Developmental Co-ordination Disorder:
A Review of Evidence and Models of Practice Employed by Allied Health Professionals in Scotland
Specification/PDU/AHP/2006/001
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Table 2: Primary research team, consultative support and research assistants

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1 Introduction to the executive summary

The Allied Health Professions (AHPs) Clinical Effectiveness and Practice Development network was established in 2001 with the aim of promoting the use of evidence in practice, sharing best practice and building confidence in AHPs to engage with the clinical effectiveness and clinical governance agenda. To take this work forward, the NHS Quality Improvement Scotland Practice Development Unit (NHS QIS PDU) began a process of engaging with AHPs to identify clinical improvement priorities within specific topic areas. One of the topics identified within the Children’s Topic Specific Group was developmental co-ordination disorder (DCD). DCD is a motor skill disorder that often becomes evident in school-aged children. Children with DCD lack the motor co-ordination necessary to perform tasks considered appropriate for their age, given normal intellectual ability and the absence of other neurological disorders. DCD was identified for further work for the following reasons:

- DCD is a common disorder. Prevalence of movement difficulties in children has been reported as high as 19%. However, two studies undertaken in the UK reported a prevalence of 5% and 8.5% respectively1.
- Children with DCD may have other difficulties, and there are co-morbidities associated with attention deficit hyperactivity disorder (ADHD), Autism spectrum disorder (ASD) and speech and language impairments.
- A key method of managing DCD is through the assessment and interventions of allied health professionals (AHPs). These include podiatrists, orthoptists, orthotists, speech and language therapists, occupational therapists and physiotherapists.
- To date, no synthesised evidence (professional, service user and scientific evidence) has been available in Scotland to support therapists to understand clinically effective practice for children with DCD.

Dr Kirsty Forsyth was commissioned by NHS QIS Scotland to complete a synthesis of evidence.

This document provides a synthesis of evidence, organised around children’s and families’ journeys through healthcare services, and developed into a framework, with the intent of supporting therapists deliver effective practice for children with DCD.

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1 Reported prevalence is dependant on the criteria and measures used to identify the disorder.
2 Executive Summary of findings

2.1 Objectives and methods

The objectives included:

1. identify what evidence is currently available in relation to AHP intervention in the assessment and management of DCD (researched service delivery)
2. identify current service delivery by AHPs including areas of innovation, emerging practice and where possible information on impact and outcome (current service delivery)
3. identify a criteria or framework that would indicate clinically effective practice for AHPs (synthesis of data).

These objectives were achieved through the methods below:

The evidence gathered through these methods came from every health board in Scotland

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2 An ethical opinion was received from the Multi-Centre Research Ethics Committee (MREC). Approval for subject recruitment was gained from the Multi-Centre Research and Development Committee (MRAD) as well as local NHS R&D offices. Honorary contracts and enhanced Discourse Scotland checks were gained.
2.2 Overall methods: how we collected our information

Because of the complex nature of the interventions under investigation, and the multiple stakeholders associated with the care of children with DCD, a diverse range of methodologies (including qualitative and quantitative methods) were included:

- **researched service delivery**
  - the evidence perspective
    - a review of 50 quantitative studies, 10 qualitative studies and 10 key policy documents
- **current service delivery**
  - the service user perspective
    - six\(^3\) focus groups with 25 children with DCD
    - seven focus groups with 46 parents of children with DCD
  - the professional perspective
    - a national survey of 602 AHPs\(^4\) (this represents all individuals in the professions who work with children and 11% of the total AHP workforce)
    - in-depth interviews to understand innovative practice with 26\(^5\) AHPs
- **synthesis of data**
  - findings from the above data were synthesised by a multi disciplinary group of AHP researchers and practitioners through a cyclical process of immersion, thematic analysis, idea webbing and conceptual clustering.

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\(^3\) Useful insights can be gained with three or four focus groups of 6-8 people.

\(^4\) OTs, PTs, orthoptists, podiatrists and orthotists were surveyed as their professional domain reflects the DSM IV criteria for diagnosing DCD. Manager networks and the NHS QIS Allied Health Professions (AHPs) Clinical Effectiveness and Practice Development network were used to identify AHPs in these professions who work with children. The total estimate of these AHP groups working with children was 602 and 100% of this population were surveyed. This represents 11% of the total AHP workforce (602/5476). AHP will be the term used in this document and refers to AHPs who work with children.

\(^5\) Saturation of information can be achieved with 12 interviews.
2.3 Short summary of findings

a. Researched service delivery: the evidence perspective

*The literature review* identified three and a half thousand international articles of which 50 quantitative studies, 10 qualitative studies and 10 key policy documents meet the inclusion criteria.

- The 50 quantitative articles were mainly focused on changing motor skills of children through individual clinic based therapy, delivered by qualified healthcare professionals.
- A summary of the highest quality evidence is presented below, for a full outline of the quantitative review please see the full report document.
- Eighteen percent (9/50) of the included studies were high quality randomised controlled trials studies, which indicated:
  - perceptual motor training and sensory integration (traditionally used by occupational therapists and physiotherapists) show benefit compared to no treatment and comparable effectiveness with each other in improving motor skills. However, the unique contribution of these therapies, or the pre-eminence of either approach over the other is not clear.
  - comparing kinaesthetic training with other approaches showed comparable/greater effectiveness in improving motor skills and kinaesthetic perception/memory; however, other studies indicated no effect relative to no treatment.
  - fatty acid supplementation can improve reading, spelling and behaviour.
- Overall, the quantitative evidence is insufficient to provide firm guidelines for practice. There are forms of care which appear promising, but all current approaches to the intervention of children with DCD require further clinical trials and outcome studies.
- Of the 10 qualitative studies sixty percent (6/10) were high quality, these indicated:
  - parents’ perspectives:
    - parents value therapy that enables a child to engage in school, home or social activities. Parents have an acute awareness that their child has significant social, emotional and physical difficulties and they were able to clearly articulate their own and their child’s difficulties. However, they felt that their concerns were trivialised by health
professionals. In particular, the process of attaining a diagnosis is difficult for parents.

- children’s perspectives:
  
  - children are able to identify a range of activities that they are not competent in and can formulate therapy goals in relation to personally important aspects of performance, eg leisure, self-care and productivity.

- Further rigorous qualitative research is required in this area, and should focus on parents’ and children’s experiences of healthcare and/or education. In particular, accessing children’s voices should be an integral part of future AHP research.

- Ten Scottish Executive and professional policy documents from 2000 to present were reviewed and indicated:
  
  - services should promote a preventative approach with early intervention and clear referral pathways to improve access to care and deliver timely care. Services should be close to where people live and have a competent workforce (with an appropriate skill mix) to promote child and parent involvement. Services should collaboratively work across boundaries of different agencies in a whole systems approach through strategic planning arrangements to ensure the involvement of key stakeholders. There should be a strong focus on the inclusion of functional activities in therapy with goals based on the daily life of the child.

b. Current service delivery: the service user perspective

- Parent focus groups identified: that parents need clear routes for entry/re-entry into ‘the system’; comprehensive and timely care/support available locally; knowledgeable and skilled professionals (health and education); communication between professionals; and professionals and parents/carers that is effective, ‘care for the carers’ to support them enable their child and raising the profile of DCD within society was viewed as important.

- Children focus groups identified that children saw therapy as being an enjoyable experience, however, some children recalled that their first visit to therapy was less than agreeable; this was evident from descriptions of initial assessment sessions with some children explaining that the first sessions were embarrassing and/or upsetting. Children were able to talk with ease about personal goals or aspirations and each
child presented a range of activities important to them. Schoolwork became a particular focus when discussing areas where they required assistance.

c. Current service delivery: the professional perspective

- AHP survey had a 65% response rate. Over half of respondents stated they saw children with DCD.

The majority of AHP referrals are received from community paediatricians, GPs and school doctors with half of these being mostly appropriate. Seventy percent of AHPs did not receive referrals from parents. Assessment is primarily carried out in a hospital location, with parents present, by senior staff, using assessments focused on the child’s capacity. Joint assessment was viewed as effective practice; however, there was little consistent evidence of this happening. In ascending order of frequency, AHP professionals provide feedback to parents, children, education and other AHPs following assessment. However, some methods of feedback were viewed as effective and not pursued. AHPs most involved in the diagnostic process are OTs, physiotherapists, and orthoptists. A greater percentage of these professions felt it was important to be involved than were actually involved. AHPs carried out goal setting with children and parents all or most of the time and found it very or mostly effective. Thirty percent identified that goal setting with education staff was an effective practice, however, it was infrequently carried out.

AHP professions are focused on different aspects of the child. OTs primarily focus on engagement in daily activities, physiotherapists focused on physical stability, orthoptists focus on visual motor skills, orthotists primarily focus on gait pattern and foot position, and podiatrists primarily focus on gait analysis and feedback and footwear advice. These AHPs expect to see changes most of the time for the above interventions.

Interventions were mainly individual and hospital based. School and home environments were seen as effective treatment locations by fifteen to twenty percent of AHPs, however, they only used these locations infrequently. The most frequent skill mix for implementing individual interventions was therapists and parents; this was identified as mostly effective. In regards to the evaluation of goals, the majority of AHPs use feedback from parents and children most frequently and found this practice very or mostly effective.
AHP interview identified a range of innovations including: using children’s perceptions of therapeutic change as primary outcome measures; using specialist tools to identify child goals and greater use of community interventions focused on children engaging with physical activities with peers. Innovative engagement with parents was demonstrated by some services, eg facilitating ‘parent to parent’ support and structuring child interventions to include specific parent focused group sessions. There were also areas where collaborative opportunities were pursued by accessing non-traditional sources of funding. Some specialist services are developing in areas of orthoptics and dietetics.

d. Synthesis of data
There were two outcomes of this analysis:

1. **Five key themes of clinically effective practice.** These themes permeate the data and represent an overall synthesis of the core values inherent in the framework.

   **Health promotion:** Promoting community-based support for children with DCD prior to any involvement with AHP services requires additional support and education. AHPs have a critical role in the design and delivery of health promotion strategies with referring agents allowing for community-based management of children possibly negating the need for more specialised services.

   **Communication:** Effective communication transcends all aspects of AHP practice with children with developmental coordination disorder. In the first instance, good communication with parents and children ensures services are relevant and that all parties feel heard and understood. Secondly, effective collaborative work is initiated, maintained and developed by efficient communication.

   **Child and parent involvement:** Structures and tools allowing children’s and parents’ voices to be heard should be an integral part of service planning and the child/family journey. Harnessing parental involvement alongside AHP practice is essential when integrating self-management as a key principle in the management of children with DCD.
**Working together:** Engaging with partners in education and developing an understanding of AHP roles will improve support for the child with DCD. Collaborative working and expanding current practice to include other agencies is essential in the development of an inclusive integrated model of service provision. Established clear pathways for entry and exit of services can assist in this process by clarifying roles and expectations for families, education and other involved professionals.

**Skills and knowledge:** All AHPs require knowledge, training, and an understanding of current evidence for intervention. AHPs, in particular occupational therapists, have a pivotal role in the development and understanding of DCD and its impact on other AHP services and other agencies. This is essential not only for children engaged with AHP services, but also for other agencies involved with children with DCD during pre and post involvement with AHP services.

2. **Individual principles** were developed and organised around the child/family journey to give them cogency. Accordingly, they engage with the early stages of a child’s difficulties, assessment, intervention, and finally discharge. For each principle:
   - the supporting data from our research is presented;
   - a key message for AHP clinicians is given;
   - quotes from parents, AHPs or children are presented where appropriate;
   - examples of smart working (ie actual work taking place at present) related to the principle are presented where appropriate.

These principles provide guidance for practitioners on service delivery for children with DCD and their families and represent the substantive contribution of this research to current AHP practice.
3 Framework principles

Helping children and families in the early stages

Developing a supportive community where initial issues are resolvable with rapid access to AHP support when required.

- Raising awareness within the community.
- Supporting self management within homes, schools and communities.
- Increasing referring agents’ knowledge and understanding.
- Optimising pre-assessment contact.

Assessment

Contextual child and family centred assessment jointly with others, creating clear expectations and agreement on optimal courses of action.

- Integrating views and expertise of parents/guardians and children.
- Harnessing benefits of collaborative assessment.
- Making assessment practices appropriate.
- Structuring the diagnostic process.
- Adopting an honest approach to outcomes and expectations.

Intervention

Collaborative goal setting that embraces child, family and community contexts and supporting the child's participation through shared expectations and responsibility within the change process.

- Putting the child and family at the centre of care when goal setting.
- Involving other AHPs and education staff in goal setting.
- Enhancing participation of children with DCD.
- The child is not the only focus for intervention.
- Sharing expectation and responsibilities in supporting change.
- Valuing formalised collaboration with others.
- Using evidenced interventions that support change.

Discharge

Supportive transitional pathways from specialist services to self management within homes, schools and communities following evaluated outcomes.

- Evaluating interventions and outcomes
- Providing strategies for self management and making use of community resources.
- Providing clear pathways for exiting services.
4 Introduction to the main report

The Allied Health Professions (AHPs) Clinical Effectiveness and Practice Development network was established in 2001 with the aim of promoting the use of evidence in practice, sharing best practice and building confidence in AHPs to engage with the clinical effectiveness and clinical governance agenda. To take this work forward, the NHS Quality Improvement Scotland Practice Development Unit (NHS QIS PDU) began a process of engaging with AHPs to identify clinical improvement priorities within specific topic areas. One of the topics identified within the child specific group was developmental co-ordination disorder (DCD).

Developmental co-ordination disorder (DCD) is a motor skill disorder that often becomes evident in school-aged children (Dewey and Wilson 2001). These children lack the motor co-ordination necessary to perform tasks considered appropriate for their age, given normal intellectual ability and the absence of other neurological disorders (Barnhart et al 2003). DCD is a common childhood disorder that can develop into a long-term condition that has significant impact on society (eg Cantell et al 1994). Children with DCD may have other difficulties, and there are co-morbidities associated with attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD) and speech and language impairments (Gillberg 2003). Medical treatment is not appropriate due to the nature of the condition. A key method of managing DCD is through the assessment and interventions of allied health professionals (AHPs). To date, no integrated AHP framework for the assessment and treatment of DCD exists for Scotland. This document provides a report of the work of the ACHIEVE Alliance Team, which has developed a framework for AHPs working with children with DCD.
5 Developmental co-ordination disorder

5.1 How many children are affected?
DCD and DCD-like motor impairments are common problems in children, which need careful consideration, as the effects of DCD are profound for Scottish children and their families. Prevalence of children with co-ordination or movement difficulties is reported as between 4-19% with a varying prevalence reported between countries (see table 3). Reported prevalence however is dependant on the criteria and measures used to identify the disorder. In accordance with the DSM-IV criteria, a diagnosis of DCD should be made if motor performance is below that expected, this significantly interferes with activities of daily living, is not due to a general medical condition and if a learning difficulty is present, motor difficulties are in excess of those usually associated with it. In most studies, non standardised measures were used; these did not indicate the impact on the child’s daily life, and none of the studies attempt to measure the presence of a learning difficulty. Kadesjo et al (1999), for example, found a 4.9% prevalence of ‘severe’ DCD and an 8.6% prevalence of ‘moderate’ DCD based on a non standardised medical assessment of motor skills. Two studies undertaken in the UK, reported an incidence of 5% and 8.5% respectively. The first study was based on teachers’ observations; whilst these were confirmed by an objective assessment, there is the possibility that other children with significant problems may have been missed and this figure could represent an underestimation of prevalence. The second study was based on a standardised motor test battery (STMB) comprising of three fine motor and three gross motor tests. Failing two tests in either fine motor or gross motor areas resulted in a diagnosis of ‘clumsy.’ Finally, it is important to note that children with DCD may have multiple difficulties, as discussed in the following section.

5.2 Co-morbidity
Children with DCD may have multiple difficulties, and there are co-morbidities associated with attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD) and speech and language impairments (Gillberg 2003). Kaplan et al (1998) highlight that co-morbidity between developmental disorders such as ADHD, language/communication disorders and DCD is the rule rather than the exception; with motor co-ordination difficulties being common to all. In addition to this, the substantial overlap between DCD and ADHD can often lead to inherent diagnostic and classification challenges (Bax 1999). Throughout this document, where there is reference to DCD, the reader should be mindful that this should be taken in the context of a condition likely to be complicated by significant co-morbidity.
Table 3: Prevalence studies of children with motor co-ordination difficulties

<table>
<thead>
<tr>
<th>PREVALENCE</th>
<th>SAMPLE</th>
<th>REFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% of the population affected 2% ‘severe’ Based on ‘expert medical opinion’</td>
<td>No details given</td>
<td>Dyspraxia Foundation, UK, 2007</td>
</tr>
<tr>
<td>8% Canada 19% Greece</td>
<td>591 children, 10.2-13.2 years, Canada</td>
<td>Tsiotra et al 2006</td>
</tr>
<tr>
<td>Scored &lt; 12th percentile in Bruininks-Oseretsky test of motor proficiency (BOTMP-SF).</td>
<td>329 children, 10.4-12.2 years, Greece</td>
<td></td>
</tr>
<tr>
<td>Estimate 6%</td>
<td>5-11 years</td>
<td>American Psychiatric Association 2000</td>
</tr>
<tr>
<td>4.9% severe DCD 8.6% moderate DCD</td>
<td>409 children, 6yrs 8 mths – 7yrs 8 mths</td>
<td>Kadesjo et al 1999</td>
</tr>
<tr>
<td>Based on medical motor dysfunction score comprising of 11 motor and fine motor items, each time rated 0 (no abnormality) – 2 (major abnormality). Classified as moderate DCD if scored 10-14, and severe DCD if scored 15 or more.</td>
<td>Sweden</td>
<td></td>
</tr>
<tr>
<td>4%</td>
<td>427 children, 6-9 years</td>
<td>Wright et al 1996</td>
</tr>
<tr>
<td>Scored &lt;15th percentile in movement ABC checklist and on subsequent testing &lt;15th percentile in movement ABC test.</td>
<td>Singapore</td>
<td></td>
</tr>
<tr>
<td>8.5%</td>
<td>201 children, Mean age 5yrs, 6 mths</td>
<td>Roussounis et al 1987</td>
</tr>
<tr>
<td>Based on standardised motor test battery (STMB) comprising of 3 fine motor and 3 gross motor tests. Failing two tests in either fine motor or gross motor areas resulted in a diagnosis of clumsy.</td>
<td>UK</td>
<td></td>
</tr>
<tr>
<td>5.9%</td>
<td>421 children, 8-12 years</td>
<td>Illoeje  1987</td>
</tr>
<tr>
<td>Scored on 8 standardised fine and gross motor tests, and regarded as clumsy if number of fails + chronological age &gt;13.</td>
<td>Nigeria</td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td>400 children, Infant school age</td>
<td>Henderson et al 1982</td>
</tr>
<tr>
<td>Children identified by teachers as having motor co-ordination problems which affected their schoolwork – these children were subsequently tested and found to have significantly lower scores on the motor impairment test compared with controls.</td>
<td>UK</td>
<td></td>
</tr>
</tbody>
</table>
5.3 What is the effect of DCD?

A child with DCD may demonstrate significant difficulty with self-care tasks (eg dressing, using utensils), academic tasks (eg handwriting, copying, organising set work, gym class), and/or leisure activities (eg sports, playground activities, social interactions) (Barnhart et al 2003). Children with DCD usually have the same expectations placed upon them as their peers, as DCD is often a ‘hidden handicap’ (Kadesjo et al 1998). This can lead to repeated experiences of failure for the child causing a significant negative impact on their self-esteem, socialisation, behaviours and academic performance (Parmenter et al 1991). Children with DCD may therefore be socially excluded (Hallum 1995) because they engage in passive, solitary activities (Pollock and Stewart 1990) and they rate themselves as particularly low in social acceptance (Resnick et al 1987, King et al 1993).

5.4 Effect on the family

Studies have highlighted high levels of family stress, particularly during the period of time when parents suspected that their child had difficulties (Stephenson et al 1990, Larkin and Parker 1998). Parents report that their child's DCD difficulties had resulted in a significant impact on family routines, siblings and daily activities (Chesson et al 1990, Stephenson and McKay 1990).
5.5 What is the social impact of DCD?

While there are immediate effects, DCD can also lead to significant life long consequences for children and this creates a significant social impact in Scotland. Studies have shown these children do not ‘grow out of it’ and move into adolescence and adulthood still trying to manage their difficulties (Cantell et al 1994, Gillberg and Gillberg 1989, Gillberg et al 1989, Hellgren et al 1993, Hellgren et al 1993). For example, a long term study has shown that 80% of the children diagnosed with DCD at the age of seven were, by age 22, unemployed, had broken the law, were alcohol or drug misusers or had mental health difficulties (in comparison to 13% of the comparison group without DCD) (Rasmussen and Gillberg 2000).

DCD is, therefore, a common childhood disorder that can develop into a long term condition which has significant impact on society. Medical treatment is not appropriate due to the nature of the condition. A key method of managing DCD, in order to avoid a long term condition developing, is through the assessment and interventions of allied health professionals (AHPs) with the aim of providing coping strategies for the child and their family.

5.6 Developmental co-ordination disorder stakeholders

There are a number of stakeholders involved in developmental co-ordination disorder. These include: allied health professions (AHPs), parents and support groups.

5.6.1 Supporting children with DCD

Prevention of long term consequences of DCD is possible if parents and the child work with AHPs, education staff and others to learn strategies to compensate for the motor difficulties. Key AHPs are occupational therapists and physiotherapists. Occupational therapists support the child by facilitating engagement with self care, play and school activities (Kurtz and Scull 1993, Schaaf and Miller 2005, Dunford and Richards 2003). Physiotherapists support children with their physicality (Kurtz and Scull 1993) as many DCD children have low muscle tone and as a result tend to fatigue easily with physical activity because of the effort involved in maintaining their posture and balance.
New emerging areas of practice in Scotland include orthoptics and dietetics; these AHPs have a possible role in the management of children with DCD, although strong evidence for their involvement is sparse. However, DCD children can have challenges with visual-motor capacity and orthoptists (NHS QIS Scotland 2004) can provide ocular assessment and intervention to support the child to develop more capacity to focus and move their eyes in coordination with their body. There is also some evidence to support dietary interventions for DCD, and how dieticians can support a child with DCD (Richardson and Ross 2000).

5.6.2 Parents are partners

Parents are essential stakeholders because they are actively involved in supporting strategies for children with DCD. Moreover, they are able to notice motor learning difficulties in very young children with DCD (Cratty 1994, Barnett et al 1998) and even recognize associated emotional and behavioural issues emerging (Fletcher-Flinn et al 1997, Fox and Lent 1996). Although there has been political pressure to advocate public involvement in service delivery by seeking the public’s view from the earliest stages, and examining possible options in an open way with good evidence (Scottish Executive 2002, Kerr 2005) this has been illusive in DCD services (Resnick and Hutton 1987, Rosenbaum et al 1996).

The development of the AHP DCD framework will, therefore, involve parents in the NIS QIS steering group and also involve them in sharing their experiences of supporting a child with DCD and what aspects of services were more/less helpful for their child.

5.6.3 The key DCD support groups in Scotland

The most prominent support group available is the Dyspraxia Foundation. Dyspraxia is another name for developmental co-ordination disorder. The Dyspraxia Foundation was founded in 1987. The foundation answers approximately 10,000 enquiries and distributes more than 20,000 leaflets about the condition, annually. The foundation supports an increased understanding of Dyspraxia (DCD), particularly among professionals in health and education.

DCD children may have interactions with both the Autistic Society and Afasic Scotland, because they may have multiple difficulties, and there are co-morbidities associated with ASD and speech and language impairments (Gillberg 2003). The Autistic Society support children who have a developmental disability that affects their imagination and how they
communicate and relate to people around them. Afasic Scotland helps parents and young people in Scotland resolve queries arising from the Scottish legal and education systems. Afasic Scotland provides training and information for education, health professionals and parents and is a registered provider of continuing professional development for teachers.

These national support groups appreciate the pivotal nature of AHP interventions and promote AHPs as an effective service to children with DCD and their families. They have also argued for a scoping of DCD services in order to understand current practice and highlight innovation within a quality framework. In line with this, they would like to contribute to the NHS QIS steering group and be an active partner in promoting and disseminating information about the framework when it is completed.

5.7 The benefits of developing an AHP DCD framework

Developing an evidenced based AHP framework for DCD through the gathering and synthesis of key information will provide stakeholders with the knowledge they need to improve services for children with DCD in Scotland. These improvements may include reviewing current service delivery, consideration of emerging practice and being able to assess quality of service delivery.

5.7.1 Review current service delivery

The AHP DCD framework will provide the critical information to DCD services in order to review their current services structures within the Scottish context. The presence of an evidenced based framework will stimulate AHPs to complete ‘in house’ re-designs in line with the framework’s recommendations. It will provide focus and evidence to argue for change and provide an impetus to bring about changes to improve practice.

5.7.2 Consider areas of emerging practice

The AHP DCD framework will also support the promotion of emerging innovative areas of practice where, for example, orthoptists and dieticians can provide critical support to a child with DCD. There are some ‘pockets of excellence’ in Scotland for these two AHP professions which will be captured within the framework. This is an opportunity to bring
these areas of emerging practice to the attention of DCD services to consider in future practice development.

5.7.3 Use as a quality framework
The AHP DCD framework can also be used to assess quality of DCD service delivery, an essential feature of NHS QIS. The NHS QIS 2004-2005 annual report states the practice development unit has a multi-professional remit to promote clinical excellence through the sharing of good practice underpinned by evidence.

5.7.4 Summary
Developing an evidence based framework will allow AHPs, for the first time, to understand both the nature of current practice in Scotland and the scientific evidence available, and when organised around children’s and families’ journeys through healthcare services, will provide a powerful tool to support effective practice.
5.8 How the framework was developed

The objectives included:

1. Identify what evidence is currently available in relation to AHP intervention in the assessment and management of DCD (researched service delivery)
2. Identify current service delivery by AHPs including areas of innovation, emerging practice and where possible information on impact and outcome (current service delivery)
3. Identify a criteria or framework that would indicate clinically effective practice for AHPs (synthesis of data)

These objectives were achieved through the below methods:

The evidence gathered through these methods came from every health board in Scotland

5.9 Overall methods: how we collected our information

Because of the complex nature of the interventions under investigation, and the multiple stakeholders associated with the care of children with DCD, a diverse range of methodologies (including qualitative and quantitative methods) were included:
• researched service delivery
  — the evidence perspective
    ▪ a review of 50 quantitative studies, 10 qualitative studies and 10 key policy documents

• current service delivery
  — the service user perspective
    ▪ six\(^6\) focus groups with 25 children with DCD
    ▪ seven focus groups with 46 parents of children with DCD
  — the professional perspective
    ▪ a national survey of 602 AHPs\(^7\) (this represents all individuals in the professions who work with children and 11% of the AHP total workforce)
    ▪ in-depth interviews to understand innovative practice with 26\(^8\) AHPs

• synthesis of data
  ▪ findings from the above data were synthesised by a multi disciplinary group of AHP researchers and practitioners through a cyclical process of immersion, thematic analysis, idea webbing and conceptual clustering.

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\(^6\) Useful insights can be gained with three or four focus groups of 6-8 people (Krueger, 1994).

\(^7\) OTs, PT’s, orthoptists, podiatrists, orthotists were surveyed as their professional domain reflects the DSM IV criteria for diagnosing DCD. Manager networks and the NHS QIS Allied Health Professions (AHPs) Clinical Effectiveness and Practice Development network were used to identify AHPs in these professions who work with children. The total estimate of these AHP groups working with children was 602 and 100% of this population were surveyed. This represents 11% of the total AHP workforce (602/5476). AHP will be the term used in this document and refers to AHPs who work with children.

\(^8\) Saturation of information can be achieved with 12 interviews (Guest et al 2006).
6 Evidence perspective: research literature and policy

6.1 Introduction

An important part in the development of any framework that aims to provide guidance to therapists for their working practice is to review relevant existing literature. Key information that could support the framework must be gathered, appraised and synthesised in a way that is trustworthy and produces a useful report. To be able to provide guidance to AHPs about which interventions for children with developmental co-ordination disorder (DCD) work (ie which interventions are the most effective), conducting a systematic review is arguably the most appropriate approach to synthesising existing research literature. Intervention-type research studies are traditionally summarised using this approach. However, although traditional systematic reviews focus only on scientific/experimental types of studies (eg randomised controlled trials), information from different sources may also be valuable in the development of the AHP framework. For example:

- studies of parents’/carers’ perspectives on AHP services;
- studies of parents’/carers’ perspectives on the needs of their child as well as their own concerns;
- studies of what children with DCD think about AHP therapies as well as their views on the difficulties they face;
- qualitative studies of AHPs’ views on the interventions provided for children with DCD; and
- national policy and guideline documents which provide guidance for AHP service provision and development.

Studies that explore the views or experiences of participants primarily use qualitative methods to generate findings and are not traditionally integrated with reviews of intervention-type research. However, the value of integrating qualitative research findings into health related systematic reviews has been acknowledged (Dixon-Woods and Fitzpatrick, 2001) and review of recent policy initiatives and developments will have an impact on the future development of AHP children and young people’s services. To support the development of a context sensitive, evidence based AHP framework, which takes into account service users’ and
providers’ views, a bespoke literature review methodology and findings are presented in this chapter. This methodology will draw upon the guidance from other researchers who have successfully synthesised different types of information as well as using established methods to conduct a systematic review of AHP interventions for DCD.

6.2 Questions guiding the review

Table 4 presents the review questions to be addressed. The review questions are grouped into three sections and the remainder of this chapter presents the methodology and findings of each. The chapter is concluded with an overview of the findings from each section and the implications for the AHP framework development.

Table 4: Review questions and the review approach adopted

<table>
<thead>
<tr>
<th>Review Question/s</th>
<th>Nature of the Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>What AHP interventions are effective for children with DCD?</td>
<td>Quantitative intervention-type research</td>
</tr>
<tr>
<td>Parents’ or carers’ views:</td>
<td>Qualitative exploratory research</td>
</tr>
<tr>
<td>• what are parents'/carers’ views about AHP interventions for children with DCD?</td>
<td></td>
</tr>
<tr>
<td>• what are parents'/carers’ views about their child’s needs/challenges that they face?</td>
<td></td>
</tr>
<tr>
<td>Children’s views:</td>
<td></td>
</tr>
<tr>
<td>• what are children’s views about AHP interventions?</td>
<td></td>
</tr>
<tr>
<td>• what are the children’s views about their needs or the challenges that they face?</td>
<td></td>
</tr>
<tr>
<td>AHPs’ views:</td>
<td></td>
</tr>
<tr>
<td>• what are AHPs' views on interventions for DCD?</td>
<td></td>
</tr>
<tr>
<td>What do current national guidelines advise about the nature of service provision for children/children with DCD?</td>
<td>National policy documents</td>
</tr>
</tbody>
</table>
6.3  Review methods

There is an increasing recognition that decisions regarding use of interventions and distribution of services should be based on available evidence. This evidence can be quantitative intervention-type research, eg randomised controlled trials (RCTs), qualitative research (eg studies of parents’ experiences of receiving care) or policy documents. Considering these three different types of evidence, different methods are required for their analysis and interpretation. The following sections will provide an overview of the different methods used in the current report to deal with the quantitative, qualitative and policy evidence gathered.

6.3.1  Identification of papers

Titles and abstracts were electronically retrieved and reviewed by the team. The following databases were searched for all available references in July 2006.

- CCTR CINAHL
- EMBASE
- MEDLINE
- OTCATS
- OTSeeker
- PsychINFO

The computerised search strategy used in Medline is presented below (exact terminology was altered to reflect indexing systems used in each individual database). Although the primary means of obtaining literature was through electronic databases, hand searches of reference lists of all systematic and literature reviews were also carried out. Hand searches of key article reference lists were also used to identify relevant studies. Hand searching was the primary method of searching for policy documents.
MEDLINE search strategy (adapted from Lipson et al 2002)

1. DEVELOPMENTAL N2 CO-ORDINATION
2. DEVELOPMENTAL N2 COORDINATION
3. (MM "Motor Skills Disorders")
4. (MM "Motor Skills")
5. (MM "Kinesthesia")
6. KINESTHE*
7. (MM "Psychomotor Disorders")
8. (MM "Developmental Disabilities")
9. PERCEPTU* N2 MOTOR
10. CLUMS*
11. DYSPRAXI*
12. SENSORY N2 INTEGRAT*
13. MINIMAL N2 BRAIN
14. MINIMAL N2 CEREBRAL
15. S14 OR S13 OR S12 OR S11 OR S10 OR S9 OR S8 OR S7 OR S6 OR S5
   OR S4 OR S3 OR S2 OR S1
16. (MM "Child")
17. (CHILD* or GIRL* or BOY* or SCHOOLCHILD* or ADOLESCEN")
18. S16 OR S17
19. (MM "Rehabilitation")
20. DIET*
21. NUTRIT*
22. ORTHOPTIST*
23. OPHTHALMOL*
24. OCCUPATIONAL N2 THERAP*
25. OPTOM*
26. (MM "Physical Therapy Modalities")
27. (MM "occupational therapy")
28. PHYSIOTHERAP*
29. TREAT*
30. PHYSICAL N2 THERAP*
31. INTERVEN*
32. (MM "Ophthalmology")
33. (MM "Nutrition")
34. (MM "Orthoptics")
35. FOOD N2 SUPPLEMEN*
36. (MM "Art Therapy")
37. (projective or psychoanal* or psychodynamic or milieu or creative)
38. (MM "Podiatry")
39. Podiat*
40. (foot or feet or ankle)
41. (MM “Orthotic Devices”)
42. (MM "Radiography")
43. (MM "Language Therapy") or (MM "Speech-Language Pathology") or (MM
   "Speech Therapy")
44. Insole*
45. S44 OR S43 OR S42 OR S41 OR S40 OR S39 OR S38 OR S37 OR S36 OR
   S35 OR S34 OR S33 OR S32 OR S31 OR S30 OR S29 OR S28 OR S27 OR
   S26 OR S25 OR S24 OR S23 OR S22 OR S21 OR S20 OR S19
46. S45 AND S18 AND S15
6.3.1.1 Inclusion criteria

For inclusion in the review research papers had to meet the following criteria

1. Criteria for considering research papers for review:
   
   - randomised controlled trials (RCT), controlled clinical trials (CCT) and other than controlled designs (OD) (eg cohort studies, before-and-after studies) which examine AHP interventions
   
   - qualitative studies should provide an ‘insider’ orientation to the topic of challenges/needs related to DCD and AHP interventions for DCD, ie it relates to the views and/or experiences of parents/carers/children/AHPs

2. Types of participants:
   
   - children diagnosed as having developmental co-ordination disorder under the Diagnostic and Statistical Manual of Mental Disorders 4 (DSM-IV) criteria
   
   - when research is older (pre DSM-IV) – children for whom DCD would have been an appropriate diagnosis
   
   - for qualitative research: parents or carers who care for a child who fits the description above

3. Types of intervention:
   
   - AHPs involved in the management of children who fit the description above (occupational therapy, physiotherapy, orthoptics, speech and language therapy, dietetics, art therapy, podiatry, prothetics/orthotics and radiography).

Policy documents were included if they were current, and relevant to the project focus.
6.4 Data management

6.4.1 Initial management of retrieved abstracts

Titles and abstracts were retrieved electronically, reviewed, and assigned to an appropriate category using Reference Manager 11 software as a platform. During initial screening, many abstracts were designated ‘not for review’ as they were irrelevant to the project focus or duplicates. During the second stage of screening, papers were obtained in full print form, inclusion and exclusion criteria were applied, and relevant papers were designated for full data extraction.

6.4.2 Data extraction

Standardised data extraction forms were used for the qualitative and quantitative research papers (see appendices 1 and 2). Data extraction forms were not used for policy documents. All papers were reviewed by two authors.

Quantitative research

For quantitative research (eg an RCT) data were extracted on a number of different dimensions covering: descriptive information (authors, date of publication), description of primary difficulty under study, sample data (age means, standard deviations and ranges, gender), nature of intervention (including intervention description, location, skill mix and individual or group treatment), outcome of therapy, assessment focus and results.

Qualitative research

For qualitative research (eg a study of children’s experiences of having DCD), data were extracted covering various aspects: descriptive information (authors, date of publication), description of primary difficulty under study, theoretical framework for the study, sample data (age means, standard deviations and ranges, gender), methods used (for data generation and analysis) and findings.
6.4.2.1 International classification of function (ICF) coding

As part of the quantitative data extraction process, the intervention outcome focus was coded using the international classification of functioning (ICF) classifications of body functions and structures, activity, or participation. The nature of outcome measurement was defined to be at the level of one or more of the following:

- body functions/body structures: within the child or
- activities/participation: addressing the impact of the impairment on the child’s ability to do certain activities and/or considering the impact of the impairment and restricted activity in terms of the child’s ability to participate as they would like in a particular context.

In light of the lack of consistent guidelines on the application of the ICF framework to AHP practice, and the likelihood of introducing error in coding because of this, regular debriefing exercises were carried out by the coding team to discuss how the ICF was being applied. In addition to this, due to the interpretative nature of the coding, ICF classifications were finalised only when they had been endorsed by the whole coding team.

Examples from occupational therapy literature include:

- body functions/body structures:
  - sensory integration
  - visual motor ability

- activity/participation:
  - participation in curriculum
  - engagement in play
6.4.3 Assessment of quality

The methods used to critique quantitative research are explicit, and are particularly well developed to support reliable synthesis of evidence relating to the effectiveness of interventions. Within these methodologies, there are widely accepted rigorous techniques for the purposes of quantifying the quality of quantitative studies. There is no such consensus around a parallel methodology that would be valid for the diverse approaches seen in the qualitative field. However, there are a growing number of publications, which offer guidance on the synthesis and critique of qualitative research (Finfgeld, 2003; Thomas et al, 2004; Dixon-Woods et al, 2004a; Dixon-Woods et al, 2006; Popay et al, 2006). The method we developed was informed through reference to this literature. We did not critique the quality of policy documents.

Quantitative research

The methodological quality of the included quantitative studies was rated by Seultjens et al’s (2004) modified van Tulder (1997) scale, which we further modified to reflect the aims of our study. This scale rates studies in terms of patient selection, interventions, outcome assessment and statistics, and through a numerical system, studies are given a quality rating. Randomised controlled trials (RCTs), and controlled clinical trials (CCTs) can achieve a grade of ‘high’ or ‘low’ quality. Other types of designs (eg case studies, cohort studies), because they lack the methodological rigour of RCTs or CCTs, can only achieve a grade of ‘sufficient’ or ‘low’ quality. These designs are referred to as other than controlled designs (ODs).

The list considers for randomised controlled trials (RCTs) and controlled clinical trials (CCTs) (Seultjens et al 2004):

- eleven criteria for internal validity, six descriptive criteria and two statistical criteria;
- all criteria were scored as yes or no/unclear. Equal weight was applied to all items;
- RCTs and CCTs are considered to be of ‘high quality’ if at least six criteria for internal validity, three descriptive criteria and one statistical criterion are scored positively. Studies not meeting these criteria are considered ‘low quality.’
The list considers for other than controlled designs (ODs) (Seultjens et al 2004):

- six criteria for internal validity, four descriptive criteria and two statistical criteria;
- all criteria were scored as yes or no/unclear;
- equal weight was applied to all items;
- ODs are considered ‘sufficient quality’ if at least four criteria for internal validity, two descriptive criteria and one statistical criterion are met. Studies not meeting these criteria are considered ‘low quality’.

**Qualitative research**

Methods of critiquing qualitative research tend to avoid reducing critique to a numerical score with associated descriptors. For the purposes of this qualitative review, a 13-point quality assessment ‘checklist’ was developed. The development was informed through reference to the literature in the area of qualitative study critique/review (Dixon-Woods et al 2004b; Brown et al 2006; Letts et al 2007). A decision was taken to generate only two broad categories (low quality and high quality) which would be used to give a sense of the quality of the qualitative studies reviewed.

For each criterion on the 13-point checklist the response options were: ‘yes’ or ‘no/unclear’; ‘yes’ indicated that the issue in question had been clearly addressed within the article, ‘no/unclear’ indicated that the issue was not addressed or it was not clearly outlined. As a simple indicator of quality, the number of ‘yes’ and ‘no/unclear’ responses were calculated for each article reviewed; where the number of criteria in the ‘yes’ category outnumbered the ‘no/unclear’ category the study was deemed high quality. Where the number of ‘no/unclear’ responses was dominant, the study was deemed: low quality (see Table 5). It is important to note that the labelling of the qualitative studies as: high or low quality is not intended to be any more than a rough indicator of the study quality.
6.4.3.1 Quantitative research: randomized controlled trials (RCTs) and controlled clinical trials (CCTs) – quality criteria used

All criteria were scored as yes or no/unclear.

**Patient selection:**

a) Were the eligibility criteria specified?
b) Treatment allocation:
   1) Was a method of randomization performed?
   2) Was the treatment allocation concealed?
c) Were the groups similar at baseline regarding the most important prognostic indicators?

**Interventions:**

d) Were the index and control interventions explicitly described?
e) Was the care provider blinded for the intervention?
f) Were co-interventions avoided or comparable?
g) Was the compliance acceptable in all groups?
h) Was the patient blinded to the intervention?

**Outcome measurement:**

i) Was the outcome assessor blinded to the interventions?
j) Were the outcome measures relevant?
k) Were adverse effects described?
l) Was the withdrawal/drop out rate described and acceptable?
m) Timing follow-up measurements:
   1) Was a short-term follow-up measurement performed?
   2) Was a long-term follow-up measurement performed?

n) Was the timing of the outcome assessment in both groups comparable?

**Statistics:**

o) Was the sample size for each group described?
p) Did the analysis include an intention-to-treat analysis?
q) Were point estimates and measures or variability presented for the primary outcome measures?
6.4.3.2 Quantitative research: other than controlled designs (ODs) – quality criteria used

All criteria were scored as yes or no/unclear

**Patient selection:**

a) Were the eligibility criteria specified?

**Interventions:**

d) Was the intervention explicitly described?

f) Were co-interventions avoided?

g) Was the compliance acceptable?

