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continued

PT in School-Based Settings

Guest Editor: Lisa Kenyon, PT, DPT, PhD, PCS

continued

Physical Therapy Virtual Conference

Mon 10/7	The Challenge of Keeping Assessments Standardized Deanne Fay, PT, DPT, PhD
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continued

School-Based Intervention for Children with Developmental Coordination Disorder (DCD) or Suspected DCD

Melinda Mueller, PT, DPT, PCS
Lisa A. Dannemiller, PT, DSc, PCS

continued

Learning Outcomes

As a result of this course, participants will be able to:

- Define the four DSM-5 criteria used to diagnose developmental coordination disorder (DCD).
- Describe the current evidence for PT management of children with DCD or suspected of DCD, specifically focused on examination and intervention in the school environment.
- Identify at least three unique challenges of working with children with DCD in the school environment.

continued

Timeline

Flexible timeline based on participant needs, but generally:

- 0-15 min: Introduction
- 15-35 min: Review of criteria for the diagnosis of DCD
- 35-75 min: Description of evidence for examination and intervention in the school setting
- 75-90 min: Unique challenges in the school setting
- 90-115: Case discussions
- 115-120: Final Q&A

continued

Important Disclaimer

- This presentation does not include recommendations from the CPG team on DCD. The CPG process is ongoing and not yet completed. This presentation has been designed to offer general information about DCD, explain some of the work that has been done, present guiding evidence, and offer clinicians some important clinical resources that we have discovered. CPG Team on DCD

DSM 5 Criterion

A diagnosis of DCD is made by a physician, psychologist, or psychiatrist when the following 4 criteria are observed:

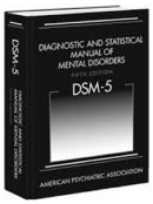
A. Learning and execution of coordinated motor skills is below age level given the child's opportunity for skill learning
B. Motor difficulties significantly interfere with ADL's, academic productivity, prevocational and vocational activities, leisure and play

DSM 5th edition, 2013

DSM 5 Criterion

C. Onset is in the early developmental period
D. Motor coordination difficulties are not better explained by intellectual delay, visual impairment, or other neurological conditions that affect movement

DSM 5th edition, 2013



continued

Other Terms in Literature

- Specific developmental disorder of motor function
- Clumsy child syndrome
- Developmental dyspraxia
- Prevalence of DCD: ~ 5-6% of school-aged children (in a class of 33, may see 2 children with probable DCD)

continued

Co-occurring conditions

- ADD and ADHD (approximately 50% co-occurrence)
- Specific learning disabilities (esp. reading and writing)
- Speech and language disorder
- Autism Spectrum Disorder
- Conduct disorder

Harris et al, 2015; Kirby et al, 2013

Characteristics of DCD

- Gross motor skill delay
- ADL limitations
- School challenges
- Social implications
- Communication issues
- Incidence: 5-6%

Kirby A, Sugden D, Purcell C, 2014

Functional Consequences

- Poor fitness
- Obesity
- Decreased physical activity (encourage individual sports)
- Poor self-esteem and self-worth
- Emotional and behavioral problems
- Impaired academic achievement
- At risk for being bullied

Cairney et al 2013; Rivilis et al, 2011

continued

Experience what it is like to have DCD

- Hand clasp/Individual finger movement

continued

Our information is from the development of a CPG

- What is a CPG?
- "An evidence-based clinical practice guideline (CPG) is a collection of action statements based on a systematic review of the literature on the topic of choice that reflects current recommended clinical practice intended to optimize patient care, minimize harm, and reduce unnecessary variability"

Kaplan, Couler, Fetters, 2013

continued

Examination: DSM V Diagnostic Criteria

- Criteria A - Motor Performance Deficits
- Criteria B - Participation and ADL Deficits
- Criteria C - Early Onset
- Criteria D - No Exclusionary Conditions

DSM 5th edition, 2013

continued

Examination: Criteria D No Exclusionary Conditions

- History and Systems Review
  - Loss of motor skills
  - Neurological signs (ataxia, abnormal muscle tone, gower's sign)
  - Signs or symptoms of trauma
  - Acute changes in cognitive function
  - Acute changes in vision

