Early Screening for Dyslexia and Reading Disorders

— Eric Tridas, MD —
About the Presenter

Eric Tridas
Eric Tridas, M.D., FAAP, is the Medical Director of the Tridas Center for Child Development and President of Developmental and Behavioral Pediatrics Consultants, Inc. He is a Developmental Pediatrician who specializes in the diagnosis and management of handicapping conditions including ADHD, learning differences, dyslexia, autism spectrum disorders, intellectual disabilities and other neurodevelopmental and behavioral problems. He completed his fellowship in Ambulatory Pediatrics with emphasis on Developmental Disabilities at the Children’s Hospital Medical Center in Boston. During that time he held an appointment as a Teaching Fellow at Harvard University. Dr. Tridas completed his residency in Pediatrics at the Children’s Hospital of Buffalo. He graduated from the University of Puerto Rico, School of Medicine in 1977. He is President of the International Dyslexia Association. Dr. Tridas is also the State Medical Director for Pediatric Health Choice-Prescribed Pediatric Extended Care Facilities (PPEC). He is on the board of directors of Artista’s Cafe, a non-profit organization that employs adults with autism spectrum disorders. Dr. Tridas is a founder and partner of Tridas, LLC, a software company that developed the Tridas eWriter, an application for web based structured interviews of caregivers and teacher’s that generates a customized evaluation report. He lectures nationally and internationally on topics such as dyslexia, learning disabilities, ADHD, autism spectrum disorders, executive functions and other behavioral and developmental pediatrics related subjects. Dr. Tridas edited a book for parents titled From ABC to ADHD: What Every Parent Should Know About Dyslexia and Attention Problems.

About CDL

Founded in 1992, the Center for Development and Learning (CDL) is a results-driven 501(c)(3) organization. CDL’s mission is to improve the life chances of all children, especially those at high risk, by increasing school success.

CDL’s work is focused on increasing teacher effectiveness. Standards set the course, and assessments provide the benchmarks, but it is highly effective teaching that yields substantial, sustained gains in student learning. All children, regardless of how they look, where they come from, or how they learn, can and will achieve school success when provided with highly effective teachers and positive, supportive learning environments.

CDL holds special expertise in the areas of literacy, learning differences, evidence-based teaching strategies, and building the capacity of teachers. We tackle real-time issues such as ways to remediate struggling readers, differentiate instruction, and build and sustain collective capacity. CDL professionals customize professional learning services to meet the specific needs of the schools and districts with whom we work.

Our current initiatives include (1) Language and Learning – Right from Birth, which provides child care providers and parents of children ages birth to three with the information, skills and support they need to help their children grow and be ready to learn when they enter school; (2) Step It Up for Literacy, which builds educators’ capacity to provide systematic, explicit and effective instruction to all students and targeted intervention for students experiencing difficulties; (3) Learning Profiles: Differentiating Instruction for Diverse Learners, which gives teachers the tools to identify and remediate learning problems with instructional and behavioral interventions; and (4) the Greater New Orleans Literacy Institute, a collaborative with Tulane University, Xavier University of Louisiana, and the Greater New Orleans Education Foundation. The Institute’s goal is to found a support initiative to ensure that all children from birth through 12th grade receive effective, evidence-based literacy instruction and graduate from high school – college and career ready.
Early Screening for Dyslexia and Reading Disorders

Eric Tridas, M.D., FAAP
President, International Dyslexia Association
Plain Talk About Reading Institute
New Orleans
April 2014

Objectives
- Identify rationale for physician involvement in the early identification of children at risk for dyslexia and other reading problems
- Understand the definition of dyslexia
- Understand the neurobiology of dyslexia
- Familiarize with screening methods to identify patients at risk for dyslexia and other reading problems
- Identify resources for the diagnosis and management of reading problems

Disclosures
- Dr. Tridas is a consultant for:
  - Pfizer
  - Eli Lilly
- Dr. Tridas is a speaker for:
  - Eli Lilly
  - Pfizer
  - Shire
- Dr. Tridas has conducted research for:
  - Eli Lilly

Why Do Medical Doctors Need To Learn About Reading?

Dyslexia/Literacy Statistics
- 10% of the population has dyslexia
- 33% of 4th graders read below basic
- 80% of prison populations are functionally illiterate
- Frequently associated with ADHD
  - 35% have a language based learning disability
- 80% of learning disabilities are related to reading
- We have a historical connection to reading
  - Physicians were the first to describe reading disabilities

NAEP 1992 - 2011
PLAIN TALK ABOUT READING
New Orleans, LA | April 28-30, 2014

Literacy statistics and juvenile court

- 85 percent of all juveniles in the court system are functionally illiterate.
- 60 percent of all prison inmates are functionally illiterate.
- Imprisonment recidivism rates
  - 16% chance if they receive literacy help
  - 70% with no literacy help
  - Taxpayer costs of $85,000 per year per inmate
- "The link between academic failure and delinquency, violence, and crime is welded to reading failure."
  - >70% of inmates in America’s prisons cannot read above a fourth grade level. (BeginRead.com)

Early Intervention Is Critical

- OT/SL for 5th grade reader 20-minute words/year
- OT/SL for 5th grade reader 30-minute words/year
- Average students receive approximately 10 TIMES as much practice in a year

Historical perspective

- 1877: Adolf Kussmaul
  - Word blindness in adults with acquired brain injuries
  - Normal sight, intelligence and ability to understand language but can’t recognize print
- 1896: W. Pringle Morgan
  - Recognition as a developmental disorder
- 1925: Samuel Orton
  - Stenophasia (twisted symbols)
  - Recognized left hemisphere involvement
  - Worked with Anna Gillingham, PhD on the development of a structured, multisensory measure of reading instruction based on phonemes

What Is Dyslexia?

Definition & Neurobiology

What is Dyslexia?

- From the Greek
  - dys – difficulty, lexia – words
- Hereditary - Neurological
- Chronic
- Problems with reading and spelling
- Comprehension is better than expected
- Basic deficit is phonemic awareness
- Often accompanied by other challenges

Dyslexia: Definition

- One of several distinct learning disabilities
- Neurobiological in origin
- Symptoms
  - Poor decoding and spelling abilities
  - Problems with accurate and/or fluent word recognition
  - Inconsistent with age, educational experience and/or cognitive ability
**Dyslexia: Definition**
- Etiology
  - Deficits in phonological processing
- Consequences
  - Poor reading comprehension
  - Poor vocabulary and general knowledge development

**Reading Disability**

**Dyslexia: Myths**
- Dyslexia is *not a visual problem*
  - Children see letters backwards
  - Children show mirror writing
- Dyslexia is responsive to standard classroom teaching
  - Dyslexia requires explicit, systematic, data-driven, intense instruction

**Poor Readers vs. Dyslexics**
- Poor Readers
  - Do not have an atypical brain
  - Problems due to:
    - Lack of experience
    - Poor environmental stimulation
    - Causes poor vocabulary and phonological processing
  - Weak phonological system affects decoding
  - Poor vocabulary affects comprehension
  - Respond quickly to intervention and more standard educational instruction

**Neurobiology of Dyslexia**

**Dyslexia: Neurobiology**

- Left Hemisphere
- Dorsal parietotemporal system (phoneme processing)
- Left inferior frontal region (speech)
- Ventral occipitotemporal system (visual word recognition)
Dyslexia: Neurobiology

- Failure of left hemisphere posterior brain systems
  - Language system
    - Word analysis system: Parsito-temporal region
    - Phoneme processing (individual units)
    - Requires attention
    - Slow processing
  - Visual System
    - Whole word system: Occipito-temporal area
    - Whole word processing
    - Fast processing

Dyslexia: Neurobiology

- Occipito-temporal area
  - Visual word
  - Rapid/automatic
  - Engaged when the word is not consciously perceived
  - Predominates in skilled readers
  - Binds together as a unit orthographic, phonologic and semantic features of a word
    - Combines the spelling with the sounds and the meaning
  - Controls fluency

Dyslexia: Neurobiology

Typical Readers: Elision versus Repetition

Typical Readers
Dyslexic Readers

Left
Right

Dyslexia: Etiology

- Language problem specific to the Phonologic Module
  - Functional part of the brain where
    - Sounds of language (phonemes) are put together to form words
    - Words are broken down into their elemental sounds (phonemes)
    - Words are discriminated from noise
  - Learning to read is not natural
## Language

- **Articulation**
  - How speech sounds are made
  - Produce the "r" sound in order to say "rabbit" instead of "wabbit".
- **Voice**
  - Use of the vocal folds and breathing to produce sound
  - Overuse or misuse can lead to hoarseness or loss of voice.
- **Fluency**
  - The rhythm of speech
  - Hesitations or stuttering can affect fluency.

## Receptive & Expressive Language

- **Receptive Language**
  - The ability of the listener to interpret the message accurately
  - Understanding others
  - Listening comprehension
  - Correlates with reading comprehension
- **Expressive Language**
  - The use of voice and gestures to relate thoughts and emotions
  - Sharing thoughts, ideas and feelings
  - Oral expression
  - Correlates with written expression

## Speech

- **Articulation**
  - How speech sounds are made
  - Produce the "r" sound in order to say "rabbit" instead of "wabbit".
- **Voice**
  - Use of the vocal folds and breathing to produce sound
  - Overuse or misuse can lead to hoarseness or loss of voice.
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## Language

- **Content**
  - Affects:
    - Comprehension
    - Expression
    - Word-finding
    - Speech discrimination

## Phoneme: Definition

- The basic units of sound in a language by which morphemes, words, and sentences are constructed
- The 40 - 52 phonemes of the English language can combine to form thousands of words
- Words must be broken into their phonemes before they can be recognized by the language system
- Deficits in phonology strongly correlate with reading problems
The Particulate Principle and Phonemes

- Particles create open ended hierarchical systems
  - i.e. nucleotides in DNA, atoms in elements
- Particles don't change
- Particles combine to create new elements but maintain their original properties
  - Phonemes combine into morphemes
- Elements/Phonemes blend

Co-articulation

- The ability to compress and overlap several phonemes into a single sound burst
  - Speech sounds are unsegmented
- Allows sound to be compatible with the capacity of the auditory system (working memory)
  - 1 to 2 secs (5 - 7 words before it leaves short term memory)
- Brain
  - Distinguishes speech from noise
  - Attends to meaning not specific sounds in words

Dyslexia: Phonology

Speaking: books → b k k
Reading: eat → k a

Phonemes are the core elements of words

Language Development

- Essential elements for Reading, Spelling & Writing
  - Phonology
  - Semantics
  - Syntax

Phonologic System

- Requires attention - arousal
- Each sound combines essential sensory features
  - Auditory
  - Visual
  - Kinesthetic

Phonologic System
Phonological Processing Deficits

- Phonological Awareness
- Rapid Naming
- Phonological Memory

Neurobiology of Phonological processing

- Phoneme Processing

Fluency

- The ability to read text
  - Quickly
  - Accurately
  - With good understanding
- The hallmark of a good reader

Neurobiology of Fluency

- Visual Word - Fluency

Reading Disability

\[(D \times F) + C = \text{Reading}\]

- D = Decoding
- F = Fluency
- C = Comprehension

Reading Process: Basic Elements

- Phonemic Awareness
- Fluency

Word Identification

- Vocabulary
- Sentence Structure

Comprehension strategies

Meaning
Reading Disability

Early Identification

Early Signs of Dyslexia
- By age of onset - Developmental history
  - Delay in speaking
  - Difficulty in pronunciation
  - Insensitivity to rhyme
  - Poor word retrieval or word finding
  - Naming the letters and their sounds

Early Signs of Dyslexia
- Infants and toddlers
  - Delay in speaking
    - First word by 1 year
  - Phrases by 18 - 24 months
  - Family history

Early Signs of Dyslexia
- Preschool years
  - Difficulty in pronunciation
    - No "baby talk" by 5 or 6 years of age
  - Omission of sounds
    - elephant for elephant
    - chic_en for chicken
  - Inverting sounds
    - animal for animal

Early Signs of Dyslexia
- Preschool years
  - Insensitivity to rhyme
    - Unable to recite nursery rhymes
      - Children that remember nursery rhymes tend to be good readers
    - Unable to differentiate between similar and different words
      - Can not focus on parts of the words
      - What rhymes with: food, talk
Early Signs of Dyslexia
- Poor word retrieval or word finding
  - Talking around a word (circumlocution)
  - Uses words like "stuff" or "things"

Early Signs of Dyslexia
- Naming the letters and their sounds
  - Before entering Kindergarten
    - Knows the names of upper and lower case letters
  - Before entering 1st grade
    - Knows the names and sounds of letters
  - Alphabetic principle
    - Sequence of letters = number and sequence of sounds
  - Matches beginning sounds of words
  - Pronounces beginning sounds of words
  - Counts phonemes in small words

