Reflex Integration for Post-Trauma Survival and Recovery

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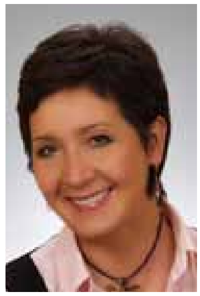
To the children and parents of Newtown, CT with whom we worked and will continue to work, and to our volunteer professionals dedicated to providing traumatic stress recovery.

Introduction



Svetlana Masgutova, Ph.D

Ten percent of American women and five percent of American men will experience Post-Traumatic stress disorder (PTSD) during their lifetimes.[1] In a national study of 4,023 adolescents ages 12 to 17 almost half reported some type of traumatic experience: sexual assault (8%), physical assault (22%), and witnessing violence (39%).[2] Neglect, domestic violence, sexual, physical and emotional abuse, terrorism, war, natural disasters, and mass shootings appear in our headlines every day. Trauma and its dire fallout is prevalent even in early childhood!

We live in harsh times and effective intervention for victims of trauma is urgently needed. Although the military and others are exploring alternative interventions such as EMDR (Francine Shapiro),[3] Somatic Experiencing (Peter Levine),[4] various forms of energy work, psychotherapy for emotional adjustment and medication for symptom relief[5] are considered the primary treatments for PTSD. The long-term experience of the author, working internationally with trauma release processes in disaster survivors, has brought her to the conclusion that the current primary treatments are not adequate and do not address the unconscious, neurosensorimotor needs of those with PTSD. While it can be helpful to address rational and emotional functioning, to work with conscious and unconscious motives, to provide pharmaceutical support and to ease tension in the muscles and tendons, these interventions do not always succeed in creating a stable on-going process that orients PTSD clients toward new perspectives and a new positive sense of life.

Both acute and chronic symptoms of trauma originate in the protective and survival mechanisms that govern the reflexive freeze and fight or flight responses. The author contends that the grip of PTSD on trauma victims can only be released by working with these non-rational non-emotional automatic responses where they originate in the nerve networks of reflex systems in the interbrain (basal ganglia, thalamus, amygdala, insula,

[1] http://psychcentral.com/lib/facts-about-ptsd/000662
[2] http://www.ptsd.va.gov/professional/pages/ptsd_in_children_and_adolescents_overview_for_professionals.asp
[3] Carlson, J., Chemtob, C.M., Rusnak, K., Hedlund, N.L, & Muraoka, M.Y. (1998). Eye movement desensitization and reprocessing (EMDR): Treatment for combat-related post-traumatic stress disorder. *Journal of Traumatic Stress,* 11, p. 3-24.
[4] Leitch, M. L., Vanslyke, J. and Allen, M, Somatic experiencing treatment with social service workers following hurricanes. *Social Work,* Volume 54, 9–18, Number 1, January 2009.
[5] http://psychcentral.com/lib/an-overview-of-treatment-of-ptsd. Accessed 12/10/13.

and limbic system) and brain stem. It is crucial for practitioners to understand and work with reflex patterns as they not only govern our actions, behavior, and thoughts in traumatic stress but are also a key resource for positive survival and neurodevelopment.

This article discusses effects of stress in normal and traumatized brains (Part 1), presents a model of the neurophysiology of stress based on reflex system functioning (Part 2), and proposes original PTSD Assessment and treatment protocols developed by the author and used effectively for over 25 years in work with trauma survivors (Parts 3 and 4). Part of a larger body of work known as Masgutova Neuro-Sensory-Motor and Reflex Integration (MNRI®), the MNRI® PTSD protocol was used with great success by the author during her many years of work with patients evacuated from traumatic events such as: the Chernobyl nuclear disaster (1986-1996), the Baku conflict (1990-1991), the earthquake in Armenia, the train crash in Ufa (1989), the Chechen War (1996-1999), conflicts in Israel (2001-2005), suicidal individuals, and survivors of fire, explosions, and abuse. MNRI® trauma recovery work uses the inherent sensory-motor links of reflex circuits to reroute brain stem neurons (lower motor neurons of the extrapyramidal nerve net system) from their anchors in an 'unbearable past trauma' to the experience of a 'safe here and now,' oriented toward positive survival in a safe healthy future. Part 5 presents in detail the results of using the MNRI® trauma protocol with 174 children and adults directly or indirectly involved in the tragic Sandy Hook School shooting in Newtown, CT on December 14, 2012.

Part 1

Stress and Trauma: the Normal Stress Response

The early work of Walter Cannon (1931) revealed that the autonomic nervous system manages two general states of function in the body as a normal course of daily life: 1) The Non-Alarm State and 2) The Alarm State. A healthy individual exposed to an isolated traumatic event will experience normal activation of neural responses designed to protect the body and enhance survival. Generated by the sympathetic nervous system, impulses from the lower brain travel to the organs and tissues, causing all the symptoms we recognize in stress: sweating or gooseflesh, dilated pupils, rapid heartbeat, shallow breathing, internal pressure, trembling, pallor, and perhaps even nausea. The release of adrenalin in the HPA-stress-axis (hypothalamus-pituitary-adrenal) pumps energy out to the limbs to support escape or self-defense (fight or flight). The enteric nervous system, popularly referred to as the 'brain in the gut,' acts to regulate digestion and elimination in ways that enhance survival.

The parasympathetic nervous system activates a relaxation response when danger has passed and one can safely return to the Non-Alarm State. In cases of overwhelming terror when no escape and no hope for survival seem possible, the parasympathetic system releases the same neurotransmitters and hormones that help the body relax, but in much larger amounts. This brings on the freeze response. In car accidents, during rape or under threat at gunpoint, protective 'freezing' enables one to collapse, faint, or dissociate from one's body.

Following a traumatic event other symptoms may persist for a few days: intense bad memories, flat effect, muscle tension, tremors, unstable gait, lack of grounding, poor balance, anxiety, and feelings of isolation. Normally, when the traumatic event is over or the source of trauma removed, a healthy individual will gradually phase out of the stressed state and move into a state mediated by the parasympathetic nervous system, recovering fully within a few days or weeks. This cycle of transition from Non-Alarm State to Alarm State and back to Non-Alarm State is governed by the autonomic nervous system with its sympathetic, enteric, and parasympathetic subsystems.

Dysfunctional Sympathetic- and Parasympathetic-Dominant States

Hans Selye's (1974) work showed that when the sympathetic nervous system dominates and the parasympathetic nervous system does not restore normal function with regular frequency, not only can the body sustain internal physiological damage, but its overall ability to function effectively and maintain emotional and behavioral stability begins to diminish. If this occurs during infancy when primary motor reflexes are developing, the underlying neuro-sensory-motor function can be challenged, making it difficult for reflexes to mature and integrate. Even after all the primary infant motor reflexes have integrated, if excessive sympathetic dominance persists, then low-level trauma, normally managed effectively by the body's near-term survival system, can trigger reflex patterns to re-surface. In other words, prolonged intermittent or chronic stress can compromise maturation and integration of primary infant motor reflexes and, even in adults, can cause previously integrated primary infant reflexes to resurface.

Under conditions of sympathetic dominance, an otherwise normally functioning sensory system may become hypo- or hypersensitive or stop working altogether. Because tactile sensitivity is the first link in the three part reflex circuit connecting a sensory stimulus with brain processing and motor response, dysfunction here will lead directly to dysfunction in the reflex circuit.

Because the central nervous system regulates and directs internal and external responses based on the input it receives, skewed input will result in a skewed response. Outgoing directives will then produce motor responses that are dysfunctional (hypo- or hyperactive) or pathological (a-reflexive, incorrect, or reversed). To the outside world, an individual with a challenged sensory system can appear emotionally and behaviorally dysregulated, when in fact the quality of their emotional or behavioral response to a stimulus accurately reflects the hyper or hyposensitivity of the challenged sensory system.

An under reactive sensory system can cause the parasympathetic system to over engage the Non-Alarm state, resulting in a very high tolerance threshold and failure to react to a small or even moderate amount of stimulation. While the purpose of the parasympathetic system is to allow restoration and growth to ensure long-term survival, if the body does not understand when sensory input is dangerous or life threatening, it will not engage sufficient mobilization or immobilization strategies to ensure survival. In other words, people with under reactive sensory systems can be at risk for harm in unsafe and life threatening situations and are more likely to engage in dangerous activities.

Over reactivity, in contrast, can cause the sympathetic nervous system to engage its Alarm State mobilization system excessively, resulting in timidity and potentially depriving the individual of restorative and developmental benefits governed by the parasympathetic system. A scratch can feel like a deep cut, a light touch like an aggressive push, an everyday sound like nails scratching on a chalkboard, or simple eye contact like a glaring stare. In either case, the sensory system misinterprets the environment and sends distorted sensory signals to the central nervous system.

When Stress Becomes Trauma

Our bodies and nervous systems are designed to tolerate the normal stressors of life. In a healthy individual the autonomic nervous system engages adequate mobilization of protection to ensure near-term survival. Its sympathetic and parasympathetic subsystems function in a symbiotic fashion, regulating variations of Alarm and Non-Alarm states, with one more or less dominant depending on the level of danger or stress presented by external conditions.

With the experience of an overwhelming level of stress beyond the ability of the body and nervous system to cope, we enter the realm of trauma. Then the natural manifestations of a normal stress response may be replaced by more serious symptoms. In acute stress disorder one may experience panic reactions, chronic anxiety, confusion, dissociation, lack of trust, insomnia, poor sleep patterns, and difficulty with basic self-care, work, and relationships. Post-traumatic stress disorder (PTSD) usually involves painful flashbacks of an unbearable event, hyper-vigilance, and emotional numbness, as well. Individuals who lack resilience because of previous conditions can experience PTSD combined with other socio-psychological and psychiatric disorders. For example, co-morbid PTSD can exist together with depression, addictions, or other anxiety disorders. Complex PTSD is more likely to manifest in individuals who have experienced long term trauma such as prolonged childhood abuse. They are often diagnosed with personality or dissociative disorders and have extreme behavioral, emotional, and/or mental difficulties (Herman, 1992). In this article, the term post-traumatic stress will be used to indicate the presence of symptoms in the aftermath of a traumatic event in cases where an official diagnosis

[6] http://psychcentral.com/lib/types-of-ptsd/000666 accessed 12/10/13

of PTSD or DESNOS (Disorder of Extreme Stress Not Otherwise Specified) has not been made.[6]

Part 2

Stress and Trauma in the Reflex System: The MNRI® Model

Another way to describe the cycle of stress response and return to normalcy (HPA-stress-axis) is through the activity of our neuro-sensory-motor reflex circuits and their survival functions. The mechanisms of protection and survival triggered by any stress or trauma are genetically present in our bodies and realized through automatic responses and instincts, which include motor and postural reflexes.

