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Partnering for Change: An innovative school-based occupational therapy service delivery model for children with Developmental Coordination Disorder

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Abstract

Background: Developmental Coordination Disorder (DCD) is a common, chronic health condition that is poorly recognized and understood in school settings. Without appropriate support, children with DCD are at increased risk of depression, anxiety, decreased physical fitness and obesity. Evidence shows that occupational therapy intervention needs to shift from remediation of impairment to chronic disease management.

Purpose: This paper describes the Partnering for Change (P4C) model, an innovative, empirically-derived school health service delivery model for children with DCD.

Key Issues: The model emphasizes the partnership of the occupational therapist with educators and parents to change the life and daily environment of a child. The P4C **P**artnership focuses on **C**apacity building through **C**ollaboration and **C**oaching in **C**ontext. The model uses a tiered approach which includes whole class instruction, dynamic performance analysis and monitoring of response to intervention.

Implications: Partnering for Change is a model of service delivery that responds to the needs of this population, addresses issues identified in research and provides a continuum of services designed to build capacity.

Key words: DCD, school health services, intervention, knowledge translation

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The majority of children who are referred to school-based occupational therapy services have difficulties identified with printing, handwriting and other fine or gross motor tasks that are necessary for their successful engagement in school settings (Miller, Missiuna, Macnab, Malloy-Miller, & Polatajko, 2001; Missiuna, 2002). There is evidence to suggest that most of these children have developmental coordination disorder (DCD) (Missiuna et al., 2008). Given the prevalence of DCD as 5-6% of the population (American Psychiatric Association (APA), 2000), this suggests that there may well be at least one child with DCD in nearly every classroom. School-based occupational therapy services for children with DCD are typically provided within a model including direct intervention and consultation (Bayona, McDougall, Tucker, Nichols & Mandich, 2006; Spencer, Turkett, Vaughan, & Koenig, 2006) in which the goal is to enhance children's performance of self-care and academic activities and facilitate their participation at school (Hanft & Shepherd, 2008; Villeneuve, 2009). However, challenges inherent to the current implementation of this model – including long waitlists, insufficient time to build effective consultation relationships and limited carryover– are impacting its success and creating frustration among educators and service providers (Case-Smith & Holland, 2009). Educators and parents have limited understanding of how to identify children's coordination difficulties and how to make simple accommodations to address the needs of children with this chronic condition. Children with DCD who have unmet needs often go on to develop secondary physical and mental health challenges (Cairney, 2011; Cairney, Veldhuizen, & Szatmari, 2010; Engel-Yeger & Hanna Kasis, 2010). A different way of utilizing the expertise and skills of occupational therapists is needed in order to provide services that better target these issues.

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This paper describes an innovative, evidence-driven occupational therapy school health service delivery model for children with DCD. The model has been trialed and refined within the early stages of a participatory action research project (Missiuna et al., 2008-2011). As recommended by the Medical Research Council, design and evaluation of a complex intervention should proceed in phases, the first of which involves identifying the components of the intervention and modeling a theoretical understanding of the way in which these elements may influence change (Campbell et al., 2000). In the Partnering for Change (P4C) model, the emphasis is on the partnership of the therapist with educators and parents to enhance children's participation. Occupational therapists (OTs) focus on collaborating and coaching teachers in context, right in their classrooms, to enhance their capacity to recognize, accommodate and support the children who are most commonly referred to school health, children with DCD. In this paper, we describe the essential elements of this model and outline their basis in evidence.

Background

DCD is a common neuro-developmental condition that impacts a child's ability to perform everyday self-care and academic tasks (APA, 2000; Barnett, 2008; Missiuna, Moll, King, King, & Law, 2007; Summers, Larkin, & Dewey, 2008; Wang, Tseng, Wilson, & Hu, 2009). Given its prevalence, Statistics Canada data would suggest that DCD affects over 400,000 school-aged children in Canada; yet, very few healthcare systems acknowledge or understand it (Barnett, 2008; Gaines, Missiuna, Egan, & McLean, 2008a; Rodger & Mandich, 2005). Twenty-five years of research has produced compelling evidence that DCD is a chronic health condition and that the motor problems of children with DCD are life-long (Cousins & Smyth, 2003; Fitzpatrick &

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Watkinson, 2003; Kirby, Sugden, Beveridge, & Edwards, 2008; Losse et al., 1991; Missiuna, Moll, King, Stewart, & Macdonald, 2008). Studies have also shown that these motor difficulties are strongly associated with the subsequent development of physical and mental health difficulties including decreased physical fitness (Schott, Alof, Hultsch, & Meermann, 2007; Tsiotra et al., 2006), obesity (Cairney, Hay, Faught, & Hawes, 2005; Cairney, Hay, Veldhuizen, Missiuna, & Faught, 2010), anxiety (Cairney, Veldhuizen et al., 2010; Piek, Barrett, Smith, Rigoli, & Gasson, 2010; Piek, Bradbury, Elsley, & Tate, 2008), depression (Cairney, Veldhuizen et al., 2010; Missiuna et al., submitted; Piek et al., 2010; Piek et al., 2008; Piek et al., 2007), low self-esteem (Cocks, Barton, & Donelly, 2009; Engel-Yeger & Hanna Kasis, 2010), and also academic failure (Lingam et al., 2010; Roberts et al., 2011; Stephenson & Chesson, 2008).

Occupational therapy interventions for children with DCD that are described in the literature are generally individualized and involve one-on-one assessment followed by intervention that is designed to change children's underlying motor impairment (Polatajko & Cantin, 2006; Wilson, 2005). Yet the high prevalence and chronic nature of this disorder, as well as its long-term impact, requires that a more sustainable type of service delivery is needed to increase awareness, knowledge and capacity among the adults who have a direct influence in the child's daily environment and who can support the child's development. In theory, this capacity-building should occur within a consultative model (Case-Smith & Holland, 2009; Gaines, Missiuna, Egan, & McLean, 2008b; Missiuna, Gaines, & Pollock, 2008; Riethmuller, Jones, & Okely, 2009; Sugden, Kirby, & Dunford, 2008) yet evidence suggests that this is often not the case (Bayona et al., 2006; Spencer et al., 2006; Villeneuve, 2009) .

