A MEDICAL APPROACH TO LANGUAGE DELAY

Communication is central to the personal development, social interaction and learning of a child.

L JACKLIN

MB ChB, MMed (Paed), FCP (Paed), MSc Child Health (Neurodevelopment)

Principal Specialist (Paediatrician)

Department of Paediatrics

Johannesburg Hospital and

Memorial Institute for Child Health and Development

Johannesburg

Lorna Jacklin is a registered neurodevelopmental paediatrician. Her interest in child development extends into childhood disabilities, particularly the child with a visual impairment, and the interaction between child abuse and developmental delay.

Speech, writing, art and body and sign language are all methods of communication. Because communication is central to the development of a child, failure of a child to speak by the age of 2 years should be taken seriously. Language problems interfere with a child's ability to communicate effectively, both in the expression and understanding of ideas. The outcome of such a delay may have widespread results ranging from academic to social problems.

The evaluation of speech development in a child requires a range of skills embodied in different specialists, making a team approach appropriate. Doctors need to understand the terminology used by speech therapists in order to facilitate communication between team members. As language delay may be associated with a wide variety of medical conditions and developmental problems the doctor plays an important role in the team.

Boys are more likely to suffer from language problems. As there is also a strong genetic predisposition, the presence of a family history is a useful indicator of the course the delay will follow. The prevalence of language delay is 7 - 10% and it is the most common developmental problem in preschool children. Although the speech problem may decrease with age, language delay frequently persists as an educational or social problem.[1]

NORMAL LANGUAGE DEVELOPMENT

The doctor needs to understand normal communication milestones and language patterns (Table I). This will assist in detecting deviant language and in assessing the seriousness of the problem. Parents, on the other hand, usually compare the child to a peer or sibling as a guide to normal language development. Fig. 1 shows the normal speech and language pathway as described by Reynell in 1969.[1]

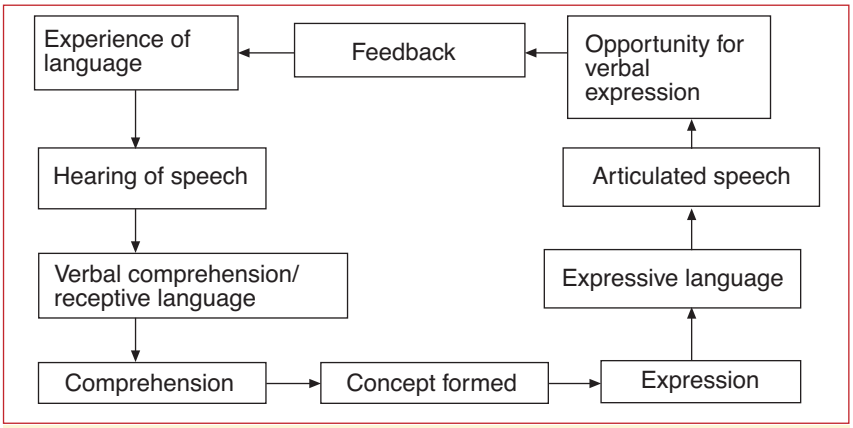

Fig. 1. Pathway for normal speech and language development.

Table I. **Linguistic and auditory milestones**

Language milestone	Age (months)	Language milestone	Age (months)
Alerting	1	Two words	12
Social smile	1½	Three words	14
Cooing	3	One-step command (without gestures)	15
Orient to voice	4	Four to six words	15
Orient to bell (I)	5	Immature jargoning	15
'Ah-goo'	5	Seven to 20 words	18
Razzing	5	Mature jargoning	18
Babbling	6	One body part	18
Orient to bell (II)	7	Three body parts	21
'Dada/mama' (inappropriately)	8	Two-word combinations	21
Gesture	9	Five body parts	23
Orient to bell (III)	10	50 words	24
'Dada/mama' (appropriately)	10	Two-word sentences (noun-pronoun	24
One word	11	inappropriately and verb)	
One-step command (with gesture)	12	Pronouns (I, me, you, inappropriately)	24

Source: Capute AJ, Accardo PJ. Linguistic and auditory milestones during the first two years of life. Clin Pediatr 1978; **17:** 847.

