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Forms

“Improvements in Chronic Conduction Aphasia with Therapy and Online Home Practice”

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AMERICAN SPEECH-LANGUAGE-HEARING ASSOCIATION

LingraphiCARE America is approved by the Continuing Education Board of the American Speech-Language-Hearing Association (ASHA) to provide continuing education activities in speech-language pathology and audiology. **See course information for number of ASHA CEUs, instructional level and content area.** ASHA CE Provider approval does not imply endorsement of course content, specific products or clinical procedures.

This course is offered for 0.1 ASHA CEUs (Introductory level; Professional area).

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Complete a 0.1 ASHA CEU Course

Speech-language pathologists (SLPs) are invited to participate in a one-hour ASHA-approved course offering, "Improvements in Chronic Conduction Aphasia with Therapy and Online Home Practice." To be eligible to receive 0.1 ASHA CEUs (Introductory level), please see the guidelines below.

For more information about ASHA's most up-to-date eligibility criteria, go to the FAQ section of the ASHA CE website: http://www.asha.org/CE/FAQs/.

Course Description:

We discussed improvements in persons with chronic conduction aphasia after resumption of therapy with a clinical, computer-based program using interactive exercises. Participants learned where and at what levels significant improvements occurred, including impairment and functional communication levels, according to Western Aphasia Battery and Communicative Effectiveness Index assessments.

Learning Outcomes:

By completing this course, participants will be able to:

1. Characterize the magnitudes of overall improvements documented among persons with chronic conduction aphasia following additional structured therapy that includes online home practice.
2. Describe observed patterns between initial WAB and CETI assessment scores and final assignments to either conduction aphasia or anomic aphasia.
3. Describe observed patterns between initial WAB and CETI assessment scores and final assignments to either conduction aphasia or anomic aphasia.

Additional courses in the Evidence-based Practice track include:

- Improvements in Chronic Global Aphasia with Advanced Therapy and Home Practice (Introductory, 0.05 ASHA CEUs)
- AAC Technology Design for Persons with Aphasia (Introductory, 0.1 ASHA CEUs)
- Maximizing Patient Outcomes by Leveraging Clinical Data from Online Therapy (Introductory, 0.05 ASHA CEUs)

Processing:

Online course completions are reported to ASHA quarterly. Please allow eight to ten weeks for processing. Lingraphica will issue a certificate of participation to each SLP who completes a CEU course.

For more information, or to start a device trial, contact: **continuinged@lingraphica.com**

Chronic Conduction Aphasia

I. CHARACTERISTICS

- Western Aphasia Battery Aphasia Quotient range: $24 \leq AQ < 82$
- Hallmark of grossly impaired repetition with relatively preserved comprehension
- Poor transmission between Wernicke's area and Broca's area
- Otherwise speech is fluent, with good speech rate, intonation, stress patterns
- However, literal paraphasias and pauses are common
- Good reading comprehension
- Typically aware of errors in speech and writing and attempt repairs

II. TYPES

• *basic choice communicators*	require maximal assistance from partners
• *controlled situation communicators*	participate in conversations structured by a skilled communication partner
• *augmented input communicators*	have auditory language processing difficulties indicating support of verbal input through gesture or visual symbols
• *comprehensive communicators*	avail themselves of a range of preserved skills to facilitation communication (e.g., pointing, gestures, limited letters / speech …)

III. AAC INTRODUCTION / USE

- **Assess** device's communicative capabilities against client's communicative needs
- **Assess** device's operational demands against client's motor, sensory and cognitive capabilities
- **Adapt** device's communicative contents to client's communicative situation, support
- **Train** client and family in access, use, and adaptation of communicative materials
- **Monitor** use, noting improvements often occur in natural language production with device use
- **Extend** available materials, adapt for newly possible communicative situations - turn improvements to client advantage

IV. CLINICAL RESULTS

- Over 30% of Lingraphica users with conduction aphasia evolved to a milder severity within conduction aphasia (mean ΔAQ = +14.2).
- Mean CETI Overall improvement of this latter group was +17.9

