

26. A Long-Term Follow-Up of Aphasic Patients After Intensive Treatment

James Aten, Robert T. Wertz, Marianne Simpson,
Deanie Vogel, and Darlene Graner

Few quantitative reports (Collins & Wertz, 1983; Doyle & Holland, 1984; Hanson, Metter, & Riege, 1989; Holland, 1980b) can be found that describe aphasic patients over extended periods of time after formal treatment has ended. Holland (1980b) reported that chronic patients who continued treatment performed significantly better on the *Communicative Abilities in Daily Living (CADL)* (Holland, 1980a) than those who discontinued treatment. Collins and Wertz (1983) observed that intensively treated patients who were reevaluated at least 18 months after treatment maintained gains achieved in treatment. They also noted that additional treatment improved performance. Hanson et al. (1989) reported on 35 patients followed for over 4 years post-onset. They observed improvement in some, stabilization beyond 2 years in the majority, and declines in others.

A study initiated in 1979 and completed in 1983 (Wertz et al., 1986) provided an opportunity to conduct follow-up testing and collect demographic data on 53 (56%) of the 94 patients who had completed a 24-week intensive treatment trial that included systematic, thorough testing. We believed that information concerning changes in aphasic patients after formal management ended could have important ramifications for both language treatment and other aspects of rehabilitation.

This study was designed to answer the following questions:

1. Did patients' test scores change over time?
2. If changes occurred, how were these changes distributed across linguistic, functional communicative, and nonlinguistic measures?

The authors wish to give special recognition to the VA Cooperative Study Group: D. Weiss, R. Brookshire, L. Garcia-Bunel, A. Holland, J. Kurtzke, L. LaPointe, R. Marshall, F. Milianti, R. Brannegan, H. Greenbaum, J. Carter, N. Barnes, and R. Goodman.

3. Does additional treatment or general health status influence test performance at follow-up?

METHODS

Three Veterans Administration Medical Centers—Hines, Illinois; Long Beach, California; and San Antonio, Texas—participated in this follow-up study. An attempt was made to schedule all patients who participated in the earlier treatment study for reevaluation. Patients who were available for follow-up ranged from 6 to 10 years post-onset.

Three measures—the *Porch Index of Communicative Ability (PICA)* (Porch, 1967), the *CADL*, and the *Coloured Progressive Matrices (CPM)* (Raven, 1962)—were selected from the initial battery to sample language, functional communication, and nonverbal ability at follow-up. Additional anecdotal information was obtained by telephone interview from patients or family members of patients who were unavailable for formal testing. In most instances, reevaluations were completed during a single 3-hour visit.

RESULTS

Table 26.1 shows that 53 patients had completed the earlier treatment trial at the three centers—18 patients from Hines, 18 from Long Beach, and 17 from San Antonio. At follow-up, they averaged 7.66 years post-cerebrovascular accident (CVA), and their mean age was 65.44 years ($SD = 6.77$) with a range of ages from 54 to 80. The sample was representative of the patients who participated in the earlier treatment study. The mean age of all patients was 58 years at entry; at the 7-year follow-up, the average age of all patients was 65.4. Twenty-one patients (40%) were deceased at the time of follow-up. Nine (17%) were unavailable for reevaluation for various reasons that included distance from the test center, illness (theirs or their spouse's), or belief that their speech or language was now normal. Five patients (9%) could not be contacted. The remaining 18 patients (34%) were reevaluated. Table 26.2 shows that *PICA* Overall percentiles at the conclusion of the 24-week study averaged 69.44 compared to 65.89 at follow-up. *CADL* scores averaged 108.00 at 24 weeks and 106.55 at follow-up. *CPM* scores were 23.89 at 24 weeks and 21.12 at follow-up.

The first question asked whether performance changed between termination of treatment and follow-up. Statistical comparisons (t tests for paired samples) revealed that the decline in scores on the *PICA* and *CPM*

TABLE 26.1. STATUS OF 53 PATIENTS AT FOLLOW-UP

<i>Center</i>	<i>Available for Reevaluation</i>		<i>Deceased at Follow-Up</i>		<i>Unavailable for Reevaluation</i>		<i>Status Unknown</i>	
	<i>N</i>	<i>(%)</i>	<i>N</i>	<i>(%)</i>	<i>N</i>	<i>(%)</i>	<i>N</i>	<i>(%)</i>
Hines (<i>N</i> = 18)	5	(28)	8	(44)	2	(11)	3	(17)
Long Beach (<i>N</i> = 18)	7	(39)	8	(44)	3	(17)	0	(0)
San Antonio (<i>N</i> = 17)	6	(35)	5	(29)	4	(24)	2	(12)
Combined (<i>N</i> = 53)	18	(34)	21	(40)	9	(17)	5	(9)

Note: \bar{X} = 7.66 years post-onset.