Table II. **Landmarks in the development of communicative skills during the first 15 months of life[1] (Extract)**

Month	Sound production	Auditory perception	Communication
0 - 1	Reflexive sound production: cry, discomfort sounds, vegetative sounds. These sounds are either vocalic or consonantal. Pain and hunger cries are differentiated in first week	Responses to instrumental music and speech are differentiated. Responses show preference for human speech. Ability to turn head in horizontal plane to sound source in immediate vicinity is present	Infant links mother's voice with her face and is comforted when crying by her voice. Infant responds differently to infant crying and to adult speech. Infant stares intently at faces
2 - 3	Consonantal sounds are produced at the back of the mouth. Brief consonantal elements are superimposed upon vocalic sounds	Sucking and heart rate responses indicate discrimination of different CV syllables (ba v. da; da v. ta)	Social smiling and cooing vocalisations appear. Infant is attentive to nodding, smiling adult and is likely to vocalise in response to adult. Turn-taking is managed chiefly by adults; mother and infant may vocalise in chorus

The speech of 5-year-old children is usually fluent; they are able to express themselves adequately and understand what is said in the everyday context. From this age speech will increase in complexity until adulthood. The rate and extent of speech development is widely variable. Some children with delayed speech will catch up while others require intervention. The challenge is to decide when to intervene. Factors to consider when a child has a developmental delay are the familial pattern of language development, environmental factors and the ability to hear. Significant language delay in a child with normal hearing is a predictor of a learning disability, and such children should be referred to a speech and language therapist for evaluation and intervention (Table I).

Language milestones in infancy

In the infant language is the interaction between information received by a variety of means, e.g. vision, hearing and touch, and the response of the infant to the information. This is a social interaction. The development of communication can therefore be divided into 3 areas, namely production, understanding and communication (Table II). Delayed production but good understanding and communication would have a better prognosis than a delay in all areas.[1]

Sound production is dependent on motor control of the oral structures such as the tongue, palate and jaw. Movement of the oral muscles has to

Because communication is central to the development of a child, failure of a child to speak by the age of 2 years should be taken seriously.

The prevalence of language delay is 7 - 10% and it is the most common developmental problem in preschool children.

The speech of 5-year-old children is usually fluent; they are able to express themselves adequately and understand what is said in the everyday context.

Children with language difficulties may demonstrate problems in self-regulation and are easily frustrated, impulsive and inattentive when activities related to language are involved.

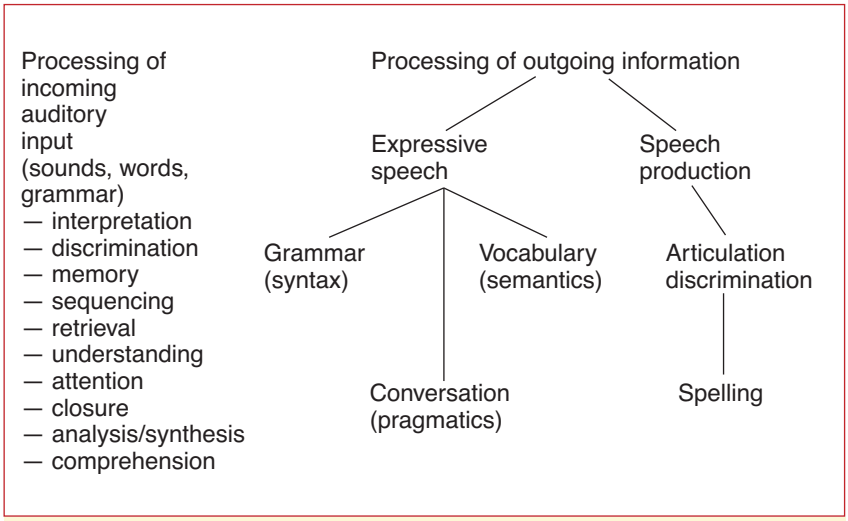

Fig. 2. Areas where problems may arise in children with severe speech/language impairment.

be co-ordinated with breathing and the larynx. The resulting pitch, hardness and timing of speech are referred to as prosody.

