

1983

Observations on the effects of a single-channel cochlear implant on a seven year old

Kathryn K. Barringer

Follow this and additional works at: http://digitalcommons.wustl.edu/pacs_capstones

 Part of the [Medicine and Health Sciences Commons](#)

Recommended Citation

Barringer, Kathryn K., "Observations on the effects of a single-channel cochlear implant on a seven year old" (1983). *Independent Studies and Capstones*. Paper 176. Program in Audiology and Communication Sciences, Washington University School of Medicine. http://digitalcommons.wustl.edu/pacs_capstones/176

This Thesis is brought to you for free and open access by the Program in Audiology and Communication Sciences at Digital Commons@Becker. It has been accepted for inclusion in Independent Studies and Capstones by an authorized administrator of Digital Commons@Becker. For more information, please contact engeszer@wustl.edu.

✓
LIBRARY
CENTRAL INSTITUTE FOR THE DEAF

Observations on the Effects of a
Single-Channel Cochlear Implant
on a Seven Year Old

Independent Study
Kathryn K. Barringer
Sponsor: Dr. G. Popelka
May 13, 1983

PLEASE DO NOT REMOVE
FROM LIBRARY

In the past decade, cochlear implants have become increasingly popular instruments in aiding the deaf. The prosthesis which enjoys the most popularity and definitely the most clinical use is the single-electrode cochlear implant. More than 200 deaf patients, including over forty children have received this implant. Professionals who support this procedure lean heavily on the reports of patients and their families. One such professional states,

"What is most needed to satisfy critics of the present day prosthesis is...their own personal observation and examination of the performance of subjects presently using an implant."¹

One can read a few "glowing testimonials" among the writings of the professionals, but there is little else published on the subject.

I, therefore, undertook the study of an implanted child, to decide what effect the implant had on his life. It is necessary to recognize from the onset that, aside from actual test data, the statements made within are my opinions and not tried fact. It is also necessary to note I observed only one subject. However, having completed my training as a teacher of the hearing impaired, having read extensively on the subject of cochlear implants, and having been employed as a houseparent for hearing-impaired residential students, I feel qualified to make these observations and judgements.

My first contact with the subject (hereafter known as "A") was in September, 1981. As one of his houseparents I was in

close daily contact with him and responsible for him for nearly all of his out-of-school hours. This exposure lasted through two school years; one prior to the implantation and one following it.

Administrators of A's school were notified of the intended operation in the Spring of '82. Subsequently a full battery of tests were administered to determine A's pre-operative abilities or levels. The battery included audiologic, speech production, speechreading ability, and language tests. These tests will be more fully described later in this paper.

In July, 1982 A was implanted without any complications. Allowing a two-month healing period, stimulation to the electrode began in September. September 17th, A returned to school.

Some of the tests were repeated in October. However, since a six-month stimulation period to allow for adjustment to the implant is recommended, most of the testing was repeated six or more months after stimulation began. Tables I - V review A's pre- and post-operative test scores, and will be one basis of my comparison. Appendix I, which presents a log of A's statements and behaviors kept from January to May, 1983, and my recollection of the 1981-82 school year will make up the second basis. Observations of A's teacher from the 1981-82 school year will make up the third.

A is a seven-year-old male. Meningitis, at age four, caused a bilateral, profound, sensorineural hearing loss. After trying several educational programs, A's parents enrolled him in an oral school for the deaf. It was through this school program that I

came in contact with A and that he received all of the tests which are referred to in this paper.

In my first year of experience with A I observed that while his speech was often unintelligible, and his word order often confused, it was not uncommon for him to say a full sentence with near normal speech and language. An example of this was when he came to tell me he had put his laundry away and said, "All my clothes are in closet." This kind of pattern is not unusual for meningitic children whose language was almost fully developed at the onset of the disease and subsequent deafness. Therefore, seeing this pattern in A did not surprise me since he was already four when he contracted meningitis.