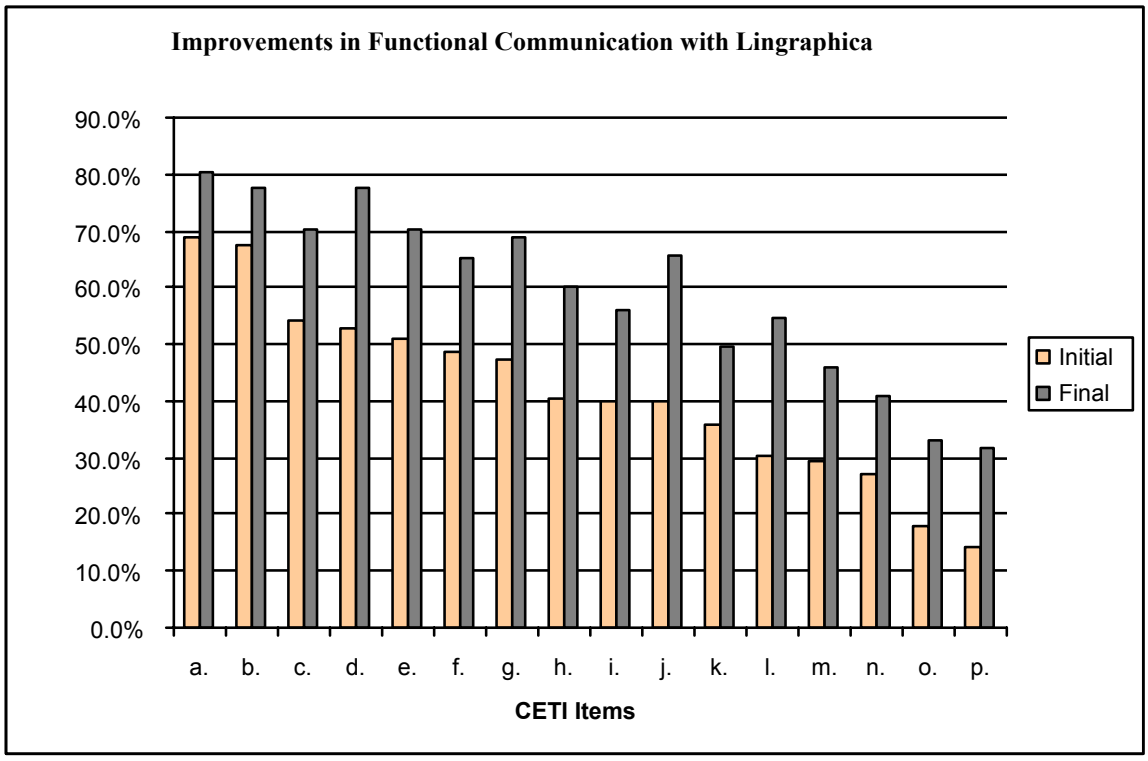

Figure Key:		CETI Item #
a.	Getting somebody's attention.	1
b.	Indicating understanding of what is being said to him/her.	5
c.	Communicating emotions.	4
d.	Giving yes and no answers appropriately.	3
e.	Responding or communicating without words.	11
f.	Having a one-to-one conversation with you.	7
g.	Saying the name of person in front of him/her.	8
h.	Getting involved in group talks about self.	2
i.	Having coffee-time visits with friends, neighbors.	6
j.	Communicating physical problems such as aches, pains.	9
k.	Understanding writing.	13
l.	Starting a conversation with people not in family.	12
m.	Having a spontaneous conversation.	10
n.	Participating in a conversation with strangers.	15
o.	Describing or discussing something in depth.	16
p.	Participating in a fast group conversation.	14

References

Brookshire, 1997
Garrett, 1992
Lomas, 1989
Kertesz, 1982
Weintich, 1995

Changes in Persons with Chronic Conduction Aphasia Following SGD Practice and Use

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Clinical AAC Research Conference, 2014

ABSTRACT:

We analyze WAB (impairment level) and CETI (functional level) clinical assessment data for thirteen persons with chronic conduction aphasia who used a Speech Generating Device (SGD) at home for therapy and communication. We use: (1) matched *t*-tests to determine magnitude and significance of differences of overall means following SGD use; and (2) ANOVAs following partition by WAB discharge assignments to conduction ~ anomic aphasias to probe the significance of group differences over course of intervention. Matched *t*-tests show significant improvements by discharge on all assessed WAB items without exception, and on all but three CETI items. ANOVAs, by contrast, reveal only five items displaying group mean differences in WAB and CETI assessments over the course of intervention. We consider implications for clinical practitioners whose speech-language-communication rehabilitation caseloads include persons with chronic conduction aphasia.

