

The McMaster *at night* Pediatric Curriculum



Feldman, HM. "Evaluation and Management of Language and Speech Disorders in Preschool Children". *Pediatrics in Review* 26 (4). 2005.

Objectives

- Describe **normal** language and speech development, and recognize abnormalities that require **referral**
- Generate a **differential diagnosis** for language and speech delay in a preschool child
- Differentiate specific language impairment from global delays and autism
- Evaluate the effectiveness of **treatment** for language and speech delay

Background

- **Language**: the expression of human communication through which ideas and information can be shared
 - **Receptive language**: the ability to understand
 - **Expressive language**: the ability to produce
- **Speech**: manifestation of language that uses vocal sound, requiring a **complex interaction** of cortical, motor, respiratory, laryngeal and oral systems
- **10-15%** of 2-year-olds are diagnosed with speech delay, and over half will “catch up” by 3 years

Normal Milestones

Age	Receptive	Expressive
0-2 months	Turns to sound Prefers voices Interested in faces	Cries
2-4 months		Coos
6 months	Responds to name	Babbles
9 months	Understands verbal routines	Points
12 months	Follows a verbal command	Jargon First words
15 months	Points to body parts by name	Learning new words slowly 10-20 words
18-24 months	Understands sentences	Learning new words quickly 50-100 words Uses two-word phrases

Normal Milestones

Age	Receptive	Expressive
24-36 months	Answers questions Follows two-step commands	Uses three-word phrases Asks “what” questions 50% intelligible
36-48 months	Understands much of what is said	Asks “why” questions 75% intelligible
48-60 months	Understands much of what is said, commensurate with cognitive level	Creates well-formed sentences Tells stories 100% intelligible
6 years		Pronounces most speech sounds correctly May still have difficulty with “sh”, “th”, “s”, “z”, “r”, “l”
7 years		Pronounces speech sounds correctly including consonant blends

Test Your Knowledge

- Which of the following children would you refer for further evaluation of speech delay?
 - A. 4-month-old who does not babble
 - B. 12-month-old with no single words
 - C. 24-month-old with fewer than 50 words
 - D. 48-month-old with dysfluency

The Answer

- Like lab tests, the normal achievement of milestones occurs within a **range**, and abnormal is defined by degree of deviation from the mean



- The average 12-month-old has a few words, but absence of words is not a cause for concern until 15-18 months
- A 24-month-old should have a **rapidly increasing** vocabulary of well over 100 words
- **Dysfluency** is normal in preschoolers

Indications for Referral

Age	Finding
Any age	Lack of response to sound Lack of interest in interaction with people Loss of previous milestones
4 months	Lack of drive to communicate
6-9 months	Poor sound localization
12 months	No verbal routines Failure to use mama, dada
15-18 months	No single words Poor understanding of language
24 months	Vocabulary less than 50 words or no two-word phrases Less than 50% intelligible to strangers
36 months	Rote memorization or repetition only Less than 75% intelligible to strangers
48 months	Inability to participate in conversation Stuttering

The Case

- The parents of an 18-month old boy bring him to your office because they are concerned that he **does not have any words**
- He responds to his name and says “mama” and “dada” with meaning but otherwise communicates by crying, smiling, making vocalizations and pointing
- He has been treated for two ear infections but otherwise his medical history, including perinatal history, is unremarkable

History

What would you ask?

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History

- Full history of language development milestones
- Determine if the delay is expressive alone
 - Does the child follow commands?
- Complete developmental history including
 - Gross motor
 - Fine motor
 - Social
 - Cognitive
- The younger the child, the more challenging it is to differentiate cognitive from speech development

History

- The **social development** history is critical
 - Does the child **point** to objects?
 - Is the child **interested** in communicating?
 - Does the child demonstrate **reciprocity**?
 - What is the nature of the child's **play**?
- Have any milestones ever been **lost**?
- Ask for the results of any **audiology tests** and for the parents' assessment of the child's hearing
 - Does the child **turn to sound** or **respond to his name**?

History

- A thorough medical history focusing on factors that affect **cognition** (genetic disorders, prenatal exposures, prematurity, birth asphyxia, intracranial hemorrhage), **hearing** (meningitis, ototoxic medications, chronic otitis media), and **motor development** (CP, neuromuscular disorders)
- **Family history** of speech delay, delays in other domains, learning disabilities, hearing impairment, and genetic disorders
- It is essential to assess parents' level of education, degree of concern, and access to **social supports**

Physical Exam

What would you look for?

A dark blue background featuring a silhouette of a city skyline with various skyscrapers. A large, bright full moon is visible behind the buildings in the center-right area.

Physical Exam

- **Observe** the child during the encounter including interactions with parents, interactions with strangers, and the child at play
- Does the history match your assessment?
- Look for **growth** abnormalities and **dysmorphic features**
- Examine the **skin** for neurocutaneous stigmata
- Perform a full **neurological exam** (adjusted for age) including cranial nerves, motor exam, and reflexes

Physical Exam

- Inspect the external **ear** canals and tympanic membranes for effusion
- Examine the **mouth** and pharynx for malformations that may impact speech
- Complete **a full systemic exam** to assess any potential impact of chronic disease on development

Workup

What would you order?

