Understanding Developmental Dyspraxia

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A Textbook for Students and Professionals

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Contents

Foreword

Dyspraxia is a serious condition affecting perhaps six per cent of children and causing significant distress and educational difficulty.

As a parent of a child who has both developmental dyspraxia and attention deficit hyperactivity disorder, I have been very aware of the issues of comorbidity and of the difficulties in obtaining an appropriate diagnosis. As a professional working with children and adults with learning disability, many of whom have other disorders including developmental dyspraxia, I am aware of the difficulty of making the right diagnosis and finding the right services for affected individuals.

I am therefore delighted to welcome this book and commend it to professionals and parents alike. It gives a lucid, accessible and comprehensive account of current knowledge of the aetiology and presentation of dyspraxia and of related difficulties. It provides very helpful advice on appropriate assessment, relevant legal issues and useful intervention.

Madeleine Portwood has been working in a professional and voluntary capacity, helping children and adults with dyspraxia for some ten years. She brings to this work her wealth of experience in the field and a detailed knowledge of current research issues. This is the only book of which I am aware that covers these issues in such detail and I am sure it will become a valued textbook in the field.

Dr Jane Radley
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January 2000

Preface

Since the publication of my first text on developmental dyspraxia in 1996 there has been extensive research into the origins, diagnosis and treatment of the disorder. The purpose of this volume is to provide a handbook for clinicians that considers not only the characteristics of dyspraxia but also the comorbidity of other developmental disorders: attention-deficit hyperactivity disorder, autistic spectrum disorders and dyslexia.

There is further discussion on the validity of neuropsychometric assessment when 'profiles', apparently characterising dyspraxia, show marked similarities to those of youngsters with identified syndromes: Turners, Williams and Smith-Magensis. As a result of this increasing awareness among professionals, many of the children not previously diagnosed with these specific conditions are now identified.

Assessment must consider all aspects of development to ensure that an accurate diagnosis is made and attention is not focused solely on the 'primary' presenting disorder. The research cited in chapter one suggests that the comorbidity of developmental disorders is as high as 40 per cent and in such cases the provision made should consider all of the presenting difficulties.

In my work during the past ten years I have become increasingly aware of the difficulties and frustration experienced by children and their families who move between professionals in an attempt to obtain a diagnosis. The struggle continues as the families attempt to gain access to appropriate services. Early identification would have a significant effect on future outcomes and raised awareness amongst professionals involved with young children, in particular health visitors and adults working with pre-schoolers in playgroups or nurseries is important.

I have offered some discussion on the roles of the Health and Education Authorities in identifying and making provision for such youngsters. Perhaps it would not be too difficult to provide training for the educators of the future in colleges of education or students in disciplines such as medicine, psychology, optometry, physio/occupational therapy, speech therapy and nursing.

I believe that there is a wealth of experience and support already available but it is necessary to co-ordinate these services and ensure that systems are in place to make them accessible for children and adults alike.

Madeleine Portwood
Durham, January 2000

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I would like to extend my thanks to the children and parents who have contributed to my research and allowed their case studies to be presented. In addition, I am grateful to the adults who have given me some insight into the difficulties experienced when identification and support has not been made available in childhood.

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- Alan Duff, Advisory Teacher in Physical Education
- Dave Ford, Senior Primary Inspector and Janet Bennett, Early Years Inspection Officer, who produced the Durham Scheme for Baseline Assessment 'Flying Start'.

Finally, I thank those who have been directly involved in the production of this text:

- John O'Neill and Joanne Clark – illustrations
- Gillian Bell – additional research
- John Portwood – data analysis
- Peter Chislett and Sally Critchlow – editing and proof reading.

Chapter 1

Defining dyspraxia

The purpose of this text is to provide clinicians with current research information and facilitate the diagnosis of developmental dyspraxia. The most appropriate starting point is to consider the acknowledged diagnostic criteria in the Manual of the American Psychiatric Association.