**Outcome measurement:**

i) Was the outcome assessor not involved in the treatment?

j) Were the outcome measures relevant?

k) Were adverse effects described?

l) Was the withdrawal/drop out rate described and acceptable?

m) Timing follow-up measurements:

1) Was a short-term follow-up measurement performed?

2) Was a long-term follow-up measurement performed?

n) Was the timing of the outcome assessment in all patients comparable?

**Statistics:**

o) Was the sample size of the patient group described?

q) Were point estimates and measures or variability presented for the primary outcome measures?
Table 5: Quality guidelines for reviewers – RCTs and CCTs (based on Seultjens et al 2004)

<table>
<thead>
<tr>
<th>Eligibility criteria specified?</th>
<th>Scored positively if a list of explicit inclusion/exclusion criteria is included (statement on use of standardised measures, IQ, levels of functional impairment, motor skills, age, gender).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups similar at baseline?</td>
<td>To get a positive score the groups will have to be similar at baseline (numbers, demographic factors, and value of main outcome measures).</td>
</tr>
<tr>
<td>Randomization performed?</td>
<td>Method of randomization will be positively scored if a random assignment sequence was used.</td>
</tr>
<tr>
<td>Treatment allocation concealed?</td>
<td>Concealment of treatment allocation will be scored positively where an independent person generated the assignment of patients to a particular arm of the study and was not responsible for determining eligibility of the patients.</td>
</tr>
<tr>
<td>Sample sizes described?</td>
<td>Scored positively if sample sizes for all groups are presented.</td>
</tr>
<tr>
<td>Interventions explicitly described?</td>
<td>Scored positively if the reviewer believes the treatment/comparison interventions to be described in sufficient detail. This must include personnel involved, frequency of intervention and duration of intervention.</td>
</tr>
<tr>
<td>Care provider blinded?</td>
<td>The reviewer determines if enough information about blinding is given to score a ‘yes’.</td>
</tr>
<tr>
<td>Co-interventions avoided?</td>
<td>Co-interventions should either be avoided in the trial design or similar between experimental and control groups.</td>
</tr>
<tr>
<td>Compliance acceptable?</td>
<td>The reviewer determines if the compliance to the interventions is acceptable, based on reported intensity, duration, number of sessions for both experimental intervention and control intervention.</td>
</tr>
<tr>
<td>Patient blinded?</td>
<td>The reviewer determines if enough information about blinding is given to score a ‘yes’.</td>
</tr>
<tr>
<td>Outcome measures relevant?</td>
<td>Outcome measures relevant: outcome measures must reflect limitation in activity and participation.</td>
</tr>
<tr>
<td>Adverse effects described?</td>
<td>Scored positively if adverse effects are described.</td>
</tr>
<tr>
<td>Short-term follow-up?</td>
<td>Scored positively if a short term (&lt;6 months) follow-up measure was performed (irrespective of quality of follow up measures).</td>
</tr>
<tr>
<td>Long-term follow-up?</td>
<td>Scored positively if a long term (&gt;6 months) follow-up measure was performed (irrespective of quality of follow up measures).</td>
</tr>
<tr>
<td>Outcome assessor blinded (not involved in treatment for ODs)?</td>
<td>Blinding of outcome assessors will be scored positive only if assessors were blinded regarding treatment allocation and when standardized assessment measures or procedures were used to structure interviews.</td>
</tr>
<tr>
<td>Drop out rate described/acceptable?</td>
<td>The number of participants who were included in the study but did not complete the observation period or were not included in the analysis must be described and reasons given. If the percentage of withdrawals and drop outs does not exceed 20% for short term follow-up and 30% for long term follow-up and does not lead to a substantial bias then a ‘yes’ is scored.</td>
</tr>
<tr>
<td>Timing of outcome assessment comparable?</td>
<td>Timing of outcome assessment should be identical for all intervention groups and for all important outcome assessments.</td>
</tr>
<tr>
<td>Intention-to-treat analysis?</td>
<td>NB Studies are automatically scored positively if all subjects completed the treatment (ie there were no drop-outs)</td>
</tr>
<tr>
<td>An intention to treat analysis means that, where subjects did not receive treatment (or the control condition) as allocated, and where measures of outcomes were available, the analysis was performed as if subjects received the treatment (or control condition) they were allocated to. This criterion is satisfied, even if there is no mention of analysis by intention to treat, if the report explicitly states that all subjects received treatment or control conditions as allocated. Intention to treat: will be scored positive if all patients randomized to the intervention group were included in the analysis regardless of non-compliance and co-interventions. If loss to follow-up is substantial (20% or greater), an ITT analysis, as well as an alternative analysis, which accounts for missing values (eg, worst case analysis) should have been performed.</td>
<td></td>
</tr>
<tr>
<td>Point estimates and measures of variability presented for the primary outcome measures?</td>
<td>A point measure is a measure of the size of the treatment effect. The treatment effect may be described as a difference in group outcomes, or as the outcome in (each of) all groups. Measures of variability include standard deviations, standard errors, confidence intervals, interquartile ranges (or other quartile ranges), and ranges. Point measures and/or measures of variability may be provided graphically (for example, SDs may be given as error bars in a figure) as long as it is clear what is being graphed (for example, as long as it is clear whether error bars represent SDs or SEs). Where outcomes are categorical, this criterion is considered to have been met if the number of subjects in each category is given for each group.</td>
</tr>
</tbody>
</table>
6.4.3.3 Qualitative research – quality criteria used

All criteria were scored as yes or no/unclear

1. Is the purpose of the research stated?
2. Is relevant literature reviewed to support the study rationale?
3. Is there a statement of the research philosophy/or theoretical perspective?
4. Is there congruency between the researcher’s philosophical stance and the methodology/methods reported?
5. Is the sampling strategy purposeful in relation to the research questions/aims?
6. Is there concordance between the reported methodology and data analysis/interpretation?
7. Is the approach to analysis adequately described?
8. Is the context of the data generation adequately described?
9. Is it clear how the data, data interpretation and conclusions are linked?
10. Is the voice of the respondent evident in supporting the representation and interpretation of the findings?
11. Is the influence of the researcher upon the study processes and study findings addressed?
12. Are the findings meaningful or useful in relation to the context for which the study findings are intended to inform?
13. Overall, is the research clearly and/or coherently reported?
Table 6: Determining quality rating for the qualitative review

<table>
<thead>
<tr>
<th>Quality rating</th>
<th>Description of the rating</th>
<th>Calculating the rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>High quality</td>
<td>The ratings gained via the quality check list suggest the study is trustworthy with relatively few factors which suggest the findings may lack credibility.</td>
<td>The majority of points are rated under the ‘Yes’ heading – ie the critical point is addressed.</td>
</tr>
<tr>
<td>Low quality</td>
<td>The ratings gained via the quality check list suggest one of two things (or a combination of both):</td>
<td>The majority of points are rated under the ‘No/unclear’ heading – ie the critical point is not addressed or the feature may be addressed but this is not make clear in the article.</td>
</tr>
<tr>
<td></td>
<td>• that there are a high number of factors which may confound the study findings ie there is a high risk that the findings may not be credible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• that there is a relatively large number of questions relating to the research quality which cannot be appraised as the information is unclear; therefore, the credibility of the study cannot be fully ascertained.</td>
<td></td>
</tr>
</tbody>
</table>
6.5 Review findings

6.5.1 Papers identified during the searching process

- The computerised strategy retrieved a total of 3597 articles.
- The hand search retrieved a total of 20 articles.
- An overall total of 3617 papers were screened.
- 50 quantitative papers were designated for in depth review.
- 10 qualitative papers were designated for in depth review (three sets of authors were represented twice within the articles collected ie they have presented their findings via two publications (ie Stephenson et al 1991 and Chesson et al 1990); (Missiuna et al 2006 and 2007) and (Mandich et al 2003 and Rodger and Mandich 2005).
- 10 policy documents were identified through hand searching.

The process of identifying papers is provided in Figure 1 below.
Figure 1: Review process and numbers

Inclusion criteria:

Study types - Randomised controlled trials, controlled clinical trials, and other than controlled designs (e.g. cohort studies, case studies) and qualitative research.

Participants - Children diagnosed as having developmental coordination disorder under the DSM-IV criteria or (when research is older) children for whom DCD may have been an appropriate diagnosis.

Interventions - Occupational therapy, physiotherapy, orthoptics, speech and language therapy, dietetics, art therapy, podiatry, prothetics/orthotics or radiography.

Electronic search: 3597 papers identified

Hand search: 20 papers identified

3617 papers identified in total

Check for duplicates

Duplicates: 410 papers removed

Leaves 3207 papers

Initial screening

Irrelevant literature: 2966 papers removed

Leaves 241 papers

Detailed abstract review: 181 papers removed

Full article review

Qualitative research: 10 papers

Quantitative research: 50 papers

Literature on childhood developmental disorders other than DCD, assessment practices and basic science was excluded at this stage.

At this point, intervention literature, qualitative research and relevant descriptive literature was submitted for detailed abstract review.
6.6 Quantitative research: understanding the efficacy of AHP interventions

The following sections will present an overview of the findings of the review of quantitative literature.

- There were 50 studies included.
- The frequency (%) for the quality of studies was: high quality RCT n=9/50 (18%); low quality RCT n=11/50 (22%); high quality CCT n=0/50 (0%); low quality CCT n=10/50 (20%); sufficient quality OD n=7/50 (14%); low quality OD n=13/50 (26%).
- The specific types of intervention covered were:
  - application of orthoses,
  - fatty acid supplementation,
  - reflex inhibition exercises and optometric vision therapy,
  - kinaesthetic training,
  - sensory integration therapy,
  - multi-sensory training,
  - cognitive interventions,
  - task orientated therapy and
  - perceptual motor training.
- The majority of studies focused on individual therapy.
- Clinic was the most common treatment location, followed by a school setting.
- All of the studies used qualified healthcare staff, providing direct therapy (approximately half the studies) or as consultants or part of a multi-disciplinary/cross sector team (approximately half the studies).
- When other staff were involved these were most frequently education professionals.
- The majority of studies evaluated outcomes at the level of body function/body structures only; few studies measured outcomes at the level of activity/participation.
Table 7: Descriptive statistics of all studies included in the quantitative review

<table>
<thead>
<tr>
<th>Study Elements</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICF classification (measured outcomes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body functions/body structures only</td>
<td>37/50</td>
<td>74%</td>
</tr>
<tr>
<td>Body functions/body structures and activity/participation</td>
<td>11/50</td>
<td>22%</td>
</tr>
<tr>
<td>Activity/participation only</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Individual and Group Interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>30/50</td>
<td>60%</td>
</tr>
<tr>
<td>Group only</td>
<td>11/50</td>
<td>22%</td>
</tr>
<tr>
<td>Individual and group</td>
<td>7/50</td>
<td>14%</td>
</tr>
<tr>
<td>Unknown</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic only</td>
<td>15/50</td>
<td>30%</td>
</tr>
<tr>
<td>School only</td>
<td>10/50</td>
<td>20%</td>
</tr>
<tr>
<td>School and home</td>
<td>3/50</td>
<td>6%</td>
</tr>
<tr>
<td>Home only</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Clinic and school</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Clinic and home</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Community hall</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>15/50</td>
<td>30%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>26/50</td>
<td>52%</td>
</tr>
<tr>
<td>Qualified education staff</td>
<td>8/50</td>
<td>16%</td>
</tr>
<tr>
<td>Qualified healthcare staff and qualified education staff</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Qualified education staff and parents</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Unqualified education staff</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Parents only</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Qualified healthcare staff, qualified education staff and parents</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Qualified healthcare staff and parents</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Qualified healthcare staff and unqualified staff</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Skill mix unknown</td>
<td>5/50</td>
<td>10%</td>
</tr>
</tbody>
</table>

Table 8: Design of all studies in the quantitative review

<table>
<thead>
<tr>
<th>Design</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCT</td>
<td>20/50</td>
<td>40%</td>
</tr>
<tr>
<td>CCT</td>
<td>10/50</td>
<td>20%</td>
</tr>
<tr>
<td>OD</td>
<td>20/50</td>
<td>40%</td>
</tr>
</tbody>
</table>

Table 9: Quality rating of all studies in the quantitative review

<table>
<thead>
<tr>
<th>Quality</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High quality RCT</td>
<td>9/50</td>
<td>18%</td>
</tr>
<tr>
<td>Low quality RCT</td>
<td>11/50</td>
<td>22%</td>
</tr>
<tr>
<td>High quality CCT</td>
<td>0/50</td>
<td>0%</td>
</tr>
<tr>
<td>Low quality CCT</td>
<td>10/50</td>
<td>20%</td>
</tr>
<tr>
<td>Sufficient quality OD</td>
<td>7/50</td>
<td>14%</td>
</tr>
<tr>
<td>Low quality OD</td>
<td>13/50</td>
<td>26%</td>
</tr>
</tbody>
</table>
6.6.1 Nature of interventions in quantitative literature

A wide range of studies met the inclusion criteria for the review. The diversity was reflected in the professional affiliation of the primary authors and the types of intervention (see Table 10 and Table 11). The specific types of intervention covered were: application of orthoses, fatty acid supplementation, reflex inhibition exercises and optometric vision therapy, kinaesthetic training, sensory integration therapy, motor imagery training, multi-sensory training, cognitive interventions, task orientated interventions and perceptual motor training (see Table 11).

Table 10: Professional affiliation of primary authors

<table>
<thead>
<tr>
<th>Professions</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational therapy</td>
<td>16/50</td>
<td>32%</td>
</tr>
<tr>
<td>Psychology</td>
<td>11/50</td>
<td>22%</td>
</tr>
<tr>
<td>Education</td>
<td>8/50</td>
<td>16%</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>9/50</td>
<td>18%</td>
</tr>
<tr>
<td>Podiatry/orthotists</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Dietetics</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Speech and language therapy</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Orthoptist</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Art therapy</td>
<td>0/50</td>
<td>0%</td>
</tr>
<tr>
<td>Radiography</td>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>0/50</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 11: Types of intervention covered

<table>
<thead>
<tr>
<th>Types of Interventions</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptual motor training</td>
<td>13/50</td>
<td>26%</td>
</tr>
<tr>
<td>Sensory integration therapy</td>
<td>11/50</td>
<td>22%</td>
</tr>
<tr>
<td>Task orientated interventions</td>
<td>9/50</td>
<td>18%</td>
</tr>
<tr>
<td>Kinaesthetic training</td>
<td>6/50</td>
<td>12%</td>
</tr>
<tr>
<td>Cognitive interventions</td>
<td>4/50</td>
<td>8%</td>
</tr>
<tr>
<td>Provision of orthotics</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Fatty acid supplementation</td>
<td>2/50</td>
<td>4%</td>
</tr>
<tr>
<td>Reflex inhibition exercises and optometric vision therapy</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Motor imagery training</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Multi-sensory training</td>
<td>1/50</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>
6.7  Summary of findings by intervention type

What follows is a summary of the findings of the systematic review by intervention type

6.7.1.1  Kinaesthetic training

(i) Analytic summary of all studies for kinaesthetic training (see Table 12)

There were six studies which focused on kinaesthetic training. In terms of quality, half the studies were high quality RCTs, the remainder being mostly low quality RCTs. In the main, older children (>8 years) were studied. Two studies used a no treatment (NT) control group. Most of the studies measured outcomes at the level of body functions/body structures, one measured outcome at the level of activity/participation. In one study, the treatment location was unknown. The majority of studies focused on individual therapy provided in clinic or school settings. All but one of the studies used qualified healthcare staff only; in one study, the skill mix was unknown.

Table 12: Analytic summary of all studies for kinaesthetic training

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>5/6</td>
<td>83.3%</td>
</tr>
<tr>
<td>Activity/participation only (assessment)</td>
<td>1/6</td>
<td>16.6%</td>
</tr>
<tr>
<td>Individual and group interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>5/6</td>
<td>83.3%</td>
</tr>
<tr>
<td>Individual and group</td>
<td>1/6</td>
<td>16.6%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic only</td>
<td>3/6</td>
<td>50%</td>
</tr>
<tr>
<td>School only</td>
<td>2/6</td>
<td>33.3%</td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>1/6</td>
<td>16.6%</td>
</tr>
<tr>
<td>Skill mix</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>5/6</td>
<td>83.3%</td>
</tr>
<tr>
<td>Skill mix unknown</td>
<td>1/6</td>
<td>16.6%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on kinaesthetic training (see Table 13)

**Polatajko et al (1995)** [High quality RCT]

In this study, there was no evidence of effect for kinaesthetic training or OT on visual motor integration or motor skills. Kinaesthetic training was more effective than OT and no treatment in improving kineastetic sensitivity. Findings were based on individual therapy carried out by qualified healthcare staff in a clinic, for (kinaesthetic training) 20 minutes 2/3 times per week for 5 weeks or (OT) 45 minutes 2/3 times per week for 9 weeks.

**Sims et al (1996a)** [High quality RCT]

In this study, kinaesthetic training showed no greater benefit compared to no treatment. Findings were based on individual therapy provided by qualified healthcare staff in a clinic, for 25 minutes per day for 2 (school) weeks.

**Sims et al (1996b)** [High quality RCT]

In this study, equal improvements were seen for kinaesthetic training and cognitive affective training in kinaesthetic sensitivity and motor skills, both were more effective than no treatment. Findings were based on work carried out by qualified healthcare staff in a clinic, for 25 minutes per day for 2 (school) weeks.

**Laszlo et al (1988)** [Low quality RCT]

In this study, kinaesthetic training was more effective than general motor training in improving kinaesthetic perception and motor skills. Findings were based on individual intervention, in a school location, carried out by qualified healthcare staff, for 1.5-3 hours of intervention over two weeks.

**Laszlo et al (1993)** [Low quality RCT]

In this study, kinaesthetic training was more effective than general motor training in improving kinaesthetic perception and motor skills. Findings were based on individual intervention for 2-3 hours of intervention over 2 weeks. Skill mix and treatment location were not stated.
Harris et al (1991) [Low quality CCT]

In this study, kinaesthetic training was more effective than handwriting practice in improving handwriting. Findings were based on individual and group intervention, in a school location, for 1x 15 minute session per day for 6 days. Skill mix was not stated.
<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polatajko et al (1995)</td>
<td>DCD N=74 ages: 7-12 years</td>
<td>Kinaesthetic training vs OT vs NT</td>
<td>No evidence of effect for kinaesthetic training or OT; visual motor integration, motor skills Greater improvement due to kinaesthetic training; kinaesthetic sensitivity</td>
<td>High Quality RCT</td>
</tr>
<tr>
<td>Sims et al (1996a)</td>
<td>Clumsy children N=20 ages: 8-9 years</td>
<td>Kinaesthetic training vs NT</td>
<td>No greater benefit for kinaesthetic training over no treatment: kinaesthetic perception and motor skills</td>
<td>Low Quality RCT</td>
</tr>
<tr>
<td>Sims et al (1996b)</td>
<td>Clumsy children N=36 ages: 8-9 years</td>
<td>Kinaesthetic training vs cognitive affective training vs NT</td>
<td>Equal improvement for kinaesthetic training and cognitive affective training over no treatment: kinaesthetic perception and motor skills</td>
<td>Low Quality RCT</td>
</tr>
<tr>
<td>Laszlo and Sainsbury (1993)</td>
<td>Deficits in kinaesthetic acuity and kinaesthetic perception and memory N=308 ages: 5-8 years</td>
<td>Kinaesthetic training vs general motor training</td>
<td>Greater improvement due to kinaesthetic training: kinaesthetic perception and motor skills</td>
<td>Low Quality RCT</td>
</tr>
<tr>
<td>Harris et al (1991)</td>
<td>Poor hand writers N=30 ages: 5-8 years</td>
<td>Kinaesthetic training vs handwriting practice</td>
<td>Greater improvement due to kinaesthetic training: handwriting</td>
<td>Low Quality CCT</td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.1.2 Perceptual motor training (PMT)

*(i) Analytic summary of all studies for perceptual motor training* (see Table 14)

There were thirteen studies which focused on perceptual motor training. Six studies compared perceptual motor training to a no treatment (NT) comparison, two to task specific intervention, one to PE only and one to a placebo intervention. Two studies did not use a control group. In terms of quality, five studies were low quality RCTs, four were low quality CCTs, one a sufficient quality OD and three low quality ODs. Younger (<8 years) and older children (>8 years) were studied. Most of the studies measured outcomes at the level of body functions/body structures, three measured outcomes at the level of body functions/body structures and activity/participation. The majority of studies focused on individual and group therapy provided by qualified healthcare staff and qualified educational staff in school and clinic settings.

**Table 14: Descriptive statistics of all studies within perceptual motor training**

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>10/13</td>
<td>76.9%</td>
</tr>
<tr>
<td>Body functions/body structures and activity/participation (assessment)</td>
<td>3/13</td>
<td>23.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual and group interventions</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual only</td>
<td>3/13</td>
<td>23.1%</td>
</tr>
<tr>
<td>Group only</td>
<td>5/13</td>
<td>38.5%</td>
</tr>
<tr>
<td>Individual and group</td>
<td>4/13</td>
<td>30.8%</td>
</tr>
<tr>
<td>Unknown</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinic only</td>
<td>2/13</td>
<td>15.4%</td>
</tr>
<tr>
<td>School only</td>
<td>4/13</td>
<td>30.8%</td>
</tr>
<tr>
<td>Home only</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
<tr>
<td>School and home</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
<tr>
<td>Community hall</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>4/13</td>
<td>30.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skill mix</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualified healthcare staff only</td>
<td>4/13</td>
<td>30.8%</td>
</tr>
<tr>
<td>Qualified healthcare staff and unqualified staff</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
<tr>
<td>Qualified healthcare staff, qualified education staff and parents</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
<tr>
<td>Qualified healthcare staff and qualified education staff</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
<tr>
<td>Qualified education staff</td>
<td>4/13</td>
<td>30.8%</td>
</tr>
<tr>
<td>Qualified education staff and parents</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
<tr>
<td>Parents</td>
<td>1/13</td>
<td>7.7%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on perceptual motor training (see Table 15 and Table 16)

**Chia and Chua (2002) [low quality RCT]**

In this study, sensory/perceptual motor training was effective compared to no treatment in improving sensory-motor functioning. Non-significant changes were seen in exam scores, learning behaviour and social/emotional responses. Findings were based on individual and group intervention, provided by qualified healthcare staff for (individual) two sessions per week for 8 weeks, then (group) 2x sessions per week for 4 weeks. Treatment location was not stated.

**Kernahan et al (1986) [low quality RCT]**

In this study, a school based perceptual motor training programme was effective compared to no treatment in improving body awareness, dynamic balance, basic agility and skipping. Findings were based on group intervention, in a school location, provided by qualified healthcare staff for 30-45 minutes per day for 8 weeks.

**Platzer (1976) [low quality RCT]**

In this study, perceptual motor training was effective compared to no treatment in improving self-concept. Findings were based on individual and group intervention, provided by qualified healthcare staff for 30 minutes per day for 10 weeks.

**Pless et al (2000) [low quality RCT]**

In this study, perceptual motor training failed to show a benefit over no treatment on motor skills measures. However, examining individual cases, children with borderline motor difficulties improved more than children with definite motor difficulties. Findings were based on group intervention, provided by qualified education staff for 1 session per week for 10 weeks. Treatment location was not stated.

**Watter and Bullock (1983) [low quality RCT]**

In this study, perceptual motor training was effective compared to no treatment in improving word recognition and educational progress. Findings were based on intervention in a school
setting, provided by qualified healthcare staff for 6 months. Intervention frequency was not stated.

Rintala et al (1998) [low quality CCT]

In this study, equal improvements were seen between a perceptual motor training programme and task specific training on motor skills. Task specific training lead to greater improvements in object manipulation. Findings were based on group intervention, in a school location, provided by qualified healthcare and education staff for (PMT and task specific) 3x 45 minute sessions per week for a total of 30 sessions.

Schoemaker et al (1994) [low quality CCT]

In this study, perceptual motor training was effective compared to no treatment in improving motor skills. Findings were based on individual intervention, in a clinic, provided by qualified healthcare staff for 2x 45 minute sessions per week for 3 months.

Eliasson et al (2003) [low quality CCT]

In this study, computer based perceptual motor training (focusing on fine motor skills) was more effective than jumping on a trampoline in improving fine and general motor skills. Findings were based on individual intervention, provided by parents at home, for 15 minutes per day for 4 weeks.

Horvat et al (1982) [low quality CCT]

In this study, a home perceptual motor training programme combined with PE was more effective than PE alone in improving static and dynamic balance. Findings were based on individual and group intervention, at home and in school, provided by parents and education staff for (home programme) 3x 30 minutes per week for 12 weeks (with telephone support from professional) and (PE in school) 1x session per week for 12 weeks.

Peters and Wright (1999) [sufficient quality OD]

In this study, a sensory motor/perceptual motor programme provided by a teacher was effective in improving forced vital capacity and motor skills. There was no evidence of effect
on perceived competence. Findings were based on group intervention, in a community setting, provided by qualified education staff for 1 hour per week for 10 weeks.

Iversen et al (2005) [low quality OD]

In this study, a task specific approach with a high degree of parental involvement was more effective than a programme of perceptual motor training in improving specific skills (based on parental report). Findings were based on individual and group intervention, in a school location, provided by qualified education staff and parents encompassing daily practice for 1 school year.

Gersten et al (1975) [low quality OD]

In this study, perceptual motor training was equally effective when provided by therapists or assistants in improving motor skills, visual and somatosensory perception, language and educational skills. Findings were based on group intervention, provided by qualified and unqualified healthcare staff for 4 hours per week for 7 months.

Lee and Smith (1998) [low quality OD]

In this study, a perceptual motor training programme was effective in improving physical function, motor planning and co-ordination. Findings were based on individual intervention, in a clinic location, provided by qualified healthcare staff with a supporting home programme provided by parents for 1x 1 hour session per week for 8 weeks (home programme 15-20 minutes per day).
### Table 15: Perceptual motor training (1)

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Exam scores, learning behaviour and social/emotional responses (positive trend only, not statistically significant).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pless et al (2000)</td>
<td>Below 15th percentile in movement ABC N=37 ages: 5-6 years</td>
<td>PMT + consultation vs NT</td>
<td>No difference in groups at posttest.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More children with borderline motor difficulties improved than children with definite motor difficulties. (ie children with definite motor difficulties did not benefit from this type of intervention).</td>
<td></td>
</tr>
<tr>
<td>Kernahan et al (1986)</td>
<td>Perceptual motor difficulties identified by teacher N=82 ages: 5-8 years</td>
<td>School-based perceptual-motor programme vs NT</td>
<td>Improvements due to school-based perceptual-motor programme: Body awareness, dynamic balance, basic agility and skipping.</td>
<td></td>
</tr>
<tr>
<td>Watter and Bullock (1983)</td>
<td>Minimal cerebral dysfunction N=62 ages: 5-13 years</td>
<td>PMT vs NT</td>
<td>Greater improvement due to PMT: Word recognition and educational progress (no significance testing carried out)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Body perception, balance, throwing, tracking (positive trend only, not statistically significant).</td>
<td></td>
</tr>
<tr>
<td>Eliasson et al (2003)</td>
<td>Very lo birth weight (VLBW) infants &lt;1200 kg + &lt;12th percentile Mvt ABC N=19 ages: 5-7 years</td>
<td>Computer based perceptual motor/fine motor training vs jumping on a trampoline (placebo)</td>
<td>Improvements due to computer based perceptual motor/ fine motor training/trampoline jumping; Fine motor ability, motor skills.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Improvement in ability to control goal directed arm movements (positive trend only, not statistically significant).</td>
<td></td>
</tr>
<tr>
<td>Horvat (1982)</td>
<td>Classification of learning disabled and scoring at least 1 SD below the normal in static and dynamic components N=15 ages: 7-9 years</td>
<td>PMT vs PE home programme vs PE only</td>
<td>Greater improvements due to PMT + PE home Programme + PE: Static and dynamic balance.</td>
<td></td>
</tr>
<tr>
<td>Rintala et al (1998)</td>
<td>Developmental language disorder and motor disorder (? co-morbid DCD) N=54 ages: 6-10 years</td>
<td>PMT vs PE</td>
<td>Equal improvements due to PE or PMT: Motor skills.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Greater improvements due to PMT: Object manipulation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ball skills (positive trend only, not statistically significant).</td>
<td></td>
</tr>
<tr>
<td>Schoemaker et al (1994)</td>
<td>Clumsy (children belonging to lowest performing 5 percent as measured by Henderson revision of test of motor impairment) N=36 ages: 6-9 years</td>
<td>PMT vs NT</td>
<td>Greater improvements due to PMT: Motor skills.</td>
<td></td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant*
Table 16: Perceptual motor training (2)

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peters and Wright (1999)</td>
<td>DCD</td>
<td>Sensory motor/perceptual motor programme provided by teacher</td>
<td>Improvements due to programme: Forced vital capacity, motor skills No evidence of effect for perceived competence.</td>
<td>Sufficient Quality OD</td>
</tr>
<tr>
<td></td>
<td>N=16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ages: 7-8 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iversen et al (2005)</td>
<td>DCD</td>
<td>Task specific with high degree of parental involvement vs PMT limited parental involvement</td>
<td>Greater improvement due to task specific intervention; Specific skills (parental report)</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td></td>
<td>N=30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ages: 7-12 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lee and Smith (1998)</td>
<td>Dyspraxia</td>
<td>PMT</td>
<td>Improvements due to perceptual-motor programme: Physical function, motor planning and co-ordination Improved activity and participation (parental report)</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td></td>
<td>N=60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ages: 4-14 years</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.1.3 Sensory integration (SI)

(i) Analytic summary of all studies for sensory integration (see Table 17)

There were eleven studies which focused on sensory integration. Three compared sensory integration to perceptual motor training and no treatment, one to child centred therapy, one to physical education and no treatment, one to Le Bon Depart™ therapy, one to perceptual motor training and one to tutoring. One study combined sensory integration with speech and language therapy and one with perceptual motor training, neither study used a control group. One study examined sensory integration alone and did not use a control group. In terms of quality, most of the RCTs were high quality, one being low quality. One OD was sufficient quality, the other four low quality. Younger (<8 years) and older children (>8 years) were studied. Most of the studies measured outcomes at the level of body functions/body structures, two measured outcome at the level of activity/participation. The majority of studies focused on individual therapy provided by qualified healthcare staff and qualified education staff in clinic or school settings.

Table 17: Descriptive statistics of all studies within sensory integration

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>9/11</td>
<td>81.8%</td>
</tr>
<tr>
<td>Body functions/body structures and activity/participation (assessment)</td>
<td>2/11</td>
<td>18.2%</td>
</tr>
<tr>
<td>Individual and group Interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>8/11</td>
<td>72.7%</td>
</tr>
<tr>
<td>Group only</td>
<td>1/11</td>
<td>9.1%</td>
</tr>
<tr>
<td>Individual and group</td>
<td>2/11</td>
<td>18.2%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic only</td>
<td>5/11</td>
<td>45.5%</td>
</tr>
<tr>
<td>Clinic and school</td>
<td>2/11</td>
<td>18.2%</td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>4/11</td>
<td>36.4%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>9/11</td>
<td>81.8%</td>
</tr>
<tr>
<td>Qualified healthcare staff and qualified education staff</td>
<td>1/11</td>
<td>9.1%</td>
</tr>
<tr>
<td>Skill mix unknown</td>
<td>1/11</td>
<td>9.1%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on sensory integration (see Table 18)

**Humphries et al (1990) [high quality RCT]**

In this study, SI was more effective than perceptual motor training in improving sensorimotor skills; both interventions were effective compared to no treatment. There was no evidence of effect for cognitive, academic or language performance. Findings were based on individual therapy, in a clinic setting, carried out by qualified healthcare staff for 1 hour per week for 24 weeks.

**Polatajko et al (1991) [high quality RCT]**

In this study, SI and perceptual motor training were equally effective in improving motor and academic skills. Findings were based on individual therapy, in a clinic setting, carried out by qualified healthcare staff for 1 hour per week for 6 months.

**Wilson et al (1992) [high quality RCT]**

In this study, SI and tutoring were equally effective in improving motor and academic skills. There was no evidence of effect for self esteem. Findings were based on individual therapy, in a clinic and school setting, on children aged 5-9 years, carried out by qualified healthcare staff and qualified education staff for 2x 1 hour sessions per week for 12 months.

**Humphries et al (1992) [high quality RCT]**

In this study, SI was more effective than perceptual motor training in improving motor planning, and less effective in improving motor skills; both interventions were effective compared to no treatment. There was no evidence of effect for cognitive, academic or language performance. Findings were based on individual therapy, in a clinic setting, on children aged 6-8 years, carried out by qualified healthcare staff for 3x 1 hour sessions per week for 8 months.

**Humphries et al (1993) [high quality RCT]**

In this study, SI and perceptual motor training were equally effective in improving sensorimotor skills; both interventions were effective compared to no treatment. Findings
were based on individual therapy, in a clinic setting, provided by qualified healthcare staff for 3x 1 hour sessions per week for 8 months.

**Densem et al (1989)** [low quality RCT]

In this study, SI and PE were found to be effective compared to no treatment, and equally effective in improving expressive language, perceptual motor and sensory integrative skills, and handwriting. Findings were based on group (PE) and individual (SI) therapy, provided by qualified healthcare staff for (SI) 17.4 (mean) hours of intervention or 16 (mean) hours of therapy over a 5 month period.

**Jaroma et al (1984)** [low quality OD]

In this study, SI combined with speech and language therapy was effective in improving visual motor integration (positive trend only, not statistically significant) and articulation (based on teacher report). Findings were based on individual therapy provided by qualified healthcare staff for 50 minutes, 1–2 times per day for 4 weeks.

**DeGangi et al (1993)** [low quality OD]

In this study, SI, when compared to child centred therapy, was more effective in improving gross motor skills and functional skills and less effective in improving fine motor skills. Findings were based on individual therapy carried out by qualified healthcare staff in clinic and school for 50 minutes per week for 2 months.


In this study, non statistically significant change was noted in children receiving SI in terms of their gross and fine motor skills. This finding was based on individual intervention, provided by qualified healthcare staff, for 1–4 assessment sessions and 10 weekly treatment sessions. Therapy duration was 6 months; treatment location was not stated.

**Davidson and Williams (2000)** [low quality OD]

In this study, a combined SI/PMT approach was not effective in improving fine motor skills or visual motor integration. Findings were based on individual intervention, provided in a 10 week block (location, frequency and skill mix were not stated).
**Leemrijse et al (2000) [sufficient quality OD]**

In this study, SI was less effective than Le Bon Depart™ therapy in improving motor skills, praxis and rhythm. Findings were based on individual therapy, in a clinic, provided by qualified healthcare staff for 1 hour per week for 12–18 weeks.
<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humphries et al (1992)</td>
<td>Learning disabilities and sensory integrative dysfunction N=103 ages: 58-107 months</td>
<td>SI vs PMT vs NT</td>
<td>Greater improvement due to SI: Motor planning Greater improvement due to PMT: Motor skills No evidence of effect for cognitive, academic and language performance Both better than no treatment</td>
<td>High Quality RCT</td>
</tr>
<tr>
<td>Wilson et al (1992)</td>
<td>Learning disability and sensory integrative dysfunction N=29 ages: 5-8 years</td>
<td>SI vs tutoring</td>
<td>Equal improvement for SI and tutoring: Motor and academic skills No evidence of effect for self esteem</td>
<td>Low Quality RCT</td>
</tr>
<tr>
<td>Humphries et al (1990)</td>
<td>Motor difficulties learning disability and sensory integrative dysfunction  N=30 ages: 72-99 months</td>
<td>SI vs PMT vs NT</td>
<td>Greater improvement due to SI: Sensorimotor skills No evidence of effect for cognitive, academic and language performance Both better than no treatment</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>Densem et al (1999)</td>
<td>Perceptual motor difficulties and learning disabilities N=57 ages: 5-10 years</td>
<td>SI vs PE vs NT</td>
<td>Equal improvement for SI and PE: Expressive language, perceptual motor and sensory integrative skills, and handwriting Both better than no treatment.</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>Leemrijse et al (2000)</td>
<td>DCD N=6 ages: 6-8 years</td>
<td>SI vs Le Bon Depart™ therapy</td>
<td>Greater improvement due to Le Bon Depart™: Motor skills, praxis and rhythm</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>Davidson and Williams (2000)</td>
<td>DCD N=37 age: ?</td>
<td>SI/PMT combined</td>
<td>Improvement due to SI/PMT combined: Fine motor skills and visual motor integration (not clinically significant, essentially no effect)</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>Allen et al (1995)</td>
<td>Motor learning difficulties N=5 ages: 5-11 years</td>
<td>SI</td>
<td>Improvement due to SI: Gross and fine motor skills (positive trend only, not statistically significant)</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>Study</td>
<td>Condition</td>
<td>Intervention</td>
<td>Findings</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>DeGangi et al</td>
<td>Developmental, motor, emotional-behavioural and sensory-integrative</td>
<td>SI vs child centred</td>
<td>Greater improvement due to SI:</td>
<td></td>
</tr>
<tr>
<td>(1993)</td>
<td>disorders sensory including motor planning</td>
<td>therapy</td>
<td>Gross motor skills and functional skills.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N=12</td>
<td></td>
<td>Greater improvement due to child centred therapy:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ages: 36-71 months</td>
<td></td>
<td>Fine motor skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Behaviour, attention and play the same for both groups.</td>
<td></td>
</tr>
<tr>
<td>Jaroma et al</td>
<td>Vestibular and tactile dyspraxia</td>
<td>SI and SLT</td>
<td>Improvements due to SI + SLT:</td>
<td></td>
</tr>
<tr>
<td>(1984)</td>
<td>N=1</td>
<td></td>
<td>Articulation (teacher report)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>age: 6 years</td>
<td></td>
<td>Visual motor integration (positive trend only, not statistically significant)</td>
<td></td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant*
6.7.1.4 Task orientated therapies

(i) Analytic summary of all studies for task orientated therapies (see Table 19)

There were nine studies which focused on task orientated interventions. Two studies compared task orientated intervention to no treatment and one to task orientated intervention. One compared a functional task orientated intervention to a creative task orientated intervention. Two studies compared task oriented intervention using different groups of children or treatment provider - one compared children diagnosed with developmental coordination disorder to normal children, one compared parents to teachers in relation to the provision of task orientated interventions. Three studies did not use a control group. In terms of quality, two studies were low quality RCTs, three studies were low quality CCTs, two ODs were sufficient quality and two were low quality. Younger (<8 years) and older children (>8 years) were studied. Most of the studies measured outcomes at the level of body functions/body structures, one measured outcomes at the level of body functions/body structures and activity/participation and one at the level of activity/participation only. The majority of studies focused on individual only and group only therapy provided by qualified education staff, qualified health care staff and unqualified education staff in school, clinic, home and home and school settings.

Table 19: Descriptive statistics of all studies within task oriented therapies

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>7/9</td>
<td>77.8%</td>
</tr>
<tr>
<td>Body functions/body structures and activity/participation (assessment)</td>
<td>1/9</td>
<td>11.1%</td>
</tr>
<tr>
<td>Activity/participation only (assessment)</td>
<td>1/9</td>
<td>11.1%</td>
</tr>
<tr>
<td>Individual and group Interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>4/9</td>
<td>44.4%</td>
</tr>
<tr>
<td>Group only</td>
<td>4/9</td>
<td>44.4%</td>
</tr>
<tr>
<td>Unknown</td>
<td>1/9</td>
<td>11.1%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic only</td>
<td>1/9</td>
<td>11.1%</td>
</tr>
<tr>
<td>School only</td>
<td>3/9</td>
<td>33.3%</td>
</tr>
<tr>
<td>Home only</td>
<td>1/9</td>
<td>11.1%</td>
</tr>
<tr>
<td>School and home</td>
<td>1/9</td>
<td>11.1%</td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>3/9</td>
<td>33.3%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>2/9</td>
<td>22.2%</td>
</tr>
<tr>
<td>Qualified education staff</td>
<td>4/9</td>
<td>44.4%</td>
</tr>
<tr>
<td>Unqualified education staff</td>
<td>2/9</td>
<td>22.2%</td>
</tr>
<tr>
<td>Parents only</td>
<td>1/9</td>
<td>11.1%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on task orientated therapies (see Table 20)

**Revie et al (1993) [low quality RCT]**

In this study, two different forms of task orientated therapy were effective in improving over arm throws, target kicking and bouncing and catching balls. Findings were based on group intervention, provided by student teachers for eight 1-hour sessions over 4 weeks.

**Pless et al (2001) [low quality RCT]**

In this study, task specific activities were effective compared to no treatment in improving perceived motor competence. Findings were based on group intervention, in a school location, provided by qualified education staff in a 10 week block (other frequency data were not presented).

**Sugden and Chambers (2003) [low quality CCT]**

In this study, task orientated activities provided by teachers or parents were effective in improving motor skills. Findings were based on individual intervention, in home or school, provided by qualified education staff or parents for 3-4x 20 minute session per week for 7 weeks.

**Larkin and Parker (1998) [low quality CCT]**

In this study, a task orientated programme was effective in improving hip range of motion. Findings were based on group intervention, by qualified education staff for 15 minutes intervention and 60 minutes education per week for 6 weeks.

**Schoemaker et al (2003) [low quality CCT]**

In this study, task orientated activities were effective compared to no treatment in improving motor skills; however, there were no statistically significant differences between the groups on measures of handwriting. Findings were based on individual intervention, provided by qualified healthcare staff for 1x 30 minute session per week for a total of 18 sessions (precise duration data were not presented).
McWilliams (2005) [sufficient quality OD]

In this study, a task orientated programme was effective in improving self esteem (based on parental report), non-significant changes were noted on a standardised measure of self esteem. Findings were based on group intervention, in a clinic, provided by qualified healthcare staff for 1-1.5 hours per week for 6-8 weeks.

Bishop and Horvat (1984) [low quality OD]

In this study, a task orientated programme provided by parents was effective in improving specific motor skills (push ups, sit ups, long jump, ball kicking and ball throwing). The authors did not use significance testing. Findings were based on individual intervention, in the child’s own home provided by parents for 3x 30 minutes per week for 7 weeks.