Another pattern in meningitic deaf children is having problems with imitation of speech and language models. Since their auditory channel was finely tuned and in constant use prior to the illness, the visual channel, less critical to communication skills, is often less developed than the auditory channel. With the onset of deafness, in this case profound, the visual channel must compensate for the loss of auditory stimulation, a job it is ill prepared to do. It was, therefore, also no surprise that A performed at a lower level in the classroom than he did in the relaxed, unstructured setting of the dorm. Examples like the one previously mentioned were reported much more frequently in the dorm than at school where exactness of language was goaled.

A was a very social child. His deafness did not seem to close him off from people, hearing or deaf, familiar or unfamiliar. He exhibited self-confidence, persistence and a genuine

friendliness which attracted people to him. He did, however, tend to be loud, both in speech and environmental interactions which sometimes interfered in his dealings with hearing people. If reminded he could control this.

In school, A's teacher also pointed to his tendency to "ramble on" in incomplete sentences, confused word order, and unintelligible speech. She described him as distractable, active, and sometimes inattentive. When they worked on a given set of material, such as vocabulary, she said she never felt he had a really good grasp of it. One day he would seem to know it and the next, not. This she felt was at least in part due to his distractability.

Since his return to school in September, 1982 after having received the implant, I have not perceived any changes in his attitude towards others. He is still outgoing and, in general, easy going. He is aware, however, that his "new ear" as he calls it, is different and this sometimes causes self-consciousness as was exhibited on February 10th (see log: Appendix I).

Another psychological result of being implanted is that A believes strongly that he can hear now. This can be seen in the log on March 4, 7, 10, 21, and April 20. It is difficult to pinpoint exactly what led him to believe this, but one can see this belief in his parents also. In the March 21 entry of the log, A tells us that his father is happy he is not deaf any more. Similar comments have been made in letters from A's parents to A and in conversations they have held in my presence.

Certainly it is the common belief in popular magazines and

newspapers that the cochlear implant restores hearing to the deaf. I quote this from one magazine entitled Friendly Exchange.

...Friendly Exchange told you about young Tracy Husted of Upland, California, and how her hearing was restored - thanks to a cochlear implant.²

This is only one example, but it is this idea that pervades popular opinion on the cochlear implant - the miracle cure for the deaf.

Also, although they are careful not to say the implant restores hearing, and in fact say it does not, professionals who support the implant and the implantation process in several instances, have written things which, when read by those unfamiliar with the anatomy and function of the ear, would be taken as stating that normal hearing is restored. Some examples of this are:

1. "Subjects demonstrated relatively normal intensity and duration difference limens."
2. "Subjects report hearing a wide variety of sounds in their daily environment."
3. "The cochlear implant program is directed toward restoring auditory communication for those who suffer severe or profound deafness."
4. "Practicing with speech is easier and more progressive now that the children are able to auditorily monitor their voices."

As I have previously stated, it is not what these articles say, but what they imply to the inexperienced reader that puts

across this attitude.

This belief that he is no longer deaf sometimes makes A feel responsible for the other boys who can't hear. This was potentially dangerous on April 20th when he started across the road, without adult supervision, leading another deaf child by the hand. He thought it was O.K. because "he can hear the cars now."

The log, however, shows many examples of things which, according to implant literature, A should be able to hear with an implant and doesn't, things that the other boys can hear but A doesn't, or times when A says he hears something which is not really occurring. In all examples, A is wearing both a conventional aid and implant, but whenever he claims to hear something he points to the left (implanted) ear. A few examples are January 12th and 15th, February 23rd, March 4th, and April 15th. On the other hand, there are a few examples when his claim of having heard something seems legitimate (the 23rd and 29th of January, and the 17th of April).

In my opinion, over this past year, some of A's language problems have been greatly reduced. His word order has improved immensely. While he still gets excited and starts saying things in any order, if reminded to slow down, he can often use proper word order. He has a lot more usable vocabulary. And he seems to be more able to express himself.

