Reconnecting Pathways

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What is a brain imbalance?

The most common brain " imbalance" occurred between the two hemispheres of the brain; the scientific name is a functional disconnection.
Essentially it is a lack of connection, communication and integration between networks on either side of the brain.

This lack of integration is most commonly a result of a developmental imbalance or developmental asynchrony.

This means that one side of the brain is delayed or slowed in its development which causes the other to mature and grow faster, this imbalance in growth and maturity prevents the two sides of the brain from properly integrating.

This results in an unevenness of functional abilities where one side of the brain is advanced or even "too strong" relative to the other side which has skills and functions that are underdeveloped and weaker. Obsessive, compulsive or hyperactive behavior is an example of the left hemisphere being too strong and producing symptoms.

This combination of strengths and weaknesses can result in many different types of physical, mental health and learning issues that can last a lifetime.

Examples of issues connected to Brain Imbalances

The brain controls everything, so an imbalance in the brain can result in imbalances in every system in any combination ADHD, Autism, Dyslexia, OCD, Memory and concentration issues, depression, anxiety, hormone imbalances, blood sugar imbalances, muscle and sensory imbalances that can cause back pain, headaches, dizziness, immune imbalances that can cause chronic infection, food sensitivities, allergies and autoimmune issues and many more.

All of these issues have been increasing at epidemic levels and all can be a direct result of a developmental brain imbalance. This imbalance can happen later on in life as well but this is not as common.

There is no damage or pathology in the brain, there is no genetic mutation it is not a chemical problem, it is just a physiologic, electrical imbalance and it can be corrected. When the imbalance in the brain is corrected all of the other imbalances are most often corrected as well.

The Cause

The cause of these imbalances are environmental and lifestyle changes that have come about over the past 20 years primarily with the advancements in computer technology Lack of physical activity, poor diet, stress, inflammation are the primary factors that affect brain development, and can lead to imbalances in the brain.

The same factors causing a rise in obesity, diabetes and heart disease are the same factors behind the rise of developmental brain imbalances.

What can be done to identify and correct a brain imbalance?

Each person has a unique combination of strengths and weaknesses, to correct the problem we identify the nature of the imbalances, target the weaker areas on the underactive side with a specific program of mental and physical exercise, sensory stimulation, lifestyle and behavior modification along with diet and nutrition. This problem can usually be corrected in a matter of months. It starts with adopting some simple lifestyle changes and some simple activities and exercises which will start changing your brain right away. Even simple Brain Integration and Balancing exercises done 15-20 minutes a few times a week has been shown to make significant changes in the brain.

History of Brain Imbalances

The story of the history of our understanding of the brain and brain imbalances is a long one. The fact that brains of animals are asymmetric, which means there is a right and left half is one of the most accepted facts in neuroscience. It is believed that the earliest brain were asymmetric even 500 million years ago.

It wasn't till the late 1800's when researchers like Paul Broca and Wernicke, started to confirm that the human brain was asymmetric. They discovered this when examining the brains of people that had strokes and had aphasia (the inability to speak).

They found that only when the stroke occurred on the left did it cause a problem with verbal speech. The same injury to the right hemisphere did not cause this. The real turning point however started on the west coast of USA in the 1960's, when 3 researchers: Joseph Bogen, Phillip Vogel and Roger Sperry conducted what is known as Split brain surgery on patients with severe epileptic seizures. In this surgery they literally separated the two halves of the brain by cutting the bridge that holds them together the corpus callosum. They did this to try to stop the seizures but in doing this they also unlocked secrets of the human brain. This was the first time the two halves of the brain could be studied separately in live humans and from the beginning it was very clear that the two sides of the brain controlled functions in very different ways. Over the next several years there was a huge amount that came out about this. But the research stalled because there was no way to look at a completely intact brain. In the early 80's

at Harvard a researcher named Norm Gerschwin was studying developmental dyslexia. They did autopsies on seven people with severe dyslexia, but it was also noted that all of the subjects had exceptional visual spatial skills in things like art, architecture, engineering, music and athletics. They discovered there was a physical imbalance in the brains of these individuals where language areas on the left side of the brain were much smaller than usual, but that the same area on the right side was much larger than normal. They believed this imbalance was responsible for this unevenness of skills and dyslexia. They even called it a
"pathology of superiority" where there was disability associated with an unusual ability in another area. However, other than this imbalance there was nothing "wrong" with the brain it looked perfectly intact. Dyslexia was just one of a number of neurological issues that were increasing but these issues like ADHD, Autism and other psychological and learning issues. But they seemed almost invisible; there was no clear pathology in the brain or physical damage.

