

Children with Speech-Language Disorders Improving Recognition & Care Coordination

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Disclosures

Dr. Scheiner has no disclosures

Dr. Ball has no disclosures

Learning Goals

Upon completion of this activity, participants will:

1. Identify and understand significance of speech-language problems in the primary care pediatric setting
2. Make recommendations for assessment and treatment
3. Support informed development of communication for patients and families

Learning Objectives

During this presentation we will:

1. Summarize speech and language development in young children
2. Use case examples to illustrate delayed communication and communication disorders
3. Discuss evaluation and treatment of speech and language disorders

S/L Disorders Epidemiology

- Most common reason for developmental delay/disorder (7.5-10% preschool children, boys>girls)
- ~ 1/2 of all children in Early Intervention /Special Education
- Early language delays often precede ongoing language & learning difficulties and social-emotional challenges

Communication

LANGUAGE

- Phonology
- Morphology
- Syntax
- Semantics
- Pragmatics

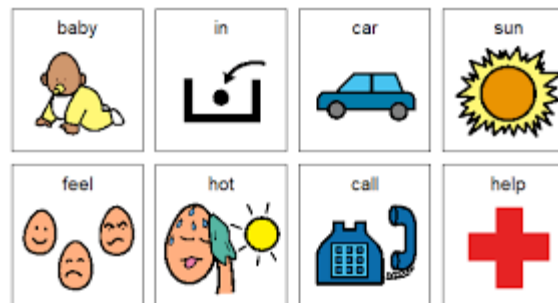
SPEECH

- Speech sounds
- Voice
- Resonance
- Fluency

Language

Words, Gestures or Written Symbols

1. Morphology: words and their internal structure; morpheme - smallest unit of language that has meaning (e.g. dog/dogs)
2. Syntax: grammar
3. Semantics: meaning of words
4. Phonology: sound rules
5. Pragmatics: social communication



Speech



Production of Sound

1. speech sounds

- articulation
- coordinating breath and movements
- motor planning

2. Voice and resonance

- sound production through upper airway

3. Fluency: continuity, smoothness, rate, effort

Requirements for Language Learning

- *Social interactions* (supportive) – child abuse, neglect
- *Verbal input* (adequate) – adult centered, parents with limited education
- *Hearing* (intact) – sensorineural hearing loss
- *Human brain* (healthy, normal) – cognitive disability, autism, specific language impairment
- *Oral mechanisms* (functioning) – cleft palate, velopharyngeal insufficiency

Delay versus Disorder

25% delay or 1.5 SD below the mean

15% at 24 mos. do not meet criteria of 50 words and 2 word phrases

1/3 children delayed at 2 yrs. are delayed at 3-4 yrs.

7.4% with language disorder at school age

Prognosis

- ~ 1/2 of children with language delay at 2 years will function normally by 3-4 years
- Favorable prognosis:
 - age 2: good receptive skills & symbolic play
 - age 3: using verbs & prepositions; increasing sentence length
- Persistent language problems at school entry are likely to continue
- Speech and language delay is associated with learning and behavior problems

Misconceptions about S/L Delay

MISCONCEPTIONS

- Boys are delayed (> 6 mos.)
- 2nd and 3rd born let older siblings speak for them
- Children from bilingual households are delayed

