Motor Skills Disorders in young children

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Synonyms

- Clumsy child
- Motor clumsiness
- Motor control disorder
- Developmental coordination disorder
- Developmental disorder of motor control
- Motor dyspraxia
- Dyscoordination disorder
Importance

- Early identification
- Marker of other difficulties
- Early intervention
- Child’s self esteem (preschooler and later on)
- Child’s social acceptability and peer relations. Academic tasks
Importance

- Condition varies in severity from obvious to very mild
- Often goes unnoticed
- Perceived as laziness, lack of interest, dislike of the activity
- Higher association with behavioral difficulties and learning disabilities, attention span problems
Motor coordination

- Developmental task, acquired as a process
- Requires processing in brain, input, processing and output
- Influenced by higher functions, like motivation, planning, intent
- Participation of cerebellum, vestibular system, proprioceptive reception, etc.
Components of motor functioning

- Muscular Tone
- Gross motor skills
- Fine motor skills
- Motor planning
- Sequencing of movements
- Strength
- Sensory integration
components

- **MUSCULAR TONE**
- Basic and consistent baseline state of contraction
- Hypotonicity: child appears floppy, tends to adopt positions of less resistance, leans on things
- Hypertonicity. Like “washboard”, stiff, less easy movement. Tremor?
components

- GROSS MOTOR SKILLS
- Activities of everyday life, walking, running, throwing
- Jumping, standing, hopscotch,
- Posture influences performance
- Organization, smoothness of movement, whether achieves its goal, COST TO THE CHILD
components

- FINE MOTOR SKILLS
- small muscles in organized fashion, hands, feet, head, face (peri-oral, periocular, etc.)
- Delicate tasks. Pincer grasp? Intentional tremor?
- Drawing, cutting, manipulation of small objects, blowing bubbles, whistling, eating, etc. Also articulation of words
components

- **STRENGTH**
- Does child appear too strong? i.e. too forceful, brusque?, not able to modulate strength?
- Does child appear too weak, unable to draw intense lines, to hold a glass, to open packages, a can, etc. ?
- Muscular development? High or low?
components

- MOTOR PLANNING
- imagine a mental strategy to carry out a movement or action
- How to overcome an obstacle
- Odd strategies? or no idea of how to accomplish a movement?
- Falls easily, falls while standing, trips ion self, etc.
components

- SPEED AND SEQUENCING OF MOVEMENTS
- Whether child can achieve movement but also speed
- Whether the movement can be accomplished in sequence
- more obvious in complex motor tasks
- child may appear slower, or attempt too fast performance
components

- SENSORY INTEGRATION
- Input in different sensory channels
- Processing in the brain
- Organization of output
- COPING RESPONSES, depending on the task
- Variability of coping depending on sensory stimulation, state of organization, etc
- BEST PERFORMANCE?
Epidemiological features

- No evidence of ethnicity factors
- More frequently affected are boys
- Most obvious during school age years
- Can be detected in infancy or early childhood.
- US studies. Around 5% of children of school age, enough to cause concern
Epidemiology

- Sweden (Kadesjo- Gillberg). 6.1% in a sample of children (409) non referred
- High stability, 8 months later. Boys affected more frequently
- Singapore (Wright). 4% of children 6 to 9 years of age.
- UK. 10% of children (Henderson).
Clinical features

- INFANCY
- Child may appear hypertonic.
- Reacts with easy startles, or hyper-reactive
- Maintains extensor tone
- Persistence of primitive reflexes beyond 6-7 months (Moro, plantar, palmar, rooting, etc.)
Clinical features. infancy

- Hypertonic child may appear “advanced”, like standing very soon, trying to walk by 8 months, etc.
- (African American infants may develop sooner than other ethnic groups)
- Movements appear stiff
- No opposing thumb at 6 months
- Tip toe walking, toes point down
Clinical features. infancy

- More hypotonic child
- Child may be very placid
- Not learning to sit, to roll over
- No self-correcting reflexes
- Child sees world go by
Clinical manifestations toddler

- Food management difficulties, higher consistencies
- No develop rotatory grasp
- No develop pincer grasp around 10 months
- Not able to maintain upright posture or sit,
- Late in developing standing ability and walk
Clinical Preschool child

- Not able to jump on both feet
- Not able to hop on one foot after four years
- Not developing dominance right or left by age four
- NO hand preference
- General impression of clumsiness
- Pencil grasp, primitive
- All this requires exposure by parents
Preschool clinical

• Move whole arm to carry out small motor act
• no isolation of the wrist
• Shoulder belt is weak?
• Easily gets tired
• Often says that it hurts to draw
• Child says he hates to draw or model with clay
Clinical. Preschool

- Unable to squeeze with fingers
- Difficulty with kicking ball, cutting with scissors, coloring
- Tying shoes, putting on coat
- Test motor sequencing
- Diadokokinesis
- Move limbs against resistance
- What is the investment in each movement?
Clinical preschool

- Does child easily fatigue?
- Does child seem unable to modulate strength and has brusque movements/
- Fatigue brings on more errors
- Observe signs of overflow of movement, grimacing, strenuous movements,
- Test proprioception
Motor coordination diff.

- Causes
- Genetic factors
- Use ob substances in utero
- Prematurity
- Exposure and opportunity to practice movements.
Co-morbidity

- Attention deficit hyperactivity
- DAMP syndrome (Disorder of Attention, Motor Control and Perception)
- Written expression disorder
- Phonological problems
- Worse self esteem, anxiety about certain activities
Tests

- Test for soft neurological signs (Denckla)
- Test of motor impairment (TOMI) normed for different ages balance, motor abilities in everyday life tasks
- ABC test of motor coordination. Fine movements. Unilateral, bilateral, making holes, etc.
- 2nd. All the body. Balance, jumping, quick movements.
tests

• Milani Comparetti and Gidoni. Test. Patterns of movement that may be qualitatively different.
• Not only whether child can do it.
• Primitive reflexes.
tests

- Kinesthetic sensitivity test. (Laszlo and Bairstow)
- Bruininks Oserestsky motor proficiency
- Body’s position in space, proprioception
- Towen’s test for minor neurological dysfunction
intervention

• Occupational therapy
• Sensory integration approach
• Models that address the whole child
• Models that address teaching specific skills one at a time.
Intervention

- Cognitive motor intervention
- teach a movement or a pattern of movement.
- ABC movement manual (Henderson and Sugden).
- Set of exercises to practice till mastered
- Also motivation and cognitive issues