The understanding of speech develops from an awareness of the rhythm, pitch, intensity and content of adult speech and the ability to discriminate sounds. An infant will respond to this aspect of speech long before understanding develops.

Communication behaviour in the infant is seen as responsiveness to others and awareness of the response of others, as shown in vocal play behaviour between mothers and their babies. Infants soon learn that they are able to influence interaction and to make demands on the adult. Observation of these three aspects of communication will give an indication of the seriousness of the problem. An infant showing a delay in all areas will have a worse prognosis than one with a delay in one area only.

Language acquisition in the second year

In the second year language starts with sounds, later replaced with real words, accompanied by gestures. There is a rapid growth in vocabulary to about 50 words. Speech starts as single-word utterances, progressing to multi-word phrases with a single meaning ('out the door' meaning 'out') or multi-word with multi-function, e.g. 'me — go — bye-bye'. Sentences will consist of a content word, e.g. baby, and a function word which expresses relations, e.g. go, sleep, my, etc. The method of production and the use of gesture vary from child to child. Language can be described by its form, content and use. Increasing complexity occurs with the development of grammatical form. The form of the sentence is referred to as syntax, i.e. grammar. This is the structure of the sentence, which in English is dependent on word order, and the endings of words (pleural, possessives, tenses). The early understanding of speech is situational, e.g. 'give me the cup?' when the child is sitting at the meal table. This request is usually accompanied by gesture to assist understanding. Parents naturally accommodate the communication needs of a child by simplifying and slowing their speech. The meaning attached to a word is referred to as semantics.[2]

The use of speech to communicate in the social context is termed pragmatics. The child learns how to use speech to establish and maintain social interest. This is done by linking utterances to the needs of the partner. The child is aware of the need to sustain a topic. This is achieved by turn taking. Language is modified to the context, e.g. more or less formal depending on the social context. The child shows an awareness that language can be used to influence others. In summary the child learns to have a conversation.

The requirements for language acquisition are the following:

- Normal hearing, necessary to develop the ability to perceive the elements of speech and to discriminate between sounds.
- Normal speech motor abilities and normal hearing, necessary for the child to monitor the production of sounds.
- An environment where a child is exposed to speech and is encouraged to express him/herself will support the learning of speech. Language and cognitive development are closely related.
- Language must be learnt in an environment that allows speech to develop as a means of social interaction.

See Table III for referral guidelines.

Table III. **Guidelines for referral of an infant for audiology, speech-language or psychological evaluation**

