sensory processing, part 2

Balancing acts

Development of the vestibular sense – and addressing over- and under-sensitivity – is explored by **Anne O'Connor** and **Dr Kath Dickinson** in part two of this new series

first sense that we tend to think of, our vestibular sense is conceivably the most important and fundamental to our well-being. If it is working well, we hardly give it a thought, but if it is not working as well as it needs to, or indeed is working overtime, then we really 'know about it' – even if we don't actually know what it is or what it does!

lthough not the

WHAT IS IT?

Put simply, our vestibular sense is our internal sense of balance. More accurately, however, it is a complex 'system' for balance that is essential for controlling important aspects of everyday life and our interactions with the world around us, such as posture, alertness, concentration and stillness, as well as balance (Connell and McCarthy 2014).

It is believed to be our oldest sense and is intrinsically linked to movement and our need to negotiate gravity. It is not very well developed at birth, but we have a biological drive to move in ways that will stimulate its development.

WHERE IS IT?

Our vestibular system is in the mid region of the brain and centred in the inner ear, which is why problems with our ears can sometimes make us dizzy or feel sick. We have three semi-circular canals in our inner ears that follow the three planes of movement. Think:

- nodding your head
- shaking it from side to side
- tilting it from left to right.

These reflect the three dimensional kinds of movement we make in our daily lives.

The canals are filled with fluid which flows through the canal that is affected by whichever movement we make. This, in turn, affects tiny hairs and crystals within the inner ear, stimulating nerve endings. These send messages to the brain about the plane of movement. Working together with our other senses (particularly vision), these messages inform the brain about what the body needs to do to find, keep or regain our balance (Connell and McCarthy 2014).

WHAT DOES IT DO?

When our vestibular system is fully developed and functioning well, it not only helps us keep our balance when on the move, but also provides us with 'gravitational security'. This growing confidence in the body's ability to move efficiently and without falling over also leaves our brains (and minds) free to concentrate on everything else we do – and, as such, is very important for our learning and emotional health.

It is very closely linked with all our other sensory systems and plays an important part in their integration with each other.

HOW DOES IT DEVELOP TYPICALLY?

Not only are we biologically driven to develop our vestibular systems from our earliest moments, but it

The vestibular system helps us keep our balance so the brain can concentrate on other things

It is believed to be our oldest sense and is intrinsically linked to movement and our need to negotiate gravity seems most humans are also biologically driven to help babies engage in exactly the kinds of movements that stimulate development. We rock and sway infants to sleep and bounce them

on our knees to stimulate them. As they get older, we get more vigorous in our playfulness – 'throwing' them in the air and responding to their cries of 'again, again' as we spin them around or sway backwards with them, tuning into their bodies so that we can safely match our vigour with the child's level of enjoyment.

A rich diet of vestibular stimulation suitable for healthy development includes all that early shared activity as well as independent spinning, swaying, sliding, jumping, running, balancing, rocking and hanging upside down – exactly the kinds of activity that children will naturally seek out and which good playgrounds encourage.

Healthy development

A child with healthy vestibular development is likely to: feel confident and relatively safe

.....

www.nurseryworld.co.uk





during movement play at different speeds, on different surfaces and over changing levels, even if their feet are off the ground or they are swinging upside down

- be able to stop and start movement calmly and will enjoy testing their balance and control in games such as musical statues
- feel comfortable taking developmentally appropriate physical risks and cope with minor falls and tumbles,

righting themselves quickly and continuing their play

have a growing sense of their body's ability to adapt and adjust to the world around them, allowing them to move confidently and with co-ordination.

Developmentally appropriate activities

Our vestibular system takes time to develop and the rate of development is different for each of



about this series

Our five external senses (touch, sight, hearing, smell and taste) and three internal senses (interoceptive, vestibular and proprioceptive) are constantly sending messages to our brains – a process that we often barely register. Yet this sensory information is vital in helping us understand and make sense of the world.

Typical sensory development occurs naturally in childhood. However, for some children this doesn't happen, causing sensory processing difficulties that impair development and are manifested in children's behaviour.

Advice and support Part one of this series

→ REFERENCES AND FURTHER READING

- Ruth Stevens, https:// beaconhouse.org. uk/wp-content/ uploads/ Sensoryprocessingcoordinationand-attachment-Article-min.pdf
- Sensory Integration and the Child by Anna Jean Ayres
- A Moving Child is a Learning Child by Gill Connell and Cheryl McCarthy
- Understanding Physical Development: Linking bodies and brains by Anne O'Connor and Anna Daly

Rate of vestibular development is different for each child provides an introduction to typical and atypical sensory processing and integration. The rest of the series will look at the senses individually, explaining the causes, symptoms and effects of sensory problems and giving advice on how to adapt provision and practice to address a child's sensory difficulties.