The 90's was the "decade of the brain" and there was an explosion of new brain research. There was also the development of tools that could image the brain in real time. Functional imaging allowed researchers to look at a live intact brain as it worked in real time. Now it became apparent that many issues like Dyslexia and ADHD were "functional" problems where there wasn't anything physically wrong the problem was in the way the brain was functioning which was somehow different. It was becoming apparent that the brain was a much more dynamic organ than previously thought. It could change its structure and function based on use. The brain also wasn't just communicating with physical connections, but also through timing and synchronization of networks in the brain. This virtually invisible synchronization and timing when disrupted also seems to be at the root of many issues. At first in Broca's time injury to the brain involved the grey matter or the brain cell bodies. But later on, it became apparent that physical injury or stroke to the white matter connections (axons), could cause similar symptoms as injury to grey matter.

Whereas grey matter injury caused specific damage in one area the white matter injury disrupted communication between areas, this became known as a disconnection syndrome. Later with better ways of imaging the brain, it became apparent that there were some people that had symptoms that looked like grey or whit matter damage without any actual injury to the brain at all.

That there was a disruption or lack of integration between areas of the brain especially
the two sides of the brain and this seemed to be the primary problem in Dyslexia, ADHD, Autism and other similar mental health and education problems. This problem was called a Functional Disconnection. T

his was in the early 1990's and this is when Dr. Robert Melillo became involved in this research area because children he knew including his own son was labelled with ADHD. When he asked other professionals what was actually happening in the brain, they all said they didn't know what the actual problem was. Frustrated, Dr. Mellilo who was a Chiropractor with a specialty in Neurology and Rehabilitation and who had been teaching clinical neurology on a post graduate level decided to do his own research. He was already experimenting in research and clinically

with the concept of hemispheric imbalances in adults with various physical issues. After a few years he was able to put together the relationship between functional disconnection or brain imbalances and their connection to ADHD and almost all other neurobehavioral issues in kids.

What wasn't completely understood was why were the two hemispheres functionally disconnected. Dr Melillo believed that this was a result of a maturity imbalance where one side of the brain was growing at a slower rate and this resulted in an imbalance that got worse over time. He called this a developmental asynchrony and depending on whether the delay in development was in the right side or left side would determine the different symptoms like dyslexia vs ADHD, same problem much different clinical presentation. This explained why all of these kids had this unevenness of skills where they struggled in some areas but were much better or exceptional in other areas. This was something that had been documented for years but was never explained. Dr. Melillos' theories explained it all perfectly. It also gave Dr. Melillo the answer as to how to correct this issue; if he could target and activate the weak areas on the underdeveloped side he could create a functional balance in the brain and therefore help to integrate the brain properly. He worked for years to develop a program that could address all the issues. Dr. Melillo also realized that kids with imbalances have issues affecting all areas of their body and brain; they not only had learning, behavioral and social issues. They had issues with their motor system, sensory processing, digestive issues and other nutritional problems, immune issues and inflammation.

Dr. Melillo was able to connect all the issues that these kids had to all of these other physical health issues. He showed that an imbalance in the brain can lead to an imbalance in all of the systems of the body resulting in many different conditions.
Now, Dr. Melillo has shown that if these imbalances that start in the womb or early childhood don't get corrected, they will continue and affect the person throughout their adulthood as well. He believes and has proven that the rise in many adult physical and mental health issues are the adult manifestation of a brain imbalance. He has also shown that these imbalances whether they started in childhood or whether they developed later in life, they can be addressed and corrected at any age restoring health and quality of life.

What are Reflexes?

Reflexes are repetitive, involuntary movements in response to sensory stimuli. They emerge in utero, during the birth process, or during the first part of the infant's life and have survival, protective, restorative, and postural purposes. Reflexes assist in the infant's development; they are an important sign of brain and neurological development and development of the nervous system. Most reflexes are categorised as either intrauterine, primitive and postural.

