

Physiotherapy and Dyspraxia for professionals

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The Dyspraxia Foundation defines dyspraxia as “*an impairment or immaturity of the organisation of movement*”. This difficulty with planning movements has also been described by Cermak (1991) and Ayres (1979) in their definitions of dyspraxia. Cermak in fact defines dyspraxia as “*a difficulty in planning and carrying out skilled, nonhabitual motor acts in the correct sequence*”. Dyspraxia is also frequently used to describe children who have difficulty in daily activities that require co-ordination of movement that is out of proportion to the child’s age and intelligence. As a result of these difficulties, it is a condition which threatens physical development and may reduce the child’s ability to reach her/his full potential. Physiotherapy aims at improving the quality of movement both with the planning and carrying out of movements. This is achieved through exercises, games and activities.

The Importance of Movement

Motor development influences intellectual, social and emotional development. Through play a child will learn and practice her/his gross motor skills and co-ordination skills until s/he perfects them. Through play with peers a child learns social skills including the concept of giving, taking and sharing. Exploration of the environment leads to knowledge about the child’s world and to the formulation of basic concepts, e.g: under/over, up/down; which will later be used learning basic academic skills (Lee & French, 1994). These factors in turn lead to self confidence and a positive self image. Children use their previous positive experiences to attempt new tasks and explore new areas without being threatened with failure. It can be seen that movement is the basis for learning and where there are limited or impaired movement skills, as is the case for dyspraxic children, problems arise and escalate as the child grows older (Lee & French, 1997). The dyspraxic child has many negative experiences and feels threatened by failure. S/he frequently fails with new activities. This in turn leads to poor self confidence and self image. This forms the most important aim of all treatment. Self confidence and self esteem must be improved so the child can build on positive experiences and feel s/he is achieving

HOW TO IDENTIFY A CHILD WITH DYSPRAXIA

Dyspraxic children may be experiencing a number of difficulties both within and outside the classroom setting. Some of the difficulties are listed below. Many children will not necessarily experience all the difficulties stated:

- delay in reaching milestones e.g. standing, walking, hopping, jumping, climbing stairs
- some never crawl (30 – 80%)

- poor writing and drawing ability
- unable to sit still
- disorganised / messy and difficulty planning
- frequently fall or trip over
- loner
- messy eater and spills drinks or knocks trays over
- plays the clown or is disruptive in class
- poor concentration and easily distracted
- poor at games lessons and ball skills
- slow at dressing/undressing
- knocks into things or stands too close to people
- difficulty following instructions – visual and verbal

GUIDELINES FOR AGE APPROPRIATE SCORES

Guidelines taken from “Birth to Five Years” Mary Sheridan. Scores taken after 5 years are from personal experience

Standing on 1 leg:

3 years:	momentarily
4 years:	3 - 5 seconds
5 years:	8 - 10 seconds
6 years:	15 - 20 seconds
7 years:	20 – 25 seconds
8 years:	25 – 30 seconds
9 years:	30+ seconds

Standing on tip toes:

3 years:	stands and walks on toes
4 years:	also able to run on toes
5 years:	runs lightly on toes

Hopping:

4 years:	preferred foot a few hops
5 years:	on either foot for 2 - 3 meters

Jumping:

2½ years:	jumps from a lower step
3 years:	usually jumps with two feet together from the bottom step of stairs

Stairs:

2 years:	holds onto rails and goes one step at a time
3 years:	walks up stairs reciprocally-comes down stairs one step at a time
4 years:	walks up and down stairs reciprocally but holds into rail initially

Riding a tricycle/bicycle:

2 years:	sits and steers tricycle but cannot use pedals
3 years:	rides tricycle using pedals
4 years:	expert rider and can do 'U' turns
5 years:	rides bicycle without stabilizers

Throwing a ball:

2 years:	throws football and tennis ball over head and forwards
3 years:	throws a ball and can catch a football if thrown into outstretched arms
4 years:	shows increasing skills with balls and can use a bat
5 years:	plays a variety of ball games with rules
6 years:	throws/bounces and catches a tennis ball with dominant hand to himself
	throws and catches tennis with dominant hand to someone else
7 years:	throws/bounces and catches to self a tennis ball and claps once before catching ball
8 years:	as above but with 2 claps
9 years:	as above but with 3 claps

Kicking a ball:

2 years:	walks into a ball to kick it
3 years:	kicks ball forcibly
4 years:	kicking skills improve constantly
5 years:	able to stop a trapped ball

Skipping:

5 years:	achieved
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THE PHYSIOTHERAPIST'S ROLE

- assess to identify the difficulties and ensure that these may be helped by the physio
- treatment to overcome the current difficulties
- educate the parents, teachers, child and all other professionals involved with the child
- liaise with other professionals
- provide a long term management programme

THE ASSESSMENT

The main element of the physiotherapist's assessment will involve assessing skills to determine whether the child is carrying them out either to an age-appropriate level or with the quality that would be expected. It can be seen that in order to write, for example, a child must have good shoulder control, hand-eye co-ordination, balance for sitting on the chair, midline crossing, directional awareness, spatial awareness. motor planning and short term memory. Similarly, the ability to eat well at a table will require good balance to sit on the chair, good shoulder control, hand-eye co-ordination, bilateral integration, spatial awareness, body perception and proprioception and midline crossing. Likewise, activities in P.E require all the above skills.

Main points of the assessment:

- ensure that the parents and child have a full understanding of what the assessment will involve – give a handout beforehand
- gain as much information as possible about the current difficulties experienced by both home and school using a confidential questionnaire. This will also ensure that no awkward questions are asked in front of the child
- give the child a questionnaire to gain their likes, dislikes and draw a picture of themselves. (This will save time in the assessment and help with advice on activities and hobbies later)
- assess the child
- make sure it is FUN
- give an explanation to the parents and the child afterwards
- set aims and goals
- liaise with the school

KEY AREAS TO BE ASSESSED

A brief description of the areas that are usually assessed are given below along with a few examples of the test that may be carried out and a few ideas on treatment.

Muscle tone:

a number of children with dyspraxia are found to be low toned. It is important to assess whether there is full range of movement or hypermobility of the joints. In a number of cases it is particularly the MCP and DIP joints that show hypermobility but the elbows and knees may also as well as the ankle joints. A number of children also show tight Hamstrings.

Shoulder control:

This relates to the muscle strength and joint laxity around the shoulders. It is an important factor for hand function

Assessment: *Wheelbarrows:*

children aged 3 – 5 = 40 – 60 steps of wheelbarrows

Children aged 6+ = 65 – 100 steps of wheelbarrows

Children too heavy for wheelbarrows = 15 – 30 half press ups in 3 seconds

Activities to assist: crab walking, bunny hops, dog's dinner, whizz ball, hanging out the washing

Pelvic control:

This relates to the muscle strength and joint laxity around the hips and is required for balance and activities such as standing on one leg, hopping and kicking a ball. Together with shoulder trunk control it plays an important role in general postural balance

Assessment: *standing on one leg:*

3 years: momentarily 4 years: 3 - 5 seconds

5 years: 8 - 10 seconds 6 year: 15 - 20 seconds

7 years: 20 – 25 seconds 8 years: 25 – 30 seconds

9 years: 30+ seconds

*Also check: ability to walk backwards on knees – there should be no circumduction of hips
balance in half kneeling – it should not be easy to take off balance*

Activities to assist: bridging, kneel walking, step ups, balance work on cushions/sissels/wobble boards, throwing bean bags in half kneeling

Active trunk extension and flexion:

There is often a predominance of flexion patterns which is maintained in activities such as rolling or movement up against gravity.

Extension assessment: *consider general posture in all positions and activities such as hopping, jumping*

Head lifts for under 6 years: prone lying with arms down by side lift

head and shoulders and hold. 3 – 4 years = 10 – 15 seconds

5 – 6 years = 15 – 20 seconds

Aeroplanes for over 6 years: prone lying with arms out in front, lift head, arms and legs and hold:

6 years = 15 – 20 seconds

7 years = 20 – 25 seconds

8 years = 25 – 30 seconds

9 years = 30+ seconds

Activities to assist: lying on tummy and throw a ball with two hands

Eye /hand co-ordination

This is the ability of the hands and eyes to work together and is needed for activities such as catching and throwing balls and with writing

Assessment: *throw and catch a ball to a person with 2 hands and with alternate hand
Bounce and catch a ball to a person with 2 hands and with alternate hand
Throw and catch a ball to self with two hands and with alternate hand
Bounce and catch a ball to self with two hands and with alternate hand
Carry out all above tasks 5 times each – a child should be able to complete:*