Dyspraxia is a developmental condition and the comorbidity with autistic spectrum disorders, dyslexia and 'Attention Deficit and Hyperactivity Disorder' (ADHD) is high. My own research between 1988 and 1999 (Portwood 1999) suggests that it is probably between 40 per cent and 45 per cent.

Szatmari *et al.* (1989a) state that the comorbidity of ADHD with other disorders is common with up to 44 per cent of those identified having at least one other condition and 32 per cent having two or more.

Barkley (1990) comparing ADHD children with controls found they were considerably more likely to display associated problems with academic achievement, language and motor co-ordination, as many as 25 per cent having significant delays in the development of maths, reading or spelling and up to 30 per cent showing problems with language.

In addition, parents of ADHD children described their youngsters as being less co-ordinated than expected for their age.

The overlap between dyspraxia, ADHD, and other developmental disorders is evident when comparing the descriptions contained in the American Psychiatric Association Diagnostic and Statistical Manual (DSM-IV 1994). An overview is essential before attempting to determine which conditions are present.

'Learning Disorders' describes specific difficulties in reading (dyslexia), mathematics and handwriting.

'**Developmental Co-ordination Disorder** (DCD)' identifies as its essential feature a marked impairment in the development of motor co-ordination (dyspraxia).

Diagnostic features of Developmental Co-ordination Disorder (315.4)

The essential feature of Developmental Co-ordination Disorder is a marked impairment in the development of motor co-ordination (Criterion A). The diagnosis

is made only if this impairment significantly interferes with academic achievement or activities of daily living (Criterion B). The diagnosis is made if the co-ordination difficulties are not due to a general medical condition (e.g., cerebral palsy, hemiplegia, or muscular dystrophy) and the criteria are not met for Pervasive Developmental Disorder (Criterion C). If Mental Retardation is present, the motor difficulties are in excess of those usually associated with it (Criterion D). The manifestations of this disorder vary with age and development. For example, younger children may display clumsiness and delays in achieving development motor milestones (e.g., walking, crawling, sitting, tying shoelaces, buttoning shirts, zipping trousers). Older children may display difficulties with the motor aspects of assembling puzzles, building models, playing ball, and printing or writing.

Associated features and disorders

Problems commonly associated with Developmental Co-ordination Disorder include delays in other non-motor milestones. Associated disorders may include Phonological Disorder, Expressive Language Disorder, and Mixed Receptive-Expressive Language Disorder. Prevalence of Developmental Co-ordination Disorder has been estimated to be as high as 6 per cent for children in the age range of 5–11 years. Recognition of Developmental Co-ordination Disorder usually occurs when the child first attempts such tasks as running, holding a knife and fork, buttoning clothes, or playing ball games. Its progression is variable. In some cases, lack of co-ordination continues through adolescence and adulthood.

Differential diagnosis

Developmental Co-ordination Disorder must be distinguished from motor impairments that are due to a general medical condition. Problems in co-ordination may be associated with specific neurological disorders (e.g., cerebral palsy, progressive lesions of the cerebellum), but in these cases there is definite neural damage and abnormal findings on neurological examination. If Mental Retardation is present, Developmental Co-ordination Disorder can be diagnosed only if the motor difficulties are in excess of those usually associated with the Mental Retardation. A diagnosis of Developmental Co-ordination Disorder is not given if the criteria are met for a Pervasive Developmental Disorder. Individuals with Attention Deficit Hyperactivity Disorder may fall, bump into things, or knock things over, but this is usually due to distractibility and impulsiveness rather than to a motor impairment. If criteria for both disorders are met, both diagnoses can be given.

Summary of diagnostic criteria for Developmental Co-ordination Disorder (315.4)

A. Performance in daily activities which require motor co-ordination is substantially below that expected given the person's chronological age and measured

intelligence. This may be manifested by marked delays in achieving motor milestones (e.g., walking, crawling, sitting), dropping things, 'clumsiness', poor performance in sports, or poor handwriting.