Primitive Reflexes

Primitive Reflexes are automated stereotypic movements directed from the brainstem and require no cortical processes (thinking). These are movement patterns babies are born with to respond to specific sensory stimulation.

Primitive reflexes develop during uterine life and are fully present usually by birth or shortly thereafter in normally developed full term infants. Primitive reflexes play a fundamental role in establishing head control, posture, sensory integration and the ability to move with stability and control. In addition, the primitive reflexes further stimulate the brain in order to improve attention and control of impulses, helping to diminish hyperactivity.

They assist in linking up the key neurological areas of the brain for emotional control and intellectual or academic pursuits.

These reflexes serve three primary functions:

1. They aid babies to make their way through the birth canal
2. They enable babies to survive the first few months of life
3. They provide babies the ability to practice movement patterns which are required later in life.

The primitive reflexes integrate into postural reflexes, and this integration should be completed while the infant is still on the floor and before he learns to crawl and walk. For this reason, it is extremely important for babies to be able to move freely on the floor on their stomach and back.

Postural Reflexes

The postural or lifelong reflexes are necessary for our stability and balance in gravity, and they enable us to move automatically and with ease. Development of postural reflexes is dependent upon function of the basal ganglia (i.e. part of the brain which works in cooperation with the motor cortex to control our motor activity). Primitive reflexes are integrated into mature postural reflexes by the spontaneous rhythmic movements that an infant makes before he learns to crawl and eventually walk.
Postural reflexes help us establish balance, coordination and overall physical and emotional well-being. Most of the postural reflexes are life-long and designed to ensure our survival, especially during stressful situations as we mature into adulthood. Achieving the

developmental motor milestones may be an important basis for various aspects of later child development[2].

Integrating Reflexes

There are many reflex patterns. Nonintegrated or active primitive reflexes that persist beyond childhood, teen or into adulthood will hinder brain development and can be a major contributor to physical, intellectual, emotional, behavioral and social problems[1]. The ones that are most common and which may remain most active for some children or adults are listed below.

These reflexes usually are present when there are challenges with balance, coordination, attention, concentration, math, reading and writing, and difficulties with vision, speech and language, behavior, or emotional stability.

Reflex integration can assist in completing the reflex patterns and integrating them into our whole body system for increased sensory integration and motor development, improved coordination and balance, enhanced visual, auditory, and academic performance, and overall physical and emotional well-being.

Below are a list of the main reflexes.

Babkin Reflex

The Babkin Reflex emerges around 9 weeks in utero, is active during the first 3 months after birth, and should be integrated at about 4 months. This reflex helps the baby to stimulate the breast causing breast milk to flow while breastfeeding. The pattern of the Plantar Reflex in the feet is very similar to the Babkin Reflex in mammals when they stimulate the breast with their paws. When infants suck, there is not only involuntary movement of their hands, but many times their toes and feet curl. When a child with an active Babkin Reflex writes or does other fine motor work, like playing an instrument or using scissors, there will be involuntary movements of the mouth and tongue. Harald Blomberg (2012) has found that the Babkin Reflex may influence the movements of the sphenoid and temporal bones, and directly impacts speech, articulation, and even phonological ability.

Some symptoms of a nonintegrated Babkin Reflex

- Low muscle tone in the hands
- Poor handwriting; impaired fine motor skills
- Challenges with speech and articulation; speech delay
- Tensions of the jaw; grinding or clenching of teeth; tensions in the body, especially tightly clenched fists
- Can affect reflexes responsible for eating, therefore can be seen in eating disorders and excessive nail biting
- Retention of long-term sucking, such as biting or sucking on ones clothes or objects in the hands

Fear Paralysis Reflex (FPR)

This reflex is an early intrauterine, rather than primitive reflex that emerges in the womb sometime during the second month after conception. The Fear Paralysis Reflex is one of the earliest reflexes and the most characteristic reaction is withdrawal away and/or a temporary freeze from any sudden, unexpected or threatening stimuli, event or trauma. When this happens, the fetus shuts off its environment by producing stress proteins and literally becomes paralyzed by fear.