Kirby A, Sugden D, Purcell C, 2014

continued

Examination: Criteria D
No Exclusionary Conditions

- Exclusionary Conditions
  - Cerebral palsy
  - Congenital syndromes
  - Genetic disorders
  - Malignancies
  - Musculoskeletal disorders (i.e. hip dysplasia)
  - Neurodegenerative disorders
  - Toxic and teratogenic disorders
  - Traumatic brain injuries
  - Visual impairments

continued

Examination: Criteria C
Early Onset

- Delay in gross motor or fine motor skills in the early developmental period

DSM 5th edition, 2013

continued

Examination: Criteria B Participation and ADL Deficits

- Developmental Coordination Disorder Questionnaire (DCDQ'07)
  - Parent Questionnaire (http://www.dcdq.ca/)
  - Control during movement, fine motor and handwriting, and general coordination
  - Sensitivity 86% Specificity 71%
  - 5 to 15 yo
  - Free!
  - Little DCD-Q - $

Wilson et al, 2009

continued

Examination: Criteria B Participation and ADL Deficits

- Motor Assessment Battery for Children Checklist - Second Edition (MABC-2-C)
  - Teacher, Parent or Therapist complete questionnaire
  - Self-care skills, classroom skills, ball skills and recreational skills
  - Sensitivity 41%, Specificity 88%
  - 3 to 16 yo
  - $$

Henderson, Sugden, & Barnett, 2007

continued

continued

Examination: Criteria B Participation and ADL Deficits

- General questionnaires, checklists and interview
  - Teacher checklist and or interview
  - Parent interview
  - Student interview
  - Ecological checklist across all school settings

continued

Examination: Criteria A Motor Performance Deficits

- Motor Assessment Battery for Children, 2nd Edition (MABC-2)
  - Norm Referenced (UK population)
  - 3 to 16 yo
  - 20 to 40 minutes to administer
  - 3 domains: manual dexterity, aiming and catching and balance
  - $$$

Henderson, Sugden, & Barnett, 2007

continued

Examination: Criteria A Motor Performance Deficits

- Motor Assessment Battery for Children, 2nd Edition (MABC-2)
  - MABC-2 pdf (http://elearning.canchild.ca/dcd_pt_workshop/assets/identification/mabc-2.pdf)

continued

Examination: Criteria A Motor Performance Deficits

- Bruininks-Oseretsky Test, 2nd ed. (BOT-2)
  - Norm Referenced (US population)
  - 4 to 21 yo
  - 45 to 60 minutes to administer
  - 4 domains: fine manual control, manual coordination, body coordination, and strength and agility
  - $$$

continued

continued

Examination: Criteria A Motor Performance Deficits

- Fundamental motor skills (quality and ability)
- Ecological Checklist with Movement Analysis (examples):
  - Keeping up with peers during transitions (hallways, stairs, on/off floor)?
  - Ability to participate in age appropriate games on the playground?
  - Posture during sitting activities
  - Ability to participate in PE

continued

Examination of Body Structures and Functions:

- Motor Performance, Physical Activity and Physical Fitness
- Poor motor performance
- Poor physical activity outcomes
- Perform significantly lower in most fitness components
  - Cardiorespiratory fitness
  - Muscle strength and endurance
  - Balance

Rivilis et al, 2011

continued

Examination of Body Structures and Functions:

- Components of physical fitness related to access at school:
  - Muscular strength and endurance
    - 30 second walk test
  - Cardiorespiratory Fitness
    - 6-minute Walk Test, 20-meter Shuttle Run
  - Balance
    - Pediatric Reach Test
- APTA Fact Sheet: List of Assessment Tools

continued

Complete Outcome Measures Related to Participation

- Canadian Occupational Performance Measure (COPM)
- Perceived Efficacy and Goal Setting Program (PEGS)
- Children's Assessment of Participation and Enjoyment (CAPE) and Preferences for Activities of Children (PAC)
- Goal Attainment Scale (GAS)

continued

Task-Oriented Intervention

- Task-Oriented Intervention - motor activities or programs to improve the acquisition and execution of a specific functional task
  - Motor Skills Training (MST)
  - Neuromuscular Task Training (NTT)
  - Cognitive Orientation to Daily Occupational Performance (CO-OP)
  - Motor Imagery (MI)

