

## REVIEW ARTICLE

# Speech and language delay in children: A review and the role of a pediatric dentist

### Abstract

Speech and language development is a useful indicator of a child's overall development and cognitive ability. Identification of children at a risk for developmental delay or related problems may lead to intervention and assistance at a young age, when the chances for improvement are the best. This rationale supports screening of preschool children for speech and language delay or primary language impairment or disorder, which needs to be integrated into routine developmental surveillance practices of clinicians caring for children.

### Key words

Early intervention, identification, language delay, speech delay

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## Introduction

Speech and language development in children is a dynamic process. Speech refers to the mechanics of oral communication or the motor act of communicating by articulating verbal expressions. Language encompasses the understanding, processing, and production of communication. Several types of speech and language delay and disorders have been described, although the terms used to describe them vary.<sup>[1]</sup> Speech problems include stuttering or dysfluency, articulation disorders, or unusual voice quality. Expressive language delay may exist without receptive language delay, but they often co-occur in children. Some children may also have disordered language. These language problems can involve difficulty with grammar (syntax), words or vocabulary (semantics), the rules and system for speech sound production (phonology), units of word meaning (morphology), and the use of language particularly in social contexts (pragmatics). Speech and language problems can exist together or separately.<sup>[2]</sup>

In general, a child is considered to have a speech delay if the child's speech is significantly below

the norm for children of the same age. A child with speech delay has speech development that is typical of normally developing child of a younger chronologic age, the delayed child's skills are acquired in a normal sequence, but at a rate slower than normal.<sup>[3]</sup> Children, 5 years of age or younger whose speech and language delays are untreated may exhibit diminished reading skills, poor verbal and spelling skills, behavior problems, and impaired psychosocial adjustment. This can lead to the overall academic underachievement and a lower IQ that may persist into young adulthood.<sup>[4]</sup> Thus, screening and identification of a speech delay can lead to early intervention and therapy. In this review article, we will discuss the etiology of speech delay in children, screening tests, management, and the role of the pediatric dentist in the diagnosis and referral for further intervention and treatment.

## Normal Speech Development

The mechanism of speech production is composed of four processes.<sup>[5]</sup>

1. Language processing: in which the content of an utterance is converted into phonemic symbols in the brain language centre.
2. Generation of motor commands to the vocal organs in the brain motor centre.
3. Articulatory movement for production of speech by the vocal organs based on these motor commands.
4. Emission of air sent from the lungs in the form of speech.

To determine if a child has a speech delay, the physician must have a basic knowledge of speech milestones. Normal speech progresses through stages of cooing, babbling, echolalia, jargon, words and word combinations, and sentence formation. The normal pattern of speech development is shown in Table 1.<sup>[6]</sup>

## Epidemiology

Exact figures that would document the prevalence of speech delay in children are difficult to obtain because of confused terminology, differences in diagnostic criteria, unreliability of unconfirmed parental observations, lack of reliable diagnostic procedures, and methodological problems in sampling and data retrieval. It can be said, however, that speech delay is a common childhood problem that affects 3% to 10% of children.<sup>[7]</sup> The

disorder is three to four times more common in boys than in girls.<sup>[8-10]</sup>

## Etiology

Speech delay may be a manifestation of numerous disorders.

### Causes of speech delay

#### Mental retardation

Mental retardation is the most common cause of speech delay, accounting for more than 50% of cases<sup>[11]</sup> a mentally retarded child demonstrates global language delay and also has delayed auditory comprehension and delayed use of gestures. In general, the more severe the mental retardation, the slower the acquisition of communicative speech.<sup>[12]</sup>

#### Hearing loss

Intact hearing in the first few years of life is vital to language and speech development. Hearing loss at an early stage of development may lead to profound speech delay.<sup>[13]</sup> Hearing loss may be conductive or sensorineural conductive loss is commonly caused by otitis media with effusion, malformations of the middle ear structures and atresia of the external auditory canal.<sup>[14,15]</sup> Sensorineural hearing loss may result from intrauterine infection, Kernicterus, ototoxic drugs, bacterial meningitis, hypoxia, intracranial hemorrhage, certain syndromes (e.g., Pendred syndrome, Waardenburg syndrome, Usher syndrome and chromosomal abnormalities (e.g., trisomy syndromes).