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Collaborative consultation is beginning to be adopted as a preferred occupational therapy service delivery method in school-based practice in North America (Bayona et al., 2006; Case-Smith & Holland, 2009; Reid, Chiu, Sinclair, Wehrmann, & Naseer, 2006; Villeneuve, 2009). This is "a process in which a trained, school-based consultant, working in an egalitarian, nonhierarchical relationship with a consultee, assists that person in her efforts to make decisions and carry out plans that will be in the best educational interests of her students" (Kampwirth, 2006, p. 3). Sayers (2008) undertook a critical appraisal of the evidence for an occupational therapy classroom-based collaborative approach, as compared with direct service, pull-out models of intervention, for promoting participation in schoolchildren. Her review of ten articles found equal evidence to support collaborative consultation and 1:1 service delivery; however, teachers reported greater satisfaction when service was provided in the classroom and therapists' suggestions were implemented to a greater extent in the collaborative models (Sayers, 2008). Although a partnership with educators has been recognized as important within collaborative consultation (Barnes & Turner, 2001; Case-Smith, 1997; Dunn, 1990; Fairburn & Davidson, 1993; McWilliam, 1995; Niehues, Bundy, Mattingly, & Lawlor, 1991; Nochajski, 2001), a recent literature review by Villeneuve (2009) highlighted some of the issues that impact on the success of consultation including; teachers' time constraints, limited understanding of therapist roles, lack of availability of therapists due to restricted visit numbers, substantial travel time between schools, and unclear delineation of responsibilities within the collaborative partnership (Bose & Hinojosa, 2008; Nochajski, 2001).

At present in school health [in Ontario], occupational therapists providing health services intend to use a consultation model; however, the healthcare delivery system has a structured

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model in which numbers of school visits are pre-assigned and remuneration often occurs only for visits when the child is present. Children with DCD have differing needs so, depending upon the age of the child and the issues identified, service delivery approaches needs to be flexible. Waitlists as long as two years for occupational therapy intervention further compound the issue (Deloitte & Touche LLP, 2010). Hoyt-Hallett et al (2009) recently described how moving from a linear model of service delivery towards a continuum of services addressed many different needs and reduced waitlists for pediatric occupational therapy services in Alberta (Hoyt-Hallett, Beckers, Enman, & Betuzzi, 2009). Concerns about lengthy waitlists, models of intervention focusing on remediation, and issues surrounding the flexible delivery of collaborative services contributed to the development of a new model called "Partnering for Change". In the first phase of a participatory action research project, our team pilot-tested in 2008-09 what we believed were the empirically-derived essential components of an innovative OT service and subsequently modeled the relationship among the mechanisms that would be presumed to lead to change in the way we support children with DCD in schools. The remainder of this paper describes the model that resulted.

The Partnering for Change Model

Partnering for Change (P4C) emphasizes the partnership of the therapist with educators and parents to change the life and daily environment of a child. While the child with DCD is still the ultimate focus, service delivery occurs indirectly, around the child, through a partnership between the therapist, educator and parent. The **P**artnership focuses on **C**apacity building through **C**ollaboration and **C**oaching in **C**ontext (P4C) (see Figure 1). Instead of direct service,

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the core activities of the occupational therapist are relationship building and knowledge translation, with the school as the client. The model was developed based on both theory and research about the needs of children with DCD, and about the type of strategies that enhance children's participation in school settings.

Step 1: Universal Design for Learning.

In order to address the needs of this large population and reduce waitlists, the P4C model moves from focusing on the one child in the classroom who has been referred for service towards a more general focus on enhancing teacher knowledge and building capacity regarding children who have similar motor challenges. Teachers who are able to recognize and work with children with DCD effectively need to have knowledge about typical motor development: what motor skills are expected of children at different ages, and how to promote these skills through curriculum-based activities. As a first step in this model, occupational therapists work in tandem with teachers in their classrooms to enhance their capacity to understand developmental differences and to teach motor-based skills to all children. For example, therapists might point out ways to optimize classroom layout, design activity centres or demonstrate large group lessons for the class as a whole. Teachers learn to recognize when the curricular tasks that they are using require motor skills (e.g., cutting out shapes during a math activity) and they are helped to design alternative methods that are non-motor based to address curriculum goals (e.g., using stamps and stickers versus paper and pencil to complete a worksheet). This aspect of the P4C model aligns with an educational initiative called Universal Design for Learning (UDL) which focuses on enabling occupational performance in the classroom through promotion of changes within the physical and social environment (Campbell & Skarakis-Doyle, 2007). UDL

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emphasizes designing educational materials and methods that will enable learning goals to be met by children who may differ widely in their abilities and in the extent to which they are able to fully participate in the curriculum (Campbell, Missiuna, Pollock & Gaines, 2011; Orkwis, 2003). Recommendations provided at this stage of the model are grounded in the therapists' knowledge of typical motor development and provide collaborative dialogue to facilitate teachers' thinking about the varied ways in which children might receive instruction and demonstrate what they know (Campbell & von Stauffenberg, 2009).

Step 2: Differentiated Instruction.

Once professional collaboration has created an enhanced understanding of how to optimize the classroom environment for development of many motor-based skills, the therapist and teacher can begin to look more closely at the smaller group of learners who are experiencing challenges performing motor-based activities. Knowledge about person-environment interactions and observation and analysis of daily occupation are skills that the therapist brings into classrooms, hallways and gymnasiums. Complementary to UDL, which is geared to supporting all children, Differentiated Instruction (DI) involves modifying teaching practice to target individual student needs. DI has been described as requiring teachers to "…to adapt pedagogical interventions to the needs of each student, acknowledging that each student differs in interests, learning profile, and level of functioning. While UDL provides the teacher with broad principles for planning, differentiated instruction allows teachers to address specific skills and difficulties" (Expert panel on literacy and numeracy instruction for students with special education needs, 2005, p.14). Teachers are generally very knowledgeable about how to differentiate content (what is learned); however, for children experiencing motor challenges, therapists may suggest ways in

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which teachers might differentiate the processes (the activities), the products (the accomplishment that follows an activity) or the evaluation methods (e.g., written versus oral).