TABLE 26.2. CHANGES IN PERFORMANCE AT FOLLOW-UP FOR 18 APHASIC PATIENTS

<i>Test</i>	<i>Final Treatment Trial</i>		<i>Follow-Up</i>		<i>Significance Level</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
PICA	69.44	(25.44)	65.88	(23.95)	.05
CADL	108.00	(30.73)	106.55	(34.51)	*
CPM	23.89	(8.07)	21.12	(6.49)	.05

Note: PICA = Porch Index of Communicative Ability. CADL = Communicative Abilities in Daily Living. CPM = Coloured Progressive Matrices.

*Not significant.

were significant ($p < .05$). The change on the CADL was not statistically significant ($p > .05$). The slight drop in performance on all measures suggests small, clinically insignificant changes when the standard error of measurement and probable age-related influences are considered. Thus, for the group, gains achieved during treatment (Table 26.3) were maintained over time. Despite the slight decline in scores after treatment, the 7-year follow-up scores remain 16 percentile points higher for the PICA and 13 points higher for the CADL compared with pretreatment scores. Group means obscure some major individual score changes for a few patients, and these are considered in the Discussion section.

The second question concerned the distribution of test score changes across linguistic, functional, and nonlinguistic parameters. Table 26.4 reveals significant correlations among all measures at follow-up, and a nonsignificant relationship between performance on any measure and age. There was evidence of a small but significant decline over time on the

TABLE 26.3. TEST SCORES AT PRETREATMENT, POST-TREATMENT, AND FOLLOW-UP

	PICA			CADL			CPM		
	PRE	POST	F/U	PRE	POST	F/U	PRE	POST	F/U
Long Beach	44	67	67	97	119	111	25	26	24
	40	50	54	87	93	114	28	28	28
	79	88	81	132	134	128	34	35	—
	39	77	66	61	103	80	14	26	14
	47	48	53	104	114	124	27	28	26
	74	90	93	129	132	132	18	19	17
	53	84	81	102	127	131	28	32	31
San Antonio	55	60	54	119	122	107	23	17	16
	51	79	88	115	123	131	20	24	23
	74	94	82	128	111	111	25	26	25
	30	39	41	70	63	77	20	19	17
	22	32	7	130	84	20	7	7	—
	12	13	21	26	13	30	4	5	10
Hines	32	54	54	42	93	96	12	23	10
	67	96	90	106	120	131	18	24	19
	40	81	77	87	128	129	23	31	26
	78	99	90	121	131	131	20	28	25
	77	99	91	122	134	135	21	32	27
\bar{X}	50.78	69.44	66.11	93.22	108.0	106.56	20.39	23.89	21.13

Note: $N = 18$. PICA = Porch Index of Communicative Ability. CADL = Communicative Abilities in Daily Living. CPM = Coloured Progressive Matrices.

linguistic measure (*PICA*) and the nonverbal measure (*CPM*), but not on the functional measure (*CADL*).

Analysis of individual patient change, shown in Table 26.5, indicated that six patients improved or remained the same on the *PICA* and *CADL*, but four of these declined on the *CPM*. Six patients declined or remained the same on all three tests. The other six patients varied, but their change patterns showed a dominant pattern. The *CADL* improved for five and was unchanged for one, while *PICA* and *CPM* scores declined for all but one patient (whose *PICA* was stable). Our older patients appeared to show a greater reduction in nonverbal performance than in linguistic performance. This has been observed by Sasanuma (1988) and is reflected in *CPM* normative data that show a decline of approximately 4 points per decade from ages 50 to 70.

Analysis of *PICA* subtests was performed to determine if Overall score declines were related to changes on the graphic subtests. As can be seen in Table 26.6, declines in scores on graphic subtests were essentially the same as changes in Overall scores.

TABLE 26.4. CORRELATION AMONG MEASURES AT FOLLOW-UP

	24-Week PICA OA	Follow-Up PICA OA	24-Week CADL	Follow-Up CADL	24-Week CPM	Follow-Up CPM
Age	+.25	+.10	+.10	-.23	-.28	-.16
24-Week PICA OA		+.97*	+.85*	+.80*	+.71*	+.47**
Follow-Up PICA OA			+.84*	+.89*	+.74*	+.51**
24-Week CADL				+.84*	+.73*	+.58*
Follow-Up CADL					+.88*	+.70*
24-Week CPM						+.79*

Note: $N = 18$. PICA = Porch Index of Communicative Ability. OA = Overall percentiles. CADL = Communicative Abilities in Daily Living. CPM = Coloured Progressive Matrices. * $p < .01$. ** $p < .05$.

The third question concerned potential influences of additional treatment and health status. The influence of additional treatment was difficult to assess objectively, because the durations and types of therapy varied, documentation was often poor, and the data were difficult to retrieve. Table 26.7 indicates that the seven patients who received verifiable additional treatment improved 1.7 percentile points on the PICA and 5.7 points on the CADL, whereas the CPM remained essentially stable. Eleven patients who did not receive additional treatment showed declines of 7.0 on the PICA, 5.9 on the CADL, and 5.2 on the CPM. Collins and Wertz (1983) reported somewhat smaller differences between patients who received additional treatment and those who did not in their follow-up study.

