Speech as a Landmark in Development

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THE OLD SAYING "sticks and stones may break my bones but names will never hurt me" is far from the truth. Speech is used to hurt, to conceal, to appeal, to withhold, to teach, to learn, to dream, to endear. An individual's speech may reveal his intelligence, his emotional state, his hearing, his nationality, his creativity, his sincerity, or even his sanity.

Why is it then that the average person knows so little about speech—its development, its physiology, its disorders? Perhaps it is because the study of speech production and speech disorders is of recent origin, particularly in this country. The field of speech pathology was formalized as a university course of study only about 40 years ago.

Although we have learned much about speech and its disorders, we are still babes-in-the-woods insofar as our knowledge of intellect and emotions is concerned. Many hundreds of years have elapsed since the Greek, Demosthenes, placed pebbles in his mouth and thus distracted himself into improved speech fluency. Yet, we continue to flounder in our attempts to help the stutterer (or stammerer).

Let us examine this complex phenomenon called speech and discover how it might come to us—or fail to come.

Children may fail to speak because their brains failed to develop thought, their auditory senses disallow imitation, the mechanical parts cannot work together, or their psyches have been isolated or have elected to reject speech or its teachers.

Each child comes to the world with his individual constitutional potential, coupled with whatever prenatal influences have acted upon it. At this point, many youngsters bear seeds of speech and language disorders. Three percent of our children are mentally retarded, another 22 percent are below the normal IQ of 90 (*1*). By our definition of intelligence and means of testing it, language is the great separator.

It is said that talking is perhaps the most complex neuromuscular function of man. As a complex neuromuscular act, speech requires an intact, highly integrated neural system for satisfactory articulation, in addition to the need for learning the syntax of language.

Deafness or severe hearing loss is said to be present in 0.5 percent of preschool children (*2*). Cleft lip and palate occurs once in every 617 live births in Oregon (*3*). These causes of speech disorders, along with others, are obvious. What to do about them is not.

The newborn infant is an active, noisy being. A weak birth cry, failure to cry, or subsequent undue quietness—the so-called good baby—may be early evidence of many childhood disorders, including speech and language defects.

No child expresses more than he comprehends except in parrot-fashion, as the mongoloid. Even you and I understand more words and recognize greater eloquence than we ourselves are able to use. So it is not surprising that we find expression lagging behind comprehension throughout development. It behooves us not to forget in practice that a child's mental age is a basic determiner of his speech and language age and that a mentally retarded child's speech development may frequently be at least a year

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behind his mental age and may be expected to be well behind the speech development of children with normal intelligence.

Parents of retarded children often indicate that they know their child would be all right if he could just talk. We must help them to understand that poor speech is basic to, and an integral part of, the intellectual impairment.

Expected Development

The happy, normally developing infant of 6 months sounds happy. He makes playful noises during much of the time he is awake. His "goos" and squeals have already begun to shift from vowel-like utterances to consonant sounds, which will increase as chains of babbling. By 9 months he may imitate environmental sounds and will understand "no no" and play "pat-a-cake" before his first birthday (*4*). The quiet 1-year-old who has not yet babbled is suspect. By the 12th month most infants have started to use their first words.

The skilled speech diagnostician can readily evaluate the language age of the 1-year-old. Whereas most parents do not consider their children as having "started to talk" before 18 months, we can see that the 1-year-old already has progressed through the birth cry and vegetative sounds of comfort and discomfort, has quieted to external noise, and progressed through random vocalization to sounds of self-stimulation. He first has utilized the neutral vowels, moving steadily from back to front vowels with frequent pitch variation. Smiling, reaching toward extended arms, shaking the head, and eventually waving "bye bye" show social responsiveness. Localization of sound, endless strings of syllables, laughing, attention to facial movements, and imitation of sounds all constitute the preamble to consistent use of the first word (*4*).

The communication instinct appears so strong that speech needs overcome life's casual insults and forge on to adequacy, seemingly not so much because of the environment, but almost in spite of it, though speech nonfluency and stuttering may be exceptions. My impression is that language and articulation disorders are principally the result of normal variations in development, mental retardation, neurological deficit, severe hearing impairment, aggravated psychic disturbance, and serious oral structural defects. Note that this rules out high palate, tongue tie, "laziness," "siblings talk for him," "he doesn't have to talk because everyone waits on him," "his brother was born when he started to talk," and all of the other intuitive guesses often stated but seldom strengthened by objective evidence. One should not say that such causes are not possible, but I believe they are rare.

The compensatory throat constriction in many postoperative cleft palate children is evidence of the physiological struggle for normal speech. Hard of hearing children learn lip-reading on their own. I have seen two children with Mobius syndrome, including paralysis or weakness of facial musculature, compensate for lip sounds with their tongues as well as might any ventriloquist. Another little girl had such a tiny, deformed tongue (oral-facial-digital syndrome) that one would think she could not reach the upper gum ridge with her tongue tip. This youngster compensated on her own to such an extent that the entire soft tissue floor of her mouth elevated as the tongue reached the gum ridge behind the upper teeth. In order to make this magnificent compensation the base of the tongue raised the hyoid bone, which elevated the larynx and changed vocal pitch slightly every time a tongue-tip sound was made.