With regard to motor-related difficulties, teachers will often be able to identify that a child is struggling but may be unclear as to the cause of the problems. For example, it can be difficult to tell whether a young child who has delayed development of printing actually has coordination difficulties or is inexperienced. Suggesting the provision of age-appropriate pre-printing activities and then monitoring the child's "response to intervention" (see below) enables therapists to see whether the student progresses quickly or continues to struggle. With subsequent trials of these types of interventions, children who have DCD can be differentiated from those who will simply require more experience or alternative instructional strategies. Usually, children with DCD do not learn new motor tasks by doing developmentally appropriate activities or simply practicing (Wilson et al., 2004; Zoia, Castiello, Blason & Scabar, 2005) so their failure to progress becomes evident when these experiences have been provided. Given the P4C model's emphasis on building capacity, the way in which the therapist has differentiated and the reasons for a child's progress, or lack thereof, is then discussed with the teacher.

Step 3: Accommodation.

The needs of children with DCD often begin as relatively simple issues – difficulty learning to tie shoelaces or do up pants – and a considerable difference can be made to their daily frustrations by identifying problems and resolving them early on. If a child has been provided with appropriate experiences but is still unable to perform a motor-based skill, rather than referring him or her to school health support services, this model asks the therapist to observe the child performing that task, in the context in which the task is normally performed. The therapist

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uses Dynamic Performance Assessment (DPA), "an observation-based process of identifying performance problems or performance breakdown" (Polatajko & Mandich, 2004, p.60). Analysis focuses on the demands of the task and on how the environment may be impeding or facilitating task completion. There is no formal assessment of components that might be presumed to underlie the child's motor difficulties. Therapists hypothesize about potential contributing factors, identify one or two things that could be changed in the task or environment and then systematically try changing them. By trialing these strategies, therapists can analyze the results immediately and try something else if these strategies don't work as anticipated. In the P4C model, however, introducing the modification or strategy is not the end. OTs subsequently communicate with the teacher how and why these changes have helped, so the teacher sees the difference and his/her capacity is enhanced to try similar strategies another time or with another student. If a strategy is found to be effective and improves the child's ability to access the curriculum, it may be useful to recommend this as an accommodation that be built into a student's Individual Education Plan (IEP). This then further builds capacity across the team of educators working with the student in addition to the classroom teacher. Successful strategies are shared by the OT or the teacher with the child's parent, whenever possible, to ensure even more generalization.

The approach being used throughout the progressive steps in the P4C model is similar to concepts expressed in educational literature concerning Response to Intervention (RTI), an approach that moves away from standardized assessment and formal identification of children with special needs (Reeder, Arnold, Jeffries & McEwen, 2011). RTI usually involves teachers making decisions based on the results of a series of interventions (Ardon, Witt, Connell, &

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Koenig, 2005). This tiered-approach encourages teachers to work with professionals to problem-solve, identify difficulties early, and try out strategies in the classroom before proceeding to assessment. Similar to the progression illustrated in P4C, RTI is usually described as having 3 tiers: whole class methods, introduction of materials for targeted groups, and trials of materials for children who require more individualized interventions (McIntosh et al., 2011). RTI is based on the premise that small changes in classroom instruction may contribute to improvements in student learning and that a student's "response to intervention" provides valuable information (Bradley, Danielson & Doolittle, 2007). RTI approaches are usually targeted toward earlier identification of the small number of children who will proceed to special education services or assessment by professionals. P4C, on the other hand, presumes that capacity can be built among teachers and parents to manage many, or even most, of the challenges experienced by children with DCD in the classroom and, by so doing, that secondary consequences may be prevented.

Although the essential elements of the P4C model that have been described thus far are not dissimilar to elements that are found in many educational settings that use an RTI approach (e.g., Ardoin et al., 2005; Marston, Muyskens, Lau, & Canter, 2003), the features that distinguish P4C from these other models include an emphasis on relationship building and on the knowledge translation that occurs when therapists collaborate with teachers, in context. These features are described in greater detail in the section that follows.

Essential Ingredients of P4C

Relationship Building

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Lack of time to meet with teachers and little understanding of roles and responsibilities has been consistently identified as one of the major barriers to effective consultation (Hinder & Ashburner, 2010; Sayers, 2008). In a recent qualitative study of effective school-based occupational therapy practice, Hasselbusch and colleagues emphasized the value of relationship building when they identified the first step in the process as 'joining up': establishing and building relationships, spending time in the school, and clarifying expectations (Hasselbusch & Penman, 2008). Instead of therapists visiting up to five or six schools in one day, the P4C model involves the OT spending a full day in the school, becoming part of the school team. This involves relationship building and establishing trust with the classroom teachers and others in the school environment. Therapists also need to develop a thorough understanding of school board policies, the curriculum, the school culture, individual school procedures and classroom practices, areas of content which have been recommended in the literature as critical for practice in school settings (Case-Smith & Holland, 2009; Swinth, Spencer, & Jackson, 2007; Villeneuve, 2009). This is achieved by spending time in classrooms to "get a feel" for classroom activities, teachers' styles and curriculum expectations, working alongside the teacher, participating in school routines and events, spending break times in the staff room and becoming familiar with the variety and extent of demands on teachers.

Another aspect of relationship building involves enhancing teachers' understanding of the occupational therapist's areas of expertise. In this collaborative model, short, experientially-based "lunch and learn" sessions are offered in response to topics and questions that are identified by teachers, not by therapists. Teachers quickly recognize that the OT brings a different perspective and is able to provide practical and useful suggestions that can be applied to

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routines and activities in the classroom. Since teachers initiate these requests, and therapists are working in the classroom, suggestions that are made by the OT are feasible and more likely to be implemented. The OT is available on an ongoing basis to support the teacher in the practicalities of embedding suggested strategies into the daily classroom routines.

Knowledge Translation

Knowledge translation involves exchanging information, knowledge and resources with adults in which there is an emphasis on *exchange* – both parties learning from one another (Law, Missiuna, & Pollock, 2008). In sustainable knowledge translation, both teachers and OTs need to be comfortable sharing their respective areas of expertise and to then be able to retain, transfer and generalize the learning that occurs. Hanft, Rush & Sheldon (2004) suggest that consultants should ask teachers which learning styles work best for them and interact with teachers using their preferred strategies. In the P4C model, principles of adult learning theory that are used include: making information relevant, accommodating different learning styles, acknowledging previous experiences, making learning practical, and applying learning to individual situations (Knowles, Holton, & Swanson, 2005). If knowledge translation is effective, both teachers and OTs will have enhanced capacity to manage new situations and new students who have DCD and may also share this knowledge with others in their community. For learning to be maintained and generalized, teachers need to have opportunities to problem-solve, to actively experience application of strategies, and to recognize other times when these would be useful. Communication techniques such as bridging and 'asking, not telling' (Polatajko & Mandich, 2004) emphasize creating links or bridges between what the teacher is presently learning to other similar students, skills, situations and activities, and problem-solving to find solutions. OTs also

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learn through every exchange of knowledge more about what skills and creative suggestions teachers bring and which strategies are likely to be more effective to foster participation of children with DCD in educational settings.