Series authors

Anne O'Connor is an early years consultant and author, specialising in the Prime areas of development (www. primedforlife.co.uk).

Dr Kath Dickinson is owner of SEND to Learn Nursery in Blyth, Northumberland. She has a doctorate in SEND (autism).

us. It is, therefore, vital to follow the lead of the child. They will spin, slide, wriggle and roll whenever the urge takes them – and they will stop when they know they have had enough (Connell and McCarthy 2014).

'Tuned in' adults and play partners will respond to this and make sure the play (and physical expectation) matches the child's individual developmental readiness. It is OK to sometimes suggest, lead and supervise activities that will stimulate the vestibular system – just make sure you observe carefully children's responses in exactly the same way you observe their responses to other adult-led activities.

PROBLEMS WITH VESTIBULAR PROCESSING

Problems with vestibular processing could take the form of under- (hypo) sensitivity or over-(hyper) sensitivity to vestibular stimulation. It might help to think of this in terms of the child's ability to respond to – or suppress the amount of – sensory information that their brains are receiving (Stevens 2018).

One of the key figures in sensory integration, Dr Anna Jean Ayres,

www.nurseryworld.co.uk

sensory processing, part 2

likened this to the volume on a radio where the dial is set either too high or too low. Both make listening uncomfortable (Ayres 2005).

Over-sensitive

Being over-sensitive is where the dial is set too high and the sensory 'cup' is too small (as described in Part 1 of this series and A Child's View of Sensory Processing, available at www.youtube.com/ watch?v=D1G5ssZlVUw). Because the brain isn't able to 'turn down' or suppress the information, even a normal amount of vestibular stimulus is too much and leads to the system being overloaded and the 'cup' overflowing.

A child's own movement and the motion around them may quickly overwhelm them. This might mean they:

- are often travel sick
- lose their balance easily
- are unsure and anxious on different surfaces and levels
- do not like being upside down
- avoid sport or vigorous play. Such children need carefully

planned and developmentally appropriate input and experiences to help them become less sensitive and able to tolerate everyday vestibular input.

Under-sensitive

Being under-sensitive is where the dial is set too low and it is difficult for the nervous system to 'hear' or receive the sensory information. A child who is under- (hypo) responsive has a huge vestibular 'cup' that feels impossible to fill. Their bodies require extra input to help them become more aware and they are constantly seeking it - often through the kinds of movement that will get them into trouble!

These children might:

- be moving, spinning and hanging upside down constantly
- find it very hard to be still
- appear impulsive and reckless. They also need carefully planned and developmentally appropriate extra input in order to regulate their movement and aid their concentration.

NB: Clinical assessments of sensory processing issues must be carried out by an appropriately qualified occupational therapist. Always seek advice and guidance if you are concerned about a child.

.....

A child who (hypo) responsive has a huge vestibular 'cup' that feels impossible to fill

.

EQUIPMENT SUPPLIERS

- TTS, www.ttsgroup.co.uk
- Spectrum Educational, www.spectrum educational.co.uk
- ASD Visual Aids, www. asdvisualaids. com
- Springboard Supplies, www.springboard supplies.co.uk
- TFH UK. www.special needstoys.com
- Mike Ayres Design, www.mikeavres
- design.co.uk Rompa, www.
- rompa.com Sense Toys, www.sense toys.com

SUPPORTING VESTIBULAR DEVELOPMENT

Vestibular development can be addressed in any setting through access to movement activities, the use of specific equipment and supervised 'risky' play. Equipment can be borrowed, bought or made (making sure all safety standards are adhered to) and does not have to cost the earth. Access to the outdoors provides lots of opportunities for staff to help children develop their 'vestibular sense'. Gender does not dictate over- or under-sensitivity, and both boys and girls can have issues with their vestibular development, although the case studies mentioned here each include boys.

Over-sensitive child

A young boy came to nursery with an over-sensitivity to movement. He was very unsure and unsteady on his feet, did not really enjoy gross motor activities, such as climbing or jumping, and would not run or use the 'big' outdoor toys such as the ride-in cars or the swing.

To help overcome this over-sensitivity, staff provided him throughout the day with a variety of activities which they did alongside him. He was taken outdoors and his hand held while he walked on the grass, the gravel, the pebbles, the leaves and any other surfaces we could find.