#### Maturation delay

Maturation delay (developmental language delay) accounts for a considerable percentage of late talkers. In this condition, a delay occurs in the maturation of the central neurologic process required to produce speech.<sup>[16]</sup> The condition is more common in boys, and a family history of "late bloomers" is often present. The prognosis for these children is extremely good and they usually have normal speech development by the age of school entry.

#### Expressive language disorder

Children with an expressive language disorder (developmental expressive aphasia) fail to develop the use of speech at the usual age. These children have normal intelligence, normal hearing, good emotional relationships, and normal articulation skills. The

**Table 1: Normal pattern of speech development**

Age of the child	Achievement
1 to 6 months	Coo in response to voice
6 to 9 months	Babbling
10 to 11 months	Imitation of sounds; says "mama/dada without meaning
12 months	Says 'mama/dada 'with meaning , often imitates two and three syllable words
13 to 15 months	Vocabulary of four to seven words in addition to jargon, <20% of speech is understood by strangers
16 to 18 months	Vocabulary of ten words, some echolalia and extensive jargon; 20% to 25% speech understood by strangers
19–21 months	Vocabulary of 20 words, 50% speech understood by strangers
22 to 24 months	Vocabulary >50 words, two word phrases, dropping out of jargon, 60-70% of speech is understood by the strangers
2-2.5 years	Vocabulary of 400 words, including names, two-three word phrases, use of pronouns, diminishing echolalia, 75% of speech understood by strangers
2.5-3 years	Use of plurals and past tense, knows age and sex; counts three objects correctly, three to five words per sentence, 80-90% of speech understood by strangers
3 to 4 years	Three to six words per sentence; asks questions, converses, relates experiences, tells stories, almost all speech understood by strangers
4 to 5 years	Six to eight words per sentence, names four colors, counts ten pennies correctly

Information from Schwartz ER. Speech and language Disorders. In: Schwartz MW, ed. Pediatric Primary care; A problem oriented approach. St. Louis: Mosby, 1990; 696-700

primary deficit appears to be a brain dysfunction that results in an inability to translate ideas into speech. A child with expressive language disorder needs active intervention to develop normal speech as it is not self correcting. They are also at a risk for language learning disabilities (dyslexia).<sup>[17]</sup>

### Bilingualism

A bilingual home environment may cause a temporary delay in the onset of both languages. The bilingual child's comprehension of the two languages is normal for a child of the same age; however, and the child usually becomes proficient in both the languages before the age of 5 years.<sup>[18]</sup>

### Psychosocial deprivation

Physical deprivation (e.g., poverty, poor housing, and malnutrition) and social deprivation (e.g., inadequate linguistic stimulation, parental absenteeism, emotional stress, and child neglect) have an adverse effect on speech development. Abused children who live with their families do not seem to have a speech delay unless they are subjected to neglect.<sup>[18,19]</sup>

### Autism

Autism is a neurologically based developmental disorder, onset before the age of 36 months. Autism is characterized by delayed and deviant language development, failure to develop the ability to relate to others and ritualistic and compulsive behaviors, including the stereotyped repetitive motor activity. A variety of speech disorders have also been described, such as echolalia and pronoun reversal. The speech of some autistic children has an atonic, wooden, or a sing song quality. Autistic children in general, fail to make eye contact, smile socially, and respond to being hugged or use gestures to communicate.

### Elective mutism

Elective mutism is a condition in which children do not speak because they do not want to. Typically, children with elective mutism will speak when they are on their own, with friends and sometimes with their parents, but they do not speak in school, public situations or with strangers. It is seen more commonly in girls than in boys. The basis of mutism is usually family psychopathology. The children are negativistic, shy, timid, and withdrawn. The disorder can persist for months or years.

### Receptive aphasia

A deficit in the comprehension of spoken language is the primary problem of receptive aphasia. The speech

of these children is not only delayed but also sparse, agrammatic, and indistinct in articulation. Most children with receptive aphasia develop a speech of their own, understood only by those who are familiar with them.