Coaching is a specific method used to build capacity through translation of knowledge to the teacher about the relationship between strategies that might be tried and the reasons for a specific child's difficulties (Rush, Shelden, & Hanft, 2003). While working with teachers to support their existing skills and develop new skills, coaching interactions emphasize partnership and self-discovery (Rush et al., 2003). The goals of coaching are for the recipient to gain in competence, build on existing knowledge and promote ongoing learning (Shepherd & Hanft, 2008). Therapists learn about what the teacher has already tried with a child and discuss why these attempts may or may not have been successful. Recently described as 'occupational performance coaching (OPC)', this structured process of building a relationship and exchanging information, has been shown by Graham and colleagues (2010; 2009) in work with parents to be a very effective method of supporting the occupational performance of children with disabilities. Coaching aims to increase the independence of adults as they support children in resolving performance issues (Graham et al., 2010). Similar interactional styles have been promoted in other literature; for example, Blosser and Staniszewski (2010) describe a course in which speech language pathologists are taught practical tools for coaching teachers to change the way they communicate with children with speech and language disorders in the classroom.

The final element of the P4C model that is crucial to its implementation has been alluded to throughout this paper. The Partnership is focused on building capacity within the contexts in which children with DCD are participating. Enhancing the participation of children and youth is

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increasingly recognized as the most important goal of rehabilitation. The World Health Organization's International Classification of Functioning, Disability and Health identifies that interventions may be targeted to improve body structures, activities, and/or participation (World Health Organization, 2001). In the case of children with DCD, there is little evidence that interventions that target body structures and functions translate into improved participation in the functional activities and daily life situations that are important to children and families (Mandich, Polatajko, Macnab & Miller, 2001). In P4C, occupational therapists concentrate solely on enhancing children's participation in functional activities through a focus on changing factors in the child's physical and social environment, rather than on changing their underlying physical impairments.

In summary, all activities in the P4C model build the capacity of the adults in the child's daily context/environment – classrooms, schools, and playgrounds. Building capacity involves educating teachers, within their classrooms, to become knowledgeable about the motor skills needed for daily activities and to understand the impact of coordination difficulties on children's ability to complete these tasks. Instead of identifying children and referring them to school health waitlists, prevention is achieved by trying out and implementing strategies that teachers can use when issues are first identified. Enhancing the general capacity of teachers to design learning activities and environments that offer a variety of motor experiences, to differentiate instruction in order to decrease motor demands and to problem-solve about potential accommodations should allow young children with a variety of motor challenges to be more successful participating in everyday activities. Adults are empowered to deal with future concerns and to

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prevent the frustration and discouragement that is so often seen in children with DCD as they progress in school (Missiuna, Moll, King, King, & Law, 2006)

Development of Similar Concepts in OT

Since our team began to develop this model, it has been interesting to see how similar ideas have been paralleled in other parts of the world. For example, an Occupational Therapy into Schools (OTiS) model (Hutton, 2009) was implemented in a pilot project in Canterbury, United Kingdom to address the issue of large numbers of children with coordination difficulties and generalized delay requiring OT intervention. OTs provided services to a whole school, not to targeted individual children. Therapists worked with teachers within the classroom and joined the school team to promote teacher learning about how to increase participation of children in school activities. At the end of two school terms, teachers reported positively about the sharing of knowledge and their perceptions of impact on the children involved. Building close working relationships was identified as an important factor for success that facilitated knowledge sharing and trust in the OTis model implementation in the UK (Hutton, 2009).

A scoping review conducted in Scotland concluded that a framework for effective practice for children with DCD needed to include: health promotion, communication, child and parent involvement, working together, and increased skills and knowledge (Forsyth et al., 2007). Similar to the emphasis in P4C, this report highlighted the need for interventions to focus on enhancing the participation of children with DCD. New Zealand's special education legislative framework also involves occupational therapists working in schools as members of interdisciplinary teams (Simmons Carlsson, Hocking & Wright-St Clair, 2007). A qualitative

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study exploring the culture of practice in these settings found that therapists described that a large shift in attitude and skills was needed for occupational therapists to work within this model (Simmons Carlsson et al., 2007). Guiding principles outlined in the New Zealand model included: practicing collaboratively, knowing the education system, enabling students' learning, enabling participation in school communities and working with students in context. These principles align well with the P4C model.

The coaching approach used in P4C has similarities with Collaborative Performance Analysis, one of the techniques used with parents in a study of Occupational Performance Coaching (Graham & Rodger, 2010). This analysis involves a sequence of steps in which there is observation of what happens during child performance, the therapist speaks to the parent about what they would like to happen, both try to figure out what the barriers and facilitators might be and, and both share their thoughts about what parents need in order to make this change happen. While this analytic approach is more individualized and structured than is currently used in P4C, the collaborative philosophy and emphasis on changing the environment is certainly comparable.

As noted in the descriptions of these emerging models, there are several essential ingredients or components required in order for them to be fully implemented. While there is merit in each of the individual components, to fully realize the benefits of these approaches, the full range of ingredients is necessary. In the P4C model, these essential ingredients include the partnership, the collaborative team, implementation within the classroom context and a focus on capacity building through building of relationships and knowledge translation.

P4C aligns with inclusive educational approaches that promote the use of universal design for learning, differentiated instruction, and response to intervention to support all learners

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in achieving full participation and achievement at school. To date, we have implemented the P4C model with a focus on children with DCD, a highly prevalent chronic health condition: the goal of P4C is in supporting these children to succeed without referring them all for individualized, specialized intervention. We believe many of these children can be well supported within an inclusive educational system and that a similar model of service delivery might also prove to be beneficial to children with other disabilities. Future development of the P4C model will need to include more exploration of ways to build capacity among families as well as teachers.