Miyahara and Wafer (2004) [low quality OD]

In this study, a functional, task orientated programme and a creative, task orientated programme were equally effective in improving motor skills. The authors did not use significance testing. Findings were based on individual intervention, in a school location, provided by unqualified education staff for 2 sessions per week for 5 weeks per semester (over two semesters).

Wright and Sugden (1998) [low quality OD]

In this study, task orientated activities were effective in improving motor skills. Findings were based on school based intervention, provided by qualified education staff for 5 weeks (other frequency data were not presented).
Table 20: Task oriented therapies

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pless et al (2001)</td>
<td>DCD N=97 ages: 5-6 years</td>
<td>Task specific activities vs NT</td>
<td>Greater improvement due to task specific activities: Perceived motor competence.</td>
<td>Low Quality RCT</td>
</tr>
<tr>
<td>Revie et al (1993)</td>
<td>poor motor coordination N=24 ages: 5-9 years</td>
<td>Task orientated vs task orientated</td>
<td>Improvements due to task orientated activities: Over arm throw, target kicking, bounce and catch.</td>
<td>Low Quality CCT</td>
</tr>
<tr>
<td>Sugden and Chambers (2003)</td>
<td>DCD N=31 ages: 7-9 years</td>
<td>Task orientated activities (parents providing) vs task orientated activities (teachers providing)</td>
<td>Equal improvement for intervention whether teachers or parents provided task orientated activities: Motor skills.</td>
<td>Sufficient Quality OD</td>
</tr>
<tr>
<td>Schoemaker et al (2003)</td>
<td>DCD N=15 ages: 7-9 years</td>
<td>Task orientated activities vs NT</td>
<td>Improvement due to task orientated activities: Motor skills, handwriting (not statistically significant)</td>
<td>Low Quality CCT</td>
</tr>
<tr>
<td>Larkin and (1998)</td>
<td>DCD N=22 ages: 7-9 years</td>
<td>Task orientated (DCD vs normal children)</td>
<td>Improvement due to teaching of landing: Reduction of hip ROM.</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>McWilliams (2005)</td>
<td>DCD N=12 ages: 7-11 years</td>
<td>Task orientated activities</td>
<td>Improvement due to task orientated activities: Child self esteem (parent report). Child self esteem (standardised measure – positive trend only, not statistically significant).</td>
<td>Sufficient Quality OD</td>
</tr>
<tr>
<td>Bishop and Horvat (1984)</td>
<td>Clumsy child N=1 age: 8 years</td>
<td>Task orientated parent provided programme</td>
<td>Improvement due to task orientated parent provided programme: Motor skills (push ups, sit ups, long jump, ball kicking, ball throwing).</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>Miyahara (2004)</td>
<td>DCD N=7 ages: 5-8 years</td>
<td>Functional task orientated skills vs creative task orientated</td>
<td>Equal improvement for functional task orientated skills and creative task orientated skills: Motor skill</td>
<td>Low Quality OD</td>
</tr>
<tr>
<td>Wright and Sugden (1998)</td>
<td>DCD N=18 ages: 6-9 years</td>
<td>Task orientated activities</td>
<td>Improvement due to task orientated activities: Motor skills.</td>
<td>Low Quality OD</td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.1.5 Cognitive interventions

(i) Analytic summary of all studies for cognitive interventions (see Table 21)

There were four studies which focused on cognitive interventions. One study compared cognitive interventions to gross motor games, and one to current occupational therapy practice, or contemporary treatment approach (CTA). Two studies used the cognitive orientation to daily occupational performance (CO-OP) approach. In terms of quality, half the studies were low quality CCTs; the two ODs were sufficient quality. Younger (<8 years) and older children (>8 years) were studied. Most of the studies measured outcomes at the level of body functions/body structures and activity/participation.

Table 21: Descriptive statistics of all studies within cognitive interventions

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>1/4</td>
<td>25%</td>
</tr>
<tr>
<td>Body functions/body structures and activity/participation (assessment)</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Individual and group Interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Group only</td>
<td>1/4</td>
<td>25%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic only</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>1/4</td>
<td>25%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>3/4</td>
<td>75%</td>
</tr>
<tr>
<td>Skill mix unknown</td>
<td>1/4</td>
<td>25%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on cognitive interventions (see Table 22)

**Miller et al (2001) [Low quality CCT]**

In this study, CO-OP was more effective than CTA in improving goal achievement/satisfaction with goal achievement, quality of performance, communication and functional motor ability. CO-OP and CTA were equally effective in improving general motor skills; however, results of the Bruininks-Oseretsky test of motor proficiency (BOTMP) were not statistically significant. Findings were based on individual therapy carried out by qualified health care staff, in a clinic for 10x 50 minute sessions over 10 weeks.

**Allen (1971) [Low quality CCT]**

In this study, a verbal/cognitive task specific intervention was more effective than gross motor games in improving gross motor skills. Findings were based on group intervention, in a clinic, for 2x 40 minute sessions per week for seven weeks. Skill mix was not stated.

**Ward and Rodger (2004) [Sufficient quality OD]**

In this study, the CO-OP approach was effective in improving goal achievement/satisfaction with goal achievement. Findings were based on individual therapy carried out by qualified healthcare staff, for 1 hour sessions 2 times per week for ten weeks. Treatment location was not stated.

**Martini and Polatajko (1998) [Sufficient quality OD]**

In this study, a cognitive verbal self guidance intervention was effective in improving goal achievement. Findings were based on individual therapy carried out by qualified health care staff, in a clinic, for (cognitive verbal self guidance intervention) 1 hour sessions 2–3 times per week consecutively for ten weeks.
Table 22: Cognitive interventions

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miller et al 2001</td>
<td>DCD N=20 ages: 7-9 years</td>
<td>CO-OP vs CTA</td>
<td>Greater improvement due to CO-OP: Goal achievement/satisfaction with goal achievement (child report), quality of performance (therapist report) communication (Vineyard adaptive behaviour scale (VABS), activities of daily living (ADL) (VABS), functional motor ability (VABS). Equal improvement for CO-OP and CTA: General motor skills (BOTMP – positive trend only, not statistically significant). No evidence of effect on self perception of motor competence</td>
<td>Low Quality CCT</td>
</tr>
<tr>
<td>Ward and Rodger (2004)</td>
<td>DCD N=2 ages: 5-7 years</td>
<td>CO-OP approach</td>
<td>Greater improvement due to CO-OP: Goal achievement/satisfaction with goal achievement (child report). No evidence of effect on visual motor skills or general behaviour (VABS)</td>
<td></td>
</tr>
<tr>
<td>Martini and Polatajko (1998)</td>
<td>DCD N=4 ages: 7-11 years</td>
<td>Goal, plan, do, check, (GPDC) cognitive verbal self guidance intervention (pre CO-OP)</td>
<td>Improvement due to cognitive verbal self guidance intervention: Goal achievement (child report)</td>
<td></td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.1.6 Motor imagery training

(i) Analytic summary of all studies for motor imagery training (see Table 23)

There was one study which focused on motor imagery training. The RCT compared motor imagery training to perceptual motor training. In terms of quality, the RCT was low quality. Younger (<8 years) and older children (>8 years) were studied. The RCT measured outcomes at the level of body functions/body structures. The RCT focused on providing individual therapy provided by qualified healthcare staff.

Table 23: Descriptive statistics of all studies within motor imagery training

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Individual and group interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>1/1</td>
<td>100%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on motor imagery training (see Table 24)

Wilson et al (2001) [Low quality RCT]

In this study, equal improvements were seen for motor imagery training and perceptual motor training in motor skills. Both were more effective than no treatment. Findings were based on individual therapy carried out by qualified healthcare staff, for 1 hour per week for 5 weeks. Treatment location was not stated.
**Table 24: Motor imagery training**

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilson et al (2001)</td>
<td>DCD</td>
<td>Motor imagery training vs PMT vs NT</td>
<td>Equal improvement for motor imagery training and PMT; Motor skills; Both better than no treatment.</td>
<td>Low Quality RCT</td>
</tr>
<tr>
<td></td>
<td>N=54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ages: 7-12 years</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.1.7 Fatty acid supplementation

*(i) Analytic summary of all studies for fatty acid supplementation (see Table 25)*

There were two studies which focused on fatty acid supplementation. One study compared fatty acid supplementation to placebo; the second did not use a control group. In terms of quality, one was a high quality (the RCT), the other was low quality (the OD). In both studies, younger (<8 years) and older children (>8 years) were included. Both studies measured outcomes at the level of body functions/body structures and at the level of activity/participation also. Both studies focused on individual therapy provided by qualified healthcare staff and parents in school and home settings.

**Table 25: Descriptive statistics of all studies within fatty acid supplementation**

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Body functions/body structures and activity/participation (assessment)</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Individual and group Interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>2/2</td>
<td>100%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School and home</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Treatment location uncertain</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified education staff and parents</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Skill mix unknown</td>
<td>1/2</td>
<td>50%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on fatty acid supplementation (see Table 26)

Richardson and Montgomery (2005) [High quality RCT]

In this study, fatty acid supplementation was effective compared to placebo in improving reading, spelling and behaviour (ADHD symptoms). There was no evidence of effect on motor skills. Findings were based on individual intervention, by teachers and parents in school and home settings. Teachers provided a daily dose of 6 capsules on weekdays for three months. Parents did the same on weekends.

Stordy (2000) [Low quality OD]

In this study, fatty acid supplementation was effective in improving motor skills. Findings were based on individual intervention, with the supplement taken daily for four months. Skill mix and treatment location unknown.
### Table 26: Fatty acid supplementation

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
</table>
| Richardson and Montgomery (2005) | DCD N=117 ages: 5-12 years | Fatty acid supplementation vs placebo | Improvement due to fatty acid supplementation: Reading, spelling and behaviour (ADHD symptoms)  
No evidence of effect for motor skills | High Quality RCT |
| Stordy (2000)               | Dyspraxia N=16 ages: 5-12 years | Fatty acid supplementation | Improvement due to fatty acid supplementation: Motor skills | Low Quality OD |

*unless otherwise indicated, findings presented were statistically significant
6.7.1.8 Reflex inhibition exercises and optometric vision therapy

(i) Analytic summary of all studies for reflex inhibition exercises and optometric vision therapy (see Table 27)

There was one study which focused on reflex inhibition exercises and optometric vision therapy. The study did not use a control group and had an N=1 and was graded as low quality. Younger children (<8 years) were included in the study. The study focused on providing individual therapy in a clinic setting.

Table 27: Descriptive statistics of all studies within reflex inhibition exercises and optometric vision therapy

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICF classification (measured outcomes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Individual and group interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic only</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skill mix unknown</td>
<td>1/1</td>
<td>100%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on reflex inhibition exercises and optometric vision therapy (see Table 28)

**Hurst et al (2006) [Low quality OD]**

In this study, reflex inhibition exercises/optometric vision therapy were effective in improving fusional reserves, accommodative facility and oculomotor control of pursuit and saccadic eye movements, reading, visual and motor/visual perception and life skills. Findings were based on individual therapy in a clinic setting. No significance testing carried out. Optometric vision therapy occurred for 30 minutes per week for 8 months with a supporting home programme of 15 minutes per day provided by parents. Reflex inhibition exercises occurred over a 3 month period. Skill mix was not stated.
Table 28: Reflex inhibition exercises and optometric vision therapy

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurst et al (2006)</td>
<td>Dyspraxia N=1 age: 8 years</td>
<td>Reflex inhibition exercises and optometric vision therapy</td>
<td>Improvements due to reflex inhibition exercises/optometric vision therapy: fusional reserves, accommodative facility and oculomotor control of pursuit and saccadic eye movements, reading, visual and motor/visual perception, life skills. No significance testing carried out</td>
<td>Low Quality OD</td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.1.9 Multi sensory training

(i) Analytic summary of all studies for multi sensory training (see Table 29)

There was one study which focused on multi-sensory training. This OD did not use a control
group, and was graded as low quality. Older children (>8 years) were studied. The study
measured outcomes at the level of body functions/body structures only. The study focused on
individual therapy, provided by qualified healthcare staff in a school setting.

Table 29: Descriptive statistics of all studies within multi-sensory training

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures and activity/participation (assessment)</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Individual and group interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual only</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School only</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Skill mix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>1/1</td>
<td>100%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on multi sensory training (see Table 30)

**Lockhart and Law** (1994) [Low quality OD]

In this study, a multi-sensory approach was effective in improving writing quality and speed in one child. No significance testing was carried out. Findings were based on individual therapy carried out by qualified healthcare staff in a school, for five 1 hour sessions. Therapy duration was not stated.
Table 30: Multi-sensory training

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockhart and Law (1994)</td>
<td>Sensori-motor difficulties/specific language impairment N=4 ages: 9-11 years</td>
<td>Remediation of specific letters using a multi-sensory approach</td>
<td>Improvement due to multi-sensory approach: Writing quality and speed for 1 child No significance testing carried out</td>
<td>Low Quality OD</td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.1.10 Application of orthoses

(i) Analytic summary of all studies for application of orthoses (see Table 31)

There were two studies which focused on the provision of orthotics. Neither study used a control group, both had an N=1. In terms of quality, one study was graded as sufficient quality, the other was low quality. In both studies, younger children (<8 years) were included. Both studies measured outcomes at the level of body functions/body structures, focussing on individual therapy provided by qualified healthcare staff and parents in clinic and home settings.

Table 31: Descriptive statistics of all studies within application of orthoses

<table>
<thead>
<tr>
<th>ICF classification (measured outcomes)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body functions/body structures only (assessment)</td>
<td>2/2</td>
<td>100%</td>
</tr>
<tr>
<td>Individual and group Interventions</td>
<td>2/2</td>
<td>100%</td>
</tr>
<tr>
<td>Individual only</td>
<td>2/2</td>
<td>100%</td>
</tr>
<tr>
<td>Location</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Clinic and home</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Not applicable</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Skill mix</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Qualified healthcare staff only</td>
<td>1/2</td>
<td>50%</td>
</tr>
<tr>
<td>Qualified healthcare staff and parents</td>
<td>1/2</td>
<td>50%</td>
</tr>
</tbody>
</table>
(ii) Descriptive summary of individual studies on application of orthoses (see Table 32)

**Buccieri (2003) [Sufficient quality OD]**

In this study, orthoses were effective in improving gross motor skills, foot alignment and posture. No significance testing was carried out. Findings were based on individual therapy carried out by qualified healthcare staff with support from parents, in clinic and home settings. Orthoses were worn initially for 1 hour 3 times per day, then continually whilst wearing shoes for 5 months.

**Orner et al (1994) [Low Quality OD]**

In this study, orthoses were effective in improving balance. Findings were based on individual therapy carried out by qualified health care staff. Orthoses were worn while walking over 8 weeks. Treatment location was not specified.
Table 32: Application of orthotics

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Intervention</th>
<th>*Findings and outcome area(s)</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buccieri (2003)</td>
<td>Gross motor delay N=1 age: 2.5 years</td>
<td>Orthoses + physiotherapy</td>
<td>Improvement due to orthoses: Gross motor skills, foot alignment and posture No significance testing carried out</td>
<td>Sufficient Quality OP</td>
</tr>
<tr>
<td>Orner et al (1994)</td>
<td>Learning disability N=1 age: 5.5 years</td>
<td>Orthoses</td>
<td>Improvement due to orthoses: Balance skills</td>
<td>Low Quality OP</td>
</tr>
</tbody>
</table>

*unless otherwise indicated, findings presented were statistically significant
6.7.2 Conclusions: quantitative research

A wide range of studies met the inclusion criteria for the review. This diversity was reflected in the professional affiliation of the primary authors, the types of intervention investigated and the outcome measures used. The specific types of intervention covered were: application of orthoses, fatty acid supplementation, reflex inhibition exercises and optometric vision therapy, kinaesthetic training, sensory integration therapy, motor imagery training, multi-sensory training, cognitive interventions, task orientated interventions and perceptual motor training.

6.7.2.1 Higher quality findings

The following interventions have been tested in randomised and controlled clinical trials, and although further research is required in most areas, they represent the best available evidence in AHP treatment for children with DCD.

Perceptual motor training and sensory integration [5x high quality RCTs; 6x low quality RCTs; 4x low quality CCTs; 2x sufficient quality ODs; 7x low quality ODs]

- Comparable effectiveness to each other on improving body function/body structure outcomes (eg motor skills, balance).
- Both more effective than no treatment in improving body function/body structure outcomes (eg motor skills, balance).
- Limited evidence of carry over to activity/participation outcomes (eg functional tasks, engagement in leisure, participation in curriculum).

Kinaesthetic training [3x high quality RCTs; 2x low quality RCTs]

- Contradictory findings.
- Comparing kinaesthetic training with other approaches showed comparable/greater effectiveness in improving body function/body structure outcomes (motor skills, kinaesthetic perception and memory); however, other studies show no effect relative to no treatment.
- No investigation of carry over to activity/participation outcomes (eg functional tasks, engagement in leisure, participation in curriculum).
**Fatty acid supplementation** [1x high quality RCT; 1x low quality OD]

- Fatty acid supplementation, compared to placebo, is effective in improving activity/participation outcomes (reading, spelling and behaviour).
- Mixed evidence of effect on body function/body structure outcomes (motor skills).

**Task orientated therapies** [2x low quality RCTs; 3x low quality CCTs; 2x sufficient quality ODs; 2x low quality ODs]

- More effective than no treatment on improving body function/body structure outcomes (motor skills and perceived motor competence).
- Comparable effectiveness with perceptual motor therapy in improving body function/body structure outcomes (eg motor skills).
- Limited evidence of carry over to activity/participation outcomes (eg functional tasks, engagement in leisure, participation in curriculum).
- This evidence is derived from a review of a diverse range of heterogeneous interventions, further research is required.

**Cognitive interventions** [2x low quality CCTs; 2x sufficient quality ODs]

- Verbal self-guidance techniques were more effective than traditional OT on gross motor activities. The research indicates an improvement in activity/participation outcomes (self-selected child goals) with this intervention, and provides some evidence for body function/body structure outcomes (motor skills).

**Motor imagery training** [1x low quality RCT]

- Comparable effectiveness to perceptual motor training in improving body function/body structure outcomes (motor skills). No investigation of carry over to activity/participation outcomes (eg functional tasks, engagement in leisure, participation in curriculum).
6.7.2.2 Lower quality findings

The following interventions require controlled trials, and randomised controlled trials in order to evaluate fully their efficacy.

**Orthotics [1x sufficient quality OD; 1x low quality OD]**

- Provision of orthotics may be of benefit to improve motor skills, foot alignment, posture and balance. No investigation of carry over to activity/participation outcomes (e.g., functional tasks, engagement in leisure, participation in curriculum).

**Reflex inhibition exercises and optometric vision therapy [1x low quality OD]**

- May improve oculomotor control, eye movements, reading, visual and motor/visual perception and life skills

**Multi sensory training [1x low quality OD]**

- In this study, multi-sensory training lead to an improvement in handwriting in one child (from a sample of four).
6.7.3 Methodological and other weaknesses in the quantitative research

It is important to note that many of the quantitative studies in this review had significant methodological weaknesses; this introduces bias and serves to decrease the sensitivity of the studies to treatment effects. What follows is a list of the most common problems identified.

- Only one study reported an adequate procedure for concealment of treatment allocation.
- Less than half (20) studies randomised participants into treatment arms.
- Many of the studies had numerical and other imbalances in treatment arms.
- Many studies had small numbers, and few had treatment arms greater than 50 subjects.
- Samples varied in the homogeneity of children involved; in addition to this studies varied in the clarity of the descriptions of their samples – therefore, in this body of literature, samples are likely to be highly heterogeneous.
- In some studies, interventions were inadequately described. More problematically, many studies did not report manualised intervention programmes.
- Assessment of fidelity to treatment protocols was infrequent.
- Although blinding of treatment providers as well as patients/clients is very difficult (if not almost impossible) in most AHP research, many studies did not blind outcome assessors.
- Follow up procedures were poor in most studies; with only seven following up children after 6 months.
- The outcome measures used in this body of literature reflect primarily body functions and body structures; activity and participation measures were used infrequently.
6.7.4 **Overall conclusions: quantitative research**

The 50 quantitative articles were, in the main, focused on changing motor skills of children through individual clinic based therapy, delivered by qualified healthcare professionals.

Eighteen percent (9/50) were high quality randomised control trials studies which indicated the following:

1. Perceptual motor training and sensory integration (traditionally used by occupational and physiotherapists) show benefit compared to no treatment and comparable effectiveness with each other in improving motor skills. However, the unique contribution of these therapies, or the pre-eminence of either approach over the other is not clear. In short, this suggests that therapeutic approaches that involve direct therapist-child contact are more effective than no treatment, but that the exact nature of therapy intervention to achieve maximum benefit has yet to be identified.

2. Comparing kinaesthetic training with other approaches showed comparable/greater effectiveness in improving motor skills and kinaesthetic perception/memory; however, other studies indicated no effect relative to no treatment. Further, this treatment has seen little use in the clinical field over recent years, and should be viewed as an experimental modality.

3. In one high quality RCT fatty acid supplementation improved reading, spelling and behaviour in children with DCD. This is an interesting finding, but should be treated with caution as improvements were not seen in DCD indicators (ie motor skills).

The remainder of the research, of a generally lower quality, and primarily relating to occupational therapy and physiotherapy interventions, indicates that task-oriented therapies show benefit over no treatment and comparable effectiveness with alternative treatments. Parents or teachers under the guidance of therapists have also successfully provided these therapies. However, this evidence is derived from a review of a diverse range of heterogeneous interventions and further research is required. More recently developed interventions, ie CO-OP (a goal orientated, problem solving approach which teaches children
cognitive strategies to deal with motor problems) or motor imagery training (an approach which combines sessions of physical practice with periods of mental rehearsal/visualisation of specific tasks) have shown positive outcomes, but have yet to robustly demonstrate their efficacy.

Orthoptic and podiatric interventions for children with DCD lack evidence of effectiveness. Case studies indicate that use of orthoses may improve foot alignment, posture and balance, and that optometric vision therapy may improve oculomotor control, eye movements, reading, visual and motor/visual perception and life skills. Controlled trials are urgently needed for these interventions.

Due to the infrequent use of suitable outcome measures (ie participatory and functional measures), there is very little evidence to support or disprove the value of any therapy in terms of generalisation to a child’s wider participation (eg self-care, leisure, play and school work).

Overall, the quantitative evidence is insufficient to provide firm guidelines for practice. There are forms of care which appear promising (primarily occupational therapy and physiotherapy), but all current approaches to the rehabilitation of children with DCD require further clinical trials and outcome studies.

Although these are extremely challenging to undertake, future AHP research should focus on methodologically sound, multi-centre randomised controlled trials (RCTs). To support large scale trials, therapists and researchers should work together to develop smaller scale locally relevant programmes of research and audit. As noted above conducting trials in this area is extremely challenging, and careful consideration should be given to methodological rigour. Recommendations for future RCTs include the following:

- well-defined samples with rigorous methods for identifying DCD children within DSM-IV criteria;
- large enough samples to provide clinically meaningful results;
- adequate concealment of treatment allocation;
• no treatment, alternative treatment or placebo control groups;
• blinding of outcome assessors;
• use of treatment manuals;
• assessment of fidelity to treatment manuals;
• use of functional and participatory outcome measures;
• follow up of at least six months to assess the durability of interventions; and
• full and accurate reporting using the CONSORT checklist as guidance.
6.8 Qualitative research: understanding parents’ and children’s experiences

The following sections will present an overview of the findings of the review of qualitative literature.

- There were 10 studies included.
- The frequency (%) for the quality of the studies was: high quality n=6/10 (60%); low quality n=4/10 (40%).
- Of the 10 articles identified, only one article explored the views of children; nine articles focused on the views of parents.
- Five of the studies were conducted in Canada, one in Sweden and four in the UK.
- The majority of studies used semi-structured or in-depth interviews to generate findings.
- All studies recruited participants via clinics/hospitals or referral lists associated with some kind of therapy; most often occupational therapy.
- There were no studies exploring the views of AHPs on the management of children with DCD and this question could therefore not be addressed by the qualitative review.

Table 33 provides a descriptive summary of the individual qualitative studies.
<table>
<thead>
<tr>
<th>Author and year</th>
<th>Country and recruitment site</th>
<th>Sample</th>
<th>Area/issue explored</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missuina et al (2007)</td>
<td>Canada Public health service, education and private health care</td>
<td>13 parents of children with DCD</td>
<td>What are the parents' views of the experiences that their child faces?</td>
<td>High</td>
</tr>
<tr>
<td>Rodger and Mandich (2005)</td>
<td>Canada University clinic – skills group</td>
<td>12 parents of 10 children with DCD</td>
<td>How do parents experience finding support for their child with DCD and what difficulties do they observe their child having?</td>
<td>High</td>
</tr>
<tr>
<td>Segal et al (2002)</td>
<td>Canada OT clinic</td>
<td>8 parents of 6 children with DCD (5 had comorbid conditions)</td>
<td>What do parents think about their child's social life?</td>
<td>High - borderline</td>
</tr>
<tr>
<td>Chesson et al (1990)</td>
<td>UK NHS</td>
<td>Parents of 31 children with motor learning difficulties</td>
<td>How do parents' view family life when one of their children has motor learning difficulties?</td>
<td>Low</td>
</tr>
<tr>
<td>Chia (1997)</td>
<td>UK Occupational therapy service</td>
<td>8 parents of children with dyspraxia</td>
<td>What are parents' concerns and feelings in relation to having a child with dyspraxia?</td>
<td>Low</td>
</tr>
<tr>
<td>Dunford et al (2005)</td>
<td>UK NHS</td>
<td>35 children with a likely diagnosis of DCD, 35 parents, 35 teachers associated with these children</td>
<td>What are children's views on the difficulties they face, and how does this compare with their parents' and teachers' views?</td>
<td>Low</td>
</tr>
<tr>
<td>Stephenson et al (1991)</td>
<td>UK NHS</td>
<td>31 parents of children with motor learning difficulties</td>
<td>How do parents experience the diagnostic process and day-to-day life with a family where one child has motor learning difficulties?</td>
<td>Low</td>
</tr>
</tbody>
</table>
6.8.1 Summary of qualitative review findings

What follows is a summary of the findings of the qualitative review by: (1) views about AHP interventions and (2) views about the challenges that parents and/or children face when living with DCD.

6.8.1.1 Parents’ and children’s views about AHP interventions

The review question for qualitative literature asked: what are the views of parents/carers/children in relation to allied health professions interventions for DCD?

Following analysis of studies which explored the views of parents/carers (n=6) or children (n=1) in relation to AHP intervention, four themes were generated. These are summarised in Table 34.

Table 34 What are parents’ and children’s views about AHP interventions?

<table>
<thead>
<tr>
<th>Key themes</th>
<th>Supporting study</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Struggling to access help</td>
<td>Pless et al (2001)</td>
<td>N=37</td>
</tr>
<tr>
<td></td>
<td>Rodger and Mandich (2005)</td>
<td>N=12</td>
</tr>
<tr>
<td>Knowing where they want improvement</td>
<td>Dunford et al (2005)</td>
<td>N=35</td>
</tr>
</tbody>
</table>
(i) Key themes from the qualitative research – parents’/children’s views about AHP interventions

(1) Parents reported struggling to access help for their child. They had difficulty knowing where to go for help, both in relation to the education sector and health care. Parents reported feeling as if their concerns for their child were at times trivialised. This, at times, was associated with feelings of frustration, anger and guilt.

(2) Child centred therapy outcomes were viewed as an important component of intervention. Parents highly valued interventions that resulted in positive outcomes related to goals, which the child had selected. These goals were often related to the attainment of skills that enabled the child to re-engage with social activities; allowing them to participate more freely with their peers.

(3) Parents described the benefits of therapy intervention in one study (Stephenson et al, 1991). Parents reported perceived benefits from occupational therapy intervention, reporting with improvements in their child’s sense of self, behaviour and performance both in school and at home.

(4) Only one study explored children’s views (Dunford et al, 2005). Children were reported as having definite opinions about which activities/skills they would like to improve. These include activities related to self-care, leisure, schoolwork and motor skills and differed in some areas from activities/skills identified by their parents and teachers.
(ii) Descriptive summary of individual qualitative studies relating to parents'/children’s views about AHP interventions

Mandich et al (2003) [High quality]

In this study, parents reported that therapy that focuses on activities and participation improved their child’s quality of life. The authors concluded from the study findings that interventions that focus on important child-focused goals, enabling competence in activities that foster participation are likely to be important in improving the child’s quality of life. The findings were based on in-depth interviews with 12 parents of 10 children who had DCD.

Missiuna et al (2007) [High quality]

In this study, the authors concluded that outlining the developmental trajectory of the child with DCD (through the eyes of the parent) is important in highlighting expectations in relation to age and the environment. The authors concluded that early screening should include scoping the views of parents. In addition, the study suggested that AHPs and educational staff need adequate awareness of the complex challenges children with DCD and their families face. The findings were based on in depth interviews and questionnaires with parents of 13 children with DCD.

Missiuna et al (2006) [High quality]

In this study, the authors suggested that their findings were useful for occupational therapists in terms of focussing on occupational performance when managing children with DCD and aiding understanding of the parent’s needs/concerns. The findings of this study support the need for early intervention. The findings of this study were based on in-depth interviews and questionnaires with parents of 13 children with DCD.

Pless et al (2001) [High quality]

This study concluded that parents may be a valuable source of information and therefore health professionals should ask parents about differences they note between their children/others and explore their concerns. The authors suggest that this may help to identify parents who may need extra support and information in terms of engaging their child in physical activities. The findings of this study were based on semi-structured interviews with 37 parents of children with motor difficulties.
Rodger and Mandich (2005) [High quality]

In this study, parents’ feelings of frustration in attempting to gain support from health professionals were highlighted. The authors reported a need to increase awareness of motor difficulties to ensure early diagnosis and appropriate referral for interventions. In addition, the authors reported that health and education professionals should be aware of parents’ concerns, the significant impact DCD can have on a family, as well as attending to the knowledge that parents have of their child. The findings of this study were based on in-depth interviews and the use of a demographic questionnaire with 12 parents of children with DCD.

Stephenson et al (1991) [Low quality]

In this study, parents reported a lack of support or shared concern from education staff. There was a reported improvement in self-esteem, school performance and behaviour of the child following therapy. The authors suggest that the important message for occupational therapists is that therapy may be important in improving the child’s confidence and reducing family tensions as well as improving the child’s behaviour. The therapist was considered as vital in providing support and information to families and to education based professionals as well as the child. The findings of this study were based on semi-structured interviews with parents and data collected from clinical records.

Dunford et al (2005) [Low quality]

This study suggests that use of the research version of PEGS (perceived efficacy and goal setting system) may enable children with DCD to share their views on activities that they find difficult or that they perceive they cannot do well. It was shown that there may be differences between the parent’s, teacher’s and the child’s views regarding challenging areas of occupational performance. The findings of this study were based on the results from the research version of PEGS completed by 35 children with a likely diagnosis of DCD. In addition to this, a self-report questionnaire was completed by 35 parents and 34 teachers associated with these children.
### 6.8.1.2 Challenges that parents and/or children face when living with DCD

Seven themes were generated from studies exploring the views of parents/carers (n=8) in relation to challenges they or their children face; one theme was developed from Dunford et al’s (2005) paper on children’s views. These are summarised in Table 35.

**Table 35: What are parents’ and children’s views about the challenges that are faced when living with DCD?**

<table>
<thead>
<tr>
<th><strong>Parents/carers views</strong></th>
<th><strong>Supporting study</strong></th>
<th><strong>Sample size</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key themes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling guilty about their parenting role</td>
<td>Chia (1997)</td>
<td>N=8</td>
</tr>
<tr>
<td></td>
<td>Pless et al (2001)</td>
<td>N=37</td>
</tr>
<tr>
<td>Uncertainty in the pre-diagnosis phase</td>
<td>Chia (1997)</td>
<td>N=8</td>
</tr>
<tr>
<td></td>
<td>Pless et al (2001)</td>
<td>N=37</td>
</tr>
<tr>
<td></td>
<td>Rodger and Mandich (2005)</td>
<td>N=12</td>
</tr>
<tr>
<td></td>
<td>Stephenson (1991)</td>
<td>N=31</td>
</tr>
<tr>
<td>Observing the child to fail in social engagement</td>
<td>Chia (1997)</td>
<td>N=8</td>
</tr>
<tr>
<td></td>
<td>Segal et al (2002)</td>
<td>N=8</td>
</tr>
<tr>
<td></td>
<td>Rodger and Mandich (2005)</td>
<td>N=12</td>
</tr>
<tr>
<td></td>
<td>Chesson et al (1990)</td>
<td>N=31</td>
</tr>
<tr>
<td>Believing the child has a negative or eroded sense of self</td>
<td>Mandich et al (2003)</td>
<td>N=12</td>
</tr>
<tr>
<td></td>
<td>Rodger and Mandich (2005)</td>
<td>N=12</td>
</tr>
<tr>
<td><strong>Children’s views</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Key theme</strong></td>
<td><strong>Supporting study</strong></td>
<td><strong>Sample size</strong></td>
</tr>
</tbody>
</table>
(ii) Key themes from the qualitative research – views about the challenges that parents and/or children face when living with DCD

(1) Parents described feelings of confusion regarding how they should best care for their child and support their child at home and in day-to-day life. They were unsure to what extent they should help or assist the child or allow the child to avoid activities/tasks that he/she found difficult.

(2) Parents reported a mixture of negative emotions in relation to their caring role. Parents describe feeling guilty about their role as a parent, in relation to the belief that they may not be doing all that they can as a parent to support their child. Parents also report feeling anxious and uncertain about what is happening with their child, particularly prior to diagnosis. The parent, at this stage fears something is not ‘right’ but is unsure of what exactly is wrong.

(3) Parents observed distinct motor difficulties in their child and are able to clearly define the activity limitation and functional difficulties that their child experiences. The parents note differences in the abilities of their child in relation to others. The parent observes their child to fail in participating in numerous social activities. In the parents’ view this is a significant negative facet of the child’s condition.

(4) Parents were concerned that the child has an eroded or negative image of self, as the child lacks self-confidence. This is related to inability to participate in some activity, being excluded by peers, and in some cases the child may be even subject to bullying and teasing.

(5) In Dunford et al’s (2005) study of children with DCD, they identified that children would report a wide range of activities in which they felt they were not competent. This included activities associated with self-care, school work and leisure activities. They were also able to select and prioritise personal areas of difficulty.
(ii) Descriptive summary of individual qualitative studies relating to parents’/children’s views about challenges they face when living with DCD

**Dunford et al (2005) [Low quality]**

In this study, whilst parents and children had concerns regarding motor skills and schoolwork, the children voiced additional concerns about self-care and leisure activities, which were rarely reported by the adults. This study found that there may be differences between the parents’, teachers’ and the children’s views regarding challenging areas of occupational performance. The findings of this study were based on the results from the research version of PEGS (perceived efficacy and goal setting system) completed by 35 children with a likely diagnosis of DCD. In addition, a self report questionnaire was completed by 35 parents and 34 teachers associated with these children.

**Segal et al (2002) [Low quality]**

In this study, parents reported that children were subject to stigma in relation to their motor difficulties. Associated with this, some children avoided stigma situations, leading to participation restrictions. Conversely, improving the child’s performance regarding motor activities (which are important to them) may enable them to participate with their peers. The findings of this study were based on in-depth interviews with eight parents of six children with a diagnosis of DCD.

**Chesson et al (1990) [Low quality]**

In this study, during the pre-diagnosis phase, a greater number of mothers than fathers identify the child as experiencing difficulties; this may generate familial conflict. Parental conflict may also be apparent, in relation to the day-to-day care of the child and be related to feelings of frustration. Two thirds of parents reported that family life was significantly affected by the child’s difficulties, this being associated with accommodation to meet the child’s needs and feelings of frustration and friction. The findings of this study were based on semi structured interviews with parents from 31 families.

**Chia (1997) [Low quality]**

In this study, parents reported a range of negative emotions in relation to their child gaining a diagnosis eg worry, anxiety, guilt. Parents are aware of their child facing a number of
functional and social difficulties. At times, parents felt isolated, and the author concluded that emotional support for the child and family should be part of interventions. The findings of this study were based on open ended questionnaires completed by 8 parents.

Table 36 and Table 37 below, present a summary of the individual studies included in the qualitative review along with their quality rating.

Table 36: Descriptive summary of individual studies included in the qualitative review: high quality rating

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Area/issue explored</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandich et al (2003)</td>
<td>12 parents of 10 children with DCD</td>
<td>How do performance deficits impact upon the lives of children with DCD?</td>
<td>Children's problems may be trivialised by others but they are observed to have significant, negative impact upon the child's well being and social participation.</td>
</tr>
<tr>
<td>Missiuna et al (2007)</td>
<td>13 parents of children with DCD</td>
<td>What are the parents' views of the experiences that their child faces?</td>
<td>Parents are concerned about the difficulties that they observe their child facing in all aspects of life eg play and self-care. These problems evolve with time, are associated with the child experiencing negative emotions, and reduced self-esteem.</td>
</tr>
<tr>
<td>Missiuna et al (2006)</td>
<td>13 parents of children with DCD</td>
<td>What are parents' views regarding their child's participation patterns and experiences in the early years?</td>
<td>Parents feel uncertain and experience self-doubt in early stages as they try to understand what is happening to their child and how best to help their child. Parents report problems in dealing with health professionals eg receiving confusing information.</td>
</tr>
<tr>
<td>Rodger and Mandich (2005)</td>
<td>12 parents of 10 children with DCD</td>
<td>How do parents experience finding support for their child with DCD and what difficulties do they observe their child having?</td>
<td>Parents noted many difficulties in the child's day-to-day performance of activities. They feel frustrated and alone when attempting to get help, at times feeling their concerns were trivialised by health professionals.</td>
</tr>
<tr>
<td>Segal et al (2002)</td>
<td>8 parents of 6 children with DCD (5 had comorbid conditions)</td>
<td>What do parents think about their child's social life?</td>
<td>Parents indicated that their child was subject to stigma in relation to their motor difficulties and as a consequence would try to avoid certain situations. Conversely, when the child improved motor performance they were noted to re-engage with participative activities.</td>
</tr>
</tbody>
</table>
Table 37: Descriptive summary of individual studies included in the qualitative review: low quality rating

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample</th>
<th>Area/issue explored</th>
<th>Findings</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesson et al (1990)</td>
<td>Unclear – parents of 31 children with motor learning difficulties</td>
<td>How do parents view family life when one of their children has motor learning difficulties?</td>
<td>Parents are aware of their child experiencing difficulties in the early years of life. Parents may experience parent-to-parent conflict in relation to observed difficulties and in managing the day-to-day care of the child. In general, family life was significantly affected by the child’s needs and their responses to this.</td>
<td>Low Quality</td>
</tr>
<tr>
<td>Chia (1997)</td>
<td>8 parents of children with dyspraxia</td>
<td>What are parents’ concerns and feelings in relation to having a child with dyspraxia?</td>
<td>Parents report a mixture of negative emotions in relation to diagnosis eg anxiety and guilt. Parents are aware of the child having social and functional difficulties; at times, the parents report feeling isolated and misunderstood.</td>
<td>Low Quality</td>
</tr>
<tr>
<td>Dunford et al (2005)</td>
<td>35 children with a likely diagnosis of DCD, 35 parents, 35 teachers associated with these children</td>
<td>What are children's views on the difficulties they face, and how does this compare with their parents’ and teachers’ views?</td>
<td>Children reported a wide range of activities, which they felt they were not competent in; they were able to prioritise personal areas of difficulty. Goals were identified by children in all three areas of occupational performance: leisure, self care and productivity. Whilst teachers, parents and children all had concerns regarding motor skills and schoolwork, the children voiced additional concerns about self-care and leisure activities that were rarely reported by the adults.</td>
<td>Low Quality</td>
</tr>
<tr>
<td>Stephenson et al (1991)</td>
<td>31 parents of children with motor learning difficulties</td>
<td>How do parents experience the diagnostic process and day-to-day life with a family where one child has motor learning difficulties?</td>
<td>Parents observe that their child is having difficulties with various motor tasks/functions and that they can feel uncertain about what is happening as well as anxious. Parents may also note lack of support or shared concern from education staff. Diagnosis was viewed as positive in terms of explaining the child’s behaviour and parents reported an improvement in self esteem, school performance and behaviour of the child following therapy.</td>
<td>Low Quality</td>
</tr>
</tbody>
</table>
6.8.2 Conclusions: qualitative research

Ten studies were included in the qualitative review, of these, nine explored the views of parents in relation to their experiences of caring for a child with motor difficulties. Only one study addressed the child’s view, exploring what they thought were areas of difficulty and where they would like to see improvements. Of the 10 studies identified, only four were conducted in the UK, three of these were more than 10 years old and all were rated ‘poor’ in terms of study quality. That said, some findings were consistent throughout a number of studies, taken together, these were re-formulated into themes, to provide an overview of the key messages from the qualitative literature reviewed.

6.8.2.1 Views of parents

The views, feelings and experiences of parents associated with caring for their child with DCD or motor difficulties:

- parents experienced a range of negative emotions or feelings over time as they observed their child having difficulties with a range of activities/functions eg confusion and worry about what to do, to best support their child; guilt about their parenting role;
- the early stages of a child’s difficulties and gaining a diagnosis were difficult for parents;
- parents were certain about the difficulties they observed their child experience, these could be physical, functional, social and/or emotional difficulties;
- when parents attempted to get help/advice in relation to their child, they reported feeling that their concerns were, at times, trivialised by health professionals; they report feeling isolated and misunderstood.