Reflexes are automatic encoded programs of the nervous system responding to specific sensory stimuli. Their three part neural circuits involve a chain reaction from sensory stimulation through brain processing to motor response. Given to every one of us inherently, from generation to generation (also epigenetically), they are our keys to survival. Automatic, unconsciousness, and constant, they guarantee stability for the nervous system in stress and distress (Van der Kolk, Roth, Pelcovitz, Sunday, Spinazzola, 2005).

Beginning in early gestation and continuing through the first two years of life, each individual goes through developmental stages of emergence, activation, maturation, and integration of sensory-motor patterns associated with infant reflexes. The entire reflex system is crucial for future motor, sensory, emotional, and cognitive development (Pavlov, 1960). Here, however, we are primarily concerned with its function in assuring protection and survival. Three reflexes in particular call for special attention: Tendon Guard, Moro, and Fear Paralysis. These reflex patterns seem to be the most affected by stress and are most vulnerable and dysfunctional in individuals with traumatic stress and PTSD.

The Tendon Guard Reflex (TGR) is a generalized response of the brain-body system to stress. It manifests at three levels: Foot Tendon Guard, Core Tendon Guard, and Upper Tendon Guard (at the neck). The TGR is a life long reflex present in infants, children, and adults, elicited when stress enters the environment. Because the Core Tendon Guard (CTGR) integrates and initiates all other Tendon Guard Responses, it will be the focus in this text.

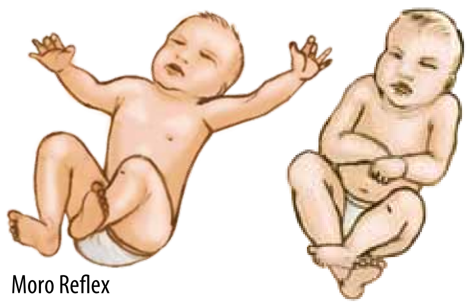

Core Tendon Guard Reflex

Protective task: The CTGR brings information to the brainstem/RAS/thalamus about possible danger, discomfort, or risk. Lower motor neurons of the extrapyramidal nerve net system activate the whole organism through the HPA stress axis, providing protection and survival by contracting flexors or extensors in the body. Depending on the level of stress, either a 'freeze' or 'fight' or 'flight' response will result. The HPA stress axis governs the production of adrenalin, cortisol, and noradrenalin, depending on how much survival activity is needed to adapt to a physical change or injury. Using the biomechanics of the Tonic Labyrinthine Reflex (flexion-extension responses to gravity), and working through the body's Golgi system and through its links with the HPA axis, the CTGR regulates the level and intensity of excitation and inhibition needed to keep the body safe. Under intense stress, if the CTGR cannot cope alone, then the Fear Paralysis or Moro and/or other reflexes are triggered to provide increased emergency protection.

The pattern of flexion in the freeze response is characterized by automatic withdrawal of the core, holding breath, muscle contraction, visual convergence, and inhibition of movement. In contrast, the pattern of extension in the fight or flight response manifests in backward trunk extension, visual divergence, and readiness for action. When freezing enables one to hide effectively from a danger, when flight enables one to escape, or when fighting back protects one from harm, then the protective response has done its job and only lasts for a short time.

Data gathered on survivors of trauma and individuals diagnosed with PTSD who received treatment with MNRI® show that the CTGR remains affected for 4 to 12 months following a traumatic event in 100% of the cases. Their hyperactive response to the CTGR test indicates over-production of stress hormones by the HPA stress axis and a chronic state of alarm in their Golgi system. Excessive amounts of stress hormones can destroy myelin, particularly in the lower motor neurons (Sechenov, 1995), brain stem (Bremner, et al. 1995; Bremner, 2001), and cerebellum (Sherin, Nemeroff, 2011), affecting automatic life functions such as circulation, blood pressure, breathing, and digestion, as well as reflexes and instincts.

The Moro Embrace Reflex is a protective response to a sudden vestibular or proprioceptive experience of loss of stability or change in the position of the head relative to gravity. Through its neural connections with the sympathetic nervous system it is linked to the fight or flight response. The earliest phase emerges at nine weeks in utero. The first two developmental phases of this reflex are mature at birth and remain active up to the third or fourth month, when it integrates into the whole body motor and proprioceptive systems. In adults this reflex activates movements of the limbs from core to periphery and periphery to core when a stable body position is lost.


Moro Reflex

Protective task: this reflex trains our flexion-extension mechanisms to protect the body. Rapid flexion or extension can prevent a fall by helping us to regain equilibrium. Curling into a ball (flexion) can prevent injury if we do fall. A sudden backward or downward movement activates the posterior-anterior semicircular canals in the labyrinths, sending the HPA axis alarm system a command to produce stress hormones to strengthen the body in case of a fall. Phase 1 is characterized by disorganization or chaos. It signals the loss of stability. The infant opens the core of their body, extends arms and fingers, inhales rapidly, and holds their breath. In phase 2 order is reestablished as the whole body flexes and withdraws, activates protection and regains wholeness. In phase 3 the infant accepts comfort by embracing a person or soothing object, releases stress, and becomes ready to communicate. When fully matured, the Moro Reflex pattern supports the development of bonding and trust, integration of thought and movement, self-regulation, organization, concentration, and comprehension.

Data from MNRI® experiences with the effects of post-traumatic stress and PTSD show that the Moro Reflex pattern is affected in 100% of cases. Its response to both the MNRI® testing procedures and triggering in real life remains hyperactive for 3 to 14 months after a traumatic event and can continue longer if no stress-release work is done. This again is evidence of the chronic state of alarm created by the overworking HPA stress axis.

Fear Paralysis (FPR) known in adults as the startle response, is active from birth throughout life (Baldacara, Jackowski, Andreoli, Mello, 2011). Although it is often confused with the infant Moro Reflex, FPR differs from the Moro in both stimulus and response. The FPR is triggered, not by vestibular, but by unexpected, sudden, intense tactile, auditory, or visual input. A further difference is that Fear Paralysis is linked to the freeze response, unlike the Moro, which is linked to fight or flight.


Fear Paralysis Reflex

FPR appears at the 9th week of gestation in flexion of the core as a withdrawal response. At the 28th week, this reaction appears as core withdrawal with abduction of limbs and bringing the head into forward flexion and an upright relationship to gravity. At birth, the reflex is already well developed. At 10 days, the infant clearly demonstrates this response to sudden sound, unexpected and unpleasant touch, and flashing light. Normally it is integrated into the whole body movement system by age three and eventually becomes the adult startle response.

Protective task: this reflex activates a strong sympathetic response followed immediately by a parasympathetic one, which organizes inhibitory processes of the nervous system, freezing the whole organism and its movements (Kaada 1986). The core withdraws (abdominal rectus muscles contract) with slight lateral limb abduction and breath is held on inhalation. This pattern may be accompanied by slight core flexion, forward tilt of the head, slight flexion in the elbow joints, extension at knees, blinking (corneal reflex), a gasp or deep sigh, and momentary fright (freeze response). It serves to economize resources and preserve them in case of longer lasting stress. Fear Paralysis not only activates its characteristic motor pattern, but also affects respiration and heartbeat, preparing the infant to coordinate physiological and emotional fear in one response for effective protection of the whole body. The freeze response also mitigates bodily sensations of discomfort, injury, and pain. All these manifestations dissipate quickly in a healthy person when the stimulus is removed. In individuals with post-traumatic stress and PTSD, this reflex is dysfunctional due to 'transmarginal inhibition' (Asratian, 1983), caused by unbearably intense or long lasting danger, pain, fright, or loss.

The effect of prolonged dysfunctional sympathetic and parasympathetic states is very clear in the way victims of every type of post-traumatic stress and PTSD demonstrate lack of integration in their Tendon Guard, Moro, and Fear Paralysis Reflexes. Symptoms of PTSD such as nervous blinking, staring, poor balance, anxiety, phobias, insomnia, fatigue, lack of trust, avoidant behaviors, depression, dependency, vulnerability to emotional overwhelm, freezing, dissociation from one's body, inability to cope with stress, and lack of resilience are all characteristic of dysfunctional Fear Paralysis and Moro Reflexes. These behavioral issues can be accompanied as well by symptoms that undermine physical health: motion sickness, digestive issues, overworked adrenal glands, and weakened immune systems.

Negative Protection

MNRI® practitioners refer to the consequences of pathology, dysfunction, and hypo- or hyperactivity in reflex expression as negative protection. If a sympathetic-dominant state of hyper-arousal persists over time, muscle tension may remain in the body, resulting in excessive reactivity. Tactile, visual, and auditory systems may become hypersensitive and one may experience the feelings, sights, and sounds of everyday life as invasive and intolerable. When the conditions of normal life are stressful one may tend to withdraw or to enlist defensive compensations. In contrast, if the system has been totally overwhelmed, a parasympathetic-dominant freeze response may persist, resulting in low muscle tone and inactivity. Individuals in this state may tend toward passivity, have difficulty resuming the activities of normal life and be unable to defend themselves in dangerous situations. Excessive or insufficient protection becomes negative protection which is present when hyperactive reflexes interfere with self-regulation, voluntary control, cognitive function, and intentional behavior, and when hypoactive reflexes provide insufficient protection from harm or danger.

Among the elements of the reflex system most critical for overall protection is tactile sensitivity. Because the external stimulus for so many reflexes is tactile, proper regulation of tactile sensitivity is essential for the brain receptors, whose job is to process incoming signals and organize appropriate motor responses. Skewed input leads to skewed output, again a form of negative protection.