Interaction-communication	Expression-production
Excessive crying after 3 months of age Lack of crying, or crying perceived as abnormal in infancy Lack of eye contact or smiling after 3 months of age Lack of cooing vocalisations or response to smiling at adults from 3 to 6 months of age Expressions of dislike at being held (squirming, crying, consistent tenseness relieved by placing child in infant seat) in first 6 months Failure of appearance of laughter or lack of laughter in interactive situations by 6 months of age Failure to respond in interactive peek-a-boo and patty cake games by 1 year of age Failure to indicate communicative intention non-verbally by 1 year of age	Failure to produce any consonantal sounds (raspberries, nasals, and stops) in the first year of life Failure to produce consonantal sounds towards front of mouth in second 6 months of life Failure to produce high front /v/, back /a/, and rounded vowels /u/ by 15 months of age Failure to produce prolonged vocalic or consonantal sounds, to combine primitive consonantal and vocalic elements in a single segment, or to produce series of segments or syllables in non-cry in the first 12 months of life Failure to produce reduplicated babbling by 9 - 10 months of age Lack or use of an excessive amount of expressive jargon after 18 months of age Failure to produce recognisable words by age 2 Failure to use several recognisable two-word combinations that combine two ideas by age 2 years, e.g. 'more juice' Lack of multi-word utterances (phrases, sentences) by age 3 Lack of intelligible speech by age 3 Many initial consonants omitted at age 3. Lack of final consonants by age 4 Continuing substitution of easy sounds for more difficult sounds after age 5 Persisting faults of speech articulation after age 7 Decrease in amount of speech produced, instead of steady increase, at any age from 3 to 7 years Sentences that are poorly formed, confused, marked by word reversals or telegraphic style by age 4 (dialectal variations not to be considered in this category) Noticeable stuttering or other types of abnormality of rhythm or rate (rapid speech, cluttering) after age 4 Monotonous, unusually loud, hoarse, harsh, or inaudible voice Pitch that is not appropriate to child's age and sex Noticeable hypernasality or lack of normal resonance Embarrassment or disturbed feelings about speech on the part of the child at any age
Reception-comprehension	
Failure to respond to environmental sounds Failure to quiet to mother's voice when infant is fussing or crying and when mother is out of immediate line of sight and not in contact with infant Difficulty in localising a sound source correctly after 9 - 12 months Failure to respond to voices of family members in the second 6 months of life when they return after an absence and are still out of immediate line of sight and not in contact with infant Failure to understand common words or commands by age 18 months Failure to indicate 1 or 2 familiar objects or people when these are named with gesture in the second year of life Failure to indicate 1 or 2 familiar objects or people when these are named (without accompanying gesture towards or gaze at object-person) early in the third year of life Failure to understand simple discussions of past or future events by age 3 years Report that a child does not understand what is said, 'takes no notice' of what is said, or 'takes a long time to catch on' to what is said in the third year of life	

DISORDERS OF COMMUNICATION

Disorders of communication can be due to abnormalities in expressive speech, receptive speech or both together (Fig. 2).

DISORDERS OF EXPRESSIVE SPEECH

Disorders of resonance

There are due to interrupted oronasal sound balance, caused by anatomical abnormality of the palate, velum or pharynx, resulting in hyponasal or hypernasal speech. Referral to an ENT specialist, speech pathologist, or dentist is recommended.

Voice disorder

The voice may be abnormal in quality, pitch or loudness. This may be caused by damage to the vocal cords or by allergy, or it may be neurogenic or psychogenic in origin. In most cases, independent of the aetiology, voice training will be necessary as part of the management. Referral to an ENT specialist, speech therapist, neurologist and/or psychologist may be necessary.

Disorders of fluency

Fluency is dependent on the rate and rhythm of speech. Dysfluency is common between 2 and 4 years and may progress into later life. Early referral is needed to determine the nature of the problem and underlying factors. It is important to provide the parents with guidance on how to handle the problem and to monitor progress.

Disorders of articulation

This is a disorder in sound production, i.e. consonants and vowels. Sound production is a learnt auditory motor act, which requires both hearing and production. It requires intact oral, nasal and laryngeal co-ordination. Sounds are refined into grammatical forms. Speech sounds are complete by 8 years. There is a variable rate of acquisition. Articulation errors include substitution, omission, distortion or addition. Causes of poor articulation are heterogeneous and include:

- hearing impairment
- structural abnormalities of the oral cavity, jaw, palate
- neurological problems — central or peripheral, e.g. difficulties with co-ordination, weakness or paralysis of the vocal cords
- central nervous system problems — may cause an abnormality of volition. These children have a normal capacity for movement but lack the capacity to sequence the sounds into speech.

Management of expressive speech disorders

Children with a mild or moderate disorder respond to traditional speech therapy. Severe disorders of communication require augmentative communication techniques such as boards (Bliss Board), charts, sign language (Makaton), and computer-assisted communication systems. A thorough evaluation of the child, environment and financial constraints is needed before a decision on the form of assistance can be made.