FACTS

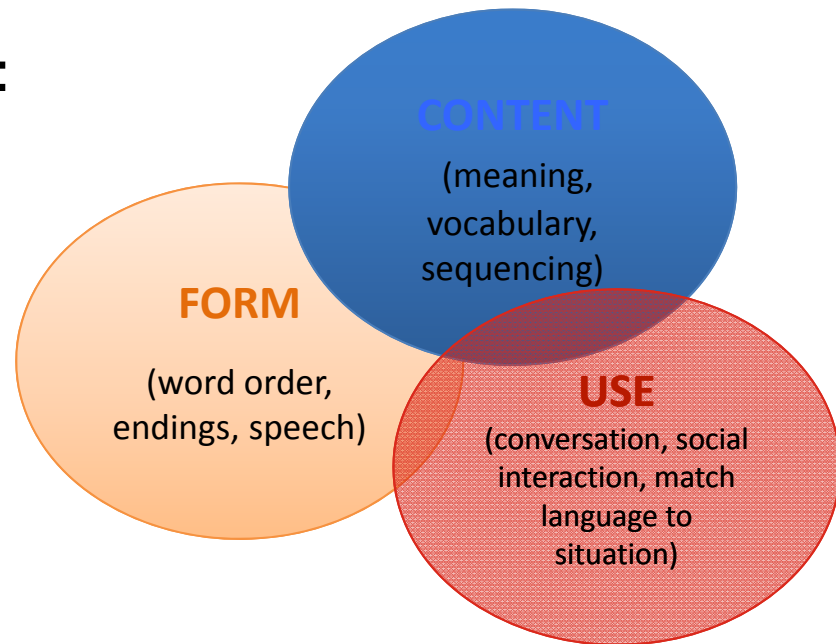
- Boys are *slightly* delayed (1-2 mos.)
- Children have strong motivation to speak for themselves
- Children from bilingual households may show mild delay and early mixing (e.g., “Spanglish”)

Language Disorders

Significant delay in use/understanding of spoken or written language

The disorder may involve:

- Phonology
- Syntax
- Morphology
- Semantics
- Pragmatics



Research shows that phonological skills are critical for acquiring literacy (Hetzroni, 2004)

Language Disorders – subgroups

Expressive language disorder: weak vocabulary skills, word finding difficulties, word omissions, poor narrative skills, grammatical errors (past tense, plurals)

Receptive language disorder : difficulty following directions, understanding words/sentences, answering questions

Mixed expressive/receptive language disorder: difficulty with word retrieval, use place holder utterances (uhmm) or nondescript phrases (that 'thing'), short sentences, simple words such as articles may be omitted

Speech Sound Disorders - subgroups

Articulation - inability to produce sounds correctly

Phonological –does not apply rules of phonology correctly (pig – pi; tub – tuh), consonant errors more common

Neurologic – dysarthria (slurred, strained quality, affects, pitch, intonation), apraxia (vowel & consonant errors, inconsistent/variable production)

Voice & Resonance – abnormalities in the production of sound through the upper airway: hypernasality, hoarseness; cleft lip/palate, velopharyngeal insufficiency, laryngeal problems

Stuttering/Dysfluency – disruption in smooth production of speech, includes repetitions, prolongations, interjections

Case 1

A mother brings her 2 year old son to your office for a well-child visit. She is concerned about his speech and language development. Initially she was not worried because he is boy. Milestones: babbled at 6 months, no single words at 15 months, said 'mama' and 'dada' specifically and 'milk' at 18 months, now uses ~ 6 words but not combining words; points, waves and smiles appropriately; eye contact is good. Creates novel play with kitchen utensils. He is a friendly and agreeable toddler. His past medical history is not concerning. Physical exam is normal.

Case 1 - Language Skills – typical 2 years

Uses 2 word phrases

Follows 2 step commands

Vocabulary of 20-50 words (too many to count usually means more than 50 words)

Demonstrates imaginary play

Names objects

Case 1 - Evaluation

Hearing test: normal

Referral to Early Intervention – 25% delay in expressive language skills; normal receptive language, normal cognitive skills (best are standard (z/t) scores: 1.5 SD)

Speech and language evaluation: same results as EI evaluation

Other diagnostic studies: not indicated at this time; consider comprehensive developmental evaluation

Case 1: Late Talker - expressive language delay

13-18% of 1 ½ -3 yrs. children present with late talking

Risk factors: family history language delay, limited language environment, low socioeconomic status

Development: normal language comprehension, speech, cognitive abilities, play skills

Intervention: speech-language therapy effective

Prognosis: children develop typical language by 4 years

Caveat: some children struggle with higher order language skills such as word finding and syntax (vocabulary, grammar & sentence structure)

Case 2

A 4 year old male toddler presents with persistent delayed talking. At 2 years of age he qualified for Early Intervention (EI) services (25% delay in his expressive language skills). At 31 months of age he qualified for Child Find services based on his transition assessment. His hearing test is normal. His physical examination results are normal and he appears to be socially engaging.

