A Research Proposal for Evaluating the Utility of the Brain Score as a Newborn Screening Test

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Abstract

This article presents sound research methodologies that incorporate the testing and validation of the Brain Score as a screening tool at birth. These methodologies measure the Brain Score's reliability, reproducibility, and effectiveness in evaluating neonatal neurophysiology. The goal of this research proposal is to determine the efficacy of the Brain Score approach to improve the health of all neonates and mothers.

The primary hypothesis is that fetal and birth traumas may sow the seeds of chronic illness in children. As the genes imprint physical traits at conception, untreated trauma may also stamp newborns with chronic conditions for life. If the Brain Score proves to be an effective and reliable tool, it will alert professionals to at-risk newborns and indicate corrective craniosacral fascial therapy. We will prove this hypothesis by showing that treatment for newborns to mitigate the trauma from dystocia significantly decreases the incidence of many chronic diseases. We will also prove a secondary hypothesis that preventative therapy for mothers-to-be has a positive effect on neonatal neurophysiology.

Introduction

This research proposal investigates the utility of the Brain Score as a screening test at birth. We intend to use sound research methodology to measure its reliability, reproducibility, and effectiveness in evaluating neonatal neurophysiology. The goal of this research proposal is to determine the efficacy of the Brain Score approach to improve the health of all neonates and mothers.

The primary hypothesis is that fetal and birth traumas may sow the seeds of chronic illness in children. As the genes imprint physical traits at conception, untreated trauma may also stamp newborns with chronic conditions for life. Because clinical experience has shown this therapy to be corrective for children, toddlers, and infants with many conditions, the most logical step through inductive reasoning is to propose research methods to investigate the practice of the Brain Score as a newborn screening tool.

If the Brain Score proves to be an effective and reliable test, it will alert professionals to at-risk newborns and indicate corrective craniosacral fascial therapy. We will prove this hypothesis by showing that treatment for newborns to mitigate the trauma from dystocia significantly decreases the incidence of many chronic diseases. We will also prove a secondary hypothesis that preventative therapy for mothers-to-be has a positive effect on neonatal neurophysiology.

We have carefully observed that a restricted craniosacral fascial system for children appears to be pathognomonic for a wide spectrum of neurophysiological

illnesses. The following fifteen pediatric conditions that we treat span from the outer range of serious brain injury including autism, cerebral palsy, and epilepsy, to less severe nervous system diseases such as ADHD, strabismus, and reading (dyslexia) and speech disorders, to the more common pediatric illnesses of asthma, earache, colic, esophageal reflux, headache, rhinitis, neck ache, and scoliosis.[1]

Problem Statement

Children with many chronic diseases maybe falling through the cracks of the health care system today because of the lack of central nervous system assessment at birth. The Apgar score is the time tested standard to quickly measure the vital signs (skin color, heart rate, reflex irritability, muscle tone, and respiration) to bring forth life, but lacks the parameters to effectively assess neonatal neurophysiology.

Since no one now or in the foreseeable future can totally control fetal and birth traumas, we propose the research evaluation of the utility of the Brain Score as a neonatal screening test. The primary rationale for this research is that if the Brain Score approach is successful, it can provide the missing neurological evaluation and treatment procedures to significantly reduce the incidence of many chronic conditions in children.

Literature Review

For over one hundred years, the cranial osteopathic profession has recognized the relationship between birth trauma and many of the previously mentioned diseases.[2] In 1899, William Sutherland D.O. pioneered the field by discovering a mechanical model involving the brain's slight "breathing" and cranial bone movement.[3] In 1902, Andrew Still D.O., the founder of osteopathy, stated that "the cerebrospinal fluid is the highest known element that is contained in the human body, and unless the brain furnishes this fluid in abundance, a disabled condition of the body will remain".[4] At the end of Sutherland's career in the 1950s, his model shifted to one of an indirect cerebrospinal fluid potency, where the "Breath of Life" was the primary mover of the system.[5, 6]

Beryl Arbuckle D.O. in 1948 discussed the cranial aspect involving emergencies of the newborn.[7] In 1954, she also reported on the effects of uterine forces upon the craniosacral system of the fetus.[8] In a clinical study of 1250 newborns Viola Frymann D.O. found in 1966 that almost 90% of the neonates had craniosacral restrictions; only 10% had normal motion.[9] This landmark study showed the connection between fetal/birth trauma and the function of the central nervous system in a significantly large number of normal births.

