

## The Neurodevelopmental Approach to Developmental Delays

By Kay Ness, 2000

### Introduction

There is much hope for the child with developmental delays. This hope lies in the very nature of the brain and the central nervous system. A review of scientific literature reveals that the human brain displays plasticity, meaning that with specific stimulation, function, structure and even chemistry of the brain and central nervous system changes when impacted specifically by stimulation. This tells us that human function, which is controlled by the central nervous system and more specifically the brain, is changeable. If we can evaluate what is causing problems in development and if we are wise enough to find the specific stimulation that can impact that development, we can accelerate the development and help improve function.

In order to explore the neurodevelopmental approach to dealing with developmental delays, we must understand the meaning of the term. To be developmentally delayed simply means that in some way, a child is functioning at least one to two years behind in areas of cognition, speech and language, gross and/or fine motor areas. The term in no way indicates causes of delays which can be attributed to genetic anomalies, brain injury, chronic ear infections, metabolic problems or a combination of these or many other cause. A neurodevelopmentalist treats a child with developmental delays the same way that he treats any other child: find out where the child is functioning, find the specific causes of problems, and designs a specific stimulation and educational program to accelerate development to the next levels. Any sensory system can be too sensitive (hyper) or not sufficiently sensitive (hypo). Specific stimulation can normalize the sensory systems no matter the present condition.

### Evaluating Developmental Delays

#### Motor Function.

A simple but universal principle of a neurodevelopmental evaluation is that if there is a problem with a specific function (OUTPUT) such as gross motor function, then one must examine the input to that system, in this case, the tactility and the vestibular system.

The tactility system is broken into 3 major areas: the deep sensors next to the bones (responsible for deep pain sensation, muscle tone and mobility), the soft touch on the skin surface (responsible for feeling textures, tickles and so forth), and temperature sensation.

Low muscle tone is a sign that the deep sensors have low sensation. The evaluator looks at the pain sensation system by squeezing arms and legs and watching how the individual responds to this and how he is able to distinguish different pressures. Also, the parents are questioned as to how the child responds to pain: does the child come in with mysterious bruises, bumps and even is slow to respond to broken bones, etc. Also, a child with low deep sensation may have ear infections and not feel them appropriately. There have been children whose eardrums burst before the parents knew that the child had an ear infection, the pain sensation was so low. This is a child that could be walking around, a little awkward, tending to bump into things and not quite knowing where his arms and legs are going (proprioception). This child is often described as uncoordinated and awkward.

Many children are sensitive on the skin surface to tickles, textures or temperature and still have low pain sensation. Evaluation of each system very specifically is important in deciding a program design for that individual.

The vestibular system can be hypo or not sensitive or hyper and too sensitive. Specific tests are done to decide which and how to help normalize this system. A sign that the vestibular system is not functioning normally is carsickness, balance problems, eye tracking problems, dizziness and so forth. Chronic ear infections can involve the vestibular system and keep it from developing normal function.

If an individual has never gone through normal developmental steps of crawling, creeping and learning to walk in a cross pattern, the foundations for smooth and coordinated motor function has not been laid. Taking an individual back through these steps while working on specific tactile and vestibular problems can remediate these problems.

Fine motor function also involves the tactility system. Little hands with low muscle tone or unbalanced muscle tone and development make it hard to develop good fine motor function. Some children are too sensitive on their hands and avoid handling things or do not like feeling certain textures. Some children can have strong muscles to grip something but very weak muscles that open their hands - quickly identified by those cute little dimples on the back of hands that babies normally have. Some children just have very weak hands from low muscle tone. It is important to note that low muscle tone prevents muscles from building. Developing normal tactility helps build the ability to develop muscles.

#### Intellectual/ cognitive delays

A label of mentally retarded is often devastating to parents. Many children come to us with labels like Mentally Retarded, Central Auditory Processing Disorders, visual processing disorders, figure/ground discrimination problems, etc. Some children have low eye contact, do sensory play, hand flapping, rocking, and other self-stimulatory activities. These labels, it must be understood, are again, simply terms describing what they are doing. It by no means describes what they are capable of doing once the specific problems are addressed and teaching is accelerated according to how that individual learns best.

The way to begin evaluation of problems with cognition is to look at the main ways we learn: the visual and auditory systems.

With the visual system, we evaluate whether the central detail vision is well developed, whether the individual uses the peripheral vision inappropriately (visual sensory play and/or low eye contact), whether the eyes track and converge smoothly and the level of visual processing. All of these problems are easily remediated with appropriate exercises and specific stimulation to normalize function.

With the auditory system, the "normal" years of chronic ear infections can interfere with auditory development to result in cognitive delays. Since hearing is developmental, fluid in the middle ear will distort the hearing and delay auditory development and processing. Some individuals have actual hearing loss, some have tonal processing problems, some are sensitive to certain frequencies (covering ears in noisy or confusing environments or changes in behaviors in noisy environments). These individuals can test with normal hearing on an audiogram but still have significant problems with processing tones. All of these problems are open to remediation with sound therapy and specific training to improve auditory processing.

Processing, both visual and auditory, are very significant in intellectual function. If an individual can only process 1 or 2 pieces of information and is older than 5 years, this individual is unable to function with his peers. This individual would be considered "retarded". If we improve the processing (short-term memory) to 6 or better, this individual can now process information in the environment and can function normally. This is discussed in more detail in the paper: "Hearing, Learning and Listening".

Once the sensory systems are processing abilities are evaluated, neurodevelopmentalists evaluate how the individual thinks, either visually or linearly. An individual needs both abilities but often, due to developmental issues, lopsided development takes place and we often see individuals with great visual abilities and no logic, or the contrary, great linear thinking but no ability to think globally. Balancing these thinking abilities is important in helping the individual function normally and eliminates some "strange" behavior.

#### Speech and language delays

There are many pieces to developing good speech and language skills. As in other areas of development, neurodevelopmentalists first look at the inputs: hearing and oral motor issues.

Hearing and processing skills are already discussed. When a child is sensitive to sounds, there is a tendency to shut down auditorily and not listen. Hence, the child will not develop good auditory processing and the ability to speak in sentences. Not distinguishing certain sounds may interfere with enunciation also. Samonas sound therapy is used to remediate these problems.

Oral motor issues are a bit more involved and can interfere with articulation. First, looking at the ability to move and control the tongue and jaw is important. Does the child chew properly? Is the child sensitive to textures in his mouth? Is the child aware when he has too much food in his mouth? Does he choke easily? These can involve mouth tactility issues and specific mouth stimulation is important to help normalize this function.

In looking at tongue control, can the child stick his tongue out and raise the tip towards his nose? Can the child lateralize his tongue, moving it from corner to corner of his mouth smoothly? If not, mouth stimulation and tongue exercises are called for before any specific speech therapy will be effective. A tongue thrust or being tongue-tied can also interfere with articulation.

Once processing and oral motor pieces in place, specific training can take place to model good articulation and practice it with the child. Without those pieces, it is very difficult to make good progress.

#### Conclusions

Though an individual has problems and has been labeled as disabled in some way, this by no means is indicative of the ultimate level at which that individual may be able to function. By looking at the causes of the problems, treating these causes and then teaching the individual in an intense way that teaches to his strengths while remediating weaknesses, functional improvement can be achieved.

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