EACD Recommendations*

German-Swiss Interdisciplinary
Clinical Practice Guideline
S3-Standard according to the
Association of the Scientific Medical Societies in Germany (AWMF)

Revised for the UK

Pocket version**

Definition, Diagnosis, Assessment and Intervention of

Developmental Coordination Disorder (DCD)

Version – July 2011 (UK, July 2012)

* Terminology in this document is consistent with that of the International Classification of Functioning (ICF)
**Background and references are in the long version (Blank, R., Smits-Engelsman, B., Polatajko, H., & Wilson, P. (2012). European Academy for Childhood Disability (EACD): Recommendations on the definition, diagnosis and intervention of developmental coordination disorder (long version). *Developmental Medicine & Child Neurology, 54*(1), 54-93.)

EACD recommendations

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Hans Forssberg (Chair of the EACD)

The recommendations were approved by an European panel of experts at the EACD meeting in Brussels 26th May, 2010 and through further DELPHI rounds.
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The full guidelines and process are documented in Blank et al. (2012).

Process of tailoring the EACD recommendations to the UK context

General coordination:
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The international consensus presented in the EACD recommendations for DCD (SDDMF) was contextualised for the German-Swiss healthcare system. Context specific aspects of these recommendations were adapted for the UK by consensus among a group of organisations involved in working with those with DCD (SDDMF). Revisions to the recommendations focused solely on the differing context of the UK (and of legislative and practice differences of each country comprising the UK). These recommendations will be revised in the same time frame as the full EACD consensus, and with reference to this (approx. March 2014, on a three yearly cycle).

POCKET VERSION

Recommendations (R) and Statements (S) given in the tables below are based on levels of evidence (LOE) for good clinical practice (GCP) (see page 9).

Definition, diagnostic criteria, assessment, intervention indication

R 1	The term Developmental Coordination Disorder (DCD) should be used to refer to children with developmental motor problems in countries which adhere to the DSM IV-TR classification. In countries where ICD10 has legal status, the term Specific Developmental Disorder of Motor Functions (SDDMF) (F82, ICD10) should be used.	GCP++
R 3	The diagnosis of DCD (SDDMF) should be made by professionals who are qualified to examine the specific criteria.	GCP++
R 6	A dual diagnosis of DCD (SDDMF) and other developmental or behavioural disorders (e.g., ASD, learning disorders, ADHD) should be given if appropriate.	GCP++
R 8	The onset of DCD (SDDMF) is usually apparent in the early years, but would not typically be diagnosed before 5 years of age. If a child aged between 3 and 5 years shows a marked motor impairment, even though there have been adequate opportunities for learning and other causes of motor delay have been excluded (e.g., deprivation, genetic syndromes, neurodegenerative diseases), the diagnosis of DCD (SDDMF) may be made based on the findings from at least two assessments carried out with a sufficiently long interval between them (at least 3 months).	GCP++
R 11	The use of questionnaires (e.g., DCDQ-R, M-ABC-Checklist) is not recommended for population-based screening for DCD.	LOE 0 Level Aneg.
R 2	Criteria for the diagnosis of DCD (SDDMF): I: Motor performance that is substantially below expected levels given the child's chronological age and appropriate opportunities for skill acquisition. II: The disturbance in Criterion I significantly interferes with activities of daily living or academic achievement. III: An impairment of motor coordination that is not solely explainable by mental retardation. The disturbance cannot be explained by any specific congenital or acquired neurological disorder or any severe psychosocial problem.	GCP++
R 12	Careful history taking is essential to support the application of Criteria I, II, III. History should include the following aspects: 1) Parental report (GCP++): • Family history including DCD (SDDMF), comorbidities, environmental factors (e.g., psychosocial factors), neurological disorders, medical diseases, mental disorders, social condition of the family. • Personal history including exploration of resources and possible aetiology (pregnancy, birth, milestones, achievements, social contacts, nursery, school (grades, levels), previous and present disorders esp. neurological disorders, sensory problems (previous assessments), accidents. • History of the disorder (child) including DCD (SDDMF) and comorbidities, exploration of resources, ADL and participation, individual/personal factors, burden of disease, consequences of the DCD (SDDMF). • Exploration of problems: present level / deficits of motor functions, ADL and participation. 2) Teacher report (GCP++): • Motor functions, activities/participation, environmental factors/support systems, individual/personal factors (ICF). • School-based behaviour that bears on comorbidity for attentional disorders, autistic spectrum disorder, learning disorders. • academic achievement.	GCP++

