

**SIGNED ENGLISH AS A TRANSITIONAL STEP IN THE  
TREATMENT OF A CHILD WITH REYE'S SYNDROME**

by

**G.G. Abkarian**  
Ithaca College

**James P. Dworkin**  
University of Kentucky

and

**Suzanne Reid Brown**  
Ithaca College

**ABSTRACT**

*A case study is presented involving a normally developing child who suffered cessation of productive verbal language following hospitalization for Reye's Syndrome, an increasingly frequent patho-neurologic entity. Implications of a Signed English (SE) training program used as an initial therapeutic strategy and later coupled with verbal language stimulation are discussed. The problems and advantages of using this SE-fading technique for speech-language rehabilitation in a public school setting are explored.*

Reye's syndrome was first identified in 1963 (Reye, Morgan, Baral). An outbreak of over 400 cases was reported, from over 43 states, during the period December 1976 to November, 1977. Males are affected slightly more frequently than females (56% and 44%, respectively) and 93% of those cases identified are white, with an average age of eight years and a range of one to 23 years. The mortality rate is about 40%. Of those who survive, 11% present neurologic sequelae and the remaining do not exhibit recognized complications (Van Caille, Morin, Roy, Goeffroy, McLaughlin, 1977; Corley, Rubin, Hattwick, Noble, Cassidy, 1976; Ruben, Streiff, Neal, Michaels, 1976).

Ordinarily this syndrome develops in a previously healthy child who may be recovering from a viral illness, most notably Type B influenza or chicken pox (Hochber, Nelson, Janzen, 1975; Tang, Siegesmund, Sedmak, Casper, Varma, McCreadie, 1975). Five to 10 days post recovery from the illness, the child may begin to exhibit signs and symptoms associated with five progressive stages of Reye's syndrome (Lovejoy, Smith, Wood, Bresman, Victor, Adams, 1974). In stage one relentless vomiting, lethargy, and sleepiness is exhibited. Liver dysfunction and type 1 EEG may also be identified (Simon, 1974). In stage two, disorientation, delirium, combativeness, hyperventilation, and hyperactive reflexes occur. Liver dysfunction and type 2 EEG are again noted. In stage four, deepening coma, decerebrate rigidity, loss of oculocephalic reflexes, and large fixed pupils occur. Minimal liver dysfunction and type 3 or 4 EEG are noted. In stage five, seizures, loss of deep tendon reflexes, flaccidity, and respiratory arrest occur. Liver function may be normal and type 4 EEG is noted.

It is not usually until late in stage two or early in stage three that the diagnosis of Reye's syndrome is considered. Neurologic damage among those who survive is considered to be closely tied to cerebral edema and the previous comatous state, and accounts for those individuals who survive with neurologic sequelae.

**Case History**

R.V. weighed 7 lbs. 11 oz. at birth and followed a normal developmental history until age 4.8 years when he experienced episodes of influenza and mild pneumonia. Gradually, he

developed signs and symptoms of stages one through four of Reye's syndrome. While in hospital, the disease progressed rapidly, necessitating intracranial decompression and respiratory support. A period of about two months elapsed before his condition stabilized and he was released from hospital. The course of his recovery was initially quite slow. At first, he was unable to sit up or walk and displayed considerable difficulty with fine motor coordination of his hands. These functions slowly improved over the next six months. His communication skills, as described by his physician, were characterized by whispered phonation, multiple articulation errors, and severe dysfluency. In September, 1977, R.V., now six years old, was readmitted to kindergarten and underwent a battery of speech-language and medical tests throughout the following eight months.

### **Speech-Language Testing**

Clinical examination of the speech mechanism and articulation testing revealed signs and symptoms characteristic of mixed, spastic-hypokinetic, dysarthria, chiefly characterized by imprecise production, hypernasal resonance, and hoarse-breathy, monoloudness, and monopitch phonation. Specifically, feature errors in voicing, sibilance, lateral, continuance, and frontness were identified (Kamara and Kamara, 1975). Spontaneous speech was considered severely dysfluent, with a predominance of repetitions of initial sounds and words. Language comprehension was evaluated using tests for auditory comprehension of language (TACL) (Carrow, 1973), assessment of children's language comprehension (ACL) (Foster, et al., 1973), and picture vocabulary (PPVT) recognition (Dunn, 1965). R.V. scored within one standard deviation from the mean on the TACL (22nd percentile) with errors primarily in passive voice and complex syntactical sentences. Though he missed the first two items in the four critical elements section on the ACL, his overall score fell within the normal limits for his age. Picture vocabulary scores were also within normal limits. Non-standardized measures of functional language comprehension supported test data in determining R.V. to be within normal limits for language comprehension.

### **Medical Testing**

Physical examination revealed that height and weight were in the 25th percentile and general appearances of the head, neck, thorax, spine, abdomen, and limbs were normal. Neurological testing revealed mild persistent truncal ataxia and spastic quadriparesis with positive Babinski and negative Romberg signs. No sensory deficits were noted. CAT scans showed marked prominence of the lateral ventricles, but otherwise were negative.

### **Speech-Language Training**

At the start of the school year, September, 1977 (nine months post-trauma), traditional articulation training and language stimulation programs were initiated twice a week, in one half hour blocks. Because R.V. experienced great difficulty with articulatory movements, he was easily frustrated by failures during articulation training, which resulted in his reluctance to cooperate in therapy or communicate with his classmates or relatives. In mid-October, six weeks after therapy was initiated, the speech-language clinician scheduled a meeting with R.V.'s kindergarten and learning disabilities teachers, school psychologist, and parents to discuss the feasibility of an alternative course for his speech-language rehabilitation. The group decided that in view of R.V.'s severe dysfluency and phonatory and articulatory difficulties, a signed English (SE) program would be initiated, portions of which would be taught to the classroom teacher, and all of which would be taught to the parents. From the start, it was not intended that SE should serve in lieu of oral speech, but rather as a transitional step which might provide R.V. with an immediate communicative tool and consequently, reduce his frustrations using verbal language. In order to stimulate as much oral speech production as possible, breathing, phonatory, and articulatory exercises were emphasized throughout the SE training program. A familiar youngster from the classroom was included in the sessions to serve as someone with whom he could communicate directly using SE.