2 years: throws football and tennis ball over head and forwards

3 years: throws a ball and can catch a football if thrown into outstretched arms

4 years: shows increasing skills with balls and can use a bat

5 years: plays a variety of ball games with rules

6 years: throws/bounces and catches a tennis ball with dominant

hand to himself

throws and catches tennis with dominant hand to someone else

7 years: throws/bounces and catches to self a tennis ball and once before catching ball

clap

8 years: as above but with 2 claps

9 years: as above but with 3 claps

These children also often have difficulty with eye tracking and this can be assessed when they throw and catch balls to themselves if they follow the ball with their eyes

Activities to assist: throwing and catching balloons, kooshes, juggling balls, floaters. There are many games on the market such as magna force, magnetic fishing games,

Eye foot co-ordination

This is the ability of the eyes and feet to work together and is required for kicking, walking around objects on the floor as well as rough surfaces and stairs

Assessment: kick a ball to a person 5 times and from the age of 5 trap it with each foot

2 years: walks into a ball to kick it

3 years: kicks ball forcibly

4 years: kicking skills improve constantly

5 years: able to stop a trapped ball

Activities to assist: touching specific points with your foot, kicking a ball so that skittles are knocked down

Midline Crossing

This is the ability to cross a hand from one side of the body to another and is necessary for activities such as writing

Assessment: In long sitting, ask the child to take a bean bag from one side of the body to the other and repeat with the other side. The child should be able to achieve task by placing the bean bag and not throwing it from the age of 3

Walking sideways and the child should be able to cross one foot over the other

A child should be able to achieve this from 4 – 5 years

Activities to assist: spooning rice from one bowl to another, drawing a big figure of 8

Directional Awareness

This is the ability to move in different directions and can be observed throughout the assessment. Directional awareness is related to the development of body perception and symmetrical and bilateral integration.

Activities to assist: ask the child to move forwards and backwards and sideways

Spatial awareness

This is the ability of the child to judge distances and direction for himself in relation to other objects and should be looked at specifically if the child is complaining of knocking over drinks and bumping into things. Spatial awareness is related to body perception and directional sense and is often seen as a difficulty with children showing difficulty with shoulder and pelvic control

Assessment: observe the child moving in a room with a lot of equipment and furniture in it

Activities to assist: climbing, going through tunnels, moving in and out of cones

Bilateral Integration

This is the ability to move both sides of the body simultaneously in hopping patterns of movement and is important for riding a bicycle and using a knife and fork.

Activities to assist: threading and sewing games, labyrinth games, scooter work (under supervision)

Symmetrical Integration

This is the ability to move both sides of the body simultaneously in identical patterns of movements.

Assessment: ask the child to jump forwards 10 times. Ensure that both feet land together. Ask the child to throw and catch with both hands. Ensure that ball is thrown with equal force and caught with both hands together

Activities to assist: jumping into hoops, catching a ball with two hands together, jumping on trampoline

Knowledge of two sides/dominance of one side

This is early development of laterality which culminates in a child's thorough understanding of the left and right side and dominance of one side

Assessment: ask the child to carry out various tasks with right and left limbs eg wave your right hand.

For dominance:

Place a pencil on a table in the midline position and ask the child to pick it up and write

Ask the child to kick a ball

With a small telescope ask the child to pick it up and look through it

Activities to assist: encourage the child to use their dominant hand only, place stickers on the dominant hand

Short term memory

This can be taken from both visual and auditory commands and should include number and different directions. It is important for activities such as dictation, copying from text or following instructions

Assessment: Age 3 – 5: ask the child to carry out 3 tasks when shown and instructed eg Clap hands x 3, take 3 steps and turn around

Age 6 – 9: as above but ask the child to complete 4 tasks

Age 10+ : as above but with 5 tasks

Activities to assist: commercial games such as match me, Button maze, electronic and computer games, pairs, obstacle courses

Motor Planning

This is the ability to plan the necessary movements that are required for moving from one position to another.

Assessment: ask the child to climb over 4 chairs and then to creep back to the beginning under the chairs. Consider the confidence involved and whether the child is able to climb with ease over the backs of the chair. Also consider how the child gets off the chairs – backwards (immature) or Forwards

Activities to assist: obstacle courses, climbing frames

Self Organisational skills

This is the ability to plan the necessary activities for carrying out tasks of daily living eg having all the equipment necessary for school work, having a bath.

