

An occupational therapy delineation model of practice is presented, which guides a multidimensional understanding of the psychopathology of attention deficit hyperactivity disorder (ADHD) and its management. Previous research has established that occupational therapists lack detailed training or theory in this field. The delineation model of practice is based on a literature review, clinical experience and a consensus study carried out with occupational therapists to determine their priorities for the evaluation of, and intervention with, children with ADHD.

Part 1 of this article presents the model and examines its implications for evaluation and intervention at the levels of child, task and environment. A family-centred assessment and treatment package, based on the delineation model, is described. Part 2 of this article will report the results of a multicentre study, which was designed to evaluate the effectiveness of this package.

Occupational Therapy for Children with Attention Deficit Hyperactivity Disorder (ADHD), Part 1: a Delineation Model of Practice

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Introduction

In the United Kingdom (UK), occupational therapy for children with attention deficit hyperactivity disorder (ADHD) is a small field of practice (Chu 2003a), even though 5% of school-aged children in the population are affected by the condition (American Psychiatric Association [APA] 1994). Occupational therapists have much to offer children with ADHD in facilitating engagement in meaningful tasks and successful participation in different occupations, but lack holistic models of evaluation and intervention.

In part 1 of a two-part article, an occupational therapy delineation model of practice is presented, in order to provide guidelines for understanding the specific psychopathology and management of this disorder from a multidimensional perspective. The model is based on an

extensive literature review, the first author's clinical experience and the data gathered from occupational therapists about their priorities for assessment and treatment (Chu 2005). Many strategies are suggested for assessing, understanding and addressing the needs of children with ADHD. The application of this model is discussed by describing specific occupational therapy evaluation and intervention procedures that are suitable for a family-centred assessment and treatment package. Some validation for this model is achieved through a multicentre evaluation, which will be reported in part 2 of this article.

Background information

ADHD is a specific neuropsychiatric disorder (APA 1994). Children diagnosed with ADHD 'appear impulsive, overactive and/or inattentive to an extent that is unwarranted for their developmental age and is a significant hindrance to their social and educational success' (British Psychological Society 1996, p8). There have been few published studies describing the role of occupational therapy for children with ADHD (Chu 2003b), apart from those addressing a sensory integrative approach (Oetter 1986a, 1986b, Cermak 1988a, 1988b) or a specific treatment method (Peterson 1993, Woodrum 1993, Shaffer et al 2001).

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In Europe and North America, clinical guidelines have been published on ADHD and hyperkinetic disorder for medical, psychological and other health care practitioners (British Psychological Society 1996, American Academy of Child and Adolescent Psychiatry 1997a, 1997b, Taylor et al 1998, Overmeyer and Taylor 1999, National Institutes of Health 2000, American Academy of Pediatrics 2000, 2001, Taylor et al 2004). Although these guidelines are primarily medically and psychologically based, certain assessment and treatment components are useful for occupational therapy practice; for example, behavioural assessment procedures, psychoeducational programmes for parents and the behavioural management of the child. In order to integrate the use of these components with specific occupational therapy evaluation and intervention procedures for children with ADHD, occupational therapists need to synthesise relevant information and frame them within an occupational therapy model of practice. The development of a model of practice for children with ADHD will guide therapists in the process of evaluation and intervention, and establish the specific role of occupational therapy within a multidisciplinary team.

(Kortman 1994). It builds on and integrates interdisciplinary knowledge and is applicable in a particular field of practice (Kielhofner 1992). It presents and organises a number of theoretical concepts used by therapists in their work (Feaver and Creek 1993). A good delineation model gives clear guidelines about what to assess and how to assess it, and states the goals of treatment with clear intervention strategies. Thus, a delineation model has the dual task of explaining a group of phenomena and guiding practice related to those phenomena for a specific client group (Dunn 2000).

What is a delineation model of practice?