LANGUAGE DISABILITY

This is a heterogeneous group of disorders characterised by deficits in comprehension, production and use of language. The aetiologies range from hearing impairment, mental retardation, to pervasive developmental disorder. All children who present with a language delay should have a hearing assessment. Problems in comprehension of language refer to difficulty in understanding the spoken language. These children present with difficulty in understanding:

- words and relationship expressed by a word, e.g. his, hers
- sentences with different grammatical structures and lengths
- social conversations, idioms, humour, explanations
- stories and lectures.

Evaluation by a speech therapist would involve an assessment of all these areas of difficulty measured against the age expectations for the child. Children who have difficulties in comprehension may also have expressive language difficulties. Expressive language is the means of representing thoughts and self in a social context. Deficits are manifest by difficulties in age-appropriate syntax, morphology, word-finding and ability to comment in story-form or conversation.

To assess expressive language the following are looked at:

- analysis of the topic
- context of communication
- intent of the child
- principal means of communication
- relationships expressed by the child
- sentence-building skills
- word-finding abilities
- appropriateness of the sentence
- organisation of narrative in conversation.

Parents complain that their children have difficulty expressing ideas in words or that they are unable to follow the child's conversation. The child does not speak like other children and becomes frustrated if not understood, and refuses to repeat. These children do not speak much and prefer to do things for themselves, or will use gestures to communicate. They frequently exhibit tantrums or difficulty in control.

Management of language delay

Therapy includes programmes that improve the cognitive forms represented in language. A modified teaching environment may be necessary which provides for organisation and language modification. Individual therapy will begin with what the child knows and proceed developmentally, assisting the child in acquiring new and appropriate strategies to facilitate the production of language consistent with age, and academic and social needs.

PSYCHOLOGICAL ASPECTS OF LANGUAGE

Specific language impairment refers to a child who has normal hearing, normal cognitive function in certain areas, normal social interaction and no emotional cause for language delay. The diagnosis of a specific language disability is based on the assumption of normal intelligence. Most of the intelligence tests rely on language to determine intellectual functioning. This places language-disabled children at a disadvantage. These children will do better in the non-verbal scales of such tests. It is therefore recommended that tests which rely less heavily on language, such as the CASS or Hisky-Nebraska Test of Learning Aptitude, be used.

Children with language difficulties may demonstrate problems in self-regulation and are easily frustrated, impulsive and inattentive when activities related to language are involved. These children struggle with aggression. This and poor communication lead to difficulty with peer relationships. These children are therefore at risk for psychiatric disorders including anxiety and behavioural problems. Such problems frequently persist as self-regulation and academic problems.[2] Referral is recommended for a hearing test, to a speech therapist, and to a psychologist.

WHAT ROLE COULD A DOCTOR PLAY IN PROMOTING LANGUAGE DEVELOPMENT IN THE COMMUNITY?

There is a strong association between early language skills and academic performance. It is therefore important not only that early language delays be identified and remediated, but that there is active prevention of language delay. Factors that have been associated with good language development

and subsequent good academic outcomes are good parent-child interaction and a good language environment.[3-5] It is therefore the responsibility of the medical practitioner to encourage parents to spend time talking to their children. The traditional bedtime story does much to encourage both bonding and an opportunity for language development. The 'television culture' does little to encourage good language. Retaining the tradition of eating around the dinner table has many elements that encourage both good communication and emotional stability.

References available on request.

IN A NUTSHELL

Communication is central to the personal development, social interaction and learning ability of a child.

Development of communication can therefore be divided into 3 areas, namely production, understanding and communication.

A team should do the evaluation of a child who fails to communicate.

To play a meaningful role in the team it is important that the doctor understands the terminology used by speech therapists.

Language delay may be associated with a wide variety of medical conditions and developmental problems.

A doctor must have some idea of normal communication milestones and language patterns.

There is wide variability in the rate and extent of speech development.

Factors to consider when a child has a developmental delay are the familial pattern of language development, environmental factors and ability to hear.

Significant language delay in a child who has normal hearing is a predictor of a learning disability and such children should be referred to a speech and language therapist for evaluation and intervention.