	3) Views of the child should be taken into account (GCP++); child adapted questionnaires may be useful, but cannot be generally recommended (GCP++).	
R 13	Concerning criterion III: Appropriate clinical examination with respect to medical, neurological and behavioural problems is necessary to verify that the disturbance is not due to a general medical, neurological or behavioural condition.	GCP++
S 2	The clinical examination should include: • Neuromotor status (exclusion of other movement disorders or neurological dysfunctions). • Medical status (e.g., obesity, hypothyroidism, genetic syndromes, etc.). • Sensory status (e.g., vision, vestibular function). • Emotional and behavioural status (e.g., attention, autistic behaviour, self-esteem). • Cognitive function should there be a history of learning difficulties at school.	++
R 7	Co-morbidities should be carefully diagnosed and treated according to established clinical guidelines (e.g., ADHD, autism, dyslexia, specific language impairment).	GCP++
S 1	Because of the high probability of comorbidity in DCD (SDDMF), disorders like ADHD, ASD and learning disorder, particularly specific language disorder and in later age reading problems (e.g., poor reading comprehension) have to be checked by careful history taking, clinical examination and specific testing if possible according to existing clinical practice guidelines. If there is any hint of interference (e.g., attentional problems) during objective motor testing, the motor testing should be repeated (e.g., under medication or after other therapeutic intervention for attention problems).	++
R 4	Concerning criterion II: The complete assessment should include consideration of activities of daily living (e.g., self-care and self-maintenance, academic/school productivity, pre-vocational and vocational activities, leisure and play) and the views of the child, parents, teachers and relevant others.	GCP++
R 9	Concerning criterion II: The use of a validated questionnaire to collect information on the DCD (SDDMF) related characteristics of the child from parents and teachers is recommended to support and operationalise Criterion II.	GCP++
R 10	Concerning criterion II: Standardised, or at the very least, psychometrically validated questionnaires such as the DCDQ-R or the MABC2-checklist may be recommended for use in those countries where the questionnaire is culturally relevant.	LOE 2 Level B
R 14	Concerning Criterion I: An appropriate, valid, reliable and standardised motor test (appropriately norm-referenced) should be used.	
R 15	Concerning Criterion I: In the absence of a gold standard test for establishing Criterion I, the Movement Assessment Battery for Children (M-ABC-2) may be recommended (LOE 2, level B). Where available, the Bruininks-Oseretsky Test, 2nd version (BOT-2) may also be recommended (LOE 2, level B). However no UK standardisation of the BOT-2 is currently available. In the absence of generally accepted cut-offs for identifying DCD (SDDMF), it is recommended that when using the M-ABC-2, or other equivalent objective measures, the 15th percentile (total score; standard score 7 or less) should be used as a cut-off.	LOE 2 level B
R 17	Concerning Criterion I: For children aged between 3 and 5 years, if a diagnosis is needed (e.g., for intervention purposes), a cut-off of $\leq 5^{th}$ percentile is recommended for the total score on the M-ABC-2, or equivalent objective measures (see also R 8).	GCP++
R 16	Based on the limitations of the available instruments, classification of specific domains of dysfunction (e.g., gross motor or fine motor dysfunction), can be made on the basis of clinical judgement. The use of gross motor or fine motor items of standardised assessments may be recommended alongside observation and reports of difficulties across relevant gross motor or fine motor tasks. For those using ICD10, the guideline group suggests that the 5th percentile cut-off on the fine or gross motor sub-section (e.g., M-ABC-2, BOT-2) be used for diagnosis if criteria II and III are met.	GCP++
R 18	In determining whether intervention is indicated, personal factors, environmental factors, burden of disease and participation should be taken into consideration.	GCP++

	Sources of information include history (including previous diagnostic and therapeutic history), clinical examination, parental report and if possible self-report, teacher or nursery/preschool reports, questionnaire information and motor test results.	

For EACD summary flow chart, see Blank et al. (2012).

