Dyspraxia: what it is and how to help

Wendy Fidler, Chair of the Dyspraxia Foundation Education Panel, explores a surprisingly common disability which is still poorly understood.

> **"Everyone says I'm stupid but I know I'm not. I wish someone could understand what it's like to be me. I feel so fed up and lonely."**
>
> **Sarah**, an eight year-old girl who has dyspraxia

The Dyspraxia Foundation (*www.dyspraxiafoundation.org.uk*) defines dyspraxia as: 'An impairment or immaturity in the organisation of movement, which leads to associated problems with language, perception and thought.' The word dyspraxia comes from two Greek words, 'dys', meaning faulty or abnormal and 'praxis' meaning action or deed. In essence, dyspraxia is an impairment of executive functioning, i.e. the ability to plan and carry out thoughts and movements smoothly and efficiently.

The Dyspraxia Foundation definition of dyspraxia refers to sensory/motor development and this can include oral and verbal dyspraxia. Diagnosis is usually made by an educational psychologist, a paediatrician, or a speech therapist.

With Developmental Verbal Dyspraxia, speech disorder is the predominant presentation, but children may also have Oro-Motor Dyspraxia, affecting their ability to make and co-ordinate the movements of the larynx, lips, tongue and palate and /or generalised dyspraxia affecting gross and fine body movements.

How we learn

A newborn baby's brain is only slightly organised, responding to sounds (aural) and gravity (vestibular), and ready to absorb, react to and refine his understanding of his environment. Given the proper amounts of nutrients, oxygen, stimulation and freedom to move, repeat and refine, children's brains develop complex nervous systems.

As children receive sensory stimuli via touch, taste, sight, sound, smell, motion and pressure their neurons (nerve cells) communicate by an electrochemical process. Neurotransmitters are released by a neuron (the pre-synaptic neuron), and bind to and activate the receptors of another neuron (the post-synaptic neuron).

Myelinisation

When children first learn something, it is slow going, like beating a path through untravelled terrain. As neurons are activated repeatedly, they lay down over the axon a multilayered, white, phospholipid (fatty), segmented covering called myelin. (Neuron was the Greek word for nerve, though its original meanings were sinew, tendon, cord, or bowstring.)

Myelin increases the speed of nerve impulse transmission, and insulates, protects and assists axon regeneration if the nerve is damaged. The more myelin built up, the faster the transmission. In highly myelinated neurons, impulses travel at 100 metres per second. Therefore, more practice, more myelin, faster processing – until it becomes easy and familiar. Thicker myelin coats translate into brains that are larger and better able to co-ordinate rapid perceptual decisions.

Move more, learn more

"Exercise is really for the brain, not the body. It affects mood, vitality, alertness and feelings of well-being." John J Ratey, A User's Guide to the Brain, MD Harvard Medical School, 1999

Dyspraxic children may flicker in and out of wakefulness especially if there is no movement stimulation, leading to difficulties with attention, concentration and focus. They tend to lose their balance and have more accidents, often invading the space of others because of a deficit in understanding of spatial relationships in their environment.

Such children can run, but they can't stand still, hop on one foot, skip, jump or do the slow, cross-lateral movements that stimulate new neural cell growth in the hippocampus. They wriggle in their desks because their back and neck muscles have not been adequately trained to hold their bodies upright against gravity.