### Cerebral palsy

Delay in speech is common in children with cerebral palsy. Speech delay occurs most often in those with an athetoid type of cerebral palsy. The speech delay may be due to hearing loss, spasticity of the muscles of the tongue, coexisting mental retardation or a defect in the cerebral cortex.<sup>[20]</sup>

## Clinical Evaluation of a Child with Speech Delay

A history and physical examination are important in the evaluation of a child with speech delay. The physician should be concerned if the child is not babbling by the age of 12 to 15 months, not comprehending simple commands by the age of 18 months, not talking by 2 years of age, not making sentences by 3 years of age, or is having difficulty in telling a simple story by the age of 4-5 years.<sup>[7,21]</sup>

## Screening Tests

Assessing children for speech and language delay and disorders can involve a number of approaches, although there are no uniformly accepted screening tests for use in primary care setting. Mile stones for speech and language development are generally acknowledged. Concerns for delay arises if there is no verbalization by the age of 1 year, if speech is not clear or if speech or language is different from children of the same age.<sup>[22]</sup> Parent questionnaires and parent concern are often used to detect delay.<sup>[23]</sup> Most formal instruments designed for diagnostic purpose have not been widely evaluated for screening. Instruments constructed to assess multiple developmental components, such as the ages and stages questionnaire,<sup>[24]</sup> clinical adaptive test /clinical linguistic and auditory milestone scale,<sup>[25]</sup> Denver developmental screening test,<sup>[26]</sup> includes speech and language components. Instruments designed for specific communication domains include the McArthur communicative development inventory,<sup>[27]</sup> ward infant language screening test, assessment, acceleration, and remediation (WILSTAAR),<sup>[28]</sup> fluhaarty speech and language Screening Test,<sup>[29]</sup> early language milestone scale several others.

The early Language milestone scale [Figure 1] is a simple tool that can be used to assess language delay in children who are younger than 3 years of age. The test focuses on the expressive, receptive, and visual language. The early Language milestone scale helps clinicians implement the mandate to serve the developmental needs of children from birth to the age of 3.<sup>[30]</sup>

The test consists of 43 items arranged in three divisions, auditory expression, auditory receptive and visual. It relies primarily on the patient's report, with occasional testing of the child. It can be done in the physician's office and it takes only 1-10 min to administer, depending on the age of the child and scoring technique. Score with either pass or fail or point scoring method. Pass/fail yields a rating for the tests as a whole.

For children 2.5 years to 18 years of age the peabody picture vocabulary test revised<sup>[31]</sup> is a useful screening instrument for word comprehension.

It is an untimed, individual intelligence test. The test measures an individual's receptive (hearing) vocabulary for standard American English and provides a quick estimate of their verbal ability or scholastic aptitude. It was created by two pioneers in special education, Lloyd M. Dunn and Leoata M. Dunn. The test is given verbally and takes about 20-30 min. For its administration, the examiner presents a series of pictures to each person. There are four pictures to a page, and each is numbered. The examiner states a word describing one of the pictures and asks the individuals to point to or say the number of the picture that the word describes.

The Denver developmental screening test is the most popular screening test in clinical use for infants and young children.<sup>[32]</sup> It is a test for screening cognitive and behavioral problems in preschool children. It was developed by Williams K. Frankenburg and first introduced by him and J.B. Dobbs in 1967. The scale reflects what percentage of a certain age group is able to perform a certain task and the subject's performance against the regular age distribution is noted. Tasks are grouped into four categories (social contact, fine motor skills, language, and gross motor skills). It includes items such as smiles spontaneously (performed by 90% of 3 month olds), knocks two building blocks against other (90% of 13 month old), speaks three words other than "mama and dada" (90% of 21 months old), or hops on one leg (90% of 5 year old).<sup>[26,32]</sup>