His speech is about the same as it was last year, but proper word order makes it easier to understand him. When his word order gets confused, he is just as unintelligible as he ever was.

Also, he is still very loud which tends to make it uncomfortable to listen to him. When reminded, however, he can speak at a more normal level.

In summarizing the log, I created four categories describing A's actions and statements: 1) those things which A did/didn't hear, 2) psychological reactions to the implant, 3) the perfect language samples, and 4) mechanical problems with the implant. I then broke the first category into three subareas. The first, things that A legitimately heard, was exhibited January 23rd & 29th, and April 17th. Things A said he heard which were not occurring, the second subarea, can be found in the entries on January 15th, February 23rd & 29th, and March 12th. Finally, the things which A did not hear that he should have heard with either his aid or his implant appeared seven times throughout the four months (January 12th & 13th, February 23rd, March 12th, April 15th & 27th, and May 1st).

I separated the psychological reactions to the implant into 1) the feeling that A was no longer deaf, and 2) all other feelings directly related to the implant. In the time logged, A said or implied he was no longer deaf six times, on March 4th, 7th, 10th, 12th, & 21st, and April 20th. Other directly related feelings were shown on February 8th, 10th, & 18th, and April 20th.

Six perfect, and several other near perfect, language samples can be found throughout the log. The sheer number of samples with proper word order testifies to the improvement A is making in that field.

The final category, mechanical problems, became critical only once during the time in question. A's microphone was dis-

covered missing January 31st and the implant was in for repair until February 15th. When comparing this to a conventional aid, this is an extremely reasonable down time. Also, the fact that only one breakage occurred in the four months is a tribute to the durability of the external apparatus.

Upon observation of A in his new classroom, A's teacher (from the '81 - '82 school year) reported that she felt he was less distractable, and seemed to be using better language than he had in her classroom. Again, the most prominent improvement was in word order. She felt that his speech was about the same as it had been, but that proper word order helped his intelligibility. As this concurred with my observations in the dorm, I feel confident that we are properly assessing his performance.

The complete battery of tests allows us to look more objectively at A's performance before and after he received the implant. The audiologic testing was made up of standard measures, the Test of Auditory Comprehension - (two subtests), the Monosyllable, Trochee, Spondee Test, and the Minimal Auditory Capabilities Test - (three subtests). Each was given in May '82, October '82, and February '83.

The results of these tests are shown in Tables I - III. These allow us to compare A's performance with a conventional aid and then with a cochlear implant in the same ear (Table I). A's average aided sound field thresholds were improved by 18 dB, from 68 dB HL in May 1982 to 50 dB HL in February 1983.

A's results on the Test of Auditory Comprehension show a decrease in his performance for both subtests. An increase on

TABLE I
Audiologic Testing
(left ear)
(implanted July, 1982)

Tests	Test Date	Preimplant May, 1982	Postimplant October, 1982	Postimplant February, 1983
Standard	Average Aided Field Thresholds (dB HL)	68 dB		50 dB
TAC	Linguistic vs. Non-Linguistic	70%	60%	40%
	Speech vs. Environmental	33%	33%	20%
MTS	Speech Recognition	11%	28%	22%
	Speech Categorization	33%	61%	44%
	Question vs. Statement	70%	30%	40%
	Spondee Discrimination	35%	40%	35%
MAC	Monosyllable Identification	0%	0%	0%
	Speech Reading			
	Aided	32%	35%	42%
	Unaided	32%	37%	54%

- Notes: a) Threshold values are in dB HL re: CID field.
b) All scores are in percent correct response.
c) Chance responding differs with subtest.
d) TAC = Test of Auditory Comprehension
MTS = Monosyllable, Trochee, Spondee Test.
MAC = Minimal Auditory Capabilities Test.

both speech-recognition and speech categorization sections of the Monosyllable, Trochee, Spondee Test was realized. And an analysis of the results on the Minimal Auditory Capabilities Test shows a decrease in performance on one subtest and no change on the others.