RESEARCH DESCRIPTION:

Over the past fifteen years, articles published in peer-reviewed journals have analyzed outcome data to show that persons with aphasia who use a Speech Generating Device improve significantly at both the impairment and functional communication levels in natural communicative performance; and more recent analyses reveal significant relationships between performance on selected assessment items at intake, in comparison to subjects' improvements in aphasia diagnostic category upon discharge assessment.[1] In this paper extending the approach to a new population, the subject sample comprises twelve persons with chronic conduction aphasia; and in data analysis, we aim to identify overall significant improvements, as well as areas of significant difference that are associated specifically with outcome assignment to *conduction ~ anomic aphasia* upon SGD intervention.

METHODS

Subjects

Subjects were patients with chronic aphasia who participated in structured rehabilitation programs using the Lingraphica SGD. They used the SGDs in scheduled clinical treatment and training sessions with Speech Language Pathologists, and also took them home between sessions

for completion of assigned exercises, communication support, self-guided practice and exploration, and other uses of interest to them. To qualify for inclusion in this study, subjects had to meet six criteria: i) medical diagnosis of aphasia at program intake; ii) chronicity of aphasia, defined as at least six months postonset; iii) completion of at least one month of program participation; iv) assessment at intake and discharge using the four language subtests from the *Western Aphasia Battery* (WAB);[2,3] v) WAB assignment to conduction aphasia at intake; and vi) assessment at intake and discharge using the sixteen items of the *Communicative Effectiveness Index* (CETI).[4] Twelve patients meeting these criteria comprise the sample of this study. Their demographic, diagnostic, and treatment characteristics are presented in Table 1.

Treatment

The aphasia rehabilitation programs, the SGD used in it, and participant benefits and outcome improvements are described elsewhere.[1, 5-11] Generally during treatment sessions, subjects and clinicians used the portable computer-based system for material presentation and interaction, then between sessions subjects took their systems home to complete assigned exercises, to explore, practice, rehearse on their own, and to facilitate functional communication. Program participation continued as long as significant functional improvement could be documented monthly; then subjects were discharged. Mean duration of program participation was 20.0 weeks, with a mean frequency of 2.2 sessions/week.

Tests

WAB language subtests were administered by the SLP clinicians to all subjects at intake and at discharge. CETI ratings were completed at intake and discharge by family members or close friends. All testing and ratings were all done in standard ways, absent the SGD technology, with the goal of assessing subjects' unaided impairment-level and functional-level performances.

Data Analysis

Using raw WAB scores, derived WAB Aphasia Quotients (AQs), and raw CETI scores, we calculated and compared pre-treatment and post-treatment means with one-tailed, matched *t*-tests to establish statistical significance of differences of means. We then partitioned the sample into two subgroups using WAB discharge assignments to conduction ~ anomic aphasia, and used 1-way ANOVAs to probe significance of subgroup means on all items from administration of the WAB and CETI over course of intervention. Level for rejection of the Null Hypothesis was set at $p = .05$.[12]

RESULTS

For the overall sample of 12 subjects, analysis of WAB data shows statistically significant improvements ($p < .05$) on the all of the language subtests, as well as on the calculated AQ. Table 2 provides details, with initial and final mean scores, differences of those means, standard deviations, and the associated t_{obs} and p values for the differences of means.

For the overall sample of 12 subjects, analysis of CETI data shows statistically significant improvement ($p < .05$) on the large majority – thirteen of sixteen – of items, and on the CETI Overall. Table 3 provides details, with initial and final mean scores, differences of means, standard deviations, and associated t_{obs} and p values. Appendix 1 provides the reference list of sixteen items rated on the CETI.

Tables 4 through 6 show the data means for each of the two discharge subgroups – conduction & anomic aphasia – together with the results of 1-way ANOVAs probing the significance of differences of means between these two discharge subgroups.