Conclusion

Partnering for Change is a model of service delivery developed in response to the evidence-based needs of a large population of children who often receive school-based occupational therapy services, addresses issues that have been identified in research with this population, aligns with current initiatives within the educational system, and provides a continuum of services over several tiers. The goal of this type of service delivery is to build the capacity of educators to manage many of the children who are struggling at school and to create a more supportive environment for children with DCD. When families and educators become more knowledgeable, children's daily frustrations can be identified sooner and accommodations provided which may prevent secondary deterioration in academic performance, physical and mental health. This service delivery model is empirically-derived and now needs to be evaluated on a larger scale.

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Key Messages

1. Developmental coordination disorder (DCD) is a chronic, highly prevalent health condition that puts children at risk for academic failure and secondary physical and mental health conditions.

2. Evidence is mounting for a move from individualized occupational therapy services aimed at remediation of deficits to contextually-based capacity building models to enhance the participation of these children at school.

3. Partnering for Change is an empirically driven model that aligns with current initiatives within the educational system and aims to enable teachers and families to support students with DCD.

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Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
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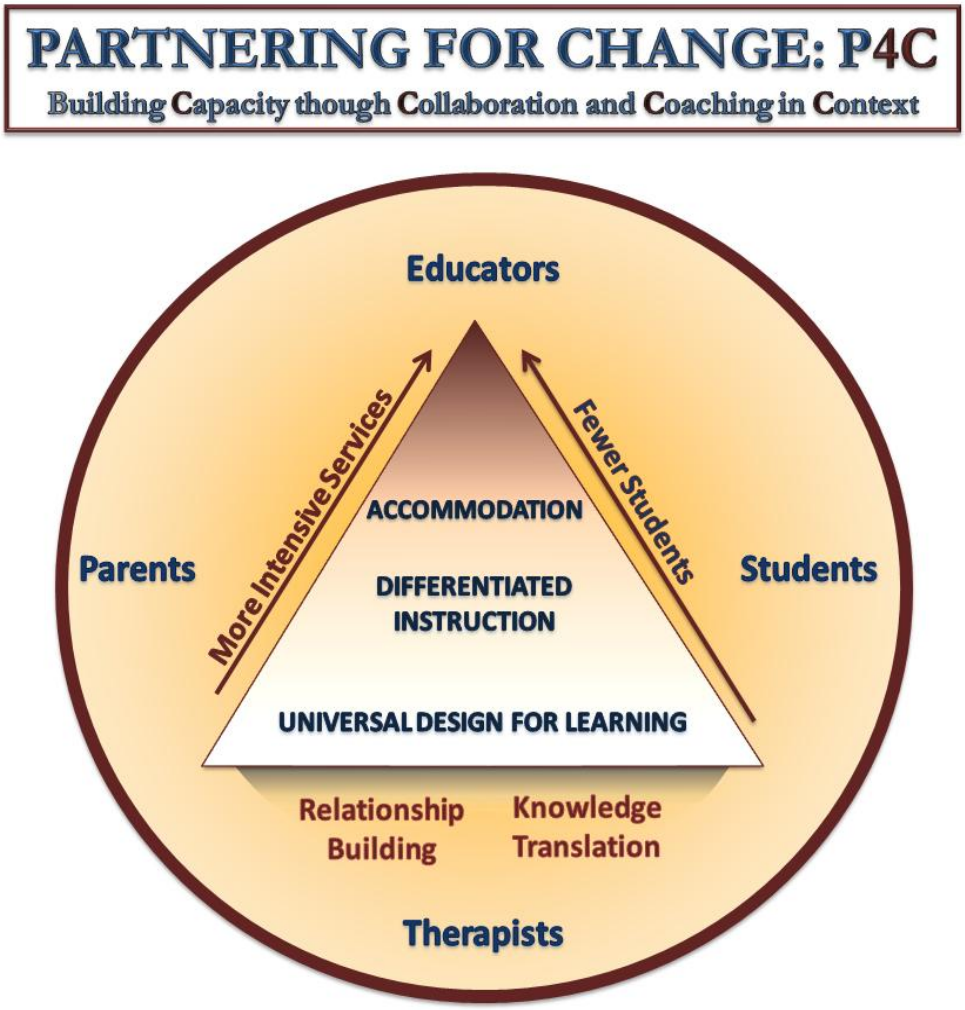
Figure 1: Partnering for Change Model[1]



[1] Reprinted with permission of the authors. *The Partnering for Change team used evidence from the literature to design a conceptual model that was tested in school settings and refined. This Figure reflects the partnership that is needed between Therapists, Parents and Educators to create environments that will facilitate successful participation for all students. Working from a foundation that focuses on relationship building and sharing of knowledge, these partners collaboratively design universal environments that foster motor skill development in children of all abilities, differentiate instruction for children who are experiencing challenges and accommodate for students who need to participate in a different way. While the school remains the target of intervention, allowing therapists to impact the greatest numbers of children, therapists are able to increase the intensity of the service that they provide as they coach educators and/or parents about individual students who have more complex needs. In this model, all collaboration and intervention occurs in the context of the school environment.*

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (DSM IV-TR)* (4th ed.). Washington, DC: American Psychiatric Association.

Ardon, S., Witt, J., Connell, J., & Koenig, J. (2005). Application of a three-tiered response to intervention model for instructional planning, decision making, and the identification of children in need of services. *Journal of Psychoeducational Assessment, 23*, 362-380.

Barnes, K., & Turner, K. (2001). Team collaborative practices between teachers and occupational therapists. *American Journal of Occupational Therapy, 55*, 83-89.

Barnett, A. L. (2008). Motor assessment in developmental coordination disorder: From identification to intervention. *International Journal of Disability, Development and Education, 55*, 113-129.

Bayona, C. L., McDougall, J., Tucker, M. A., Nichols, M., & Mandich, A. (2006). School-based occupational therapy for children with fine motor difficulties: Evaluating functional outcomes and fidelity of services. *Physical & Occupational Therapy in Pediatrics, 26*, 89-110.

Blosser, J., & Staniszewski, K. (2010, April). *Improving kids' classroom performance by coaching their teachers*. Short course presented at the Annual Convention of the California Speech-Language-Hearing Association, Monterey, CA.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Bose, P., & Hinojosa, J. (2008). Reported experiences from occupational therapists interacting with teachers in inclusive early childhood classrooms. *American Journal of Occupational Therapy, 62*, 289-297.

