

Screening for motor problems and developmental coordination disorder in children with autism spectrum disorder

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Research group Adapted Physical Activity and Psychomotor Rehabilitation

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Background

High prevalence of motor problems

- ✓ 80-90%
- ✓ +/- 80% DCD
- ✓ Early in life and persistent

Overlooked (not core feature)
Underdiagnosed

- ✓ Early recognition → intervention
- ✓ Secondary negative effects
- ✓ Only 1/3 is referred to PT

Motor assessment
should be part of
routine clinical
examination in
children/adolescents
with ASD

Background – routine clinical examination?

Need for **comprehensive** assessment due to heterogeneity in motor profiles



- ✓ Time consuming
- ✓ Expensive
- ✓ Expert therapists
- ✓ Burden child / family
- ✓ Redundant in subset without motor problems



Screening?

Study objective

Is questionnaire-based screening reliable and valid to be used as an initial screening for co-occurring motor problems / DCD in children with ASD?

- Can we use the Developmental Coordination Questionnaire – revised (DCDQ) to identify those children who should be referred for an extensive motor assessment protocol and those who should not?
- Determine the level of agreement between DCDQ-scores and
 - (1) standardized motor assessment instrument
 - (2) DCD diagnosis
 - (3) clinical judgement (referral to physiotherapy)

Method - participants

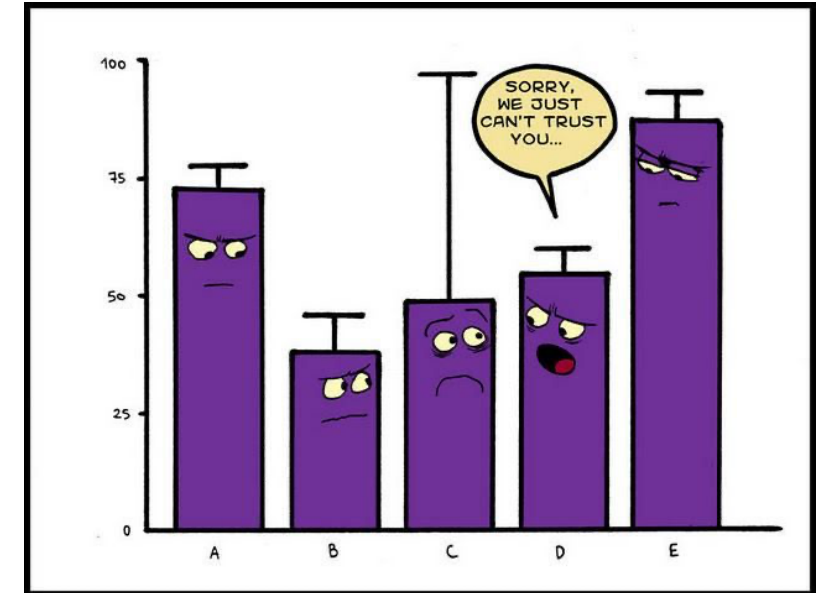
- N = 115 (81.7% males)
- 5-15y (M = 8.98; SD = 2.43)
- Expertise Centre Autism (UPC KU Leuven)
 - Comprehensive diagnostic protocol
 - Consecutive sampling
- Inclusion:
 - ASD diagnosis according to DSM-5, based on decision multidisciplinary team
- Exclusion
 - Physical disability hampering motor assessment
 - Known neurological disorders impacting motor abilities
 - Incomplete data on MABC-2 / DCDQ

Method - instruments

- **Developmental Coordination Questionnaire-revised (DCDQ)**
 - Most used and studied questionnaire worldwide; many languages
 - 15 items: total score (age dependent cutoff) and 3 subscales (control during movement; fine motor / handwriting; general coordination)
 - But sensitivity and specificity tend to vary across settings/populations
- **Motor assessment**
 - Movement Assessment Battery for Children, second edition (MABC-2-NL)
 - Beery-Buktenica Developmental Test of Visual Motor Integration (VMI-6th)
 - Handwriting (SOS-2-VL)

Method - statistics

- **Internal consistency:** Cronbach's Alpha
- **Concurrent validity:** Spearman correlations
- **Discriminant validity:** Mann-Whitney U test
- **Sensitivity, specificity, positive and negative predictive value**
- **Degree of agreement in classification:** Kappa statistic



Results – internal consistency

- Total DCDQ = excellent ($\alpha = .91$)
- Subscales
 - Control During Movement = good ($\alpha = .89$)
 - Fine Motor and Handwriting = good ($\alpha = .87$)
 - General Coordination = good ($\alpha = .75$)
- No redundant items
 - Corrected item-to-total correlations .33-.75
 - α did not increase if item deleted

DCDQ can be used in ASD population, without specific adaptations

Results – concurrent validity

DCDQ	MABC – 2 - NL			
	Total Score	Manual dexterity	Aiming and catching	Balance
Total score	.60**	.54**	.40**	.50**
Control during movement	.61**	.49**	.50**	.52**
Fine motor / handwriting	.38**	.38**	.21*	.31**
General coordination	.43**	.42**	.25**	.36**

Results – discriminant validity

- (1) ASD + DCD group (n = 31) versus ASD- noDCD group (n = 84)
Lower DCDQ scores in ASD + DCD group in comparison to ASD – noDCD group (large ES; $\eta^2 = .29$)
- (2) Motor problems group (n = 78) and no motor problems group (n = 37), according to MABC-2 total score
Lower DCDQ scores in motor problem group in comparison to no motor problems group (large ES; $\eta^2 = .22$)

DCDQ discriminates between children with or without motor problems/DCD

Results – sensitivity, specificity, PPV and NPV

	DCDQ			
	Sensitivity	Specificity	PPV	NPV
MABC-2-NL	79.5%	54.1%	78.5%	55.6%
DCD diagnosis	96.8%	41.7%	38.0%	97.2%
Referral physiotherapy	80.0%	52.5%	75.9%	58.3%

Results – agreement in classification

	MABC-2-NL ($\kappa = .338$)		DCD diagnosis ($\kappa = .258$)		Referral physiotherapy ($\kappa = .333$)	
	At risk	Not at risk	Yes	No	Yes	No
DCDQ at risk	62	17	30	49	60	19
DCDQ not at risk	16	20	1	35	15	21

Take home message

- Screening for co-occurring motor problems in children with ASD is an absolute necessity
- DCDQ can reliably be used, without specific adaptations, in children/adolescents with ASD:
 - As an initial screening instrument for co-occurring motor problems
 - To determine whether referral for full motor assessment is necessary
 - To exclude a DCD diagnosis
 - To detect co-occurring motor problems, regardless of a DCD diagnosis

Questions?

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