B. The disturbance in Criterion A significantly interferes with academic achievement or activities of daily living.

C. The disturbance is not due to a general medical condition (e.g. cerebral palsy, hemiplegia, or muscular dystrophy) and does not meet criteria for a Pervasive Developmental Disorder.

D. If Mental Retardation is present, the motor difficulties are in excess of those usually associated with it.

Criteria for Attention Deficit Hyperactivity Disorder (ADHD) (314.01)

A. Either (1) or (2):

(1) Inattention: at least **six** of the following symptoms of inattention have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(b) often has difficulty sustaining attention in tasks or play activities
(c) often does not seem to listen to what is being said to him/her
(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions)
(e) often has difficulties organising tasks and activities
(f) often avoids or strongly dislikes tasks (such as schoolwork or homework) that require sustained mental effort
(g) often loses things necessary for tasks or activities (e.g., school assignments, pencils, books, tools, or toys)
(h) often easily distracted by extraneous stimuli
(i) often forgetful in daily activities.

(2) Hyperactivity – Impulsivity: at least **four** of the following symptoms of hyperactivity – impulsivity have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level:

(a) often fidgets with hands or feet or squirms in seat
(b) leaves seat in classroom or in other situations in which remaining seated is expected
(c) often runs about or climbs excessively in situations where it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
(d) often has difficulty playing or engaging in leisure activities quietly.
(e) often blurts out answers to questions before the questions have been completed

(f) often has difficulty waiting in lines or awaiting turn in games or group situations.

B. Onset no later than age seven.

C. Symptoms must be present in two or more situations (e.g. at school, work, and at home).

D. The disturbance causes clinically significant distress or impairment in social, academic, or occupational functioning.

E. Does not occur exclusively during the course of PDD, Schizophrenia or other Psychotic Disorder, and is not better accounted for by Mood, Anxiety, Dissociative, or Personality Disorder.

Criteria for Autism Disorder (299.00)

A. A total of six (or more) items from (1), (2) and (3), with at least two from (1), and one each from (2) and (3).

(1) Qualitative impairment in social interaction, as manifested by at least two of the following:

(a) marked impairments in the use of multiple non-verbal behaviours such as eye-to-eye gaze, facial expression, body posture, and gestures to regulate social interaction

(b) failure to develop peer relationships appropriate to developmental level

(c) lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)

(d) lack of social or emotional reciprocity (note: in the description, it gives the following as examples: not actively participating in simple social play or games, preferring solitary activities, or involving others in activities only as tools or 'mechanical' aids).

(2) Qualitative impairments in communication as manifested by at least one of the following:

(a) delay in or total lack of the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)

(b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others

(c) stereotyped and repetitive use of language or idiosyncratic language

(d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.

(3) Restricted, repetitive and stereotyped patterns of behaviour, interests and activities, as manifested by at least two of the following:

(a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus

(b) apparently inflexible adherence to specific, non-functional routines or rituals

(c) stereotyped and repetitive motor mannerisms (e.g. hand or finger flapping or twisting, or complex whole-body movements)
(d) persistent preoccupation with parts of objects.

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age three years:

1. Social interaction
2. Language as used in social communication
3. Symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

Criteria for diagnosis of Asperger's Disorder (299.80)

- At least two demonstrations of impaired social interaction. The patient:
  - Shows a marked inability to regulate social interaction by using multiple non-verbal behaviours such as body posture and gestures, eye contact and facial expression.
  - Doesn't develop peer relationships that are appropriate to the developmental level.
  - Doesn't seek to share achievements, interests or pleasure with others.
  - Lacks social or emotional reciprocity.
- Activities, behaviour and interests that are repetitive, restricted and stereotyped (at least one of):
  - Preoccupation with abnormal (in focus or intensity) interests that are restricted and stereotyped (such as spinning things).
  - Rigidly sticks to routines or rituals that don't appear to have a function.
  - Has stereotyped, repetitive motor mannerisms (such as hand flapping).
  - Persistently preoccupied with parts of objects.
- The symptoms cause clinically important impairment in social, occupational or personal functioning.
- There is no clinically important general language delay (the child can speak words by age two, phrases by age three).
- There is no clinically important delay in developing cognition, age-appropriate self-help skills, adaptive behaviour (except social interaction) and normal curiosity about the environment.
- The patient doesn't fulfil criteria for schizophrenia or another specific Pervasive Developmental Disorder.

