Dysgraphia in the Classroom

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• Dysgraphia is:
  – “...a writing pattern characterized by substantial effort which interferes with a student’s ability to convert ideas into a format...Primarily, the student experiences difficulty in automaticity remembering and mastering the sequence of muscle motor movements needed in writing letters or numbers.” (p. 72)

Developmental Coordination Disorder-Dysgraphia

• Types:
  – Dysgraphia
  – Gertsman Syndrome-(not the type associated with Mad Cow Disease-Bovine Spongiform Encephalopathy)

* Symptoms of Developmental Gertsman Syndrome:
  Dyscalculia (Mathematics Disorder), Dysgraphia, problems with Directionality, finger agnosia

Deuel speculated there are three types of dysgraphia:

- “Dyslexic Dysgraphia:
  - Spontaneously written text is poorly legible, with textual complexity influencing legibility.
  - Oral spelling severely abnormal.
  - Coping of written text relatively preserved.
  - Drawing relatively preserved.
  - Finger tapping speed abnormal.” (p. S7)

Developmental Coordination Disorder—Dysgraphia

- “Dysgraphia due to motor clumsiness:
  • Spontaneously written text is poorly legible.
  • Oral spelling relatively preserved.
  • Copying of written text is poorly legible.
  • Drawing is usually compromised.
  • Finger tapping speed abnormal.” (p. S7)

Developmental Coordination Disorder-Dysgraphia

- “Dysgraphia due to defect in understanding space:
  • Spontaneously written test is poorly legible.
  • Oral spelling relatively preserved.
  • Copying of written text is poorly legible
  • Drawing severely abnormal.
  • Finger tapping speed is normal.” (p. S7)

“The neuromuscular patterns in normal writing originate in visual, auditory, tactile-kinesthetic, and linguistic images in the human cortex that stimulate the motor area where manual-motor images are aroused. These are conveyed to the writing hand in a delicate blending of visual-auditory-, tactile-, and kinesthetic-linguistic processes. Dysfunction at any point or points in this neuropsychological structure may result in impaired writing ability...” (p. 393)

Developmental Coordination Disorder-Dysgraphia

• Dysgraphia is most commonly related to:
  – Dyslexia
  – But, may be comorbid to coordination problems and spatial awareness

Developmental Coordination Disorder-Dysgraphia

- It is an impairment in the process of writing.
- They have problems with the ability to use automatic serial movements for letter forms.
- They exert excessive effort
- They sometimes can create accurate letters by using vision to guide their movements.
- Older dysgraphics are harder to habilitate.
- Cursive writing may be harder than manuscript.

Developmental Coordination Disorder-Dysgraphia

- Often those with dysgraphia have weak motor memory
- Writing is not automatic, inconsistent requires a lot of cognitive processing and erasures
- There are degrees of dysgraphia
- “When the motor function is liberated from sequential memory, such children can demonstrate a strong fine motor performance, which results in artistic creative drawings.” (p. 66)

Developmental Coordination Disorder-Dysgraphia

- “Drawing and most other motor skills do not demand as much recall of precise automatic, sequential motor patterns. Instead they rely on movements that involve more visual guidance and decision-making as they are performed.” (p. 67)

- “The major handwriting problem for dysgraphic students is difficulty formulating or implementing the motor plan, especially as reciprocity (the ability to change directions adequately and fluently) is required.” (p. 67)

Developmental Coordination Disorder—Dysgraphia

• Active Working Memory allows the return to earlier steps to integrate new information into them.
• Dysgraphics have problems with Active Working Memory which leads to Processing Fatigue.
• This results in poor automization of the motor movements and leads to Motor Fatigue.
• The more they write the less legible it gets.

“Disruption in the neuropathways may result in: (1) motor impairment (e.g., tremor, letters clumsily drawn, letters overlapped or not linked, absence of loops, reduplication of strokes, micrographia, etc.); (2) spatial disorders (poor alignment of letters, crowding of words, omitting a margin, orientating lines upward or downward, etc.); (3) syntactical disorders (agrammatic written answers…” (p. 393)

Developmental Coordinaton Disorder-Dysgraphia

- Many dyslexics have right side weakness which causes problems with handwriting.
- Such people have poor pencil grips

• The following are the types of pencil grips people use:
  – Non-inverted
  – Partially inverted
  – Normal
  – Tight grip
  – Loose Grip

“A survey of fine-motor requirements in elementary schools in Massachusetts showed that 30% to 60% of the time in school was spent in mostly fine-motor activity. This statistic reveals why the child with poor written expression (Dysgraphia) is a major disadvantage for a large portion of the school day.” (p. S6)

A Good Book That Summarizes this Research


Developmental Coordination Disorder-Dysgraphia

The importance of handwriting will probably diminish as students use computers more for written assignments.