Stress Anchored in a Reflex Pattern

Another way that trauma can affect reflex system functioning is through damage to innate neural pathways at the moment of stress. Suppose, for example, that an infant burns their hand by grasping a hot object and the grasp motor pattern becomes anchored to an association with pain. Thereafter, the brain avoids pain by refusing to elicit this motor response, thus arresting the training and maturation of the grasp reflex motor pattern and delaying the next stages of manual skill development. Accidental trauma has formed a vicious cycle: grasp motor pattern ==> memory of burn ==> brain interpretation (grasp causes pain) ==> refusal to respond to a safe stimulus that should elicit the grasp response ==> protection against grasp and poor ability to grasp (dysregulation in the balance of excitatory and inhibitory mechanisms) ==> poor muscle tone regulation in palm, fingers and arms ==> poorly developed qualities of grasp movement ==> poorly developed manual skills ==> poor academic performance (drawing, writing, typing) ==> poor self-esteem ==> fear of judgment from others concerning poor skills ==> tension and fear ==> extra effort ==> exhaustion ==> loss of motivation ==> refusal to participate in fine motor hands-on tasks ==> failure to meet expectations ==> negative relationships with teachers and parents, self-punishment and depression, behavioral challenges ==> regression (crying, infantile behavior, complaining, looking for sympathy, hiding the problem, blaming others or objects), and aggression.

A dysfunctional reflex can also be elicited as the result of being anchored to a positive outcome. Suppose an automatic Moro response (core withdrawal, holding breath, visual convergence, narrowing of visual and auditory field of attention) enabled a child to survive a life-threatening fall in the past thanks to the following sequence: sudden loss of stable body position in space (vestibular-proprioceptive stimulus), active Moro Reflex pattern while falling, core withdrawal, body maintained a round shape, child rolled and sustained no injury. The brain-body system anchored the Moro Reflex, in another vicious cycle, as ==> chronic core withdrawal (leaning too far forward), excessive visual convergence and narrow visual and auditory attention span ==> poor postural, visual, and auditory control ==> protective brain response ==> fear ==> greater tension in core withdrawal ==> limited visual and auditory perception ==> emotional instability ==> fear based behavior

==> effort to control emotions ==> guarded style of communication ==> trying hard ==> exhaustion ==> fear based self-judgment and negative attitude ==> fear based relationships ==> poor self-realization. In this kind of response, Moro is mixed with Fear Paralysis and leads to confusion in brain processing, causing fear or panic as a habitual response to stressors, large or small.

What is common to both of the above examples is that the repetitive firing of the reflex elicits protection and survival responses in a dysfunctional way. Whether the reflex pattern resonates with a negative experience that led to harm or a positive experience that enhanced survival, these responses function on the physiological level of survival and connect with the emotional response of fear or a conscious thought of fear. This is why work with reflexes requires highly trained specialists to analyze the complexities of problematic reflex pattern expression and to choose appropriate corrective tools.

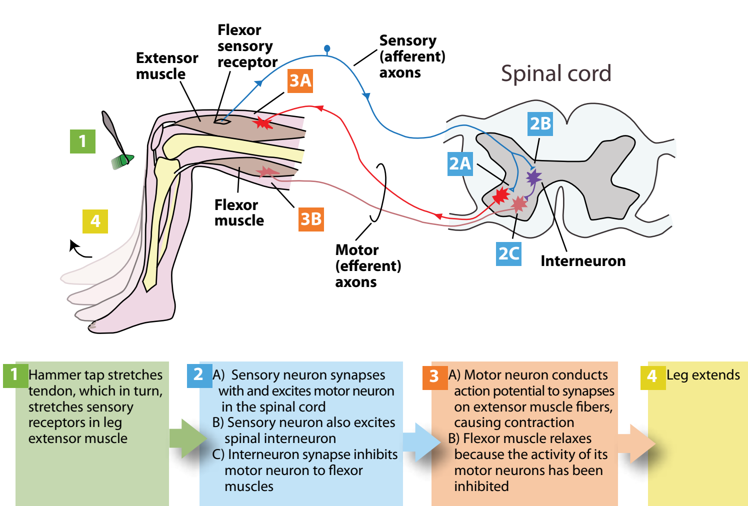
Post-Traumatic Stress and Dysfunction in the Reflex System

Unbearable or prolonged post-traumatic stress affects all three parts of the reflex circuit (Sechenov, 1960; Asratian, 1983; see Leg Circuit drawing):

1) compromised transmission of sensory stimuli: receptor thresholds, electrical conductivity in the sensory neuron, and release of neurotransmitters (Glutamate, Substance-P, gene-related peptide) at the end of the neuron

2) inefficient or faulty processing in the synapses: release of sensory neurotransmitters to the motor neuron and its interneuron, electrical-chemical relations between sensory and motor neurons, and initial transmission in alpha and gamma motor neurons that should take place on five levels of the nerve system: spinal cord, medulla, midbrain, thalamus and cortex. Conductivity in the interneuron can also be affected, resulting in a poorly regulated release of inhibitory neurotransmitters (dopamine and GABA) at the beginning of the gamma-motor neuron.

Leg Circuit



3) faulty motor neuron function: electrical conductivity in the excitatory alpha-motor neuron connecting with muscle fibers to contract them (agonist muscle), and in the inhibitory gamma-motor neuron connecting with muscle fibers to lengthen them (antagonist muscle), resulting in poor coordination of the motor or postural response.

Studies using BAER (brain stem auditory evoked response), EEGR testing, and brain-imaging (Pilecki, Masgutova, Kowalewska, Masgutov, Akhmatova, Sobieszczanska, Kalka, 2012) with individuals with PTSD led us to posit a correlation among reflex dysfunctions, disharmonious brain wave spectrum imaging (Pilecki, Masgutova, Kowalewska, Masgutov, Akhmatova, Sobieszczanska, Kalka, 2012) and immune system function (Masgutova, Akhmatova, Lebedinskaya, 2013). We conclude that the most critical aspect of reflex circuit dysfunction occurs in interneuron connections where metabolic dysfunctions resulting from lack of dopamine and GABA undermine regulation throughout the reflex circuit. Poor regulation in the reflex circuit affects the whole nervous system – sympathetic/parasympathetic, lower motor neurons, the RAS (which should differentiate between safe and unsafe incoming stimuli), the midbrain's territorial and self-preservation instincts, and the thalamus. The amygdala and insula are then unable to accurately decode input and, because their first priority is protection, they trigger the alarm state in the whole organism. This situation ends in a vicious cycle by triggering the HPA stress axis, which produces an excess of adrenalin and cortisol that further prolongs the alarm state. Under such chronic stress, the protective aspect of a reflex circuit becomes hyperactive, overworks the HPA stress axis even further, and exhausts the endocrine, immune (Masgutova, Akhmatova, Lebedinskaya, 2013), and nerve systems.

Part 3

MNRI® Assessment

The MNRI® Reflex Parameters Assessment (Masgutova, 2011; see also the article in this book on Assessments) identifies the level of maturity and integration of thirty reflexes and then serves as a baseline for a program designed to improve reflex circuit functioning. A trained MNRI® practitioner will administer specific stimuli in multiple tests for each reflex to determine its level on a scale of 0 – 20 ranging from deep pathology to above average maturity and integration. Testing a reflex as an unconditioned reaction is possible only in infants and young children. In older children and adults, reflexes themselves are not checked. The MNRI® Assessment measures an older child's or adult's imitation of an 'ideal' inherent genetically encoded motor response to a particular stimulus. Techniques used to test the Moro Reflex are given below as an example. In every day life, the Moro response might be elicited by sudden vestibular and/or proprioceptive stimulation such as in a fall, a boat ride in rough waves, or a traffic accident. In the testing situation, a professional supplies the trigger.

Moro Assessment (to ensure safety should be done only by trained personnel):

1. Inclining the head 30 degrees backwards. The patient is lying on their back. Their head is carefully lifted forward, then suddenly tilted backwards 30 degrees. This unexpected vestibular stimulation can cause a Moro response in the limbs or whole body if the reflex is hyperactive.

2. Straightening Legs. The patient is supine with legs bent at the knees and feet on the table or floor. The therapist rapidly straightens their legs, supporting them with hands under the knees. This test checks the response to proprioceptive stimulation.

3. Moro-2 Posture for protection (for mobile patients). The patient is supine. The therapist asks them to move into the Moro 2 pattern: flexing the core, bringing all limbs into the body center, making fists, and exhaling. Next the practitioner holds all four limbs from the center in a way that limits flexion and asks the patient to resist this pressure with their core, arms, and legs (checking the patient's ability to flex core and limbs simultaneously) using 20-25% of their strength. The practitioner notices the strength of the response and whether all components of the Moro 2 motor pattern are correct.

4. Moro-1 Posture for Core opening (for mobile patients). The patient is supine in flexion as in #3. Now the practitioner holds all limbs from the outside in a way that prevents extension and asks the patient to resist this pressure by attempting to open the core, arms, and legs (checking the patient's ability to extend core and limbs). The practitioner notices the strength of the response and whether all components of the Moro 1 motor pattern are correct.

Five Assessment Parameters Reflex basic patterns are evaluated in each of five parameters:

- ***Sensory-motor circuit:*** Circuit integrity is evaluated in terms of levels of sensitivity to the stimulus (normal, hypersensitive, hyposensitive, or a-reflexive) and levels of activity in the response (normal, hyperactive, hypoactive or a-reflexive).
- ***Sequence and direction:*** Evaluation is based on the fidelity of the motor response to the inherent genetically encoded sequence and pattern associated with a specific stimulus. The response can be correct, incorrect, mixed, or a-reflexive.
- ***Timing and speed:*** The motor response must begin in a fraction of a second from the moment of sensory stimulation. It must also complete its pattern quickly enough to fulfill its protective function. A delayed or slow reflex response could result in injury. The response can be normal, too fast, too slow, or a-reflexive.
- ***Intensity:*** The intensity of a reflex is the amount of physical energy supplied by a system of muscles and ligaments in response to a stimulus. Muscle tone regulation governing the response should reflect the intensity of the stimulus. The response can be normal, hyper-tense, hypo-tense, or a-reflexive.
- ***Symmetry:*** Symmetry can be seen in the bi-lateral pattern, direction, timing, and intensity of the reaction. The response can be symmetrical, asymmetrical, mixed or a-reflexive.

Each reflex is analyzed with regard to these five parameters, with a possible score of 4 points for each parameter, yielding a scale of 0 – 20 points. According to the algorithm created by Anna Krefft (2007),16 – 17.75 points represents the norm and below 10-11.75 the reflex pattern is at a dysfunctional level. Below is a detailed example of scoring for the Fear Paralysis Reflex (FPR).