Let us return to the developing child of 18 months, who carries out very simple instructions and is capable of pointing to about three body parts upon request. He uses 10 to 20 words and still exhibits considerable jargon or "jabbering." The word "no" becomes an important part of his vocabulary as he establishes his feelings of self and shows his drive for more independence through negativism (*5*).

Children of age 2 who have not yet used their first word are candidates for formal evaluation regarding their developmental status. At this age, children usually have begun to place 2 words together and may have a vocabulary of 50 to 250 words (*4*).

When a child is delayed in reaching physical landmarks of development, such as sitting and walking, we can expect him to be delayed in speech onset. Children learn only a few words between 12 and 18 months. They generally tend

to concentrate on one skill at a time, and the struggle for walking posture and balance apparently leaves little time for speech expression.

We should be concerned about the 3-year-old who does not put two words together. In fact, it is a good plan to seek developmental evaluation for any child whose language shows a delay in development of 1 year or more.

At 3 years the average child uses simple sentences half of the time during his speech discourse. This develops from the consistent use of two- and three-word phrases at age 2½ (*4*). He can explain action shown in pictures, for example, "The baby is sleeping." He knows his own sex, "boy" or "girl," and is capable of carrying out two unrelated commands (*5*).

Taking the History

When questioning a parent about the onset of baby's first words and about vocabulary development, it is important to define the terms. A word is any sound used consistently to mean something, regardless of how understandable it might be by usual standards. Often when a mother anxiously reports that her child has not "started to talk," careful interviewing reveals that the child may have 10 to 20 words. This may constitute a misunderstanding of what should be expected of a child at a given age. We might be able to inform such a parent that her child's language is developing satisfactorily, but that his articulation is not as clear as that of most children his age. Language is a far more basic indicator of development than is articulation.

When interviewing the parent who is concerned about her young child's "failure to talk" it is usually good policy to name various baby words in order to help her to remember. Ask about words or sounds for parents, siblings, pets, clothing, toilet, food, and drink. Inquire about the use of car, bye bye, nite nite, no, oh, see, and so forth. When asking if the child has begun to put words together, give examples such as "down, mama," "bye bye, car," "daddy, home." If you can establish that the child jabbers (uses jargon) a lot, you have a firm clue that expression is between 14 and 21 months.

The parent who says her child learned mama and dada at 6 to 9 months is probably reporting babbling rather than words, since these sounds are most commonly used in babbling. The same may be true of an 18- to 24-month-old child who shows delayed speech. The parent may mistakenly report that the child said the words, mama or dada, at 12 months, or 18 months, and then "quit talking." This might be late babbling and would be evidence of slow acquisition of speech skills. Caution is thus required by the interviewer, as is knowledge regarding speech maturation, so that he does not mistakenly use historical information to "prove" that speech development stopped because of such events as the birth of a younger child.

Speech Nonfluency

Stuttering or speech nonfluency in children frequently begins between ages 2 and 5. This may vary from simple easy repetitions to severe struggle behavior associated with talking. It is important to note the many burdens, responsibilities, restrictions, and frustrations which are the lot of young children. They must share their parents with siblings, learn toilet control, keep hands off untouchables, be polite and neat, show respect for parents, show off in front of guests, be quiet, speak up, not cry, fight back, share toys, eat a big meal, stop sucking thumb, not argue. Speech itself is a means of social-emotional contact between people and these contacts may entail anger, fear, guilt, excitement, and so forth. When a child's vocabulary is incomplete, his neuromuscular control tenuous, and his emotional stability is limited, nonfluency of speech or stuttering may occur.

Frequently a child who is seen for the complaint of stuttering turns out to be a slowly maturing child or one who is intellectually slow. In such a case, the parents may unduly pressure the child to achieve beyond his capacity. The parents may unconsciously react to the child's slowness by trying to force him to prove he is not "slow."

Excessive speech nonfluency in young children is generally thought to be symptomatic of frustration or continuing anxiety (*6*). This might helpfully be approached through a series of parent conferences during which child-rearing practices are explored and, hopefully, modified if this seems indicated. Care should be used by parents not to penalize the child's nonfluency by constantly correcting his speech.

I recall an unusual set of circumstances which possibly precipitated stuttering in a 3-year-old boy. His grandparents raised him, for the most part, until 18 months of age because his father was in the armed services and his mother worked. When he was 18 months old, he and his mother moved across the country to join the father. This separation from the grandmother seemed to be traumatizing for the boy, as did two subsequent visits by the grandparents. Just before his third birthday, the youngster and his younger sibling showed no significant problems. They slept in one room, had a separate room in which to play and romped outdoors a great deal. Shortly thereafter the father was discharged from the army and the grandparents met the parents at the army base in California. They returned to Oregon in two separate cars—the 3-year-old riding with the grandparents and the younger sibling in the parents' car. Upon arrival in Portland, the parents moved into the small two-bedroom home of the grandparents while the reportedly frustrated father searched for a job. The young sibling slept in the parents' bedroom and the patient slept in his grandparents' bedroom. The weather was rainy and grandmother's rules were more restrictive than the children were used to. Within 10 days after arrival in Portland the 3-year-old began to stutter. He frequently reported to his mother that he loved his grandmother but that "you are really my mother."

