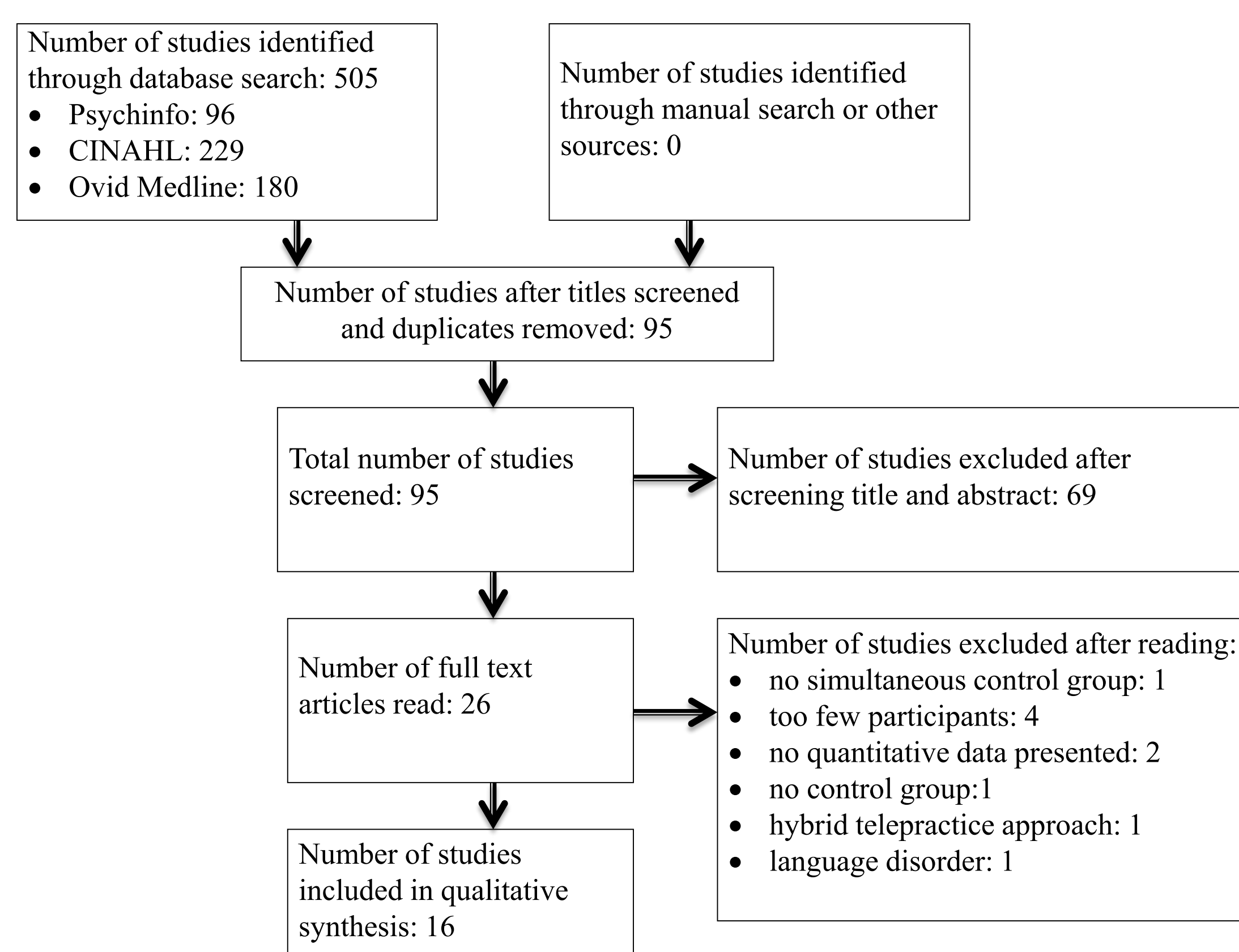


Table 1: Summary of Article Findings

Authors (Year), Country	Etiology	Study Design	N	Gender	Age (years)	Outcome Measures	Statistical Results (P value, K value, % agreement, or otherwise specified)	Results	Strength of Article
Mashima et al. (2003), USA	Voice	Non-RCT	72	34 female 38 male	Average 45	1. Perceptual assessment of voice 2. Subjects stated therapy experience 3. Acoustic analysis 4. Fiber-optic laryngoscopy	1. P>.05 2. P=.35 3. .29 (effect size) 4. P=.07	The study found FTF ^a treatment and telepractice treatment to be statistically similar in regard to efficacy.	Good
Theodoros et al. (2003), Australia	Dysarthria	RCT	10	Not reported	20-70	1. Severity of dysarthria 2. FDA ^b 3. ASSIDS ^c	1. 90% 2. 40-100% 3. P=.03-.80	Telepractice may be a clinically reliable method of assessment for dysarthria.	Poor
Hill et al. (2006), Australia	Dysarthria	RCT	19	79% male 21% female	18-74	1. Spontaneous speech sample 2. Reading passage 3. ASSIDS ^c 4. FDA ^b	1. 63-94% 2. 100% 3. 83-100% 4. 63-100%	No significant difference between telepractice assessment and FTF ^a assessment.	Good
Wormald et al. (2008), USA	Voice	Non-RCT	78	33 male 45 female	Not reported	1. Sensitivity of automated system 2. Specificity of automated system 3. Correct identification	1. 92% 2. 75% 3. 78%	The telepractice system needed improvements to accurately diagnose vocal fold paralysis.	Fair
Hill, et al. (2009), Australia	Dysarthria	RCT	24	62.5% male 37.5% female	16-78	1. Informal motor assessment 2. Informal perceptual speech assessment 3. ASSIDS ^c 4. Diagnosis of dysarthria type	1. 96-100% 2. 88-100% 3. P=.05-.17 4. 66%	Telepractice is a reliable and valid method to assess dysarthria severity.	Strong
Hill et al. (2009), Australia	Apraxia	RCT	11	8 male 3 female	16-78	1. ABA-2 ^d 2. Severity level of ABA-2 ^d tasks 3. Severity level	1. P=.06-.68 2. K=.068-1.0 3. 90.9%	No significant difference between the FTF ^a and telepractice conditions in the assessment of apraxia.	Good
Carey et al. (2010), Australia	Fluency	RCT	40	17.5% female 82.5% male	18+	1. %SS ^e at established intervals 2. Speech naturalness 3. Treatment experience 4. Participant stated stuttering severity	1. P=.24 2. P=.24 3. P=.2 4. P=.2	No difference between groups regarding ease of treatment and rapport with therapist.	Strong
Constantinescu et al. (2010), Australia	Dysarthria	RCT	61	42 male 19 female	52-89	1. Perceptual voice parameters: change pre and post intervention 2. ASSIDS ^c 3. Acoustic measures 4. Perceptual oromotor parameters	1. 91-100% 2. Comparable values 3. Comparable values 4. 86-100%	The assessment of hypokinetic dysarthria via telepractice is generally reliable and valid.	Strong
Constantinescu et al. (2010), Australia	Dysarthria	RCT	34	27 male 7 female	54-84	1. Acoustic parameters 2. Perceptual and voice parameters 3. %SS ^e	1. P=.001-.59 2. P=.001-.067 P=.99	The delivery of LSVT ^f via telepractice is valid and reliable.	Strong
O'Brian et al. (2010), Australia	Fluency	Non-RCT	20	Not reported	2-5	%SS ^e	P=.99	No statistically significant difference between methods.	Good