Fear Paralysis Assessment in Detail The subject is lying supine on a massage table. Scores are based on observation of the subject's response to stimulation of the tactile system by light taps on five different points of the body and stimulation of the auditory system by taps on the table (after a demonstration and explanation of the test). Taps are administered twice, once with eyes open and once with eyes closed, in the following locations:


Fear Paralysis Reflex

1) middle of the sternum
2) on the table surface on both sides (auditory FPR stimulus)
3) insertion of the deltoid muscles on both arms simultaneously
4) insertion of the triceps muscles on both arms simultaneously
5) sides of both hips
6) middle of the arches of both feet

Scoring the five parameters of responses to Fear Paralysis stimuli: In each case the specialist observes four features for each parameter and assigns one point (+) for a mature or normal response and zero points (–) for a response indicating pathology, dysfunction, or low level of development:

Sensory-motor circuit: Four features (total possible score - 4 points):

1) Response to tap on the middle of the sternum. Breathing: a) no change, normal breathing (+), b) rapid inhalation and/or holding breath, fear (-)

2) Response to tap in 1) above. Blinking (corneal reflex): a) no blinking (+), b) hyperactive blinking, stress, fear (-)

3) Response to tap in the area of insertion of the deltoid muscles on both arms simultaneously. Breathing: a) no change, normal breathing (+), b) rapid inhalation or holding breath, fear (-).

4) Response to tap in 3) above. Dilation of the pupils: a) no change (+), b) dilation of pupils, anxiety, shock (-). Note: in hyperactive FPR the latency of response for dilation of pupils is 1 second, in tendency for shock/fear in 1-1½ seconds, and in panic attack response 2 seconds.

Sequence and direction: Four features (total possible score - 4 points):

1) Response to tap on the middle of the sternum. Muscle tone regulation: a) little or no increase of tone in the body (+), b) visible hyperactive motor response by strong startle reaction (-).

2) Response to simultaneous taps at the insertion of the deltoid muscles on both arms. a) little or no increase of tone in the body (+), b) visible hyperactive motor response by strong startle reaction (-).

3) Response to taps on the table surface – next to the head (auditory FPR stimulus). Muscle tone regulation: a) little or no increase of tone in the body (+), b) visible hyperactive motor response by withdrawal startle reaction or by Moro motor pattern instead of FPR, stress, fear (-).

4) Response to taps as in 3) above with subject in Moro 1 position. Muscle tone regulation: a) little or no increase of tone in the body (+), b) visible hyperactive motor response by withdrawal startle reaction or by Moro motor pattern, stress, fear (-).

Intensity of response (muscle tone regulation): Four features (total possible score - 4 points):

1) Response to tap on the middle of the sternum. Muscle tone: a) slight muscle tone increase seen in stronger force of next exhalation (+), b) strong muscle tone increase in whole body, sympathetic response such as flushing or sweating (-).

2) Response to simultaneous taps at the insertion of the deltoid muscles on both arms. Muscle tone: a) slight increase in muscle tone seen in stronger force of next exhalation (+), b) strong increase in muscle tone in upper or whole body, sympathetic response such as flushing or sweating (-).

3) Response to simultaneous taps at the insertion of the triceps muscles on both arms. Muscle tone: a) slight muscle tone increase is seen in a stronger force of next exhalation (+), b) strong muscle tone increase in upper or whole body, sympathetic response such as flushing or sweating (-).

4) Response to simultaneous taps on sides of both hips. Muscle tone: a) slight muscle tone increase is seen in a stronger force of next exhalation (+), b) strong muscle tone increase in upper or whole body, sympathetic response such as flushing or sweating (-).

Timing and speed: *Four features (total possible score - 4 points):*

1) Response to tap on sternum. Latency time before response: a) normal period of latency (30 m/sec) before slight increase in muscle tone seen in next prolonged exhale (+), b) sympathetic response: rapid increase in muscle tone, flushing, sweating or dissociating from body; or excessively slow or no increase of muscle tone in the body (-).

2) Response to simultaneous taps at the insertion of the deltoid muscles on both arms. Latency time before response: a) normal period of latency (30 m/sec) before slight increase in muscle tone seen in next prolonged exhale (+), b) sympathetic response: rapid increase in muscle tone, flushing, sweating or dissociating from the body; or excessively slow or no increase of muscle tone in the body (-).

3) Response to simultaneous taps at the insertion of the triceps muscles on both arms. Latency time before response: a) normal period of latency (30 m/sec) before slight increase in muscle tone seen in next prolonged exhale (+), b) sympathetic response: rapid increase in muscle tone, flushing, sweating or dissociating from body, or excessively slow or no increase of muscle tone in the body (-).

4) Response to simultaneous taps in the middle of the arches of both feet. Latency time before response: a) normal period of latency (30 m/sec) before slight increase in muscle tone seen in next prolonged exhale (+), b) sympathetic response: rapid increase in muscle tone, flushing, sweating or dissociating from body; or excessively slow or no increase of muscle tone in the body (-).

Symmetry: *Four features (total possible score - 4 points):*

1) Response to simultaneous taps at the insertion of the deltoid muscles on both arms. Symmetry of the response: a) slight bilaterally symmetrical increase in muscle tone (+), b) no symmetry in muscle tone increase and movements (-).

2) Response to simultaneous taps at the insertion of the triceps muscles on both arms. Symmetry of the response: a) slight bilaterally symmetrical increase in muscle tone (+), b) no symmetry in muscle tone increase and movements (-).

3) Response to simultaneous taps on both sides of the hips. Symmetry of the response: a) slight bilaterally symmetrical increase in muscle tone (+), b) no symmetry in muscle tone increase and movements (-).

4) Response to simultaneous taps in the middle of the arches of both feet. Symmetry of the response: a) slight bilaterally symmetrical increase in muscle tone (+), b) no symmetry in muscle tone increase and movements (-).

Note: each location is tapped only once. Observations relating to the five different parameters and their features are based on the response to each single tap.

This is an example of the precise observation, evaluation, and scoring of one reflex motor pattern. Data from such an Assessment is processed by a computerized New MNRI® Assessment Program (Akhmatov, 2013). The final result is a thorough analysis of reflex pattern development in the subject, showing strengths, weaknesses, and tendencies in nine clusters of motor, sensory, emotional, and cognitive function:

1) Upper Limbs Reflex Patterns
2) Tonic Reflex Patterns
3) Righting Reflex Patterns
4) Lower Limb Reflex Patterns
5) Gross Motor Reflex Patterns
6) Oral-Facial, Visual, and Auditory Reflex Patterns
7) Reflex Patterns Supporting Protection and Survival
8) Reflex Patterns Supporting Curiosity and Cognition
9) Reflex Patterns Supporting Emotional Stability and Maturation

In over 35 years of clinical observation by the author and our MNRI® team of specialists dealing with Post-Traumatic stress and PTSD, these individuals have consistently demonstrated extreme hyper-reactivity in their responses to all features in all parameters of the Fear Paralysis Assessment. Interestingly, they present hyperactive pupil dilating with an unusually long latency period of 1½ to 2 seconds between the stimulus and the response. This delay, caused by *transmarginal inhibition* (Setchenov, 1961; Asratian, 1963), is related to the numbing effects of panic attacks, shock, and breathless fear; conditions in which the nervous system responds more slowly. Parts of the nervous system taking longer to organize feedback are then in conflict with the hyper-excitation of survival functions in the reflex system.

Part 4

MNRI® Therapy: the MNRI® PTSD Protocol

MNRI® reflex integration techniques and exercises developed by the author for post-traumatic stress and PTSD were originally used for non-verbal work with children in states of panic, shock, and numbness, who could neither reason nor verbalize their emotions and feelings. Some of the children had even lost normal speech (for example a teenager who began to stutter after witnessing killings in the Baku conflict, a non-verbal child with CP who suffered in a fire, a child with Asperger syndrome run over by a truck, and babies and children with Down syndrome burned by vandals in fires during the war in Chechnya). These techniques were also used for immobile individuals (one wounded in the Ufa train explosion, one with MS who witnessed the killing of another person). For over 25 years this combination of exercises has proved in real life to be an effective therapeutic tool with victims of various natural and human-caused disasters, tragedies, and catastrophes. Later they were organized into a protocol with a sequence of specific steps. The MNRI® PTSD Protocol has achieved exceptional results with both children and adults in verbal (with a psychotherapeutic component) and non-verbal versions.

Steps of the MNRI® PTSD Protocol:

Setting a Goal: The goal: in the subject's own words, the goal would express something similar to: "To let go of fear and negative thoughts of physically or emotionally painful events…. I am open to courage and ready to be a winner. I am open to good health and growth under any circumstance." The subject is asked to notice where they feel the goal in their body, to touch that place and rate the goal on a scale of 0-10 (0-1 poor, and 9-10 high). How comfortable is it to contemplate the goal? How congruent is it with their current internal state? How realistic is it?

Subjective experience of the goal: the professional asks, "How does your goal make you feel? (positive, negative, trust or no trust that the goal is possible to realize)". Then, further questions concerning overall functions: "When you are tuned into your goal and feel an emotional response to it, can you breathe…. see (use your vision)…. listen and hear…. think clearly…. act rationally… pause… feel your emotions congruently? These parameters are then used by the subject to create a baseline point of orientation for comparing their current state to the following two states: "I am still in the traumatic event, then and there," and "I am present, I have reached the here and now." The subject's position close to or far away from those two states can be observed at the beginning, through this process, and at the end of the session.

The subject can also choose to combine MNRI® reflex integration with emotional release and strengthening (led by a professional psychologist or psychotherapist trained in MNRI® PTSD techniques) to transform negative sensory-motor anchors into positive ones or to create new positive anchors. The strategy of the verbal emotional work (not discussed in this report), if included, must follow harmoniously with the steps of the non-verbal techniques.

Non-verbal MNRI® PTSD Protocol:

1. Release of Negative Protection. The task of this group of exercises is to diminish improper triggering of too many reflex patterns causing negative protection and poor coping.

1) Tactile Stroking: to activate generalized tactility, to bring a subject still experiencing post-traumatic stress back to the 'here and now,' to awaken them from shock, and to activate bonding so they can feel protected and safe.

2) Fear Paralysis: to let go of extreme fear, anxiety, worry, stress, and distress; to activate tolerance mechanisms for sensory perception, to re-orient them from the perception of neutral stimuli as dangerous. MNRI® research shows that this work supports the release of fear and anxiety through its possible effect on the thalamus, amygdala and insula (Masgutova S., Masgutov D., Akhmatov, 2013).