Case 2 - Evaluation

Early Intervention: 25% delay in expressive language

Transition Assessment: 25% delay in expressive language skills, mild delay in receptive language skills

Speech-Language Evaluation: diagnosed with mixed expressive receptive language disorder

Comprehensive Developmental Evaluation: verbal cognitive abilities below average, average nonverbal cognitive abilities

Other evaluations: consider comprehensive developmental evaluation

Case 2: Specific Language Impairment

- Language skills < other cognitive abilities
- May affect**: expressive language or both expressive and receptive language
- Young children**: difficult to determine delayed vs. disordered language

These features may be difficult to identify in a clinical setting (disorder may look like delay with limited language sample)

Speech language clinician usually determines whether a delay constitutes a 'disorder'

Case 2 Language Disorders

Treatment: S/L therapy more effective treatment for expressive than receptive

Heterogeneous group: at 4 years of age about 50% of late talkers present with language difficulties

Difficulty with higher order language: inferences (slang, sarcasm, humor, irony, metaphor), pragmatics, difficulty producing stories

Written language/reading are often impaired as a result of language disorders

Case 3

The parents of a five year old girl are concerned about their child's speech. She talks frequently but she is not easily understood. At preschool she participates in group activities and enjoys interacting with her friends. When speaking she says 'coe' instead of *comb*, 'tite' instead of *kite*, 'poon' instead of *spoon* and 'weg' instead of *leg*. Her physical exam is normal. She frequently hits and has temper tantrums during her structured preschool group activities.

Case 3 – Phonological Disorder

Speech sound errors that are rule based

Occur at the phoneme level

Examples:

- comb-coe (final consonant deletion (3-3.5 yrs.))
- kite-tite (fronting 3-4 yrs.)
- leg- weg (substituting w or y for l or r (5 yrs.))
- Banana – nana (syllable deletion)
- Spaghetti – paghetti (cluster simplification)

Case 3 – Phonological Disorder

Options for treatment include

- *Cycles Phonological Pattern Approach* (Hodson & Paden, 1983, 1991) has underlying concepts (cycle through sound patterns, contrast sound types, learn self monitoring skills, match another's production, active participation)
- *Distinctive Features* (contrast features that distinguish sounds and the meaning related to them) (e.g., Sue vs. zoo, bee vs. pee, two vs do, rack vs rag)

Phonology versus Apraxia

PHONOLOGICAL DISORDER

- Consonant omissions & substitution errors common
- Vowel errors rare
- Terminal deletions common
- Deletions not specific to position in word
- Accuracy unrelated to number of syllables in words

CHILDHOOD APRAXIA OF SPEECH

- Consonant omissions & substitution errors common
- Add complexity in errors (add sounds, syllables)
- Vowel errors common
- Accuracy reduced with longer utterances
- More likely to be unintelligible

Case 4

A 7 1/2 year old boy is brought in due to concerns about speech delay. He cannot say 'r.' He is in 1st grade and is no longer receiving speech therapy at school. He was discharged from therapy at the end of kindergarten due to good progress. 'R' is the only remaining sound he has not perfected.

Case 4 Articulation Disorder

Mostly intelligible speech by 3 years

Misarticulated at 4-5 years: l, r, s, z, th, ch

Concern if:

- Unable to make: p, b, m by 3 years
- Unable to make d, n, k by 4 years
- Unable to make sh and th by 6 years
- Unable to make r, s by 7 years

Case 4 Articulation (Phonetic) Disorder

Substitution or distortion of individual sounds

-th for s

-w for r

- b for v

- Differs from Phonological Disorder (language rule-based)
- Usually no know cause (exception – hearing loss)
- Evaluation: Speech Language Evaluation
- Treatment: placement cues, palatal mapping, drill

Case 5: Down Syndrome

Chromosomal disorder (aka Trisomy 21); 1/800 live births

Intellectual disability (severity varies; mild-moderate usually), facial features, hypotonia

Risks: ~ 50% cardiac, GERD, celiac, 15% hypothyroid, vision, hearing, leukemia, overall developmental delays

A 3 year old child with Down syndrome presents with slurred speech with a nasal, “rough” voice, a tongue that seems large for his oral cavity, and slow speaking rate. Hearing assessment identified middle ear dysfunction and he has been treated 4 times with antibiotics for otitis. He is described by his family as a very happy child who is quiet most of the time.