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Workup

- All children presenting with speech delay should have **formal audiology assessment** regardless of whether newborn hearing screen was passed
- Further investigation is directed by history, exam findings, and developmental stage
- Children with some expressive language ability may be referred for **language, cognitive, or psychoeducational testing**
- Karyotype, chromosomal microarray, or specific **genetic tests** may be indicated

Workup

- In the case of abnormal neurological exam, brain MRI may rarely be indicated
- Iron deficiency and lead poisoning contribute to developmental delay
- Referral to a speech language pathologist for complete assessment is often warranted

Differential Diagnosis

Developmental Etiologies	
Specific	Pervasive
Specific language impairment Receptive Expressive Mixed	Autism spectrum disorders
Intellectual disability (global developmental delay)	Rett's disease
Articulation/phonologic disorder	Childhood disintegrative disorder
Fluency disorder (stuttering)	Pervasive developmental disorder NOS
Verbal apraxia	
Selective mutism	

Differential Diagnosis

Other Etiologies	
Condition	Examples
Hearing impairment	Congenital (genetic, TORCH) or acquired (medications, infections)
Prematurity and/or low birthweight	
Genetic conditions	Down syndrome, Fragile X, Williams, NF1, TS
Neurological conditions	Seizures, cerebral palsy, brain malformations, head trauma, intracranial hemorrhage
Metabolic conditions	Mitochondrial disease, PKU, hypothyroidism, iron deficiency
Toxins	Lead poisoning
Socioeconomic factors	Lack of language stimulation, low socioeconomic status, low parental education, neglect, parental depression, lack of permanency

Hearing Loss

- Despite universal hearing screening for newborns in Ontario, **mild, progressive** and **acquired** causes of hearing loss will be missed
- The most common cause of mild hearing loss is **chronic otitis media with effusion**, however tympanostomy has no more impact on speech and learning than watchful waiting
- For sensorineural hearing loss, depending on severity, **language therapy, cochlear implantation**, and **alternative or augmentative** methods of communication may be successful

Specific Language Impairment

- Defined as receptive, expressive or mixed language delay with solidly normal development in all other domains
- Cognitive ability on non-language tasks is higher than on language tasks
- Generally responds well to therapy but some children will go on to develop learning disabilities or behavioral problems

Autism Spectrum Disorders

- Pervasive developmental disorder characterized by:
 1. Impairment in social interaction
 - Poor non-verbal communication
 - Lack of peer relationships and reciprocity
 - Lack of shared attention
 2. Impairment in communication
 - Delayed expressive language
 - Repetitive or stereotyped speech
 3. Restricted, repetitive, stereotyped behavior
 - Preoccupation with parts
 - Inflexible adherence to nonfunctional routine
 - Motor mannerisms
 - May have exaggerated responses to stimuli

Autism Spectrum Disorders

- Prevalence is increasing but this may be due to awareness and diagnostic practices (estimated at 1/100-150 children, with males more affected)
- Early detection of ASD is critical as some patients benefit from [Applied Behavior Analysis](#) especially when provided on an intensive basis
- Prognosis is tied to IQ
- May be a feature of other conditions such as Down Syndrome and Fragile X Syndrome

Test Your Knowledge

- Of the following clinical features, which would be the most predictive of future development of autism in your 18-month-old patient?
 - A. Does not interact well with strangers
 - B. Does not point to objects
 - C. Only engages in parallel play at daycare
 - D. Has no words

The Answer

- Pointing to objects normally appears at 9 months; lack of **shared attention**, including pointing, is the strongest predictor of future development of autism
- Toddlers normally have stranger anxiety so ask about reciprocity and communication with caregivers
- Parallel play is the norm until age 2-3 years
- No words at 18 months is concerning but SLI is more likely than autism



The Social Environment

- Children who have suffered from **abuse** or **neglect** commonly have speech delay
- Even under less extreme conditions, vocabulary size and maturity of speech are associated with the **quality and quantity of parental input**
- **Reading to children** interactively is the most effective way to expand vocabulary
- Other strategies include limiting media exposure, repeating and expanding on a child's verbal output, and linking new words with gestures

Test Your Knowledge

- The parents of a 5-year-old girl are very concerned that she has not spoken a word in JK since starting 2 months ago. She speaks fully-intelligible complete sentences at home, and is otherwise well. What is the diagnosis?
 - A. Verbal apraxia
 - B. Childhood disintegrative disorder
 - C. Landau-Kleffner syndrome
 - D. Selective mutism

The Answer

- **Selective mutism** is a psychiatric disorder in which a child who is capable of normal speech is unable to speak in certain situations, often with social anxiety
- CDD involves a dramatic loss of milestones in all domains after 3-4 years of normal development
- Verbal apraxia is a disorder of oromotor speech planning
- Landau-Kleffner is a sleep-seizure disorder causing subacute aphasia



Summary

- Pediatricians have a central role in the detection, evaluation and management of children who have speech and language delay
- A comprehensive developmental and medical history is the most important diagnostic tool, which is supplemented by inventories and formal tests
- At minimum, management includes audiology assessment, speech language therapy for isolated delay, and comprehensive multidisciplinary treatment for multidimensional problems

Summary

- For children with specific language impairment only, it is difficult to predict who will improve
- Though most children with specific language impairment catch up, all children are **at risk for future academic and behavioral disorders**, and therefore require regular long-term follow-up



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