In examining the unaided speechreading scores, one can see that A has made a considerable improvement in speechreading abilities during the past year. Comparing the three unaided scores, one discovers that in May of 1982 aided (conventional aid) and unaided scores were equal. However, post implant aided scores drop below their corresponding unaided scores. This would imply that the implant impedes rather than aids A's speechreading ability.

Comparing the right and left ears (Table II) allows us to compare the performance of a cochlear implant alone, to a conventional aid in the contralateral ear. Superior performance was shown by the conventional amplification in six of the seven subtests which are comperable.

When comparing the performance of the cochlear implant and the conventional aid together to the performance of the conventional aid alone (Table III) the results were split. Of six subtests, three demonstrated a decrease in performance, while three showed an improvement.

Tests of articulation are much more difficult to compare, but pre- and post-operative results are shown in Table IV. The Goldman - Fristoe Test of Articulation was administered in May and October of '82 and again in May of '83.

~~PR~~ These test results showed that over the period in question,

TABLE II
Audiologic Testing
(right and left ears)

Tests	Test Date	Preimplant May, 1982		Postimplant October, 1982		Postimplant February, 1983	
		Right	Left	Right	Left	Right	Left
Standard	Average Aided Field Thresholds (dB HL)		68 dB	40 dB			50dB
TAC	Linguistic vs. Non-Linguistic	50%	70%	70%	60%	90%	40%
	Speech vs. Environmental	40%	33%	33%	33%	33%	20%
MTS	Speech Recognition	33%	11%	33%	28%	17%	22%
	Speech Categorization	72%	33%	67%	61%	56%	44%
MAC	Question vs. Statement	50%	70%	30%	30%	60%	40%
	Spondee Discrimination	60%	35%	60%	40%	40%	35%
	Monosyllable Identification	0%	0%		0%		0%
	Speech Reading						
	Aided	27%	32%		35%		42%
	Unaided	32%	32%	37%	37%	54%	54%

Notes: a) See Table I.

TABLE III
 Audiologic Testing
 (Conventional Aid vs. Binaural)

Tests	Test Date	Postimplant October, 1982		Postimplant February, 1983	
		Right	Binaural	Right	Binaural
TAC	Linguistic vs. Non-Linguistic	70%	50%	90%	40%
	Speech vs. Environmental	33%	33%	33%	27%
MTS	Speech Recognition	33%	33%	17%	50%
	Speech Categorization	67%	67%	56%	72%
MAC	Question vs. Statement	30%	55%	60%	50%
	Spondee Discrimination	60%	40%	40%	50%
	Monosyllable Identification		---	---	---

Notes: a) See Table I.

Table IV

SOUNDS-IN-WORDS
RESPONSE MATRIX

SOUNDS-IN-WORDS
RESPONSE MATRIX

SOUNDS-IN-WORDS
RESPONSE MATRIX

KEY WORDS

INITIAL MEDIAL FINAL

INITIAL MEDIAL FINAL

INITIAL MEDIAL FINAL

- Plate 1 5 21 h o u s e
- Plate 2 13 9 t e l e p h o n e
- Plate 3 8 1 c u p
- Plate 4 7 3 g u n
- Plate 5 3 9 k n i f e
- Plate 6 4 10 w i n d o w
- Plate 7 7 35 w a g o n . . . w h e e l
- Plate 8 8 c h i c k e n
- Plate 9 22 1 z i p p e r
- Plate 10 21 22 22 s c i s s o r s
- Plate 11 10 8 12 16 d u c k . . . y e l l o w
- Plate 12 20 v a c u u m
- Plate 13 2 15 m a t c h e s
- Plate 14 16 l a m p
- Plate 15 14 20 s h o v e l
- Plate 16 17 c a r
- Plate 17 17 6 r a b b i t
- Plate 18 9 14 f i s h i n g
- Plate 19 15 15 c h u r c h
- Plate 20 23 f e a t h e r
- Plate 21 1 21 23 23 p e n c i l s . . . t h i s o r t h a t
- Plate 22 17 13 18 c a r r o t . . . o r a n g e
- Plate 23 19 13 6 6 19 b a t h t u b . . . b a t h
- Plate 24 19 11 t h u m b . . . f i n g e r . . . r i n g
- Plate 25 18 j u m p i n g
- Plate 26 18 p a j a m a s
- Plate 27 30 24 p l a n e . . . b i p l a n e
- Plate 28 25 14 b r u s h
- Plate 29 26 2 d r u m
- Plate 30 27 7 f l a g
- Plate 31 3 29 S a n t a C l a u s
- Plate 32 29 2 34 C h r i s t m a s t r e e
- Plate 33 31 16 s q u i r r e l
- Plate 34 32 s l e e p i n g . . . b e d
- Plate 35 33 20 s t o v e