<https://youtu.be/RwlXyoHMfYA>

<https://youtu.be/IGKS95G4ynM>

Case 5: Down Syndrome

Treatment:

Address articulation accuracy, rate/pacing strategies, focus on hearing (many fail to manage hearing long term), identify idiosyncrasies & address them because they reduce intelligibility significantly

Prognosis: make progress with appropriate interventions (language and cognition are NOT highly correlated with speech success)

Augmentative & Alternative Communication (AAC) options may provide opportunities for language development and communication of more complex utterances than the child has available with her natural speech

Case 5 Down Syndrome

Literature indicates:

1. Many oral hypotonia – if so, may have flaccid/ataxic features
2. Macroglossia is not typically present, appears large compared to confines of oral cavity
3. Speech is not highly correlated with language or cognition (likely anatomy/motor control)
4. Dysfluency is common (**Lidcombe** may be appropriate)
5. Reduced intelligibility is a serious problem that persists throughout life
6. *Education tidbit*: Parents use fewer words-children with DS hear 22% fewer words than typical children; children with DS produce 54% fewer vocalizations

(Kent & Vorperian 2013; Thiemann-Bourgue, etal 2014)

Case 6

KD is 3 ½ year old girl friendly and active girl. About 12 months ago her parents noticed a rapid increase in her ability to communicate. She speaks in full sentences. For the past 8 months her parents have noticed that she has difficulty 'getting the words out.' This problem interferes with her ability to maintain a conversation. You ask about her favorite toy and she says 'I li-li-li-li like Doc McStuffin. She looks concerned when she is speaking.

Case 6 Stuttering

Typical

- whole word or phrase repetitions
- interjections
- hesitations
- revisions

Less Typical

- repetition of sounds
- syllable repetition
- prolongation

Case 6 Stuttering

Developmental dysfluency: 3-4 years of age

Prevalence ~ 1%

Treatment before 6 years of age and within one year of onset associated with better outcome

Intervention focuses on teaching compensatory strategies

*** Note: There is one evidence based treatment program that targets preschool children showing benefit [Lidcombe: Onslow 1997; Rousseau 2007]*

Case 6 Stuttering

Normal Non-fluency

- Onset 2-5 yrs.
- < 6 months duration
- whole word or initial sound repetition
- No tension or struggle

True Stuttering

- Onset 2-5 yrs.
- Lasting > 6 months
- Part word repetitions
- Sound prolongations, interjections or blocks
- Struggle/tension during speech

Case 7

A 4 year old boy is seen at your office for speech/language delay. At one year of age his mother had concerns about his communication skills. At 18 months he was not pointing or waving but he was identifying letters and numbers. He recites sentences he has heard in his preschool classroom. When you ask him a question he repeats it. He makes requests using full sentences. He prefers to play in parallel with his classmates and he has frequent temper tantrums. By parent report, his pre-academic skills are good. His physical exam is normal.