3) Moro: to strengthen the subject's own inner-resources for protection, to bring them back from physical and emotional withdrawal, and to open them to the surrounding stimuli and the world on a proprioceptive level. Integration of Moro also works through the thalamus, amygdala, and insula to support the release of fear and anxiety and enable the patient to see alternatives.

Note: These two exercises follow each other only in this format, where it is important to differentiate two distinctly separate defense mechanisms: Fear Paralysis based on the freeze response and Moro based on fight or flight. In post-traumatic stress and PTSD, these two responses overlap each other, confusing the sympathetic system, basal ganglia, amygdala and its insula, and causing challenges in decoding and interpretation of real or imagined dangerous stimuli.

2. Differentiation. The motor patterns of these reflexes belong to the group of asymmetrical or cross-lateral movements more associated with conscious control, rational thinking, and involvement of the cerebral cortex than the homologous, symmetrical startle responses described above. The task of these differentiation techniques is to activate neurophysiological circuits that allow differentiation of body parts on the kinesthetic level. Physical differentiation then becomes the foundation for higher levels of differentiation: past from present, present from future, here from there, and traumatic memory from positive future possibilities.

4) Leg Cross Flexion-Extension: for activation of proprioceptive pathways that govern cross-lateral lower limb motor patterns, supporting differentiation on the kinesthetic level, in this case starting with the lower limbs and hips.

5) Sequential Arms Opening: for release of the tendency to protect the core with flexed arms as in the Moro 2 position. The upper part of the body tends to be mostly under conscious control. When individuals are consciously over-focused on past trauma, hyperactive protection makes them unable to release and open their arms. Opening the arms also serves as a metaphor for opening to relationships, to new experiences, to life, and to a meaningful future.

6) Eye Tracking: for horizontal and near-far tracking, convergence-divergence, and peripheral vision and to reestablish regulation in areas of the midbrain responsible for territorial instinct and self-preservation (tegmentum, tectum, and pre-tectum) that become hyperactive during stress. Eye tracking strengthens binocular vision for tracking, focus recovery, and other visual processing unrelated to vigilance and scanning for danger.

Optional: Hands Pulling: to reestablish the coordination of core flexion with visual convergence and trunk extension with visual divergence in a visual system that has become hyper vigilant and unable to alternate appropriately between central and peripheral focus.

3. Grounding and Stability. This group of reflex techniques activates the functions of the midbrain, cerebellum, and cortex to bring back the physical feeling of stability with body weight distributed evenly on the ground. A subject can then be grounded not only physically, but also grounded in the present moment and in one's self.

7) Hands Grasp: for confidence in one's ability to 'hang on' to what is important, to protect oneself, and to feel safe in one's personal space

8) Foot Grasp: for feeling grounded and safe in one's personal space

9) Grounding: same as above

10) Foot Metatarsi/Big Toe Rotation: for proper body weight distribution on the ground and the feeling of stability

4. Adrenalin-Cortisol Release. The task of these techniques is to detoxify the overloaded HPA-axis of excessive stress hormones

11) Babinski: stimulates lower motor neuron and redirects their activity away from hypersensitive tactile receptors. More efficient proprioceptive processing then leads to more accurate decoding of sensations, better grounding, and better differentiation of pain from touch. This raises the pain threshold, helps to release the negative anchoring of pain to touch and limits secondary benefit from pain. Stimulation of the Babinski sensory motor points also serves as a painkiller.

12) Perez: activates micro-movement in the spine and supports normal lordotic curvature to enhance circulation of cerebra-spinal fluid, thus helping to release toxins and stored stress hormones from the body and calming the HPA-stress-axis.

13) Abdominal Sleep Posture: works with HPA-stress-axis to relax the body and calm the emotions.

5. Brain Activation. (Masgutova, S., Masgutov, D., Akhmatov, 2013) The task of these reflex patterns is to activate fast brain waves (alpha and beta), supporting active consciousness, easier focusing, and intentional choice making.

14) Galant: releases stress, activates alpha and beta waves.

15) Hands Supporting: activates positive self-protection and alpha and beta waves.

16) Trunk Extension: awakens the body, enhances concentration and focus, and activates alpha and beta waves.

17) Foot Tendon Guard: awakens the Golgi system throughout the body, releases muscle tension, and activates alpha and beta waves, thus enhancing focus and awareness.

6. Completion:

18) Tactile Stroking: Strengthening the feelings of presence, bonding, and belonging and the awareness of a renewed capacity for real life and real interactions.

Completion of work with the Goal

Revisit the goal: "Where do you feel the stress in your body now that treatment is completed?" The subject is asked to rate the goal again on a scale of 0 – 10 as they did before treatment, "How comfortable is it to contemplate the goal? How congruent is it with their current internal state? How realistic is it?"

Subjective experience of the goal: the professional asks, "What does your goal make you feel now? (positive, negative, trust or no trust that the goal is possible to realize)". Then, further questions concerning overall functions: "When you are tuned into your goal and feel an emotional response to it, can you breathe…. see (use your vision)…. listen and hear…. think clearly…. act rationally… pause… feel your emotions congruently?" The subject compares these responses to those given to the same questions before treatment. Finally, the subject evaluates any changes in their position relative to the following two states: "I am still in the traumatic event, then and there," and "I am present, I have reached the here and now."

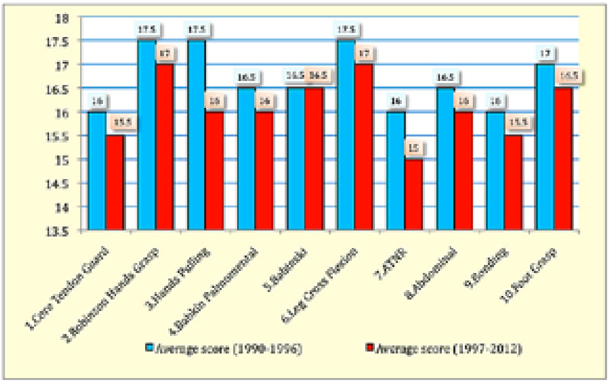
Part 5

Assessment, Clinical Observations, and Analysis of the Effectiveness of the MNRI® PTSD Protocol for Individuals with Post-Traumatic Stress and PTSD

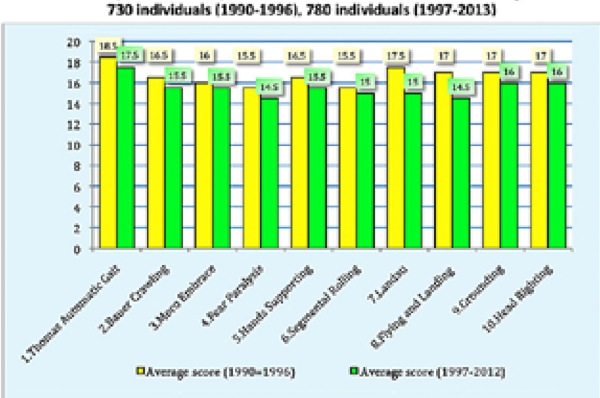
Reflex Pattern Profiles in Neurotypical Children (Control Group)

To identify deviations from normal reflex development and expression in children and adults experiencing traumatic stress, PTSD and other disorders, MNRI® uses the Exemplary Reflex Pattern Profile created through research on 30 reflex patterns in children with neurotypical development (1989-2013). This exemplary profile serves as the control group. The MNRI® Reflex Parameters Assessment (for 30 reflex patterns) was evaluated and statistically verified using Prof. Anna Krefft's Algorythm (NewKrefft Method, 2007). It demonstrated that the norm on a scale of 0 to 20 is 16-17.75 points. The large bank of MNRI® reflex assessment data gathered over a period of twenty-four years made possible a comparison of

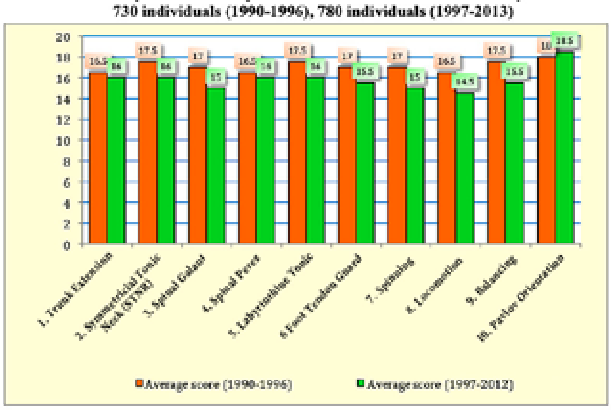
Reflex Patterns Profile in Children with Neurotypical Development (Age 2-19)
Group A: Motor Responses within Sagittal Plane of the Body
730 individuals (1990-1996), 780 individuals (1997-2013)



Reflex Patterns Profile in Children with Neurotypical Development (Age 2-19)
Group B: Motor Responses within Horizontal Plane of the Body
730 individuals (1990-1996), 780 individuals (1997-2013)



Reflex Patterns Profile in Children with Neurotypical Development (Age 2-19)
Group C: Motor Responses within Dorsal Plane of the Body:
730 individuals (1990-1996), 780 individuals (1997-2013)

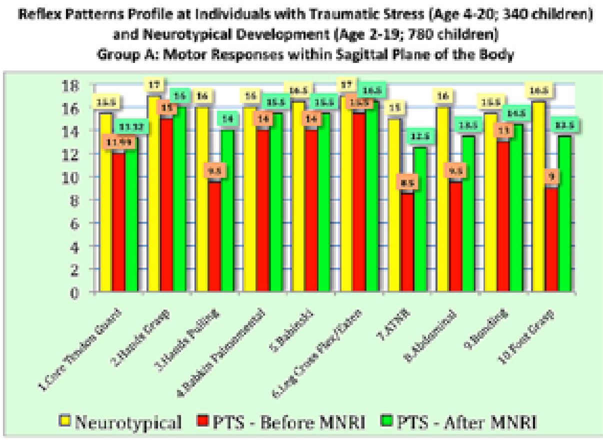


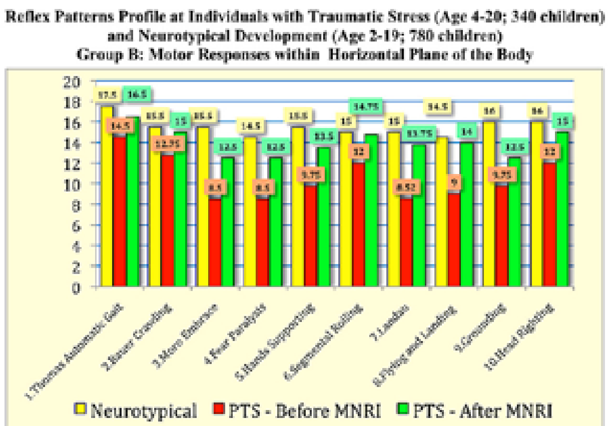
two groups of neurotypical children ages 2 to 19, one earlier (Group A, 1989-2006, 780 children) and one later (Group B, 2007-2013, 730 children). Children in the earlier group achieved average scores indicating normal reflex pattern development (16.77 points). In Group B (2007-2013) the average score was only 15.80, below the norm of 16-17.75 and below the average of 16.77 in Group A (S. Masgutova, 2008-2013, lectures). The statistical validity of both results is significant and equals 0.56 in the earlier group and 0.78 in the later, with $p<0.001$. This data is presented in the two bar graphs above, with 30 reflexes grouped according to body planes and motor coordination systems (sagittal, horizontal and dorsal).