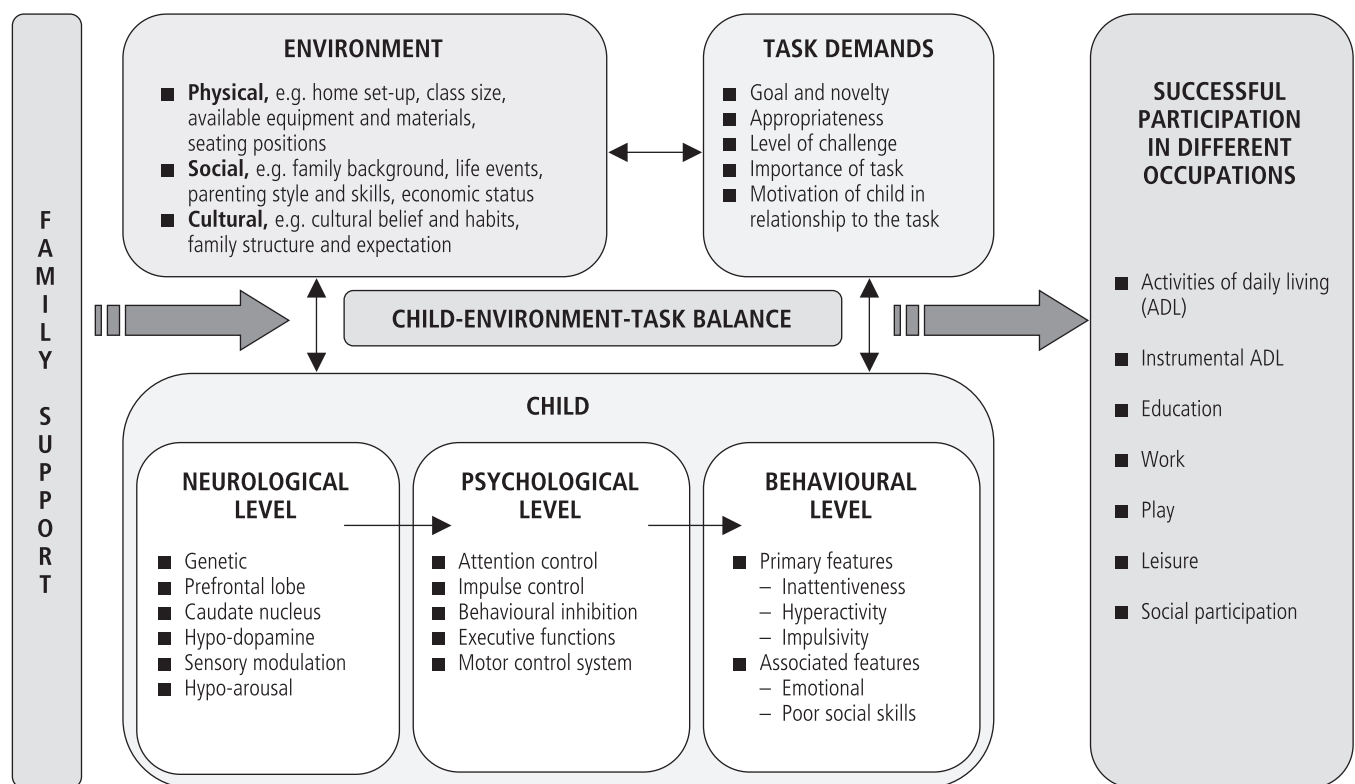
A delineation model identifies evaluation and intervention principles for specific groups of clients and can be conceptualised within a broader professional model that emphasises the concept of occupation for health

Theoretical concepts of an occupational therapy delineation model of practice for children with ADHD

Theoretical concepts relating to order, disorder and therapeutic intervention are the primary theoretical core of occupational therapy. They provide logic, coherence and rationale for the clinical applications of the model (Kielhofner 1992). The occupational therapy delineation model of practice for children with ADHD is based on the theoretical concepts relating to the child, the environment, the task, the interaction among these key factors and the child's participation in different occupations.

Fig. 1 illustrates the interaction of these factors within the proposed model. It helps the understanding of a child's problems at different levels of dysfunction; the

Fig. 1. An occupational therapy delineation model of practice for children with attention deficit hyperactivity disorder (ADHD).



effect of different environmental factors; the demands of the task selected; and the child's level of participation in different occupations, which are purposeful and meaningful within different situations and with different levels of family support.

The child with ADHD

The model presented in Fig. 1 highlights the interaction between the child and his or her environment and tasks at different levels of functions (that is, neurological, psychological and behavioural) by synthesising different research evidence (as reviewed by Chu 2003b).

Theories about the neurological basis of ADHD have identified the roles of the frontal-basal ganglia and dopamine pathways, with impaired functioning resulting in problems of attention control and behavioural inhibition (Lou 1996, Castellanos 1997). The brain functions as a whole: higher cortical processes require the sensory processing function that occurs at lower subcortical levels, and lower subcortical levels depend on cortical functions for interpreting sensory information (Bundy et al 2002). Voeller (2001) broadened the proposed neurological basis of ADHD to include prefrontal-subcortical circuits. The frontal lobe, basal ganglia and thalamus may form a system or loop, which activates and inactivates ascending/arousal and descending/inhibiting pathways (Cummings 1993). This conceptualisation links the three levels of functions/dysfunctions as interrelated components in explaining the aetiological factors of ADHD.

This model suggests that we need assessment tools to evaluate the primary behavioural features pertaining to ADHD and also tools to identify the different neurological and psychological correlates for the presenting behavioural patterns. In terms of management, the model emphasises that a child with ADHD needs neurological, psychological and behavioural intervention strategies to support performance and promote participation in different occupations.

The environment

Environments are the contexts in which children engage in different tasks or occupations, and include the physical and social settings (Case-Smith 2001). Different environments have inherent features that can enable or disable a child's performance. Children with ADHD typically have different symptoms at different times and in different situations. For example, some children with ADHD may exhibit considerably better self-control, appropriate behaviour and improved performance with a teacher who maintains a relatively calm atmosphere, with structured tasks, well-defined expectations and positive reinforcement for appropriate behaviour (DuPaul and Stoner 2003).

Schools that offer relatively effective programmes for children with ADHD are also strong on organisational and environmental factors, which include positive attitudes towards and understanding of ADHD, support at authority level, and provision of coordinated intervention through teams of professional workers (Burcham et al

1993). Therefore, it is important to assess different environmental factors that may contribute to the presentation of different behavioural patterns in children with ADHD. The assessment provides a basis for effective intervention by addressing those environmental factors that induce or exaggerate the behavioural patterns of a child with ADHD.