Case 7 Autism

All children with autism have social communication problems which may affect:

- Turn taking/conversation
- Nonverbal communication
- Topic maintenance
- Initiation of social interaction

Repetitive or rigid language (echolalia, counting)

Uneven language development

Case 7 Autism

| Cognitive | Ability Problems Observed |
|--|---|
| Mutual gaze | To establish social contact |
| Shared Gaze | To establish joint attention to another person, pet or object |
| Pointing or Showing | To express interest in objects or activities |
| Vocalizing | To gain attention |
| Responding to name , attending to caregivers voice | To show recognition of name or familiar voice |
| Showing interest in other children or people | To establish some early social interactions and communication exchanges |
| Pretending in play | To show symbol use and representation of objects, actions, characters |

Case 7 Autism

All children with autism should undergo S/L evaluation

- Assess basic language skills
- Assess pragmatic language skills

Established treatments

- behavior (ABA, PRT)
- modeling
- peer training
- story based intervention (social stories)

Emerging Treatments

- AAC device
- Language Training (production and understanding)
- Picture Exchange Communication System

Case 8: Cerebral Palsy

A 15 year old male is seen in your office. You have been following him since his birth (grade 3IVH, NICU, periventricular white matter lesions). He has been doing well with speech and was discharged from therapy when in the 4th grade, but you notice that his speech seems harder to understand than it has been before.

Case 8 Cerebral Palsy

Many people with spastic cerebral palsy will show changes in overall intelligibility of speech as they age; as a result, **monitoring speech** is essential for long term management

Augmentative & alternative communication (AAC) strategies and devices may become needed, even if they never were previously. **An AAC evaluation should be considered when decreased speech intelligibility interferes with daily academic/vocational communication needs** (e.g., speech productions are limited in length & complexity, fatigue results in decreased speaking)

R

Speech-language evaluation for 4 year, 7 month old male with history of chronic otitis, PE tubes, family history of language disorder. Child failed articulation screening.

Speech-language evaluation for 3 year, 8 month old girl with *spastic* cerebral palsy; strained, low pitch voice; slow, inaccurate speech.

Speech-language evaluation for 6 year old with suspected autism

Treatment Frequency and Dose

| Disorder | Dose | Time | Type |
|--------------------|------------|-----------|--------------------------------------|
| Apraxia | 4 per week | 15-30 min | Individual |
| Developmental SSD | 3 per week | 30-50 min | Individual or Pair |
| Language/ Literacy | 2 per week | 30-50 min | |
| Language/DD | 2 per week | 30-50 | Group |
| Autism | Daily | | Structured with behavior focus (ABA) |

**Note: Studies have shown that more is not always better. In some cases, it appears that increased dose may interfere with generalization of skills and new learning -*

Pediatric Evaluation

- Developmental surveillance (eliciting concerns) at all health supervision visits
- Administer *formal screening instrument* at 9, 18, 30 or 24 months
- Routine use of specific speech and language screening tools for preschool children not recommended by AAP
- Screening for Speech and Language Delay in Preschool Children: Recommendation Statement. US Preventative Services Task Force. Pediatrics 2006;117;497-501

Fail Screening or Have Concerns

- Comprehensive speech-language assessment.
- Ask family to bring copies of previous evaluations to the visit (Early Intervention, Child Find)
- Prescription for SLP – adding small details will help provide the most relevant assessment
 - “difficult to understand”
 - “limited vocabulary”
 - “hoarse voice”
 - “repeats parts of words”
 - “often coughs when drinking”

Evaluation

- History/Risk Factors: prenatal/delivery/medical history, verbal input, social interactions, developmental skills, oral mechanisms (feeding, drooling), family history
- Hearing evaluation
- Speech/language evaluation
- Cognitive or intellectual functioning evaluation

Differential Diagnosis

Language delay/disorder

Hearing loss

Global developmental delay/intellectual disability

Autism

Genetic syndrome (Down Syndrome, Fragile X, Klinefelter Syndrome, Velocardiofacial Syndrome, Williams Syndrome, Noonan's Syndrome)

Neglect/limited environmental stimuli

Referral and Treatment

- Early Intervention < 3 years of age
- Child Find \geq 3 years of age
- Global developmental delay – further diagnostic evaluation is indicated
- Advise parents about a language rich environment – talking, reading, reciprocal communication starting in infancy
- Speech language therapy – tailored to needs of child

Changes to Your Practice

- Initiate a history of speech/language development
- Implement AAP screening recommendations
- **Parent concerns are valid & predictive of delays-
*parent concerns detect 70-80% of children***
- Use educational materials to promote language and literacy
 - Handout/Appendices
 - <http://www.asha.org/public/>
- Establish links with services or community agencies that assess and treat communication disorders