Assessment: *ask the child to verbally and then to demonstrate making a sandwich*
The child should include: 2 pieces of bread, butter them with a knife, put in the filling, place the second piece of bread on top, cut the bread or eat it.
Age 4 – 6 : 4- 6 sequences
Age 7 – 8: 7 - 8 sequences
Age 9 + 9+ sequences
As the child matures they will include more detail to include getting out the necessary things as well as putting things away

Activities to assist: commercial games such as Go Getter, Rush Hour, downfall, Make 7, noughts and crosses, battleships, write out job lists, discuss how to carry out activities for daily living such as making sandwiches, getting ready to go swimming or to school

The Treatment

There are many forms of treatment. Generally children are seen on a weekly basis for 8 weeks (Lee & French, 1994., Lee, 1996), and treatment is supplemented by a daily home programme which takes no longer than 15 - 20 minutes to complete. The importance of the home programme cannot be stressed enough as it is through this that skills can be practiced regularly and acquired and muscle strength can reach its maximum potential. The treatment generally consists of exercises to improve muscle strength and activities and games to improve skills. Skills should be broken down to a level that the child can achieve so that confidence is improved and then can be built upon. The emphasis on treatment must be based on the sessions being fun and enjoyed by the child as this will encourage the child to learn and encourage participation. There are both advantages and disadvantages for treating children on a one to one basis or in a group. However, many children have very poor concentration skills and will work better on a one to one basis initially. Close liaison with the school is vital so the teacher can be given advice on management within the classroom and P.E setting. Many of the activities used in treatment can also be carried out in P.E. It is important for all those involved with the child to understand that the child needs time to practice and master skills.

Following treatment children should be reviewed 3 months after the completion of treatment to ensure that the progress made has been maintained and the long term aims and goals set by the parents have been reached.

Long Term Management Programme

It is vital for both the child and parent that following treatment and the review, a long term management programme is made. This includes carrying out a check list regularly to ensure that the progress made with the skills and muscle strength is maintained and any difficulties can easily and quickly be identified. Advice should also given on regular sports in addition to those carried out in school to ensure that newly acquired skills are practiced and strength continues to be maintained. Swimming is frequently encouraged as is football and tennis training. Most children will suggest sports that they have a particular interest in and these may include rowing, Judo, cricket and activities such as chess. Children should be continued to be monitored on an annual basis to ensure that progress is maintained, the check-list can be updated and continued close liaison with the school is recommended. This is of particular importance at the start of a new school year when new staff may be involved or with a change of school in particular moving to senior school.

Effectiveness of Treatment

Physiotherapy treatment has an effect on the gross motor skills, ball skills, fine motor /manual dexterity, activities of daily living and on self confidence and self esteem. There have been several published reports on the effectiveness of physiotherapy treatment in England (Norton & Twentyman (1995), Lee and Smith (1998), William, Smith & Ainsley (1999), Lee & Smith (2002)). These authors reported an improvement with treatment, and included children having been treated in a group or on an individual basis. Lee & Smith (1998) showed objectively that the children treated on an individual basis made on average 69% improvement with their gross motor skills immediately following treatment. By the review which took place 3 months later, the children had continued to progress, with each child on average making 73% improvement with their gross motor skills and parents reported an improvement of 72% on average with the activities of daily living. Lee & Smith (2002) also showed that these children had generally maintained the improvement with their scores over 3 years although 20% had required one further course of treatment. In their article, Lee & Smith also reported that the children were more willing to attempt new activities, had more friends and were generally more confident.

Lee , Yoxall and Smith (2002) carried out an audit of 25 children who received physiotherapy treatment over an 8 week period and they tested the self esteem prior and following treatment using B/G Steem. Their results concluded that all the children had made progress and on average had improved their scores by 3.21 points. In addition, the parents of all these children verbally reported an improvement with confidence and self esteem.

Conclusion

Dyspraxia is a very rewarding and enjoyable field to work in and one that we as professionals can offer so much to help with. As public awareness improves and the condition becomes more recognised, more children will have the opportunity for help that they so desperately require. It is not a case that a dyspraxic child will be the next Ian Botham or Tim Henman, but they *can* enjoy and compete in sports. Physiotherapy focuses on the very skills that are required in sport and within the classroom setting although they will be of a more refined nature and will give the child an improved opportunity to learn and reach her/his maximum potential for adult life.

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