The significantly lower scores were in reflexes directly responsible for protection: Fear Paralysis (14.5 in Group B vs. 15.5 in Group A), Core Tendon Guard (15.5 vs. 16.0) and Moro (15.5 vs. 16.0). Group B's scores for other reflex patterns influencing postural control, emotional maturation, and stability were also below the norm and below the average of Group A: Hands Supporting (15.5 vs. 16.5), ATNR (15 vs. 16), Bonding (15.5 vs.16) and Spinal Galant (15 vs. 17). Lower levels of development in these reflex patterns will inevitably lead to increased activation of defensive mechanisms in the organism and inhibit overall sensory-motor development, affecting motor ability, behavior, and cognition. These results suggest that lower levels of maturation in the reflex system may be one important reason for greater challenges in the development of protective mechanisms and less resilience under stress found in the younger generation by professionals dealing with problems of PTSD and personality growth (Masgutova S., Masgutov D., 2014).

Reflex Pattern Profiles in Children with Post-Traumatic Stress

Post-trauma MNRI® Assessment data from 340 children (1989-2013) show extremely challenged protective reflexes at levels 4 to 7 points below the norm: CTGR - 11.99, Moro and Fear Paralysis - 8.5, Hands Supporting – 9.75, and ATNR – 8.5 points. The same overall tendency is evident for other reflex patterns as well. The three bar graphs below compare neurotypical children from Group B and children with post traumatic stress before and after treatment with MNRI®.

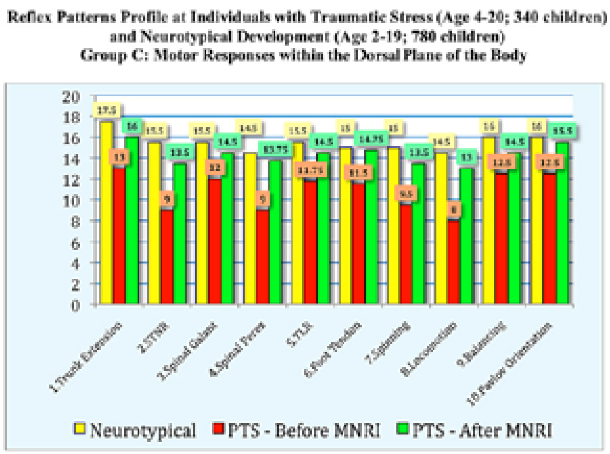




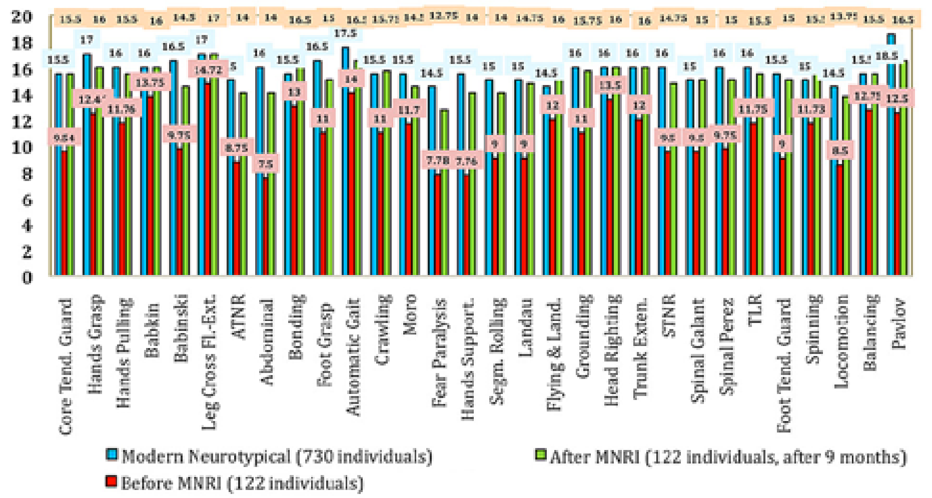
After 1-3 treatment sessions with the MNRI® PTSD Protocol these children demonstrated significant improvement in all reflex patterns: CTGR improved from 11.99 to 12.32 points, Moro and Fear Paralysis from 8.5 to 12.5 points, Hands Supporting 9.75 to 13.5, and ATNR from 8.5 to 12.5 points. All these reflexes moved from below to above the boundary between dysfunctional and functional. The same tendency for positive change is seen in other reflexes as well.

Reflex Pattern Profiles in Children from Newtown

The Sandy Hook Elementary School shooting in Newtown, CT on December 12, 2013 affected the



Newtown Graph # 1. Reflex Pattern Profiles of Newtown Children with Post-Traumatic Stress before MNRI® (February, 2013; red), and after MNRI (October, 2013; green) compared to Neurotypical Children (blue)



whole community. Adults, children, and everyone in the community were in shock and suffered great emotional stress; living and suffering with the unbearable images of 20 innocent children, 6 teachers, and a school principal massacred in their pleasant New England town on an ordinary school day. Our first visit took place one and a half months after the tragedy by invitation from a local family. A team of seven volunteer MNRI® specialists arrived to offer the MNRI® PTSD protocol to anyone interested. Altogether 264 MNRI® therapy sessions were given, 194 for children and 70 for adults. This method was new for Newtowners. Our professional decision was to use a non-verbal process, limiting any possibility of re-traumatizing our clients by dwelling on their tragic experience. We welcomed the opportunity to bring our method to a community in need.

The MNRI® Reflex Parameters Assessment was administered to 174 individuals in Newtown who had experienced direct and non-direct traumatic stress, among them 122 children ages 4-19 and 52 adults ages 20-63. Four successive assessments were done, the first testing was 1½ months after the event (February 2013), second testing after 3 months (April, 2013), third testing after 6 months (May-June, 2013), and the fourth testing 9 months (October, 2013) after the event. Tests were carried out before and after treatment with the MNRI® PTSD Protocol. This report presents assessment data for children only. Reflex Pattern Profiles of the children from Newtown in February before treatment show overall tendencies similar to those found in the profiles of other children from other traumatic events (1989-2013): low functional state of reflex pattern expression (see Newtown Graph #1 for specifics).

Our previous MNRI® clinical work demonstrates that when 35% or more of reflex patterns test in the dysfunctional ranges, symptoms of other disorders are always present: sensory processing disorder, ADHD, autism, CP, emotional instability, anxiety, and others. In all 122 children from Newtown, 43.3% of reflex patterns tested at dysfunctional levels following the event, which is similar to the data from other children following different traumatic experiences (340 individuals – 46.6% of their reflexes were dysfunctional). (Note: compare with data for adults following trauma - 36.7% of their reflexes were dysfunctional.) Clearly, with 43.3% of their reflexes testing in the dysfunctional ranges, the children who directly or indirectly experienced the shooting at Sandy Hook Elementary School were in a state of physical and emotional shock and fear severe enough to effect their daily functioning and well being.

Trained MNRI® professionals administered the MNRI® PTSD Protocol based on the Assessment data. This analysis specifically focuses on results of 46-51 children who received multiple assessments and therapy sessions. Scores were obtained for 1) 51 children at the initial intervention in February, 1½ months after the event, 2) the same 51 individuals a second time in April, 3) 46 individuals (from the original 51) a third time in May-June, and 4) 46 individuals (from the original 51) a fourth time in October. The sequence of assessments and treatments allowed us to see the dynamics of change in reflex profiles of the Newtown children and to determine which reflex patterns needed more support.

The table below presents the overall data from Assessments of these children. The column under 'Before

MNRI®' represents a baseline for reflex function in this group 1½ months after the shooting. The three columns under 'After MNRI' represent averages of their performance before and after the MNRI® sessions offered at those times. Thus the column for April 2013 shows the improvement that held from the initial session in February combined with immediate gains from the current session. Likewise, the columns for May-June and October combine gains maintained from the previous MNRI® treatments with new gains from the current sessions.

Table XYZ (at right) shows very clearly the dynamic of change in reflex motor patterns in these children over the treatment period.