Promoting Language Development

- The quality of a child's language environment: associated with vocabulary development
- Shared book reading: opportunity to learn language in a developmentally sensitive context
- Conversational interactions: rich with narrative and explanatory talk

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Speech and Language Development Mnemonic

| Age | Skills |
|----------|---|
| ½ year | Parts of words (babbling) |
| 1 year | 1 word, 1 step direction, point |
| 1½ years | Between words & sentences (jargon), nonverbal communication |
| 2 years | 2-word sentences, 2-step directions, 200 words, ½ intelligible |
| 3 years | 3-5 word sentences, 3-step directions, ¾ intelligible, 3 pieces of information: first name, age, sex |
| 4 years | Converses; fully intelligible; 4 P's: pronouns, prepositions, plurals, past tense; names 4 colors |
| 5 years | Extended narrative, future tense, 5 pieces of information: letters, numbers, shapes, full name, address |

Language Development

| Age | Receptive Skills | Expressive Skills |
|-----------|--|--|
| Newborn | Attends to voice, regards face | cries |
| 3 months | | Differentiates cry, coos |
| 6 months | Recognizes name | Begins to babble |
| 9 months | Responds to 'no', learns routines, waves bye-bye | Points, says 'mama' or 'dada' nonspecifically |
| 12 months | Follows simple commands with gestures | Says 'mama' or 'dada' specifically, jargons, says first word |

Language Development

| Age | Receptive Skills | Expressive Skills |
|--------------|--|--|
| 12 months | Follows simple commands with gestures | Says 'mama' or 'dada' for parents, says first words |
| 15 months | Points to body parts, follows single command without gesture | Acquires words slowly, uses simple and idiosyncratic forms |
| 18-24 months | Understands sentences | 50 word vocabulary, uses 2 word phrases |
| 36 months | Follows 2 and 3 step commands | Short sentences, uses more complex grammar |
| 48-60 months | Understands concepts such as same, different | Grammar matures, constructs narratives, scripts |
| 72 months | | Mature speech sounds, applies language to reading |

Communication Disorders - DSM V

Language disorder

Speech sound disorder

Childhood onset fluency disorder

Social (pragmatic) communication disorder

Unspecified communication disorder

Language Disorders (SLPs)

Expressive language disorder:

- expressive language abilities significantly
- below nonverbal intellectual ability and
- receptive language development

Mixed expressive-receptive disorder:

- impairment in expressive and receptive abilities

subtypes: phonological, lexical, syntactic, semantic, pragmatic

Red Flags in Infancy

| AGE | FINDING |
|-------------|--|
| 2-6 months | Lack of response to sound, lack of interest in social interactions, no urge to communicate |
| 6-12 months | Loss of cooing or babbling |
| 12 months | Failure to understand routines, produce mama/dada specifically |

Red Flags in Toddlers

| Age | Finding |
|--------------|---|
| 15-18 months | Failure to use or understand pointing, poor understanding of words, no expressive vocabulary |
| 18-24 months | Limited symbolic play, loss of communication skills |
| 24 months | Lack of ability to follow commands, vocabulary < 35-50 words, no 2 word utterances, rote memorization without novel phrases |

Red Flags in Preschool

| Age | Finding |
|------------|---|
| 24 months | Inability to follow commands, vocabulary <35-50 words, no 2 word utterances, rote memorization without novel phrases |
| 36 months | Inability to follow 2 step commands, limited vocabulary, no simple sentences, <1/2-1/3 intelligible, excessive repetition |

Red Flags in School Age

| Age | Finding |
|------------|--|
| 48 months | Inability to follow 3 step commands, poor sentence structure, no complex sentences, > ¼ unintelligible sentences, stuttering |
| 60 months | Inability to express ideas, persistent stuttering |
| 72 months | Errors in sound production, inability to manipulate sounds of words for rhyming, poor reading skills |