Bradley, R., Danielson, L., & Doolittle, J. (2007). Responsiveness to intervention: 1997 to 2007. *Teaching Exceptional Children, 39*(5), 8-12.

Cairney, J. (2011). Gross motor problems and psychiatric disorders in children. *Developmental Medicine and Child Neurology, 53*, 104-105. doi:10.1111/j.1469-8749.2010.03808.x; 10.1111/j.1469-8749.2010.03808.x

Cairney, J., Hay, J. A., Faught, B. E., & Hawes, R. (2005). Developmental coordination disorder and overweight and obesity in children aged 9-14y. *International Journal of Obesity, 29*, 369-372.

Cairney, J., Hay, J. A., Veldhuizen, S., Missiuna, C., & Faught, B. E. (2010). Developmental coordination disorder, sex, and activity deficit over time: A longitudinal analysis of participation trajectories in children with and without coordination difficulties. *Developmental Medicine and Child Neurology, 52*, e67-e72. doi:10.1111/j.1469-8749.2009.03520.x

Cairney, J., Veldhuizen, S., & Szatmari, P. (2010). Motor coordination and emotional-behavioral problems in children. *Current Opinion in Psychiatry, 23*, 324-329. doi:10.1097/YCO.0b013e32833aa0aa

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Campbell, W., Missiuna, C., Pollock, N., & Gaines, R. (2011, April). *Partnering for Change: An innovative service delivery model for implementing response to intervention.* Poster session presented at the Annual Convention of the Canadian Association of Speech-Language Pathologists and Audiologists, Montreal, Quebec.

Campbell, M., Fitzpatrick, R., Haines, A., Kinmonth, A.L., Sandercock, P., Spiegelhalter, D., & Tyrer (2000). Framework for design and evaluation of complex interventions to improve health. *British Medical Journal, 321,* 694-696. doi:10.1136/bmj.321.7262.694

Campbell, W. N., & Skarakis-Doyle, E. (2007). School-aged children with SLI: The ICF as a framework for collaborative service delivery. *Journal of Communication Disorders, 40*, 513-535.

Campbell, S. B., & von Stauffenberg, C. (2009). Delay and inhibition as early predictors of ADHD symptoms in third grade. *Journal of Abnormal Child Psychology, 37*, 1-15. doi:10.1007/s10802-008-9270-4

Case-Smith, J. (1997). Variables related to successful school-based practice. *The Occupational Therapy Journal of Research, 17*, 133-153.

Case-Smith, J., & Holland, T. (2009). Making decisions about service delivery in early childhood programs. *Language, Speech, and Hearing Services in Schools, 40*, 416-423. doi:10.1044/0161-1461(2009/08-0023)

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Cocks, N., Barton, B., & Donelly, M. (2009). Self-concept of boys with developmental coordination disorder. *Physical & Occupational Therapy in Pediatrics, 29*, 6-22. doi:10.1080/01942630802574932

Cousins, M., & Smyth, M. M. (2003). Developmental coordination impairments in adulthood. *Human Movement Science, 22*, 433-459.

Deloitte & Touche LLP. (2010). *Review of school health support services: Final report.* Ontario Ministry of Health and Long Term Care.

Dunn, W. (1990). A comparison of two service provision models in school-based occupational therapy services: A pilot study. *The Occupational Therapy Journal of Research, 10*, 185-191.

Engel-Yeger, B., & Hanna Kasis, A. (2010). The relationship between developmental co-ordination disorders, child's perceived self-efficacy and preference to participate in daily activities. *Child: Care, Health and Development, 36*, 670-677. doi:10.1111/j.1365-2214.2010.01073.x

Expert panel on literacy and numeracy instruction for students with special education needs. (2005). *Education for all: The report of the expert panel on literacy and numeracy instruction for students with special education needs, kindergarten to grade 6.* Ontario Ministry of Education.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Fairburn, M., & Davidson, I. (1993). Teachers' perceptions of the role and effectiveness of occupational therapists in schools. *Canadian Journal of Occupational Therapy, 60*, 185-191.

Fitzpatrick, D. A., & Watkinson, E. J. (2003). The lived experience of physical awkwardness: Adults' retrospective views. *Adapted Physical Activity Quarterly, 20*, 279-297.

Forsyth, K., Howden, S., Maciver, D., Owen, C., Shepherd, C., & Rush, R. (2007). *Developmental co-ordination disorder: A review of evidence and models of practice employed by allied health professionals in Scotland - summary of key findings.* NHS Quality Improvement Scotland.

Gaines, R., Missiuna, C., Egan, M., & McLean, J. (2008a). Educational outreach and collaborative care enhances physician's perceived knowledge about developmental coordination disorder. *BMC Health Services Research, 8*, 21. doi:10.1186/1472-6963-8-21

Gaines, R., Missiuna, C., Egan, M., & McLean, J. (2008b). Interprofessional care in the management of a chronic childhood condition: Developmental coordination disorder. *Journal of Interprofessional Care, 22*, 552-555.

Graham, F., & Rodger, S. (2010). Occupational performance coaching: Enabling parents' and childrens' occupational performance. In S. Rodger (Ed.), *Occupation-centred practice with children: A practical guide for occupational therapists* (pp. 203-226). Chichester: Wiley Blackwell.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Graham, F., Rodger, S., & Ziviani, J. (2009). Coaching parents to enable children's participation: An approach for working with parents and their children. *Australian Occupational Therapy Journal, 56*, 16-23. doi:10.1111/j.1440-1630.2008.00736.x

Graham, F., Rodger, S., & Ziviani, J. (2010). Enabling occupational performance of children through coaching parents: Three case reports. *Physical & Occupational Therapy in Pediatrics, 30*, 4-15. doi:10.3109/01942630903337536

Hanft, B., Rush, D., & Shelden, M. (2004). *Coaching families and colleagues in early childhood.* Baltimore, Maryland: Paul H. Brookes Publishing Co., Inc.

Hanft, B., & Shepherd, J. (Eds.). (2008). *Collaborating for student success: A guide for school-based occupational therapy*. Bethesda, MD: American Occupational Therapy Association, Inc.

Hasselbusch, A., & Penman, M. (2008). Working together: An occupational therapy perspective on collaborative consultation. *Kairaranga, 9*(1), 24-31.

Hinder, E. & Ashburner, J. (2010). Occupation-centred intervention in the school setting. In S. Rodger, (Ed.). *Occupation-centred practice with children: A practical guide for occupational therapists*. (pp 227-247). Oxford: Wiley-Blackwell.

Hoyt-Hallett, G., Beckers, K., Enman, M., & Betuzzi, C. (2009). Addressing pediatric wait times using the model of human performance technology. *Canadian Journal of Occupational Therapy, 76*, 219-227.

Hutton, E. (2009). Occupational therapy in mainstream primary schools: An evaluation of a pilot project. *The British Journal of Occupational Therapy, 72*, 308-313.

Kampwirth, T. J. (2006). *Collaborative consultation in the schools: Effective practices for students with learning and behavior problems*. Upper Saddle River, NJ: Prentice Hall.

Kirby, A., Sugden, D., Beveridge, S., & Edwards, L. (2008). Developmental co-ordination disorder (DCD) in adolescents and adults in further and higher education. *Journal of Research in Special Educational Needs, 8*, 120-131.

Knowles, M., Holton, E., & Swanson, R. (2005). *The adult learner: The definitive classic in adult education and human resource development* (6th ed.). Amsterdam: Elsevier Butterworth-Heinemann.

Law, M., Missiuna, C., & Pollock, N. (2008). Knowledge exchange and translation: An essential competency in the twenty-first century. *OT Now, 10*(5), 3-5.

Lingam, R., Golding, J., Jongmans, M. J., Hunt, L. P., Ellis, M., & Emond, A. (2010). The association between developmental coordination disorder and other developmental traits. *Pediatrics, 126*, e1109-1118. doi:10.1542/peds.2009-2789

Losse, A., Henderson, S. E., Elliman, D., Hall, D., Knight, E., & Jongmans, M. (1991). Clumsiness in children - do they grow out of it? A 10-year follow-up study. *Developmental Medicine and Child Neurology, 33*, 55-68.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Marston, D., Muyskens, P., Lau, M., & Canter, A. (2003). Problem-solving model for decision-making with high‐incidence disabilities: The Minneapolis experience. *Learning Disabilities Research & Practice*, 18, 187-200.

McIntosh K., MacKay, L.D., Andreou, T., Brown, J.A., Mathews, S., Gietz, C., & Bennett, J.L. (2011). Response to intervention in Canada: Definitions, the evidence base, and future directions. *Canadian Journal of School Psychology*, *26*, 18-43.

Mandich, A.D., Polatajko, H.J., Macnab, J.J., & Miller, L.T. (2001). Treatment of children with developmental coordination disorder: What is the evidence? *Physical and Occupational Therapy in Pediatrics, 20*, 51-68.

McWilliam, R. A. (1995). Integration of therapy and consultative special education: A continuum in early intervention. *Infants and Young Children, 7*(4), 29-38.

Miller, L. T., Missiuna, C. A., Macnab, J. J., Malloy-Miller, T., & Polatajko, H. J. (2001). Clinical description of children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, *68*, 5-15.

Missiuna, C. (2002). Poor handwriting is only a symptom: Children with developmental coordination disorder. *Occupational Therapy Now, Sept/Oct*, 4-6.

Missiuna, C., Cairney, J., Pollock, N., MacDonald, K., Russell, D., Cousins, M., & Veldhuizen, S. (submitted). Exploring psychological distress in children with developmental

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

coordination disorder and/or attention-deficit hyperactivity disorder: A population-based study. *Journal of the American Association of Child and Adolescent Psychiatry.*,

Missiuna, C., Gaines, R., & Pollock, N. (2008). Getting the word out: Disseminating evidence about developmental coordination disorder. In M. Law, & J. McDermid (Eds.), *Evidence-based practice in rehabilitation* (2nd ed., pp. 315-330). Thorofare, NJ: Slack Inc.

Missiuna, C., Hecimovich, C., Pollock, N., Russell, D., Cairney, J., Bennett, S., … Rosenbaum, P. (2008-2011). *Partnering for change (Demonstration Project): Promoting health and participation of school-aged children with developmental conditions in their communities.* [Grant KAL 86792 proposal funded by the Canadian Institutes of Health Research].

Missiuna, C., Moll, S., King, G., King, S., & Law, M. (2006). "Missed and misunderstood": Children with coordination difficulties in the school system. *International Journal of Special Education, 21*, 53-67.

Missiuna, C., Moll, S., King, S., King, G., & Law, M. (2007). A trajectory of troubles: Parents' impressions of the impact of developmental coordination disorder. *Physical & Occupational Therapy in Pediatrics, 27*, 81-101.

Missiuna, C., Moll, S., King, G., Stewart, D., & Macdonald, K. (2008). Life experiences of young adults who have coordination difficulties. *Canadian Journal of Occupational Therapy, 75*, 157-166.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Missiuna, C., Pollock, N., Egan, M., DeLaat, D., Gaines, R., & Soucie, H. (2008). Enabling occupation through facilitating the diagnosis of developmental coordination disorder. *Canadian Journal of Occupational Therapy, 75*, 26-34.

Niehues, A., Bundy, A., Mattingly, C., & Lawlor, M. (1991). Making a difference: Occupational therapy in public schools. *The Occupational Therapy Journal of Research, 11*, 195-212.

Nochajski, S. (2001). Collaboration between team members in inclusive educational settings. *Occupational Therapy in Health Care, 15*, 101-112.

Orkwis, R. (2003). *Universally designed instruction. ERIC/OSEP digest*. ERIC Clearinghouse on Disabilities and Gifted Education, Council for Exceptional Children.

Piek, J. P., Barrett, N. C., Smith, L. M., Rigoli, D., & Gasson, N. (2010). Do motor skills in infancy and early childhood predict anxious and depressive symptomatology at school age? *Human Movement Science, 29*, 777-786. doi:10.1016/j.humov.2010.03.006

Piek, J. P., Bradbury, G. S., Elsley, S. C., & Tate, L. (2008). Motor coordination and Social–Emotional behaviour in preschool-aged children. *International Journal of Disability, Development and Education, 55*, 143-151.