The task demands

Tasks are defined as 'sequences of actions in which persons engage to satisfy either external societal requirements or internal motives' (Kielhofner 1995, p101). Occupational therapists classify these tasks into self-care, school/work, play and leisure, and social participation (Watson and Llorens 1997). Tasks are related to occupations, at particular ages and in specific environments (Case-Smith 2001). When considering the dimension of task demands, variables such as the goal, novelty, appropriateness, the level of challenge and the importance of the task, and also the motivation of the child, are salient. The goal of a task is the central key factor. It is critical to identify what the child wants or needs to do when planning interventions. All this supports the need to assess the child's neurological and psychological functions, behavioural regulation, perceptual-motor functions and other environmental factors that may contribute to the child's presenting problems in different tasks. It also provides the basis for different management strategies.

Family support

It is important to consider the impact of family support and parental involvement on the child's behaviours (Humphry 2002). Recent research has demonstrated that the more parents hold informed beliefs about ADHD, the less likely they are to use ineffective discipline (Johnston and Freeman 2002). This highlights the importance of appropriate education or information sharing with parents so that they can interact with and support the child in an appropriate manner, achieving better long-term outcomes (Harrison and Sofronoff 2002, Hinojosa et al 2002).

Child-environment-task balance

The child-environment-task balance determines the success of occupational performance and participation in different occupations. Occupational performance is a process of interacting with the environment according to the child's goals or intentions. It refers to the match between the skills and abilities of the child; the demands of the task; and the characteristics of the physical, social and cultural environments (Law et al 1996). For example, if a child with ADHD is asked to engage in a task that over-challenges his or her attention control, this will contribute to an unsuccessful occupational outcome. Alternatively, if the environment is highly distracting, it will be difficult for the child to sustain sufficient attention control to complete the task, even though the task itself is at an appropriate level for the child.

Family-centred care approach

Occupational therapists recognise that the ultimate outcome of a child's development is highly influenced by the caregiving environment (Hinojosa et al 2002). They strive for a collaborative relationship with parents and appreciate that the child with ADHD is part of an interactive family system. Occupational therapists working with children with special needs are part of the formal social support system and are in a position to encourage the family's efforts to network among friends, family members and parent groups.

A family-centred approach is demonstrated when the therapist enables parents to become equal team members (Brown et al 1997). A family-centred service recognises that each family is unique; that the family is the constant in the child's life; and that parents are the experts on the child's abilities and needs. The strengths and needs of all family members are considered. Therapists work collaboratively with parents to make informed decisions about the services and supports available, and to empower and enable them in the whole intervention process. When applying these principles to the management of children with ADHD, all the evaluation and intervention procedures adopted should be framed within a family-centred care approach, as advocated by Rosenbaum et al (1998) and Humphry and Case-Smith (2001).

Because of the complexity of the condition, a multidimensional evaluation approach and a multifaceted intervention framework are adopted in the clinical application of the model. Different evaluation and intervention

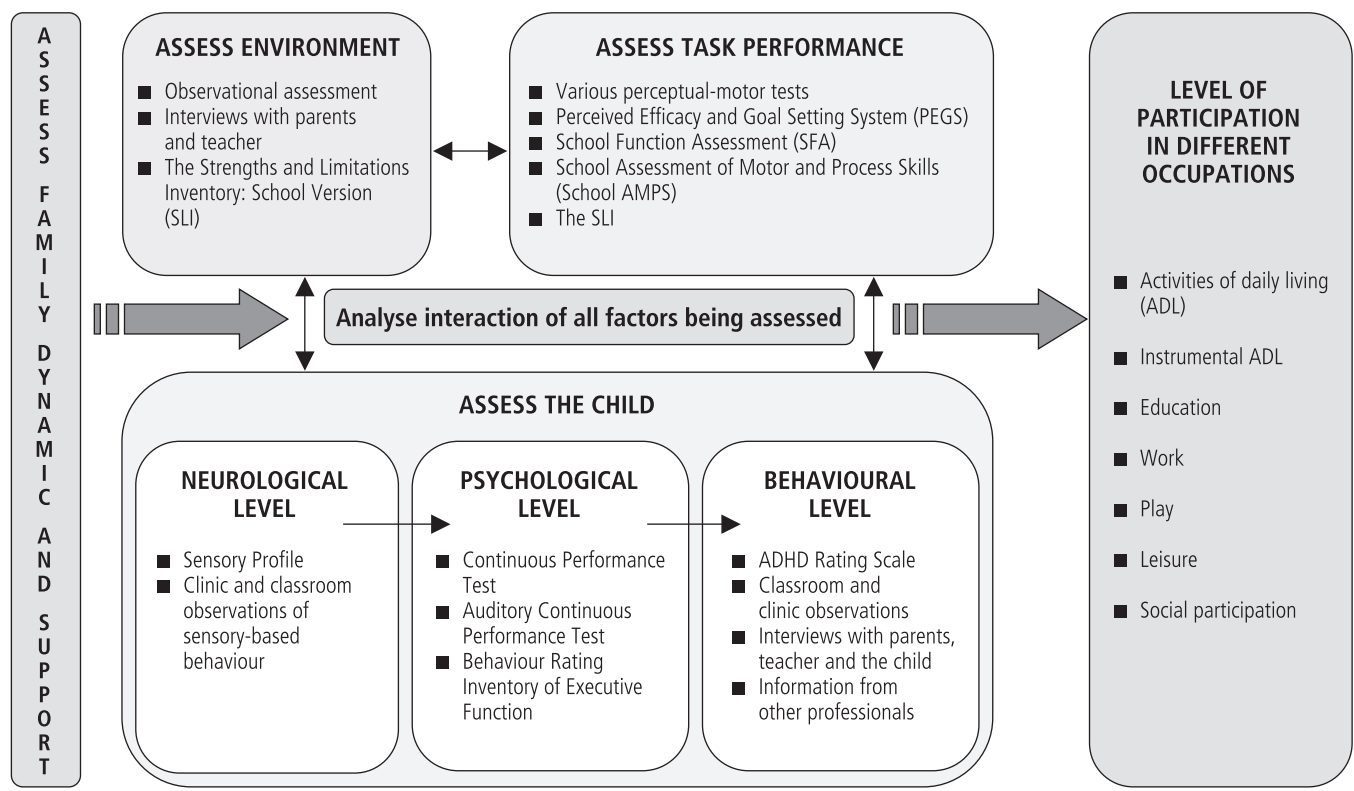
procedures from different treatment approaches (for example, behavioural, sensory integrative and psychoeducational approaches) are integrated into this delineation model for children with ADHD. The following sections describe the range of evaluation and intervention procedures and their application, based on the principles of the family-centred care approach advocated in the model.