Learning Disorders (315.00)

Reading disorder

- As measured by a standardised test that is given individually, the patient's ability to read (accuracy or comprehension) is substantially less than would be expected considering age, intelligence and education.

- This deficiency materially impedes academic achievement or daily living.
- If there is also a sensory defect, the reading deficiency is worse than would be expected with it.

Mathematics disorder

- As measured by a standardised test that is given individually, the patient's mathematical ability is substantially less than would be expected considering age, intelligence and education.
- This deficiency materially impedes academic achievement or daily living.
- If there is also a sensory defect, the mathematics deficiency is worse than would be expected with it.

Disorder of written expression

- As measured by functional assessment or by a standardised test that is given individually, the patient's writing ability is substantially less than would be expected considering age, intelligence and education.
- The difficulty with writing grammatically correct sentences and organised paragraphs materially impedes academic achievement or daily living.
- If there is also a sensory defect, the writing deficiency is worse than would be expected with it.

Related Specific Developmental Disorders

The Diagnostic and Statistical Manual refers to the different learning disorders (LD) as Specific Developmental Disorders. They are identified as particular academic skill areas which have failed to develop as expected given the child's intellectual ability and educational experience. In addition to these Specific Developmental Disorders in arithmetic, writing and reading, several disorders of speech and language are also defined: Developmental Articulation Disorder, Developmental Expressive Language Disorder and Developmental Receptive Language Disorder.

'Diagnosis' of a condition is often dependent on the route of the referral. If a particular outcome is expected, it is possible to 'select' the symptoms most indicative of that disorder. Checklists are notoriously good at facilitating this method of assessment. It is insufficient to observe the child's presenting behaviours without obtaining a developmental history and undertaking a detailed assessment. Too often the 'primary' presenting difficulty is identified and supported while the underlying causes remain 'untreated'. It is not enough for the clinician to know the criteria for the diagnosis of dyspraxia or ADHD; he/she must be able to distinguish the presenting symptoms from the other conditions which have similar characteristics.

Case study

A six year old boy presents as having difficulty with the articulation of speech. There is no evidence of a receptive language problem. Father and elder brother have a history of delayed language acquisition. There was also some delay in the development of motor co-ordination and perceptual skills.

With such information, it could be assumed that here is a 'classic' case of dyspraxia. My own research (1999) identified delayed acquisition of speech in 45 per cent of the identified sample population. However, consideration should be given to the following studies.

Szatmari *et al.* (1989b) and Barkley (1990) agree that between 10 and 54 per cent of the children with ADHD have problems with expressive, but not receptive, language compared with 2 to 25 per cent in the control groups. ADHD children will probably say more in conversation than the controls (Zentall 1988) although when confronted with tasks which require specific verbal responses they are likely to be much more dysfluent.

Hartsough and Lambert (1985) identified more than 50 per cent of a sample of ADHD children as having poor motor co-ordination with Shaywitz and Shaywitz (1984) finding a high percentage of ADHD youngsters with perceptual difficulties.

To move towards an accurate diagnosis Barkley (1990) states:

> the clinician brings to the case the wealth of previous clinical and research literature that has accumulated on groups of children with the same diagnosis. This literature may then point the way to other treatments and information about the course and outcome of the disorder, and to potential aetiologies of it.

The chapters which follow are intended to provide such additional information with regard to the neurological principles of dyspraxia, factors influencing early development and the role of professionals in diagnosing the condition.