The second factor, health status, was assessed indirectly by comparing ages (at entry into the original study) of patients who were alive at follow-up with ages of deceased patients. Less than 2 years difference in age was found between the deceased and living patients. Thus, we assume that poor health, not age, explains morbidity.

Referring back to Table 26.3, two patients (fourth Long Beach patient and fifth San Antonio patient) revealed a decline at follow-up of 11 and 25 points, respectively, on PICA Overall percentiles and even more extreme declines on the CADL (23 and 64) and CPM (12 and not-testable). Our observations, coupled with family interview information, strongly indicated that the test performance decline was reflected in loss of independent functions at home. In the absence of a documented second CVA, dementia of unknown etiology was suspected.

TABLE 26.5. TEST SCORE CHANGES AND AGE

<i>Age</i>	<i>PICA</i>	<i>CADL</i>	<i>CPM</i>
54	0	-8	-2
54	4	21	0
58	5	10	-2
59	0	3	-13
61	-4	1	-5
62	4	17	5
64	-6	-15	-1
65	-3	4	-1
65	9	8	-1
67	-7	-6	*
67	2	14	-2
67	-9	0	-3
69	-12	0	-1
70	-6	11	-5
71	-11	-23	-12
71	-8	1	-5
74	3	0	-2
80	-25	-64	*
65.44	-3.56	-1.44	-2.88

Note: PICA = *Porch Index of Communicative Ability*, CADL = *Communicative Abilities in Daily Living*, CPM = *Coloured Progressive Matrices*.

*Patient not testable.

DISCUSSION

This investigation provided the opportunity to assess patients several years after they had participated in intensive treatment. The major result was minimal change in group linguistic, functional, and nonlinguistic test performances 7 years after intensive treatment ended. The results of the earlier treatment trial demonstrated that patients improved during intensive treatment. Our follow-up results demonstrate that this improvement was maintained 7 years later. Similarly, Hanson et al. (1989) reported that 86% of their patients maintained language improvement at 2 years post-treatment; however, 10 patients showed subsequent decline in PICA performance at 5 years post-treatment. Eleven (61%) of our patients who received no additional treatment showed a decline in scores compared to 7 patients who received additional treatment and did not show a decline in performance. Continued assessment of patients who

TABLE 26.6. PICA OVERALL SCORE CHANGES CONTRASTED WITH CHANGES ON GRAPHICS

PICA OA		<i>Graphics</i>	
24 WEEKS	FOLLOW-UP	24 WEEKS	FOLLOW-UP
69.44	65.89	73.22	72.00

Note: PICA = Porch Index of Communicative Ability. OA = Overall percentiles.

TABLE 26.7. INFLUENCE OF ADDITIONAL TREATMENT

<i>Measures</i>	<i>Groups at Follow-Up</i>			
	ADDITIONAL TREATMENT (N = 7)		NO ADDITIONAL TREATMENT (N = 11)	
	\bar{x}	(RANGE)	\bar{x}	(RANGE)
PICA OA	+1.0	(-8, +5)	-6.7	(-25, +5)
CADL	+5.1	(-15, +21)	-7.4	(-64, +11)
CPM	-0.6	(-2, +5)	-5.2	(-13, +1)

Note: PICA = Porch Index of Communicative Ability. OA = Overall percentile.
CADL = Communicative Abilities in Daily Living. CPM = Coloured Progressive Matrices.

receive treatment and those who do not would seem warranted to determine if treatment effects decline without subsequent intervention.

Doyle and Holland (1984) reported that 40% of their patients had died prior to follow-up. This is identical to our morbidity rate, excluding the five patients whose status was unknown. Thus, at least 60% of aphasic patients will live for at least 7 years. This longevity after CVA for the majority of aphasic patients merits our continuing concern for ways to improve the communicative quality of those lives.

CONCLUSIONS AND CLINICAL IMPLICATIONS

Having established that well-designed and intensively delivered treatment is efficacious for many, that there are upper limits on improvement received from intensive language treatment, and that improvements are maintained over several years, our attention in clinical investigations can now be directed toward *how much* language treatment is *enough*, and *when and what* we should offer aphasic patients after formal treatment ends. Would our untreated patients have shown less decline, or even improved

further on the functional measure, if they had received additional treatment, as in the Aten, Caligiuri, and Holland (1982) study? What was the quality and quantity of our patients' communication during the 7 years prior to follow-up? Would certain patients have shown less decline if follow-up training for facilitating informational exchanges had been provided to them and their communicative partners, as Lyon (1989) suggests? Our results do not provide these answers.

Our results do support the belief that improvement obtained during treatment is maintained for a protracted period after treatment has stopped. Indirectly, this is additional support for the efficacy of the original effort. Treatment achieved the desired effect, *improvement*, and that effect persisted over time after treatment ceased. The treatment effect may have been augmented when additional therapy was offered, but further measurement of this potential effect is needed.

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