Some symptoms of a nonintegrated FPR

- Low tolerance to stress; a sense of being frozen or feeling stuck
- Can cause lifelong challenges related to fear and underlying anxiety
- Social isolation and fear of new situations or activities; extreme shyness
- Fear of failure; perfectionism
- Helplessness; depression
- Hypersensitivity to one or several of the senses, especially touch, sound and light
- Sleeping and/or eating disorders
- Panic attacks and social phobias are often seen in adults
- Temper tantrums; holding one's breath; oppositional or aggressive behaviors can be seen.
- Difficulty making or maintaining eye contact or intense staring often without blinking

Moro Reflex

When a baby is surprised or scared, for example by a sudden movement or a loud noise, baby will startle: extend neck and arms and breathe in, followed by flexing of spine and limbs and a loud cry. This reflex will help the baby take the first breath when first born and is a way to communicate the need for assistance and help from mum.

This is a fight-flight reflex, a stress response, during which stress hormones are released into the blood stream. This will cause the heart rate, breathing rate and blood pressure to increase, just as when an adult is stressed. This reflex should integrate within the first few months of life and become the less severe reaction we as adults know as startle.

This reflex should disappear between 2-4 months of age. If retained, the child/adult may be hypersensitive to other senses and may over-react to stimulation and be in constant 'fight or flight'. This will lead to over activity of the sympathetic nervous system and the Adrenal Glands.

Due to the constant demands on the adrenal glands, they may become fatigued and a child/person may suffer with allergies, asthma, depressed immune system, and chronic illnesses. Other observable social/learning problems associated with a retained Moro reflex are:

- Insecurity; poor adaptability and resistance to change; often clings to familiarity
- Attention problems; easily distracted; hyperactive movements and behavior

- Hypersensitivity to light, sound, touch, smell; tendency to suffer from sensory overload
- General anxiety; free floating anxiety
- Motion sickness, poor balance and coordination
- Easily angered or emotional outbursts
- Difficulty sleeping or settling down to sleep
- Poor stamina; cycles between hyperactivity and fatigue
- Weakened immune system

Asymmetrical Tonic Neck Reflex (ATNR)

In utero, the Asymmetrical Tonic Neck Reflex helps facilitate kicking movements of the fetus felt by the mother. When fully emerged in utero, the ATNR supports the fetus in twisting and turning down the birth canal. When the baby turns their head to the side, the arm and leg will straighten on the same side. This reflex is also referred to as the "fencer position". As the ATNR integrates, the movements of the infant on the stomach and the back help to train binocular vision (the cooperation of both eyes) and the ability to track moving objects with his eyes. A nonintegrated ATNR beyond four to six months can interfere with other developmental motor abilities, such as rolling over, commando-style tummy crawling, and crawling on all fours. Crawling in fluent cross-patterned movements is more complicated when the ATNR reflex is not integrated.

In school, the ATNR plays a significant role in the learning process and in creating more hemispheric brain dominance. It helps to establish cross lateral motor coordination across the physical midline, as well as, active coordination of the visual and auditory systems. The ATNR is also important for writing, as it assists with the motors skills of the arms, shoulders and neck in order for fine motor skills to be efficient.

Some symptoms of a non-integrated ATNR

- Difficulty crawling in cross-patterned movements
- One sided (robot like movement) rather than cross lateral walking
- Problems bringing arms to midline (catching balls)
- Difficulty with eye tracking, eye-hand coordination
- Difficulty with reading, writing, listening and comprehension; dyslexia
- Poor handwriting and difficulty fluently expressing ideas when writing
- Inefficient motor skills of the arms, shoulders and neck (e.g. riding a bike)
- Mixed or confused handedness is common
- They may turn the books at weird angles to make reading and writing easier.
- Insecure balance
- Possible scoliosis
- Associated sensory systems: auditory, vestibular, visual, and proprioceptive

Palmer/Grasp Reflex

In a baby, when you place your finger in his palm, the fingers will close and hold on. This reflex goes back in evolution to when babies clung on to their mother for safety. If the reflex does not integrate properly the child could have problems with hand and finger control, poor pencil grip, hand writing and hypersensitivity of the hand. Due to this reflex's association with the Rooting and Sucking Reflex, this child may often also dribble profusely and suffer delayed speech and articulation. You can often see the child's mouth and tongue move when they are writing and drawing.