Multidimensional evaluation of children with ADHD

Each child with ADHD has a unique constellation of problems and multiple domains of functioning may be affected (Whalen and Henker 1996). Therefore, it is important to adopt a multidimensional evaluation approach (Chu 2003c) in order to determine whether or not ADHD is present and how it affects the child's development and performance in different areas of occupation. Over half of children with ADHD are influenced by one or more of the associated comorbidities that cause additional psychiatric, neurological and learning problems (Tannock 1998, Brown 2000). There are also many different conditions that mimic the clinical features of ADHD (Hill and Cameron 1999). Therefore, it is important to make a differential diagnosis and to identify comorbidity when evaluating children with ADHD.

Fig. 2 illustrates the application of some of these evaluation procedures within the model and suggests a number of relevant standardised scales. Although each of

Fig. 2. Application of the model in the multidimensional evaluation of children with attention deficit hyperactivity disorder (ADHD).



these evaluation procedures is limited in some manner, when they are used in a multidimensional evaluation package a system of checks and balances develops such that the drawbacks of any single measure are balanced by data obtained through other means (Barkley 1998, Anastopoulos and Shelton 2001).

Assessing the child at the neurological level

Recent research indicates that poor sensory modulation function could be a basis for the presenting behavioural pattern in children with ADHD (Cermak 1988a, Mangeot et al 2001). Sensory modulation is the capacity to regulate and organise the degree, intensity and nature of responses to sensory input in a graded and adaptive manner, so that an optimal range of performance and adaptation to challenges from the environment can be maintained (Lane et al 2000). Dysfunction in sensory modulation has a strong impact on a child's behaviour in the areas of arousal, attention, affect and action (Williamson and Anzalone 2001, Schaaf and Anzalone 2001). Children with ADHD tend to present a pattern of sensory seeking behaviour that interferes with their regulation of behaviour and also with participation in different occupations (Dunn and Bennett 2002).

The Sensory Profile (Dunn 1999) is a judgement-based caregiver questionnaire. It measures children's behaviours hypothesised to be linked to sensory processing abilities and profiles the effect of sensory processing on functional performance in the daily life of children 5-10 years of age. A separate worksheet is developed for assessing children with ADHD. Therapists should also make observations of sensory-based behaviour within clinical and classroom settings to complement the data generated from the Sensory Profile.

Assessing the child at the psychological level

The psychological basis of ADHD is usually addressed by clinical psychologists unless the occupational therapist has appropriate postgraduate training in the administration and interpretation of different psychological tests, such as the Conners' Continuous Performance Test – II (Conners 2001) or the Behaviour Rating Inventory of Executive Function (Gioia et al 2000). Therapists may need to obtain information from psychologists if they have assessed the child.

Assessing the child at the behavioural level

It is important to check whether the ranges of inattentive, hyperactive and impulsive behaviours presented by the child were present before the age of 7 years, occur in two or more settings and also cause impairment in social, academic or occupational functioning (APA 1994). The ADHD Rating Scale – IV (DuPaul et al 1998) is useful for screening, assessment and the evaluation of treatment outcome. Both Home and School Versions are completed independently by a child's parent and teacher, and are reported to provide reliable and valid data regarding the frequency of ADHD symptoms.

Besides using the ADHD rating scale, semi-structured interviews with parents, teacher and child are an important component of the evaluation. The interviews provide the phenomenological data that rating scales cannot capture (Barkley and Edwards 1998). Therapists can develop an interview form based on the work of different authors in the field (Wodrich 1994, Barkley and Edwards 1998, Barkley and Murphy 1998, Dowdy et al 1998, DuPaul and Stoner 2003).

It is important to note that interview and rating scale data are subject to a number of limitations, including the inherent biases of those answering the interview questions and completing the questionnaires (Barkley and Edwards 1998). Thus, ideally, these data should be supplemented with observational assessment of the child's behaviour and psychosocial functions in the natural environment, such as the child's emotional control, peer-group relationships, social skills and interaction with parents.