Many related causative factors could have been operating in this case. Possibly the strongest, as suggested by the boy's statements to his mother, was the conflict of loyalties that he must have felt. Not only might he have been in conflict regarding choice of parents, but there was the additional possibility of losing his natural parents to the younger sibling who slept in their bedroom. This is merely one example of conflict in speech development (stuttering).

Speech Maturation

By age 4 children use conversational-style speech and generally their articulation is completely understandable. This does not mean that they are expected to produce all of the consonants correctly, but their errors do not generally interfere with intelligibility (*7*).

It is not until 6 years of age that most children have the consonant sounds correct. These 25 sounds develop in a fairly specific order, depending upon the complexity of neuromuscular coordination required, and can be studied in the individual child to estimate his age of speech maturation. Easy sounds like m, b, p, w, h are learned by 2 years. Then n, d, t, k, g, ng, and y, learned by 3 years and sh, ch, j, zh at about age 4. The last, or late-developing sounds, are learned at 5, 6, and 7 years of age and come in this approximate order: f, v, l, s, z, r, wh, th, and voiced th (*6*).

Approximately 12 percent of first graders make errors of articulation. In general, many of these children improve without any special help. In schools where no special help is given the percent of children with articulation errors in the second grade has dropped to 7 or 8 percent, and in the third grade to 4 percent (*8*). The difficulty, of course, for the speech specialist is to determine which children are not likely to improve without special help.

Many speech clinicians do not work with any first or second graders unless they show obvious signs of organic impairment, such as cleft palate. Children having articulation disorders at 10 years of age usually do not improve without special help because the speech maturation period is over.

An interesting aspect of oral physiology, which relates to sucking, chewing, swallowing, and to speech, is the apparent progressive maturation of tongue movements and of musculature surrounding the tongue. The young infant makes sucking movements with the lips and tongue. That is, the lips are very active in early feeding and the tongue moves largely in an anterior-posterior direction. In fact, the small size of the mouth and the large size of the tongue permit little other than a pistonlike front and back movement.

As the mouth enlarges, teeth erupt, and solid foods become the principal diet, sucking slowly changes. A more elevated tongue-tip position becomes evident. The food bolus is swept back by peristalticlike tongue movement. The lips become less and less active in swallowing and the muscles of mastication become more active. One extensive study (*9*) has shown that about 50 percent of first graders still show signs of

this suckinglike oral physiology. If the lip seal is broken (lips pulled apart rapidly) during swallow, frequently the tongue tip can be seen protruding between the teeth of these children.

Most children progress to the more mature molars-together swallow. Some retain the less mature pattern. The cause of this is in dispute but an unusually large percent of cerebral palsied children retain the infantile swallow. These children are more likely to retain certain speech errors and to develop dental malocclusions. This abnormal swallow is frequently referred to as "tongue thrust." The progress of the swallow can provide information regarding maturation in some children with speech disorders.

Summary

I have attempted to demonstrate how observations of children's speech and language development may serve as valuable indicators of their general physical, intellectual, and emotional progress. Speech lag or breakdown may corroborate other suspect areas of development or may point the way to them. Speech and language disorders seldom originate in the mouth. Ideas must precede speech, and speech is a direct correlate of intelligence.

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Construction Grants for Educational Facilities

Under Public Health Service programs for the health professions, 21 construction grants totaling $37,971,897 were recently approved for 15 educational facilities.

Seventeen grants totaling $32,750,197 were awarded under the Health Professions Educational Assistance Act of 1963, and 4 grants totaling $5,221,700 were made under the health research facilities construction program begun in 1956.

Approximately $20.9 million will go to 6 medical schools: University of Hawaii, Honolulu; University of Arizona, Tucson; Washington University, St. Louis, Mo.; Boston University, Boston, Mass.; University of North Carolina, Chapel Hill; and University of Miami, Fla.

Nearly $11 million has been awarded to 4 dental schools: University of North Carolina, Chapel Hill; Loyola University, Chicago, Ill.; Georgetown University, Washington, D.C.; and Western Reserve University, Cleveland, Ohio.

Four nursing schools will receive $3.2 million. They are Ball State University, Muncie, Ind.; Murray State College, Murray, Ky.; University of Cincinnati, Ohio; and Dillard University, New Orleans, La. Pharmacy schools at the University of the Pacific, Stockton, Calif., and at the University of Illinois, Chicago, will receive $2.2 million. A grant of $735,000 has been awarded to the new school of public health at the University of Hawaii, Honolulu.

Upon completion of construction, the schools can accommodate the following additional enrollment increases in entering classes: medicine, 185; nursing, 216; pharmacy, 137; dental, 77; and public health, 35.