Staff then filled trays (which could be used indoors or outside) with different surfaces and textures, so that he could walk in these (initially in his shoes, then socks, then eventually in bare feet). We included artificial grass, sand, soil, pebbles and soft fabric. (Sensory 'walks' can be purchased ready-made.)

Nursery has both indoor and outdoor equipment that he could use to bounce on, such as trampettes, therapy balls, peanut balls and cot mattresses, all of which were used on a daily basis for short periods of time, initially supported and alongside staff. The peanut ball was also used for balance, rolling, introducing upside-down movements and swaying.

Learning activities were incorporated into the use of the equipment – for example, rolling forward on the peanut ball to reach a favoured toy or resources or jigsaw piece. We set him challenges, for example:

- Count how many bounces you can do on the trampette.
- Bounce while we sound out your name.
- Bounce while we sing your favourite song.
 - The list of possible activities is, of course, endless.

The nursery also has a nest swing alongside 'normal' swings, an indoor swing hung from the ceiling, a spinning top which the child or children can sit in and a wobble board, all of which were used to find out which pieces of equipment he liked and would tolerate.

The child was also encouraged to take part in daily yoga sessions and active 'wiggle' time, where the children dance, jump, spin, crawl over bean bags, crawl under tables and practise gross motor skills and active nursery rhymes - for example, 'Row your boat', 'The wheels on the bus' and 'Horsey, horsey'.

This boy has now been in nursery for a year and he can walk confidently on a variety of surfaces, happily takes part in all physical activities and loves the trampette, therapy balls and the outdoor police car. His concentration, focus, confidence and communication have shown a dramatic improvement, as he is no longer using up 'brain power' and energy to contend with controlling his over-sensitivity to vestibular processing.



AT SEND TO LEARN NURSERY



Movement activities, both indoors and outside, are essential for addressing vestibular development

Under-sensitive child

Look for a child that is constantly on the move, never still, climbing all over the place, hanging upside down, and this is possibly the child who has an under-sensitive vestibular system. It's not that they are exhibiting 'bad' behaviour, they are doing this because they crave and need this stimulation to function. So, it's not about telling them to stop or to get down. Rather it is about accepting this need and providing a functional safe way for them to continue to carry out these activities which help them concentrate, so that they can focus on their cognitive development.

This is what we did with a young boy who was extremely under-sensitive. We provided open access to the same equipment mentioned above, plus places where he could climb safely. For example, we built a pallet box, we have car and tractor tyres, wooden pallets and small barrels outdoors which he could climb on. We also allowed him to build obstacle courses which he had to negotiate to get to a favoured object. We are lucky enough to have trees that he can climb on and we made a tyre swing. Indoors we used a second-hand office chair on wheels which he could move about on and spin in, and we bought an 'egg chair' that spins.

We made up a song about him having to climb down, instead of 'telling him no'. It's about learning to accept that our role, as practitioners, is to develop learning, not produce youngsters that can sit still. It's about developing youngsters who are available for learning, and if this means that they paint while swinging back and forward or read when they are lying upside down, then does it matter? It's the painting and reading that you ultimately want, not the sitting still. If there is a need to sit still, then provide a therapy ball or wobble seat or wobble cushion for the child to sit on.

As the child develops, their vestibular system will develop

and the need for this 'excessive' movement will be reduced or more controllable. We also introduced this child to daily yoga sessions so that he did learn to control his body movements and stay still for short periods of time.

After a year in nursery, he could follow staff instructions to come down from unsafe places without fussing or having an extreme emotional reaction. He could sit at a table for short periods of time (even up to ten minutes) to take part in focused learning activities. He could join the rest of the nursery for story time, sitting next to a favoured member of staff or lying upside down on a chair. Again, he made progress in his concentration, focus, communication and cognitive development.

He is now in Reception class at an SEN school that has continued to provide an environment for him which meets his vestibular needs, and he is making good progress.

Providing movement activities

If you do not have the space or the money for a broad range of movement activities, think about the possibility of taking your children:

- to a local park that has swings and a climbing frame
- for a walk in the locality over different surfaces and gradientsto the beach.

Let them walk outside in bare feet (checking first that the ground is clear of any unwanted debris).

Simple resources such as wobble cushions or even textured pillows can be used and take up no additional space. Or spinning office chairs, tyres and pallets can be found second hand, often for free.

Or if none of these are an option, simple daily movement activities or games such as crawling, jumping, spinning, balancing and rolling can still have a big impact.