#	**Table XYZ. Reflex Patterns** (X1-X30)	Newtown Children with post-traumatic stress (46-52 children out of 184): Before MNRI®	Newtown: After MNRI®			Children who experienced other traumatic events (340 individuals)		Control group: Neuro-typical (730 individuals)
		52 children in 1½ months	52 children in 3 months	46 children in 6 months	46 children in 9 months	Before MNRI®	After MNRI®	
X1	Core Tendon Guard	9.54±0.78	13.5±1.03	14.75±0.71	15.5±0.45	11.99±0.96	13.32±0.78	15.5±0.45
X2	Robinson Hands Grasp	12.46±0.84	14.62±1.8	16±1.12	16±0.74	15±0.87	16±1.12	17±0.65
X3	Hands Pulling	11.76±0.7	14±7.76	15±0.71	15.5±0.71	9.5±0.45	14±0.79	16±0.54
X4	Babkin Palmomental	13.75±0.96	14±0.85	15.5±0.97	16±0.74	14±0.87	15.5±0.96	16±0.78
X5	Babinski	9.75±0.9	12.65±0.81	14±0.72	14.5±0.84	14±0.8	15.5±0.77	16.5±0.8
X6	Leg Cross Flex.-Ext.	14.72±0.79	15.75±0.76	16.5±0.96	17±0.44	15.5±0.78	16.5±1.14	17±0.87
X7	Asymmet. Tonic Neck (ATNR)	8.75±0.94	12.54±0.7	13.75±0.79	14±0.69	8.5±0.8	12.5±1.1	15±0.67
X8	Abdominal	7.5±0.72	11.5±0.82	13±0.99	14±0.69	9.5±0.87	13.5±0.75	16±1.04
X9	Bonding	13±0.85	15±0.77	16±0.87	16.5±1.08	13±0.82	14.5±0.96	15.5±0.65
X10	Foot Grasp	11±1.09	13.52±0.95	14±0.53	15±0.71	9±0.47	13.5±0.75	16.5±0.77
X11	Automatic Gait	14.03±077	15.75±0.83	16.5±0.5	16.64±0.4	14±0.8	16.5±1.04	17.5±0.78
X12	Bauer Crawling	11±1.3	13.03±1.2	13.5±1.14	15.75±0.52	12.7±0.76	15±0.77	15.5±0.58
X13	Moro Embrace	11.73±0.92	13.03±1.2	13.75±1.18	14.5±1.1	8.5±0.49	12.5±0.68	15.5±0.61
X14	Fear Paralysis	7.75±0.8	9.5±0.8	11.93±1.3	12.75±1.36	8.5±0.78	12.5±1.14	14.5±0.45
X15	Hands Supporting	7.75±0.85	10.46±1.4	13±0.87	14±0.69	9.75±0.68	13.5±0.86	15.5±0.74
X16	Segmental Rolling	9±0.73	11±1.08	13±0.87	14±0.69	12±0.45	14.75±0.87	15±0.82
X17	Landau	9±0.73	10.75±1.3	12.5±1.39	14.75±0.76	8.52±0.87	13.75±1.03	15±0.75
X18	Flying and Landing	12±1.04	13±1.02	15.75±0.75	16±0.74	9±0.92	14±1.14	14.5±0.74
X19	Grounding	11±1.08	12±0.9	14±0.98	15.75±0.52	9.75±0.78	12.5±0.82	16±0.78
X20	Head Righting	13.5±0.91	14.5±0.68	15.75±0.45	16±0.74	12±0.74	15±0.87	16±0.79
X21	Trunk Extension	12±0.89	14±0.76	15.75±0.71	16±0.74	13±0.88	16±0.69	16±0.65
X22	Symmetr. Tonic Neck (STNR)	9.5±0.8	11±1.18	13.12±1.12	14.75±1.31	9±0.96	13.5±0.78	16±0.64
X23	Spinal Galant	9.5±0.8	14±0.76	14.5±0.71	15±0.75	12±0.71	14.5±1.14	15±0.87
X24	Spinal Perez	9.75±0.9	12±0.9	13±0.97	15±0.73	9±0.78	13.75±1.07	16±0.74
X25	Tonic Labyrinthine (TLR)	11.75±0.92	14±0.78	14.5±0.72	15.5±0.77	11.75±0.8	14.5±1.05	16±0.86
X26	Foot Tendon Guard	9±0.73	11±1.18	12.67±0.96	15±0.74	11.5±0.82	14.75±0.58	15.5±0.73
X27	Spinning	11.73±0.93	14.5±0.68	15±0.79	15.5±0.66	9.5±0.81	13.5±0.83	15±0.93
X28	Locomotion	8.5±0.64	8.75±0.94	9.75±0.99	13.75±1.14	8±0.96	13±0.78	14.5±0.78
X29	Balancing	12.75±0.7	13±0.78	14±0.87	15.5±0.77	12.5±0.87	14.5±0.78	15.5±0.73
X30	Pavlov Orientation	12.5±0.8	14.5±0.64	15.5±0.53	16.5±0.55	12.5±0.91	15.5±0.83	18.5±0.67
	Total Dysfunctional patterns:	43.3%	6.6%	3.3%	0%	46.6%	0%	0%

Legend:

blue	6-9.75 points	Dysfunctional
purple	10-11.75	Border between dysfunctional and functional
pink	12-13.75	Very low functional level
orange	14-15.75	Low functional level
yellow	16-17.75	Normal functioning

By April, after only two sessions of MNRI®:

1) 40% (12 reflex patterns; 14-15.75; orange) moved higher on the functional scale though still at a low level: Robinson Hands Grasp, Hands Pulling, Babkin Palmomental, Leg Cross-Flexion-Extension, Bonding, Automatic Gait, Head Righting, Trunk Extension, Galant, TLR, Spinning, and Pavlov Orientation.

2) 33.3% (10 reflex patterns; 12-13.75 points; pink) improved from dysfunctional to a very low functional level: Core Tendon Guard, Babinski, ATNR, Foot Grasp, Bauer Crawling, Moro, Spinal Perez, Flying and Landing, Grounding, and Balancing.

3) 20% (6 reflex patterns; 10-11.75; purple) moved to the marginal level between dysfunctional and functional: Abdominal Sleep Posture, Hands Supporting, Segmental Rolling, Landau, STNR, and Foot Tendon Guard.

4) only 6.7% (2 reflex patterns) were below 10 points (blue), remaining dysfunctional – Fear Paralysis and Locomotion (vs: 43.3% [13 reflex patterns] before MNRI® therapy).

The high number of reflex patterns reaching the functional level so quickly, along with observation of the children's behavior and communication, showed that they were moving toward a more positive future perspective. This was evident in their goals and their conversations about sports, creativity, games, and other activities. Before their first session in February many of the children presented a posture of withdrawal (core flexed and eyes down when speaking). They were visually and auditorily hyper-vigilant and very dependent on adults. Already following that initial treatment, it was gratifying to see them extended, growing taller (improved Trunk Extension Reflex), courageously making eye contact and smiling and joking at the end of the sessions. Similar changes were evident in the adults as well and were welcomed by the children. One boy told his father, "Dad, it is so great to hear you laugh again!"

Summary of Data

Newtown Table # 1 (below) summarizes the Assessment parameter results relative to clusters of reflex motor patterns governing specific functions.

Improvement in the direction and symmetry parameters was remarkably fast and stable, suggesting that MNRI® repatterning of the reflex circuit components was highly effective. The direction parameter is particularly significant in the MNRI® model. Regaining the norm in the direction of a reflex motor pattern means, theoretically, that self-regulation in the inter- and motor neurons (alpha and gamma) and links between sensory and motor neurons have been restored. In other words, the integrity of the reflex circuit has been reestablished. This is the central construct in Masgutova reflex re-patterning and integration. Assessment scores give us dry statistical data. Practically, the achievement of reflex pattern integration is seen in improved ability to focus, to be present, to regulate fear and emotional responses, and to experience inner peace, well-being, and joy. Such positive changes were clearly evident in the appearance and behavior of the Newtown children.

Three bar graphs at right show the gradual increase in scores of all 30 reflex patterns (X1-X30; 10 patterns in each graph) to the functional level. Blue columns on the left show the baseline scores from Assessments done in February 2013, 1½ months following the event, before any MNRI® treatment. Red (April), green (May/June), and yellow (October) show increasing improvement after each intervention.

Protective reflex patterns in neuro-typical children and children who experienced trauma

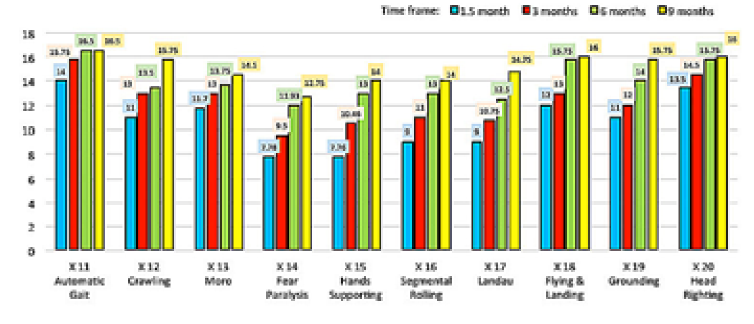
The Core Tendon Guard Reflex in the Newtown children before MNRI® was lower than in the 1989-2006 data from other children with post-trau-

Newtown Table # 1 **Reflex Pattern Profiles in Children with Post-Traumatic Stress Before MNRI® (Age 4-19; 122 children, Newtown)**

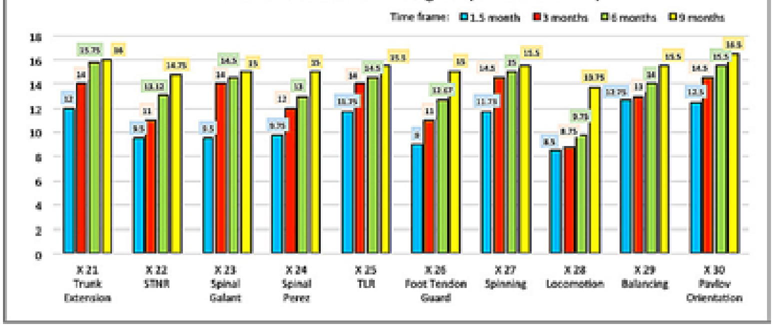
Assessment Parameter Results Clustered According to Specific Skills

#	Reflex Patterns/ Clusters	Parameters of Reflex Patterns – totals in %														
		Re-Activity			Direction of movement			Intensity (muscle tone)			Latency			Symmetry		
		Norm	Hyper	Hypo	+	–	+/-	Norm	Hyper	Hypo	Norm	Hyper	Hypo	+	–	+/-
1	Upper Limb	10.7	83.6	5.7	71.5	5.7	23.0	13.9	79.5	6.6	9.0	81.1	9.8	4.1	84.4	11.5
2	Tonic	13.1	80.3	6.6	43.4	26.2	30.3	14.8	59.0	26.2	13.9	61.5	24.6	3.3	94.3	2.5
3	Righting	17.2	77.0	5.7	47.5	10.7	41.8	15.6	79.5	4.9	27.9	68.9	3.3	18.9	71.3	9.8
4	Lower Limb	24.6	73	2.5	42.6	10.7	46.7	26.2	71.3	2.5	27.0	70.5	2.5	16.4	63.9	19.7
5	Gross Motor	38.5	27.9	33.6	64.8	5.7	29.5	26.2	68.9	4.9	30.3	48.4	21.3	18.0	78.7	3.3
6	Oral, Facial, Visual and Auditory	34.4	32.0	33.6	36.9	13.1	50.0	26.2	47.5	26.2	32.0	49.2	18.9	9.8	85.2	4.9
7	Protection and Survival	9.8	86.9	3.3	36.8	40.2	23.0	1.6	95.1	3.3	4.9	91.8	3.3	23.0	54.1	23.0
8	Curiosity/Cognition	42.3	39.5	8.2	43.3	33.0	18.8	42.3	31.1	6.6	60.7	29.5	9.8	31.3	68.9	9.8
9	Emotional Stability	14.8	85.2	0.0	37.7	42.6	19.7	13.1	83.6	3.3	13.1	72.1	14.8	23.8	53.3	23.0
	Average total	24.7	64.2	11.0	49.5	19.8	31.0	22.2	68.4	9.4	24.3	63.7	12.0	15.4	72.7	11.9