1 p	✓	✓	✓
2 m	b	b	mp
3 n	d	omit	omit
4 w	omit		
5 h	-		
6 b	✓	✓	✓
7 g	✓	✓	✓
8 k	✓	✓	✓
9 f	✓	✓	X
10 d	✓	omit	omit
11 ŋ		omit	omit
12 j	l		
13 t	omit	✓	omit
14 ʃ	omit	+	omit
15 tʃ	d	omit	+
16 l	X	✓	omit
17 r	w	w	omit
18 dʒ	X	X	omit
19 θ	✓	omit	+
20 v	f	betw. f+v	betw. f+v
21 s	d	d	+
22 z	d	d	omit
23 ð	d	d	

1 p	b	✓	✓
2 m	b	b	b
3 n	d	-	-
4 w	-		
5 h	-		
6 b	✓	✓	-
7 g	X	✓	✓
8 k	g	X	✓
9 f	b	✓	✓
10 d	✓	-	X
11 ŋ		-	-
12 j	-		
13 t	-	✓	✓
14 ʃ	d	-	-
15 tʃ	d	-	-
16 l	✓	-	-
17 r	w	b	-
18 dʒ	d	d	-
19 θ	d	-	X
20 v	b	f	-
21 s	d	d	+
22 z	d	d	-
23 ð	-	d	

1 p	✓	✓	✓
2 m	b	X	✓
3 n	d	-	✓ X
4 w	-		
5 h	-		
6 b	X	✓	-
7 g	✓	d	✓
8 k	betw g+k	X	-
9 f	X	✓	X
10 d	✓	✓	-
11 ŋ		g	g
12 j	-		
13 t	✓	✓	-
14 ʃ	✓	d	-
15 tʃ	+	d	+
16 l	✓	✓	-
17 r	-	w	-
18 dʒ	d	d	+
19 θ	X	-	-
20 v	X	X	X
21 s	d	d	+
22 z	d	d	-
23 ð	X	d	

BLENDS

SYLL. WORD SET

BLENDS

SYLL. WORD SET

BLENDS

SYLL. WORD SET

24 bl	b	30 pl	p
25 br	b	31 skw	-
26 dr	d	32 sl	l
27 fl	✓	33 st	+
28 kl	l	34 tr	b
29 kr	k	35 hw	b

24 bl	X	30 pl	X
25 br	b	31 skw	k
26 dr	-	32 sl	l
27 fl	f	33 st	+
28 kl	-	34 tr	+
29 kr	k	35 hw	b

24 bl	X	30 pl	pul
25 br	b	31 skw	d
26 dr	d	32 sl	xl
27 fl	✓	33 st	+
28 kl	l	34 tr	X
29 kr	-	35 hw	✓

by Ronald Goldman, Ph.D. and Macalynne Fristoe, Ph.D.

1) RESPONSE FORM / Goldman-Fristoe Test of Articulation

A picked up a few new sounds such as final m, medial d, and initial t. However, his performance on several sounds decreased markedly, such as initial and medial b, medial g, k in all positions, and medial f.