Assessing the environment

The therapist should also gather information related to the home environment through the interview or the information from other team members (for example, information on family dynamic and support from the family therapist). School is another environment in which children with ADHD experience many challenges. A useful evaluation tool designed specifically for children with ADHD is the Strengths and Limitations Inventory: School Version (SLI) (Dowdy et al 1998). The SLI is a multidimensional rating scale designed to document the strengths and limitations that may be manifested in an academic setting. It consists of items that address memory, reasoning, executive function, social/emotional status, communication, reading, writing and mathematics. The teacher or anyone who has observed the child over time can complete it.

Another important means of assessment is classroom observation. The therapist can observe the child across a variety of settings (for example, classroom, playground and dining hall) and in interaction with different individuals. In many cases, direct observations will provide the most fruitful data when conducted during independent seatwork situations and transitions between lessons (Dowdy et al 1998). It is also helpful to observe the behaviour of the teacher and the other children in the class. For instance, teacher behaviours (for example, prompts, reprimands, feedback and shouting) could be possible antecedent and/or consequent events for the child's behaviour (DuPaul and Stoner 2003). In addition to classroom observation, therapists can also interview teachers to gather more information and analyse the sensory components of the physical environment for possible effects on the child's behaviour.

Assessing task performance

The assessment of perceptual-motor and functional skills provides information on the underlying functions and dysfunctions of the child, and their impact on the child's

ability to carry out different tasks and engage in different occupations. Information generated in this area of evaluation helps to make a differential diagnosis and identify comorbidity, such as developmental coordination disorder (DCD). Detailed information on the child's functional difficulties forms the basis for different intervention strategies. Therapists can administer a battery of standardised perceptual-motor tests within routine paediatric occupational therapy practice; for example, the Motor Free Visual Perception Test – Third Edition (Colarusso and Hammill 2003); the Beery-Buktenica Developmental Test of Visual-Motor Integration – 5th Edition (Beery and Beery 2004); the Movement Assessment Battery for Children – 2nd Edition (Henderson and Sugden 2007); and the DCD Questionnaire (Wilson et al 2000).

For assessing functional skills, therapists can use different standardised tools, such as the Perceived Efficacy and Goal Setting System (Missiuna et al 2004), the School Function Assessment (Coster et al 1998) and the School Version of the Assessment of Motor and Process Skills (Fisher and Bryze 1998). However, some therapists may use non-standardised questionnaires or checklists because most of these standardised tools either are too expensive, take a long time to administer, are not readily available in certain work settings or are not standardised for the UK population.

Assessing family dynamic and support

The therapist can gather information on the family dynamic and support through an interview with the parents and the observation of the interaction between

the child and parents. The therapist should also incorporate information from other professionals (for example, child psychiatrist, clinical psychologist and family therapist) for the overall interpretation and management of the child's presenting problems.