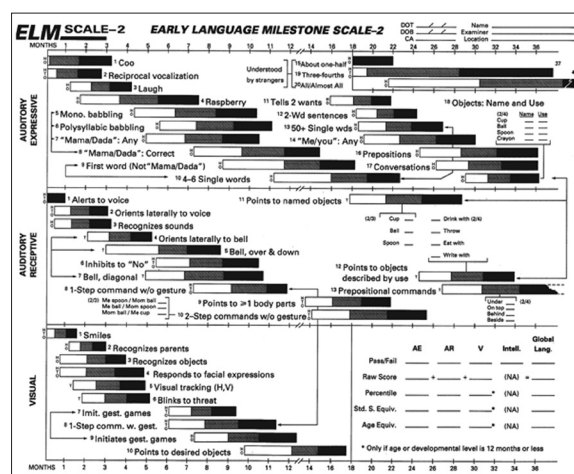
## Diagnostic Evaluation

All children with speech delay should be referred for audiometry. Tympanometry is also a useful diagnostic tool. An auditory brain-stem response provides a definitive and quantitative physiologic means of ruling out peripheral hearing loss. It is useful in infants and uncooperative children.<sup>[33]</sup> Functional magnetic resonance imaging can also be used to study the brain lobe activity in speech delayed children.<sup>[34]</sup>

## Management

The management of a child with speech delay should be individualized. The health care team might include the physician, a speech - language pathologist, an audiologist, psychologist, an occupational therapist, and a social worker. The primary goal of language remediation is to teach the child strategies for comprehending spoken language and producing appropriate linguistic or communicative behavior. The speech language pathologist can help the parents learn ways of encouraging and enhancing the child's communicative skills. Psychotherapy is indicated for the child with elective mutism. In autistic children gains in speech acquisition have been reported with behavior therapy that includes operant conditioning.<sup>[35]</sup> In children with hearing loss, measures such as hearing aids auditory training, lip reading instruction and myringotomy can be indicated.<sup>[36]</sup>

Speech therapy takes place in various settings including speech and language specialty clinics, home, schools, or classrooms. Direct therapy or group therapy provided



**Figure 1:** Early Language Milestone scale. Coplan J. Austin, Tex; Pro-Ed, 1987



by a clinician, caretaker, or teacher can be child centered, and/or include peer and family components. Therapies include naming objects, modeling and prompting, individual or group play, discrimination tasks, reading and conversations.<sup>[37]</sup>

## Role of the Pediatric Dentist in Screening a Child for Speech or Language Delay

The American Academy of pediatrics (AAP) recommends that all infants and young children receive periodic screening for developmental delays in the primary care settings.<sup>[38]</sup> The centre for disease control and prevention (CDC) recommends developmental screening for autism, speech and language delay and other developmental delays in primary care setting.<sup>[39]</sup> The American Speech –language Hearing Association recommends that “pediatric speech language screening be conducted by appropriate credentialed and trained speech–language pathologists.<sup>[40]</sup>

Preschool aged children with speech and language delay may be at a risk for learning disabilities once they reach school age.<sup>[41]</sup> They may have difficulty in reading, exhibit poor reading skills at age 7 or 8,<sup>[42-44]</sup> and have difficulty with written language in particular.<sup>[45]</sup> This may lead to overall academic underachievement,<sup>[46]</sup> and in some cases lower IQ scores.<sup>[47]</sup> As adults, children with phonological difficulties may hold lower skilled jobs than their non language impaired siblings.<sup>[48]</sup> In addition to persisting speech and language-related underachievement (verbal, reading, and spelling), language delayed children have also shown more behavior problems and impaired psychosocial adjustment.<sup>[49,50]</sup>

It is not clear how consistently clinicians screen for speech and language delay in primary care settings, the potential barriers to screening include lack of time, no clear protocol and competing demands of the primary care visits.<sup>[51]</sup>

Pediatric dentists are primarily involved in treating young children and communication with the child is essential for co-operation and effective treatment. During the process of communicating with the child, any evidence of abnormal speech or deviant or delayed language skills can be identified by the pediatric dentist. Thus, screening children for speech and language delay can be integrated into routine clinical practice, followed by referrals for thorough diagnostic evaluation and appropriate intervention.