Grogan-Johnson et al. (2011), USA	Speech Sound Disorder	Non-RCT	13	11 male 2 female	6-11	1. GFTA-2 ^g 2. Pre/post intervention scores 3. Mastery of objectives	1. P=.014 2. 98% of participants in the telepractice group and 95% of participants in the FTF ^a group improved their articulation of targeted speech sounds 3. 84% of participants in the telepractice group and 47% of students in the FTF ^a group mastered the objectives	Telepractice may be an effective method of treatment.	Poor
Waite et al. (2012), Australia	Speech Sound Disorder	Non-RCT	20	13 male 7 female	4-9	1. Informal oromotor screening 2. Connected speech sample	1. 96% 2. 100%	Telepractice and FTF ^a assessments were similar and results were within 80% agreement of each other.	Good
Grogan-Johnson et al. (2013), USA	Speech Sound Disorder	RCT	14	9 male 5 female	6.4-9.9	1. GFTA-2 ^g 2. Listener judgment	1. P=.43 2. P=.16	No difference between telepractice treatment and FTF ^a treatment. Most participants made progress regardless of group.	Good
Rangarathnam et al. (2015), USA	Voice	RCT	14	11 female 3 male	16	1. CAPE-V ^h 2. Acoustic measurements 3. Change in airflow 4. Voice Handicap Index	1. P=.62 2. P>.05 3. P>.05 4. P=.26	Treatment via telepractice was comparable to FTF ^a treatment.	Good
Bridgman et al. (2016), Australia	Fluency	RCT	49		3-6	1. %SS ^e 2. Number of visits to complete Stage 1 3. Follow up %SS ^e at 18 months post treatment 4. Typical severity rating measured by parents 5. Number of weeks to complete stage 1 6. Mean duration of treatments 7. Parent perceived relationship between clinician and child	1. P=.16 2. P=.71 3. P=.72 4. P=.64 5. P=.67 6. P=.001 7. P=.18	No statistical difference between telepractice and FTF ^a groups.	Strong
Theodoros et al. (2016), Australia	Dysarthria	RCT	52	16 women 36 men	55-87	1. Acoustic measures: change pre to post intervention 2. DME ⁱ 3. Communication partner rating 4. DIP ^j 5. PDQ-39 ^k	1. P.001-.232 2. P<.001-.721 3. P=.001-.408 4. P=.001-.671 5. P>.05	Treatment of dysarthria via telepractice is valid and reliable.	Good

^a = Face-to-face treatment; ^b = Frenchay Dysarthria Assessment; ^c = Assessment of Intelligibility of Dysarthric Speech; ^d = Apraxia Battery for Adults – 2nd Edition; ^e = Percent syllables stuttered; ^f = Goldman Fristoe Test of Articulation – 2nd Edition; ^g = Consensus Auditory-Perceptual Evaluation of Voice – V; ^h = Direct magnitude estimates of speech intelligibility; ⁱ = Dysarthria impact profile; ^j = Parkinson's disease questionnaire – 39; ^k = Lee Silverman Voice Treatment

Recommendations

- Telepractice may result in improved communication, academic, social, and emotional skills as a result of:
 - Increased access to high quality speech services in the home environment
 - Increased access to clinical services in rural areas or areas with a shortage of SLPs
- Further quantitative research is needed in the following areas:
 - All levels of severity of speech sound disorders
 - Attention deficits (e.g., TBI)
 - Natural environments (e.g., home, school)
- Further qualitative research is needed to determine patient and SLP satisfaction

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Conclusions

- The overall quality of studies reviewed was 'good'.
- Telepractice is generally a valid and reliable delivery method in the treatment and assessment of speech disorders in children and adults.
- The quality of intervention delivered via telepractice appears equivalent to traditional face-to-face therapy.

Selected References

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