Some symptoms of a non-integrated Palmer/Grasp Reflex

- Challenges with motor control of the hands; weak hands
- Poor fine motor (hand, finger) coordination; poor handwriting, drawing, knitting, playing musical instruments
- Unusual pencil grip
- Poor speech, articulation, and communication skills
- Intertwined speech and hand movements which can lead to difficulty with speech.
- Difficulty grasping or letting go of objects, which can also affect sports like golf and baseball
- Associated sensory systems: tactile and proprioception.

Rooting/Suck

When a baby's cheek and lips are stroked they will reflexively turn their head, open their mouth with the tongue extended, search for the nipple and start sucking and swallowing.

This reflex should be integrated by 3-4 months of age. If this reflex does not integrate well, the child may be hypersensitive on the skin around the mouth, and/or have the tongue too far forward in the mouth, which may interfere with chewing and swallowing solid foods, as well as possibly causing speech and articulation difficulties.

Some Symptoms of non-integrated Rooting Reflex

- They could dribble profusely
- Tactile sensitivity around the face, poor articulation, messy eaters
- Suck their thumb, and, due to the association with the Palmar Reflex
- Difficulties with manual dexterity and hypersensitivity of the hands.
- Associated sensory systems: tactile and proprioceptive

Spinal Galant

In a baby, when you stroke the muscles next to the lower spine on one side, you will see a slight contraction of those muscles and to flex sideways toward the stimulated side. This is one of the reflexes tested in newborns to help rule out brain damage at birth. Stimulation down both sides of the spine at the same time simultaneously activates a related reflex that will induce bladder emptying reflex. Like the ATNR, it is thought that the Spinal Galant is

important in the birthing process and it facilitates movement of the hips as the baby descends into the birthing canal it also improves muscle tone along the spine. This reflex should be gone by 3-9 months of age.

Some symptoms of a nonintegrated Spinal Galant Reflex

- Prefers to wear loose clothing
- Fidgety when sitting or being held; general restlessness; extreme ticklishness
- Attention and concentration difficulties; can be seen as being hyperactive
- Bedwetting past the age of 5; intestinal challenges, chronic digestive issues
- Scoliosis or fixations the spine
- Associated sensory systems: auditory, tactile, and proprioceptive

Tonic Labyrinthine Reflex (TLR)

The Tonic Labyrinthine Reflex helps with stability; it helps us develop muscle tone, balance, posture, and coordination throughout the whole body. This reflex is about where the head and body are in space and the interaction of the senses. It causes the limbs to bend when the neck is flexed, and to straighten when the neck is extended. Often when the TLR Reflex is not integrated, there is more rigidity in the leg muscles and tensions in the neck.

In school, the TLR reflex helps with coordination, spatial awareness, orientation to sequencing and time, and vision. When not integrated, this reflex can also contribute to attention problems and can affect hearing and auditory processing due to the fact it helps integrate the vestibular and proprioceptive centers of the body.

Some symptoms of a non-integrated TLR

- If flexion does not integrate, the child may be weak and floppy and will often stand and sit with stooped posture
- Retained extension could result in a child who appears stiff, with rigid and jerky movements
- Balance problems with changes in head position (walking up or down stairs, riding a bike, looking up at the board or to paint the ceiling)
- Overall coordination problems
- Fear of heights
- The child can suffer vision and hearing problems
- May suffer motion sickness.
- Difficulty in sequencing order and time
- Weak muscle tone; weak neck muscles; tension and pain in the neck
- Difficulties holding the head up
- Posture might be forward resulting in low energy
- Weak eye muscles, difficulty with vision
- Skipping words or line of print when reading
- Very tight, rigid muscles; tendency to walk on toes

Symmetrical Tonic Neck Reflex (STNR)

This reflex assists the child in getting up on his hands and knees and eventually crawling using a cross lateral movement pattern. The STNR becomes integrated when the infant kneels on all fours and begins to rock back and forth. This final rocking pattern needs to be smooth, easy and rhythmical in order for the infant to be able to crawl well, If this reflex does not integrate, the child may not learn to cross-crawl properly, a skill which is essential for thorough integration between the left and right sides of the brain, as well as training the eyes to focus and track.