SE training began in late October, 1977, for twice-weekly sessions. Illustrated in the appendix is the sign vocabulary which was felt to be functional for R.V.'s purposes and age. Due to fine motor difficulties of his digits, some signs had to be modified. By February, 1978, both he and his classmate had learned more than 100 signs.

In an effort to extend the environments in which SE could be employed, the speech-language clinician began a once-weekly sign language workshop for the first grade students, teacher, and full-time aide in R.V.'s classroom. Beginning with a discussion of handicapping conditions generally, the many uses and types of non-verbal communication were introduced. Subsequent lessons involved items that were a part of R.V.'s functional sign vocabulary, with 10-15 new signs introduced each week. The classroom teacher reviewed the signs daily.

There were no observable improvements in R.V.'s articulatory skills during the first four months of SE training as revealed by standard articulation testing. However, as he progressed in his use of SE as a primary means of communication, he used vocalizations more freely and with less frustration. It appeared that he used single signs as prompter or starter devices from which to initiate oral speech.

Beginning in December 1977 (12 months post-trauma) and continuing throughout the winter months, R.V. experienced several bouts of pneumonia which disrupted the training program. During this period his efforts to vocalize decreased; he was frequently absent from school, became increasingly frustrated, learned no new signs, and initiated communication with his family only infrequently. After a month hiatus, SE training was re-initiated for R.V. and his classmate in April, 1978. Although he had retained the signs previously learned, his correct use of them was inconsistent. His classmate, however, did not exhibit these same difficulties. As therapy sessions ended in June, 1978, his functional vocabulary approximated 100 signs and he was again coupling verbalizations with signs. A once a week summer training program was instituted with a new clinician who was familiar with the case and with SE, but no discernable progress was made.

In September, 1978, R.V., now seven, entered a regular first grade class and was re-scheduled, without his classmate, for speech-language therapy. After the initial three sessions, wherein those signs previously learned were reviewed, the focus of training was on signs coding emotion (happy, sad, etc.). Voice and tongue exercises and traditional articulation production techniques were also included. By December, 1978, he learned many new signs and used them in conjunction with those he learned earlier for purposive communication.

## DISCUSSION

The cooperation of R.V.'s classroom teacher, aide, classmates, the school administration and the parents of his fellow first graders has greatly enhanced his use of signs and his acceptance into the social activities of the classroom. This peer training procedure also gave him an opportunity to lead the class using signed communication. Additionally, the children in the classroom benefitted in their exposure to and acceptance and understanding of R.V.'s handicapping conditions.

Although R.V. has shown some improvement in gross motor skills such as walking and hand gesturing, he still exhibits poor fine motor control of his articulators, most notably the tongue. During connected discourse this results in poor speech intelligibility. Additionally, he continues to have difficulty with respiratory support for speech, characterized chiefly by reduced length of utterance, episodes of whispered phonation, and prosodic insufficiency.

At the time of this writing (May, 1979), R.V.'s non-verbal vocabulary is almost 150 signs. While he is occasionally able to string three to four signs together to produce acceptable language structure, he most often uses isolated, high information signs to convey his basic needs and desires. However, it is felt that limited manual dexterity, rather than the lack of language development and structure, is primarily responsible for his restricted use of signing.

Speech-language therapy now appears to be at a critical junction for R.V. A decision to continue the expansion of his SE skills could interfere with his willingness and desire to attempt to acquire more traditional (verbal) speech and language skills. The possibility of turning to other non-verbal systems as alternatives to SE may be warranted if R.V.'s manual skills do not continue to improve significantly. However, the decision to introduce yet another communicative system, would have to be carefully weighed and considered. In the interim, in addition to SE, traditional speech-language therapy will be continued with attention focused on control of respiration, voicing, and articulatory competence.

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Requests for reprints should be addressed to James P. Dworkin, Ph.D. Assistant Professor/Director, Program in Speech and Communication Disorders. Department of Special Education, University of Kentucky, Lexington, Kentucky 40506

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**APPENDIX**

**SIGN VOCABULARY**

**I. Nouns**

**A. People**

**1. Family**

mother	grandmother
father	grandfather
sister	brother
baby	

**2. Other associates**

boy	girl
man	woman
teacher	policeman

**B. Toys**

ball	bicycle
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**C. Animals, birds, etc.**

dog	cat
bird	lion
fish	elephant
rabbit	

**D. Food**

apple	banana
milk	pie

**E. Parts of the body**

eye	ear	leg
finger	feet	lips
hand	hair	neck

**F. Objects in the Environment**

bed	bathtub	book
cup	car	chair
comb	glass	scissors
tree	toothbrush	telephone
window	zipper	door

**G. Clothing**

socks	shoes	coat
hat	jacket	

**H. Places**

school	home (house)
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**II. Verbs**

bring	stop	cook
buy	think	hear
eat	open	close
see	wash	sit
read	come	go
sleep	cry	can't
smile	love	

**III. Adjectives**

sorry, happy, sad, good, bad, sick, clean, dirty

IV. Pronouns

I

me

you

we

us

my

who

V. Prepositions

in

out

on

with

without

to

under

above

over

below

through

VI. Adverbs

tomorrow

yesterday