A is currently in the process of the second post-implant retesting for linguistic ability. Seven tests make up the linguistic portion of the battery. They are the Assessment of Children's Language Comprehension, the Test for Auditory Comprehension of Language, the Peabody Picture Vocabulary Test, Bang's Vocabulary Comprehension Scale, the Grammatical Analysis of Elicited Language - Simple Sentence, the Illinois Test of Psycholinguistic Abilities, and the Scales of Early Communication Skills. The first four tests assess receptive skills, the GAEL-S evaluates expressive abilities, and for the SECS and ITPA, both skills are assessed. At the time of this paper's publication three tests had been administered, the ACLIC, the PPVT, and the ITPA. Table V gives a breakdown of the results for each of these tests and each test date.

The results of the Assessment of Children's Language Comprehension showed that A's ability to comprehend spoken language increased by approximately ten percent. Also, while a special scoring procedure was required for the Peabody Picture Vocabulary Test (see Note c. Table V) it also showed an improvement from the pre-operative to the May, '83 post-operative testing. Therefore, on both tests of receptive language, A demonstrated some improvement.

As previously stated, the Illinois Test of Psycholinguistic Abilities assesses the integration of receptive and expressive

TABLE V
Linguistic Testing

Tests	Test Date	Preimplant May, 1982	Postimplant October, 1982	Postimplant May, 1983
<u>Receptive Language</u>				
ACLCLC	Percent Correct Response	85%	91%	93%
PPVT	Form L - Age Equivalent*	3-1	3-1	3-8
<u>Receptive and Expressive</u>				
ITPA	Grammatical Closure	2-6	2-6	2-6
ITPA	Auditory Association	2-6	---	3-3

Notes: a) Chronological Age for May, 1982 = 6-11, Oct. 1982 = 7-4, May, '83 = 7-11.

b) ACLCLC = Assessment of Children's Language Comprehension.
PPVT = Peabody Picture Vocabulary Test.
ITPA = Illinois Test of Psycholinguistic Abilities.

*c) No basal was established as A missed one of the first eight trials. However, the Age Equivalent Score was figured on the basis of his total performance.

skills. Two subtests, Grammatic Closure and Auditory Association, were administered. A's scores on the Grammatic Closure Subtest remained the same over the year's time. However, his age equivalent score on the Auditory Association Subtest did improve from 2-6 in May, 1982 to 3-3 in May, 1983.

Overall, then, A showed slight improvement on all but one subtest. However, in looking at his age equivalent scores, one will see that while his chronological age increased by a full year, his age equivalent scores increased, at best, by seven months. Therefore, in light of this fact, and based solely on these test results, one would not be able to say that A had made a significant improvement in linguistic abilities.

In studying A's case I have reviewed his behavior and linguistic skills in the dormitory, his teacher's opinions of his performance in the classroom, and the assessment of A's audiologic, speech, speech reading, and linguistic abilities and levels before and after he received the cochlear implant. The following statements summarize my findings.

- 1) A's personality has remained basically the same with the exception that he now believes that he can hear.
- 2) A's speech has, according to my estimation and that of his teacher, also remained the same. The Goldman-Fristoe Test of Articulation showed some improvement on a few sounds, but marked decline in A's ability to produce several others.
- 3) A has made some improvement in linguistic skills as was demonstrated by the majority of the tests and by the statements made by his teacher and I. However, this improvement is not significant when taking into account his chronological age.
- 4) Audiologically, "a decrease in performance on the majority of tests was found with the cochlear implant compared to performance with a conventional aid."⁷

Looking at this summary would lead one to say that A had received nothing from the implant, but that is not so. The feeling that he is able to hear now - that he is no longer deaf - has been given to him. What does this mean to A? How has it effected his life? Looking back to the summary of the log one will see that A came to me several times to tell me he had heard something, but this did not happen from March 12 - May 6. This suggests to me that A is becoming confused. On one hand, he believes he can hear, but each time he says he heard something I have to tell him he didn't.