## References

1. American Speech -Language Hearing Association. Welcome to ASHA. Accessed online. <http://www.asha.org>.
2. Blum NJ, Baron MA. Speech and language disorders. In: Schwartz MW, editor. Pediatric Primary care; a problem oriented approach. St. Louis: Mosby; 1997. p. 845-9.
3. Ansel BM, Landa RM, Stark-Selz RE. Development and disorders of speech and language. In: Oski FA, DeAngelis CD, editors. Principles and Practice of Pediatrics. Philadelphia: Lippincott; 1994. p. 686-700.
4. Nelson HD, Nygren P, Walker M, Panoscha R. Screening for speech and language delay in preschool children. Evidence synthesis no 41. Rockville MD: Agency for healthcare research and quality. Accessed online at: <http://www.ahrq.gov/downloads/pub/prevent/pdfser/speechsyn.pdf>.
5. Honda M, NTT. CS laboratories. Speech Synthesis technique based on speech production mechanism. Journal of Acoustical Society of Japan 1999;55:777-82 .
6. Schwartz ER. Speech and language disorders. In: Schwartz MW, editor. Pediatric primary care: Problem oriented approach. St. Louis: Mosby; 1990. p. 696-700.
7. Shonkoff JP. Language delay: Late talking to communication disorder. In: Rudolph AM, Hoffman JI, Rudolph CD, editors. Rudolph's pediatrics. London: Prentice-Hall; 1996. p. 124-8.
8. Silva PA, Williams S, McGee R. A longitudinal study of children with developmental language delay at age three: Later intelligence, reading and behavior problems. Dev Med Child Neurol 1987;29:630-40.
9. Stevenson J, Richman N. The prevalence of language delay in a population of three -year-old children and its association with general retardation. Dev Med Child Neurol 1987;29:630-40.
10. Vessey JA. The child with cognitive, sensory, or communication impairment. In: Wong DL, Wilson D, editors. Whaley & Wong's nursing care of infants and children . St. Louis: Mosby; 1995. p. 1006-47.
11. Coplan J. Evaluation of the child with delayed speech or language. Pediatr Ann 1985;14:203-8.
12. Leung AK, Robson WL, Fagan J, Chopra S, Lim SH. Mental retardation. J R Soc Health 1995;115:31-9.
13. Leung AK, Robson WL. Otitis media in infants and children. Drug Protocol 1990;5:29-35 .
14. Schlieper A, Kisilevsky H, Mattingly S, Yorke L. Mild conductive hearing loss and language development: A one year follow - up study. J Dev Behav Pediatr 1985;6:65-8.
15. Allen DV, Robinson DO. Middle ear status and language development in preschool children. ASHA 1984;26:33-7.
16. Whitman RL, Schwartz ER. The pediatrician's approach to the preschool child with language delay. Clin Pediatr (Phila) 1985;24:26-31.
17. McRae KM, Vickar E. Simple developmental speech delay: A follow -up study. Dev Med Child Neurol 1991;33:868-74.
18. Davis H, Stroud A, Green L. The maternal language environment of children with language delay. Br J Disord Commun 1988;23:253-66.
19. Allen R, Wasserman GA. Origins of language delay in abused infants. Child Abuse Negl 1985;9:335-40.
20. Bishop DV. Developmental disorders of speech and language In: Rutter M, Taylor E, Hersov L, editors. Child and adolescent psychiatry. Oxford: Blackwell Science; 1994. p. 546-68.
21. Denckla MB. Language disorders. In: Downey JA, LowNL, editors. The child with disabling illness. Principles of