Rachel Woods D.O. stressed the importance of osteopathic manipulation to mitigate the effects of birth trauma for newborns and mothers in 1973.[10] In 1976, Dr. Frymann recommended osteopathic treatment in infancy for the prevention of future learning difficulties.[11] Harold Magoun Sr. D.O. that year also reported many positive pediatric case reports with many of the previously mentioned diseases in his classic cranial osteopathic textbook.[12] In 1983, John Upledger D.O. discussed the successful resolution of many chronic conditions for children with craniosacral therapy.[13]

According to John Barnes, P.T., the fascial component of the craniosacral fascial system consists of a full body web of connective tissue that intertwines and infuses with

every structural cell including nerves, muscles, blood and lymph vessels, organs, and bones and connects everything in the body.[14] He further defined fascia as having three anatomical layers: the subcutaneous layer just below the epidermis, the deeper layer enmeshing with the above structures, and the deepest layer as the dura of the craniosacral system.[14]

He found in the 1970s that trauma strained the fascial system, leading to many different symptoms and illnesses.[14] These strain patterns can pull anywhere in the body, including most importantly the cranial structures, mandible, and sacrum, at up to 2,000 pounds per square inch.[15]

The Craniosacral Fascial System

The craniosacral fascial system is an integration of the craniosacral and fascial or connective tissue components.[16] Anatomically, the gently moving brain and spinal cord send off nerve branches throughout the body's tissues. The cerebrospinal fluid starts its journey in the choroid plexus of the ventricles, gently fluctuates through the craniosacral system, and flows within these cranial and spinal nerve sheaths out into the billions of fine collagen tubules of the fascial component.[17] Researchers have confirmed a unified system by discovering cerebrospinal fluid in these tubules with surprisingly no ordinary ground substance, blood, or lymph present.[18]

The two major premises of the craniosacral fascial system are that the brain has to "breathe" to function well, and the fascia has to be free for optimal body physiology.[16] The fascia has two very important qualities: it holds all of the remembered and forgotten traumas of the body[14], and it can pull on the cranial and sacral structures at up to 2,000 pounds per square inch.[15]

Trauma can upset normal neonatal neurophysiology. Fascial strain can result from having spent nine months in a confined space; a multiple birth, creating a premium for space, may have also been a factor. The cranium wedged into the pelvis for an extended period of time, a difficult ride through the birth canal, and/or a forceps or a vacuum assisted delivery may cause additional strain in the system.

Therapy can help the body release these traumas individually, like peeling the layers of an onion.[1] For children and adults emotions may surface in the mind-body connection, but the only concern for newborns can be the physical aspect of the gestation and birth. Fortunately, neonates have a very tiny onion.

Research Methodology

The goal is to prove that the Brain Score is an effective, reproducible, and reliable screening test for newborns. The objective is to prove the primary hypothesis that the administration of the Brain Score is effective in helping children to prevent conditions resulting from fetal and birth traumas, which sow the seeds of chronic illness. These diseases are asthma, earache, headache, colic, esophageal reflux, neck ache, scoliosis, rhinitis, ADHD, strabismus, reading and learning disorders, autism, cerebral palsy, and epilepsy. Another objective is to prove the secondary hypothesis that preventative therapy for mothers-to-be has a positive effect on neonatal neurophysiology.

The research design will consist of three stages, each building upon each other. The first stage will test the reliability and reproducibility of the Brain Score with a group of birthing professionals and neonates. If this initial testing proves to be successful, stage two will commence where the Brain Score will prove if prenatal maternal craniosacral fascial therapy is effective for the improvement of neonatal health. If the results of this small study prove to be positive, the final phase, involving a large population, will prove the effectiveness of the Brain Score approach in preventing the above-mentioned fifteen diseases.

The following general principles apply to each of the three stages. Since the Brain Score is intended as a global screening test, the study populations will include representation from five continents (North America, South America, Europe, Asia, and Australia). Each birthing professional team will present at a hospital setting and consist of at least one physician, at least one nurse, and possibly a midwife and doula. They will participate in standardized training on the application of the Brain Score in such a manner as to validate its use and effectiveness. The Brain Score will be paper-based to meet the portability requirements of the diverse clinical settings.

The patient population will consist of healthy women of childbearing age and their neonates. The birthing professionals will screen them for potential participation in the protocols. Following the protocol flow charts they will obtain informed consent, review inclusion/exclusion criteria, collect the medical history, perform a physical exam, collect vital signs, review prior and concomitant medication, review adverse experiences, perform craniosacral fascial therapy, and provide therapy report cards. They will also educate mothers-to-be as to the risks and benefits of the application of the Brain Score on their newborns.

Stage one: The first phase addresses the following two questions: Will different examiners have similar pre and post therapy Brain Scores for the same neonate? Will the Brain Scores improve consistently after craniosacral fascial therapy?

The first question directly attends to the issue of the technique being practitioner dependent. The goal is to prove a uniform consistency of provider scoring. Fifty births on each of the five continents will be included in this study for a total of 250 births. Two birthing teams in one hospital per continent will attend the births (approximately twenty-five births per team).

The providers will do the Brain Score at each birth before therapy and compare their results for similarity. When they have completed therapy, the Brain Scores are again compared for similarity. With a minimum of two providers per birth to create a valid comparison, the statistics of this testing will determine the reliability and reproducibility of the Brain Score.

The second question addresses whether craniosacral fascial therapy consistently alters the value of the Brain Score. The goal is to prove that the Brain Score improves significantly as a result of treatment. The averages of the pre and post treatment Brain Scores for the 250 neonates will be compared. Statistical significance of improvement will determine the effectiveness of the Brain Score and lay the groundwork for the next two research stages.