Table 4 shows that – for the quantitative demographic / clinical data – there are no significant differences between the two subgroups. This is shown for subgroup differences by: (i) years of age at intake; (ii) number of years following onset of aphasia at intake; (iii) weeks of participation in this therapy program; and (iv) number of sessions per week meeting with SLPs in the program.

Tables 5a, b, & c show that at the *impairment level*, significant differences between the discharge subgroups are found for improvement in auditory verbal comprehension during treatment, and for spontaneous speech following discharge.

Tables 6a, b, & c show that at the *functional communication level*, significant differences are found in the *improvements* registered during treatment in three items, i.e., #2, #5, and #6. Those differences notwithstanding, functional communication is shown to be not significantly different in the two groups when assessed either at intake or at discharge.

DISCUSSION AND CLINICAL IMPLICATIONS

Several points emerge from this study. First, for the sample of twelve subjects with chronic conduction aphasia, mean scores are shown to improve – following SGD use – on most assessed measures, at both the impairment level and the functional level. The improvements are often sizable, and the changes statistically significant. These findings establish that conduction aphasia is not *per se* contraindicative of important improvements, even in the chronic stage.

Second, by discharge there was – only occasionally – reassignment of aphasia category from conduction to anomic aphasia. In this sample, 1 of the 12 subjects (ca. 8%) was reassigned to anomic aphasia by discharge.

Third, ANOVAs of data by discharge assignment to aphasia diagnostic categories show that the two subgroups show four areas of significant difference in improvements during treatment, but only one area of significant difference – spontaneous speech – upon discharge assessment.

Findings such as these should help us frame questions for future clinical research, in efforts to develop and refine prognostic tools, methods for identifying candidates for resumption of treatment, and outcome prospects. One example: given the lack of significant intake differences in WAB and CETI assessments between those who move from conduction to anomic aphasia and those who don't, it appears that prognostic indicators of such movement – if such exist – are to be sought elsewhere. We do show significant difference at discharge in spontaneous speech. This suggests possible prognostic benefit from examining brain images at intake for lesion and/or fMRI activation patterns associated with such differences at discharge.

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Table 1: Overall Demographic / Clinical Data Summary for SGD Users with Chronic Conduction Aphasia (n = 12)

Characteristic	Mean (SD)	Range	No. (%)
Gender			
male			3 (25.0)
female			9 (75.0)
Age (y)	75.6 (6.2)	67–84	12 (100)
Handedness			
right			9 (75.0)
unknown			3 (25.0)
Time postonset (y)	4.67 (3.59)	0.61–12.0	12 (100)
Etiology			
L-CVA			12 (100)
Overall-level Assessments at Intake			
WAB AQ	58.7 (13.1)	35.2–75.3	12 (100)
CETI Overall	41.3 (16.6)	18.0–77.5	12 (100)
Treatment			
frequency (sess/wk)	2.2 (1.0)	1.1– 4.5	12 (100)
duration (wks)	20.0 (8.5)	7.7–37.1	12 (100)
Assessments at Intake and Discharge			
impairment level (WAB)			12 (100)
functional level (CETI)			12 (100)

Table 2: WAB (Impairment Level) Changes in Chronic Conduction Aphasia following SGD Use

Item	n	Initial Mean (SD)	Final Mean (SD)	Diff (SD)	t_{obs}	p
Spontaneous speech *	12	12.8 (3.0)	14.6 (2.8)	+ 1.8* (0.6)	+3.87	= .003
Aud. verb. * comprehen.	12	162.4 (18.6)	171.2 (16.3)	+ 8.8* (13.2)	+2.29	= .043
Repetition *	12	40.6 (21.7)	52.2 (16.8)	+11.6* (10.3)	+3.90	= .003
Naming *	12	44.3 (23.7)	58.5 (22.2)	+14.2* (13.7)	+3.59	= .004
Aphasia * Quotient (AQ)	12	58.7 (13.1)	68.4 (13.3)	+ 9.7* (6.3)	+5.37	= .0002

*$p < .05$

Table 3: CETI (Functional Communication) Changes in Chronic Conduction Aphasia Following SGD Use