6.8.2.2 Views of children

The views of children with DCD or motor learning difficulties:

- children appear to be able to identify a range of activities that they are not competent in, associated with this, children can formulate therapy goals in relation to personally important aspects of performance, eg leisure, self-care and productivity.
6.8.3 Methodological and other weaknesses in the qualitative research

Of the 10 studies rated for quality, only six of these were rated as ‘high quality’; with two of these being ‘borderline’ in terms of their classification. The quality check list served to give a general impression of the quality of the critiqued studies and it is important to note that the labelling of the studies as ‘high’ or ‘low’ quality is relatively arbitrary given the absence of a widely used, validated methodology/method for the critique and synthesis of qualitative studies. It is therefore important to highlight the most commonly noted methodological weaknesses; these are as follows:

- a significant number of the studies failed to present detailed information about the nature of the interviews which they used to generate findings;
- there was failure to fully define the participants, both in terms of describing the children’s diagnosis and the relationship between the parents and children studied;
- it appeared that a proportion of the researchers may also have had contact with the parents/children in their capacity as a therapist. This would have implications for the type of findings that would be generated. Associated with this there was consistent failure to acknowledge and discuss the impact of therapist/researcher in generating findings and conclusions;
- several studies referred to attempts to uphold or enhance the credibility of their findings and analysis, eg the use of peer analysis and respondent checking of transcripts. However, this was not evident for the majority of the studies.

6.8.4 Overall conclusions: qualitative research

Of the 10 studies included in review, nine of these focused upon exploring the views, feelings and/or experiences of parents with children who had motor co-ordination difficulties. Only one paper presented findings on children’s views of their difficulties. Common parent-themes were identified within the studies of parents’ perspectives, with researchers tending to focus upon talk about the challenges they saw their child experiencing as well as their own feelings about parenting and seeking help. Parents reported various negative feelings associated with their parenting role, eg worry, guilt and anxiety. They were able to observe a range of activities and functions with which their child had difficulty. There was a relative lack of detailed exploration of parents’ experiences of healthcare and/or education; with most studies reporting difficulties when trying to get help in the early stages.
The quality of the studies reviewed varied. There were a number of methodological weaknesses or at least reporting omissions, which pertained to the majority of studies, eg failure to adequately describe the participants and data generating processes. Although it is possible to make negative comment about the papers reviewed, it is arguable that this type of data – the views of the parents and children – are still inherently valuable (as we often have the actual ‘words’ of the respondent) in terms of understanding the experiences of the users. Further work should advance the exploration of the children’s view and parents’ or carers’ perspectives on healthcare/therapy (their needs and concerns). To achieve this, researchers may have to provide greater structure for discussions/interviews. Any further qualitative work in this area should attend to issues of rigour and fully detail the study methodology and findings to allow the reader to evaluate the value of the work and its application to different contexts.
6.9 The policy context

The following sections will present an overview of the findings of the review of policy documents.

The following documents were included:

- Changing lives (2006)
- Delivering care enabling health (2006)
- Delivering for Health (2005)
- Doubly Disadvantaged (2003) was commissioned by the College of Occupational Therapists
- Draft Children’s Services (Scotland) Bill Consultation (2006)
- Getting it right for every child (2006)
- Protocol for Intervention – Developmental Co-ordination Disorder – NAPOT Guidelines for Good Practice
- Scottish Executive’s Review of Speech and Language Therapy, Physiotherapy and Occupational Therapy for Children (2003)

6.9.1 National Policy: Scottish Executive

6.9.1.1 Health and social services

A range of recent initiatives and developments will have an impact on the future development of AHP children and young people’s services. Delivering for Health was launched in 2005 and identified transformational change in the NHS from a service that is currently primarily
focused on providing care in hospitals to one where care is planned, delivered and evaluated close to people’s homes, when this is the most appropriate action. It sets out the Scottish Executive’s priorities and provides a strategic plan for the development of healthcare in Scotland, with an emphasis on:

- delivering services close to where people live
- offering people timely access to services
- promoting a strong emphasis on anticipatory care
- supporting individuals and carers in self-managing long term conditions.

Delivering Care Enabling Health (2006) emphasised the enabling role of the allied health professionals in supporting the agendas within Delivering for Health.

The shift in policy direction in the health service is mirrored in the social care sector by Changing Lives (2006). The review of social work in Scotland sets out a vision for social services for the 21st Century. The report outlines recommendations which highlight the need for change to ensure services respond to future demographic changes, public expectations, workforce availability and financial allocations. The recommendations focus on:

- designing and delivering needs led services,
- promotion of service user self management,
- earlier intervention and prevention approaches
- promote the appropriate skill mix in delivery of care
- support re-design of services to support transformational change
- develop a learning culture and develop enabling leadership.

When taken together these two policy documents provide a shared vision of health and social care within Scotland including the principles below:
• prevention and early intervention
• user involvement
• carers as partners
• community capacity building
• whole-system approaches
• self management of care
• competent workforce.

6.9.1.2 Children and young people’s services
Legislation specific to children includes the Additional Support for Learning Act (2004) which introduces a new framework for providing for children and young people who require additional help with their learning. The act aims to ensure that all children and young people are provided with the necessary support to help them work towards achieving their full potential and promotes collaborative working among all those supporting children and young people. This act supports:

• educational duty to make adequate provision for children with support needs
• more rights for parents including the ability to request assessments, mediation, knowing if their child has an additional support need and having their views identified within a co-ordinated support plan (CSP)
• new independent mediation services and dispute resolution arrangements
• better planning and preparation for transition to post-school life
• removal of current record of need and the introduction of a new co-ordinated support plan for those who meet the criteria

More recent overarching Scottish Executive policy that outlines a vision for children services is Getting it Right for Every Child (2006) which is the programme for change that will transform services for children. It gives clear authority and responsibility to agencies and professionals to work with children, families, local communities and each other, in a way that
brings practicality and reality to the vision for services Scotland’s children. The proposal for action includes:

- families and children should know what services they can get
- duty to be alert to the needs of children
- duty to co-operate in meeting the needs of children
- movement towards a single assessment, record and planning process.

The Draft Children’s Services (Scotland) Bill consultation is intended to support the implementation of Getting it right for every child. It sets out Scottish Ministers’ commitment to reforming the delivery of children’s services to place a greater focus on improving outcomes for children and to create a Scotland in which every child matters, where every child, regardless of their family background, has the best possible start in life. The proposed legislation:

- places duties on agencies to work together to provide support for children and make a clear plan for children with complex needs.
- ensures that children and their families’ views are taken into account when developing plans to support them.

Other initiatives have related to protecting vulnerable children and to healthcare for children and young people. The Children and Young People's Health Support Group published its Action Framework for Children's Services in early 2007. The framework recognises the contribution of AHPs to the health care of children and young people. The framework is designed to bring together in a single, focused and accessible format the principle challenges facing the provision of children and young people’s health services and the action required from healthcare providers and others to address them. Specific foci include:

- involving children, young people and their carers
- lack of available staff in specialist areas
• not all staff working with children have the appropriate skills so there needs to be a focus on education, training and development
• planning (national, regional, local) to include integrated children’s service plans
• models of care to include development of managed clinical networks (MCN)
• performance management and quality improvement.

The National Steering Group for Specialists Children’s Services in Scotland which reports to the Children and Young People’s Health Support Group is also currently reviewing the provision of specialist services in Scotland, with likely implications for AHPs.

6.9.1.3 Allied health professions
The Scottish Executive’s Review of Speech and Language Therapy, Physiotherapy and Occupational Therapy for Children (2003) was commissioned due to a number of concerns. Children were still finding it difficult to access services despite a significant increase in the funding for therapy services, and the Riddell Advisory Committee Report (1999) identified a shortage of therapists leading to unacceptable waiting times and questions regarding current management and organisation of services. The review highlighted the need to:

• develop integrated approaches between local authorities and NHS Scotland
• expand the pool of suitably experienced and skilled therapists
• review skill mix within professions
• implement measures at NHS board level to reduce the therapy waiting times
• establish strategic planning arrangements to ensure the involvement of key stakeholders and effective and efficient delivery of services by therapists.

6.9.1.4 Continuing professional development and the Allied Health Professions in Scotland: a National Learning Needs Analysis
Delivering for Health (2005) recognises the importance of developing sustainable clinical teams and the need to support this through role development for allied health professions. This CPD framework promotes:
• role development for AHPs including building of consultant posts
• leadership development in knowledge and application to change management and re-
  design techniques in a whole system approach
• overcoming challenges of access, style and format of training
• establish a knowledge exchange network through NES.

6.9.2 Professional context

6.9.2.1 Leeds DCD Consensus Statement
In October 1994, the London (Ontario) first consensus statement on DCD was crafted. The Leeds Consensus Statement 2006 was an updated consensus view funded by UK’s Economic and Social Research Council. This consensus included:

• an interpretation on the DSM-IV criterion for diagnosing DCD
• assessments that could be used to diagnose DCD
• a recommendation that interventions should include activities that are functional and
  are based on those that are relevant to daily living of the child, parents, teachers and others
• that interventions should aim to improve child motor skills and other attributes such as
  self esteem and confidence
• listening to the child’s wishes (including choosing priorities; establishing targets of suc-
  cess; engaging in monitoring their own progress)
• highlighting the involvement of a number of individuals who can contribute to
  interventions eg parents, teachers, health professionals, coaches and other family
  members to enhance application to everyday life
• acknowledgement of the necessity to accommodate the contextual life of the family
• recommendations for interventions to be to be evidence based and grounded in theory
  that supports a more refined understanding of DCD.
6.9.2.2 College of Occupational Therapists

Doubly Disadvantaged (2003) was commissioned by the College of Occupational Therapists because of concerns of increasing DCD referrals to occupational therapy services and subsequent waiting times. Average waiting time for DCD children in the UK was identified as 46 weeks. This report identified that children with DCD often had the same expectations placed on them as their peers, as DCD is often a ‘hidden handicap’. In addition, DCD children were given low priority despite these children and young people being at risk of being socially excluded in adult life.

6.9.2.3 National Association of Paediatric Occupational Therapists (NAPOT)

These guidelines provide guidance on referral, assessment, intervention, evaluation and discharge for occupational therapists working with children with DCD.

6.9.3 Overall conclusions: the policy context

Policy documents support the view of services which are based on collaboratively working across boundaries of different agencies in a whole systems approach, delivered close to where people live, and offering people timely access to services. They promote a preventative or anticipatory perspective, and support self management of conditions (promoting child and parent involvement in care). Document highlight the importance of appropriate skill mix, which in turn facilitates a competent workforce (including education colleagues). Activities in therapy that are functional and based on the daily life of the child are also recommended.
6.10 Key findings from the review of the research literature and policy documents

6.10.1 Quantitative research

- The 50 quantitative articles were, in the main, focused on changing motor skills of children through individual clinic based therapy, delivered by qualified healthcare professionals.

- Eighteen percent (9/50) were high quality randomised control trials studies which indicated the following:
  - sensory integration and perceptual motor training (traditionally used by occupational therapists and physiotherapists) are more effective than no treatment, but no more effective than each other at improving motor skills
  - that fatty acid supplementation can improve reading, spelling and behaviour
  - that kinaesthetic training shows comparable/greater effectiveness in improving motor skills, kinaesthetic perception and kinaesthetic memory in some studies; but in other studies shows no effect relative to no treatment.

- The remainder of the research, of a generally lower quality, and primarily relating to occupational therapy and physiotherapy interventions, indicates:
  - recently developed interventions, eg task specific approaches or cognitive approaches, have yet to robustly demonstrate their efficacy.

- Due to the small number of studies using suitable outcome measures, there is limited evidence to support or disprove the value of any interventions in terms of a child’s wider participation (eg self-care, leisure, play and school work).

- Due to a lack of quality research, the effectiveness of orthoptic and podiatric interventions for children with DCD is uncertain.

- Overall, the quantitative evidence is insufficient to provide firm guidelines for practice. There are forms of care which appear promising (primarily occupational therapy and physiotherapy), but all current approaches to the rehabilitation of children with DCD require further clinical trials and outcome studies.

6.10.2 Qualitative research

- Of the studies reviewed, the majority focused upon exploring the views, feelings and/or experiences of parents; few engaged with children.

- Common parent-themes were identified within the studies of parents’ perspectives, with researchers tending to focus upon talk about the challenges they saw their child experiencing as well as their own feelings about parenting and seeking help.

- Parents have an acute awareness that their child is having significant social, emotional and physical difficulties.

- Parents reported various negative feelings associated with their parenting role, eg anxiety.

- Parents were able to clearly articulate their own and their child’s difficulties.
• When parents attempted to get help/advice in relation to their child, they reported feeling that their concerns were trivialised by health professionals; they report feeling isolated and misunderstood.

• The early stages of a child’s difficulties and the process of attaining a diagnosis are difficult for parents.

• Parents/guardians value therapy input that enables a child to engage in school, home or social activities.

• Children appear to be able to identify a range of activities that they are not competent in. Associated with this, children can formulate therapy goals in relation to personally important aspects of performance, eg leisure, self-care and productivity.

• Further rigorous qualitative research is required in this area, and should focus on parents’ and children’s experiences of healthcare and/or education.

6.10.3 Policy

• There are common themes identified in the policy documents reviewed, supporting the following:
  – delivering timely care close to where people live
  – promoting a preventative (health promotion) approach
  – promoting self management of conditions
  – promoting child and parent involvement in care
  – promoting an appropriate skill mix, and competent workforce
  – early intervention and clear referral pathways to improve the ease of access to care
  – collaboratively working across boundaries of different agencies in a whole systems approach
  – strategic planning arrangements to ensure the involvement of key stakeholders
  – clear pathways for caseload management
  – inclusion of activities in therapy that are functional and goals set based on the daily life of the child.
7 Service user perspective: exploring parents’ and children’s perceptions of AHP interventions

7.1 Introduction
In addition to carrying out a review of available evidence, we explored the views of children with DCD or suspected DCD and their parents, throughout Scotland. Data were gathered through focus groups (seven focus groups with parents and six focus groups with children); a total of 46 parents and 24 children took part in these facilitated discussions. The focus groups took place across seven different health board areas within Scotland (Highland, Tayside, Dumfries & Galloway, Forth Valley, Greater Glasgow & Clyde, Lothian, and Fife).

7.1.1 Engaging with children
The right of the child to participate in decisions which impact on their lives is increasingly recognised, being integral to the United Nation Convention on the Rights of the Child (United Nations 1989), and a cornerstone of recent government policy (Scottish Executive 2003). In terms of research, studies that have focused on the child’s experience have been rare. This has been related to a number of factors. Stringent ethical guidelines, for example, and the recent societal focus on the protection of children, often complicate research to such an extent that using children as participants becomes impractical. Unsurprisingly, the pragmatic researcher will often turn to parents or other proxies, and the voice of the child may be lost through the filter of their guardians or questionnaires. This is an undesirable outcome. The voices of children have an important role to play in defining how services should be formed and improved. However, accessing their perceptions can be difficult, and researchers must pay heed to the skills and capacities of children when engaging them as research participants.

Compared to adults, children are less able to discuss their lives, they do have less experience and their cognitive abilities are less well developed than those of adults (Eiser et al 2000). However, this does not pose an insurmountable barrier to accessing their perceptions. It merely necessitates a level of care on the part of the researcher to appropriately grade/adapt his or her methods of data collection. Moreover, literature consistently indicates that children are competent participants in their own right and have valuable things to say about their lives. Carter et al (2002), for example, using a novel methodological approach involving a series of
guided activities and a focus group, explored the way in which chronic pain impacted on the lives of young people. The young people were able to share and explore their experiences, providing valuable data about their lives and their perceptions. Sartain et al (2000) also discuss the importance of involving children in research. They present an exposé of pertinent techniques and methodologies for working with children. They present a framework that ‘seeks to illustrate the utility of viewing children as active participants in data collection and care’, p919. They highlight the fact that children’s opinions are seldom sought, that parental or professional narratives often supersede children’s voices. In short, much current policy and research practice ignores the fact that children have valuable things to say about their lives.

Harnessing children and young people’s voices and translating their opinions and needs has become an essential component of integrated children’s services planning, ensuring that the needs of the child are at the centre of local service delivery (Scottish Executive 2006 ‘getting it right for every child’). A strong message articulated by children and young people during the consultation process for ‘Delivering a Healthy Future – An Action Framework for Children and Young People’s Health in Scotland’ (Scottish Executive 2006), was that they did not feel heard and understood by services; this highlights that children should ultimately be at the centre of consultation on services and their views canvassed in a meaningful way.

7.1.2 Engaging with parents

Parents are essential stakeholders in the care of children with DCD. Moreover, it is widely recognised that participation of parents in the implementation of therapy is integral to the outcome and effectiveness of input. Parents can be, and many are, actively involved in supporting therapeutic strategies for their children, and possess valuable in-depth information about their children’s skills and abilities. For example, qualitative research indicates that parents recognise motor learning difficulties in very young children with DCD or suspected DCD (Pless 2001, Rodger 2005). In many cases, parents are the first to identify their child’s motor co-ordination problems and subsequently experience great difficulty and emotional trauma, struggling to access services to help and support their child (Mandich 2003, Missiuna 2006). Research has also shown that having a child with motor co-ordination difficulties in the family has a physical, emotional and social impact not only on the child but on the family as a whole; impacting on the lives of both parents and siblings (Stephenson 1991). In line with the wider literature (e.g. Carter 2000, Maciver 2005) this body of work has also identified the impact of healthcare service characteristics on parents.
Although there has been political pressure to advocate for public involvement in service delivery by seeking the service users’ views (Scottish Executive 2002, 2005) this has been illusive in DCD services in Scotland to date. Qualitative research, by allowing parents to describe, discuss and explain the factors that they find important, provides a tool to develop understanding of the nature of living with a child with motor co-ordination difficulties. Insights gleaned from this type of research can sensitise clinicians and other involved parties, leading to a situation where parents’ motives, actions and worries are better understood; this may lead to better quality care. Concerning the investigation of healthcare, parents’ stories of pathways to diagnosis, and of their journey through the ‘system’, are likely to be particularly enlightening for health care providers (Maciver 2005).

7.1.3 Summary

For the reason outlined above, it was considered essential that the views of parents of children with DCD (or suspected DCD) in Scotland should be sought, and that this information should be key in informing the development of a framework for children with DCD. This data was gathered through focus groups, in which 46 parents and 24 children took part in discussions in a variety of health board locations throughout Scotland (Highland, Tayside, Dumfries & Galloway, Forth Valley, Greater Glasgow & Clyde, Lothian, and Fife) over a three-month fieldwork phase. This included a mix of rural and urban locations, and allowed us to engage with a range of families collecting information on parents’ and children’s experiences across Scotland.
7.2 Research objectives and questions - parents

7.2.1 Principal research objectives

- To gain knowledge of the views and experiences of parents of children with developmental co-ordination disorder (or suspected DCD or similar motor co-ordination difficulties) regarding allied health professions therapy sessions.

7.2.2 Secondary research objectives

- Explore parents’ views and experiences related to allied health professions assessment.
- Explore parents’ views and experiences related to the nature of support from an allied health professional (where service provided, by whom, when and how often).
- Explore parents’ views and experiences related to what aspects of allied health profession provision were useful/effective.
- Explore parents’ views and experiences related to what aspects of provision need to be addressed in relation to improving allied health profession services for DCD.

The way in which these objectives relate to the NHS QIS role and the project specification objectives is described in Table 38.
### Table 38: Objectives and research questions related to NHS QIS role - parents

<table>
<thead>
<tr>
<th>NHS QIS ROLE</th>
<th>Specification Objectives</th>
<th>Sub-objectives for parent focus groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening to the needs and preferences of patients/users</td>
<td>3.1 Identify what evidence is currently available in relation to AHP intervention in the assessment and management of DCD.</td>
<td>Explore parents'/carers’ experiences and views related to seeking help/support for their child with DCD [exploration of needs in relation to gaining/not-gaining access/referral to health professionals].</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explore parents'/carers’ experiences and views related to having their child assessed by health care professionals [explore positive and negative views along with preferences].</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explore parents'/carers’ experiences and views in relation to the management of their child with DCD as provided by health professionals [explore positive and negative views along with preferences].</td>
</tr>
<tr>
<td></td>
<td>3.2 Identify current models of service delivery by AHPs including areas of innovation, emerging practice and where possible information on impact and outcome.</td>
<td>Explore parents'/carers’ experiences, views and preferences in relation to the nature of the support/care provided by health professionals [where is care provided, by whom, when, how often?].</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explore parents/carers views regarding what they consider to be effective and/or useful care in relation to DCD.</td>
</tr>
<tr>
<td></td>
<td>3.3 Identify a criterion or framework that would indicate clinically effective practice for AHPs</td>
<td>Reflecting upon their experiences and views regarding care provided for their child with DCD, explore parents'/carers’ unmet needs and ideas about what overall aspects of care provision are useful/effective and which are: less useful/ineffective/harmful. Explore parents'/carers’ ideas about what issues they think need to be addressed in relation to improving care for children with DCD.</td>
</tr>
</tbody>
</table>
7.3 Research objectives and questions – children

7.3.1 Principal research objectives

- To gather data on the views and experiences of children with DCD (or suspected DCD) regarding allied health professions therapy sessions.

7.3.2 Secondary research objectives

- Explore children’s views and experiences related to allied health professions assessment.
- Explore children’s views and experiences related to the nature of support from an allied health professional (where the service is provided, by whom, when and how often).
- Explore children’s views and experiences related to what aspects of allied health profession provision were useful/effective.
- Explore children’s views and experiences related to what aspects of provision need to be addressed in relation to improving allied health profession services for DCD.

The reasoning behind the selection of the objectives is outlined in Table 39.
Table 39: Objectives and research questions related to NHS QIS role - children

<table>
<thead>
<tr>
<th>NHS QIS ROLE</th>
<th>Specification Objectives</th>
<th>Sub-objectives for children's focus groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening to the needs and preferences of patients/users</td>
<td>3.1 Identify what evidence is currently available in relation to AHP intervention in the assessment and management of DCD.</td>
<td>3.1.1 Explore children's experiences and views related to assessment and/or management by AHPs [explore positive and negative views along with preferences in relation to the contact they have with AHPs or others who implement AHP prescribed interventions].</td>
</tr>
<tr>
<td></td>
<td>3.2 Identify current models of service delivery by AHPs including areas of innovation, emerging practice and where possible information on impact and outcome.</td>
<td>3.2.1 Explore children's experiences, views and preferences in relation to the nature of the support/care provided by health professionals [where is care provided, by whom, when, how often?]. 3.2.2 Explore children's views regarding what they consider to be effective and/or useful care in relation to DCD.</td>
</tr>
<tr>
<td></td>
<td>3.3 Identify a criterion or framework that would indicate clinically effective practice for AHPs</td>
<td>3.3.1 Reflecting upon their experiences and views regarding care provided, explore children's unmet needs and ideas about what overall aspects of care provision are useful/effective and which are: less useful/ineffective/harmful. Explore children's ideas about what issues they think need to be addressed in relation to improving care for children with DCD.</td>
</tr>
</tbody>
</table>
7.4 Sampling and recruitment

Recruitment of families took place across seven health board areas (Highland; Tayside; Dumfries & Galloway; Forth Valley; Greater Glasgow & Clyde; Lothian, and Fife). At these sites, occupational therapists (as key professionals with access to children currently receiving AHP services and their families) were provided with parent/child information packs (see appendix 3) and asked to identify families for potential participation. Once children/parents were identified, and their consent received to release their details to the research team, they were contacted by the research team. Children and parents were recruited (if possible) as a whole family unit, with the express intention of a parent focus group running concurrently with a children’s focus group at each individual site. Forty-six parents and 26 children were recruited to the study.

7.4.1 Inclusion criteria

Defining this cohort of children presents several challenges. Not only do the DSM-IV diagnostic criteria lack clarity, making screening unreliable (Henderson 2006), the nature of DCD and the heterogeneity of behaviour observed within those diagnosed with the disorder, along with the existence of DCD-like motor impairments in those with other neurodevelopmental disorders, can present difficulties in fully understanding the aetiology (Hill 2006). For inclusion in the study, children were therefore defined ‘[children] who have a diagnosis of DCD or fit the DSM-IV criteria for DCD’, thus reflecting the population of children who may fit the DSM-IV criteria but for a variety of reasons, may not have a diagnosis. In addition to implementing inclusion criteria regarding a diagnosis of DCD, it was clear that an age range that reflected the population of children likely to be involved in intervention was an important dimension. It is apparent, within the literature, that the lower age limit of children with DCD included in descriptive or experimental studies (including intervention studies) is currently 6 years of age (Geuze et al 2001). Reviewing the literature presented within our systematic review of intervention studies, an age of 5–12 years was apparent. In addition, some authors suggest working only with children over six in a focus group setting (Hennessay and Heary 2005). When taking this into consideration, and reviewing the literature in relation to competence, children within this age range (ie 6-12 years) are credited with being able to read, write and make themselves understood (Fraser et al 2004). Thus, an inclusion criterion was formulated; to gather data (overall) from 6–12 year old children, whilst aiming to form separate focus groups of 6-8 year olds and 9–12 year olds.
In order to participate, the families were required to meet the following criteria:

- children are between the ages of 6–8 years or between the ages of 9–12 years (ie the aim was to have focus groups of children that were of a similar age)
- children have a diagnosis of DCD (or fit the DSM-IV criteria for DCD)
- children are currently or recently (ie within the last year) receiving an AHP therapy
- it is preferable but not essential that children are receiving therapy from multiple (ie two or more) AHP groups
- both the parents and children would be suitable/willing to take part in a focus group discussion

7.4.2 Exclusion criteria

- Any child where participation would necessitate that the child could not attend a school or therapy associated activity.
- Any child who could not converse in English.
7.5 Ethics

An ethical statement was received from the Multi-Centre Research Ethics Committee (MREC). Approval for subject recruitment was gained from the Multi-Centre Research and Development Committee (MRAD) as well as local NHS R&D offices. Where local R&D administrators deemed it necessary, honorary contracts and enhanced discourse Scotland checks were gained for all of the research team members. In addition, the following issues were considered:

- risks of taking part
- informed consent
- confidentiality

7.5.1 Risks of taking part

To encourage children to talk freely, both they and the researcher must feel safe while taking part in the research (Masson 2004). Experienced clinical therapists were involved in the focus group development and during the sessions to engage and encourage interaction from all children involved. Sessions were located within the therapy departments that children were familiar with, and a member of the child’s therapy team was present to welcome children along with the research team. Parents accompanied their child, but were not involved in the child-focus groups, thus supporting their child in the company of unfamiliar adults, whilst avoiding inhibiting their contribution in the sessions with their peers (Masson 2004). In addition, it was clearly illustrated within the information provided that their child was free to withdraw at any time and without giving any reason with this decision having no effect on the care their child would receive.

7.5.2 Informed consent

There is an ethical requirement to gain, if possible, written informed consent (Masson 2004). This was gained from parents for their participation (see appendix 3), for their child’s participation (see appendix 3) and for the taking of photographs. In line with good practice in this area, children were also required to complete an assent form (see appendix 3).
7.5.3 Confidentiality

Information was collected through recording and observation at the group session. All materials were stored anonymously, and stored in a locked room or password protected desktop computer. Only the team directly involved in the study had access to this material, with names, addresses and any potentially identifying features removed from material presented in the project.
7.6 Focus group procedure - children

Therapists use play therapeutically with children often to assist in the process of assessment, with appropriately graded play activities forming the basis of intervention. In a research context, structuring and eliciting responses becomes dependant on the ability of the researcher to find appropriate techniques that neither exclude nor patronise the children involved (Fraser et al 2004). To gather data, focus groups were identified as the most appropriate structure to allow the collection of information from several children at a time; with interaction between members stimulating the generation of data that the investigator might not otherwise have gained (Taylor and Kielhofner 2006). Play and activities formed the basis for the question structure within the focus group, which was structured in an age appropriate manner around events that would be meaningful to the children (Fraser et al 2004).

There are a number of factors involved when planning and running focus groups. A typical recommendation for group size is that it should contain no fewer than five children and no more than eight (Greenbaum 1997; Lysack et al 2006). Smaller groups may become parallel interviews or larger groups may become challenging to moderate (Hennessay and Heary 2005). Additionally, large age differentials can create imbalance in terms of needs and abilities, upsetting the group dynamic (Hennessay and Heary 2005). Recruitment influenced the ability of the research team to structure same gender groups, although the literature would suggest that children in same sex focus groups work best (Greenbaum 1988). Considering the above, focus groups were structured in the following manner:

- six participants
- ages within 2–3 years of each other
- same gender groups, unless the group already know each other (eg they all attend the same therapy group) in which case they may be in a mixed gender group

Length of group

Timing of focus groups was flexible with activities and structure designed to relate to different age groups:

- children between 6–8: maximum of 45 minutes
- children between 9–12: maximum of 60 minutes
• the time will be flexible, eg if children are bored or tiring the session will be stopped before this point

Location

Location sites were accessed through local clinicians and in a site familiar to the children, eg local hospital, but not the therapy rooms where they would normally have treatment.

Seating

Appropriate chair heights for the children (with moderators sitting on similar chairs) around a circular table – this ensures there is eye contact between moderator, assistant moderator and all children. Moderator and assistant moderator sitting at the table.

Role of the moderator (a clinical expert in paediatrics)

• To use a language that is understandable for the participants.
• To introduce the session and answer any questions.
• To guide the discussions using appropriate ice breakers, questions, probes and prompts.
• To lead the summary session.

Role of the assistant moderator (research specialist)

• To use a language that is understandable for participants.
• To take field notes regarding any emerging themes, group dynamics, to monitor/operate the recording equipment.
• To monitor participants for signs of any boredom, tiredness, stress, or discomfort and act appropriately to counter these, eg suggest a break, draw the session to a close.
7.7 Focus group procedure – parents

Number of parents involved in any single group

- 6–10 participants

Length of group

- Maximum of 60 minutes.
- Last 5–10 minutes for closing of session.
- The time will be flexible, eg if parents are bored or tiring the session will be stopped before this point.

Location

- A site familiar to the parents, eg local hospital.

Seating

- Around a circular table, ensuring there is eye contact between moderator, assistant moderator and participants.
- Moderator and assistant moderator sitting at table.

Role of the moderator

- As above (see children’s section).

Role of the assistant moderator

- As above (see children’s section).
7.8 Recording, transcription and analysis

Groups were digitally recorded using an Olympus DS-2300 digital recorder, stored in DSS file format, and transcribed verbatim (parent focus group) or partially transcribed (child focus groups). The analytical process for the study followed a number of stages, using tools and techniques common to applied qualitative research (Harden 2005, Ryan and Bernard 2000, Seale 1999, Strauss and Corbin 1998, Crabtree and Miller 1992, Dey 1993, Barry 1998, Murphy et al 1998). Transcripts were read and re-read (immersion). Parts of the text were then labelled/tagged with word or phrase in an open coding procedure. These open codes were then compared/combined to develop categories and themes. A ‘category’ is defined as a group of coded words or sections of text which are related. ‘Themes’ are developed from ‘categories’ and can be defined as: a conceptualisation of the underlying patterns that are identified as being a substantive element of phenomena being studied (Boyatzis, 1998). Analytic and procedural memos were used to note impressions and ideas; negative cases were explored where they arose.

Because much of the child focus group data was pictorial in nature, its content was analysed by coding the images into categories (eg a picture of therapy, a picture of playing) where it was possible to identify commonalities across the sample. Throughout, categories of pictures and our interpretations of their meaning were compared with children’s own (recorded) accounts to further the analysis. Notes taken during, and immediately after focus groups, were also used to sensitise the research team to the children’s narratives.

Finally, the team was encouraged to reflexively engage with the data, and regular debriefing meetings were held to discuss the progress of the analysis and emerging findings.
7.9 Overall sample characteristics

Table 40 contains information on the overall sample characteristics of the families involved in the focus group discussion.

Table 40: Overall sample characteristics

<table>
<thead>
<tr>
<th></th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers interviewed</td>
<td>34</td>
</tr>
<tr>
<td>Fathers interviewed</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
</tr>
<tr>
<td>Number of children within age category</td>
<td></td>
</tr>
<tr>
<td>6-8 years old</td>
<td>11</td>
</tr>
<tr>
<td>9-12 years old</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>8.5</td>
</tr>
<tr>
<td>Range (years)</td>
<td>5-12</td>
</tr>
<tr>
<td>SD</td>
<td>1.67</td>
</tr>
<tr>
<td>Number of male children</td>
<td>20</td>
</tr>
<tr>
<td>Number of female children</td>
<td>5</td>
</tr>
</tbody>
</table>
# 7.9.1 Detailed sample characteristics – all involved children

Table 41: detailed sample characteristics

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Age difficulties became apparent</th>
<th>Age when child received diagnosis</th>
<th>Age when child was referred</th>
<th>Referral Source</th>
<th>AHP input included</th>
<th>Details of Service Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH1</td>
<td>Dyspraxia</td>
<td>5 years</td>
<td>6 years</td>
<td>Parent unable to recall</td>
<td>Child psychologist/school doctor</td>
<td>OT - 12 week block course</td>
</tr>
<tr>
<td>CH2</td>
<td>ADHD/DCD</td>
<td>nursery age</td>
<td>4 years</td>
<td>1 year ago</td>
<td>ADHD Clinic</td>
<td>OT - Parent unable to recall</td>
</tr>
<tr>
<td>CH3</td>
<td>Autism/Dyspraxia</td>
<td>1½ - 2 years</td>
<td>5 years</td>
<td>3 years ago</td>
<td>Nursery/Paediatrician</td>
<td>OT, PT, SLT - PT - 12 week course; SALT through school</td>
</tr>
<tr>
<td>CH4</td>
<td>Awaiting diagnosis</td>
<td>5 years</td>
<td>Awaiting diagnosis</td>
<td>Parent unable to recall</td>
<td>Parent unable to recall</td>
<td>OT - OT in school</td>
</tr>
<tr>
<td>CH5</td>
<td>Dyspraxia</td>
<td>5 - 6 yr</td>
<td>7 years</td>
<td>7 years</td>
<td>SLT</td>
<td>OT, PT - SALT x1PW, PT x1PM</td>
</tr>
<tr>
<td>CH6</td>
<td>No</td>
<td>2 years</td>
<td>Parent unable to recall</td>
<td>Parent unable to recall</td>
<td>School</td>
<td>SALT, OT - Input in school</td>
</tr>
<tr>
<td>CH7</td>
<td>Dyspraxia (parent unsure)</td>
<td>14 months</td>
<td>Parent unable to recall</td>
<td>4 years ago</td>
<td>Paediatrician</td>
<td>OT PT ophthalmologists; podiatrist - Group OT, 11 others</td>
</tr>
<tr>
<td>CH8</td>
<td>Dyspraxia (parent unsure)</td>
<td>Evident in nursery</td>
<td>Parent unable to recall</td>
<td>Primary 3</td>
<td>Teacher, parent private OT</td>
<td>OT, SLT - Private OT</td>
</tr>
<tr>
<td>CH9</td>
<td>None given</td>
<td>4 years</td>
<td>N/A</td>
<td>6 years ago</td>
<td>School</td>
<td>OT - OT</td>
</tr>
<tr>
<td>CH10</td>
<td>Dyspraxia</td>
<td>When she was a baby, she was a poor feeder, late developing milestones, sitting at 8 months.</td>
<td>8.5 yrs</td>
<td>Primary 3 OT and teacher noticed difficulties</td>
<td>As a baby through hospital</td>
<td>OT, PT, SLT - OT 6-8 weeks of intervention 1:1, also during the summer for a group. Going back for individual sessions PT, position of hips.</td>
</tr>
<tr>
<td>CH11</td>
<td>No</td>
<td>Early on, slow to walk, slept a lot, very slow to interact with environment, walked at 15.5 months.</td>
<td>N/A</td>
<td>&quot;years ago&quot; P4</td>
<td>Referred by SLT to OT</td>
<td>OT = Going to be reviewed before she goes to secondary school.</td>
</tr>
<tr>
<td>CH12</td>
<td>Dyslexia</td>
<td>Early on</td>
<td>School aged</td>
<td>Parent unable to recall</td>
<td>GP</td>
<td>OT - D/C</td>
</tr>
<tr>
<td>CH13</td>
<td>DCD</td>
<td>15 months</td>
<td>9 years</td>
<td>Parent unable to recall</td>
<td>School</td>
<td>OT - OT - Blocks during summer (at home and school)</td>
</tr>
<tr>
<td>CH14</td>
<td>Co-ordination Disorder</td>
<td>6 years</td>
<td>9/10 years</td>
<td>7/8 years old</td>
<td>School</td>
<td>OT - OT - Block of 6 sessions (Home/School)</td>
</tr>
<tr>
<td>CH15</td>
<td>Dyslexia, Co-ordination difficulties</td>
<td>2½ years</td>
<td>9 years</td>
<td>7 years old</td>
<td>Self/EGP</td>
<td>OT - OT - Blocks during holidays (6 weeks)</td>
</tr>
<tr>
<td>CH16</td>
<td>Dyslexia/Dyspraxia</td>
<td>3 years</td>
<td>6 years</td>
<td>6 years old</td>
<td>Parent unable to recall</td>
<td>OT - OT - Once every 3 months</td>
</tr>
<tr>
<td>CH17</td>
<td>DCD</td>
<td>18 months</td>
<td>5 years</td>
<td>5 years</td>
<td>School</td>
<td>OT, PT, Podiatry - PT - blocks of 6; OT - 9 sessions over blocks</td>
</tr>
<tr>
<td>CH18</td>
<td>Dyspraxia, mild dyslexia</td>
<td>3 years</td>
<td>9 years</td>
<td>7 years</td>
<td>Self/School</td>
<td>OT - OT - 6 blocks of 6 sessions x2</td>
</tr>
<tr>
<td>CH19</td>
<td>Dyslexia</td>
<td>8 years</td>
<td>9 years</td>
<td>8 years</td>
<td>GP</td>
<td>OT - OT - Assessment and 6 week block of treatment</td>
</tr>
<tr>
<td>CH20</td>
<td>Dyspraxia</td>
<td>4 years</td>
<td>9 years</td>
<td>9 years</td>
<td>Paediatrician</td>
<td>OT, SLT - OT - block sessions</td>
</tr>
<tr>
<td>CH21</td>
<td>No</td>
<td>From birth (premature baby)</td>
<td>Since birth</td>
<td>Since birth</td>
<td>Since birth</td>
<td>OT, PT, SLT, podiatrist, orthoptist, orthodontist - Current therapy</td>
</tr>
<tr>
<td>CH22</td>
<td>Dyspraxia and dysphasia</td>
<td>2 years</td>
<td>5 years</td>
<td>2 years ago</td>
<td>Paediatrician</td>
<td>OT, SLT - OT - 0/5 block at present</td>
</tr>
<tr>
<td>CH23</td>
<td>Dyspraxia</td>
<td>4 or 5 years</td>
<td>7 years</td>
<td>Recently initiated by parents</td>
<td>OT, PT</td>
<td>OT - OT - 6 treatments, PT - 2 appointments</td>
</tr>
<tr>
<td>CH24</td>
<td>No</td>
<td>3 or 4 years</td>
<td>N/A</td>
<td>1 year ago</td>
<td>School Doctor</td>
<td>OT, SLT - OT - OT - 1/52; SALT now d/c was 0/52</td>
</tr>
<tr>
<td>CH25</td>
<td>Dyspraxia</td>
<td>1 year</td>
<td>6 years</td>
<td>Parent unable to recall</td>
<td>School Nursery</td>
<td>OT, SLT - OT - OT - 3 group sessions, 4/5 x individual sessions every few months</td>
</tr>
</tbody>
</table>

Key: PT - physiotherapy
7.10 Main themes

7.10.1 Themes generated from parent/carer focus groups

Parent themes were generated from talk about experiences of seeking help and support, their perceived needs (and the associated needs of their child), their views on un-met needs and their ideas about how care could be improved. The themes are presented under three main headings which relate to areas in which parents would like to see improvements or change:

- accessibility to care and support
- provision of quality care
- DCD profile and the broader community

Under each heading, the themes and supporting sub-themes are reported along with associated description/explanation and relevant parent/carer quotations (Table 42 provides an overview of the main headings and related themes). For quotations, non-verbal behaviour (eg gesturing) was noted (although this was relatively uncommon); displays of emotion (eg laughing, crying) were also noted. An ellipsis […] is used to indicate pauses. Length of pause was not recorded.
Table 42 Overview of the key areas where parents would like to see improvement or change and associated parent/carer themes and sub-themes generated from the focus groups

<table>
<thead>
<tr>
<th>Key area for improvement or change</th>
<th>Associated parent/carer themes</th>
<th>Associated sub-themes</th>
</tr>
</thead>
</table>
| Accessibility to care and support | Clear routes for entry/re-entry into 'the system' | • Struggling-blind to get into the system
• Knowing ‘something’ is wrong
• Self-labelling as the ‘failing parent’ |
| Provision of quality care         | Comprehensive care/support available locally | • Relocating to get the best care
• Experiencing disjointed care
• Current best resources and technology – comparing availability |
| Timely care                        | • Anger and frustration over waiting times |
| Knowledgeable and skilled professionals (health and education) | • Constantly evaluating care - comparing and critiquing
• Cherishing the empathetic, child-centred therapist
• Valuing improvement in participation |
| Valuing effective communication between professionals; and professionals and parents/carers | • Confusion and up-set: mixed messages and jargon |
| Care for the carers                | • Feeling like the isolated ‘different parent’ |
| DCD profile and the broader community | Raising the profile of DCD | • Increasing awareness of DCD among society in general
• Increasing knowledge and understanding of DCD among all who work with children |
7.10.1.1 Key area for improvement or change: accessibility to care and support

Theme: clear routes for entry/re-entry into ‘the system’

Parents/carers wanted to know what services were available for their child and for themselves (e.g. in terms of getting advice) and to understand (clearly) how they could go about getting access to these services. Parents/carers wanted to have a degree of control in relation to accessing services at different stages, i.e. initial referral, accessing increased support when the child was ‘in the system’ as well as post-discharge. Parents/carers reported that because the needs of their child were likely to fluctuate over an extended period of time, they wanted to be able to have increased access to support as and when they needed it. They also felt that it would be useful if there was forward planning, i.e. anticipating times when the child would need greater support, e.g. transition from primary school to secondary school. In particular, some parents reported that the time around discharge was particularly difficult and worrying, a time when they felt they were again alone.