Smits-Engelsman et al, 2018

continued

Task-Oriented Intervention

- Motor Skills Training and Neuromuscular Task Training -based on theories of motor control and motor learning, focus on goal attainment through active participation and task demands that are progressively increased
  - Intervention Example:
    - Stairs as an intervention to improve stair negotiation
    - Stairs as an intervention to improve leg strength

continued

Task-Oriented Intervention

- Cognitive Orientation to Daily Occupational Performance (CO-OP) - 4-step self-instructional problem-solving strategy. This method is typically summarized with the mnemonic "GOAL-PLAN-DO-CHECK"
  - Additional training is required to implement the intervention
  - Intervention Example:
    - Jumping Rope

Polatajko & Mandich, 2004

continued

Task-Oriented Intervention

- Motor Imagery (MI) - is a mental process by which an individual rehearses or simulates a given action.
  - 6 components:
    - Visual imagery exercises
    - Relaxation and mental preparation
    - Visual modeling of fundamental motor skills
    - Mental rehearsal of skills from an external perspective
    - Mental rehearsal of skills from an internal perspective
    - Overt practice with repetitions of the skill and mental rehearsal between each skill.

Wilson et al, 2016

continued

Interventions at the Level of Body Function and Body Structure

- Core Stability Training
  - Task-oriented training to include functional tasks which included walking, running, jumping, hopping, skipping and galloping.
- Balance Training
  - Task-oriented training to include functional tasks which included walking, running, jumping, hopping, skipping and galloping.
- Cardiorespiratory Training
  - Interval training with running

YU et al, 2018

continued

The Evidence on Intervention: Type

- Outcomes in motor performance
  - BEST: Combination of a task oriented approach with impairment level interventions
  - GOOD: Task-oriented approach alone
  - NOT RECOMMENDED: Impairment level intervention in isolation

YU et al, 2018

continued

The Evidence on Intervention: Sessions

- Outcomes in motor performance
  - Group (4-6:1) vs. Individual
    - Both are equally effective
    - Combination of group and individual sessions
    - Large group (11:1) may cause increased anxiety and decreased enjoyment

deHora et al, 2018

continued

The Evidence on Intervention: Intensity

- Outcomes in motor performance
  - Increased practice schedule / repetition
    - 4 to 5 times a week
    - Frequency was more important than the amount of time
    - Use of direct time, home program, supplemental
  - Increased duration
    - 9 weeks

Yu et al, 2018

continued

Role of School-based Physical Therapist

- Improving functional motor skills (gross and fine)
  - Increase participation in school activities with peers
  - Increase participation in physical activities at school and in the community
- Collaborating with school team members and significant adults
  - Education of diagnosis
  - Strategies to improve participation
- Recommend and provide resources for community activities (individual vs. group, motor vs. non-motor)

continued

Possible School Needs

Children with DCD may qualify for a 504 plan or an IEP

- They may need:
  - More time to complete assignments and testing
  - Less handwriting and more keyboard
  - Assistance with organizational issues
  - Auditory or visual recording of stories or papers
  - Adapted PE or modifications/adaptations to PE
  - School counseling
  - Co-existing conditions (ASD, ADHD)

continued

Case Discussion

continued

Additional Resources

- CanChild https://www.canchild.ca/en/diagnoses/developmental-coordination-disorder
- Flyer for PE teachers
- Flyer for MD for identification and referral questions
- M.A.T.C.H booklet for teachers
- http://www.dystalk.com/topics/2-dyspraxia
- Children with DCD booklet for parents and teachers
- Flyer for coaches
- Studies on DCD
- Videos for evaluation and intervention ideas

continued

Additional Resources

EACD article

Blank R, Smits-Engelsman B, Polatajko H, et al. European Academy for Childhood Disability (EACD): recommendations on the definition, diagnosis and intervention of developmental coordination disorder. Dev Med Child Neurol. 2012;54(1):54-93.

http://www.dystalk.com/topics/2-dyspraxia

continued

Questions?

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