Early Signs of Dyslexia
- Typical development
  - 4 – 6 y/o aware that words come apart
  - 6 y/o 70% can count phonemes in small words

Early Signs of dyslexia
- After 1 year of reading instruction (end of 1st grade) can't separate sounds of spoken word - phoneme segmentation

Common Signs of Dyslexia
- Problems with:
  - Phoneme segmentation
  - Phoneme deletion
  - Specific word retrieval (i.e. tornado for volcano, prostitute for prosecute)
  - Rapid word retrieval

Screening Tool History
Infant and Toddler
- Did your child...
  - Say single words by 18 months (ex. eat, juice, money)? □ □
  - Understand 250 words by 18 months? □ □
  - Speak in 2-3 word phrases by 2 years (ex. go eat more cookies)? □ □

Screening Tool: History
After completing the 4 y/o VPK
- Did your child...
  - Eliminate sounds from words (to eat, go to eat, go to juice)? □ □

- Could your child...
  - Recite simple nursery rhymes (ex. nursery rhyme)? □ □
  - Identify words that rhyme with each other (ex. potato)? □ □
  - Name at least 10 upper case letters (ex. A, B, C, D, E)? □ □
  - Identify the letters in his/her own name? □ □
Screening Tool: History

After completing the Kindergarten

- Could your child...
  - Name most of the upper and lower case letters? □ □
  - Say the sound of most letters? □ □
  - Match a beginning sound to a word starting with that sound (yes, use to say)? □ □
  - Identify the beginning sounds of spoken words? □ □
  - Write his/her first and last name? □ □

Screening Tool: History

After completing the First Grade

- Can your child separate and/or count the sounds in a word? □ □
- Does your child sound out unfamiliar words while reading? □ □
- Does your child have problems finding the right word? □ □

General History

- Is there a family history of language and/or reading problems? □ □
- Is there a concern about your child’s reading abilities? □ □
- Clinician’s concern □ □

Screening: Test

Alphabetic principle (use following words for items below)

- GUUV (3) □ NID (3) □ STEEB (4) □ FRAS (4) (listening #)
- guv (3) □ nid (3) □ steb (4) □ ras (4) (listening # or #)

- Entering Kindergarten
  - Names UPPER CASE letters P F
  - Say a word that rhymes with run. P F

- Entering 1st
  - Names and sounds of beginning letters in words P F
  - Names and sounds of ending letters P F
  - Reads a 3-letter nonsense word (252 words) P F

Screening: Test

Alphabetic Principle

- Entering 2nd grade
  - Reads a 4-letter nonsense word (252 words) P F

Word Parts (entering 2nd grade)

- Tells how many sounds are in each spoken word: P F
  - Says ball without the b □ □
  - Fills in the following sentence: "Paint: I showed my teacher the picture _______" P F

Clinician’s Concern

P F

Intervention

WHAT TO DO ABOUT IT.

Research Based Reading Instruction

- Essential Components
  - Phonemic awareness
    - Recognize, remember and manipulate individual sounds
  - Phonics and word recognition
  - Sound – symbol relationship, word meaning
  - Reading Fluency
    - Read with sufficient speed an accuracy to support comprehension
  - Vocabulary development
    - Individual word meanings
  - Reading comprehension
    - Verbal reasoning, background knowledge, comprehension strategies
Reading Instruction

- Other components
  - Basic writing skills
  - Compose English with accuracy, fluency and clarity of expression
  - Comprehending and using language
  - The ability to listen and understand the meaning of what someone is saying

Effective Reading Instruction

- Explicit
  - Clearly and directly explained not left to discovery
- Systematic
  - The speech sounds, spelling patterns, sentence structures, text genre and language conventions
- Cumulative
  - Continual review one skill builds on another
- Sequential and Incremental
  - Manageable steps
- Data driven
  - Ringphasis, speed of instruction and support are determined by student's progress

Effective Reading Instruction – The 4 I’s

- Informed methodology
- Informed instructor
- Appropriate intensity and fidelity
- Involved administrators

Explicit Instruction: Design of Instruction

- Explicit Instruction of Skills/Strategies
  - Model  I do it.  My turn.
  - Prompt  We do it.  Let's do this together.
  - Check  You do it.  Your turn.

Dyslexia: Management

Dyslexia-specific brain activation profile becomes normal following successful remedial training

The drE nEd

WE'RE DONE!

QUESTIONS