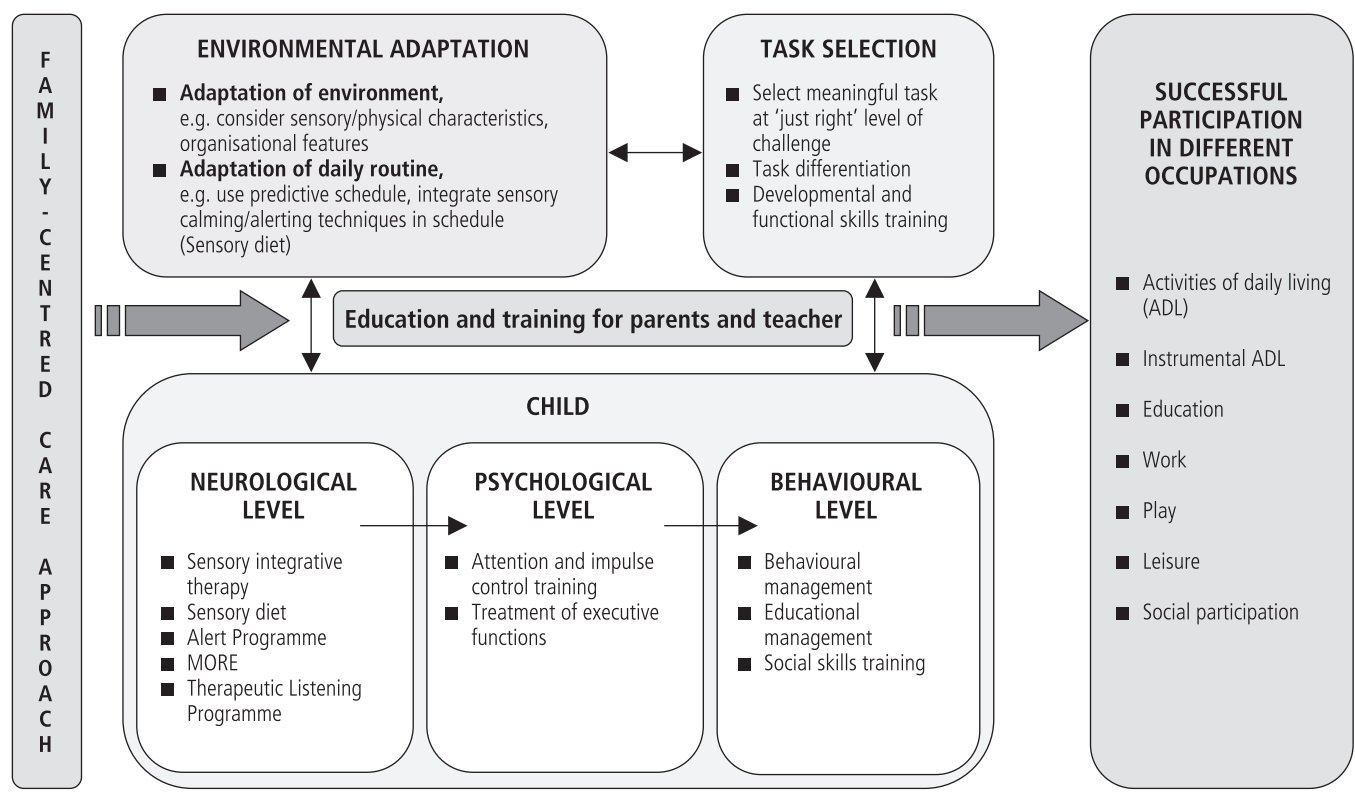
Using the assessment data

The overriding goals of the multidimensional evaluation are to derive accurate data regarding the frequency and severity of ADHD behaviours across settings and with different individuals, as well as the possible causes of the child's difficulties in performing and participating in different occupations. After gathering all the data, the therapist analyses and interprets the results, which provides relevant information for the selection of different treatment components within the multifaceted intervention programme described below.

Multifaceted intervention of children with ADHD

In order to remediate the various facets of the disorder, a framework of multifaceted intervention (Chu 2003c) is adopted in this model. Fig. 3 illustrates the application of some of these intervention strategies within the delineation model for children with ADHD. The positive outcomes in empowering and enabling parents and teachers through the family-centred care approach are an important contribution to the ultimate success of the intervention.

Fig. 3. Application of the model in the multifaceted intervention for children with attention deficit hyperactivity disorder (ADHD).



Treatment through education and training for parents and teacher

After the completion of the multidimensional evaluation, a feedback session should be conducted with both parents and teachers so that they both hear the same information. It is important to set common goals and objectives with parents, teachers and the child. From the family-centred care perspective, sharing information about the child's condition with the main caregivers is an important aspect of work. The research studies reviewed suggested that better treatment outcomes can be achieved by improving parents' and teachers' understanding of the condition (Burcham et al 1993, Corkum et al 1999, Hoza et al 2000, Johnston and Freeman 2002) and behavioural management strategies (Coker and Thyer 1990, Hinshaw and Melnick 1992, Barkley 1998). The sharing of information can be achieved by using information packs, seminars and direct consultation with parents and teacher.

Treatment through environmental adaptation

Different environmental factors may contribute to the presentation of different behavioural patterns in children with ADHD and suitable modification will help to facilitate the child's participation in different occupations. Clinical experience indicates that for children with ADHD, a calming environment with less stimulation is desirable to maintain their attention control and promote self-regulation, such as a classroom with a clear layout and a neutral colour scheme. The adaptation of the sensory and physical environments is considered to be an important area of intervention in paediatric occupational therapy practice (McEwen 1990). The therapist needs to help parents and teacher to appreciate the extent to which naturally occurring activities and interactions within the environment provide the sensory input required to regulate, or disrupt regulation of, arousal level, attention control and activity level (Williamson and Anzalone 2001).

It is important to note that reasonably consistent, predictable and structured daily routines help children to self-regulate. The therapist should introduce the use of a visual timetable within the home and classroom environments. A visual timetable is a visual presentation of a daily schedule on a large piece of paper (Dowdy et al 1998). It provides a predictive schedule and helps the child to know what is about to happen. Being able to anticipate events enables the child to move from a reactive mode to a purposeful, self-initiated mode of behaviour, which, in turn, helps the child to cope more successfully with changes in the environment.

The therapist should also check other environmental factors in relation to the child's associated problems, such as the appropriate dimensions of chair and table to address poor postural control, the selection of seating position to address potential ocular-motor deficits and the provision of a special device to aid efficient handwriting performance.

Treatment of the child at the neurological level

As discussed, recent research studies have provided evidence of the association between dysfunction in sensory modulation and ADHD (Mangeot et al 2001, Dunn and Bennett 2002). Sensory techniques may be effective in addressing many of the problem behaviours characteristic of children with ADHD, including inattention, disorganisation and hyperactivity (Bhatara et al 1978, Kantner and Tacco 1980, Bhatara et al 1981). The ultimate goal of sensory integrative intervention is to facilitate a child's development, self-actualisation and occupational performance (Bundy et al 2002).

In order to address the child's sensory needs, the therapist needs to consider how the child's sensory diet varies throughout the day (Williams and Shellenberger 1994). The concept of 'sensory diet' is based on the idea that each individual requires a certain amount of sensory stimulation to be in his or her most alert, adaptable and skilful state (Wilbarger 1995). This is much like a person's nutritional requirement. For example, for a child with sensory seeking behaviour, the teacher can assign the child to distribute learning materials within the classroom so that the child can get the necessary movement stimulation.

For therapists who have completed postgraduate training in certain specific sensory-based techniques, the Alert Programme for Self-Regulation (Williams and Shellenberger 1992, 1994), the MORE: Integrating the Mouth with Sensory and Postural Function (Oetter et al 1995) and the Therapeutic Listening Programme (Frick and Hacker 2000) can provide effective techniques in regulating the child's behaviour. There are also different sensory modulation techniques, which could be scheduled into the child's sensory diet programme. These include giving the child deep pressure touch (Krauss 1987); using latex-free rubber tubing as a 'chewy' (Scheerer 1992); using a weighted vest (VandenBerg 2001); and allowing the child to sit on a therapy ball chair while doing his or her schoolwork (Schilling et al 2003). The therapist should integrate the use of a visual timetable with a sensory diet programme.