Sub-theme: struggling-blind to get into the system

Parents/carers reported the difficulties they experienced when first attempting to get some help or advice from health professionals. They encountered a number of difficulties: not knowing who they should speak to for help, not having their concerns taken seriously by health care professionals or those who worked in education and being turned away, not knowing where they could look for information to help guide them.

Sub-theme: knowing ‘something’ is wrong

Feelings of frustration and anger were associated with this phase as the parent/carer had identified that their child was not behaving as they would expect. Parents had made comparisons with siblings or other children to help them identify areas of difficulty. At times, in the very early stages, first time parents would accept reassurance from the health professional or education specialist and retreat from their pursuit of assessment/advice. In later stages, when problems became apparent again, they were then uncertain about what action to take. In cases where parents felt their child had experienced significant delay in ‘getting into the system’, due to earlier reassurances, there was anger about what they perceived as ‘lost time’ to make a positive impact upon the child’s life.
Sub-theme: self-labelling as the ‘failing parent’

Parents/carers reported that, in the early stages (particularly pre-diagnosis or prior to getting entry into the health care system or additional support for their child at school), they felt as if they were failing to gain the relevant help and support for their child. They identified these stages as ones where they felt guilty and anxious. Guilt was associated with not being able to get the relevant help and not being able to help the child. Anxiety and worry was related to concerns for the child, day-to-day and for their future.

Related to these concerns and negative feelings the parents valued the ideas, advice and general support and reassurance offered by therapists and/or education based professionals.

7.10.1.2 Key area for improvement or change: provision of quality care

Theme: comprehensive care/support available locally

Sub-theme: relocating to get the best care

Ideally, parents wanted quality, comprehensive health care services (medical care and therapies) and supporting, education-based care provided locally. Some parents highlighted that other areas had a greater range of services and resources for the care of children with DCD than their own. A few parents had relocated (ie moved home) to get access to what they perceived to be better services (these were educational support services). Having services located at a distance was viewed as adding to the disruption of family life, eg added travelling time for appointments, at times being associated with the child missing schooling.

‘And I think you get things set up in school and then it comes to end of term and it all falls apart again. That’s what I’ve found. You have to keep going back to school.’[parent]

Sub-theme: experiencing disjointed care

Parents/carers expressed frustration and anger when they experienced repeated questioning or their child faced repeated assessments; indicating that important information had not been passed between professionals. This, they felt, wasted valuable time and raised their concern that professionals were not working in a united way to support their child. They reported feeling that they were experiencing isolated ‘care-events’ that were not connected, eg the health professionals referred them between one-another but did not appear to share information. Other examples of discontinuous support involved the school setting where
support would be given by one teacher, during one year, and as the child progressed to the
next year support was discontinued. Parents/carers perceived the care of their child to require
a team approach, eg occupational therapists communicating with school teachers and ensuring
that care was consistent. This sub-theme is closely linked to the sub-theme of valuing
effective communication.

Good communication was viewed as a key component of providing care for the child which
was of high quality; this was in part related to the role of communication in aiding care across
different sites, eg home, child development clinic and school. Parents/carers reported that for
significant gains to be made, they believed there needed to be an integrated approach to care.
The examples around this sub-theme primarily relate to two sectors: education and health
care. Parents/carers gave examples of good and bad practice in terms of co-operation and
joint working involving education and health sector based professionals. Parents/carers
believed that where there were good lines of communication and shared child-centred goals
between the educational and health sites, then care would be more effective.

‘It’s a nightmare that there’s not one single file for all our children. We used to come
here... They used to ask us a sheet load of questions, five sheet loads of questions. You’d
sit and go through it all and then come and they’d say, “Okay we’ll make an appointment
at [hospital name]”..... so you’d go down to [hospital name]. They’d say “What’s
wrong with your son”...and then somebody else would just go through it all again. I used
to be so frustrated and exhausted with this.’[parent]

‘The physio they picked up and she had OT support then but they didn’t talk so, I think
there could be a lot more. Even a person who could co-ordinate the whole service
because I don’t think there is anybody. It’s down to each department and they’re
fragmented and they need to communicate with each other.’[parent].

Sub-theme: current best resources and technology – comparing availability

Parents/carers were aware of discrepancies regarding the availability and quality of resources
on offer to support the child with DCD. Ideally, parents/carers wanted the best available
technologies, eg information and communication technology or specialist seating.

Theme: timely care

Sub-theme: anger and frustration over waiting times
Parents/carers wanted timely, i.e. prompt, access to care. They reported feeling that some waiting times for initial assessment and for treatment were unacceptably long.

‘You’re on a waiting list. They say over a year to wait and she’s now in Primary 5. We’re not prepared to wait […] I had a nephew that had the same sort of problems as well and he got to high school – too late for high school.’ [parent]

Parents/carers reported feelings of frustration and at times anger when they did not know what services were available and how to access these. As a parent/carer they felt it was their responsibility to provide the very best care for their child. To do this, they require locally available, easily accessible, flexible and comprehensive care. This, they felt was important in realising their child’s potential. When they could get the care that was needed, when they needed it, where they wanted it they were, in part, fulfilling their parenting role.

Theme: knowledgeable and skilled professionals (health and education)

Sub-theme: constantly evaluating care - comparing and critiquing

Parents/carers reported feeling confident about the therapy or support their child was receiving at a clinic or at school when they perceived the professional involved was knowledgeable about DCD and was suitably skilled in their work. Parents/carers reported that they had observed there to be discrepancies between professions regarding their knowledge, skills and understanding in relation to DCD; this was a source of concern. As parents/carers often spent a significant amount of time gathering information about DCD, e.g. surfing the internet, reading textbooks, etc, at times, they felt able to make judgement about another’s level of DCD awareness/knowledge.

‘And I felt entirely and utterly responsible for ensuring that my child got everything appropriate and I just felt it was really, really unprofessional. What I wanted was that professional to come to me and say “Right. We think your son possibly has this, this and this. These are the options in terms of therapy. This is what we’ll start with. If this doesn’t work, then we’ll go to this. This is why we do this, this is why we do this, this is why we do this. This is what you might expect to see.”’ [parent]

Sub-theme: cherishing the empathetic, child-centred therapist

Parents/carers valued those professionals (e.g. AHPs, teachers, support workers) who appeared to be genuinely interested in the child’s welfare and sought to tailor care/support/advice in
ways which effectively supported the child and family. This ‘genuine’ interest in the child appeared to be linked to the parents/carers perceiving the professional focussing upon the child’s/families needs and having positive attitude towards the child and the child’s care.

‘the report of it came forward on that assessment, I did not find user friendly at all either. It was… you know, there was an appendix at the back that was all of these formal assessments and it wasn’t […]. That wasn’t meaningful to me and I don’t think it would be meaningful to a lot of people. It wasn’t particularly meaningful, it wasn’t particularly user friendly and I don’t how that could be.’ [parent]

Sub-theme: valuing improvement in participation

When parents talked about the difficulties that they observed their child having they were particularly concerned and upset to observe their child failing to play with other children, failing to be included in play with others and at times being subject to teasing and bullying. They associated this with negatively affecting the child’s confidence and self-esteem. In contrast, when the child was observed to progress, at times as a direct result of therapy, with activities and functions that enabled participation with peers they noted improvement in confidence and general well-being; parents highly valued this type of therapy outcome.

Theme: valuing effective communication between professionals; and professionals and parents/carers

Sub-theme: confusion and up-set: mixed messages and jargon

Parents/carers valued timely and clear communication from professionals (health care and school) in relation to their child’s care. At times parents felt that healthcare professionals, in particular, failed to keep them adequately informed about the management of their child, eg failing to explain the outcome of an assessment or intervention. At times, when information was passed to the parent/carer it was not done using simple and easy to understand language, leaving the parent/carer feeling confused and distanced from the management of the child. Parents/carers wanted to be involved in their child’s management, hoping they could make a contribution to the care, at times this was blocked by ineffective communication.

‘getting information at a time when you’re ready to understand it and in a way that you can understand it and probably that might have been more useful if that was spread out
over a few sessions rather than this programme of activity which we furiously went at.’
[parent]

‘Plain English. Doctors and teachers speaking to me in plain English and saying “Don’t force [son] to eat certain foods because to him it tastes like he’s eating slugs” you know, things like that. Just say to them “Ask doctors and teachers to put it in plain terms for you.”’ [parent]

Theme: care for the carers

Sub-theme: feeling like the isolated ‘different parent’

Although parents/carers were often able to gather information about DCD from a variety of sources and had access to a therapist, many reported that they felt isolated as a parent, striving to get best available support for their child, without having contact or knowledge of other parents/carers facing similar challenges. Some identified the chance meetings with other parents/carers at clinic as a rare but useful/supportive event. In connection with this, they reported these meetings were a useful opportunity to share information and experiences. This, they reported, was a source of support for them as parents/carers. Many said they would not necessarily like to attend formalised ‘support group’ meetings but wanted an opportunity for informal peer gatherings, perhaps facilitated through therapists.

‘Really to me there’s a really important fact. As I was just getting my confidence about all this is how you feel about yourself and as a parent has such an enormous impact on how the child copes with their difficulties and how they feel about themselves. And what is so ironic is from the minute you know something’s wrong to you finally get a diagnosis you go through this most harrowing, awful experience in which you reduce yourself to nothing; to this worthless, neurotic, terrible parent. What impact does that have on your child?’ [parent]

7.10.1.3 Key area for improvement or change: DCD profile and the broader community

Theme: raising the profile of DCD

Sub-theme: increasing awareness of DCD among society in general

Parents/carers reported that, in their view, DCD was a condition that was not understood by most within our society, but they felt that it was a condition that was not even recognised by most. They believed that some of the difficulties that their children faced could be alleviated if there was a greater awareness of the existence of DCD and the difficulties associated with
Parents/carers used the example of dyslexia as a condition which had gained greater public awareness. The basic assumption was that, with greater knowledge of the condition there may be greater tolerance and/or action to support the affected children.

‘If you listen, because the parent knows. I think what we’ve experienced is that our suspicions and our concerns have been proved right. And if they had listened and given a little bit more consideration instead of just giving lip service you know we could have been further down the road than we are.’ [parent]

‘I know that there’s limited training but there should be more. If it’s one in ten children that’s got these difficulties then health visitors should be looking for it and not thinking it’s a rare thing that they’re not going to see.’ [parent]

Sub-theme: increasing knowledge and understanding of DCD among all who work with children

Parents/carers were aware that it would not be an easy nor quick task to increase the public awareness of DCD; however, the lack of knowledge about DCD among health care professionals and others who worked with children, eg health visitors, school assistants, PE teachers, was considered unacceptable and possibly damaging. Parents/carers felt that any individual working with children should have a basic knowledge and understanding of the condition and at least know enough about the management to be able to direct a parent/carer to a relevant professional for further advice.

‘She absolutely adores it [dancing] and we have videos of the whole chorus going to the left and she goes to the right but she has a dancing teacher that never ever picks her up on that who will go up to her and stroke her arm or her leg to give her the sensory feedback to say which part of the body she’s got to move. As opposed to her swimming teacher that stands on the side and screams instructions at her...the teacher’s didn’t need intense knowledge. I’ve given them both the same information but it was the will to take it and to do something about it and see the child within the difficulty rather than the problem first and the child second.’ [parent]

“I feel that as well. I feel that at school there’s not enough people being made aware of kids with autism, dyspraxia and that. I think the schools and health centres and things like
that should be trying to raise awareness. There should be adverts on TV or something.’ [parent]
7.10.2 Themes generated from child focus groups

The children’s themes were generated from talk and play activities around experiences at therapy, things that they would like to be better at and things that they think they have difficulties with. The themes are presented under two main headings:

- Views about therapy
- Functional difficulties and personal goals

Under each heading, the themes are reported along with associated description/explanation and relevant child quotations (Table 43 provides an overview of the main headings and related themes).

Table 43 Key areas of discussion from the children’s focus groups and associated themes

<table>
<thead>
<tr>
<th>Key areas of discussion</th>
<th>Associated child themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Views on therapy</td>
<td>• Therapy is definitely fun and games</td>
</tr>
<tr>
<td></td>
<td>• The first visit was different</td>
</tr>
<tr>
<td></td>
<td>• I’ve been told it’s for my muscles…</td>
</tr>
<tr>
<td>Functional difficulties and personal goals</td>
<td>• I know what I want to be better at…</td>
</tr>
<tr>
<td></td>
<td>• Sometimes I need help with…</td>
</tr>
<tr>
<td></td>
<td>• Relishing rare moments of success</td>
</tr>
</tbody>
</table>

7.10.2.1 Key area for discussion within the children’s focus groups: views on therapy

Theme: therapy is definitely fun and games

Children had a clear impression of therapy sessions, and were able to recollect and talk about their experiences. Most often, the children were recounting stories about attending physiotherapy or occupational therapy sessions; this was ascertained through their accounts and the pictures they produced.
Children viewed therapy as something that was principally fun, an enjoyable experience, filled with challenging and pleasurable activities. Children used words such as: ‘fun’ and ‘games’ to frame their experiences.

‘I just thought it was for fun.’ [child]

Theme: the first visit was different

In contrast to the majority of their therapy visits, some children recalled that their first visit to therapy was less than agreeable, this was evident from descriptions of initial assessment sessions. Some children explained that the first sessions were embarrassing and/or upsetting.

‘The first time[...] I felt a wee bit embarrassed’ [child]

Theme: I’ve been told it’s for my muscles...

Overall, the children did not appear to have a deep understanding of why they actually attended therapy, this was reflected in their repeated assurance that it was simply: ‘fun’. When this issue was probed further, the children did offer some explanations. They responded with suggestions such as, ‘[I attend therapy] because of my balance’ or, ‘it helped my muscles, and my balance and stuff’.

It is likely that older children would have been able to give a more full explanation or show greater understanding but the children within these focus groups appeared to re-iterate explanations that may have been given to them by parents and/or therapists. Interestingly, few children related their therapy to getting better at the things which they identified as key areas where they would like to see improvements. When children did talk about the outcome of therapy they related it to improvements in gross function, eg ‘I am better at balancing’. One child was the exception to this, he explains the activity that he improved in, directly linking it to therapy:

“Coming here [...] I couldn’t tie my shoelaces [...] but the more I came here and the more [therapist] taught me how to do it, I eventually learned to tie my laces” [child]
7.10.2.2 Key area for discussion within the children’s focus groups: functional difficulties and personal goals

Theme: I know what I want to be better at…

Children were able to talk with ease about personal goals or aspirations, this talk was facilitated through play, with the children writing on small coloured adhesive notes and ‘posting’ their responses on paper charts around the walls. They also communicated their aspirations through drawing with coloured pens; writing below each what the picture represented.

From the written notes, pictures and talk, children communicated aspirations to improve performance in multiple areas of their lives. Each child presented a range of activities or functions that were important to them; it was noted that there was significant variance around these personal goals. Key areas identified by the children for improvement included: leisure activities and gross motor skills, school activities and personal care, see Table 44 for examples of these. The weighting and importance of activities related to home, school or leisure appeared to be dependant on their age and development.
Table 44 Activities or functions reported by the children as ‘things they would like to be better at’

<table>
<thead>
<tr>
<th>Types of activity or function identified by the children</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance associated with leisure, play or gross motor</td>
<td></td>
</tr>
<tr>
<td>skill</td>
<td></td>
</tr>
<tr>
<td>• Playing football</td>
<td></td>
</tr>
<tr>
<td>• Playing basketball</td>
<td></td>
</tr>
<tr>
<td>• Riding a bike (without stabilisers)</td>
<td></td>
</tr>
<tr>
<td>• Karate</td>
<td></td>
</tr>
<tr>
<td>• Playing a musical instrument (with my friend)</td>
<td></td>
</tr>
<tr>
<td>• Catching balls</td>
<td></td>
</tr>
<tr>
<td>Performances associated with school</td>
<td></td>
</tr>
<tr>
<td>• Spelling</td>
<td></td>
</tr>
<tr>
<td>• Reading</td>
<td></td>
</tr>
<tr>
<td>• ‘Remembering things’ (eg words and sentences)</td>
<td></td>
</tr>
<tr>
<td>• Finding things</td>
<td></td>
</tr>
<tr>
<td>• Listening</td>
<td></td>
</tr>
<tr>
<td>Performances associated with home life</td>
<td></td>
</tr>
<tr>
<td>• Cutting food</td>
<td></td>
</tr>
</tbody>
</table>

Theme: sometimes I need help with..

When the children were asked, ‘what things are you good at?’ or, ‘what things do you find hard or difficult?’ they lacked spontaneity in response; for this age group, these questions appeared challenging. The children responded by identifying things that they believed they were generally, ‘bad’ at, eg schoolwork. In contrast, when the questions were changed to: ‘what would you like to be better at?’ and ‘what do you need help with?’ they were able to identify a range of different things and identify associated feelings. School work became a particular focus when discussing areas where they required assistance.

‘I’m not good at anything at school’ [child]

The quotation that follows is from a boy explaining his desire for some kind of invention, which would ease the learning process for him:
'I wish there could be an invention that they put these suckers on your head and you press the button and all the knowledge you’re going to learn at school your pen writes it.' [child]

Children were able to express things that made them feel sad as well as reflect and imagine what it must feel like to have success, at times elaborating and describing how achieving a particular goal or ambition may feel. In the following quotation, the child explains that he has never scored a goal when playing rugby, he then goes on to imagine what it would be like if he were to score.

‘How do you feel if you find it difficult to score goals?’ [moderator]
‘It makes me feel a bit sad ‘cos I’ve never scored a goal’ [child]
‘How would you feel if you scored a try?’ [moderator]
‘There was this thing on the radio, you phone up and you can get a fanfare for the first time you’ve done something in your life’ [child]
‘So you’d like a fanfare?’ [moderator]
‘Yes, on the radio.’ [child]

Theme: relishing rare moments of success

When encouraged to reflect, children were able to pin point and identify moments where they had achieved a particular task, and how that made them feel. They discussed this in relation to how they were then able to use these skills and relate to their peers. Achievement in life skills appeared to allow them to move to a position where they were able to assist peers with that skill.

Here the focus group moderator asks a child about how it felt to be able to tie his own shoe-laces when another child joins the conversation:

[Moderator and child discussing the moment when the child could successfully tie his own shoe-laces]

‘How did that make you feel?’ [moderator]
‘Kind of nice [...] ‘cos when I couldn’t do it I needed other people to help me, and by the time there was me with two other boys I could tie my shoe laces’ [child 1]
‘How did that make you feel?’ [moderator]
'Excited!' [child 1]

[another child is trying to join the conversation] ‘Yes; [child] was going to say something?’” [moderator]

‘‘I still can’t tie my shoelaces.’ [regretfully] [child 2]

‘I could help you!’ [child 1]

7.11 Conclusions: service users perspectives - parents and children

A vital part of informing the development of the AHP framework was to engage with the main services users, ie parents/carers of the children with DCD (or suspected DCD) and the children themselves. Focus groups were used as a method to enable the parents/carers and children to have their say, to share their experiences, express their views, feelings and ideas for change and development of AHP therapies. Forty-six parents/carers took an active part in one of seven focus groups run throughout Scotland (the groups were conducted over seven different health board locations). Twenty four children were able to articulate their views through spoken word, drawings, writing and play in one of six focus groups (these groups running concurrently with the parent/carer focus groups).

7.11.1 Summary of parent/carer focus group findings

The aim of the parent/carer focus groups was to elicit the views and experience of the participants in relation to AHP therapy and services, to probe their views on areas that could improve, their ongoing needs and concerns. Several key themes were generated from the extensive transcripts resultant from these facilitated group discussions, the themes were oriented to give an overview of the primary areas where parents would like to see improvement or change.

- Clear routes for entry/re-entry into ‘the system’
  - parents/carers reported difficulty accessing care and support and this was particularly harrowing for some as they had observed their child having difficulties; unable to get help for their child and uncertain about what to do, they felt a sense of failure

- Comprehensive and timely care/support available locally
− parents/carers want their child to be receiving the best possible care in the area where they live (ie at the local school and at the local clinic/hospital), they highly value care that is ‘joined up’, eg AHPs communicating and sharing information, AHPs working with education to provide relevant support throughout the schooling years.

− parents/carers want their child to receive care when they need it most and feel that some waiting times can be a barrier to this

**Knowledgeable and skilled professionals (health and education)**

− Parents/guardians value those AHPs and education workers who put the child at the centre of care, those who are knowledgeable and skilled and who focus on outcomes that relate to the child successfully re-entering age-appropriate social circles, those that improve their well-being and self-esteem

**Valuing effective communication between professionals; and professionals and parents/carers**

− parents/guardians value AHPs who use clear and simple language to keep them up to date with their child’s status and progress. They stress the importance of effective communication between health professionals and health/education as something fundamental to the provision of quality care.

**Care for the carers and raising the profile of DCD within society**

− parents/guardians can experience an array of negative emotions and feelings: anxiety, fear, frustration, isolation and anger, and value opportunities to gain support from other parents/guardians

− parents/guardians would like DCD to be more commonly understood and recognised by people in society and in particular by all those working with children.
The parents/guardian focus groups generated rich data with clear messages to inform the AHP framework. The themes generated represent the most common issues presented by the participants.

7.11.2 **Summary children’s focus group findings**

Despite the children within the focus groups being relatively young (average age 8½), they were able to express their views about therapy (most commonly in relation to occupational therapy and physiotherapy). Children identified therapy as being fun, an enjoyable experience, although the initial assessments were remembered for inducing embarrassment or upset. That said, the children did not have great understanding of why they attended therapy.

**Children’s views on therapy…**

- Therapy is definitely fun and games:
  - children identified therapy as being fun, an enjoyable experience. They had a clear impression of therapy sessions, and were able to recollect and talk about their experiences. Most often, the children were recounting stories about attending physiotherapy or occupational therapy sessions; this was ascertained through their accounts and the pictures they produced.

- The first visit was different:
  - in contrast to the majority of their therapy visits, some children recalled that their first visit to therapy was less than agreeable; this was evident from descriptions of initial assessment sessions. Some children explained that the first sessions were embarrassing and/or upsetting.

- I’ve been told it’s for my muscles…
  - Overall, the children did not appear to have a deep understanding of why they actually attended therapy, this was reflected in their repeated assurance that it was simply: ‘fun’.
Children’s views on functional difficulties and personal goals…

• I know what I want to be better at…
  – Children were able to talk with ease about personal goals or aspirations. Each child presented a range of activities important to them; it was noted that there was significant variance around these personal goals. Key areas identified by the children for improvement included: leisure activities and gross motor skills, school activities and personal care. The weighting and importance of activities related to home, school or leisure appeared to be dependant on their age and development.

• Sometimes I need help with…
  – when the children were asked, ‘what things are you good at?’ or, ‘what things do you find hard or difficult?’ they lacked spontaneity in response; for this age group, these questions appeared challenging. The children responded by identifying things that they believed they were generally ‘bad’ at, eg schoolwork. In contrast, when the questions were changed to: ‘what would you like to be better at?’ and ‘what do you need help with?’ they were able to identify a range of things and identify associated feelings. School work became a particular focus when discussing areas where they required assistance.

• Relishing rare moments of success
  – When encouraged to reflect, children were able to pin point and identify moments where they had achieved a particular task, and how that made them feel. They discussed this in relation to how they were then able to use these skills and relate to their peers. Achievement in life skills appeared to allow them to move to a position where they were able to assist peers with that skill.
8 Professional perspective: exploring AHP practice in Scotland through interview

8.1 Introduction

In addition to carrying out a review of current evidence and engaging with service users, a series of interviews with AHPs was undertaken. Twenty six professionals were interviewed, one-to-one; the interviews involving professionals from across every health board area in Scotland. Seven different AHP groups were consulted (ie occupational therapists, physiotherapists, podiatrists, orthoptists, orthoptists, dieticians and speech and language therapists). Data were generated through talk with 11 occupational therapists; five physiotherapists, two podiatrists, two orthotists, two orthoptists, two dieticians, one speech and language therapist and one physical education (PE) teacher.

Engaging with AHPs

In order to gain an in-depth understanding of the care provided by allied health professions for children with developmental co-ordination disorder, interviewing was chosen as the method of data collection. When interviewing is conducted using a competent and non-directive approach, it can generate a useful insight into a practitioner’s world, giving access to data it would take months to gather by observation (Seale 1999). The one-to-one interviews were used to access the experts’ experiences, views and ideas about providing support for children with DCD (or suspected DCD) and their families.
8.2 Research objectives and questions

Principle research objectives:

- to gain an in depth understanding of allied health professions’ support of a child with developmental co-ordination disorder

Secondary research questions:

- what is the nature of the innovative practice conducted?
- what are AHPs views/experiences related to assessment in DCD?
- what are AHPs views/experiences related to interventions/treatments or management?
- how are children with DCD and their parents/guardians involved in care?
- what aspects of care provision need to be addressed in relation to improving AHP services for DCD?

The way in which these objectives relate to the NHS QIS role and the project specification objectives is described in Table 45.
### Table 45: Principle research questions and the link to NHS QIS objectives

<table>
<thead>
<tr>
<th>NHS QIS Specification Objective</th>
<th>AHP research questions</th>
</tr>
</thead>
</table>
| Objective 3.2: Identify current models of service delivery by AHPs including areas of innovation, emerging practice and where possible information on impact and outcome | What is the nature of the innovative practice conducted?  
- Development and demands  
- Critical players/providers  
- Recipients (patients, parents, AHPs)  
- Local context  
- Local or national policy  

What are AHPs views/experiences related to assessment in DCD?  
- What do they do?  
- How?  
- Why - effectiveness?  
- Where?  
- When?  

What are AHPs views/experiences related to interventions/treatments or management?  
- What do they do?  
- How?  
- Why, effectiveness?  
- Where?  
- When?  

How are children with DCD and their parents/guardians involved in care? |

| Objective 3.3 Where possible identify a criteria or framework that would indicate clinically effective practice of AHPs | What aspects of care provision need to be addressed in relation to improving AHP services for DCD?  
- Local context  
- National context |


8.3 Sampling and recruitment

The identification of AHPs for interview was informed by multiple sources: (1) approaching national AHP managers, asking them to identify those they believed to be carrying out innovative practices in relation to the care of children with DCD and their families, (2) identification through the survey responses and, (3) by scoping local authorities. Once identified, AHPs were sent a letter, and followed up with a phone call. Recruitment took place across all health board locations in Scotland.

A quota target list for stratified sampling was applied to the recruitment process of AHPs; with the aim to include at least one AHP from each key group and at least one AHP from every health board in Scotland.

Twenty-six AHPs were recruited to the study in total (11 occupational therapists, 5 physiotherapists, 2 podiatrists, 2 orthotists, 2 orthoptists, 2 dieticians, 1 speech and language therapist and 1 PE teacher).

Inclusion criteria

In order to participate, AHPs were required to meet the following criteria:

- currently working in Scotland
- experience of working with DCD children (or children suspected of having DCD)
- be identified (by self or others) as carrying out potentially innovative practice
- be able to read, write and converse in English
- be able to provide informed consent

8.4 Ethics

The ethical procedures followed the same methods and principles as outlined previously. For the AHP interviews, full approval for recruitment was not required from local R&D departments; however, all were informed of the study, the aims and methods.
8.5 **Interview procedure**

Prior to conducting the interview with the professional, the following were undertaken:

- answering any further questions the interviewee may have
- re-checking they had read and understood the consent form
- signing the consent form
- starting the recording equipment

8.6 **Recording, transcription and analysis**

Interviews were digitally recorded using an Olympus DS-2300 digital recorder, stored in DSS file format, and transcribed verbatim. The analytical process for the study followed a number of stages, using tools and techniques common to applied qualitative research (Harden 2005, Ryan and Bernard 2000, Seale 1999, Strauss and Corbin 1998, Crabtree and Miller 1992, Dey 1993, Barry 1998, Murphy et al 1998). Transcripts were read and re-read to familiarise the researcher/s with the content (immersion). The interview accounts were then fragmented, based on a pre-defined framework; the framework categories were: assessment; intervention; engagement of parents/children and ‘plans for the future’. These fragmented data were then grouped by profession and examined in order to identify elements of best and innovative practice. Throughout this process, an open-coding procedure was applied to identify emergent concepts, ie issues or topics which were not covered by the framework categories. Analytic and procedural memos were written to note impressions or ideas that were developing.
### 8.6.1 Sample characteristics

Table 46: Sample characteristics

<table>
<thead>
<tr>
<th>Profession</th>
<th>Full time (FT) or part time (PT)</th>
<th>No. of years working with children</th>
<th>Work site (primary care, secondary care, schools, others)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietician</td>
<td>PT</td>
<td>17</td>
<td>Primary care</td>
</tr>
<tr>
<td>Dietician</td>
<td>FT</td>
<td>4</td>
<td>Primary care, schools</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>FT</td>
<td>8</td>
<td>Primary care</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>FT</td>
<td>8</td>
<td>Primary care, schools, homes</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>FT</td>
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<tr>
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<td>PT</td>
<td>12</td>
<td>Secondary care</td>
</tr>
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<td>7</td>
<td>Secondary care, schools, homes</td>
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<td>3</td>
<td>Primary care</td>
</tr>
<tr>
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<td>5</td>
<td>Primary care, schools, homes</td>
</tr>
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<td>Secondary care</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>FT</td>
<td>9</td>
<td>Secondary care, schools, homes</td>
</tr>
<tr>
<td>Occupational therapist</td>
<td>FT (term time)</td>
<td>11</td>
<td>Primary care (community hospital)</td>
</tr>
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<td>FT</td>
<td>6</td>
<td>Primary care</td>
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<tr>
<td>Orthoptist</td>
<td>PT</td>
<td>6</td>
<td>Secondary care</td>
</tr>
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<td>FT</td>
<td>20</td>
<td>Primary care</td>
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<tr>
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<td>Primary care</td>
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<td>FT</td>
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<td>Educational consultant</td>
<td>FT</td>
<td>14</td>
<td>Primary care and school</td>
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<td>Educational consultant</td>
<td>FT</td>
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</tr>
<tr>
<td>Physiotherapist</td>
<td>FT</td>
<td>4</td>
<td>Secondary care and primary care</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>FT</td>
<td>9</td>
<td>Primary care and schools</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>PT</td>
<td>3</td>
<td>Secondary care, primary care, schools, home</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>FT</td>
<td>18</td>
<td>Secondary care, schools, homes</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>PT</td>
<td>20</td>
<td>Schools</td>
</tr>
<tr>
<td>Podiatrist</td>
<td>FT (split jobs)</td>
<td>32</td>
<td>Secondary care, higher education institution</td>
</tr>
<tr>
<td>Podiatrist</td>
<td>PT</td>
<td>3</td>
<td>Secondary care</td>
</tr>
<tr>
<td>Speech and language therapist</td>
<td>PT</td>
<td>20</td>
<td>Primary care, school</td>
</tr>
</tbody>
</table>
8.6.2 Descriptive statistics of AHP interviewees

Roles:
- 15 had a clinical role (58%)
- 10 had a mixed role – clinical and managerial (38%)
- 1 had a managerial role (but worked clinically prior to this)

Working hours
- 18 participants worked full time (69%) and 8 part time (31%)

Experience with children:
- Range of experience of working with children: 3 – 36 years
- Average duration of working with children: 12 years (SD 8.6)

Working sites:
- Majority worked or were based in primary care: 14 (54%) with 11 being based in secondary care (23%) and one in education.
- Eleven specifically mentioned working within schools (23%) and were based either within primary or secondary care.
8.7 Findings from AHP interviews: best practice and innovative practice

Interviews were carried out in order to identify areas of best practice, and areas of innovative practice. In this section, the key areas of best and innovative practice are outlined with a description of each and exemplars of innovative practice. Five broad areas of best and innovative practice were generated from the interview data, these are now detailed:

- promoting child focused care
- promoting a child’s participation in life
- skills and knowledge relative to peers
- parent/carer involvement
- working together.

8.7.1 Promoting child focused care

Promoting child focused care: best practice

Allied health professionals identified current practices that were considered positive in terms of their impact on active involvement of children in care. These were manifest through:

- understanding the child's life and what is important to them, and
- setting goals with the child before therapy interventions commence.

Promoting child focused care: innovate practice:

- measuring the child’s perceptions or views before and after intervention, as an outcome of therapy; and
- using specialised tools to support a child to share their views.

Regarding innovative practice, the first (exploring a child’s perceptions before and after intervention as outcome of therapy) was implemented through the use of a child reflective tool as a therapy outcome measure. Here, the child’s perception of their abilities was assessed before and after intervention, and their perception of change used to formally judge if therapy was effective for that child. The outcome of this was an intervention focus that was based on the child's view, and an outcome that was personally relevant to that child. Also used innovatively were tools to develop goals with the child. Here, the child was supported to
identify what they wanted to work on in therapy. The outcome of this was increased child commitment to therapy as it had relevance to their life.

8.7.2 Promoting a child’s participation in life

Promoting a child’s participation in life: best practice

Allied health professionals identified current practices that were positive in terms of their promotion of children’s participation in life. These focused on:

- using functional activities as a basis for motor skills interventions

Promoting a child’s participation in life: innovative practice:

- engagement of children with a physical leisure responsibility in their community

Regarding innovative practice, a neighbourhood cycle group illustrated this. Here, therapists working with a cycle coach supported children to gain bike-riding skills, engendering a highly positive experience of success for the children through an activity, which had previously been experienced as a failure. An additional benefit associated with this work was that the group was locally sited within the community. This was an opportunity for children to meet others locally and experience fun and success. Outcomes included (1) children entered the group with no/poor bike skills and all were able to ride bikes following the group; (2) children cited examples of having more opportunities to cycle with friends; (3) feedback from parents supported the view that the children were experiencing success where they had previously failed.

8.7.3 Skills and knowledge relative to peers

Skills and knowledge relative to peers: best practice

In terms of skills and knowledge relative to peers, AHPs identified a number of factors to consider:

- developing specialist knowledge of DCD relative to your area of paediatric practice; and
- therapists being aware of how to refer to specialist services.
Skills and knowledge relative to peers: innovative practice:

- developing specialist knowledge related to DCD and being perceived by peers as more knowledgeable (this is within the context of it being relatively uncommon for some AHP professions to have specialist knowledge of DCD)

Regarding innovative practice, this was demonstrated through: (1) an orthoptic visual stress clinic and (2) a dietetic intervention. The visual stress clinic was a service, which could offer children with DCD a specialist resource service, helping to identify whether some of their movement challenges were related to their vision and to provide specialist intervention, eg eye exercises. Outcomes were primarily related to improvement in reading, writing and school-work. The dietetic intervention focused on increasing parents’ knowledge of the potential role of diet in the remediation of challenges. Outcomes were primarily seen regarding improvement in reading, writing and behaviour.

8.7.4 Parent/carer involvement

Parent/guardian involvement: best practice

Allied health professionals identified current practices that were positive in terms of the involvement of parents: These focused on:

- explicit support of parents
- making parents feel heard and understood
- facilitation of parental and professional collaboration
- providing information (eg on the nature of therapy services likely to be provided) in a timely manner

Parent/guardian involvement: innovative practice:

- facilitation of parent-to-parent support
- parental support built into child group intervention
- explicitly shaping parents’ expectations of their responsibilities within intervention
- formal educational sessions for parents
Regarding innovative practice, this was demonstrated in a number of different ways, and at a number of different sites. In one location therapists had developed a ‘carers’ clinic’. This consisted of a block of group therapy for the child in which, for the first session, the parent viewed the child engaging in activities; the therapist also narrated the reasons for the child’s challenges and how to intervene effectively. Outcomes were perceived to include increased parent and child involvement in goal setting and increased parental participation in carrying out ‘therapeutic-type’ activities and interaction within the home.

Within another department, a parent consultation group was developed. Similar to the carers clinic, at the beginning of a block of group therapy, time was dedicated to the needs of parents. This session was specifically aimed at supporting the parents, giving them the opportunity to meet other parents and to create an informal support network. Outcomes centred on increased parental feelings of support and the development of informal parental support networks.

8.7.5 Working together

Working together: best practice

Allied health professionals identified current practices that were positive in terms of their working with other AHPs, education and a variety of other agencies. These focused on:

- working effectively through collaborating with health, education and the voluntary sector.

Working together: innovative practice

- emphasis, at regional and strategic level that DCD is a priority
- formalised collaboration between multiple agencies
- setting up collaborative opportunities by accessing non-traditional sources of funding
- providing greater variation in AHP options

Regarding innovative practice, this was demonstrated in a number of different ways, and at a number of different sites. In one location, therapists were engaging in collaborative working in a remote and rural setting. Here, a motor skill screening programme was used to identify
Children whose needs were such that they could be met in school based/school managed movement groups, with only those children who had the highest degree of need being seen by a therapist.

In another location, a multi-professional AHP team provided support for education to facilitate children’s access to the curriculum in classrooms. Elsewhere, a service for DCD children within 13 schools had been developed, where a joint occupational therapy/physiotherapy assessment was carried out, with learning assistants implementing therapy in a school location.

Finally, a regional collaborative movement program between an OT and PE specialist had been established, where they designed a motor skills programme in schools delivered by trained education staff. Outcomes for these initiatives centred on: (1) greater integration of approach between health and education; (2) increased frequency of intervention for children, (3) faster results; (4) greater child motivation; (5) sustainability of input; (6) facilitation of support staff skills; (6) effective use of therapist time.

See Table 47 and Table 48 for an overview of best practice and innovative practice (and innovative practice exemplars).
<table>
<thead>
<tr>
<th>Area</th>
<th>Best practice</th>
<th>Innovative practice</th>
<th>Innovative practice exemplars</th>
</tr>
</thead>
</table>
| **Promoting child focused care** | Understand child’s life and what is important to them | Explore the child’s perceptions before and after intervention, as an outcome of therapy | **Use of child reflective tool as therapy outcome measure**  
Measure child’s perception of their abilities before and after intervention and use the child’s perception of change to judge if therapy was effective for child.  
Outcome: focus and outcome of intervention is based on child's view |
| | Setting goals with the child before therapy starts | Use specialised tools to support child to share their views | **Use of tools to develop goals with child**  
Support child to identify what they want to work on in therapy  
Outcome: child committed to therapy as it has relevance to their life |
| **Promoting a child’s participation in life** | Using functional activities as a basis for motor skills interventions | Facilitate engagement of children with a physical leisure responsibility in their community that has potential to: (1) improve child’s sense of their competence within physical activities in which they aspire to achieve; (2) encourage life long interest in exercise; (3) encourage greater engagement with peers in their community | **Neighbourhood cycle group**  
Therapist working with a cycle coach to support children gain experiences of success in moving their body within valued biking activity alongside peers in their community.  
Outcomes: (1) entered group with no/poor bike skills and all children were able to ride bikes following group; (2) child cited examples of having more opportunities to cycle with friends; (3) emotional feedback from parents about children succeeding where they had previously failed. |
| **Skills and knowledge relative to peers** | Knowledge of DCD relative to your area of paediatric practice  
Therapists being aware of how to refer to specialist services | Developing specialist knowledge related to DCD and be perceived by peers as more knowledgeable  
Uncommon for some AHP professions to have specialist knowledge of DCD. | **Visual stress clinic**  
Clinic to screen DCD children to understand if their movement challenges are related to their vision and provide specialist intervention, eg eye exercises  
Outcome: children have improvement in reading, writing and school work.  
**Dietetic intervention**  
Increasing parents' knowledge of potential role of diet in remediation of challenges  
Outcome: Children have seen improvement in reading, writing and behaviour |
<table>
<thead>
<tr>
<th>Area</th>
<th>Best practice</th>
<th>Innovative practice</th>
<th>Innovative practice exemplars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent/carer involvement</td>
<td>Making parents feel heard and understood</td>
<td>Facilitation of parent to parent support</td>
<td>Carers clinics</td>
</tr>
<tr>
<td></td>
<td>Service is flexible, accessible and responsive to parents</td>
<td>Parental support built into child group intervention</td>
<td>(1) Block of group therapy for child and in first session parent views child engaging in activities and therapist narrates reasons for challenges and how to intervene effectively; (2) goals set collaboratively with parents/children and ‘Care Agreement’ is signed.</td>
</tr>
<tr>
<td></td>
<td>Facilitation of parental and professional collaboration</td>
<td>Explicitly shaping parents’ expectations of their responsibilities within intervention</td>
<td>Outcomes: (1) Increased parent and child involvement in goal setting; (2) increased parental participation in ‘carry over’ at home.</td>
</tr>
<tr>
<td></td>
<td>Explicit support of parents</td>
<td>Formal educational sessions for parents</td>
<td>Parent consultation groups</td>
</tr>
<tr>
<td></td>
<td>Provide information in a timely manner</td>
<td></td>
<td>Block of group therapy for child with first session specific to the parents support needs in order for the parents to have the opportunity to create informal support network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outcomes: Development of informal parental support network.</td>
</tr>
<tr>
<td>Working together</td>
<td>Working in effective collaboration with health, education and voluntary sectors</td>
<td>Emphasis at regional and strategic level that DCD is priority</td>
<td>Remote collaborative working</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Formalised collaboration between multiple agencies</td>
<td>Motor skill screening leading to identification of entry into school run movement groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Setting up collaborative opportunities by accessing non traditional sources of funding</td>
<td>Therapy inclusion project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Providing greater variation in AHP options</td>
<td>Multi professional support for education to facilitate children’s access curriculum in classrooms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Joint working project</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Service for DCD children within 13 schools – joint OT/physiotherapy assessment and learning assistants to carry out programmes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PE movement programme</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Regional collaborative movement programme between OT and PE specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Outcomes: (1) greater integration of approach between health and education; (2) increased frequency of intervention is perceived to get faster results – sustains motivation; (3) sustainability of programs; (4) facilitation of support staff skills/effective use of therapists’ time</td>
</tr>
</tbody>
</table>

Table 48: AHP interview findings (continued)
8.8 Conclusions

A number of innovative practices were identified through analysis of AHP interviews.