- rehabilitation. New York; Raven; 1982 .p. 175-202.
22. American Academy of Pediatrics. Guidelines for health supervision III. IL: Elk Grove Village; 1997.
23. Ireton H, Glascoe FP. Assessing children's development using parent's reports; the child development inventory. Clin Pediatr (Phila) 1995;34:248-55.
24. Bricker D, Squires J. Ages and stages questionnaires: A parent completed, child monitoring system. 2<sup>nd</sup> ed. Paul H. Brookes Publishing Company; 1999 .
25. Capute AJ, Palmer FB, Shapiro BK, Wachtel RC, Schmidt S, Ross A. A clinical linguistic and auditory milestone scale. Prediction of cognition in infancy. Dev Med Child Neurol 1986;28:762-71.
26. Frankenburg WK, Dobbs J, Archer P, Shapiro H, Bresnick B. The Denver II: A major revision and restandardisation of the Denver developmental screening test. Pediatrics 1992;89:91-7.
27. Fenson L, Pethick SJ, Renda C, Cox JL, Date PS, Reznick JS. Short form versions of the mcArthur communicative development inventories. Appl Psycholinguist 2000;21:95-6.
28. Coulter L, Gallagher C. Piloting new ways of working: Evaluation of the WILSTAAR programme. Int J Lang Commun Disord 2001;36(Suppl):270-5.
29. Fluharty NB. The design and standardization of a speech and language screening test for use with preschool children. J Speech Hear Disord 1973;39:75-88.
30. Coplan J, Gleason JR, Ryan R, Burke MG, Williams ML. Validation of an early language milestone scale in a high -risk population. Pediatrics 1982;70:677-83.
31. Dunn LM, Dunn LM. The Peabody picture vocabulary test Revised (PPVTR). Circle Pines, Minn: American Guidance Services; 1981.
32. Avery ME, First LR, editors. Pediatric medicine. Baltimore: Williams and Wilkins; 1989. p. 42-50.
33. Resnick TJ, Allen DA, Rapin I. Disorders of language development: Diagnosis and intervention. Pediatr Rev 1984;6:85-92.
34. Dr. Altman. Speech delayed Children. An FMRI study. Journal of Radiology. Radiological Society of North America. 2006;4:24-30 .
35. Alexander KC, Leung C, Pion K. Evaluation and management of the child with speech Delay. June 1999. The American Academy of family Physician s web Archive. <http://www.aafp.org/afp>.
36. Brookhouser PE, Hixson PK, Matkin ND. Early Childhood language delay. An otolaryngologist's perspective. Laryngoscope 1979;89:1898-913.
37. Law J, Garrett Z, Nye C. Speech and Language therapy interventions for children with primary speech and language delay or disorder. Cochrane Database syst Rev 2003;CD004110 .
38. American Academy of Pediatrics. Developmental surveillance and screening of infants and young children. Pediatrics 2001; 108:192-6.
39. Centres for disease Control and prevention. Using Developmental Screening to improve child's health. Accessed online at <http://www.cdc.gov/ncbddd/child/improve.htm>.
40. American Speech-Language -Hearing Association. Preferred practice patterns for the profession of speech-language pathology. Accessed online at <http://www.nslha.org>.
41. Bashir AS, Scavuzzo A. Children with Language disorders; natural history and academic success. J Learn Disabil 1992;25:53-65.
42. Catts HW, Fey ME, Tomblin JB, Zhang X. Longitudinal investigation of reading 35outcomes in children with language impairment. J Speech Lang Hear Res 2002;45:1142-57.
43. Scarborough HS, Dobrich W. Development of children with early language delay. J Speech Hear Res 1990;33:70-83.
44. Richman N, Stevenson J, Graham PJ. Preschool to school: A Behavioral study. In: Schaffer R, editor. Behavioral development: A series of monographs. London, United Kingdom: Academic; 1982. p. 228.
45. Bishop D, Clarkson B. Written Language as a window into residual Language deficits: A studies of children with persistent and residual speech language impairments. Cortex 2003;39:215-37.
46. Stern LM, Connell TM, Lee M, Greenwood G. The Adelaide preschool language unit. Results of follow up. J Paediatr Child Health 1995;31:207-12.
47. Young AR, Beithchman JH, Johnson C, Douglas L, Atkinson L, Escobar M, et al. Young adult academic outcomes in a longitudinal sample of early identified language impaired and control children. J Child Psychol Psychiatry 2002;43:635-45.
48. Felsenfeld S, Broen PA, McGue M. A 28 year follow up of adults with a history of moderate phonological disorder. Educational and occupational Results. J Speech Hear Res 1994;37:1341-53.
49. Cohen NJ, Barwick MA, Horodezky N, Vallance DD. Language achievement and cognitive processing and behavioral characteristics of psychiatrically disturbed children with previously identified and unsuspected language impairments. J Child Psychol Psychiatry 1998;39:865-77.
50. Cohen NJ, Menna R, Vallance DD, Barwick MA. Language, social cognitive processing, and behavioral characteristics of psychiatrically disturbed children with previously identified and unsuspected language impairment. J Child Psychol Psychiatry 1998;39:853-64.
51. Schutster MA. Developmental screening. In: McGlynn EA, editor. Quality of care for children and adolescents: A review of selected clinical conditions and quality indicators. Santa Monica, CA: RAND; 2000. p. 157-68.

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