Intervention: indication, planning, delivery, additional support, evaluation

R 23	Children with the diagnosis DCD (SDDMF) should receive intervention, as there is evidence to suggest that a range of interventions, which would include interventions in an educational setting, can be of benefit.	LOE 1 Level A
R 19	Personal factors, environmental factors and the burden of disease concerning participation should be considered when planning any intervention.	GCP++
S 1	In addition, when planning intervention, evidence of efficacy including regime and/or quantity/frequency should be considered. As children may have coexisting disorders, e.g. ADHD, intervention priorities need to be established. Individual factors, e. g. motivation or psychosocial factors (e. g. broken-home, parents with psychiatric disorders) may strongly limit the efficacy of intervention or intervention may not be possible at all. On the other hand, in some children with DCD (SDDMF) compensatory and environmental support may be sufficient.	++
R 20	For intervention planning, individual goal setting should be used. Goals set at the level of activities and participation should be given priority and the child's, parent's and educator's viewpoint/priorities taken into account.	GCP++
R 21	To evaluate intervention effects, measures that capture the level of activities and participation should be used. Sources of evaluation are clinical examination, parent report, nursery/pre-school reports, teacher reports, questionnaire information, motor test results and the child's view.	GCP++
R 22	If testing is performed during the intervention period it should inform adjustments through adaptation of individual goal setting.	GCP++
R 28	Methylphenidate may be considered for children with DCD (SDDMF) and comorbid ADHD where there is appropriate clinical indication for its use. It may be used in combination with other interventions to help improve fine motor symptoms such as difficulties with handwriting and drawing.	LOE 2 Level B
R 24	We recommend using task-oriented approaches to improve motor tasks or selected activities based on goal-setting.	LOE 1 Level A
R 25	Task-oriented approaches like the Cognitive Orientation to daily Occupational Performance (CO-OP) and Neuromotor Task Training (NTT) may be recommended as intervention in children with DCD (SDDMF).	LOE 2 Level B
S 2	Body function oriented approaches: Interventions that aim at improving body functions and structures may be effective but it seems that they are less effective in improving activities in children with DCD (SDDMF) than task oriented approaches.	++
S 3	Statements for body function oriented approaches Perceptual motor therapy (PMT) may be an effective intervention method for children with DCD (SDDMF) (LOE 2). The evidence is inconclusive for the effectiveness of Sensory Integration Therapy (SIT) as an intervention for children with DCD (SDDMF) (LOE 3). The evidence is inconclusive for the effectiveness of Kinesthetic Therapy (KT) for children with DCD (SDDMF) (LOE 3) As there is no evidence for the specific efficacy on kinaesthesis and inconclusive evidence for the effectiveness of Kinaesthetic Therapy (KT) in children with DCD (SDDMF) it is not recommended.	++
R 31	In children with poor handwriting, we suggest a task-oriented self-instruction method to improve handwriting legibility.	LOE 2 Level B
R 26	There is no evidence that manual medical intervention (e.g. osteopathic manipulative treatment) is effective on the core symptoms of DCD (SDDMF).	LOE 3 Level 0
S 4	It is possible that training of gross motor functions and strength exercises may help in some children with DCD to achieve motor competence.	++
S 5	We do not know yet if Motor Imagery training is effective in children with DCD (SDDMF) (LOE 3).	++
R 27	We do <u>not</u> suggest fatty acids + vitamin E to improve motor functions as there is no evidence for an effect on motor functions (LOE 2, B neg.).	LOE 2 B neg

R 29	We recommend professional instruction to educate and coach the parents. This should promote a supportive attitude of parents and nursery nurses/teachers so that they recognize and understand the specific problems of the child with DCD (SDDMF) and so help children with DCD (SDDMF) have the opportunity to improve their motor abilities and participation in daily activities (at home, school, leisure and in sport).	GCP++
S 6	Children with DCD (SDDMF) need ample opportunity to learn and practice movements and their participation in daily activities (house, school, leisure, sports). Therefore support from parents and teachers and other related persons is important for regular everyday practice of home exercises in addition to professional intervention.	++
R 30	We suggest considering carefully whether a group setting is appropriate for a child.	GCP ++
S 7	It is <u>not</u> suggested that children with DCD (SDDMF) at young ages (5-6years) participate in a non-specific group motor skill program (LOE 2). Group therapy is suggested for some children with DCD (SDDMF) e.g. isolated graphomotor problems or DCD (SDDMF) with motor performance between the 5^{th} and 15^{th} percentile on a norm-referenced test. In children with borderline DCD (SDDMF) and in children with behavioural co-morbidities, occupational group therapy can be a method to achieve a positive effect on their self-esteem. Individual therapy may have more positive effects in children with severe DCD (SDDMF) (< 5^{th} percentile of a norm-referenced test).	++
R 32	Prewriting exercises for children with poor handwriting may be considered.	LOE 3 Level B

For EACD summary flow chart, see Blank et al. (2012).

Reference

Blank, R., Smits-Engelsman, B., Polatajko, H., & Wilson, P. (2012). European Academy for Childhood Disability (EACD): Recommendations on the definition, diagnosis and intervention of developmental coordination disorder (long version). *Developmental Medicine and Child Neurology, 54*(1), 54-93.