AD/HD and Learning Disorders and Dysgraphia

Barkley stated:

- 15% to 30% of AD/HD have Reading Disorder
- 26% have Spelling Problems
- 10% to 60% have Mathematics Disorder
- Developmental Coordination Disorder Disorder-Dysgraphia 60%


Barkley, R.A. (2002) Mental and Medical Outcomes of AD/HD. Pre-Conference Institute, # TPA1, Thursday October 17, 2002, 14th Annual CHADD International Conference, Miami Beach, FL.
AD/HD and Learning Disorders and Dysgraphia

Hynd indicated those with Inattentive AD/HD:

- 21% have Reading Disorder
- 33% have Mathematics Disorder
- 4% have Spelling/Disorder of Written Expression

Barkley stated 50+% of those with ADHD meet criteria for DCD.

They have Poor Physical Fitness

They are Accident Prone (Especially those with ODD)

Developmental Coordination Disorder-Dysgraphia: Accommodations

“So long as the student’s writing is legible, and so long as it is the best he or she can do, I will accept it without making the writer feel threatened or inferior.” (p. 231)

Developmental Coordination Disorder - Dysgraphia: Accommodations

“If you will write a story as I have suggested, I will read it carefully. I know that it’s hard for you to spell and punctuate accurately. But don’t worry about that. The main thing is for you to express yourself. Be creative! You can trust me to appreciate the part of yourself you put on paper, I won’t betray your trust!”

Developmental Coordination Disorder Dysgraphia: Accommodations

• Warm-up you writing hand before writing
  – Mildly shake your hands.
  – Rub them together.
  – Wiggle fingers for about 10 seconds.
  – Do the above periodically as you write.

Developmental Coordination Disorder-Dysgraphia: Accommodations

• Deuel offered the following regarding habituation:
  – Allow the Dysgraphic to answer orally or to audio tape essays.
  – Allow extended time testing.
  – Allow word processors.

Developmental Coordination Disorder-Dysgraphia: Accommodations

• Adaptive pencils and pens may help those with fine motor control problems, but no spatial or linguistic problems.

• Anti-seizure medications may help those with dystonia or tremor.

Orthopedic Pens for Dysgraphia

- www.penagain.com

http://www.penagain.com/productselection.html
“Because the deficit in handwritten expression results from an adverse interplay between output systems and linguistic and non-linguistic mental operations, the lower the motoric requirement, the better and faster the written expression. Computerized word processing requires only a single ballistic movement (a keystroke, or sometimes two for capitalization) to perfectly form a legible letter or carefully measured space...”
“This is simply motor motion, once overlearned, demands a much smaller extent of cerebral activation than control of a pen or pencil.” (pp. S7-S8)

Developmental Coordination Disorder—Dysgraphia: Accommodations

- Accommodations:
  - Oral essay tests
  - A scribe/note taker—dictate to a typist
  - Word processor (Note: this will often not help those with Gertsman’s Syndrome because of finger agnosia.)
  - Voice Activated Word Processors
  - Extended time testing and for written assignments
  - Tape recorded notes
  - Good academic advisement with disability in mind
Developmental Coordination Disorder - Dysgraphia: Accommodations

• Jordan suggested the following regarding compensating for writing problems:
  – Encourage students to talk while they write
  – Extended time
  – Frequent breaks for muscle tension
  – Double spacing
  – Reduce expected writing
  – Allow the use of manuscript and/or cursive
  – Encourage drafts and editing
Developmental Coordination Disorder—Dysgraphia: Accommodations

- Dictation to a scribe
- Use sentences first as semantic maps
- Use a word processor

Development Coordination Disorder - Dyslexia

• Helpful Resource:
  – American Occupational Therapy Association
  – 4720 Montgomery Lane
  – P.O. Box 31220
  – Bethesda, MD 20824-1220
  – Phone: 301-652-2682
  – TDD: 800-337-8555
  – Fax: 301-652-7711
  – Web: www.aota.org
Developmental Coordination Disorder-Dysgraphia and/or DWE

- Helpful Technology:

  - AlphaSmart Direct, Inc.
  - Renaissance Learning, Inc.
  P.O Box 8036
  Wisconsin Rapids, WI, USA
  54495-8036
  800-656-6740
  715-424-4242 (fax)

- Website: [http://alphasmart.com/index.html](http://alphasmart.com/index.html)
• Helpful Resource:
  – American Occupational Therapy Association, Inc. (AOTA)
    4720 Montgomery Lane
    PO Box 31220
    Bethesda, MD 20824-1220
  – Phone: 301-652-2682
  – Website: http://www.aota.org
Developmental Coordination Disorder-Dysgraphia

• Helpful Resource:
  – American Physical Therapy Association
  – 1111 North Fairfax Street
  – Alexandria, VA 22314-1488
  – Phone: 800-999-2782
  – TDD: 703-684-6748
  – Fax: 703-684-7343
  – Service Center: 800-399-2728, ext. 3395
  – Web: www.apta.org
Developmental Coordination Disorder-Dysgraphia

- A good resource on Dysgraphia: