



DCD Developmental Coordination Disorder

A resource for parents, teachers and clinicians

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About Us

This book was developed by researchers from the Institute of Health Research at the University of Notre Dame Australia, Fremantle.

Tegan Grace

Dr Tegan Grace (BSci (Hons), PhD) is an early career researcher, with a strong interest in the influence of early life events during pregnancy and childhood on long term development. Her PhD focussed on the antenatal, perinatal and neonatal periods and the impact of events during this time on motor coordination and neuromuscular development in late childhood and adolescence. Tegan is a Research Fellow with the Institute for Health Research at the University of Notre Dame and has published in high quality journals and received local, national and international recognition for her research in maternal and child health and development.

Beth Hands

Professor Beth Hands (BEd(PhysEd), BSocWk, GradDipEdStudies; MEd, PhD) has been involved in research involving children and adolescents for over three decades. Her particular research focus involves health-related issues affecting children and adolescents with Developmental Coordination Disorder and other movement disorders. She is currently a Senior Research Fellow with the Institute for Health Research at the University of Notre Dame. She has published numerous peer-reviewed journals and book chapters and authored the highly regarded Fundamental Movement Skills Teacher Resource and Play5 Teacher Manual. She is an investigator on many grants and collaborates with leading researchers nationally and internationally. Beth founded the Adolescent Movement Program (AMPitup) in 2010 after recognising a lack of suitable interventions available for teenagers with DCD. AMPitup offers teenagers a bi-weekly, personalised, supportive exercise program to increase fitness and enjoyment of physical activity.

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**“I hear and
I forget.
I see and
I remember.
I move and
I learn.”**

Background

Developmental Coordination Disorder in Australia

Developmental Coordination Disorder (DCD) is a diagnosable condition where a person's motor coordination is below what would be expected for their age. This movement difficulty is not due to a diagnosis of another neurological disorder, visual impairment, or intellectual disability, but may co-occur with other disorders such as Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Speech and Language Disorders, and some Learning Disorders.

DCD may be present in between 5-15% of primary school-aged children. Of these, 50-70% will continue to present with the condition into adolescence and adulthood. Many struggle with everyday activities such as dressing, using utensils, writing and most sport-based activities.

Audience and Purpose

This resource is designed to provide information about DCD for parents, teachers, clinicians and the broader community in order to increase knowledge and recognition of the condition so early intervention and support can be provided. Community awareness is very important as DCD is currently under-recognised and under-supported in Australia and many other countries.

Families

Many parents and carers are aware their child has difficulties with motor tasks compared to their peers and siblings but may not be aware that this is a diagnosable condition and consequently cause for concern. Parents and carers often find ways and strategies to support and encourage their child or teenager to complete simple daily activities such as dressing and eating. This resource may help them access additional resources and ideas.

School

Classroom and Physical Education (PE) teachers can play an important role in enabling the better recognition and treatment of DCD in students. Due to current curriculum and policies surrounding compulsory physical education in Australian schools, PE teachers are regularly exposed to children with numerous movement difficulties. In addition practically all classroom activities require fine motor skills such as writing, cutting, and drawing. Someone with DCD will find it difficult to efficiently complete many tasks which ultimately contributes to poor learning and behaviour outcomes. Increased understanding and awareness of DCD may help classroom and PE teachers provide the necessary support to their students.

Clinicians and Allied Health Professionals

General practitioners, paediatricians, physiotherapists, occupational therapists and exercise physiologists play an important role in the diagnosis and management of DCD. Most other developmental disorders such as Attention Deficit Hyperactivity Disorder, Dyslexia and Autism Spectrum Disorder are relatively well known and supported in Australia.

Research has provided a solid evidence base for the information presented. In this resource you will find

- A definition of DCD
- A description of the characteristics of DCD
- Evidence-based strategies to assist the child, teenager, parent, carer or teacher to manage DCD in homes, schools and classrooms
- Information on other resources that provide further comprehensive support and advice

Developmental Coordination Disorder (DCD) is a diagnosable condition where a person's motor coordination is below what would be expected for their age.

Section 1: About DCD



What is Developmental Coordination Disorder?

A person with DCD has difficulty with coordinating movements and are often unable to perform everyday tasks. Four criteria are used to diagnose the condition. These are described in the American Psychological Association Diagnostic and Statistics Manual of Mental Disorders (DSM-V).

- A lower ability to perform motor skills than would be expected for an individual's age and skill learning opportunity. It is important to rule out lack of opportunity or poor fitness.
- Persistent interference with activities of daily living from the motor difficulties described above.
- Symptoms which are observed from a young age, generally 4-5 years.
- The deficits in motor skills are not explained by other conditions such as intellectual disability, neurological conditions or visual impairment.

Some parents with a child who has DCD may notice symptoms from a very early age. Developmental milestones like sitting, crawling and walking can be delayed in children with DCD, however this is not always the case. DCD may not be evident until later when the child enters formal schooling and peer comparisons become stronger. The child may have difficulty with fine motor movements such as eating with a knife and fork, tying shoelaces, or using a pencil. Gross motor activities such as riding a bike, catching a ball and mastering locomotor skills such as skipping and galloping may also prove difficult. DCD is different for every person and can affect either fine or gross motor skills or both.

Activities of Daily Living

Activities of daily living include writing, using a knife and fork, opening containers and packages, applying make-up, fastening buttons, driving a car, shaving, tying shoelaces and using scissors, rulers and other items. In addition larger movements like running, jumping, skipping or hopping, as well as manipulating larger objects such as a soccer ball, may be affected. For children and teenagers with DCD these every day activities can become a struggle.

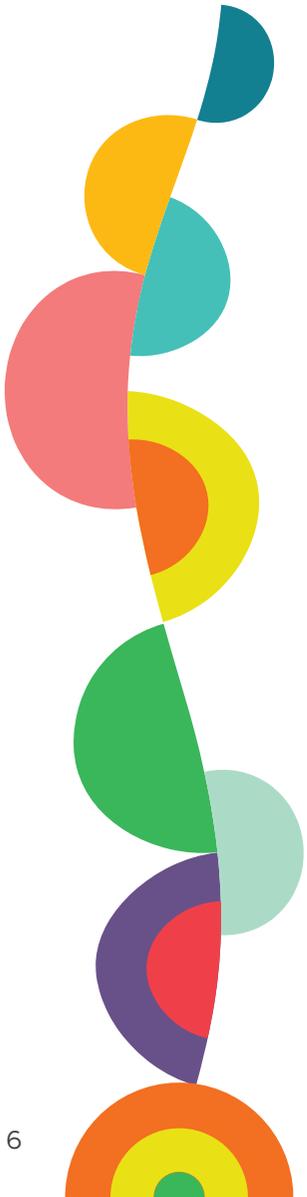
The prevalence of DCD has been estimated between 5-15% of primary school aged children which equates to around 1 in 10. In an average class of Western Australian children, teachers may encounter between 1-3 children who have DCD and the associated learning, behavioural and social issues. Some research has indicated that boys are more likely to be diagnosed with DCD, however both boys and girls can be affected.

Alternative names for DCD

Some general practitioners (GPs) and therapy providers may use other terms to describe DCD. While DCD is the most commonly used term in Australia, other countries such as Canada, the United Kingdom and United States of America may use alternative terms.

These include:

- Dyspraxia
- Clumsy child syndrome
- Motor coordination problems
- Fine or gross motor delay
- Mild motor problems
- Developmental dyspraxia
- Sensory integrative dysfunction
- Specific developmental disorder of motor function (WHO)



- Developmental apraxia
- Disorder of attention and motor perception (DAMP)
- Motor learning difficulties
- Perceptuo-motor dysfunction
- Developmental brain dysfunction, and
- Sensorimotor dysfunction.

What causes DCD?

There is no one cause of DCD. Genetics and early life factors play a role in the development of the disorder, but it is also important to note that while these risk factors may increase the chances of developing DCD, they do not automatically result in an adverse outcome. Some mothers may have a perfectly normal pregnancy with no risk factors and their child may still have DCD. It is important to acknowledge that the neurological system is extremely complex. There are a number of different mechanisms that could impact movement ability and it is most likely a combination of several factors that contribute to the disorder. These may include environmental, genetic or physiological factors such as:

- Pre-term birth
- Low birth weight
- Pregnancy hypertension (high blood pressure) and preeclampsia
- Emergency caesarean section
- Exposure to stress, high alcohol intake, smoking or cigarette smoke during pregnancy
- Genetic predisposition
- Brain lesion or impaired neurological processes such as cerebellar dysfunction

How is DCD diagnosed?

Parents and teachers may see that their child or student is struggling with poor coordination but have no idea what to do. There are few clear pathways for referral, diagnosis and support. In Australia there are several ways DCD may be diagnosed, and a multi-disciplinary approach can highlight specific areas of need and the appropriate support.

The diagnosis of DCD can be made by an occupational therapist, physiotherapist or GP. As a number of other medical conditions, such as Attention Deficit Hyperactivity Disorder, Autism Spectrum Disorder, Cerebral Palsy, juvenile rheumatoid arthritis, muscular dystrophy or traumatic brain injury may include movement difficulties as part of their diagnostic profile an examination by a GP or paediatrician is important to rule these out. DCD may be diagnosed alongside these disorders if the movement problems are more than what would be expected for the other diagnosed disorder alone.

Generally the child's parents and teacher raise the initial concerns, and additional information may be provided by a teacher, occupational and/or physiotherapist. A diagnosis is usually not made until the child is around 5 years of age after they commence more formal schooling and their developmental differences become more noticeable.

STEPS TO DIAGNOSIS AND SUPPORT

1 Screening and referral

Initial point of contact is usually a GP, Physiotherapist (Physio), Occupational Therapist (OT) or Accredited Exercise Physiologist (AEP).

.....
The GP can provide referrals to OT, Physio or a paediatrician for a clinical assessment.

.....
A GP or Paediatrician will confirm the diagnosis is not due to any other physical, neurological or behavioural disorders.

2 Multi-disciplinary assessment

A Paediatrician, OT or Physio can undertake formal and informal assessments.

This generally involves:

- The observation of the child performing a number of tasks.
- Tests of muscle tone, posture, reflexes, balance, fine and gross movement skills, power and strength.
- Parental questionnaires.
- Clinical observations.
- Formal tests of motor skill such as the McCarron Assessment of Neuromuscular Development (MAND), Bruininks-Oseretsky Test of Motor Development (BOT-2), or Movement ABC.

3 Intervention planning and delivery

The ideal strategy is a team approach:

- **Parents** can get advice on how to support their child or teenager in the home. There are many ways to adapt and modify equipment to make movement easier.
- **Teachers** can modify schooling activities and organise classroom and PE lessons to be delivered at a manageable level.
- **Therapists, including OTs, Physios and AEPs** can prescribe exercises including aspects of strengthening, balance and fine motor skills. Changes in classroom setting (such as desk set up and different stationery) may be advised to support schooling activities.

“My feet are playing a trick on me!”

(six year old boy with DCD, attempting a heel-toe walk)

What does DCD look like?

People with DCD have problems with many underlying neurological aspects of movement. These deficiencies not only make undertaking the task itself difficult but interpreting feedback and changing the movement to a more efficient pattern can become a prolonged and often frustrating experience. Understanding how poor coordination affects the person's ability to implement suggestions for improvement is essential. Teachers, parents and clinicians can then develop strategies to help the young person to improve their motor skills, and increase confidence and desire to participate.

Often children and teenagers with movement difficulties know what they want to do but not how to do it. Their hands and feet won't do what they want them to. One six-year-old expressed this well "My feet are playing a trick on me!" when trying to walk heel and toe along a line. It seems as though they are unable to remember and replicate a movement, even after being shown how. They have difficulty detecting and understanding what they need to do so new activities are approached on a trial and error basis. As a consequence they often trip and fall, or bump into furniture and other objects.

A parent may observe in the home:

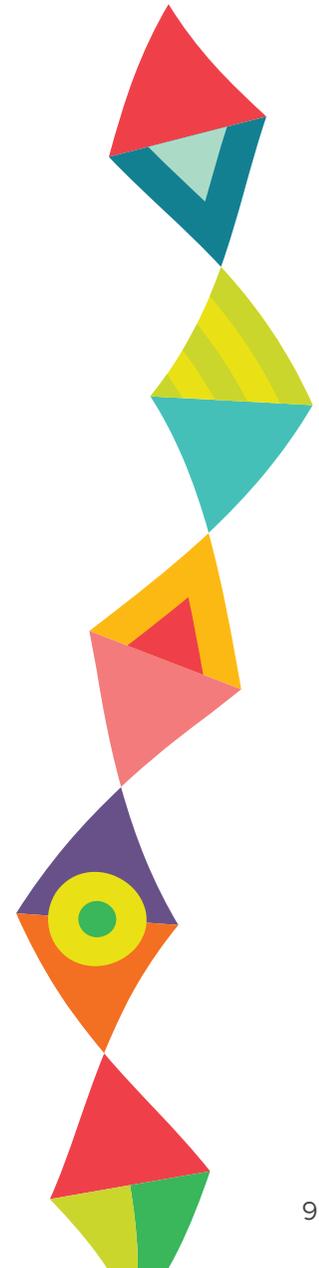
- Dressing difficulties- doing up buttons, turning clothes the right way out, putting on shoes
- Slowness to achieve motor milestones
- Difficulty using feeding utensils and other kitchen items
- Inability to ride a bike
- Difficulty manipulating small items such as lego
- Frustration, even tantrums, when unable to complete a task
- Early fatigue, and
- Being socially unpopular – not invited to peer's birthday parties, sleepovers, play dates.

A teacher may observe in the classroom:

- Difficulty with handwriting or using rulers and scissors
- Dressing difficulties – doing up buttons, turning clothes the right way out, putting on shoes
- Bumping into furniture
- A messy, disorganised desk, difficulty locating items
- Frequent falling or tripping
- Being 'off task' or 'easily distracted' when in actual fact they are finding the activity difficult
- Expressions of frustration, and
- Needing constant attention and support.

A teacher may observe in the playground:

- Social isolation; the child may retreat to the library, veranda or computer room
- Unwillingness to be physically active
- Less vigorous activity
- Less often playing on large playground equipment, and
- Less time engaged in positive social interactions.



Children with DCD will often exhibit avoidance behaviours which are, in essence, coping strategies. Withdrawing from physical activity opportunities is one of the main issues with DCD. This often leads to parents and teachers thinking the child is lazy, when really it is just their way of coping!

Behaviour observed	Could be misinterpreted as	What it really means
Pretending to be ill e.g. I feel sick, I have a stomach ache	<ul style="list-style-type: none"> → Manipulative behaviour → Lazy 	<ul style="list-style-type: none"> → I don't like this → I can't do this
Pretending to be hurt e.g. I have a sore knee	<ul style="list-style-type: none"> → Manipulative behaviour → Lazy 	<ul style="list-style-type: none"> → No one wants to play with me → No one wants to be my partner
Asking lots of questions, changing the subject	<ul style="list-style-type: none"> → Manipulative behaviour → Time wasting 	<ul style="list-style-type: none"> → I know I can't do this → I am going to look stupid!
Being off task, acting up	<ul style="list-style-type: none"> → Wilful misconduct → Stubbornness → Irresponsible 	<ul style="list-style-type: none"> → Please make me go and sit out of this activity
Saying "I'm bored", "This is stupid", "This is toooo easy"	<ul style="list-style-type: none"> → Wilful misconduct → Stubbornness 	<ul style="list-style-type: none"> → I can't do this and I don't want to even make an attempt in case I fail
Saying "I'm too tired"	<ul style="list-style-type: none"> → Manipulative behaviour → Lazy 	<ul style="list-style-type: none"> → I am very tired. Moving inefficiently is hard work!
Being the class clown	<ul style="list-style-type: none"> → Wilful misconduct → Showing off or attention grabbing 	<ul style="list-style-type: none"> → I want to save face
Being overly assertive when playing with others	<ul style="list-style-type: none"> → Bossy → Domineering → Bullying 	<ul style="list-style-type: none"> → I need to control the players and the game so I can understand what's going on and where I fit in
Being aggressive or having a 'tantrum' when asked to do something	<ul style="list-style-type: none"> → Wilful misconduct → Temper → Unable to control emotions → Lack of discipline 	<ul style="list-style-type: none"> → I would rather be in trouble than risk being made fun of → I'm angry at myself because I can't do what everyone else can

The Impact of DCD

Time management can be a difficult concept for those with DCD. Often parents and teachers lament the child who appears disorganised, undisciplined or forgetful. Extra support and help in keeping 'on task' may be needed. Recognising that these behaviours stem from a diagnosed disorder and are not simply personality traits is a profound relief to parents. Simple strategies to help organise and overcome daily hurdles can make a huge difference to the everyday lives of families. These are discussed in more detail in section two of this book.

Emotional outbursts from children and teenagers with DCD is a common occurrence and this can be due to frustration at their inability to do something or an avoidance strategy to move the focus off their performance. Either way, parents and teachers can quickly tire of the extreme behaviour and react with a disciplinary approach, focussed on the behaviour and not the underlying cause. It can be very draining for the adults involved, particularly when there are other children in the family or classroom that this behaviour affects. Support from other parents or teachers is important to ensure everyone is getting the help they might need. There is a list of websites and resources available in section three of this book.

Children with DCD will often exhibit avoidance behaviours which are, in essence, coping strategies. Withdrawing from physical activity opportunities is one of the main issues with DCD. This often leads to parents and teachers thinking the child is lazy, when really it is just their way of coping!

Poor physical health

It is known that for children and teenagers to be healthy they need to be active. The current recommendation in Australia for children and teenagers is at least an hour a day of moderate to vigorous physical activity. Many young people with DCD withdraw from opportunities to interact with their peers when playing outdoors or in physically demanding games. They employ avoidance behaviours (described in the table on pg 10) during physical education classes and find school sports carnivals very stressful. Consequently they are at risk of a range of health problems.

Some physical consequences of DCD include:

- Reduced aerobic fitness
- Lower muscle strength
- Reduced flexibility
- Lower muscle endurance
- Early fatigue as movement is very difficult and inefficient
- Reduced bone density, which can contribute to an increased incidence of fractures and a later risk of osteoporosis
- Higher incidence of overweight and obesity, and
- An increased incidence of falls.

Higher risk of social and emotional health issues

Poor movement skills also have a profound negative impact on social and emotional health. Given their avoidance of physical activities, young people often experience social isolation as they are unable to participate in many weekend sporting activities. This is particularly important for social interaction and the development of peer relationships.

Some issues include:

- Lower self-perceptions across a range of domains (including social acceptance, academic achievement, behavioural conduct)
- Lower self-esteem and self-confidence
- Higher rates of anxiety
- Greater stress levels
- Higher incidence of introversion
- Depressive symptomology
- Peer victimisation or bullying
- Increased risk taking
- Behavioural problems
- Social dysfunction
- Under developed social recognition skills and difficulty reading static and changing facial expression, and
- Difficulty maintaining personal space around others.

Poor learning outcomes

Children and teenagers with DCD do not necessarily experience learning difficulties in other areas such as reading or math, however as the condition often co-exists with disorders such as Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD), children with DCD are often reported to have learning difficulties.

Their motor coordination may impact classroom performance in a number of ways. For example:

- Difficulty holding a pencil
- Messy writing, trouble forming letters
- Inability to accurately use scissors or a ruler
- Being easily distracted or 'off task'
- Taking a long time to begin a new task or move back to their work area, and
- Learning, speech, behavioural or attention problems.

In addition those with organisational skills and time management problems may have difficulty completing homework and other tasks on time.

It is important to remember that with increased understanding and awareness, many of these issues can be addressed. Support and encouragement is key and the next section of this book will go through strategies and recommendations for working with a child with DCD as well as a list of resources and local programs available.

Section 2: **Supporting children and adolescents with DCD**



The 5 C's approach

Once teachers, parents and clinicians have an appreciation of the condition and what it looks like they will begin to recognise DCD in children and teenagers with whom they are in contact. Knowing how to support these children and help them improve their movement skills, increase their confidence and instil a desire to participate in classroom and playground activities is the focus of the next section. The 5 C's approach to working with DCD is easy to understand and implement and has resulted in great improvements in children and adolescents. These are covered in the next few pages.

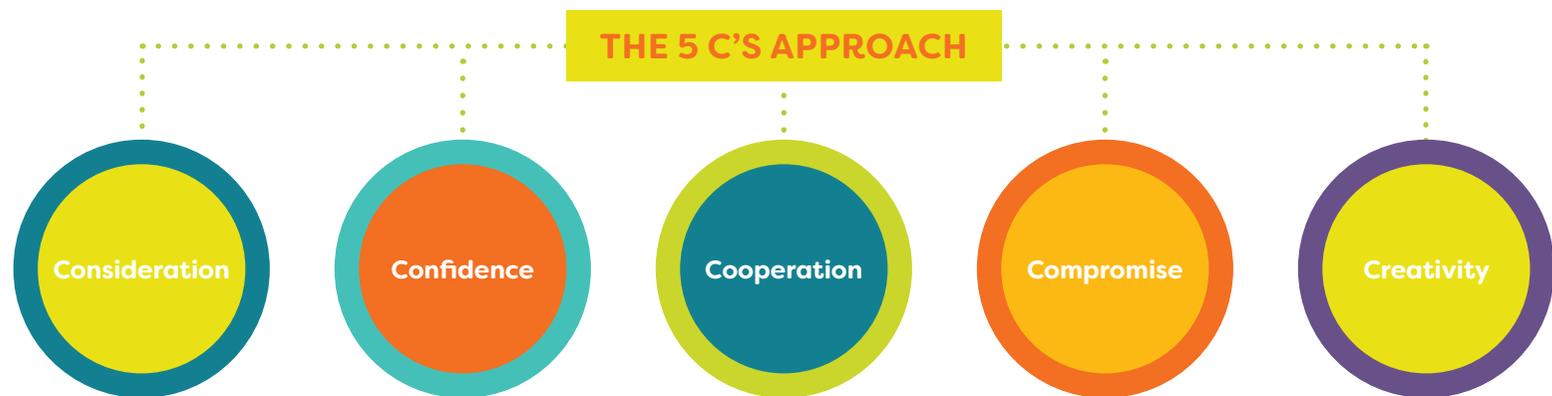
Consideration

Those working with young people with DCD must start by considering how it must feel to be unable to complete tasks that others master so easily. Most people know from experience how to perform a novel task and are confident they will be able to do it, however this is not the case for those with DCD. Consequently, building a trusting and supportive relationship is critical. For example, teachers may have known the child for a long time but a level of trust is

important before they will open up about their movement difficulties. This can be embarrassing and the child needs to know that their support person wants to help them and won't judge them. It is important to talk with them about their poor coordination and the associated difficulties. Young children, in particular, may know something is wrong but are unable to identify or verbalise it. It is often a relief when someone finally talks to them about it.

It can be frustrating working with those with movement difficulties, but it is important that this frustration is not conveyed to the child. A task that most people find very quick and easy to master (for example buttering a slice of bread) may take the young person a long time and they will make it look very hard. It is important not to take over and complete the task, making it look very easy, as this can just add to their sense of failure or incompetence.

Aim to build on strengths and interests by discussing what they are interested in and what activities they like to do. Interest and enthusiasm can be piqued when these are incorporated or built into physical activities and skill practices.



They may have specific interests, for example a TV show, hobby or sport. Using equipment or props related to these or developing a reward system that incorporates them will often be greeted with great enthusiasm, particularly by younger children. For teenagers, showing interest in them and respecting their input is invaluable.

A successful movement program for teenagers with DCD in Western Australia emphasises the importance of the participant setting their own goals and choosing which exercises they want to do in each session. The added bonus of selecting their favourite music to play in the gym during training is a good motivator and helps facilitate a strong relationship between the trainer and the teenager. This relationship, while professional in nature, is essentially a 'patient centred design' where the focus is on the whole person, not just their DCD.

Parent feedback from teenagers involved in the program emphasised how important the relationship between the teen and the trainer was:

.....
"The relationship with her trainer was very important. It gave her confidence and they didn't push too hard to do things, let her ease into it".
.....

.....
"Jaqueline has always related well to her coaches and enjoys the social interaction that she has with them. She also like the fact that the coaches take an interest in her, to get to know her and can then challenge her in the gym. It is a wonderful program".
.....

Consideration also needs to be given as to how the condition impacts on the child or teenagers' enthusiasm and attraction to physical activities. They may have developed a reluctance to try different skills due to fear of failure and use the avoidance strategies mentioned previously. Physically they might tire very quickly as they move less efficiently and use more energy compared to children without DCD. Making the activity enjoyable and providing opportunities for positive achievement is an important part of building confidence – the next key step to successful engagement in PA.

"Such a change for a boy who used to go to extreme lengths to avoid physical activity, especially in a group, or where he may be compared to other kids. He is now on a soccer team and scored a goal on Sunday, I can't believe it!"

(parent of a 13 year old boy with DCD)

Confidence

Many youth with DCD have experienced failure so often that they lose the desire and confidence to try a given task. They may feel anxious when asked to complete something they have failed previously and often give up readily. With the improvement of movement competence, confidence builds.

Strategies to build confidence through supportive interactions are outlined below.

Ensure success

It is important to ensure they experience success at some level with each activity.

- Start with an activity (simple, fun and interesting) where they can achieve a 100% success rate.
- Break down tasks into small, achievable parts. The child may complete one part and the instructor or trainer completes the other.
- Give positive, but genuine, feedback about performance. It's important the trainer does not praise an outcome which both they and the child know was unsuccessful. Honesty is a major component of trust.
- Highlight aspects of a skill or game that are successfully completed.
- Only provide intervention or assistance when needed. Don't take over and don't leave them to fail.
- Never finish an activity with failure, such as a dropped catch.
- Always finish a practice or training sessions on a positive note.

Provide choice

Provide the young person with choice by encouraging them to set their own goals and including them in the decision making process. This provides opportunities for self-regulation and confidence building and is particularly important to teenagers. Even giving them the choice of music to listen to during practice sessions will make physical activity a more enjoyable, social event.

Identify how the person learns best

Everyone has different learning styles. Some may like to watch a demonstration first before attempting the skill themselves or standing side by side to an instructor and copying their movements. Others prefer to learn by themselves as they may be shy about trying new skills. Often youths enjoy being with a group, particularly if the others have similar movement difficulties and the group is inclusive and supportive. Learning with friends can also be an effective learning medium. Group exercise classes or programs that are specifically aimed at helping those with movement difficulties in a non-competitive environment have shown promising results in improving self-esteem, confidence and fitness in teenagers that have DCD. One example of this is shown in Lisa's story on the next page.

LISA

Lisa is a 16 year old girl who was diagnosed with severe DCD. She was extremely reluctant to be involved in any organised sport or exercise except for the occasional bout of swimming and this was usually only after continuous prompting from her parents. She had very low body tone and often complained of back and neck pain and sore feet and knees as soon as she started any form of exercise. Her parents were concerned with her lack of exercise and described their attempts at getting her active as taking 'two steps forward and three steps back'. Lisa's parents had worked previously with an occupational therapist to try and improve Lisa's movement outcomes with some success, however she remained unwilling to participate in any activity outside of the OT sessions. Lisa was enrolled into a specialist exercise intervention study that was aimed at improving fitness outcomes in teenagers

with DCD. The fitness program ran twice a week at a university gym and was based around having a trainer work with each adolescent to set goals, have fun and improve fitness and attraction to physical activity. Within eighteen months Lisa's parents commented on the vast improvement in her body tone, self-confidence and desire to be physically active, even stating that Lisa had expressed she wanted to join a netball competition with her friends, something they never thought she would want to do. At school she opted to run the 3 km cross country instead of walking with her friends. She was so proud of herself. Some of the most important aspects of the program were that it was non-competitive, inclusive, and allowed Lisa choice. She could set her own goals and make decisions about which exercises she wanted to do and it was available twice a week to ensure maximum results.

Children and teenagers with DCD often need more time and on-to-one instruction when completing school work, learning a new skill or doing physical activity.

Cooperation

The old saying “it takes a village to raise a child” is particularly relevant to children with DCD. Involving all significant people (parent/s or guardian/s, extended family, friends, teachers, and health care providers) around the child or teenager during their journey of learning how to manage their condition will maximise the chances of success.

It is important that each support person identifies what outcomes they would like to see. For example, parents may want their child to enjoy sport and be active. Teachers may want to see an improvement in writing or classroom behaviour. A physiotherapist may want to work on core stability and help the child with fundamental movements. An OT may want to help them tie their shoe laces. The child may just want to be able to play a game with their friends and not feel ‘different’ to those around them.

Remember that there will be changes in the desired outcomes, particularly as the child gets older. The things a 10-year-old may be interested in (throwing a ball, kicking a footy) may be vastly different to a 17-year-old’s goals in life (putting on make-up, doing their hair, studying for exams or getting their drivers licence). Regardless of the different outcomes and priorities, developing consistent messages and strategies between each person and the child or teenager will increase success. This helps everyone to be on the same page and streamlines the approach, avoiding confusion and allowing them to know what to expect from each person helping them through their journey.

Families

Independence is important for all children, and only increases as they enter adolescence. Unfortunately this is something that may be a real sticking point for families, particularly if the older sibling has DCD and a younger sibling doesn’t. It can be difficult for parents to know when to help and when to give their teenager room to learn from their mistakes (both physical and social).

Depending on family circumstances siblings may find they have a reversal of roles, with the younger non-DCD child taking on the role of an older sibling, or an increase in friction due to one sibling being ‘better’ or more popular at school and sport. In this regard family communication is very critical. Parents may find it hard to juggle supporting and encouraging the child with DCD, minimising sibling rivalry, making sure everyone knows their place and ensuring other child/ren are getting sufficient attention.

- Encourage separate activities for each child so they can find something that is ‘theirs’, whether a sport or a hobby.
- Plan family activities that are fun and interactive without being too competitive. Board game nights, walking and taking photos outdoors, walking the dog or cooking together. If physical activity is involved all the better!

Service Providers and Educators

Good communication is a key aspect of cooperation. Teachers and parents in particular can help with school life by maintaining clear lines of communication and working together. Children may need some special considerations to make sure they are on track to achieving their goals. School teachers and parents can organise regular contact and maintain open lines of communication through email and face to face meetings.

Copies of OT or Physiotherapy reports can be provided to classroom and PE teachers before the beginning of school term to help them develop some strategies before the start of school.

Set exercises or suggestions provided by therapists can be incorporated into after school routines, either before or after homework. Make sure the teacher is aware of these and knows this time is taken into account with the overall workload on the child or teenager.

There are more examples of how everyday events can be amended to provide extra support in the next section.

Compromise

Children and teenagers with DCD need more one-on-one support and assistance to learn skills that their peers master easily. Teachers and other support people may need to accommodate and adapt to their lower skill level. This may mean modifying tasks, altering expectations and changing the environment to help them be successful at the attempted task.

Depending on the age of the child some of the compromises below may need to be taken into consideration. These can help make everyday life easier and calmer. Even simple daily tasks such as dressing and getting out of the door on time each morning can be hard for a family with a young person with DCD.

Allowing for compromises on the less important things and focusing energy on those that are a priority will help get things done in time. Choose the most important battles! Again, these will differ with age and the individual.

Ways parents of primary children can compromise

- Buy shoes with velcro rather than laces.
- Help to butter bread, cut sandwiches and pack lunch

boxes before school. Avoid containers and packages that are difficult to open.

- Arrange for homework to be completed on a computer. This enables them to focus on the content they are learning rather than the task of writing, which for many is difficult and tiring.
- Work with the teachers to make sure the child isn't falling behind – meet with them before term starts and if needed request a parent-teacher interview during term.
- Allow more time in the morning routine – getting dressed, eating breakfast, cleaning teeth.
- Make organisational skills an everyday routine. Write up a timetable or checklist of things to do before leaving for school and after returning home. Place times next to items so they can learn about time management.
- Provide flushable wet-wipes if cleaning themselves correctly after toileting is an issue because of instability and coordination.

Ways parents of teenage children can compromise

- Make sure that personal hygiene activities are organised for teenage girls each morning. Create a separate bag that contains pads and/or tampons or a change of underwear. This is useful if there is difficulty with time management and these items are needed quickly during the school day.
- Show teenage girls how to shave their legs or apply make-up- and devise strategies to help if needed. For example suggest sitting down to shave so she is more stable, or consider an electric razor, depilatory creams or waxing. For makeup that needs precision application such as eyeliner or mascara there are more permanent options such as tinting.
- Show teenage boys how to shave safely and correctly. Don't assume they will know how to shave on their own. Buy a good safety razor or an electric shaver.

- Allow for more time in the morning to get ready.
- Source alternative school uniform/clothing options (e.g. a pre-tied tie if needed for school uniform).
- Meet with teachers prior to each new school year to discuss the diagnosis. Keep the lines of communication open throughout the school year. If needed, arrange parent teacher interviews during the term.
- Create a daily schedule in an easily viewed place in the house or in their room to remind them what they need to do in the mornings and after school.

Ways teachers can compromise

Primary school

- Provide alternative seating or desk arrangements that are easily accessed, help improve posture, and reduce fatigue.
- Allow the student to complete homework or other tasks on the computer instead of by hand writing.
- Give regular breaks and consistent positive feedback throughout the class, term and semester.
- Revise skills and provide lots of opportunity for practice with constant and meaningful feedback.
- Send them back to their work station before the rest of the class (a head start and less distraction).
- Be aware that skills mastered one day may be forgotten the next!
- Don't deliver too many instructions at once.

Secondary school

- Allow the student to complete homework or other tasks on the computer instead of by hand.
- Develop strategies to teach organisational skills in the classroom. For example give a five minute warning

before regular pack up times so student can begin organising themselves.

- Develop a homework journal or diary and check it regularly. Self-regulation skills are a learning curve for everyone in high school but students with DCD may need extra prompting, reminders and support to keep on track. This is part of the condition and not a sign of laziness or an unorganised student.
- Meet with the parent/s or guardian/s before the start of term to set some goals and ensure everyone is aware of the student's needs.
- Communicate with other teachers about what works for the student and try to provide consistent support throughout the day in each subject.

Physical Education

- Break down a movement or skill into small achievable actions. This helps the child to focus on one element at a time and gives them a sense of achievement. However, even though they may master each part of a skill they may still be unable to put the pieces together proficiently. Try doing each part separately then adding on the next to gradually build up the overall skill.
- Alternate between part and whole practice of a skill.
- Identify how the young adult learns best. Is it with a best friend or a more competent peer? What sort of feedback works best? Verbal, visual or tactile guidance?
- Be aware that skills mastered in simple drills may not be demonstrated in a game situation which is more complex and unpredictable. They now have to remember the rules and strategies of the game as well as avoid bumping into others, catching or kicking a ball.
- Avoid getting out games! Who will get out first?



- Ask the youth to describe how to perform a task (the key skill criteria) rather than demonstrate it. In this way they can show their knowledge to their peers. Only ask them if you are sure they know the answer!
- Don't ask them to demonstrate a skill to the class unless 100% sure they can do it.

- Provide a non-competitive environment for learning in the playground and during PE lessons.
- Provide a choice in the challenge of an activity.
- Realise that skills mastered one day may be forgotten the next!

Type of choice	Skill Example	Variations
Demand of task	Balance on one leg	<ul style="list-style-type: none"> → Hands outstretched → Hands on hips → Eyes open or closed
Rules	Volleyball	<ul style="list-style-type: none"> → One bounce allowed → No bounce allowed → Catch allowed
Play area	Tag or chasey	<ul style="list-style-type: none"> → Small area (harder not to get caught, easier if tagger) → Large area (easier not to get caught, harder if the tagger)
Number of players	Tag	<ul style="list-style-type: none"> → Fewer players - harder
Target	Overhand throw or kick	<ul style="list-style-type: none"> → Large target or small target → Wide goal or narrow goal → Close or far away → One target or lots of targets → High target or low target
Equipment size	Catch	<ul style="list-style-type: none"> → Small tennis ball → Large basketball
Height	Balance walk	<ul style="list-style-type: none"> → Slope of incline board → Balance beam low to ground or higher



CARLOS

Carlos was a 13 year old boy with movement problems who also had cognitive difficulties and tactile and hearing sensitivity. He was extremely sensitive to loud noises and found mainstream sporting events stressful due to the crowds, whistles and high level of background noise. He was not a competitive boy and found games where he had to compete with friends made him anxious and withdrawn. Carlos had difficulty walking and running, but to the delight of his parents he did at one stage start to enjoy cycling. Unfortunately an accident on his bike meant he was turned off the activity and went back to being inactive. After buying various fitness equipment and trying to encourage other activities such as swimming, with small amounts of success, Carlos was enrolled into a gym-based fitness program for teenagers with DCD. He was impressed with the smiling faces and welcoming atmosphere of the program and his mother commented on how much he enjoyed the sessions, his improved posture, weight loss and new found enthusiasm for physical activity.

Carlos' parents continued to bring him to the program twice weekly over the next three and a half years and with each year saw consistent improvements in his attitude towards physical activity, confidence and physical health. The environment of the program emphasised personal goal setting, positive non-competitive activities and consistent and gradual improvements over time. The trainers stayed with their participant throughout a 13 week semester which meant that a trusting and friendly atmosphere was developed and Carlos reaped the benefits of that positive environment. Exercises were performed on pin-loaded weight machines which restricted extraneous movement and helped Carlos focus on lifting the weight and not the poor coordination of his limbs. Core strength was also a focus of the program and this allowed Carlos to improve his posture and to perform other exercises better.

Creativity

Create a fun and supportive learning atmosphere at home, in the classroom and in the playing field. This is often achieved by being creative when seeking solutions to everyday tasks. This could be done by changing the equipment used. For example, if a child tires easily in the classroom they may be compensating by using larger muscle groups to try and control their pencil. Using pacer pencils can help – the pencil will snap if there's too much pressure and the child will receive instant feedback that they are pressing too hard. They will then be able to slowly develop the smaller muscles in their hands and arms to control the pencil correctly.

During physical education classes, have a variety of equipment sizes and types to ensure participation and enjoyment. Check with the child or teenager to see what they feel most comfortable using or offer a number of alternatives or choices thereby creating an inclusive lesson or training session. Provide visual cues, for example foot shapes to indicate where to stand, in order to orientate the body to perform a certain skill efficiently.

There are many games parents can use to increase strength, balance, awareness of surroundings and motor planning. Simple, fun and inexpensive activities such as playing with play dough, clay or plasticine, watering plants with a trigger spray bottle, having an arm wrestle or playing tug of war games in non-competitive ways can provide opportunity to use muscles that are needed for writing, or playing bat and ball games.

Creating the right atmosphere is important. Changing the task or the environment can make it easier to complete the skill, reduce competitiveness and increase inclusion. Focus on achieving a personal best, use small groups, avoid getting out games, give lots of practice time with few interruptions and plenty of encouragement and feedback.

Activities including freestyle dance to music, imaginative play and collaborative games can add movement to the day with minimal pressure and skill requirement. Some children with DCD benefit by playing simple card games such as memory, snap, or matching cards. These help increase memory, organisation and visual perception.

Consider previous successes and skills mastered. Some are able to build on these whereas others find it difficult to transfer their learning (or generalise) to a different, yet similar task. For example, they may master skipping when singing a song or listening to music but are unable to replicate the rhythm when away from the musical cue. Keeping track of what has worked in the past can help to know what might work in the future.

Creating a fun, supportive and safe place where children and teenagers can explore movement is the cornerstone to a successful intervention program for DCD.

Task or activity	Child	Teenager
Difficulty with holding a pencil	<ul style="list-style-type: none"> → Use triangular pencils that encourage pincer grip → Use pacer pencils to give feedback on pressure 	<ul style="list-style-type: none"> → Allow work to be completed in class or at home on the computer or ipad
Slow or messy handwriting	<ul style="list-style-type: none"> → Use paper with sectioned lines as a guide → Check position at the desk (feet on the floor, arm rested on the desktop, not slumped or bent over) → Check desk height is correct → Use a computer, laptop or ipad → Allow extra time during class activities 	<ul style="list-style-type: none"> → Invest in a good desk and chair for homework if possible → Use a computer or laptop to complete work in school or at home → Allow extra time during exams for writing
Difficulty with doing up shoelaces	<ul style="list-style-type: none"> → Source shoes without laces such as velcro fasteners → Teach tying up shoe laces 	<ul style="list-style-type: none"> → Allow more time in the mornings to get ready → Source appropriate, manageable shoes
Difficulty with buttering bread	<ul style="list-style-type: none"> → Try different knife handle lengths → Make faces or patterns on the bread → Use shape cutters 	<ul style="list-style-type: none"> → Develop a range of lunch options that don't involve making sandwiches
Difficulty with balancing	<ul style="list-style-type: none"> → Use imagery 'pretend you are on a set of skis, toes forward, feet hip distance apart' → Ensure they are on a firm, level surface → Provide support- hold their hands or place a chair or bar nearby... start holding on then let go → Remind them to use their eyes- focus on something on the ground → Use their arms like aeroplane wings to help → Try balancing on different body parts eg one foot and one hand or one knee and two hands 	<ul style="list-style-type: none"> → Use specialist gym equipment, such as balance boards, discs and wobble boards, foam pads and beams to increase balance and core strength → Make it fun by adding in throwing and catching exercises while balancing → Take off shoes so they can use their feet to feel the surface → Balance with a partner or in a small group

Task or activity	Child	Teenager
Difficulty with striking a ball	<ul style="list-style-type: none"> → Start with the ball on a tee (at waist height)... not moving! → Use a larger ball and/or light bat → Keep a balloon in the air using the bat → Provide rackets with different handle lengths so that the child finds one that works best 	<ul style="list-style-type: none"> → Break down the movements → Use verbal cues and imagery → Suspend a ball by string or in a stocking from a netball or basketball ring. → Practice for short periods of time to lessen fatigue and boredom → Play fun games as reward for quality practice time
Difficulty with catching a ball	<ul style="list-style-type: none"> → Start with a large brightly coloured ball or even a balloon. Blown up beach balls are ideal → Get them to bounce and catch the ball first, so they start to learn how balls work → Work with them to feel and appreciate the size of the ball, this helps them have their hands the right distance apart → Throw a soft and looped ball to them to maximise reaction time → Don't encourage them to trap the ball against their chest, they need to use their hands → Draw faces or numbers on the ball → Cue your throw... 'ready, set, catch' 	<ul style="list-style-type: none"> → Practice in a non-competitive and private area and focus on fun not performance or competition → Try catching different sized balls and shaped objects (light boxes, cushions) → Throw clap catch... 'how many can you do'? → Don't compare their performance to anyone else → Allow them to set their own goals, for example they may want to join a team sport
Difficulty with skipping or galloping	<ul style="list-style-type: none"> → Both these skills are based on a rhythm so click your tongue, sing or play music while practising → Use musical instruments or clap hands to demonstrate the rhythm → Hold their hands and skip or gallop → Use imagery for the gallop- suggest they pretend to have a sore leg (run with a limp) or are a horse 	<ul style="list-style-type: none"> → Make up dances which include skipping or galloping → Listen to music that has the rhythm of the skill



KATHERINE

Katherine is an adult, now over 60 years of age, who has reflected on her time growing up in Australia when DCD was not a recognised disorder. She is a happy, friendly and easy-going person, however she found it hard at times to get really close to people. Katherine went to an all-girls school and recalls how she would often seek out younger children to play with as she felt more comfortable with them. Although she loved sport and in particular netball no matter how hard she tried to improve her skills she could not get into a team above bottom grade.