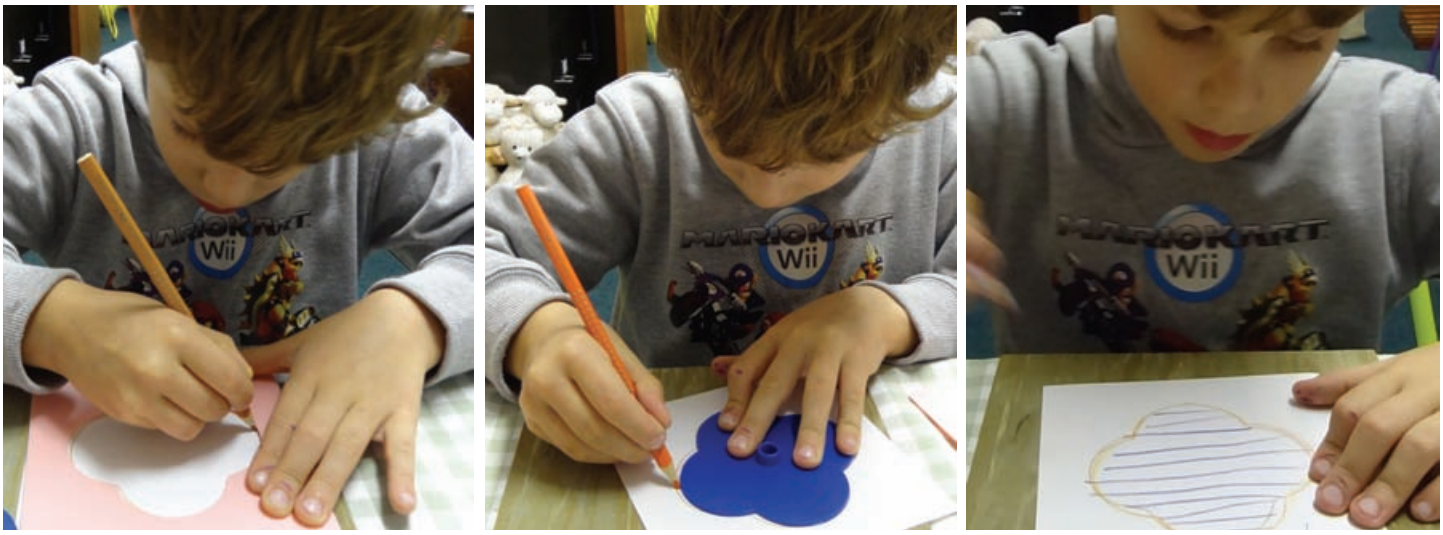
Developmental Verbal Dyspraxia

"Children with Developmental Verbal Dyspraxia have difficulty in making and co-ordinating the precise movements required for the production of clear speech, and yet there is no evidence of damage to nerves or muscles. They have difficulty in producing individual speech sounds and in sequencing sounds together in words. As a result their speech is often unintelligible even to family members."

Pam Williams: Principal Speech and Language Therapist, Nuffield Hearing and Speech Centre, Royal National Throat, Nose and Ear Hospital, London.

What dyspraxia looks like

- Difficulty producing fluent, co-ordinated movements
- Poor sense of balance leading to lack of control
- Difficulty knowing what to do and judging what kind of response is acceptable
- Difficulty retaining more than one piece of information (e.g. sequencing/first this then that)
- Weak muscle tone impacting on execution of movement patterns
- Poor awareness of body parts in relation to one another
- Poor kinaesthetic awareness – how far and in which direction should I move?
- Ipsilateral hand use (on its own body side)



Whilst working with the insets for design children see, say, hear and touch the shapes, gaining a multi-sensory insight into their properties. Furthermore whilst tracing parallel lines left to right, top to bottom as they fill in the shape they cross the body midline with their hands and eyes. This integrates the left and right sides of the brain and is indirect preparation for reading and writing.

- No clear dominant side – directional confusion

How dyspraxia impacts on education

- Reversal of numbers, letters, words
- Difficulty with asymmetrical movements e.g. tying shoelaces, using cutlery, holding paper with one hand whilst cutting with the other
- Knowing what to do
- Getting organised
- Getting it done

from *Dyspraxia 5-15,* Christine Macintyre, 2001

Sensory top tips

- Children require maximum opportunities to learn through movement, exploration and games;
- Vestibular activities in all three planes (vertical, horizontal and diagonal) can positively influence focus, bilateral integration, physical and spatial orientation, posture, muscle tone, moving and static balance skills, functional eye movements (fixing on and following objects in different planes) and rapid eye movement.

Bilateral movements

Bilateral movements involve simultaneous movements of limbs on both sides of the body, for example:

- swimming breast stroke
- two leg jumping (sack race)
- making circles with both hands at the same time

Whole arm/leg movements

- Angels in the snow – laying flat on the ground, making circular arc movements with arms and legs
- Jumping Jacks – standing, thrusting diagonals movements with arms/legs
- Montessori Long/Red Rods – seated/kneeling kinaesthetic extensions with arms at shoulder height.

Crossing the body midline

- Handcrafts – knitting, weaving, crotchet
- Montessori Red/Long Rods – 10 reds from 10 cm to 100 cm to manipulate from full arm gross motor movement to fine hand/eye control
- Montessori Insets for Design – a set of geometric shapes designed for multi-sensory investigation including tracking eye and hand movements from top to bottom, left to right (in preparation for reading in English)

Exercises to strengthen trunk, shoulders, hips and body awareness

- Row your boat – taking the weight of a friend by holding hands during activity or sitting back to back and rocking smoothly
- Volley ball – patting, throwing and catching balls of various sizes and weights whilst in kneeling position
- Montessori Line – walking toe to heel, balancing objects, walking in 2/2 time 2/4 time along the line and then freely and expressively

Denmark case study

"50% of children between 2.5 and 6 years attend Forest Kindergartens where they climb rocks, trees and hills. They jump, roll, balance and play for at least 4 hours a day no matter what the weather. The children's vestibular systems are so well developed that learning difficulties are rare." Carla Hannaford, Awakening the Child Heart, Handbook for Global Parenting, 2002

A child with emergent learning difficulties will be referred to music and/or choir activities and a movement programme (which develops the vestibular system and ameliorates the learning difficulty) with an occupational or physical therapist.

Wall and floor push ups

- Obstacle courses involving crawling, climbing, jumping, throwing, hopping, swinging
- Country Dancing – skipping, galloping, dipping, diving, circling, spinning – all good vestibular and proprioceptive fun

But not 'wheelbarrow' activities if the child's joints are hyper-mobile, or if postural stability or muscle tone are weak.

How integrated movements, music and play help children with dyspraxia

When children move, damaged tissue to and from the vestibular system can be rebuilt as new nerve connections develop and myelinate.

Integrated cross-lateral movements such as crawling, climbing, bouncing, skipping and jumping, rolling, or spinning are especially useful.

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