Treatment of the child at the psychological level

Psychologically-based treatment is usually the role of a clinical psychologist within the multidisciplinary team. Some children with ADHD will benefit from specific training in attention and impulse control, and also the treatment of executive dysfunctions (Barkley 1997, Dawson and Guare 2004).

Treatment of the child at the behavioural level

Different systematic reviews confirm that behavioural management is an effective treatment for children with ADHD (Fiore et al 1993, Pelham and Gnagy 1999). Barkley (1995) identified 10 guiding principles for raising a child with ADHD. These 10 principles highlight the specific

needs of children with ADHD; for example, they need immediate, frequent and powerful consequences to establish and maintain desirable behaviour. These guide parents to pause before reacting to the present misconduct of the child, use the delay to reflect on the principles and choose a response to the child that is consistent with these principles.

ADHD places children at serious educational risk (Barkley 1998). Therapists can apply the principles of behavioural management and sensory modulation in developing a programme of classroom management and environmental adaptation. As noted above, the visual timetable with sensory diet activities can be integrated into the schedule. The teacher can also set up basic rules of classroom behaviour for all children. Other suggestions include changes in the lesson schedule, the classroom layout and the seating position of the child. The guide to classroom interventions accompanying the SLI provides examples of appropriate interventions for specific behaviours identified in the SLI (Dowdy et al 1998). Some children may also benefit from a structured social skill training programme integrated into the real-life environment (Guevremont 1993, Sheridan et al 1996).

Treatment through appropriate task selection and remediation of developmental and functional problems

In terms of task demands and selection, Zentall (1993) advocated an increase in active participation, the use of a verbal as opposed to a written response, a focus on the novelty of tasks and self-pacing, and also a reduction in the amount of 'seat work' in order to maximise the task performance of children with ADHD.

As identified by Whitmont and Clark (1996), Barkley (1998) and Piek et al (1999), children with ADHD present a range of perceptual, language, motor and functional problems. These problems have a strong impact on the child's performance in different tasks and affect the child's successful participation in different occupations. The presence of these problems could be part of the ADHD features or related to comorbid conditions, such as DCD. The therapist should identify the problems and provide intervention accordingly.

The development of assessment and treatment packages based on the model

The model suggests a number of different evaluation and intervention procedures, a smaller array of which may be selected to formulate a specific assessment and treatment package, manageable within limited resources. The package should be affordable, in terms of time and resources; flexible, so as to meet an individual family's and child's needs; serviceable, with clinical procedures applied in some very concrete ways; and practical, so that therapists do not need to go through extensive training.

The first author has developed a basic package by taking into consideration the cost, time, resources and training involved. The package requires the use of assessment tools that are inexpensive or readily available in most paediatric occupational therapy departments. The basic rationale is that the assessment tools selected can provide sufficient information to identify the child's underlying dysfunctions and to plan an intervention programme that is child and family centred.

The package consists of a clinical pathway of 12 weekly contacts, with a combination of clinic appointments and school visits. The duration of the pathway is affordable because it is consistent with most of the packages of care for different care groups (for example, children with DCD) provided by paediatric occupational therapy services throughout the countries in the UK (see Fig. 4).