- **Promoting child focused care**
  - measuring a child’s perceptions before and after intervention as an outcome of therapy
  - using specialised tools to support the child to share their view

- **Promoting a child’s participation in life**
  - engagement of children with a physical leisure responsibility in their community

- **Skills and knowledge relative to peers**
  - developing specialist knowledge related to DCD and be perceived by peers as more knowledgeable; (considering it is relatively uncommon for some AHP professions to have specialist knowledge of DCD)

- **Parent/carer involvement**
  - facilitation of parent-to-parent support
  - parental support built into child group intervention
  - explicitly shaping parents’ expectations of their responsibilities within intervention
  - formal educational sessions for parents

- **Working together**
  - emphasis at regional and strategic level that DCD is a priority
  - formalised collaboration between multiple agencies
  - setting up collaborative opportunities by accessing non-traditional sources of funding
  - providing more variation in AHP options

The variety of innovative practices identified indicates a great deal of positive work is already being carried out in Scotland, and that this should be built upon to develop best possible care for the children and their families.
9 A National Survey of AHPs in Scotland

9.1 Mapping project aims and objectives with survey content

Variables chosen for a study depend on the aim and research question (Forsyth and Kviz 2006). Key variables identified were specifically linked with project aims and gathered information regarding the experiences of AHPs. The tables below show the overall project aim and the related objectives/methods.

9.2 Overall project aim:

To review the evidence and models of practice employed by allied health professionals in Scotland with respect to developmental co-ordination disorder (DCD).

Table 49: Tabulation of NHS QIS role, project objective and project method

<table>
<thead>
<tr>
<th>NHS QIS role</th>
<th>Project objective</th>
<th>Project method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning from the experiences of healthcare professionals</td>
<td>Identify (i) <strong>current models of service delivery</strong> by AHPs including areas of (iii) <strong>innovation, emerging practice</strong> and where possible information on (ii) <strong>impact and outcome</strong>.</td>
<td>National survey of AHPs</td>
</tr>
</tbody>
</table>

Table 50: Structure for connecting project objectives and the content of the survey

<table>
<thead>
<tr>
<th>Key components from project objectives to be addressed</th>
<th>(i) Current service delivery</th>
<th>(ii) Perceptions of impact and outcome</th>
<th>(iii) Innovative or emerging practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content of survey</td>
<td>Broad service delivery content within the survey</td>
<td>Specific service delivery content within stem questions</td>
<td>Response choices</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Frequency</td>
</tr>
</tbody>
</table>

A detailed map was then constructed to create the survey content.
### Table 51: Detailed mapping of project objective no. 3.2 with content of survey

<table>
<thead>
<tr>
<th>Content of survey</th>
<th>Key components from project objective no. 3.2 to be addressed</th>
<th>(i) Current service delivery</th>
<th>(ii) Perceptions of impact and outcome</th>
<th>(iii) Innovative or emerging practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad service delivery content within the survey⁹</td>
<td>Specific service delivery content within stem questions¹</td>
<td>Response choices: Frequency</td>
<td>Response choices: Effectiveness</td>
<td>Less frequent effective practice</td>
</tr>
<tr>
<td>Referral</td>
<td>• Acceptance of referrals</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Triage and screening</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Pre-assessment</td>
<td>• Information sent</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Information gathered</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Gaining consent</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td>• Tools¹¹</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Skill mix</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Duration</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Location</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Parental involvement</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td>• Involvement in diagnosis</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Protocols</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Skill mix</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Goal setting</td>
<td>• Frequency</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Tools</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Parental involvement</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Interventions</td>
<td>• Individual/Group</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Skill mix</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Duration</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Location</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Specific interventions¹</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Equipment provision</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Parental involvement</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Referrals to other professionals</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Outcomes of intervention</td>
<td>• Method of evaluation</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Parental involvement</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Discharge</td>
<td>• Discharge and review</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Parental involvement</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Innovative practice</td>
<td>Open ended question to invite respondents to identify what they consider to be innovative practice that is effective².</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

⁹ Content informed by systematic literature review and expert clinical opinion

¹⁰ Information will be used to identify practice that will be the focus of the interviews and focus groups

¹¹ Mixed using the International Classification of Functioning, Disability and Health (WHO, 2001)
9.3 Formulating questions

A modular pilot survey was developed, with a core set of questions identified common to all AHPs (see appendix 4). Clinical experts, identified through professional QIS Clinical Effectiveness and Practice Development Network, collaborated with the research team tailoring survey content to profession specific needs related to service provision for children with DCD. Questions were structured to emulate a typical clinical pathway followed by AHPs adopting a ‘funnel’ principle initiating a section with a general question to introduce a topic, followed by questions that became increasingly specific (Hoyle et al 2002).

9.4 Formatting the survey

Specific service delivery content within stem questions was identified to allow data gathering on profession specific clinical areas. Closed questions were used to provide specific response options allowing uniformity in response choice and, therefore, providing uniformity for analysis (Forsyth and Kviz 2006). Filter questions were employed to gain an understating of a respondent’s knowledge and experience. Questions were then structured to gain an insight regarding (i) respondents’ clinical experience in relation to frequency of current service delivery and, (ii) views regarding the effectiveness of current service, to gain an impression of impact and outcome.

‘Innovative practice’ and ‘emerging practice’ were defined for the purposes of data collection and statistical analysis as: ‘less frequent effective practice’. In addition, open-ended questions to invite respondents to identify what they considered innovative practice were included. Having an uncluttered appearance to survey formatting is essential for clarity and understanding for those responding (Salant and Dillman 1994). Detailed instructions were provided for AHPs to provide clarity around:

- study aims;
- information regarding the funding source of the study; and
- information on how to complete the survey.

In addition to this information, clarification of DCD terminology and a clinical description of how this cohort of children may present to a variety of AHP services was included.
Figure 2: Example of a frequency and effectiveness question

9. The following questions concern formats for consent.

<table>
<thead>
<tr>
<th>9(i) In what format would you gain consent?</th>
<th>9(ii) How effective do you feel the following formats are in gaining consent?</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of the time</td>
<td>Most of the time</td>
</tr>
<tr>
<td>a. Verbal from child........................1</td>
<td>2</td>
</tr>
<tr>
<td>b. Verbal from parent.........................1</td>
<td>2</td>
</tr>
<tr>
<td>c. Written from child............................1</td>
<td>2</td>
</tr>
<tr>
<td>d. Written from parent...........................1</td>
<td>2</td>
</tr>
<tr>
<td>z. Other (please specify)......................1</td>
<td>2</td>
</tr>
</tbody>
</table>
Both nominal and ordinal scales were used to structure response choices. Nominal scales allow a respondent to choose one of two finite categories (see below).

**Figure 3: Example of nominal scale**

35. Do you prescribe individual interventions that are implemented by other people?
   
   Yes .................................................................1
   No .................................................................2

Ordinal scales allow a respondent to select one of a number of finite categories (see below).

**Figure 4: Example of ordinal scale**

39(i). On average how frequently would you see a child for group intervention?
   
   Daily ...................................................................................................................1
   Weekly .............................................................................................................2
   Monthly ..........................................................................................................3
   Other *(Please specify)* ............................................................................4

Double-barrelled questions were structured to gather frequency and effectiveness data from AHPs. Response choices were balanced with an equal number of similar points on a four-point scale (see below)
The following questions concern the location of group interventions.

43(i) **Where would group intervention most frequently be carried out?**

<table>
<thead>
<tr>
<th></th>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Hospital based location</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Child development centre</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Local community/health centre</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d. School</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e. Child’s own home</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>z. Other <em>(please specify)</em></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

43(ii) **How effective are these sites for carrying out your interventions?**

<table>
<thead>
<tr>
<th></th>
<th>Very effective</th>
<th>Mostly effective</th>
<th>Somewhat effective</th>
<th>Never effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Hospital based location</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>b. Child development centre</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>c. Local community/health centre</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>d. School</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>e. Child’s own home</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>z. Other <em>(please specify)</em></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
9.5 Piloting the survey

Piloting the survey to those AHPs involved was essential to gain feedback from professional groups in relation to structure and content. Forsyth and Kviz (2006), suggest that field pre-testing can provide ‘critical information on the practical aspects of administration’. In this case, piloting allowed the research team to review survey structure based on pilot feedback.

9.6 Sampling

Sampling frames for all AHPs participating were identified through contact with clinical networks. In addition, key lead professionals were identified to assist in collating national mailing lists. Often sampling is employed as a method for targeting specific samples and relating findings to the general population (Forsyth and Kviz 2006); however, in conjunction with NHS QIS, it was considered appropriate to survey all AHPs to gain a national representation of service delivery for children with DCD. This research was initiated by the community of AHPs and it was important to afford an opportunity to the entire community to have their voice heard in the process.

Table 52: AHP groups surveyed and population numbers

<table>
<thead>
<tr>
<th>Professions surveyed</th>
<th>Population numbers (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational therapists</td>
<td>207</td>
</tr>
<tr>
<td>Orthoptists</td>
<td>89</td>
</tr>
<tr>
<td>Orthotists</td>
<td>47</td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>227</td>
</tr>
<tr>
<td>Podiatrists</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>602</strong></td>
</tr>
</tbody>
</table>

9.7 Response rate

Well-presented questionnaires and multiple mailings are considered essential when attempting to ensure a high response rates with mailed surveys. Dillman (2000) recommends three mailings, one month apart. This methodology was adopted with the first mailing, with a cover letter, survey and addressed envelope sent to the entire population. A second mailing, four weeks later, was sent to non-respondents in order to maximise the response rate. A third
and final mailing was sent to remaining non-respondents. Response rates vary widely across various survey data collection modes; however, survey experts often regard the 60 to 70 percent range as a realistic average (Forsyth and Kviz 2006).

9.8 Data analysis

The data was exported into SPSS version 13 for analysis, labelled, checked and cleaned for each of the profession datasets, occupational therapist, physiotherapist, orthoptist, podiatrist and orthotist.

Filtering each of the datasets for those that had responded ‘yes’ to question 1, (ie Do you have children diagnosed with developmental co-ordination disorder (DCD), and/or undiagnosed children for whom DCD may be an appropriate diagnosis, on your caseload?). Descriptive statistics were produced for each question for each of the professions.

The individual professions data was combined into one dataset of common questions across the different professions and overall descriptive statistics produced for this new dataset as well as cross tabulations to look at those common questions by each profession.

9.9 Findings

The overall response rate was 65% following three mailings. The highest response rates were from physiotherapists and OTs and then orthoptists.

NB: see appendix 5 for full survey findings in tabular format.
### Table 53: AHP survey - repeated mailings

<table>
<thead>
<tr>
<th>Number of Mailings</th>
<th>OT n=207</th>
<th>Physiotherapy n=227</th>
<th>Orthoptics n=89</th>
<th>Orthotics n=47</th>
<th>Podiatry n=32</th>
<th>Total n=602</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>35%</td>
<td>52%</td>
<td>34%</td>
<td>34%</td>
<td>12%</td>
<td>40%</td>
</tr>
<tr>
<td>n=72/207</td>
<td>n=119/227</td>
<td>n=30/89</td>
<td>n=16/47</td>
<td>n=4/32</td>
<td>n=241/602</td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td>21%</td>
<td>7%</td>
<td>15%</td>
<td>17%</td>
<td>44%</td>
<td>16%</td>
</tr>
<tr>
<td>n=43/207</td>
<td>n=16/227</td>
<td>n=13/89</td>
<td>n=8/47</td>
<td>n=14/32</td>
<td>n=94/602</td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>11%</td>
<td>9%</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
<td>9%</td>
</tr>
<tr>
<td>n=23/207</td>
<td>n=20/227</td>
<td>n=13/89</td>
<td>n=0/47</td>
<td>n=0/32</td>
<td>n=56/602</td>
<td></td>
</tr>
<tr>
<td>% return</td>
<td>67%</td>
<td>68%</td>
<td>64%</td>
<td>51%</td>
<td>56%</td>
<td>65%</td>
</tr>
<tr>
<td>n=138/207</td>
<td>n=155/227</td>
<td>n=56/89</td>
<td>n=24/47</td>
<td>n=18/32</td>
<td>n=391/602</td>
<td></td>
</tr>
</tbody>
</table>

#### 9.9.1 Demographics

Over half of all AHPs who responded stated they saw children with DCD (53.5%, 209/391). All AHPs were involved with DCD children to varying degrees. Seventy three percent (101/138) of OTs see children with DCD, 61.1% (11/18) of podiatrists, 59.0% (33/56) orthoptists, 58.3% (14/24) of orthotists, and 32.3% (50/155) of physiotherapists.

#### Health board

The health board areas which identified 50% or more AHPs involved with DCD were NHS Ayrshire & Arran (56%, 14/25), NHS Borders (62.5%, 5/8), NHS Dumfries & Galloway (71.4%, 5/7), NHS Lanarkshire (80.6%, 25/31), NHS Lothian (50.8%, 32/63), NHS Highlands (55.6%, 10/18) and 100% in NHS Orkney (2/2), NHS Shetland (3/3), NHS Western Isles (3/3). Notably, Orkney, Shetland and Western Isles all had OT and physiotherapy involvement; however, no other AHPs were identified as involved in DCD children.

#### Profession
In regards to the number of AHPs who were surveyed and reported seeing children with DCD, the OT profession comprised the largest number (ie 48.3%, 101/209). This was followed by the physiotherapy (23.9%, 50/209), orthoptic (15.8%, 33/209), orthotic (6.7%, 14/209), and podiatric (5.3%, 11/209) professions.

**Years of experience**

The majority of AHPs surveyed reported they had worked as a paediatric therapist for over ten years (35.4%, 74/209). This was consistent across AHP groups except occupational therapy where the majority of therapists had worked as a paediatric OT for 1-4 years (35.6% (36/101).

**Employment status**

In regards to employment status, over half of all AHPs surveyed were full time employed (54.5%, 114/209). Forty percent (85/209) of therapists surveyed were employed part time, while only 1.3% (3/209) reported being employed on a term-time contract. This was consistent across AHP grouping except physiotherapy, where there was a split between part time 48% (24/50) and full time 50% (25/50).

**Qualification**

The highest grade or level of education most commonly reached by all AHP was a BSc (58.9%, 123/209), followed by a diploma (29.2%, 61/209). This was consistent across AHP groupings except OT where there was a split between 46% (23/50) BSc and 38% (19/50) diploma.

9.9.2 **Referrals**

**Acceptance of referrals**

Less AHPs accept referrals from parents (21.5%, 45/209) and education (38.8%, 81/209) compared to higher percentages with community paediatricians (96.7%, 202/209), GP’s (87.6%, 183/209), school doctors (82.8%, 173/209) and OTs (80.4%, 168/209). In addition, there was variability across AHP groups in terms of the referrals that they accepted from different sources, for example 72.7% (8/11) of podiatrists accept referrals from parents,
whereas only 12.9%, (13/101) of occupational therapists accept referrals from parents. Referrals are accepted from education by OT (40.6%, 41/101) and physiotherapy (58%, 29/50) with orthotics (7.1%, 1/14) and podiatry (9.1%, 1/11) infrequently accepting education referrals.

**Receipt of referrals**

The majority of AHP referrals are received from community paediatricians (23.9%, 50/209), GPs (12.0%, 25/209) and school doctors (16.3%, 34/209). AHPs found the appropriateness of referrals from community paediatricians (55.5%, 116/209), GPs (52.9%, 110/209), and school doctors (46.9%, 98/209) mostly appropriate. All AHPs found referrals from OTs (41.6%, 87/209), physiotherapists (34.0%, 71/209) and community paediatricians (27.3%, 27/209) very appropriate. AHPs, however, only received referrals from OTs (61.2%, 128/209) and physiotherapists (50.7%, 106/209) some of the time. Sixty seven percent (139/209) of AHPs identified that they did not receive referrals from parents. This was consistent across AHPs except for 73% (8/11) of podiatrists, who received parental referrals either, ‘most of the time’ or ‘some of the time’.

**Triage/screening referrals**

Most AHP professionals do not screen or triage their referrals (63.2%, 132/209). However, 25.8% (54/209) think this is a very effective or mostly effective way of managing their service. Podiatrists screen most commonly (54.5%, 6/11), followed by OTs (46.5%, 47/101), orthoptists (21.2%, 7/33), physiotherapists (20%, 10/50), and orthotists (14.3%, 2/14). Few AHPs triage/screen with other professionals. Orthoptists report joint triaging with ophthalmologists (21%, 4/33) some of the time and this was identified as very or mostly effective practice; however it was stated as most frequently occurring some or none of the time. Ten percent of OTs report joint triaging with other OTs routinely. OT and orthoptists identified joint triage with community paediatricians; physiotherapists identified joint triage with OT; orthotists identified joint triage with physiotherapists and podiatrists. All of these were viewed as effective joint practice but rarely happen.
9.9.3 Pre-assessment

Data gathering

Occupational therapists most commonly gather written information from parents (44.6%, 45/101), and 40.6% (40/101) consider this to be very effective. Information is also routinely gathered from schools (in both written (37.6%, 38/101), and verbal (14.9%, 15/101) formats). Seventy percent of OTs do not use the DCD questionnaire. Physiotherapists and orthoptists, more frequently gather information verbally from parents (physiotherapists 36%, 18/50 and orthoptists 30.3%, 10/33) all of the time and, from school some of the time (physiotherapists 36%, 18/50 and orthoptists 21.1%, 7/33).

Pre-assessment consent

With regard to consent, 73.7% (154/209) of all AHPs gain consent prior to seeing a child. This varied from 86.0% (43/50) of physiotherapists, who gained consent, in contrast to 45.5% (5/11) of podiatrists. The most commonly used method was routine verbal consent from parents (50.7%, 106/209), and the least commonly used method was written consent from the child 1.4%, (3/209). Twenty five percent of AHPs employed written consent from parents and this was viewed by 30% as very effective; however, 11.5% of AHPs who viewed it as an effective method only employed this method some of the time or none of the time. Verbal consent from a child was identified by 28.7% (60/209) as a method employed all of the time, and was viewed as very effective. However 5.7% (12/209) believed gaining verbal consent from children would be very effective but secured this either none of the time or only some of the time.

9.9.4 Assessment: skill mix and duration

Assessment duration

When it comes to the amount of time spent during assessment, OTs spend the most amount of time with 73.3% (74/101) spending one to two hours. Fifty eight percent (29/50) of physiotherapists and 84.8% (28/33) of orthoptists spend one hour or less. Orthotists (64.3%, 9/14) and podiatrists (45.5%, 5/11) spend the least amount of time on assessment with a typical assessment lasting 30 minutes. All of these assessment times are viewed as mostly effective.
Assessment skill mix

Senior staff are most likely to carry out assessments (all of the time) in OT 70.3% (71/101), in physiotherapy 38% (19/50) and orthoptics 60.6% (20/33) of the time. Technical instructors are involved in the assessment process some of the time in OT (26.7%, 27/101) and physiotherapy (28%, 14/50) professions.

9.9.5 Assessment: joint assessment

While almost half of all AHPs (47.4%, 99/209) use joint assessment with OTs some of the time and 34.9% (73/209) use it none of the time, 53.1% (111/209) find this practice very or mostly effective. Moreover, 44% (92/209) stated that joint assessments with OTs are very effective, but collaborated infrequently. Twenty three percent (47/209) carry out joint assessment with community paediatricians some of the time and 18.2% (38/209) identified this as effective practice; however they only collaborated some of the time or none of the time. Joint assessment between OT and SLT (40.6%, 41/101); OT and physiotherapy (46.5%, 47/101); physiotherapy and orthotics (42.9%, 6/14); podiatry and physiotherapy (54.6%, 6/11); orthoptics and ophthalmology (21.2%, 7/33) were all viewed as very or mostly effective; however, only carried out some of the time or none of the time.

Occupational therapy: Occupational therapists carry out joint assessments some of the time with physiotherapists (47.5%, 48/101), SLTs (46.6%, 43/101) and education (22.8%, 23/101). These collaborations are viewed as very or mostly effective. Notably only 4% (4/101) of OTs viewed joint education assessment very effective with 15.8% (16/101) of OTs viewing this as mostly effective. Forty seven (47/101) percent viewed joint assessments with physiotherapists and 40% (41/101) viewed joint assessments with SLTs as very or mostly effective; however, only employed this some of the time or none of the time.

Physiotherapy: Physiotherapists carry out joint assessment with OTs (68%, 34/50), education (34%, 17/50) and community paediatricians (32%, 16/50) some of the time. Joint assessment with OT is viewed as very effective by 34% (17/50) and mostly effective with education (20%, 10/50) and community paediatricians (20%, 10/50). It is interesting to note they identified joint assessment with OTs (62%, 31/50), education (26%, 13/50) and community paediatricians (22%, 11/50) as a practice that is very or mostly effective; however they only employed this some of the time or none of the time.
Orthoptists: Orthoptists most commonly carry out joint assessments some of the time with ophthalmologists (33.3%, 11/33), and found this either very effective (15.2%, 5/33) or mostly effective (15.2%, 5/33). Joint assessment with community paediatricians (12.1%, 4/33), OTs (6.1%, 2/33), ophthalmologists (21.2%, 7/33) and learning support teachers (6.1%, 2/33) was viewed as very or mostly effective; however they only employed this some of the time or none of the time.

Orthotists: Orthotists most commonly carry out joint assessments some of the time with physiotherapists (57.1%, 8/14), and identified this practice as highly effective. Joint assessment with community paediatricians (28.6%, 4/14), OTs (21.4%, 3/14), physiotherapists (42.9%, 6/14) and podiatrists (21.4%, 3/14) was viewed as very or mostly effective; however only employed some of the time or none of the time.

Podiatry: Podiatrists most frequently carry out joint assessment some of the time with physiotherapists (45.5%, 5/11), and identified this practice as highly effective. Joint assessments with community paediatricians (18.2%, 2/11), OTs (18.2%, 2/11) and physiotherapists (54.5%, 6/11) were viewed as very or mostly effective; however, only employed some of the time or none of the time.

9.9.6 Assessment: tools

Overall, most professions (excluding OT/orthoptics) use non-standardised assessments or assessment tools.

Occupational therapy: The majority of assessments used most frequently by OTs are standardised. The five most frequently used tools by OTs are the test of visual motor integration used 65.3% (66/101) all of the time with 27.7% (28/101) using it most of the time; movement ABC is used all of the time by 61.4% (62/101) with 33.7% (34/101) most of the time; clinical observations are used 46.5% (47/101) all of the time with 29.7% (30/101) most of the time; motor free test of visual perceptual skills is used all of the time (16.8%, 17/101) with 34.7% (35/101) using it most of the time and the test of visual perceptual skills 20.8% (21/101) most/some of the time, 47.5% (48/101) all of the time. These were all viewed as very or mostly effective.
**Physiotherapy:** The five most frequently used assessments by physiotherapists are posture 92.0% (46/50), used all of the time, gait pattern used 92.0% (46/50) all of the time, core stability used 90.0% (45/50) all of the time, muscle tone used 90.0% (45/50) all of the time, and range of movement used 90.0% (45/50) all of the time. These were all viewed as very or mostly effective.

**Orthoptists:** The five most frequently used tools by orthoptists are clinical observation used 81.8% (27/33) all of the time; Wilkins rate of reading test used 75.8% (25/33) all of the time; intuitive overlays used 60.7% (23/33) all of the time; developmental eye movement test used 51.5% (17/33) all of the time; and visual field tests used 69.7% (23/33) some of the time. These were all viewed as very or mostly effective.

**Orthotists:** The five most frequently used tools by orthotists are gait pattern used 92.9% (13/14) all of the time; joint range of movement (ROM) used 71.4% (10/14) all of the time; muscle tone used 64.3% (9/14) all of the time; balance used 57.1% (8/14) all of the time; and muscle power used 57.1% (8/14) all of the time. These were all viewed as very or mostly effective.

**Podiatrist:** The five most frequently used tools by podiatrists are foot examination used 100% (11/11) of the time; joint ROM used 90.9% (10/11) all of the time; posture–general used 90.9% (10/11) all of the time; gait pattern used 90.9%, (10/11) all of the time; and biomechanical assessment used 90.9% (10/11) all of the time. These were all viewed as very or mostly effective.

**9.9.7 Assessment: location**

For all AHPs, assessments are most frequently carried out in a hospital based location all (23.9%, 50/209) or most (31.6%, 66/209) of the time. This is followed by schools most (15.3%, 32/209) and some (51.2%, 107/209) of the time. Child development centres (50.2%, 105/209) and local community/health centres (45.0%, 96/209) are not used by half of AHPs. The child’s own home is only used as an assessment location some of the time for 37.8% (79/209) of AHPs and is viewed as somewhat effective. Assessments in schools are identified as very or mostly effective practice by thirty percent (63/209) of AHPs, however these AHPs only use this assessment location some of the time or none of the time. Assessment in schools is a consistent aspiration across AHP groups.
**Occupational therapists:** OTs use hospital based locations most frequently (19.8%, 20/101 all of the time; 25.7%, 26/101 some of the time) when carrying out assessments, however OTs also report using school based locations on a less frequent basis (24.8%, 25/101 most of the time; 57.4%, 58/101 some of the time). Assessments in schools are rated as a practice that is very or mostly effective, however, 30% (30/101) only use this assessment location some of the time or none of the time.

**Physiotherapists:** Physiotherapists use hospital based locations most frequently (38.0%, 19/50 most of the time or all 8.0%, 4/50 of the time) when carrying out assessments. Physiotherapists identify sometimes using school based locations (64.0% 32/50 some of the time) and the child’s own home (62%, 31/50 some of the time). Assessments in schools are identified as very or mostly effective practice by 36% (18/50) of physiotherapists, however these physiotherapists only use this assessment location some of the time or none of the time.

**Orthoptists:** Orthoptists use hospital based locations most frequently, using them 54.5% (18/33) all of the time, and 30.3%, (10/33) most of the time. They assess within local community/health centres (21.2%, 7/33) and schools (18.2%, 6/33) some of the time. Assessments in schools are identified as very or mostly effective practice by 15% (5/33) of orthoptists, however these orthoptists only use this assessment location some of the time or none of the time.

**Orthotists:** Orthotists also use hospital based locations most frequently (71.4%, 10/14 most of the time) but also use other locations such as schools (64.3%, 9/14) and child development centres (35.7%, 5/14) some of the time. Assessments in schools are identified as very or mostly effective practice by 64% (9/14) of orthotists, however, these orthotists only use this assessment location some of the time or none of the time.

**Podiatry:** Podiatrists most frequently use hospital based locations (54.4%, 6/11) and local community health centres (45.5%, 5/11) all of the time and these locations are viewed as very effective (hospital based locations 36.4%, 4/11, and local community health centres 27.3%, 3/11).
9.9.8 Assessment: feedback mechanisms

AHP professionals all of the time provided feedback to parents (90%, 188/209), followed by children (53.6% 112/209), education (41.1% 86/209) and feedback to other AHPs (24.4%, 51/209). Arranging another session to feedback without child present (36.8%, 77/209), arranging a phone call with parents (33.5%, 70/209) and feedback to other AHPs (34%, 71/209) were all identified as very or mostly effective practice; however, these AHPs only employed these methods some of the time or none of the time. Occupational therapists feedback more frequently to education (58.4%, 59/101, all of the time and 33.7%, 34/101, most of the time) compared with the other professions. Physiotherapists (26%, 13/50) and orthoptists (30.3%, 10/33) identified feedback to education as very or mostly effective; however they engaged with this some of the time or none of the time.

**Occupational therapists:** OTs feedback to parents (89.1%, 90/101) and education (58.4%, 59/101) all of the time. They arrange another session without child present (59.4%, 60/101) or arrange a phone call with parents (53.4%, 54/101) some of the time. However, 52.5% (53/101) identified arranging another session to feedback without child present and 38.6% (39/101) also identified arranging a phone call with parents as very or mostly effective; however, these OTs employed these methods only some of the time or none of the time.

**Physiotherapists:** Physiotherapists most commonly feedback to parents (88.0%, 44/50), and children (70.0%, 35/50) all of the time. Physiotherapists arrange phone calls with parents some of the time (52.0%, 26/50), and feedback to education all (36.0%, 18/50) and some (34.0%, 17/50) of the time. Physiotherapists identified feedback to parents (52.0%, 26/50), children (48.0%, 24/50), education (46.0%, 23/50) and other AHPs (50.0%, 25/50) as mostly effective. However, 28.0% (14/50) identified arranging another session without child present, and arranging a phone call with parents (30%, 15/50) as very or mostly effective practices that are carried out some of the time or none of the time. 24.0% (12/50) identified feedback to education as very effective and carried this out all, most or some of the time, while 26% (13/50) think this practice is very or mostly effective but carried it out some or none of the time. 38.0% (19/50) identified feedback to other AHPs as very effective practice employed all, most or some of the time, while 32.0% (16/50) rate this practice as very or mostly effective but carried it out only some of the time or none of the time.
Orthoptists: Orthoptists feedback to parents (93.9%, 31/33), and children (78.8%, 26/33) all of the time, and feedback to education (48.5%, 16/33) and other AHPs (57.6%, 19/33) some of the time. Orthoptists identified feedback to parents as very (51.5%, 17/33) and mostly (42.4%, 14/33) effective, and feedback to children as very (42.4%, 14/33) and mostly (45.5%, 15/33) effective. 48.5% (16/33) identified feedback to other AHPs as practice that is very or mostly effective but carried this out only some of the time or none of the time. They also rated feedback to education (30.3%, 10/33), and arranging a phone call with parents (24.2%, 8/33) as practice that is very or mostly effective but carried out some of the time or none of the time.

Orthotists: Orthotists feedback to parents all of the time (85.7%, 12/14), and feedback to children all (50.0%, 7/14) and most (50.0%, 7/14) of the time. They arrange phone calls with parents (50.0%, 7/14) and feedback to other AHPs most (35.7%, 5/14) and some (50.0%, 7/14) of the time. 50% (7/14) rate arranging a phone call with parents as practice that is very or mostly effective but carried this out some of the time or none of the time.

Podiatrists: Podiatrists feedback to parents all of the time (100%, 11/11) and find this practice very (36.4%, 4/11) and mostly (54.5%, 6/11) effective. They feedback to children all (54.5%, 6/11) and most (36.4%, 4/11) of the time, and find it mostly effective (36.4%, 4/11). They do not arrange another session to feedback without child present 81.8% (9/11) of the time, or arrange a phone call with parents 62.6% (7/11) of the time and do not feedback to education 45.5% (5/11) of the time.

9.9.9 Assessment: parents present during assessment

Parents are normally present during AHP assessments [all (56% 117/209) and most (31.1% 65/209) of the time].

Occupational therapists: Parents are present during OT assessments most commonly all (38.6% (39/101) and most (40.6%,41/101) of the time.

Physiotherapists: Parents are present during physiotherapy assessments all (62.0%, 29/33) and most (30.0%, 15/50) of the time.
**Orthoptists:** Parents are present during orthoptist assessments 87.9% (29/33) of the time, all of the time.

**Orthotists:** Parents are present during orthotist assessments all (57.1%, 8/14) and most (42.9%, 6/14) of the time.

**Podiatry:** Parents are present during podiatry assessments all (90.9%, 10/11) and most (9.1%, 1/11) of the time.

### 9.9.10 Diagnostic process: AHP involvement

The professions most involved in the diagnostic process are OTs (19.8 %, 20/101 all of the time, and 40.6%, 41/101 most of the time), physiotherapists (14%, 7/50 all of the time, and 24.0%, 12/50 most of the time) and orthoptists (12.1%, 4/33 all of the time 27.3%, 9/33 most of the time). A greater percentage of OTs, physiotherapists and orthoptists felt it was important to be involved than were actually involved. For example, while only 19.8% (20/101) of OTs stated they were involved in providing information all of the time, 47.5% (48/101) rated it as important to do so all of the time.

### 9.9.11 Diagnostic process: protocol

Only a low number of departments have recognised protocols for diagnosis of DCD, (OT 19.8%, 20/101, physiotherapy 6%, 3/50, orthoptics 18.2%, 6/33) and only a low number of OT departments gather information on IQ (22.8%, 2/101) with physiotherapy and orthoptic departments rarely gathering this information (physiotherapists 2%, 1/50, orthoptists 6.1%, 2/33).

### 9.9.12 Diagnostic process: skills process

OTs, physiotherapists and orthoptists felt the professions for whom it was most important to be involved in the diagnostic process were community paediatricians, school doctors and occupational therapists.
**Occupational therapy:** The professionals OTs identify as being most frequently involved in the diagnostic process are community paediatricians (79.2%, 80/101, all or most of the time), school doctors (55.3%, 56/101, all or most of the time) and occupational therapists (55.5%, 56/101, all or most of the time). Community paediatricians was identified as very important (67.3%, 68/101), as were school doctors (47.5%, 48/101). OTs also identified involving education as very (15.8%, 16/50) and mostly (25.7%, 26/50) important to the diagnostic process.

**Physiotherapy:** The professionals physiotherapists identify as being most frequently involved in the diagnostic process were community paediatricians (62.0%, 31/50 all or most of the time), school doctors (66.0%, 33/50 most or some of the time), occupational therapy (86.0%, 43/50 all, most or some of the time) and GPs (60.0%, 30/50 most or some of the time). Physiotherapists identified community paediatricians (54.0%, 27/50) and occupational therapists (50.0%, 25/50) as very important, but also identified involving education as very (26.0%, 13/50) and mostly (28.0%, 14/50) important to the diagnostic process.

**Orthoptists:** Orthoptists identify community paediatricians (75.8%, 25/33, all, most or some of the time), occupational therapists (54.5%, 18/33, all, most or some of the time) and school doctors (36.4%, 12/33) as involved in the diagnostic process. They also involve clinical psychologists (48.5%, 16/33) all, most and some of the time. They rated community paediatricians as very (36.4%, 12/33) and mostly (27.3%, 9/33) important, and occupational therapists were also rated as very (36.4%, 12/33) and mostly (24.2%, 8/33) important. They rated school doctors as very important only 3.0% (1/33) of the time and mostly important only 15.2% (5/33) of the time. Clinical psychologists were rated as very and mostly important 33.3% (11/33) of the time.

**9.9.13 Goal setting frequency**

AHPs stated they set goals, all or most of the time, that are measurable (59.3%, 124/209), realistic (84.2%, 176/209), predict levels of change (53.1%, 111/209), and have a time limit (54.1%, 113/209).
9.9.14 Goal setting: collaboration

AHPs carried out goal setting with children and parents all or most of the time (72.2%, 151/209) and found it very or mostly effective (74.2%, 155/209). They carried out goal setting with education staff some of the time (45.5%, 95/209), and found it mostly effective (36.8%, 77/209). Thirty percent (63/209) identified goal setting with education staff as a practice that is very or mostly effective, however, carried out only some of the time or none of the time. AHPs were engaged with other AHPs when carrying out goal setting only some of the time (50.2%, 105/209) and found it mostly effective (46.9%, 98/209). Forty one percent (86/209) identified goal setting with other AHPs as a practice that is very or mostly effective, but carried this out some of the time or none of the time.

**Occupational Therapists**: OTs carried out goal setting with children and parents all (24.8%, 25/101) and most (43.6%, 44/101) of the time and found it very effective (40.6%, 41/101) or mostly effective (36.6%, 37/101). OTs carried out goal setting with children alone some of the time (44.6%, 45/101) and found it mostly (24.8%, 25/101) or somewhat (25.6%, 26/101) effective. They carried out goal setting with parents alone just some of the time (49.5%, 50/101) but found it mostly effective (32.7%, 33/101). OTs also carried out goal setting with education staff only some of the time (52.5%, 53/101) but found it mostly effective (50.5%, 51/101). OTs carried out goal setting with other AHPs some of the time (58.4%, 59/101) and found it mostly effective (54.5%, 55/101). 39.6% (40/101) rated goal setting with education staff as a practice that was very or mostly effective, but carried this out only some or none of the time, and 48.5% (49/101) rated goal setting with other AHPs as a practice that was also very or mostly effective, but carried this out some of the time or none of the time.

**Physiotherapists**: Physiotherapists carried out goal setting with children and parents all (30.0%, 15/50) and most (50.0%, 25/50) of the time and found it very (36.0%, 9/18/50) and mostly (34.0%, 14/50) effective. Physiotherapists carried out goal setting with education staff only some of the time (54.0%, 27/50) and found it mostly effective (32.0%, 16/50), and with other AHPs some of the time (44.0%, 22/50) and found it mostly effective (46.0%, 23/50). Twenty eight percent (14/50) rated goal setting with education staff as a practice that was very or mostly effective, but carried this out some of the time or none of the time, and 36% (18/50) rated goal setting with other AHPs as a practice that was very or mostly effective, but carried this out some of the time or none of the time.
Orthoptists: Orthoptists carried out goal setting with children and parents all (42.4%, 14/33) and most (30.3%, 10/33) of the time, and found it very (30.3%, 10/33) and mostly (45.5%, 15/33) effective. Orthoptists also carried out goal setting with other AHPs some of the time (33.3%, 11/33) and found it mostly effective (30.3%, 10/33). 30.3% (10/33) rated goal setting with other AHPs as a practice that was very or mostly effective, but carried this out only some of the time or none of the time.

Orthotists: Orthotists carried out goal setting most frequently with children and parents (42.9%, 6/14 all of the time) and found it mostly effective (42.9%, 6/14). Orthotists also carried out goal setting with education staff some of the time (42.9%, 6/14) but found it mostly effective 28.6% (4/14) of the time. They also carried out goal setting with other AHPs only some of the time (50.0%, 7/14) but found this practice mostly effective 50.0% (7/14) of the time. 28.6% (4/14) rated goal setting with education staff as a practice that was very or mostly effective, but carried this out some of the time or none of the time, and 35.7% (5/14) rated goal setting with other AHPs as a practice that was very or mostly effective, but carried this out only some or none of the time.

Podiatry: Podiatrists carried out goal setting with children and parents all of the time (45.5%, 5/11) and found it very effective (45.5%, 5/11). They carried out goal setting with other AHPs only some of the time (54.5%, 6/11) but found it very effective (27.3%, 3/11). 18.2% (2/11) rated goal setting with parents only as a practice that was very or mostly effective, but carried this out some of the time or none of the time, and 36.4% (4/11) rated goal setting with other AHPs as a practice that was very or mostly effective, but carried this out only some of the time or none of the time.

9.9.15 Goal setting: use of information

All professions used information from parents, children, health and education all or most of the time. All AHPs used information from parents to assist goal setting all (60.3%, 126/209) and most (25.8%, 54/209) of the time, and found it very (38.3%, 80/209) and mostly (46.4%, 97/209) effective. They used information from children all (56.0%, 177/209) and most (25.4%, 53/209) of the time, and found it very (38.3%, 80/209) and mostly (41.1%, 86/209) effective. They used information from education all of the time (32.5%, 68/209) and most of the time (30.6%, 64/209) to assist goal setting, and found it mostly effective (43.1%, 90/209).
**Occupational therapists:** OTs used information from parents all of the time (58.4%, 59/101) to assist goal setting, and found it very (38.6%, 39/101) or mostly (48.5%, 49/101) effective. OTs also used information from children all (53.4%, 54/101) or most (32.7%, 33/101) of the time, and found it very (40.6%, 41/101) or mostly (41.6%, 42/101) effective. They also used standardised tests such as the perceived efficacy and goal setting (PEGS) some of the time (33.7%, 34/101) to assist goal setting, and found it mostly effective (35.6%, 36/101). They also used the Canadian Occupational Performance Measure (COPM) some of the time (31.7%, 32/101). OTs used information from health most of the time (37.6%, 38/101) to assist goal setting, and found it mostly effective (50.5%, 51/101). OTs used information from education all (46.5%, 47/101) or most (35.6%, 36/101) of the time, and found it mostly effective (50.5%, 51/101). 24.8% (25/101) rated information from PEGS as very or mostly effective but used it in assisting goal setting only some of the time or none of the time, while 38.6% (39/101) rated information from parents as very effective and used in assisting goal setting all, most or some of the time. 40.6% (41/101) rated information from children as very effective and used it all, most or some of the time in assisting goal setting.

**Physiotherapists:** Physiotherapists used information from parents all of the time (58.0%, 29/50) to assist goal setting, and found it very (40.0%, 20/50) or mostly (38.0%, 10/50) effective. Physiotherapists also used information from children all of the time (54.0%, 27/50) and found it very (42.0%, 21/50) or mostly (38.0%, 19/50) effective. Physiotherapists used information from health all of the time (40.0%, 20/50) to assist goal setting, and found it mostly effective (42.0%, 21/50). They used information from education all (32.0%, 16/50) or most (34.0%, 17/50) of the time, and found it very (30.0%, 15/50) or mostly (40.0%, 20/50) effective. Information from parents (40.0%, 20/50), children (42.0%, 21/50), health (32.0%, 16/50) and education (30.0%, 15/50) were all rated as very effective and used all, most or some of the time in assisting goal setting.

**Orthoptists:** Orthoptists used information from parents (60.6%, 20/33) and children (60.6%, 20.33) all of the time to assist goal setting. Information from parents was found to be very (30.3%, 10/33) or mostly (54.5%, 18/33) effective, and information from children was found to be very (30.3%, 10/33) or mostly (39.4%, 13/33) effective. Orthoptists used the reading speed test all of the time (57.6%, 19/33) to assist in goal setting, and found it very (33.3%, 11/33) or mostly (45.5%, 15/33) effective. They used educational psychologist reports some of the time (48.5%, 16/33) to assist goal setting and found it mostly effective (30.3%, 10/33). Orthoptists used information from orthoptic assessment all of the time (63.6%, 21/33), and
found it very (51.5%, 17/33) or mostly (33.3%, 11/33) effective. They used information from education most (30.3%, 10/33) and some (48.5%, 16/33) of the time to assist goal setting, and found it mostly (42.4%, 14/33) or somewhat (30.3%, 10/33) effective. Orthoptists rated information from reading speed (33.3%, 11/33), orthoptic assessment (51.5%, 17/33), parents (30.3%, 10/33) and children (30.3%, 10/33) as very effective and used this information all, most or some of the time during goal setting. 24.2% (8/33) rated information from educational psychologists as very or mostly effective but used it some of the time or none of the time in assisting goal setting, and 18.2% (6/33) rated information from education as very or mostly effective but used it some of the time or none of the time in assisting goal setting.