Piek, J. P., Rigoli, D., Pearsall-Jones, J. G., Martin, N. C., Hay, D. A., Bennett, K. S., & Levy, F. (2007). Depressive symptomatology in child and adolescent twins with attention-deficit hyperactivity disorder and/or developmental coordination disorder. *Twin Research and Human Genetics, 10*, 587-596. doi:10.1375/twin.10.4.587

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Polatajko, H. J., & Cantin, N. (2006). Developmental coordination disorder (dyspraxia): An overview of the state of the art. *Seminars in Pediatric Neurology, 12*, 250-258. doi:S1071-9091(05)00085-9 [pii]; 10.1016/j.spen.2005.12.007 [doi]

Polatajko, H. J., & Mandich, A. (2004). In Polatajko H. J., Mandich A. (Eds.), *Enabling occupation in children: The cognitive orientation to daily occupational performance (CO-OP) approach*. Ottawa, Ontario: Canadian Association of Occupational Therapists Publications ACE.

Reeder, D. L., Arnold, S. H., Jeffries, L. M., & McEwen, I. R. The role of occupational therapists and physical therapists in elementary school system early intervening services and response to intervention: A case report. *Physical & Occupational Therapy in Pediatrics, 31*, 83-89.

Reid, D., Chiu, T., Sinclair, G., Wehrmann, S., & Naseer, Z. (2006). Outcomes of an occupational therapy school-based consultation service for students with fine motor difficulties. *Canadian Journal of Occupational Therapy, 73*, 215-224.

Riethmuller, A. M., Jones, R., & Okely, A. D. (2009). Efficacy of interventions to improve motor development in young children: A systematic review. *Pediatrics, 124*, e782-e792. doi:10.1542/peds.2009-0333

Roberts, G., Anderson, P. J., Davis, N., De Luca, C., Cheong, J., Doyle, L. W., & Victorian Infant Collaborative Study Group. (2011). Developmental coordination disorder in geographic cohorts of 8-year-old children born extremely preterm or extremely low

birthweight in the 1990s. *Developmental Medicine and Child Neurology, 53*, 55-60. doi:10.1111/j.1469-8749.2010.03779.x; 10.1111/j.1469-8749.2010.03779.x

Rodger, S., & Mandich, A. (2005). Getting the run around: Accessing services for children with developmental co-ordination disorder. *Child: Care, Health and Development, 31*, 449-457.

Rush, D.D., Shelden, M.L., & Hanft, B.E. (2003). Coaching families and colleagues: A process for collaboration in natural settings. *Infants and Young Children, 16*, 33-47.

Sayers, B. R. (2008). Collaboration in school settings: A critical appraisal of the topic. *Journal of Occupational Therapy, Schools, & Early Intervention, 1*, 170-179.

Schott, N., Alof, V., Hultsch, D., & Meermann, D. (2007). Physical fitness in children with developmental coordination disorder. *Research Quarterly for Exercise and Sport, 78*, 438-450.

Simmons Carlsson, C., Hocking, C, & Wright-St Clair, V. (2007). The "why" of who we are. Exploring the "culture of practice" of Ministry of Education, Special Education occupational therapists and physiotherapists. *Kairaranga 8(2), 6-14.*

Spencer, K. C., Turkett, A., Vaughan, R., & Koenig, S. (2006). School-based practice patterns: A survey of occupational therapists in Colorado. *The American Journal of Occupational Therapy*, *60*(1), 81-91.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Stephenson, E. A., & Chesson, R. A. (2008). 'Always the guiding hand': Parents' accounts of the long-term implications of developmental co-ordination disorder for their children and families. *Child: Care, Health & Development, 34*, 335-343. doi:10.1111/j.1365-2214.2007.00805.x

Sugden, D., Kirby, A., & Dunford, C. (2008). Issues surrounding children with developmental coordination disorder. *International Journal of Disability, Development and Education, 55*, 173-187.

Summers, J., Larkin, D., & Dewey, D. (2008). What impact does developmental coordination disorder have on daily routines? *International Journal of Disability, Development and Education, 55*, 131-141.

Swinth, Y., Spencer, K. J., & Jackson, L. L. (2007). *Occupational therapy: Effective school-based practices within a policy context.* No. 2011. Center on Personnel Studies in Special Education, University of Florida.

Tsiotra, G. D., Flouris, A. D., Koutedakis, Y., Faught, B. E., Nevill, A. M., Lane, A. M., & Skenteris, N. (2006). A comparison of developmental coordination disorder prevalence rates in Canadian and Greek children. *Journal of Adolescent Health, 39*, 125-127. doi:10.1016/j.jadohealth.2005.07.011

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Villeneuve, M. (2009). A critical examination of school-based occupational therapy collaborative consultation. *Canadian Journal of Occupational Therapy, 76 Spec No*, 206-218.

Wang, T. N., Tseng, M. H., Wilson, B. N., & Hu, F. C. (2009). Functional performance of children with developmental coordination disorder at home and at school. *Developmental Medicine and Child Neurology, 51*, 817-825. doi:10.1111/j.1469-8749.2009.03271.x

Wilson, P. H. (2005). Practitioner review: Approaches to assessment and treatment of children with DCD: An evaluative review. *Journal of Child Psychology & Psychiatry, 46*, 806-823. doi:10.1111/j.1469-7610.2005.01409.x

Wilson, P. H., Maruff, P., Butson, M., Williams, J., Lum, J., & Thomas, P. R. (2004). Internal representation of movement in children with developmental coordination disorder: A mental rotation task. *Developmental Medicine and Child Neurology, 46*, 754-759.

World Health Organisation. (2001). *International classification of functioning, disability and health (ICF).* Geneva: World Health Organization.

Zoia, S., Castiello, U., Blason, L., & Scabar, A. (2005). Reaching in children with and without developmental coordination disorder under normal and perturbed vision. *Developmental Neuropsychology, 27*, 257-273.

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html

Missiuna, C. A., Pollock, N. A., Levac, D. E., Campbell, W. N., Sahagian Whalen, S. D., Bennett, S. M., . . . Russell, D. J. (2012). Partnering for Change: An innovative school-based occupational therapy service delivery model for children with developmental coordination disorder. *Canadian Journal of Occupational Therapy*, 79, 41-50. doi: 10.2182/cjot.2012.79.1.6
Available at: http://cjo.sagepub.com/content/79/1/41.full.pdf+html