A also knows his parents are extremely pleased that "he is not deaf any more". Who, more than A, will have to deal with the fact that he is deaf. Deaf children often feel the pressure their handicap puts on their families. Is A supposed to endure this for a second time?

Another result of this feeling is that A feels he has the world by the tail, and now that he can hear, he can do anything. A and another child were almost killed on April 20th because A neither heard nor saw the car that almost hit them. Still his remark to me was it was O.K. because he can hear the cars now.

People who are in any way handicapped lead the fullest lives when they accept their handicap and learn how to compensate for it. A Is Deaf! Audiologic information shows this clearly. Letting him believe he is not is not only foolish but dangerous for A, and those around him.

As I stated in my introduction, A is only one of many children implanted. Perhaps in others the implant has been beneficial, but even the professionals responsible for the

implantations will tell you that the device has never restored a person's hearing. Any child being led to believe they are not deaf, when in fact they are, is being done a great disservice - one which, in my mind, outweighs any benefits they may be receiving.

Appendix I

Log
(January - May, 1983)

Date:	Entry:
1/11	"You have a baby? In there? You? Katie? Wow!
1/12	A was talking very rapidly with no intelligible words. I asked him to slow down and tell me again. He said, "Sometime, Mommy told me, take back to school." Twice, while we were eating, the hall telephone amplifier rang. A did not notice, even though the amplifier is new and the sound unusual.
1/13	Still not noticing the phone in the hall. "Mommy gave this you and you."
1/15	A ran to tell me the phone was ringing, but it wasn't.
1/17	We played Triominos and I won. A said, "That's not fair! That's not Fair! Wait! (A came back with a pen and paper and wrote 900,000) I got nine, zero, zero, zero, zero, zero! Ha, ha, ha!
1/20	"How big is the baby, Katie?"
1/23	I was calling the boys to get ready for dinner and A, who had been in the other room, came and said, "I heard you. Time to eat?"
1/25	----- asked if A was E.T. because his stomach was bulging out. A answered, "No, I have my gloves in my pockets."
1/29	A said he could hear the noise from a toy gun the other boys were playing with two rooms away. Although his reproduction of the sound was steady state vs. the warble of the gun, he was able to start and stop as the gun did.
1/30	Since yesterday, A's magnetic coil has fallen off his head eleven times, only once because of strenuous activity. His battery is strong.
1/31	A's microphone discovered missing.
2/01- 2/15	A's implant (external device) is in for repair.
2/08	A, putting on his hearing aid and pointing to the implant halter, said, "Whew, yuck! Makes me hot!"

Date: Entry:

2/10 My husband and I had visitors at the dorm. A asked my husband if we were talking about his "new ear" (pointed to his left ear).

2/11- A is gone with his parents.
2/14

2/16 "Maybe I get big I be policeman. You remember? Blue shirt, blue pants, black belt, black shoes, (gestured using a billyclub) gun, blue hat. You remember? I be get big, spray badmen (gestured a can of mace). Stop people drive too fast.

2/18 "Microphone a lot of dollars."

2/22 "Aunt -----, Mommy, -----, and I go to the park. I go rides. Aunt ----- buyed me three big balloons. I think up, up, up fly away. Fly to St. Louis.

2/23 I let the phone ring thirteen times because A was sitting about five feet from it and I wanted to see his reaction. There was none. When I hung up, he said, "I heard the phone."

2/26 "How many days I go home to Three Rivers?"

2/29 A saw the flashing lights on a police car and told me he could hear the siren, but the siren was not being used.

3/02 A's speech seems to be getting less inteligible. Whereas I could usually understand him on the first or second try, it now often takes three to five repetitions.

3/04 When I sat at his lunch table, A said, "I heard ----- say you sit here." We had been all of the way across the lunchroom, so even a normally hearing person could not have heard us. I asked him if he had heard or seen her tell me. A said, "I hear her, I not deaf now!"

3/07 When I took his earmold to clean it he said, "It's O.K., I not need that one."