**Orthotists:** Orthotists used information from parents all of the time (71.4%, 10/14) to assist goal setting, and found it very (35.7%, 5/14) or mostly (42.0%, 6/14) effective. Information from children was used all of the time (64.3%, 9/14) to assist goal setting and found to be mostly effective (50.0%, 7/14). Orthotists used information from health some of the time (35.7%, 5/14), and found it mostly effective (42.9%, 6/14). They also used information from education some of the time (50.0%, 7/14), and found it somewhat effective (28.6%, 4/14). 35.7% (5/14) rated information from parents as very effective and used it all, most or some of the time in assisting goal setting.

**Podiatry:** Podiatrists used information from parents all (72.7%, 8/11) or most (27.3%, 3/11) of the time to assist in goal setting, and found it very (54.5%, 6/11) or mostly (45.5%, 5/11) effective. Podiatrists used information from children all (63.6%, 7/11) or some (27.3%, 3/11) of the time to assist goal setting, and found it very (45.5%, 5/11) or mostly (45.5%, 5/11) effective. They used information from paediatricians all (27.3%, 3/11) and some (27.3%, 3/11) of the time to assist in goal setting, but found it very effective (45.5%, 5/11). Podiatrists used information from education only some of the time (36.4%, 4/11). Information from parents (54.5%, 6/11), children (45.5%, 5/11), and paediatricians (45.5%, 5/11) was rated as very effective and used all, most or some of the time in assisting goal setting. 27.3% (3/11) rated information from education as very or mostly effective, but used this some of the time or none or the time in assisting goal setting.

9.9.16 Goal setting: parental contractual agreement

82.3% (172/209) of all professions stated they did not use a contractual agreement with parents for any aspect of intervention. OTs had the highest percentage (19.8%, 20/101) of
using a contractual agreement with parents and physiotherapists were close behind (14.0%, 7/50). One podiatrist (9.1%, 1/11) used contractual agreements with parents, but orthoptists and orthotists did not use any agreement.

9.9.17 Frequency and effectiveness of contractual agreements

Overall, only a small number of all AHPs used contractual agreements (12.4%, 26/209), and of those that use them, 76.9% (20/26) found contractual agreements very or mostly effective.

**Occupational therapy:** Of 19.8% (20/101) OTs that stated they used contractual agreements, 20% (4/20) reported they were very effective and 65.0% (13/20) stated they were mostly effective.

**Physiotherapy:** Of the 10.0% (5/50) of physiotherapists that stated they used contractual agreements, 20% (1/5) stated they were very effective, 40% (2/5) stated they were mostly effective and 40% (2/5) stated they were somewhat effective.

**Orthoptists and Orthotists:** 0.0% of orthoptists and orthotists stated they used contractual agreements.

**Podiatrists:** 9.1% (1/11) of podiatrists stated they used contractual agreements all the of time, but did not state effectiveness.

9.9.18 Focus of intervention

**Occupational Therapy**

Fifty or more percent of OTs some of the time focused on socialising with peers (52.5%, 53/101), playground activity (56.4%, 57/101), transitioning (56.4%, 57/101), home routines (50%, 50/101), integration into PE (55.4%, 56/101), bike riding (52.5%, 53/101), dressing (51.5%, 52/101), eating (53.4%, 54/101), teeth brushing (52.5%, 53/101), sensory modulation (53.5%, 54/101), proprioception (50%, 50/101), computer skills (56.4%, 57/101), bilateral sequencing (57.4%, 58/101) and balance reactions (50%, 50/101), most of the time.
Additional school issues were identified in 48.5% (49/101) focused on school routines, classroom work (41.6%, 42/101) and preparation for exams (46.5%, 47/101). OTs identified changes in all of these interventions most of the time.

**Physiotherapy**

Fifty or more percent of physiotherapists identified pelvic stability (50%, 25/50), shoulder stability (50%, 25/50), stair climbing (50%, 25/50), school activities including integration into PE class (30%, 15/50) and engaging in playground activities (26%, 13/50). These interventions are identified as achieving change most of the time.

**Orthoptists**

In regards to the focus of intervention orthoptists used visual motor skills most frequently [all (21.2%, 7/33), most (33.3%, 11/33) and some (24.2%, 8/33) of the time]. They also modify reading material (42.4%, 14/33), specific games, eg computer, some of the time. They prescribe colour overlays (45.5%, 15/33) and visual perception skill reading (21.3%, 7/33) most of the time. Orthoptists expect to see changes most of the time.

**Orthotists**

Orthotists focus on used gait pattern (21.4%, 3/14), and foot position (21.4%, 3/14) some of the time. They focus on body awareness most of the time (21.4%, 3/14). They find these interventions lead to changes most of the time.

**Podiatrists**

Podiatrists focus on gait analysis and feedback (27.3% 3/11) all of the time, footwear advice (27.3%, 3/11) and foot orthosis (36.4%, 4/11) most of the time and expect to see changes in these interventions most of the time.

**9.9.19 Individual intervention: location**

The most common location for individual intervention was hospital based location (15.3%, 32/20, all of the time, and 20.1%, 42/209 most of the time). Hospital based locations were found to be very (18.7%, 39/209) and mostly (25.4%, 53/209) effective. School was used most of the time by 25.8% (54/209) of AHPs and some of the time by 33% (69/209). School
(17.7%, 37/209) and home (15.8%, 33/209) environment were seen as very or mostly effective but only used some of the time or none of the time. The least common location was in a child development centre, with 41.6% (87/209) stating they would never see a child in this location.

9.9.20 Individual intervention

**Occupational therapy:** OTs provide individual intervention 92.1% (93/101) of the time. They most frequently conduct these sessions on a weekly basis (81.2%, 82/101) and rate this frequency as mostly effective 63.4% (64/101) of the time. The most common length of time for a session was less than 1 hour (54.5%, 55/101) and 62.4% (63/101) rated this as mostly effective. OTs rated 6–8 weeks as the most common duration for individual treatment 70.3% (71/101) and 65.3% (66/101) rated this time frame as mostly effective. The most frequently used location was schools (35.6%, 36/101 most of the time) and was identified as mostly effective (37.6%, 18/101). The second most common location was a hospital based location (21.8%, 22/101) and this was identified as very effective 20.8% (21/101) of the time. 15.8% (16/101) of OTs believe a child development centre to be very or mostly effective but used this location some of the time or none of the time.

The most frequently used approach was the school based individualised child programme (51.5%, 52/101 most of the time) and this was found to be mostly effective (51.5%, 52/101). The next most frequent approach was a home based child programme (48.5%, 49/101 most of the time), which was also found to be mostly effective (51.5%, 52/101).

OTs most commonly worked in conjunction with physiotherapists (51.5%, 42/101) some of the time and found it to be mostly effective (39.5%, 40/101), with education (49.5%, 50/101) some of the time and found it to be mostly effective (39.6%, 40/101), and with SLT (46.5%, 47/101) some of the time and found this also to be mostly effective (34.7%, 35/101). The majority of OTs reported that others implemented individual interventions (78.2%, 79/101). The most frequent skill mix of others implementing individual intervention were parents (42.6%, 43/101) involved most of the time and this was identified as mostly effective 43.6% (44/101) of the time, while the least frequently used were classroom assistants who were not involved 78.2% (79/101) of the time.
**Physiotherapy:** Physiotherapists provide individual intervention 80% (40/50) of the time. They most frequently conduct sessions on a weekly basis (52%, 26/50) and rate this as mostly effective (60%, 30/50). The most common length of time for an individual session is less than 1 hour (66%, 33/50), and 54.0% (27/50) of physiotherapists rate this time frame as mostly effective. Physiotherapists rated 6–8 weeks (52%, 26/50) as the most common duration of treatment and 54% (27/50) also rated it as mostly effective. The most frequently used location was schools (36%, 18/50) used most of the time and rated as mostly effective (34%, 17/50). The second most common location was hospitals (18%, 9/50) used most of the time and rated as mostly effective (26%, 13/50). Thirty percent (15/50) of physiotherapists believe schools to be very or mostly effective but use this location some of the time or none of the time.

The most frequently used approach was the home based individualised child programme (28%, 14/50, all the time) and this was rated as mostly effective (38%, 19/50). The next most frequent approach was the school based child programme (38%, 19/50) used most of the time and rated as mostly effective 44% (22/50) of the time.

Physiotherapists most commonly worked in conjunction with OTs (56%, 28/50 some of the time) and rated this practice as mostly effective (30%, 15/50). They also worked with PE specialists (44%, 22/50) some of the time and found this mostly effective (20%, 10/50), and with teachers (42%, 21/50) some of the time and found this mostly effective (14%, 7/50). A large amount reported that others implemented individual interventions (74%, 37/50). The most frequent skill mix of others implementing individual intervention were parents (44%, 22/50) who were used most of the time and found to be mostly effective (34%, 17/50).

**Orthoptists:** Orthoptists provide individual intervention 60.6% (20/33) of the time. There was a high variability to the frequency of sessions, but the most common frequency was monthly (18.2%, 6/33) identified as mostly effective (21.2%, 7/33). The most common length of time for an individual session was less than 1 hour (42.4%, 14/33), and this was identified as mostly effective (27.3%, 9/33). Orthoptists rated 8–12 weeks (9.1%, 3/33), with a level two effectiveness (30.3%, 10/33,) as the most common duration of treatment, although high variability existed. The most frequently used location was hospital based (36.4%, 12/33 all of the time) and was rated as very effective (18.2%, 6/33). 12.1% (4/33) of orthoptists believe a local community/health centre to be very or mostly effective but use this location some of the time or none of the time.
The most frequently used approach was the home based individualised child programme (30.3%, 10/33, all of the time) and was rated as mostly effective (36.4%, 12/33). 24.2% (8/33) stated they never used the school based individualised child programme approach, while 24.2% (8/33) rated it as mostly effective.

Very few orthoptists mentioned joint working with others. 18.2% (6/33) stated that others are involved with implementing individual interventions, and the most frequent skill mix of others were parents (12.1%, 4/33 all the time) rated as very effective 6.1% (2/33) of the time. 12.1% (4/33) stated they never work with classroom assistants, while 15.2% (5/33) rated this as mostly effective.

Orthotists: Orthotists provide individual intervention most frequently every 3–4 weeks (42.9%, 6/14), and identified this as mostly effective 37.5% (5/14) of the time. The most common length of a session was split between 15 minutes (14.3%, 2/14), 30 minutes (14.3%, 2/14) and 1 hour (14.3%, 2/14), with 35.7% (5/14) rating these durations as mostly effective. The most common location for sessions was in hospital (35.7%, 5/14 most of the time) and was found to be very effective 21.4% (3/14) of the time. The next most common location was school-based (35.7%, 5/14 some of the time), found to be mostly effective 21.4% (3/14) of the time. 21.4% (3/14) of orthotists believe school locations to be very or mostly effective but use this location only some of the time or none of the time.

Podiatry: Podiatrists provide individual intervention most frequently every 3 months (27.3%, 3/11) and identified this as mostly effective (27.3%, 3/11). The most common length of a session was 15 minutes (27.3%, 3/11), identified as mostly effective (27.3%, 3/11). Duration of podiatry sessions was not asked. The most common location for an individual session was hospital based (18.2%, 2/11 all of the time) rated as very effective (18.2%, 2/11). The second most common location was local community/health centres (18.2%, 2/11) also rated as very effective (27.3%, 3/11). 9.1% (1/11) of podiatrists believed school locations to be very or mostly effective but use this location only some of the time or none of the time.
9.9.21 Group intervention

Occupational therapy

OTs provide group intervention 75.2% (76/101) of the time. They most frequently carry out group sessions on a weekly basis (60.4%, 61/101) and 52.5% (53/101) identify this frequency as mostly effective. The most common length of a session is 1–2 hours (59.5%, 60/101), and 54.5% (55/101) rate this time frame as mostly effective. The most common duration for group treatment was 6–8 weeks (54.5%, 55/101) and rated as mostly effective (54.5%, 55/101). The most frequently used location was hospital based (16.8%, 17/101 all of the time) and 17.8% (18/101) rated this as very effective. The second most common location was local community/health centres (8.9%, 9/101) rated as very effective 7.9% (8/101) of the time.

8.9% (9/101) of OTs worked in conjunction with physiotherapists most of the time and an even greater number identified this practice as very effective (16.8%, 17/101). They also worked with SLT (6.9%, 7/101 most of the time) and identified this as very effective (9.9%, 19/101), and with education (5%, 5/101) also identifying this as very effective (8.9%, 9/101).

31.7% (32/101) facilitate groups that are implemented by others. The most frequent skill mix of others implementing groups were technical instructors (10.9%, 1/101) used most of the time and rated as very effective (13.9%, 14/101), and classroom assistants (5.9%, 6/101) used most of the time and rated as very (4%, 4/101) and mostly (17.8%, 18/101) effective. 24.8% (25/101) stated they would never involve a generic assistant in providing group interventions.

Physiotherapy

Physiotherapists provide group intervention 44% (22/50) of the time. They most frequently carry out group sessions on a weekly basis (22%, 11/50), and rate this frequency as mostly effective (26%, 13/50). The most common duration of a session was 1–2 hours (22%, 11/50) with this time frame rated as mostly effective (30%, 15/50). Physiotherapists rated 6–8 weeks (22%, 11/50) as the most common duration of group treatment, which is mostly effective (24%, 12/50). The most frequently used location was in schools (10%, 5/50 all of the time) and this was rated very effective (8%, 4/50). The next most common location was a child development centre (CDC) (10%, 5/50 all of the time), also rated as very effective (8%, 4/50).
14% (7/50) of physiotherapists work in conjunction with OTs all of the time and 16% (8/50) find this very effective. 20% (10/50) facilitated groups that are implemented by others, and the most frequent skill mix of others implementing groups was classroom assistants (8%, 4/50) most of the time, rated as very effective (6%, 3/50), and PE specialists (6%, 3/50) most of the time, also rated as very effective (6%, 3/50). Therefore we can see physiotherapists work mainly with education staff when providing groups. 24.8% (25/101) stated they never involved a generic assistant in providing group interventions.

**Orthoptists**

Orthoptists provide group intervention 3% (1/33) of the time.

**9.9.22 Intervention: referral to other professions**

**Occupational therapy**

OTs refer most frequently to physiotherapy (75.2%, 76/101 some of the time), followed by SLT (73.3%, 74/101 some of the time), health visitors (73.3%, 74/101 some of the time), child and family mental health services (CAMHS) (68.3%, 69/101 some of the time), community paediatricians (67.3%, 68/101 some of the time), clinical psychologists (62.4%, 63/101 some of the time), and school doctors (58.4%, 59/101). Approximately half of all OTs refer to OT (55.4%, 56/101 some of the time), social work (54.5%, 55/101 some of the time), orthoptists (49.5%, 50/101 some of the time), and education (48.5%, 49/101 some of the time). They refer less often to school nurses [some (28.7%, 29/101) and none (61.4%, 62/101) of the time], GP’s [some (26.7%, 27/101) and none (64.4%, 65/101) of the time], orthotists [some (25.7%, 26/101) and none (63.5%, 64/101) of the time], podiatrists [some (25.7%, 26/101) and none (61.4%, 62/101) of the time], and dieticians [some (23.8%, 24/101) and none (64.4%, 65/101) of the time].

**Physiotherapy**

Physiotherapists refer most frequently to OT [most (26.0%, 13/50) and some (54.0%, 27/50) of the time] followed by orthotists (72.0%, 36/50 some of the time), community paediatricians (58.0%, 29/50 some of the time), podiatrists (58.0%, 29/50 some of the time) and SLT (52.0%, 26/50 some of the time). Less than half of OTs refer to social work (46.0%, 23/50 some of the time) education (44.0%, 22/50 some of the time), and clinical psychologists (42.0%, 21/50 some of the time). Physiotherapists infrequently refer to GPs (34.0%, 17/50
some of the time), to other physiotherapists (32.0%, 16/50 some of the time), school nurses (32.0%, 16/50 some of the time), school doctors (30.0%, 15/50 some of the time) and the voluntary sector (30.0%, 15/50 some of the time). Fifty percent (25/50) of physiotherapists do not refer to CAMHS (50.0%, 25/50), while over half do not refer to dieticians (54.0%, 27/50), health visitors (56.0%, 28/50) or orthoptists (58.0%, 29/50).

**Orthoptists**

Orthoptists most frequently refer to social work (75.8%, 25/33 some of the time), ophthalmologists (66.7%, 22/33 some of the time) and GPs (57.6%, 19/33 some of the time). They infrequently refer to OT (33.3%, 11/33 some of the time) community paediatricians (30.3%, 10/33 some of the time), education (30.3%, 10/33 some of the time), and learning support teachers (18.2%, 6/33). Over half of orthoptists do not refer to dieticians (66.7%, 22/33), health visitors (63.6%, 21/33), school doctors (63.6%, 21/33), school nurses (60.6%, 20/33), CAMHS (60.6%, 20/33), orthotists (57.6%, 19/33), learning support teachers (54.5%, 18/33), SLTs (54.5%, 18/33), clinical psychologists (51.5%, 17/33), and physiotherapists (51.5%, 17/33).

**Orthotists**

Orthotists most frequently refer to physiotherapy (50.0%, 7/14 some of the time), followed by OT [some (21.4%, 3/14) and none (28.6%, 4/14) of the time]. They do not refer to school doctors 42.9% (6/14) of the time, or GPs 35.7% (5/14) of the time.

**Podiatrists**

Podiatrists most frequently refer to physiotherapy [most (18.2%, 2/11) and some (27.3%, 3/11) of the time] followed by GPs (36.4%, 4/11 some of the time).

### 9.9.23 Intervention: equipment

**Occupational therapy**

The most common equipment OTs prescribe were angle boards [most (39.6%, 40/101) and some (54.5%, 55/101) of the time] and found them very (29.7%, 30/101) or mostly (54.5%, 55/101) effective. The second most commonly prescribed equipment was scissors [most (27.7%, 28/101) and some (66.3%, 67/101) of the time] rated as very (21.8%, 22/101) or
mostly (65.3%, 66/101) effective. Cutlery was prescribed most (28.7%, 29/101) and some (62.4%, 63/101) of the time, and found to be mostly effective (51.5%, 52/101), as were pencil grips, prescribed most (36.6%, 37/101) and some (51.5%, 52/101) of the time, found to be very (19.8%, 20/101) and mostly (52.5%, 53/101) effective. Foxdenton Chairs were prescribed both some (45.5%, 46/101) and none (47.5%, 48/101) of the time, although were found to be mostly (23.8%, 24/101) or somewhat (20.8%, 21/101) effective. The most effective equipment rated by OT were angle boards (29.7%, 30/101); scissors (21.8%, 22/101); and pencil grips (19.8%, 20/101) [rated as very effective].

Physiotherapy

The most commonly prescribed equipment by physiotherapists were orthotics [most (18.0%, 9/50) and some (68.0%, 34/50) of the time], found to be mostly (54.0%, 27/50) and somewhat (32.0%, 16/50) effective. Foxdenton Chairs were not prescribed 78.0% (39/50) of the time, but a small number of physiotherapists found them mostly (6.0%, 3/50) and somewhat (4.0%, 2/50) effective.

Orthoptists

The most common equipment prescribed by orthoptists was vision training equipment [most (39.4%, 13/33) and some (33.3%, 11/33) of the time], found to be very (24.2%, 8/33), mostly (33.3%, 11/33) and somewhat (21.2%, 7/33) effective. The second most common equipment prescribed by orthoptists were glasses (54.5%, 18/33 some of the time) and were found to be very (21.2%, 7/33) and mostly (51.5%, 17/33) effective.

Orthotists

The most common orthotics prescribed by orthotists were insoles [all (21.4%, 3/14) and most (35.7%, 5/14) of the time], found to be very (21.4%, 3/14) and mostly (35.7%, 5/14) effective. The second most commonly prescribed orthotics were ankle foot orthosis [most (35.7%, 5/14) and some (14.3%, 2/14) of the time], found to be very (14.3%, 2/14), mostly (21.4%, 3/14) and somewhat (21.4%, 3/14) effective. Less frequently orthotists prescribed orthopaedic footwear [most (14.3%, 2/14) and some (28.6%, 4/14) of the time], and found it mostly (21.4%, 3/14) and somewhat (21.4%, 3/14) effective. They prescribed lycra garments only some (28.6%, 4/14) and none (28.6%, 4/14) of the time, although found them mostly (14.3%, 2/14) and somewhat (14.3%, 2/14) effective.
Podiatry

Podiatrists prescribe footwear advice most frequently [all (27.3%, 3/11) and most (18.2%, 2/11) of the time] and found this mostly effective (45.5%, 5/11). They also provide ‘off-shelf’ foot orthosis most of the time (27.3%, 3/11), and find them very (27.3%, 3/11) and mostly (18.2%, 2/11) effective. Specific manufactured foot orthosis are also prescribed most (18.2%, 2/11) and some (18.2%, 2/11) of the time, and found to be very (27.3%, 3/11) and mostly (18.2%, 2/11) effective. Podiatrists prescribe ankle foot orthosis (45.5%, 5/11) and prescription footwear (36.4%, 4/11) none of the time.

9.9.24 Intervention: equipment challenges

Occupational therapy

In regards to the challenges to the supply and provision of equipment OTs rated funding challenges as the most common challenge [all (9.9%, 10/101), most (23.8%, 24/101) and some (47.5%, 48/101) of the time], followed by bureaucracy [most (19.8%, 20/101) and some (55.4%, 55/101) of the time], child resistance (89.1%, 90/101 some of the time), availability (50.5%, 51/101 some of the time), and parent resistance (66.3%, 67/101 some of the time).

Physiotherapy

In regards to the challenges to the supply and provision of equipment physiotherapists rated child resistance as the most common challenge [most (10.0%, 5/50) and some (70.0%, 35/50) of the time] followed by availability [most (14.0%, 7/50) and some (44.0%, 22/50) of the time], funding [most (16.0%, 8/50) and some (40.0%, 20/50) of the time], bureaucracy [most (14.0%, 7/50) and some (28.0%, 14/50) of the time] and parent resistance (some 64.0%, 32/50 of the time).

Orthoptists

In regards to the challenges to the supply and provision of equipment orthoptists rated child resistance as the most common challenge (75.8%, 25/33 some of the time), followed by availability (60.6%, 20/33 some of the time), parent resistance (48.5%, 16/33 some of the time), bureaucracy (45.5%, 15/33 some of the time), and funding (42.4%, 14/33 some of the time).
Orthotist

In regards to the challenges to the supply and provision of equipment orthotists rated parent resistance as the most common challenge (50.0%, 7/14 some of the time), followed by child resistance (42.9%, 6/14 some of the time), and availability (21.4%, 3/14 some of the time).

9.9.25 Intervention: equipment efficacy

OTs

54.5% (55/101) of OTs feel their current service design for equipment provision is mostly effective, and 34.7% (35/101) feel it is somewhat effective.

Physiotherapists

50.0% (25/50) of physiotherapists feel their current service design for equipment provision is mostly effective, while 30.0% (15/50) feel it is somewhat effective.

Orthoptists

42.4% (14/33) of orthoptists feel their current service design for equipment provision is mostly effective, while 33.3% (11/33) feel it is somewhat effective.

9.9.26 Evaluation

All AHPs

In regards to the evaluation of goals, all AHPs used feedback from parents most frequently [all (52.2%, 109/209) or most (36.4%, 76/209) of the time], and found this practice very (46.9%, 98/209) or mostly (37.8%, 79/209) effective. All AHPs used feedback from children to evaluate goals all (48.3%, 101/209) or most (36.8%, 77/209) of the time, and found this practice very (46.4%, 97/209) and mostly (34.4%, 72/209) effective. They also used feedback from education staff to evaluate goals all (31.1%, 65/209) and most (33.0%, 69/209) of the time, and rated this practice as very (33.5%, 70/209) and mostly (41.6%, 87/209) effective. Feedback from health staff was also implemented in the evaluation of goals [all (25.4%, 53/209), most (27.3%, 57/209) and some (32.1%, 67/209) of the time] and was found to be very (28.7%, 60/209) and mostly (38.8%, 81/209) effective.
Occupational therapy

The tools most frequently used all of the time by OTs to evaluate goals were feedback from parents (58.4%, 59/101), children (54.5%, 55/101) and education (50.5%, 51/101). OTs rated feedback from these three sources as very effective [parents (59.4%, 60/101); children (57.4%, 58/101), and education (47.5%, 48/101)].

OTs specifically used feedback from parents to evaluate goals all (58.4%, 59/101) or most (36.6%, 37/101) of the time, and found this practice very (59.4%, 60/101) and mostly (30.7%, 31/101) effective. Feedback from children was used all (54.5%, 55/101) or most (36.6%, 37/101) of the time, and found to be very (57.4%, 58/101) and mostly (27.7%, 28/101) effective. Education staff were used all (50.5%, 51/101) or most (36.6%, 37/101) of the time in evaluating goals, and found to be very (47.5%, 48/101) and mostly (40.6%, 41/101) effective.

Feedback from health staff was also used frequently [all (37.6%, 38/101), most (25.7%, 26/101) and some (30.7%, 31/101) of the time] and this practice was found to be very (38.6%, 37/101) and mostly (37.6%, 38/101) effective. OTs used clinical observation to evaluate goals all (21.8%, 22/101) and most (19.8%, 20/101) of the time, and found this very (18.9%, 19/101) and mostly (34.7%, 35/101) effective. Tests of visual motor integration was also used regularly [all (17.8%, 18/101), most (30.7%, 31/101) and some (28.7%, 29/101) of the time] and was found to be very (12.9%, 13/101), mostly (37.6%, 38/101) and somewhat (25.6%, 26/101) effective. OTs used movement ABC to evaluate goals all (19.8%, 20/101) most (28.7%, 29/101) and some (32.7%, 34/101) of the time, and found this practice very (16.9%, 17/101), mostly (33.7%, 34/101) and somewhat (26.7%, 26/101) effective.

Less frequently used tools by OT in the evaluation of goals were the motor free test of visual perceptual skills [used most (16.8%, 17/101), some (43.6%, 44/101) and none (29.7%, 30/101) of the time], found to be mostly (27.7%, 28/101) and somewhat (34.7%, 35/101) effective, and tests of visual and perceptual skills [used some (45.5%, 46/101) and none (33.7%, 34/101) of the time], found to be mostly (26.7%, 27/101) and somewhat (29.7%, 30/101) effective.
Physiotherapy

In regards to the evaluation of goals, physiotherapists most frequently used feedback from parents [all (36.0%, 18/50) and most (38.0%, 19/50) of the time], and found it very (24.0%, 12/50) and mostly (54.0%, 27/50) effective. They also used feedback from children all (30.0%, 15/50) or most (44.0%, 22/50) of the time, and found this practice very (26.0%, 13/50) and mostly (50.0%, 25/50) effective. Physiotherapists regularly used feedback from education staff most (44.0%, 22/50) of the time when evaluating goals, and found it mostly effective (56.0%, 28/50). Feedback from health staff was used most (38.0%, 19/50) and some (30.0%, 15/50) of the time, and found to be mostly effective (50.0%, 25/50).

Orthoptists

The tools most frequently used all of the time by orthoptists to evaluate goals were the Wilkins rate of reading test (57.6%, 19/33), clinical observation (57.6%, 19/33), and feedback from parents (54.5%, 18/33) and children (51.5%, 17/33). Feedback from children (51.5%, 17/33), the Wilkins rate of reading test (45.5%, 15/33), and feedback from parents (42.4%, 14/33) were all rated frequently as very effective.

Orthoptists specifically used the Wilkins rate of reading test all (57.6%, 19/33) and most (33.3%, 11/33) of the time, and found it very (45.5%, 15/33) and mostly (30.3%, 10/33) effective. Feedback from parents was also used frequently to evaluate goals [all (54.5%, 18/33) and most (36.4%, 12/33) of the time], and was found as very (42.4%, 14/33) and mostly (36.4%, 12/33) effective. Orthoptists used clinical observation all (57.6%, 19/33) or most (27.3%, 9/33) of the time, and it was found to be very (30.3%, 10/33) and mostly (42.4%, 14/33) effective. Feedback from children was also used regularly [all (51.5%, 17/33) and most (36.4%, 12/33) of the time], and was found to be very (51.5%, 17/33) and mostly (24.2%, 8/33) effective.

Orthoptists used developmental eye movement tests to evaluate goals all (33.3%, 11/33) and most (36.4%, 12/33) of the time, and found it very (39.4%, 13/33) and mostly (30.3%, 10/33) effective, and used intuitive overlays all (27.3%, 9/33) and most (45.5%, 15/33) of the time, and also found it very (30.3%, 10/33) and mostly (39.4%, 13/33) effective.
Orthoptists less frequently used visual field tests (60.6%, 20/33 some of the time) and found it somewhat effective (48.5%, 16/33). Feedback from education staff was only used some of the time (45.5%, 15/33), but found to be very (30.3%, 10/33) and mostly (33.3%, 11/33) effective. Similarly, orthoptists used feedback from health staff some (36.4%, 12/33) and none (30.3%, 10/33) of the time, but found this practice very (15.2%, 5/33) and mostly (27.3%, 9/33) effective.

Orthotists

Orthotists most frequently used gait pattern [all (57.1%, 8/14) and most (28.6%, 4/14) of the time] when evaluating goals, and found it very (42.9%, 6/14) and mostly (42.9%, 6/14) effective. They used feedback from parents all (42.9%, 6/14) and most (35.7%, 5/14) of the time, and found it very (35.7%, 5/14) and mostly (50.0%, 7/14) effective. Feedback from children was also used often (50.0%, 7/14 all of the time), and was found to be mostly effective (64.3%, 9/14). Joint ROM was used all (35.7%, 5/14) and most (28.6%, 4/14) of the time, and was rated as practice that was mostly (50.0%, 7/14) effective. Feedback from health staff, used to evaluate goals most (42.9%, 6/14) and some (28.6%, 4/14) of the time, was found to be very (21.4%, 3/14) and mostly (50.0%, 7/14) effective. Orthotists less frequently used feedback from education staff to evaluate goals [some (42.9%, 6/14) and none (28.6%, 4/14) of the time], but found this practice mostly effective (42.9%, 6/14).

Podiatry

In regards to evaluating goals podiatrists used many techniques frequently and found most of them effective. Podiatrists used gait pattern when evaluating goals all (72.7%, 8/11) of the time, and found it very (63.6%, 7/11) effective. They used feedback from parents all (72.7%, 8/11) of the time, and found it equally effective 63.6% (7/11). Foot Examination was commonly used by podiatrists (72.7%, 8/11 all of the time) and also found to be very (54.5%, 6/11) effective.

63.6% (7/11) of all podiatrists surveyed used general posture, biomechanical assessment, joint ROM and feedback from children all of the time when evaluating goals. General posture and feedback from children were found to be very effective 54.5% (6/11) of the time, while biomechanical assessment and joint ROM was rated as very effective 63.6% (7/11) of the time. Podiatrists used footwear assessment to evaluate goals all (54.5%, 6/11) and most (45.5%, 5/11) of the time, and found this practice very (72.7%, 8/11) effective.
63.6% (7/11) of podiatrist surveyed stated they never used feedback from education staff when evaluating goals.

9.9.27 Protocol for review
65.6% (137/209) of all AHPs stated their department did not have protocols or a framework for follow-up/review. 59.4% (60/101) of OTs, 68.0% (34/50) of physiotherapists, 72.7% (24/33) of orthoptists, 64.3% (9/14) of orthotists and 90.9% (10/11) of podiatrists stated they did not have protocols or a framework for follow-up/review in their departments.

9.9.28 Effectiveness of review protocols
20.6% (43/209) of all AHPs and 25.7% (26/101) of all OTs rated their protocols/frameworks for follow-up and review as mostly effective.

9.9.29 Discharge
59.3% (124/209) of all AHPs stated they did not have a protocol or framework for discharging children. 47.5% (48/101) of OTs stated they did not have a protocol or framework, while 44.6% (45/101) stated they did. 66.0% (33/50) of physiotherapists stated they did not have a framework or protocol for discharge, while only 8.0% (4/50) stated they did. 69.7% (23/33) of orthoptists also did not have a framework or protocol for discharge, while 21.2% (7/33) stated they did. 78.6% (11/14) of orthotists and 81.8% (9/11) of podiatrists did not have a framework or protocol for discharge either.

9.9.30 Discharge: efficacy of discharge protocol
26.6% (27/101) of OTs felt their discharge protocol was mostly effective.

9.10 Summary
The majority of AHP referrals are received from community paediatricians, GPs and school doctors with half of these being mostly appropriate. Seventy percent of AHPs did not receive referrals from parents. Most AHP professionals do not screen or triage with their referrals, however, a quarter of respondents felt they are a very effective or mostly effective way of managing their service. Prior to assessment AHPs surveyed do gather information from
parents and schools in various formats. In general, consent is secured before seeing a child although various formats are used.

Assessment is mainly carried out in a hospital location, with parents present, by senior staff, using assessments focused on the child’s capacity. Joint assessment was viewed as effective practice; however, there was little consistent evidence of this happening. In ascending order of frequency AHP professionals provide feedback to parents, children, education and feedback to other AHPs following assessment although some methods were viewed as effective but not pursued.

The AHPs most involved in the diagnostic process are OTs, physiotherapists, and orthoptists. A greater percentage of these professions felt it was important to be involved than were actually involved. Only a small percentage of departments have recognised protocols for diagnosis of DCD.

More than half of AHPs stated they set goals, all or most of the time, that are measurable, realistic, predict levels of change and have a time limit. AHPs carried out goal setting with children and parents all or most of the time and found it very or mostly effective. Thirty percent identified goal setting with education staff effective practice but infrequently carried out. The majority of all professions stated they did not use a contractual agreement with parents for any aspect of intervention. Of those who used agreements the majority found them very or mostly effective.

AHP professions are focused on different aspects of the child. OTs primarily focus on engagement in daily activities, physiotherapy focused on physical stability, orthoptists focus on visual motor skills, orthotists primarily focus on gait pattern and foot position, and podiatrists primarily focus on gait analysis and feedback and footwear advice. These AHPs expect to see changes most of the time for above interventions.

The most common location for individual intervention was a hospital based location. School and home environments were seen as effective by 15-20% of AHPs; however, they only used these locations some of the time or none of the time. The majority of therapists provide individual therapy most of the time. The majority of OTs and physiotherapists reported that
others implemented individual interventions. The most frequent skill mix when implementing individual intervention included parents and this was identified as mostly effective. Predominantly groups are run by OTs and physiotherapists. Groups involve technical instructors, classroom assistants and PE teachers. A range of equipment is provided by AHPs to children with DCD.

In regards to the evaluation of goals, the majority of AHPs used feedback from parents and children most frequently and found this practice very or mostly effective. Sixty-five percent of AHPs stated their department did not have protocols or a framework for follow-up/review. Twenty percent rated their protocols/frameworks for follow-up and review as mostly effective. Fifty nine percent of AHPs stated they did not have a protocol or framework for discharging children. Twenty percent felt their protocol was mostly effective.
10 An AHP framework for DCD

10.1 Introduction

This final chapter provides an overview and synthesis of the work of the ACHIEVE Alliance Team, which has developed a framework for AHPs working with children with DCD. This was based on:

- **Researched service delivery**
  - the evidence perspective
    - a review of 50 quantitative studies, 10 qualitative studies and 10 key policy documents

- **Current service delivery**
  - the service user perspective
    - six focus groups with 25 children with DCD
    - seven focus groups with 46 parents of children with DCD
  - the professional perspective
    - a national survey of 602 AHPs (this represents all individuals in the professions surveyed who work with children and 11% of the total workforce)
    - in-depth interviews to understand innovative practice with 26 AHPs

- **Synthesis of data**
  - findings from the above data were synthesised by a multi disciplinary group of AHP researchers and practitioners through a cyclical process of immersion, thematic analysis, idea webbing and conceptual clustering.

There were two outcomes of this analysis:

1. **Five key themes of clinically effective practice.** These themes permeate the data and represent an overall synthesis of the core values inherent in the framework.

   **Health Promotion:** Promoting community-based support for children with DCD prior to any involvement with AHP services requires additional support and
education. AHPs have a critical role in the design and delivery of health promotion strategies with referring agents allowing for community-based management of children possibly negating the need for more specialised services.

**Communication:** Effective communication transcends all aspects of AHP practice with children with developmental co-ordination disorder. In the first instance, good communication with parents and children ensures services are relevant and that all parties feel heard and understood. Secondly, effective collaborative work is initiated, maintained and developed by efficient communication.

**Child and parent involvement:** Structures and tools allowing children’s and parents’ voices to be heard should be an integral part of service planning and the child/family journey. Harnessing parental involvement alongside AHP practice is essential when integrating self-management as a key principle in the management of children with DCD.

**Working together:** Engaging with partners in education and developing an understanding of AHP roles will improve support for the child with DCD. Collaborative working and expanding current practice to include other agencies is essential in the development of an inclusive integrated model of service provision. Established clear pathways for entry and exit of services can assist in this process by clarifying roles and expectations for families, education and other involved professionals.

**Skills and knowledge:** All AHPs require knowledge, training, and an understanding of current evidence for intervention. AHPs, in particular occupational therapists, have a pivotal role in the development and understanding of DCD and its impact on other AHP services and other agencies. This is essential not only for children engaged with AHP services, but also for other agencies involved with children with DCD during pre and post involvement with AHP services.
2. **Individual principles** were developed and organised around the child/family journey to give them cogency. Accordingly, they engage with the early stages of a child’s difficulties, assessment, intervention, and finally discharge. For each principle:

- the underlying philosophy of the principle is presented;
- the supporting data from our research is presented;
- a key message for AHP clinicians is given;
- quotes from parents or AHPs are presented where appropriate;
- examples of smart working (ie actual work taking place at present) related to the principle are presented where appropriate.

Symbols are used to represent the supporting data on which the principle is based:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Children" /></td>
<td>These symbols indicate supporting evidence from a child or parent/guardian focus group.</td>
</tr>
<tr>
<td><img src="image" alt="Parent" /></td>
<td>This symbol indicates supporting evidence from a survey of AHPs.</td>
</tr>
<tr>
<td><img src="image" alt="AHP" /></td>
<td>This symbol indicates supporting evidence from an AHP interview.</td>
</tr>
<tr>
<td><img src="image" alt="P" /></td>
<td>These symbols indicate supporting evidence from policy, qualitative literature and quantitative literature respectively.</td>
</tr>
</tbody>
</table>

These principles provide guidance for practitioners on service delivery for children with DCD and their families and represent the substantive contribution of this research to current AHP practice.
Figure 6: Data synthesis
<table>
<thead>
<tr>
<th>Helping children and families in the early stages</th>
<th>Assessment</th>
<th>Intervention</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing a supportive community where initial issues are resolvable with rapid access to AHP support when required.</td>
<td>Contextual child and family centred assessment jointly with others, creating clear expectations and agreement on optimal courses of action.</td>
<td>Collaborative goal setting that embraces child, family and community contexts, and supports the child’s participation through shared expectations and responsibility within the change process.</td>
<td>Supportive transitional pathways from specialist services to self management within homes, schools and communities following evaluated outcomes.</td>
</tr>
</tbody>
</table>

**Stages of the child and family journey**

**Partnership through shared expectations**

**Principles**

- Raising awareness within the community.
- Supporting self management within homes, schools and communities.
- Increasing referring agents’ knowledge and understanding.
- Optimising pre-assessment contact.

- Integrating views and expertise of parents/guardians and children.
- Harnessing the benefits of collaborative assessment.
- Making assessment practices appropriate.
- Structuring the diagnostic process.
- Adopting an honest approach to outcomes and expectations.

- Putting the child and family at the centre of care when setting goals.
- Involving other AHP and education staff in the goal setting.
- Enhancing the participation of the child with DCD.
- The child is not the only focus of intervention.
- Sharing expectation and responsibilities in supporting change.
- Valuing formulised collaboration with others.
- Using evidence interventions that support change.

- Evaluating interventions and outcomes.
- Providing strategies for self management and making use of community resources.
- Provide clear pathways for exiting services.
Framework principles

Helping children and families in the early stages

Developing a supportive community where initial issues are resolvable with rapid access to AHP support when required.

- Raising awareness within the community.
- Supporting self management within homes, schools and communities.
- Increasing referring agents’ knowledge and understanding.
- Optimising pre-assessment contact.

Assessment

Contextual child and family centred assessment jointly with others, creating clear expectations and agreement on optimal courses of action.

- Integrating views and expertise of parents/guardians and children.
- Harnessing benefits of collaborative assessment.
- Making assessment practices appropriate.
- Structuring the diagnostic process.
- Adopting an honest approach to outcomes and expectations.

Intervention

Collaborative goal setting that embraces child, family and community contexts and supporting the child’s participation through shared expectations and responsibility within the change process.

- Putting the child and family at the centre of care when goal setting.
- Involving other AHPs and education staff in goal setting.
- Enhancing participation of children with DCD.
- The child is not the only focus for intervention.
- Sharing expectation and responsibilities in supporting change.
- Valuing formalised collaboration with others.
- Using evidenced interventions that support change.

Discharge

Supportive transitional pathways from specialist services to self management within homes, schools and communities following evaluated outcomes.

- Evaluating interventions and outcomes.
- Providing strategies for self management and making use of community resources.
- Providing clear pathways for exiting services.
Helping children and families in the early stages

‘I know there’s something not quite right’ [parent]

[Hand-drawn image with text:]

- This is me scoring a goal.
- The score is 1–0.
- We are winning.
- I am in my heart kit for football.
- The crowd is behind me.
- I am wearing my football boots.
- We are playing at Tyncastle.
Principle: Raising awareness of DCD within the community

Evidence for principle:
Parents/guardians felt DCD was a condition not well understood within society. Related to this, parents/guardians expressed the need for all individuals working with children, eg in schools or leisure facilities, to have a basic knowledge and understanding of the condition. They expressed a desire for an increased public awareness of the difficulties experienced by their children, along with greater accessibility to advice on basic approaches that could be used to support them. Policy documents support the use of a preventative approach, and suggest the need to develop a learning culture which focuses on education, training, development and planning (at national, regional and local levels) to integrate children’s service plans.