CETI	n	Initial Mean (SD)	Final Mean (SD)	Diff (SD)	t_{obs}	p
# 1	12	68.7 (24.1)	80.4 (15.2)	+11.7 (27.8)	+1.45	= .174
# 2 *	12	40.5 (22.5)	60.0 (33.9)	+19.5* (25.7)	+2.63	= .024
# 3 *	12	52.7 (27.4)	77.7 (20.4)	+25.0* (26.4)	+3.28	= .007
# 4 *	12	54.3 (29.4)	70.3 (31.1)	+16.0* (21.8)	+2.54	= .027
# 5	11	67.6 (20.1)	77.8 (16.5)	+10.2 (17.3)	+1.96	= .079
# 6	12	40.1 (30.9)	55.8 (28.3)	+15.7 (25.0)	+2.17	= .053
# 7 *	12	48.7 (24.5)	65.2 (29.7)	+16.5* (23.2)	+2.47	= .031
# 8 *	12	47.4 (27.5)	68.9 (28.7)	+21.5* (23.7)	+3.14	= .009
# 9 *	11	39.9 (22.6)	65.6 (20.8)	+25.7* (15.7)	+5.44	= .0003
#10 *	12	29.4 (27.3)	45.7 (30.2)	+16.3* (23.6)	+2.40	= .035
#11 *	12	51.1 (25.9)	70.2 (21.9)	+19.1* (28.9)	+2.28	= .043
#12 *	12	30.1 (27.2)	54.8 (34.4)	+24.7* (27.3)	+3.14	= .009
#13 *	12	36.0 (25.3)	49.6 (29.9)	+13.6* (16.8)	+2.80	= .017
#14 *	12	14.1 (14.2)	31.9 (27.5)	+17.8* (24.2)	+2.55	= .027
#15 *	12	26.9 (19.6)	40.8 (22.1)	+13.9* (12.0)	+4.01	= .002
#16 *	12	17.8 (22.2)	33.2 (30.3)	+15.4* (18.1)	+2.95	= .013
#1–16 * Overall	12	41.3 (16.6)	59.3 (19.7)	+18.0* (16.4)	+3.80	= .003

*$p < .05$

Table 4: ANOVAs of Quantitative Demographic/Clinical Data

by WAB Assignment to Aphasia Diagnostic Category at Discharge

At Intake:	conduction (12)			
At Discharge:	conduction (11)	anomic (1)	*F*	*p*
age (yrs)	75.5	76.0	0.004	.95
time p/o (yrs)	4.81	3.06	0.21	.66
duration tx (wks)	20.3	16.6	0.16	.70
freq. tx (sess/wk)	2.31	1.33	0.95	.35

Table 5a: ANOVAs of Impairment-Level Intake Data

by WAB Discharge Assignments to Aphasia Diagnostic Category

At Intake:	conduction (12)			
At Discharge:	conduction (11)	anomic (1)	*F*	*p*
Spon. Speech	12.4	17	2.45	.15
Aud. Vb. Comp.	163.3	153	0.26	.62
Repetition	39.8	49	0.15	.71
Naming	41.0	81	3.13	.11
AQ	57.2	75.3	1.90	.20

Table 5b: ANOVAs of Impairment-Level Improvement (Δ) Data by WAB Discharge Assignments to Aphasia Diagnostic Category

At Intake:	conduction (12)			
At Discharge:	conduction (11)	anomic (1)	*F*	*p*
Spon. Speech	1.7	3	0.53	.48
Aud. Vb. Comp. *	6.5	34	5.63	.039
Repetition	10.5	23	1.39	.27
Naming	14.2	14	.007	.99
AQ	9.0	16.8	1.47	.25

*$p < .05$

Table 5c: ANOVAs of Impairment-Level Discharge Data

by WAB Discharge Assignments to Aphasia Diagnostic Category

At Intake:	conduction (12)			
At Discharge:	conduction (11)	anomic (1)	*F*	*p*
Spon. Speech *	14.1	20	5.62	.039
Aud. Vb. Comp.	169.7	187	1.03	.334
Repetition	50.4	72	1.60	.235
Naming	55.2	95	3.64	.086
AQ	66.3	92.1	4.58	.058