3/10 A was staring off into space so I asked him what he was thinking about. He said, "If your baby be deaf, do not cry. Get baby a ?????? (pointed to the implant) he be not deaf any more.

Date: Entry:

3/12 When I called and gestured for the boys to come in, A did not hear or see me. When I went out to get him, he said, "You talk to my deaf ear (pointed to his right ear.)"

3/16 When A talks on the telephone he talks as if he were a normally hearing child. He knows how to talk for a while, listen, agree with the other person and talk again. This occurs whether or not he is wearing his aid and implant and no matter which ear he holds the phone to. He held this conversation after removing his aid and implant at bedtime.

"Hello Mommy. I come home eight days. I fly on airplane with -----, and big boy."

(pause)

"Uhuh! I be a big boy. Fly by myself."

(pause)

"I come home, Easter Bunny come. I want three big baskets. Lot of candy."

(pause)

"Nooo! I not get sick. I big boy. Eat a lot of candy - not get sick."

(pause)

"Bye Mommy, I love you too."

3/18 "I go home Katie's baby come out? How many days Katie's baby come out?"

3/21 "I go home see Daddy. Daddy happy I not deaf no more."

3/24-
4/04 SPRING BREAK

4/5 "Katie's baby grow BIG! Is baby deaf?"

4/7 "Today is ----- birthday. I buy happy birthday present for -----?"

4/9 "----- cake is a bunny. I like ----- cake. Bunny have long ears."

Date:	Entry:
4/11	"Katie be here when baby come out? Oh, I not see the baby."
4/15	A was about three feet from -----, but he couldn't hear ----- calling his name.
4/17	"Katie like to sing? I hear you sing. Can baby hear when you sing?"
4/20	A took -----'s hand and started across the street without me. When I caught him he said, "I have to help ----- because he deaf and I hear the cars."
4/23	"My bike is a little bit broke. Can you fix it?"
4/25	"I have a lot of dollars in wallet. I buy Mommy present."
4/27	A particularly severe thunderstorm brought questions from all of the boys but A about the noise. The shades were drawn so I know they hadn't seen the lightening.
5/01	A did not hear the warning sirens for the tornado.
5/03	"I finished washed my hands and face. I go dinner now?"
5/04	When I took his earmold to wash it, A said, "You take wash my "new ear" too?"
5/06	Do I need coat? It not cold. It beez warm."

ENDNOTES

1

William F. House, "Continued Implantation of Cochlear Prostheses in Limited Numbers of Postlingually Deaf is Appropriate, 1980, p.21.

2

Sequel, "Grateful Parents Write", Letter to the Editor, Friendly Exchange, Volume 3; no 2, Summer, 1982, p. 2.

3

House, 1980, p.12.

4

House, 1980, p.12.

5

William F. House, et. al., "The Cochlear Implant: Performance of Deaf Patients", Hearing Instruments, vol. 32; no. 9, 1981, p. 13.

6

Laurie S. Eisenburg, "Initial Experience with the Cochlear Implant in Children", Annals of Otology, Rhinology, and Laryngology, Supplement 91, vol. 91, no. 2, p. 71.

7

Gerald R. Popelka and Deborah Gittelman, "Audiologic Findings in a Child with a Cochlear Implant", ASHA, in press, p.1.

BIBLIOGRAPHY

- Eisenberg, Laurie S. "Initial Experience With the Cochlear Implant in Children," Anal. of Otolaryngology, Supplement 91 - vol. 91; no. 2, March-April, 1982
- House, William F. "Continued Implantation of Cochlear Protheses in Limited Numbers of Postlingually Deaf is Appropriate," 1982
- House, William F. et. al. "The Cochlear Implant: Performance of Deaf Patients," Hearing Instruments, vol. 32: no. 9, 1981.
- Popelka, Gerald R. and Deborah Gittelman, "Audiologic Findings in a Child With a Cochlear Implant," ASHA, in press.
- "Sequel: Grateful Parents Write," Friendly Exchange, Summer, 1983
vol. 3: no. 2