Key message:
The long term emotional consequences associated with DCD, such as low self-esteem, may be shaped by the varied contacts a child experiences with others within society. With a greater awareness of DCD within our communities, there may be greater tolerance and positive action to support the child, which could alleviate some of the difficulties faced. If others had greater understanding of DCD, they may be able to make a positive impact through their interactions. Information related to the prevention of difficulties could limit the impact of the condition for the child and their family and reduce the need for professional input at a later stage.

Exemplars of evidence:
A parent discussing awareness raising at a school: ‘…one of the OTs went to school and did a whole awareness raising thing with most of the staff and that was really, really useful […] I think that how other people react to a child really influences that child’s self-esteem.’

Some parents gave examples of teachers who demonstrated an understanding of their child’s difficulties: ‘she [child] absolutely adores it [dancing] and we have videos of the whole chorus going to the left and she goes to the right, but she has a dancing teacher that never ever picks her up on that, who will go up to her and stroke her arm or her leg to give her the sensory feedback to say which part of the body she’s got to move.’

Several AHPs commented on their potential role in increasing awareness, putting information out into the community, a podiatrist comments here: ‘the other thing, probably, my profession needs to do, and haven’t done, is produce some form of health promotion material […] the main points to look for when you buy a pair of shoes.’
Evidence for principle:
Parents/guardians expressed feelings of guilt that when their child’s difficulties first became apparent, they had not recognised these or known how best to help their child. From a professional perspective, AHPs indicated that they felt they could play a greater role regarding health promotion at the pre-referral stage working with education and other health professionals. The qualitative review also highlighted the emotional strain felt by families and feelings of guilt that parents/guardians experience in the stages prior to entry into support services and/or pre-diagnosis. Policy documents support the need for a preventative approach for these children and for AHPs to become supporters of self-care and self-management.

Key message:
At the stage before any contact is made with AHPs, support for the child from parents/guardians, those in education and/or those working in health care could reduce the impact of the condition, and may lessen the need for input in the future. Providing parents/guardians with the knowledge and understanding to do this could reduce the feelings of uncertainty, guilt and helplessness that parents/guardians report, as well as reducing the strain that the whole family may experience during these early stages.

Exemplars of evidence:
Smart working – a dietetics service has been established which works directly with schools in a health promotion role: ‘A lot of the out-reach work I do tends to be going into schools […] sometimes to discuss specific children, but sometimes it’s quite often a general enquiry from the school about how they support kids with particular difficulties when it comes to diet.’

Smart working: a service has developed an internet resource, which provides easily accessible information and support for parents/guardians and health professionals involved with children with co-ordination difficulties.
Evidence for principle:
Parents/guardians identified that accessing AHP services could be difficult, confusing, and lacking in a clear referral pathway. At this stage, many parents/guardians felt that ‘something’ was ‘wrong’ but that these concerns were sometimes not listened to or recognised by health professionals or education staff, leading to a delay in their child accessing help. Parents/guardians explained that some professionals appeared to lack awareness of possible signs of DCD, or knowledge about who could provide further advice and guidance. This left parents/guardians feeling anxious, confused, alone and unsupported. They felt that all professionals working with children should have an awareness of DCD, and have sufficient knowledge regarding management to direct them to a relevant professional for further guidance. From the survey, most AHP services accept referrals from other health professions but only a few accept referrals directly from parents or education. The majority of referrals are received from community paediatricians, GPs and school doctors with half of these being ‘mostly appropriate’. AHPs found referrals from other AHPs ‘very appropriate’; however, referrals from this source were less frequent. The qualitative review supports the findings from the parents/guardians focus groups with regard to the difficulties expressed, and that parents/guardians are aware that their child is not developing normally and may experience a lack of support from health or education in the early stages. Policy documents support the need for early intervention and clear referral pathways to improve the ease of access to care. They place a heavy emphasis on listening to parents/guardians and children when designing and delivering services.

Key message:
Early identification of difficulties and referral to appropriate services would help to ensure difficulties are addressed as and when they arise, reducing the potential social, emotional and physical consequences of the condition. An increased awareness of professional roles would enable appropriate and timely referrals to be made, and professionals should recognise that parents/guardians are often knowledgeable about their child’s difficulties. Parents and guardians however, cannot currently self refer to the majority of services.

Exemplars of evidence:
A parent discusses their early experiences: ‘…if you [health professional] listen, because the parent knows. I think what we’ve experienced is that our suspicions and our concerns have been proved right. And if they had listened and given a little bit more consideration instead of just giving lip service you know, we could have been further down the road than we are.’

Smart working: in one location, health, education and social work teams, in partnership with parents, have developed a regional resource folder with guidelines for the management of children with DCD. It is used as a reference for parents, professionals and voluntary groups and provides information on DCD as a condition, the numerous issues involved and the role of different interagency team members.

An orthoptist discusses the importance of raising awareness of their role to others to facilitate referral to the right people at the right time: “…and just raising the profile as well, educationally to say, “these children are having specific problems”. I would like to somehow to get involved with training of, teacher training [teaching them]; “these are things I would look for, are quite specific, are quite obvious and this is how you get these kids to us for assessment”.’
Principle: Optimising pre-assessment contact

Evidence for principle:
AHPs indicated that gathering information about the child and family in a pre-assessment phase afforded them the opportunity to gather sensitive information prior to the parent/guardian attending with their child. Some AHPs gathered this kind of information via telephone interview. Professionals reported that this pre-assessment contact with parents/guardians allowed them the opportunity to help structure the assessment around the child’s needs. In addition, some therapists made use of a paper-based checklist (ie the movement ABC checklist) which was completed by staff at an education site. This type of information was used to provide an opportunity to identify children who could benefit from community based intervention prior to any further therapy services involvement. The survey indicated that occupational therapists were most likely to gather information prior to face-to-face assessment, often from school and home sites. Physiotherapists and orthoptists were the professionals that predominantly gathered verbal information from schools. Very few professionals were making use of early diagnostic tools (eg the DCD questionnaire).

Key message:
Gathering information and making contact with parents/guardians during the phase prior to face-to-face contact may be beneficial for a number of reasons: (1) parents/guardians have an early opportunity to engage with the therapist regarding the child’s care, (2) it may avoid the need to discuss sensitive information while the child is present, (3) face-to-face assessments may be more appropriately structured to meet the child’s and the family’s needs and (4) it may facilitate early access to services and care/support that is delivered by others.

Exemplars of evidence:
An occupational therapist discusses the benefits of pre-assessment contact: ‘...we can try and get information before we actually see the child and we try and tailor our assessments much more now because we are having a conversation with the parent pre-assessment…I think staff feel already engaged with the parent by the time they attend […] for the child it is less intimidating as long conversations with parents on the day are avoided.’

Smart working: an occupational therapist working within a remote and rural community used the movement ABC checklist to help identify children within remote areas who had movement difficulties. These children were then offered access to education based motor skills sessions. This proactive assessment of children referred to the occupational therapist enabled the AHP to engage with current educational legislation and work with partner agencies to provide school-based intervention prior to any AHP involvement.
Assessment

“The first time [I came to therapy], I felt a wee bit embarrassed...” [child]
**Principle: Integrating views and expertise of parents/guardians and children**

**Evidence for principle:**
From the parents’/guardians’ narratives, the stage prior to referral was an emotionally challenging time. They had often waited for lengthy periods during which they experienced feelings of guilt, uncertainty, confusion, anxiety and frustration. They were also concerned about the impact of perceived delays upon their child. Parents/guardians are also keen observers of their child’s difficulties, a finding which is supported in much of the qualitative literature. Some parents/guardians wanted a diagnosis for their child, as they viewed it as something which may enable them to gather more information about the condition and was perceived, by some, to be an important tool in accessing support and understanding from education and other professionals. Children were able to talk about the activities and skills at which they would like to get better, and explain the range of things with which they still needed help. Parents and guardians reported that they valued those AHPs and other professionals who appeared to tailor care and support distinctly, to support the individual needs of the child and family. From a professional perspective, AHPs interviewed indicated that assessment could provide a useful means of gathering the children’s and parents’/guardians’ views. Many highlighted the importance of listening to the parent or guardian, as a means of gathering vital information as well as being the first step to engaging them in supporting the child. Policy documents support the importance of listening to parents/guardians/children and the duty health care professionals have to be alert to the needs of the child.

**Key message:**
National policy gives guidance about the need to listen to parents/guardians and children. The evidence presented here is important in that it can help AHPs understand the kind of experiences, concerns and valuable knowledge that parents/guardians bring with them to initial assessment sessions. Parents/guardians and children are knowledgeable about DCD and how it affects their lives. Allied health professionals are critically positioned to engage with parents/guardians and children, to gather important information they can offer and to make them feel heard and understood, opening necessary channels of communication. Viewing parents/guardians and children as active contributors and providers of key information is important when developing intervention strategies.

**Exemplars of evidence:**
A parent discusses the difficult feelings associated with gaining a diagnosis: ‘from the minute you know something’s wrong till you finally get a diagnosis you go through this most harrowing, awful experience in which you reduce yourself to nothing; to this worthless, neurotic, terrible parent.’

Smart working: an occupational therapist discussing the importance of listening to parents: ‘I think its listening to parents, and appreciating what to them are the fundamental issues and most important to them, they are key to understanding what the main issues are. I suppose I see them as much as clients as the children.’
Principle: Harnessing benefits of collaborative assessment

Evidence for principle:
Parents and guardians expressed a clear desire to have an integrated approach to the care of their child. They were able to give examples of what they perceived to be good and bad practice in terms of cooperation and joint working regarding assessment. Frustration was experienced by some as a consequence of repeated questioning or assessment of their child; this was associated with an assumption that there was insufficient information sharing and collaboration between professionals. Parents/guardians reported that this wasted time and raised their concern that professionals were not working in a united way to support their child. From a professional perspective, AHPs made repeated reference to the value of joint assessment and sharing knowledge and expertise, in particular with other AHP colleagues. They suggested the child and parent/family avoided repeated visits for assessment and would be able to observe a collaborative approach to assessment. In addition to this, AHPs were able to share skills/knowledge and work together to enhance the care of the child. The findings from the survey highlight that for many AHPs working collaboratively at the assessment stage remains an aspiration rather than a reality. Where joint assessment was carried out (and this was rated as: ‘infrequent’) AHPs indicated that joint assessments were carried out alongside occupational therapists and perceived this to be ‘very effective.’ Joint assessments with occupational therapists and physiotherapists; physiotherapists and orthotists; podiatrists and physiotherapists and orthoptists and ophthalmologists were all viewed as ‘effective,’ although they were only conducted ‘some of the time’ or ‘none of the time.’ Policy documents support the need to develop integrated approaches to service delivery between local authorities and NHS Scotland, collaboratively working across boundaries of different agencies in a whole systems approach.

Key message:
Professionals should be mindful of negative parental perceptions of duplicated uniprofessional assessments. Considering this, supporting parents/guardians and children to access professionals across health and education in an integrated manner is of key importance; it can also provide structure for integrated working throughout the patient journey. In addition to parents/guardians benefitting from collaborative working, there are clear benefits for all professionals, including increased knowledge of others’ roles and opportunities for peer support and evaluation.

Exemplars of evidence:
A physiotherapist describes the benefits of assessing children with an occupational therapist: ‘…the therapists can chat amongst ourselves and decide what we think the problems are and where we think we should go with these problems. They [the children] are actually probably getting a better assessment because we have got that peer review, that peer support there. Then we also feel that their treatment now is much more tailored to their actual needs, rather than receiving two different types of treatment.’

Smart working: occupational therapists and physiotherapists have piloted a change to service delivery where children with DCD and co-ordination difficulties are assessed by both professionals. As part of this process, occupational therapists and physiotherapists were involved in gathering and sharing information from parents/guardians through home visits and assessments were carried out in a variety of community based locations. Once children’s needs were identified, collaborative work with education meant children were included in school based intervention carried out by trained education staff.
Principle: Making assessment practices appropriate

Evidence for principle:
Parents/guardians value improvement in the child’s active engagement with age-appropriate participatory activities, eg playing on bikes with peers. They reported in focus groups that this was important as they observed the child’s self-confidence and general well-being to improve as a consequence of such developments. Children reported in focus groups that they wanted to improve in skills and activities which related to participating in play with others, eg being able to play basketball better. From a professional perspective, collectively, assessment tools used by AHPs primarily address issues of body functions. In contrast, there is little use of assessments which address issues around the child’s active and successful participation in meaningful and valued activities at home, school or in the community. Also, some professionals felt there was a need to move away from the hospital setting for assessment, although it was recognised that there were advantages when using standardised measures to being in a clinical setting. Survey data supports these findings. Firstly, most professions (excluding OTs and orthoptists) used non-standardised assessment tools, and very few used tools that assess the engagement of the child in their home, school or community environments. Secondly, AHPs appear to carry out the majority of assessments in hospital based locations. The next most frequently used location for assessment was school. This latter finding varied between professions with a higher incidence of assessments being carried out in schools by some professions (eg physiotherapists, occupational therapists) and rarely being carried out by others (eg orthoptists, orthotists and podiatrists).

Key message:
From the evidence gathered, AHPs are currently using tools to evaluate body functions, and tend not to use tools which assess participation at home, school or within the community. Parents/guardians and children, on the other hand, place value on successful participation in home, leisure or self-care activities. Accordingly, assessments addressing these facets of child performance may be beneficial. While not all components of assessment lend themselves to this orientation (for example, some assessments require a clinic location) AHPs should also give consideration to conducting assessments within or with reference to different ‘natural’ environments, (eg school and home) addressing the child’s participation in these environments. This would offer the AHP an insight into important aspects of participation as well as the opportunity to access the views of teachers and parents.

Exemplars of evidence:
A parent gives their view on the optimal place for child assessment: ‘I think the assessment could be more user friendly because these children are usually in their school or playgroup where you can watch them at play seeing as many things as you can.’

The quotations below from two different therapists highlight the arguments related to having assessments in the right place for the child and in relation to the assessment: ‘…it’s wrong to try and medicalise these children too much and bring them into hospitals, ’cause quite often they’re taking a whole day out of school for a one hour appointment.’

‘Sometimes they occur in schools, if logistically it’s going to work better to do it in a school […] but it’s better […] if they can come to us at the clinic […] because with access to the equipment and you’ve got some control of your time from a standardised assessment point of view.’
Evidence for principle:
During AHP interviews, participants discussed the complexities of diagnosis and the possible benefits of using a structured multidisciplinary process to assist professionals. Some AHPs were able to describe such collaborative practice with medical colleagues that enabled a uniform approach when moving towards a diagnosis. The development of diagnostic protocols was perceived positively as a tool that could ensure a cross-boundary approach towards gathering evidence required during this process. The survey indicated that community paediatricians were the professional group most frequently involved in the diagnosis of DCD. Of the AHPs surveyed, occupational therapists were the most frequently involved AHP group in the diagnostic process, with others being involved less frequently. The majority of AHP departments did not have a recognised protocol for supporting diagnostic process. Evidence from the parent/guardian focus groups and qualitative review would suggest that the period before and during diagnosis can be difficult and stressful.

Key message:
There are multiple component parts related to the diagnosis of DCD, as listed in the DSM-IV criteria. Appraisal of these suggests that a multidisciplinary approach would ensure all criteria have been considered and fully assessed. In some cases, AHPs work alongside paediatric medical colleagues, helping to support the diagnostic process for children with DCD. However, in some sites this process lacks consistency and order, which may result in delays, which can be harrowing for parents/guardians. Having clear protocols for contributing to diagnosis may enable more focused and effective involvement and collaboration with all those involved in the child’s life, and could reduce the time taken for a resolution to be reached.

Exemplars of evidence:
An occupational therapist talks about her concerns about the lack of a systematic approach to diagnosis for children with DCD: ‘I just feel that developmental co-ordination disorder or co-ordination difficulties children “float about”. I think they go from one professional to another and I think it depends on your luck on who you get if something is going to happen [...] I just think, [if] you get an OT who thinks you have DCD, you can get checked out by the doctor and the doctor will confirm that, or the doctor will say, “yeah, they’ve got it”, but there’s no multi-disciplinary assessment in this area. I can’t speak for anyone else, but I feel it’s really missing.’

Another occupational therapist reports on the diagnostic process in which they are involved: ‘The occupational therapists come together, have a discussion about what they’ve seen and done […] once they’ve done their assessments, they maybe chat to the parent, they maybe chat to the school again, then for the third appointment they’ll bring in the doctor, who does his neural examination, and at that point the diagnosis is made. So, on the third appointment we would look at making a diagnosis. There are some children [for whom] a diagnosis won’t be made […] and we would make a decision to do a bit more assessment.’
Principle: Adopting an honest approach to outcomes and expectations

Evidence for principle:
Parents/guardians were clear that they highly valued AHPs who were open and honest regarding the future for their child. They felt that, at times, therapists were not completely open in presenting their views of the child’s likely progress or the challenges ahead. When asked about discharge, parents/guardians reported that they found discharge from AHP services difficult and upsetting, often being perceived as an abrupt ending, leaving parents feeling alone and without support. The review of the qualitative literature draws attention to the uncertainty and anxiety that parents and guardians report during the initial stages of caring for their child, when they have no access or support from services. These may be feelings that return with the approach of discharge. Policy documents support AHP practice in enabling the self-management of conditions which are long term.

Key message:
Acquiring an in-depth understanding of parents'/guardians' and children’s knowledge, understanding and expectations at the assessment stage may assist the AHP to discuss, openly, the planned therapy intervention and projected outcomes. There is professional consensus that DCD can be a lifelong condition. All those involved with the care of the child with DCD require an awareness of this to ensure there is a shared expectation of outcome. Open, honest communication from the earliest stages of involvement with AHP services will help to ensure parents/guardians, children, education and others have realistic expectations, and are suitably prepared for and capable of employing strategies to support the child not only at the time of discharge, but throughout their involvement with AHP services.

Exemplars of evidence:
A parent talks about the moment when she confronts a healthcare professional about the longer term outcomes of therapy, she has to take a direct approach to getting an answer ‘I even got to the point where I had to say “are you actually going to cure it, or are you just going to help it?”’ And he said, “Oh no, no, we’re just helping it along.” And I thought, “Oh, what a fundamental thing that I should have known”.

A parent explains that they felt the need to know, even roughly, how things were likely to progress or not: ‘I know it’s a fine line that you walk between “it won’t” or “it will”, but I think you do need to know the parameters of what you’re looking at. That, you know, you’re not failing parents, they [the child] may never eat neatly.’
Intervention

‘Therapy is fun!’ [child]

Standing on the Platform
Principle: Putting the child and family at the centre of care when goal setting

Evidence for principle:
During the parent focus groups, participants had a clear view of their child’s strengths and difficulties, and felt well placed to provide input to professionals on important goals for their child. Children were able to demonstrate a clear ability, using basic language and drawing, to articulate skills that they aspired to develop, and tasks within the home and school with which they needed help. Difficulties in school were often the primary focus of their discussion, although children often aspired to improve in valued leisure activities such as football, karate or rugby. Children were also able to reflect on and imagine success, expressing how it must ‘feel’ to achieve a particular goal or ambition. From a professional perspective, AHPs also indicated that setting goals with the child and family was a valuable activity. Findings from the survey indicated that AHPs carry out goal setting with children and parents/guardians, ‘all or most of the time.’ Occupational therapists were the only profession who reported using standardised tools to assist with this process. Considering the qualitative review, this literature also describes children as having a definite awareness and opinion regarding their own skills and abilities, and that parents/guardians are key stakeholders in understanding a child’s difficulties. Considering the quantitative review, although use of child-centred outcome measures is not common, some evidence of efficacy of AHP intervention is available regarding improvements in child self-selected goals. Policy documents advocate listening to the child’s wishes, enabling them to choose priorities, establish targets for success and engage them in monitoring their own progress.

Key message:
Helping children to achieve valued goals is an important element of AHP practice, and for some, the ultimate objective of their interventions. When appropriate, considering the nature of the AHPs’ practice, making these goals functional in nature is beneficial for children with DCD. Actively involving children in this process ensures that the focus/outcome of intervention is based on the child’s view and may result in the child and family being more committed to therapy as it has relevance to their lives. Standardised tools are available which can support this process. Active involvement of parents/guardians in this process may help to make them feel heard and understood, and also allow them to provide valuable guidance on a child’s skills and abilities as well as areas of difficulty.

Exemplars of evidence:
An occupational therapist talks about the usefulness of having the child set their own goals: ‘I think what I found really quite helpful, is actually having the children setting their goals. Especially when they come in the groups; I use it as a means of focussing them. Some may be coming for a few weeks and it’s good just to re-focus them back, “This is the reason you’re coming and you wanted to get better at going on your bike.” Kind of re-focus them and re-integrate them into why they’re actually coming. I think that’s really good, children setting their goals.’

Smart working: in one location, therapists are using a child-focused reflective tool as a therapy outcome measure. They measure the child’s perception of their abilities before and after intervention and use the child’s perception of change to formally judge if therapy was effective for that child; this leads to the focus and outcome of intervention being based on the child's view.
**Principle: Involving other AHPs and education staff in goal setting**

**Evidence for principle:**
Children clearly articulated the importance of personal educational goals (e.g., improving reading, writing and spelling). Parents and guardians consistently highlighted that they wanted quality, comprehensive health care services (medical care and therapies) and supporting education-based care provided locally. They gave examples of good and bad practice in terms of co-operation and joint working involving education and health sector-based professionals. They also reported that where there were good lines of communication and shared child-centred goals between the educational and health sites, then care was more effective. From a professional perspective, interview respondents indicated the importance of setting goals with education staff and other AHPs; although survey findings indicate only half the AHPs carried out goal setting with education staff ‘some of the time’ and found this process ‘mostly effective.’ Policy documents suggest interventions should include activities that are functional and that goals should be based on the daily life of the child.

**Key message:**
Setting goals with other AHPs and education staff ensures that there is a consistency of approach, which parents/guardians have frequently identified as important in the care of their child. If child-centred goals are shared across multiple health disciplines and education, they are likely to be more robustly addressed by all working with the child. In addition, the communication of goals within health, and across to education, is likely to support more effective interaction between these groups.

**Exemplars of evidence:**
*An orthoptist discussing future plans for greater collaborative goal setting:* ‘… some kind of getting together with all the therapists to lay down one goal for this child to work towards, or one report, so we know where we’re going with that person, that the teachers will understand and everyone else involved.’
Evidence for principle:
Children identify the need for help with curricular activities (eg writing) and their ‘muscles’ and ‘balance’, however, the focal point of children’s aspirations for improving skills centred on activities at a participation level, and on gross motor activities (eg rugby, football, karate) that facilitated engagement with their peers. In addition, parents and guardians do not identify motor co-ordination difficulties as their primary concern. Instead, they want to see their child improve at home (eg dressing, using cutlery), school (eg keeping up academically with peers, concentrating in class) and leisure activities (eg riding a bike, swimming) along with greater social inclusion (eg having friends, being accepted by peers). They also valued their child’s sense of confidence, self esteem and general perceived ‘happiness’. From a professional perspective, AHPs focus on a number of different issues, with different professional groups having a different emphasis in their intervention approach. Survey findings also indicate this. Considering the qualitative review, parents/guardians and children value therapy input that enables a child to engage in school, home or social activities. Considering the quantitative review, although the evidence is sparse, there are some findings which indicate that improved participation is a potential outcome of AHP intervention. Policy documents suggest in addition to improving motor skills, school and leisure based activities, that AHPs should also aim to improve other attributes such as self esteem and confidence.

Key message:
Focussing on participation ensures that the emphasis is taken away from attempts to ‘fix’ children’s co-ordination problems. Instead, consideration is given to the child’s engagement with their day-to-day life tasks, school, leisure and social interaction. This approach puts child and family needs at the centre of decision making and care. It is important to note however, that working on body functions (eg gait, balance, strength) or discrete activities (eg ball skills, jumping) may also support a child’s participation. Children also value improved performance in gross motor activities (eg football or rugby) involving their peers. A focus on improving skills around these areas may improve children’s sense of their competence within physical activities, encourage a life long interest in exercise and facilitate greater engagement with peers in their community.

Exemplars of evidence:
A child discusses how he would feel if he achieved his goal of scoring a try at rugby: ‘How would you feel if you scored a try?’ [moderator] ‘There was this thing on the radio, you phone up and you can get a fanfare for the first time you’ve done something in your life!’ [Child]

The focus group moderator and child discuss the moment when the child could successfully tie his own shoelaces: ‘How did that make you feel?’ [moderator] ‘Kind of nice […]’ ‘cos when I couldn’t do it I needed other people to help me, and by the time there was me with two other boys I could tie my shoe laces’ [child] ‘how did that make you feel?’ [moderator] ‘Excited!’ [child].

Smart working: in one location, an occupational therapist and a physiotherapist, working with a cycle coach and local authority staff, supported children to gain experiences of success by teaching them to ride a bike alongside peers in the community. These children entered the group with no or very poor bike skills. At the end of the group, all were able to ride bikes. In addition, children cited examples of having more opportunities to cycle with friends, and parents/guardians provided positive feedback about their children succeeding where they had previously failed.
Evidence for principle:
Parents/guardians valued those professionals (eg AHPs, teachers and support workers) who appeared to be genuinely interested in the child’s welfare and sought to tailor care/support/advice in ways which effectively supported the child and family. This ‘genuine’ interest in the child appeared to be linked to parents/guardians perceiving the professional to be focussing upon the child’s/family’s needs and having a positive attitude towards the child and the child’s care. In addition, parents/guardians valued being empowered by AHPs to support their children in the best possible manner. From a professional perspective, AHPs demonstrated knowledge of why parents/guardians required support, and how to support them; they also appreciated the important role parents/guardians played in supporting the child. Similarly, AHPs recognised the importance of working with teachers, providing guidance and education where necessary. Lastly, some AHPs discussed their role in terms of general health promotion, focusing not on individual children, but on groups of children and their environments. Survey findings indicate that although some AHPs are working in a service delivery model which encompasses a range of the elements described above, most still provide individual interventions to children as their primary focus. Considering the quantitative review, research has shown that parents, teachers and support staff have an important role to play in providing services and can provide direct services to children under the supervision of therapists. Policy supports innovative cross boundary approaches to AHP involvement in health promotion, assessment and intervention.

Key message:
The child should not always be the sole focus for intervention. It is recognised that modification of the physical, social or attitudinal environment of the child, through engaging with parents/guardians and teachers, and through health promotion, can provide a foundation on which to build enhanced participation. In addition, explicit support of parents/guardians is an important element of AHP practice, as they often require emotional, informational and/or practical support which AHPs are well placed to deliver.

Exemplars of evidence:
_A speech and language therapist discusses strategies to involve parents:_ ‘…usually we engage the parent in whatever we’re doing and encourage them to take it on board, rather as role-modelling, we’ll get them to think of ideas as well.’

_‘An orthoptist discussing her role in working with parents/guardians and teachers:_ ‘sometimes parents need a suggestion of “take them to karate”, or “teach them to swim” just these kind of things that […] the parents are so overwhelmed by the problems that their kids have, that they don’t think of these.

_A dietician describes the importance of parents for helping children with DCD, and the importance of supporting and engaging parents:_ ‘when it comes to diet the most effective thing for children with DCD is that the parents actually feel better informed and more confident. And, so what I am saying is actually the broad range of psychological benefits for the family having mulled around these things for ages, being told by half, “do nothing”, by the other half, “do everything”, and being made to feel guilty for either option, at last having somebody that they can discuss it with, that’s somewhere between the two, I genuinely think has major psychological benefits for the family that allow them just to get on with things.’

Principle: The child is not the only focus for intervention
Evidence for principle:
Parents/guardians want to be involved in their child’s management, and make effective contributions to their care. However, this is at times blocked by ineffective communication, with failure to provide sufficient information on the child’s management and/or outcomes. The use of professional jargon left parents/guardians feeling confused and distanced from the management of the child. Lack of communication between professionals resulted in a disjointed provision of support. The need to involve parents/guardians and education was a strong theme from the AHP interviews with an identified need to shape parents/guardians expectations of their responsibilities and the expected outcomes of intervention. Professional terminology/jargon was also recognised as a barrier to effective communication with parents/guardians. Survey findings highlight that feedback to parents/guardians and other professionals from AHPs is commonplace, and therefore an important consideration. There is emerging evidence from the quantitative review that parents/guardians and education staff can be effective in the delivery of some interventions. Involving parents/guardians and children in delivering care and developing strategies for self management is supported by policy documents. Policy also endorses interagency working and the inclusion of education in a whole systems approach to the management of the child.

Key message:
There is a recognised need to involve the child, parents/guardians and education in any intervention. The development of strategies for self management, which can continue to be used on completion of therapy should be a key focus of AHP practice. Shared goals and expectations across professions, involving parents/guardians and child, with an emphasis on self management may ensure that all involved feel prepared and supported to continue to implement strategies used when therapy ends. Effective communication is a fundamental component of this process, using structure and language that is accessible to all. Parents/guardians, in particular, have made clear statements as to the confusion professional jargon can cause.

Exemplars of evidence:
A parent explains how difficult it can be to make sense of some communications from health professionals: ‘the report came forward on that assessment, I did not find [it] user friendly at all either. It was […] you know, there was an appendix at the back that was all of these formal assessments and it wasn’t […] that wasn’t meaningful to me and I don’t think it would be meaningful to a lot of people.’

A parent talks about what they observe happening at school, in terms of support, and how things can appear to ‘break down’ from one year to the next: ‘and I think you get things set up in school and then it comes to end of term and it all falls apart again. That’s what I’ve found. You have to keep going back to school.’

Smart working: in one location, therapists have set up a carers clinic where at the first session of a block of group therapy parents/guardians are involved in viewing their child participating in activities. The therapists will use this as a method to engage parents/guardians in the intervention process and as a way to aid communication about what they are doing and why.
Principle: Valuing formalised collaboration with others

Evidence for principle:
Parents/guardians perceived the care of their child to require a team approach and believed that where good lines of communication, child-centred goals and shared expectations were developed between education and health, care would be more effective. From a professional perspective, AHPs were able to highlight examples of effective collaborative working with partner agencies to deliver interventions based within community locations. They emphasised a need to develop regional and strategic approaches to the management of DCD with formal collaboration between multiple agencies across local authorities. In providing and delivering, for example, motor based interventions alongside education a strategic level approach was considered more effective than engaging with individual schools. Although there were many examples of intervention being delivered within local communities few were structured in such a way as to engage formally with the local authorities concerned. Policy recommends that strategic planning arrangements are established to ensure the involvement of key stakeholders and effective and efficient delivery of services by therapists.

Key message:
Engaging partner agencies, such as education, local authority and community groups in the delivery of community based intervention can provide the structure required to ensure a consistent approach to service delivery for children with DCD. Approaching service delivery strategically can allow such initiatives to become embedded and integral within a school day, and implemented by school based staff. Allied health professionals may need to become increasingly aware of the need to adopt this approach to service delivery, in conjunction with partners in education, using activities that focus on engaging children in valued and meaningful activities.

Exemplars of evidence:
A physical education specialist describes the strategic, regional route they took to setting up support in schools: ‘it’s amazing, I think, through all of the various different background contexts, it’s amazing how many different regions and schools and clusters of schools have something […] small motor programmes […] however, they were going about it in the opposite direction from where we were, in regards that they were starting very much from occupational therapy and physiotherapy and then trying to go in through each individual school. Whereas we were going the opposite way. It was coming from the region itself. And I think that’s [the later] always going to be a far more successful route.’

An occupational therapist describes, as an authority wide initiative, training for staff to run motor interventions based in schools: ‘we ran one training morning for the learning assistants on kind of DCD and difficulties that these children have and why, what we were going to do to help them, and then we did individual, one hour sessions with the assistants who were running the groups, and went through the programme, so they knew how the programme ran. And then after that, they get weekly visits from ourselves.’
Evidence for principle:
High quality randomised control trials have indicated that (1) sensory integration and perceptual motor training (traditionally used by occupational therapists and physiotherapists) are more effective than no treatment, but no more effective than each other at improving motor skills (2) that fatty acid supplementation can improve reading, spelling and behaviour and (3) that kinaesthetic training shows comparable/greater effectiveness in improving motor skills, kinaesthetic perception and kinaesthetic memory in some studies; but in other studies shows no effect relative to no treatment. More recently developed interventions, eg task specific approaches or CO-OP (a goal orientated, problem solving approach which teaches children cognitive strategies to deal with motor problems) have yet to robustly demonstrate their efficacy. Due to the small number of studies using suitable outcome measures, there is limited evidence to support or disprove the value of any intervention in terms of a child’s wider participation (eg self-care, leisure, play and school work). Due to a lack of quality research, the effectiveness of orthoptic and podiatric interventions for children with DCD is uncertain. Overall, the quantitative evidence is insufficient to provide firm guidelines for practice. There are forms of care which appear promising, but all current approaches to the rehabilitation of children with DCD require further clinical trials and outcome studies.

Key message:
Although further research is required in all areas, therapists should be aware of the current evidence base for their interventions. In terms of different therapies, the ‘active ingredients’ of most interventions have yet to be identified. However this does not mean they are ineffective, rather, this indicates that further work is required to identify the children most likely to benefit from intervention, and what those interventions should include. Reflection on current evidence, and integrating this into care, may contribute to the achievement of successful outcomes as well as helping to identify areas for future input.

Exemplars of evidence:
A therapist described a journal club, which routinely met to review literature and reflect on how this would change their current practice and protocols. ‘it is good to get together and have support to review literature […] it can be hard going if you are doing it on your own […] we all want to be evidence based and it is helpful to have summaries of evidence available to pull from.’
Discharge

‘...and it was like “Right, we’ll you see you at Primary 7!”’
[parent]
Principle: Evaluating interventions and outcomes

Evidence for principle:
Children were able to reflect upon times when they had experienced success and recall the feelings associated with that. It was notable that children had strong positive feelings associated with times of achievement and that they were able to talk extensively about goals they aspired to achieve in the future. Parents and guardians also talked about the importance of their child achieving personal goals. In relation to goal setting, more than half of the AHPs surveyed set goals. Parents were commonly involved in goal setting and when evaluating these, the majority of AHPs again involved parents/guardians and children. That said, 65% of AHPs did not have established protocols/frameworks for follow-up or review. Policy guidance for the care of children with DCD supports interventions that are relevant to the needs of the child and family and those that are evidence based.

Key message:
Attaining personal goals and success are critical to the child and their carers. Many allied health professionals are already engaged in goal setting and evaluation, a practice which places the child at the centre of care, and enables the therapist to critically review the effectiveness of interventions and outcomes observed. This process of review supports the development of clinical practice that is critically reflective and responsive to the improvements or lack of improvements observed.

Exemplars of evidence:
An occupational therapist talks about the importance of focusing upon effective clinical practice and talks about her desire to see more research to support this: ‘If it was me [...] I would be taking much more time to research the impact of intervention and make sure we were developing good, occupation focused outcomes and measures and make sure, in an ideal world,[interventions] come down to the kinds of children that we are really effective at working with [...] because I think that’s there and we probably should be making sure that we focus on interventions that [...] and change [we need to] just put our focus on what we do best.’
Principle: Providing strategies for self management and making use of community resources

Evidence for principle:
Parents/guardians identified that discharge can be a challenging time, associated with ongoing concerns about the future for their child. They valued having strategies to support the child, which they were able to continue implementing when therapy contact ceased. These strategies could involve activities or approaches which could be implemented within the home, school or the community setting. Interviewed allied health professionals reported that they valued having approaches to support the child, which could be continued with ease and incorporated into daily life, both at home, in the school and within the community on completion of therapy. Policy documents support the promotion of self management of conditions and involving the child, parent and other agencies in the provision of care.

Key message:
Discharge from therapy can be a difficult and worrying time for parents/guardians of children with DCD. To support the move towards discharge, AHPs and other involved professionals must share their expectations of therapy with the child and carers and aim to provide (as best they can) strategies which can continue to be used by the family to support them through and beyond this stage. Allied health professionals should endeavour to find and promote purposeful strategies which will support the child and family in self-management. Such strategies may be implemented within the home and school or within the community.

Exemplars of evidence:
The quotation below is from a parent who is explaining the benefits of taking her child to kick-boxing classes – these were recommended by a therapist: ‘That’s why I go to kickboxing because it’s exercise […] and it works for them all [the children]. They’re going to have fun. Plus they’re getting the added bonus of doing all these exercises. They don’t even relate to [therapy] […] it’s kick boxing and it’s fun and they’re doing all these exercises that’s great for them, you know for muscle tone, everything’.
**Principle: Providing clear pathways for exiting services**

**Evidence for principle:**
Parents/guardians reported apprehension and worry in relation to the future life for their child and voiced concern regarding discharge from therapy. Some services offered continued support via a telephone contact, and parents/guardians appeared to value this opportunity, finding this reassuring around the time of discharge. From the survey it was noted that the majority of AHPs do not have a protocol for discharge.

**Key message:**
An awareness of the anxieties and concerns of parents/guardians around the time of discharge should assist AHPs in preparing and supporting the child and their family. If discussions around expectations, outcomes and discharge are initiated as early as possible, this would provide an opportunity for the child, parents/guardians and education to discuss needs and concerns, and ensure interventions and goals are appropriately aligned to meet the continuing needs of the child and family. Establishing and maintaining clear and open channels of communication between the child, parent/guardian and other professionals, such as education staff, to discuss their concerns prior to exiting the service could be critical at these times. Where intervention has been successful in empowering others to support the child’s discharge, this may aid the success of transition out of therapy for all involved. Clearer pathways for re-referral could also alleviate anxiety around this time. Discharge protocols could be used as a tool to support early discussion around expected outcomes and the discharge process.

**Exemplars of evidence:**
*A parent describes worrying about their child’s future:* ‘that’s where my worry is as well. My daughter’s at the high school and you’re thinking “How are you going to cope with that?” I don’t even want [name] to walk up to the school, let alone go to the school.’

*A parent talks about her experience of discharge:* ‘they have discharged [child’s name] but said if ever there’s any problem or we need to talk to them […] and we did. A teacher at the end of last year […] she had a really good teacher who thought she could foresee problems arising and so we contacted the OT department and they’ve seen her and reassessed her and you know, they’ve been fantastic to us […] for us.’
Improving the quality of DCD service delivery: a framework

Raising awareness of DCD in communities
Supporting self management within homes, schools and communities
Integrating views and expertise of parents/guardians and children
Harnessing the benefits of collaborative assessment
Making assessment practices appropriate
Putting the child and family at the centre of care when goal setting
Involving other AHP and education colleagues in goal setting
The child is not the only focus of intervention
Evaluating interventions and outcomes

Health promotion

Early stages

Optimising pre assessment contact
Structuring the diagnosis process
Adopting an honest approach to outcomes and expectations
Valuing formalised collaboration with others
Sharing expectations and responsibly in supporting change
Using evidenced interventions that support change
Clear pathways for exiting services

Assessment

Communication

Child and parent involvement

Working together

Intervention

Skills & knowledge

Discharge

Providing strategies for self management and making use of community resources

Improving the quality of DCD service delivery: a framework
11 References in main body of report


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13 Qualitative review references


14 Policy review references


List of abbreviations (in order of use)

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full name</th>
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<tbody>
<tr>
<td>AHP</td>
<td>Allied Health Professional</td>
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<tr>
<td>SLT</td>
<td>Speech and Language Therapist</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>ASL</td>
<td>Additional Support for Learning (act)</td>
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<tr>
<td>DCD</td>
<td>Developmental co-ordination disorder</td>
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<tr>
<td>QIS</td>
<td>Quality Improvement Scotland</td>
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<tr>
<td>RCT</td>
<td>Randomised Controlled Trial</td>
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<tr>
<td>OD</td>
<td>Other than controlled design</td>
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<tr>
<td>DSM-IV</td>
<td>Diagnostic and Statistical Manual of Mental Disorders 4</td>
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<tr>
<td>ICF</td>
<td>International Classification of Functioning</td>
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<tr>
<td>CCT</td>
<td>Controlled Clinical Trial</td>
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<tr>
<td>IQ</td>
<td>Intelligence Quotient</td>
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<tr>
<td>SD</td>
<td>Standard Deviation</td>
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<tr>
<td>SE</td>
<td>Standard Error</td>
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<tr>
<td>NT</td>
<td>No Treatment (group)</td>
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<tr>
<td>NSMDA</td>
<td>Neuro-Sensory Developmental Assessment</td>
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<tr>
<td>PMT</td>
<td>Perceptual Motor Training</td>
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<tr>
<td>VLBW</td>
<td>Very Low Birth Weight</td>
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<tr>
<td>TOMI</td>
<td>Test of Motor Impairment</td>
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<tr>
<td>SI</td>
<td>Sensory Integration</td>
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<tr>
<td>CTA</td>
<td>Contemporary Treatment Approach</td>
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<tr>
<td>CO-OP</td>
<td>Orientation to Daily Occupational Performance</td>
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<tr>
<td>BOTMP</td>
<td>Bruininks-Oseretsky Test of Motor Proficiency</td>
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<tr>
<td>VABS</td>
<td>Vineyard Adaptive Behaviour Scale</td>
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<tr>
<td>ADL</td>
<td>Activities of Daily Living</td>
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<tr>
<td>GPDC</td>
<td>Goal, plan, do, check,</td>
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<tr>
<td>ADHD</td>
<td>Attention Deficit Hyperactivity Disorder</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
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<tr>
<td>PEGS</td>
<td>Perceived Efficacy and Goal setting System</td>
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<tr>
<td>CSP</td>
<td>Co-ordinated Support Plan</td>
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<tr>
<td>MREC</td>
<td>Multi-Centre Research Ethics Committee</td>
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<tr>
<td>MRAD</td>
<td>Multi-Centre Research and Development Committee</td>
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<tr>
<td>HV</td>
<td>Home visitor</td>
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<tr>
<td>CP</td>
<td>Cerebral Palsy</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<tr>
<td>PW</td>
<td>Per week</td>
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<td>PM</td>
<td>Per month</td>
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<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
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<tr>
<td>joint ROM</td>
<td>joint range of movement</td>
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<tr>
<td>COPM</td>
<td>Canadian Occupational Performance Model</td>
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<tr>
<td>CDC</td>
<td>Child Development Centre</td>
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<tr>
<td>CAMHS</td>
<td>Child and Family Mental Health Services</td>
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