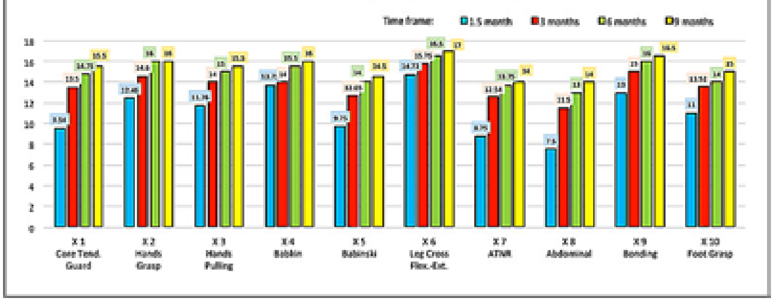
Newtown Graph # 2 **Dynamic of Reflex Pattern Profiles of Newtown Children (122) with Post-Traumatic Stress Experience before and after MNRI® Program (Pattern X11-X20)**



Newtown Graph # 3 **Dynamic of Reflex Pattern Profiles of Newtown Children (122) with Post-Traumatic Stress before and after MNRI® Program (Pattern X21-X30)**



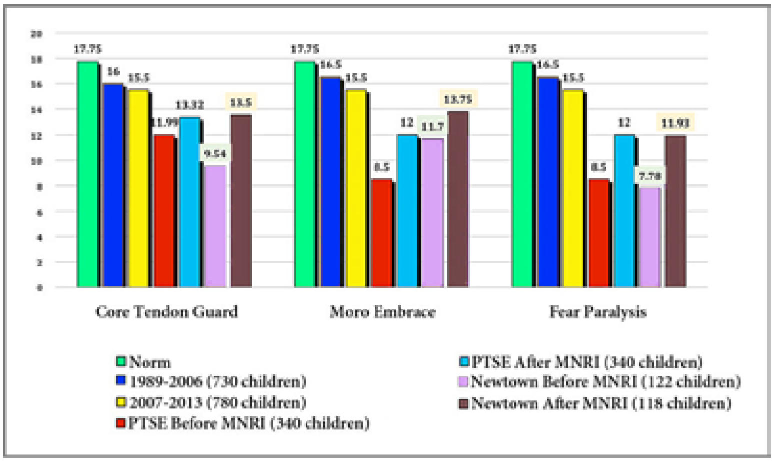
Newtown Graph # 4 **Dynamic of Reflex Pattern Profiles of Newtown Children (122) with Post-Traumatic Stress before and after MNRI® Program (Pattern X1-X10)**

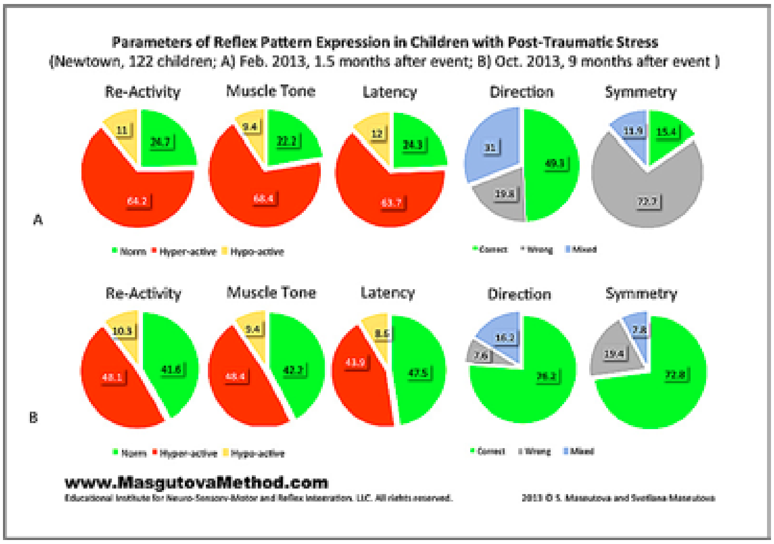


matic stress (9.54 vs. 11.99). The statistical significance of the assessment results equaled 0.51 for earlier group and 0.75 for the Newtown children (with p < 0.001). Moro in the Newtown children was higher (11.7 vs 8.5); statistical significance equaled 0.57 for the earlier group and 0.78 for the Newtown children (with p <0.001). Results for Fear Paralysis were similar for the two groups (7.78 vs. 8.5) with no statistical significance: 0.54 for the earlier group and 0.51 for the Newtown children. With some variation, data from our extensive worldwide collection, including Newtown, looking at reflex integration in traumatized children before and after the use of MNRI® indicate statistically significant positive growth and development for all.

Warning signals

Along with the excellent progress cited above, some warning signals are also apparent.





It is noteworthy that 9 months after the event, complete recovery had still not occurred for such reflex patterns as Fear Paralysis (12.75 points), Locomotion (13.75), Hands Supporting (9.75), ATNR (14), Abdominal Sleep Posture (14), Segmental Rolling (14), Babinski (14.5), and Landau, (14.5). Multiple interpretations for this can apply: 1) they were less integrated developmentally before the traumatic event, 2) these reflex patterns are more vulnerable when intense or long term stress takes place and 3) more regular and longer term work is needed for full post trauma recovery. All of these results indicate that early professional intervention is essential in trauma recovery work with children.

The pie charts at right show that reactivity, muscle tone, and latency/timing, which were hypersensitive and/or hyperactive immediately post-trauma, retain this tendency for as long as 9 months, even in children whose demeanor seems healthy and positive. This shows the importance of continuing the neuro-sensory-motor trauma recovery work beyond the time when the trauma might seem to be resolved, a year or even longer.

Early Intervention

Over 30% of children who came for MNRI® treatments 3 months or more after the shooting already showed signs of PTSD: hyperactive sympathetic responses in tests, sweaty palms, perspiring all over, dilating pupils, holding their breath, poor eye tracking, and startling or shaking/tremor during Fear Paralysis, Moro or Hands Supporting stimulation. They also reported tight muscles, insomnia, poor focusing at school, distracting memories, desire to escape others, and frequent crying or holding back tears. Some were already on medication because of more serious emotional issues. In contrast, children who came for reflex re-patterning before 3 months showed less hypersensitivity in protective reflexes, less rush of fear, more presence, clearer communication and reasoning, and more normal play and joking. This, along with the warning signals cited above, highlights the urgent need for early intervention.

Part 6

Discussion and Comments

The low levels of reflex integration observed in children and adults experiencing post-traumatic stress can lead to PTSD. When 35% or more of the reflexes we test are dysfunctional, we consistently find symptoms of other disorders. According to our research an average of 33.7% of these reflexes are dysfunctional in individuals diagnosed with PTSD. Thus the need for professional facilitation of reflex integration is urgent for anyone at risk for PTSD. In the Newtown children who experienced no work at the level of reflex systems in the interbrain and brain stem within 3 months of the event, slower dynamics of recovery with negative effects on the sympathetic nervous system (chronic hyperactive Fear Paralysis) were already present. The children who experienced MNRI® within 3 months of the event showed a faster return to functional or normal levels of reflex pattern expression, more normal sympathetic nervous system function, and a faster return to normal life.

Many other tools that were used for the Newtown survivors made a big difference, of course. The outpouring of professional and non-professional care provided healing, comfort, and support. Yet one missing piece must be acknowledged: the absolute need to address the unconscious involuntary physiology of positive survival and protection. The more we know about the reflexive responses involved in our protective and survival mechanisms, the more helpful we can be. It starts with 'low' brain technology, dealing with the HPA-stress-axis on the non-verbal level of tactile, proprioceptive, and vestibular processing. We must work with reflex patterns (units and keys for neurodevelopment), breathing (to physically take away the 'internal pressure' that all of our participants complained about), and the visual and auditory senses.

Although this article is limited to reflex patterns in children and does not address those of adults (our next planned article), it is interesting to mention the difference in expression in one particular reflex pattern. The children demonstrated hypo-activity for Hands Supporting, while their parents showed a hyperactive response mixed with Bonding. Instead of extending their arms straight they adducted as though encircling a child; it was quite obvious. Seeing this amazing manifestation of protection, survival, and need to protect the young was poignant. Our team members were in tears at the depth of the parents' impulse to save their dear children even though in shock themselves.

Feedback and support from participants in MNRI® sessions also touched us deeply:

"You are all angels." - A Sandy Hook father who was one of the first on the scene.

"I feel my feet on the ground and don't feel so lost." – A mom.

Deep sighs – A dad who hadn't been able to breathe since the event.

"I can't even tell you how happy I am I decided to try this. Thank you for coming!" - A mom.

"I feel like I can do what I need to do now." – A grandparent.

"Come back soon!" - a small boy as he left after his treatment session.

"Mom, they made my body feel so much better." – A boy.

"I'm a believer. This can help anyone. My blood pressure has been through the roof for the last couple months. I went to see my doctor yesterday right over there and my blood pressure was normal. I didn't believe it. I had them take it a second time." – A man arriving for his second appointment.

"I've been wanting to jump out of my skin ever since it happened. Now I'm comfortable." - A mom.

The concepts and statistics given here are not just neutral information for the author and the MNRI® team. These numbers represent the fallout from unbearable trauma experienced and lived through by the Newtowners who witnessed the unspeakable. This tragedy touched all of us personally and our goal for this report is to offer a method that can lead survivors of such dark events away from pain and despair, away from senseless loss and on toward inner peace, hopeful recovery, and a positive future. Our method is designed to promote neurosensorimotor reflex integration. Our success is measured not only by points in Assessments, but more importantly by deep restorative sleep, pain-free bodies, health, joy in the simple pleasures of life, confidence, resilience, and optimism.

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- *Chef Bob's Catering*
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– MNRI® Team

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Our deep thanks and gratitude to all the children and adults of Newtown for their trust in us as therapists and appreciation and enthusiasm of our PTSD Protocol. The genuine friendship of the children with their school peers and teachers was remarkable to see! We wish you all the goodness in the world. – The MNRI® Team