Katherine always had bruises and scratches from constant trips and falls as a child, however, for her, it was simply a part of life. It wasn't until later on that she would start to compare herself to others, wondering why no one else seemed to have the same difficulties walking on uneven ground or catching a ball. Even after she left school and entered adulthood she would still trip and fall regularly, recalling times when she would pick herself up off the ground at a shopping centre and make a hasty exit, leaving a group of concerned shoppers looking for the elusive object that had tripped her.

Her DCD also had an effect on her studies, particularly when she entered formal adult education however Katherine

found a way to manage this and she realised that she learnt best by 'doing'. Her strategy was to ensure any study she pursued was as related as closely as possible to work she was already doing or knowledge she already had. For example a Diploma of Special Education was undertaken between time working with children with disabilities. The experience with these children allowed Katherine to conceptualise the theoretical content of the course. She described this as needing to work 'from the concrete up'.

Katherine stills has difficulties with coordination and organisation, often losing keys, bumping or breaking things, chipping walls with the vacuum cleaner or denting the car. She can recall times, as an adult, when she overheard people comment about her not doing things 'properly' or feeling as though she had to move furniture and re-organise the space around her multiple times before she could feel comfortable in her work space or home environment. As Katherine was only diagnosed with DCD as an adult these experiences began to make sense and she now reflects that she has been able to let go of some of the past hurts. In being given a diagnosis and explanation of DCD Katherine has found "a sense of completeness about myself".

Section 3: Resources



Resources

Please note these resources are intended for information, education and research outcomes around DCD and may not necessarily provide services. Referral pathways for DCD will differ for each state and region.

Websites

Australia

Move.Grow.Engage is the name of the Western Australian Developmental Coordination Disorder Research Group which is an initiative of researchers from The University of Notre Dame Australia, Curtin University and The University of Western Australia. The researchers are dedicated to providing Australians with useful and relevant information regarding Developmental Coordination Disorder (DCD).

The website developed by the group contains details about current research projects, publications, intervention programmes and support services for families and carers and is a professional resource for practitioner. It is proudly supported by the Collaborative Research Network (CRN).

www.movegrowengage.com.au

International

DysTalks is a U.K. based website providing information and support to families for a range of disorders in addition to dyspraxia/DCD including dyslexia, and dysgraphia. The website includes an online lecture series and short talks.

www.dystalk.com/topics/2-dyspraxia

Movement Matters is an organisation that represents national U.K based groups who are involved in providing support, policy guidance, education and research concerning DCD.

www.movementmattersuk.org/default.aspx

CanChild is a Canadian based not for profit organisation that undertakes research into a number of childhood disabilities. Researchers from CanChild have strong collaborative ties to Australian based researchers in WA and the Move.Grow.Engage team.

www.canchild.ca/en/diagnoses/developmental-coordination-disorder

Further reading

Ball, M.F. (2002) *Developmental coordination disorder: Hints and tips for the activities of daily living*. Jessica Kingsley Publishers.

Blank, R., Smits-Engelman, B., Polatajko, H., & Wilson, P. (2012) *European Academy for Childhood Disability (EACD): Recommendations on the definition, diagnosis and intervention of developmental coordination disorder*. *Developmental Medicine & Child Neurology*, 54, 54-93. doi:10.1111/j.1469-8749.2011.04171.x

Cairney, J. (2015) *Developmental coordination disorder and its consequences*. University of Toronto Press.

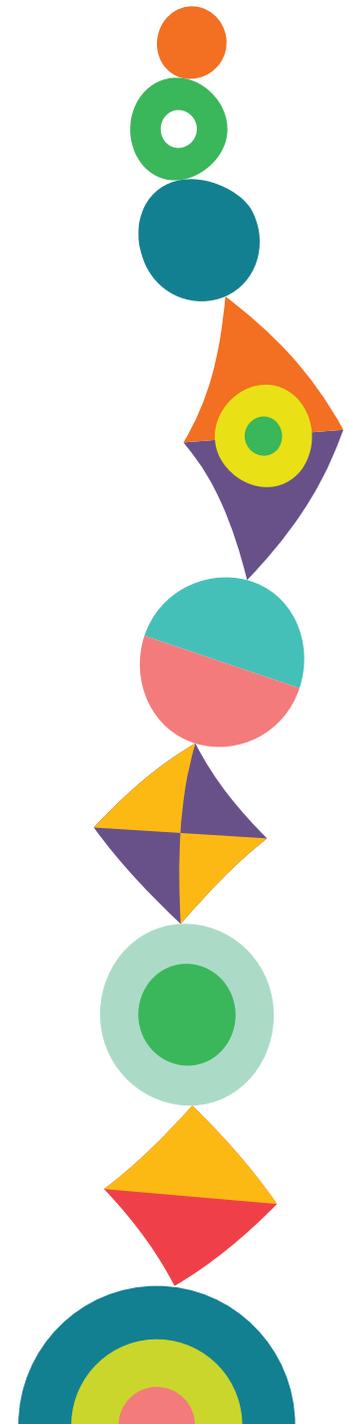
Cermak, S. & Larkin, D. (2002) *Developmental Coordination Disorder*. Delmar

Kirby, A. (2004) *The adolescent with developmental co-ordination disorder (DCD)*. Jessica Kingsley Publishers.

Ripley, K. (2001) *Inclusion for children with Dyspraxia/DCD*. David Fulton Publishers.

Sugden, D. & Chambers, M. (2005) *Children with developmental coordination disorder*. Whurr Publishers Ltd.

Sugden, D., Chambers, M & Utley, A. (2006) *Developmental Coordination Disorder as a Specific Learning Difficulty*. Leeds Consensus Statement. University of Leeds. (Blank, Smits-Engelman, Polatajko, & Wilson, 2012)





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