Evaluation of the published peer-reviewed literature*

Level of EVI-DENCE	GRADE	Oxford level	Oxford definition (diagnostic studies)	Oxford definition (intervention studies)
1 (high)	Evidence from a meta-analysis or systematic review of randomized controlled or other well-controlled studies with homogenous findings; homogeneity of the results; Very good quality of the results (e.g. validity and reliability measures >0.8)	I a	Systematic review or meta-analysis of well-controlled studies with homogenous findings	Evidence from a meta-analysis or systematic review of randomized controlled trials (with homogeneity)
	Evidence from at least one randomized controlled trial (intervention study) or well-controlled trial with well-described sample selection (diagnostic study); confirmatory data analysis, good standards (e.g. QUADAS rating >10) Very good quality of the results (e. g. validity and reliability measures >0.8)	I b	Validating cohort study with good reference standard; clinical decision rule tested within on clinical centre. E. g. randomised / representative or consecutive sample; confirmatory statistics; prospective cohort study with good follow-up (>80%)	Evidence from at least one randomized controlled trial
2 (moderate)	Evidence from at least one well-designed, controlled study without randomization sufficient standards (e. g. QUADAS rating >7); homogeneity of the results; Good quality of the results (e. g. validity and reliability measures >0.6)	II a	Systematic review of level I or II studies	Evidence from systematic review of cohort studies (with homogeneity) or Evidence from at least one controlled study without randomization
	Evidence from at least one well-designed other type of quasi-experimental study (non-randomised, non-controlled) Good quality of the results (e. g. validity and reliability measures >0.6)	II b	At least one exploratory cohort study with good reference standards; clinical decision rule after derivation or validated on split-sample or databases or retrospective cohort study with consecutive sample	Individual cohort study (incl. low quality randomised studies e. g. <80% follow-up) Evidence from at least one other type of quasi-experimental study
3 (low)	Evidence from well-designed non-experimental descriptive or observational studies (e. g. correlational studies, case-control-studies QUADAS rating >4; Moderate homogeneity of the results; Moderate quality of the results (e. g. validity and reliability measures >0.4)	III	Non-consecutive cohort study or studies without consistently applied reference standards or descriptive study	Evidence from case-control studies or Evidence from observational studies
4 (very low)	Evidence from expert committee reports or experts	IV / V		Evidence from expert committee reports or experts

* According to the scientific evidence: levels of evidence (modified according to Oxford Centre for evidence-based Medicine (March 2009) and to SIGN 1999, hierarchy of evidence proposed by the United Kingdom National Institute for Health and Clinical Excellence) using the GRADE system.
Grading / Scorings adopted from the German S3-Guideline for Childhood Obesity (2009 available from http://www.adipositas-gesellschaft.de/daten/Leitlinie-AGA-S3-2009.pdf), and from the GRADE Working group (published in British Medical Journal 2004;328:1490, Doi:10.1136/ bmj.328.7454.1490, Grading quality of evidence and strength of recommendations, Andrew D Oxman, Informed Choice Research Department, Norwegian Health Services Research Centre, PO Box 7004, St Olavs Plass, 0130 Oslo, Norway).

Levels of recommendations

Level of Evidence (LOE)	**Recommendation for / against**	**Description**
1	“should" “should not” “is not indicated”	**A**
2	"may" “may not“	**B**
3 or 4	“may be considered” or “do not know”	**0**

Strength of recommendations (R) based on level of evidence

Strength of R	**Description**	**Criteria**
A (Aneg.)	Strongly recommended that clinicians (do not) routinely provide the intervention / the assessment to eligible residents	Good quality of evidence and substantial net benefits
B (Bneg.)	Recommended that clinicians (do not) routinely provide the intervention / the assessment to eligible residents	Fair quality of evidence and substantial net benefit **or** Good quality of evidence and moderate net benefit **or** Fair quality of evidence and moderate net benefit
0	No recommendation for or against routine provision of the intervention / the assessment	Good quality of evidence and small net benefit **or** Fair quality of evidence and small net benefit
	Insufficient evidence for recommendation of the intervention / the assessment	Poor quality of evidence (conflicting results; balance between benefits and risks difficult to determine; and poor study design)

(Adaptation from the Canadian Guide to Clinical Preventive Health Care and from US Preventive Services Resources.**)**

Recommendations based on formal consensus

A number of recommendations are based on a formal consensus within a nominative group process, particularly those dealing with definition. Rs based on group consensus (Good Clinical Practice (GCP)) are included in the guideline. A strong agreement (=strong consensus >=95%, if only 10 or less participants were present >=90% agreement) is marked as GCP ++, a moderate agreement (=consensus >=75 to 95% (90% if only 10 or less participants were present) is marked as GCP +.