The STNR is another very important reflex for academic success in school. A child may have difficulty maintaining certain postural positions if the STNR is not integrated. The upper and lower parts of the body will remain at odds with each other. This is most notable when the child sits at a desk or table and is asked to read or write. When the child looks down, the arms bend causing the child to lay their head on the table instead of maintaining an upright reading or writing posture. The STNR is not only important for overall posture and muscle tone of the back and neck, but is also important for training vision, especially near and far visual focus.

Some symptoms of a nonintegrated STNR

- Problems crawling
- When reading or writing often supports head with hand or ends up slumped and lying over the table or book. May prefer to read or write while standing.
- In order to sit upright in a chair, a child sits on his legs or wraps them around the legs of the chair. If he has to sit on the floor, he will often sit with his legs in a “W” position.
- Attention and focus difficulty; trouble staying on task; squirming or fidgeting
- Vision difficulty; focusing at far and near distances
- Poor cooperation between the upper and lower body (e.g. somersaults, swimming butterfly and breaststroke); often clumsy; weak upper arms

Additional Reflexes

The above reflexes are only a few of the primitive reflexes that are present during infancy and should be inhibited in order for more sophisticated areas of the brain to develop. These reflexes represent some of the more prominent and important ones for proper social, academic, and motor development.

Research

The results of reflex/motor activity interactions in 177 normal infants are evaluated. The asymmetrical tonic neck reflex, tonic labyrinthine reflex-supine, and Moro reflexes were

assessed for each child at birth and at intervals up to 12 months. Ages of rolling prone to supine, rolling supine to prone and sitting alone were elicited from parents.
The effects of the primitive reflexes on early motor activity were assessed, and statistically significant correlations were demonstrated between decreased reflex activity and the emergence of motor milestones. The distinctive association of reflex activity with motor function suggests the interaction of several reflexes (a primitive reflex profile) rather than the influence of isolated reflex activity. Such patterns support the hypothesis that decreasing primitive reflex activity is associated with the onset of volitional motor activity in normal infants. Developmental Medicine & Child Neurology; November 2008.

A link between reading difficulties and control of movement in children was found with the presence of retained primitive reflexes. A new approach to the treatment of children with reading difficulties should include the assessment of underlying neurological functioning and appropriate remediation. The Lancet; Feb. 2000

The persistence of the ATNR was significantly predictive of attainments in reading. Educational skills may be affected by the persistence of brainstem mediated reflexes that should be inhibited in the first year after birth. Neuropsychologia; Vol. 45, Issue 4

Infants with Cerebral Palsy (CP) have been known to manifest persistence or delay in the disappearance of primitive reflexes and pathologic or absent postural reactions. Moreover, infants with >5 abnormal postural reactions have developed either CP or developmental retardation. The combined examination of primitive and postural reflexes should be considered by the child neurologist as a simple but predictive screening for the early identification of infants at risk for CP. Pediatric Neurology; Vol. 31, Issue 1

Primitive Reflexes and Attention-Deficit/Hyperactivity Disorder: Developmental Origins of Classroom Dysfunction" describes an overlap of ADHD behaviors and retained infant reflexes. The boys in the study that were diagnosed with ADHD had significantly higher levels of retained infant reflexes than the boys who were not diagnosed with ADHD.
The main reflexes that were retained are called Moro, Tonic Labyrinthine Reflex (TLR), Asymmetrical Tonic Neck Reflex (ATNR), and Symmetrical Tonic Neck Reflex (STNR). The retention of these reflexes also corresponded to lower math achievement than the boys who were not diagnosed with ADHD and had lower levels of retained infant reflexes. It was also discovered that an active Moro reflex inhibits the integration of the other three reflexes. International Journal of Special Education 2004, Vol 19, No.1.

Treatment

Through Chiropractic Adjustive techniques and various specific movement and exercise protocols offered at our clinic, primitive reflexes can be inhibited- allowing for proper neurological development to take place. The long term results of such treatment is better social behavior, improvement in academic and motor learning, and overall improvement in physical health, emotional health, and overall well being.

References

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[2] Akhgar Ghassabian, Rajeshwari Sundaram, Erin Bell, Scott C. Bello, Christopher Kus, Edwina Yeung **Gross Motor Milestones and Subsequent Development,** Pediatrics, June 2016