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, June 2012)

* Terminology in this document is consistent with that of the International Classification of Functioning (ICF)
**Background and references are in the long version
EACD recommendations

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Process of tailoring the EACD recommendations to the UK context

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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 legislation and practice differences of each country comprising the UK). The validity of 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) (according to algorithms)

Definition, assessment, intervention indication (algorithm)

Long-standing problems of motor performance or skills according to symptom checklist (age ≥3y) (R3, 11, 12)

History, clinical examination, developmental assessment
if indicated imaging, neurophysiology, blood examination
Resp. Medical disease, specific neurological disorder, mental retardation, behavioural disorder, psychosocial problems. (R2, 3, 6, 7, 12, 13)

Criterion I: Significance and specificity of the motor problems

Y

Criterion II: Relevance for ADL or academic achievement

N

Norm-referenced valid motor test (R2, 3, 12, 14, 15)

Criterion III: morbidity not explaining motor problems

N

Comorbidities: excluded (R7)

Y

Comorbidities, consequences of DCD: History, clinical examination acc. to guidelines

Y

Comorbidities, consequences: Relevance for ADL

Y

Comorbidities, consequences: Validation by tests or other technical methods

Significance / Specificity

Y

Age ≥5 yrs (R8)

Y

Age 3-4 years

Re-evaluation: Confirmation of criteria I, II, III

N

Specify subgroups (Gross- or/and fine-) (R16)

Y

Priority for intervention if necessary (DCD and/or comorbidities) (R6, 18)

R Key recommendations with numbers
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 within a diagnostic setting by a professional who is 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, kindergarten, 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.
3) Views of the child should be taken into account (GCP++); child adapted questionnaires (see above) 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 1 | The clinical examination should include:  
| | • Neuromotor status (exclusion of other movement disorders or neurological dysfunctions).  
| | • Medical status (e.g., obesity, hypothyreosis, 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).  
| S 2 | 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., 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.  
| 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.  
| 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.  
| R 14 | Concerning Criterion I: An appropriate, valid, reliable and standardised motor test (appropriately norm-referenced) should be used.  
| R 152 | 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-Oseretzky 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.  
| 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 ≤5th percentile is recommended for the total score on the M-ABC-2, or equivalent objective measures (see also R 8).  
| 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.  
| R 18 | In determining whether intervention is indicated, personal factors, environmental factors, burden of disease and participation should be taken into consideration. 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.  

| GCP++ |  
| LOE 2 Level B |
Intervention: indication, planning, delivery, additional support, evaluation (algorithm)

Intervention indication taking into account personal factors, environmental factors, burden of disease and participation (R18)

Intervention planning with individual goal setting (priorities on the level of activities and participation according to the ICF-CY taking into account the young person’s viewpoint) (R19, 20)

Comorbidity ADHD

Appropriate treatment (e.g. MPH) but further intervention for DCD necessary (R28)

Task-oriented approach: e.g., CO-OP, NTT, handwriting exercises (R24, 25, 31)

Instruction of parents, teachers / educators for transfer into activities / participation (R29)

Moderate DCD (‘Borderline’-DCD) and child > 5 years suitable for group therapy (R30)

Individual therapy (R30)

Evaluation and follow-up discussion and decision with child and parents (R21, 22)
### Intervention: indication, planning, delivery, additional support, evaluation

<p>| 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 3  | 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 4  | 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 5  | 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 kinaesthesia 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 the legibility of handwriting. | 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 6  | It is possible that training of gross motor functions and strength exercises may help in some children with DCD to achieve motor competence. | ++ |
| S 7  | We do not know yet if Motor Imagery training is effective in children with DCD (SDDMF) (LOE 3). | ++ |
| R 27 | We do not suggest fatty acids + vitamin E to improve motor functions as there is no evidence. | LOE 2 |</p>
<table>
<thead>
<tr>
<th>Evidence for an effect on motor functions (LOE 2, B neg.).</th>
<th>B neg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R 29</strong> 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).</td>
<td>GCP++</td>
</tr>
<tr>
<td><strong>S 8</strong> 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.</td>
<td>++</td>
</tr>
<tr>
<td><strong>R 30</strong> We suggest considering carefully whether a group setting is appropriate for a child.</td>
<td>GCP ++</td>
</tr>
<tr>
<td><strong>S 9</strong> It is not suggested that children with DCD (SDDMF) at young ages (5-6 years) 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 5th and 15th percentile of 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) (&lt; 5th percentile of a norm-referenced test).</td>
<td>++</td>
</tr>
<tr>
<td><strong>R 32</strong> Prewriting exercises for children with poor handwriting may be considered.</td>
<td>LOE 3 Level B</td>
</tr>
</tbody>
</table>
### Evaluation of the published peer-reviewed literature*

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

Levels of recommendations

<table>
<thead>
<tr>
<th>Level of Evidence (LOE)</th>
<th>Recommendation for / against</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“should” “should not” “is not indicated”</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>&quot;may&quot; “may not“</td>
<td>B</td>
</tr>
<tr>
<td>3 or 4</td>
<td>“may be considered” or “do not know”</td>
<td>0</td>
</tr>
</tbody>
</table>

Strength of recommendations (R) based on level of evidence

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

(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 +.