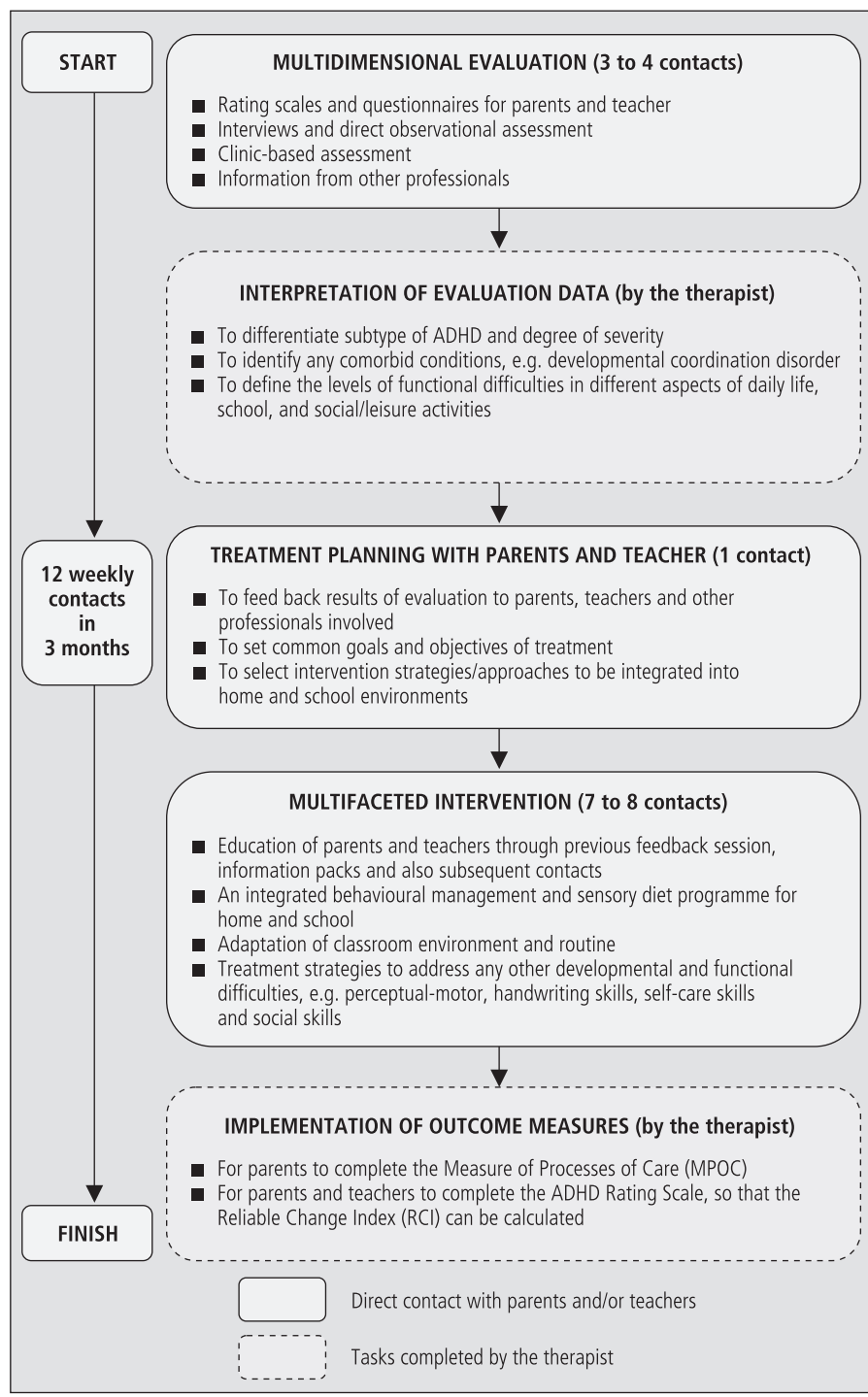
The processes of evaluation and intervention are based on the principles of the family-centred care approach. In the multidimensional evaluation process, it is recommended that the therapist uses the following assessment procedures:

1. *For the neurological basis of ADHD*, the Sensory Profile (Dunn 1999) and clinical observation
2. *For the behavioural patterns of ADHD and the child's psychosocial skills*, semi-structured interview, observational assessment and the ADHD Rating Scale – IV, Home and School Versions (DuPaul et al 1998)
3. *For the environmental factors*, semi-structured interview, classroom observation and the Strengths and Limitations Inventory: School Version (Dowdy et al 1998)
4. *For the child's task performance, perceptual-motor and functional skills*, the DCD Questionnaire for parents (Wilson et al 2000) and other perceptual-motor tests
5. *Information from other professionals* (for example, child psychiatrist, psychologist and family therapist) is incorporated into the whole evaluation process.

In the multifaceted intervention programme, the following components are advocated:

1. *Education of parents and teachers about ADHD* through a feedback session and also the provision of information packs (Jones et al 1999, CHADD 2000). Sharing information about the results of the evaluation helps to promote the understanding of the child's underlying dysfunctions and their effect on the child's behaviour. The educational process is reinforced through subsequent contacts to train parents and teachers.
2. *Treatment at the neurological level* by using different sensory modulation concepts and techniques selected from the Alert Programme (Williams and Shellenberger 1992, 1994) and the MORE (Oetter et al 1995), and also the sensory diet programme (Wilbarger 1995).
3. *Adaptation of home/classroom environment and routine* by considering the sensory characteristics of the environment (Nackley 2001), using the predictive visual timetable, and integrating different sensory modulation techniques into the home and classroom routine.

Fig. 4. Clinical pathway of the assessment and treatment package.



MPOC (King et al 1995, 1998); ADHD Rating Scale (DuPaul et al 1998).

4. *Treatment at the behavioural level* by integrating appropriate educational management strategies (Dowdy et al 1998), behavioural management strategies (Barkley 1995, 1998) and sensory modulation techniques to regulate the child's behaviour, in order to promote his or her engagement in different tasks at home and school.
5. *Enhancement of task performance* by remediating any developmental and functional difficulties identified through child-appropriate treatment strategies or approaches, such as perceptual-motor skills, handwriting skills and self-care skills.

Conclusion

Within the UK, occupational therapy for children with ADHD is a small field of practice even though considerable numbers of children are affected. In part 1 of this two-part article, the authors have combined theoretical information based on data gathered from previous research studies, a literature review and clinical experience, and organised it into an occupational therapy delineation model of practice for children with ADHD.

The model emphasises the interaction between the child, the task to be carried out by the child, and the environment in which the child carries out the task. In order to achieve successful participation in different occupations, a goodness-of-fit amongst all three factors needs to be achieved. The model also highlights a new understanding of ADHD as complex, multifaceted clusters of impairments in the neurological, psychological and behavioural domains. Given the multiple dysfunctions involved, a multidimensional evaluation and multifaceted intervention is proposed. A selective family-centred assessment and treatment package based on the model, yet feasible within limited resources, is described.

This model of practice remains to be validated. Any assessment and treatment package developed needs to be field-tested in

clinical practice and evaluated. Part 2 of this article will report the results of a multicentre research study, which evaluated the effectiveness of a family-centred assessment and treatment package based on the model outlined above as well as assessing its acceptability to parents.

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