*$p < .05$

Table 6a: ANOVAs of Functional Communication Intake Data

by WAB Discharge Assignments to Aphasia Diagnostic Category

At Intake:	conduction (12)			
At Discharge:	conduction (11)	anomic (1)	*F*	*p*
CETI #1	72.1	32	3.01	.11
CETI #2	41.9	25	0.49	.50
CETI #3	55.0	27	0.95	.35
CETI #4	55.9	37	0.36	.56
CETI #5	67.6	—	—	—
CETI #6	42.8	10	1.04	.33
CETI #7	49.9	35	0.32	.58
CETI #8	47.6	45	0.01	.93
CETI #9	39.9	—	—	—
CETI #10	30.5	17	0.21	.66
CETI #11	53.4	25	1.12	.31
CETI #12	29.5	36	0.05	.83
CETI #13	35.8	38	0.01	.94
CETI #14	14.7	8	0.19	.67
CETI #15	26.1	36	0.22	.65
CETI #16	17.2	18	< 0,01	.99
CETI #1-16	42.5	27.8	0.70	.42

*$p < .05$

Table 6b: ANOVAs of Functional Communication Improvement (Δ) Data by WAB Discharge Assignments to Aphasia Diagnostic Category

At Intake:	conduction (12)			
At Discharge:	conduction (11)	anomic (1)	*F*	*p*
CETI #1	8.2	50	2.33	.16
CETI #2 *	14.6	73	7.52	.02
CETI #3	21.0	69	3.80	.08
CETI #4	13.1	48	2.72	.13
CETI #5	10.2	—	—	—
CETI #6 *	10.5	73	10.8	.008
CETI #7 *	12.4	62	6.19	.03
CETI #8	19.2	47	1.29	.28
CETI #9	25.7	—	—	—
CETI #10	14.4	38	0.92	.36
CETI #11	15.1	63	2.96	.12
CETI #12	21.8	46	0.64	.44
CETI #13	14.0	9	0.07	.79
CETI #14	15.9	38	0.75	.41
CETI #15	14.0	13	0.01	.94
CETI #16	14.0	31	0.79	.39
CETI #1-16	15.3	47.1	4.55	.06

*$p < .05$

Table 6c: ANOVAs of Functional Communication Discharge Data

by WAB Discharge Assignments to Aphasia Diagnostic Category

At Intake:	conduction (12)			
At Discharge:	conduction (11)	anomic (1)	*F*	*p*
CETI #1	80.3	82	0.01	.92
CETI #2	56.5	98	1.42	.26
CETI #3	76.0	96	0.87	.37
CETI #4	69.0	85	0.22	.65
CETI #5	77.8	—	—	—
CETI #6	53.3	83	1.01	.34
CETI #7	62.3	97	1.28	.28
CETI #8	66.8	92	0.69	.43
CETI #9	65.6	—	—	—
CETI #10	44.9	55	0.09	.77
CETI #11	68.5	88	0.71	.42
CETI #12	52.4	82	0.66	.44
CETI #13	49.8	47	0.01	.93
CETI #14	30.6	46	0.27	.62
CETI #15	40.1	49	0.14	.72
CETI #16	31.7	49	0.28	.61
CETI #1-16	57.9	74.9	0.66	.43

*$p < .05$

Appendix 1: Items Rated on the *Communicative Effectiveness Index* (CETI)

1. Getting somebody's attention.
2. Getting involved in group conversations that are about him/her.
3. Giving yes and no answers appropriately.
4. Communicating his/her emotions.
5. Indicating that he/she understands what is being said to him/her.
6. Having coffee-time visits and conversations with friends and neighbors (around the bedside or at home).
7. Having a one-to-one conversation with you.
8. Saying the name of someone whose face is in front of him/her.
9. Communicating physical problems such as aches and pains.
10. Having a spontaneous conversation (*i.e.*, starting the conversation and/or changing the subject).
11. Responding to or communicating anything (including *yes* or *no*) without words.
12. Starting a conversation with people who are not close family.
13. Understanding writing.
14. Being part of a conversation when it is fast and there are a number of people involved.
15. Participating in a conversation with strangers.
16. Describing or discussing something in depth.

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