Stage two: The second phase addresses the question: Will the Brain Score and neonatal neurophysiology improve consistently if the mother-to-be has therapy before the conception and during her pregnancy, if needed? The hypothesis is that the strains of

maternal trauma present before the conception can be passed on to the newborn at birth. The goal will show that the maternal physical structure holds the key to neonatal neurophysiology.

This research will include one hundred mothers (fifty with no craniosacral fascial treatment and fifty with treatment) at each of the same five hospitals for a total of 500 mothers. The control group of 250 mothers will have no treatment before conception and the variable group of 250 mothers will have complete therapy before conception. The treated mothers will only seek additional therapy if they have accidental trauma before their delivery.

At the 500 births the providers will do the Brain Score for each child. The average initial Brain Scores of the neonates from the control group will be statistically compared to the average initial Brain Scores of the neonates for the treated mothers' group. This will prove how therapy for mothers-to-be positively affects neonatal neurophysiology.

Stage Three: The third phase addresses the important final question: Will the Brain Score and subsequent craniosacral fascial treatment at birth change the clinical outcomes of children for each of the following fifteen conditions: autism, cerebral palsy, epilepsy, ADHD, strabismus, reading and speech disorders, asthma, earache, colic, esophageal reflux, headache, rhinitis, neck ache, and scoliosis? This research goal will prove a varied, but statistically significant, decrease in incidence for each of these fifteen diseases.

To have statistically significant results, 10,000 neonates, 2,000 from each of the five continents, will participate. This may seem like a large sample, but it only represents about one in 7,000 global births (.014%) for one calendar year. This large sample number is required to make the rarer diseases like cerebral palsy (10/5,000), scoliosis (20/5,000), autism (35/5,000), strabismus (50/5,000), and epilepsy (125/5,000) more statistically significant for each group. The remaining ten conditions are commonly found in the world population.

To gather the required numbers of neonates, additionally trained hospital birthing staffs will be needed on each continent. The 10,000 newborns would be divided into two equal groups:

GROUP ONE: The control group - 5,000 neonates (1,000 from each continent) born without the use of the Brain Score and subsequent treatment.

GROUP TWO: The variable group - 5,000 neonates (1,000 from each continent) born using the Brain Score and having treatment until the final Brain Score reaches the 8-10 point range, depending on the criteria of the wrapped umbilical cord.

If the cord is not wrapped around the body, the goal of the final Brain Score will be a 10. If the cord is loosely wrapped once around the throat/body, the goal of the final Brain Score will be a 9. If the cord has multiple throat/body wraps or tightly wrapped around the throat/body, the goal of the final Brain Score will be an 8. If the providers do not reach the numerical goal within one week after birth, therapy will cease for the duration of the study for all children regardless of the final Brain Score.

At the five and ten-year anniversary marks the parent(s) or guardian(s) will be contacted to record by a charting method the incidences of each of the fifteen diseases. The tabulated outcomes will statistically determine the effectiveness of the Brain Score approach on a global scale.

Brain Score Methodology

The Brain Score consists of the following four parameters: the brain cycle, the sacral cycle, the shape of the head, and the presence or absence of the umbilical cord wrapped around the throat and/or body. Since no one can decipher at birth who will contract any of the previous fifteen conditions, the Brain Score may strongly indicate that a newborn with a low mark can be significantly more susceptible.

With treatment this child may have a much greater potential to regain normal neurophysiology, prevent a condition(s) in childhood, and become a healthier adult. In addition, his/her ability to think and focus in life can markedly ameliorate with this approach. It is important to remember that the Brain Score is solely an indicator as a screening test and cannot predict the future health of any child.

Trained physicians, nurses, midwives, and doulas can perform the Brain Score directly after the final Apgar score, and again after they have completed craniosacral fascial therapy to re-evaluate the child. Since central nervous system problems requiring the NICU can develop very quickly after birth, it is imperative that the provider performs the Brain Score as soon as possible.

Professionals can routinely use the Brain Score for healthy term births. The attending physician would have to use her clinical judgment as per treatment for the following medical conditions: preterm infants and infants with congenital birth defects, severe birth trauma, birth asphyxia, respiratory distress syndrome, and other similar situations. Even though a neonate may be severely physically distressed, the critical aspect of his ultimate healing may be the actual jump-starting of his central nervous system with therapy.

Since many factors are involved in a compete evaluation of a newborn's neurophysiology, the Brain Score, like the Apgar score, is by nature as a screening test incomplete. But at the critical moment of birth, like the Apgar score, it quickly gives the birthing professional a general assessment of neurological homeostasis. Even though it may take years of specialty education and clinical practice to discern the subtle nuances of the entire craniosacral system, trained students have learned to perform the Brain Score in seconds. A specialist can evaluate the whole system completely, if needed, at a later time.

Palpating the motion of the brain and sacral cycles can be highly practitioner dependant.[19] One provider may feel an eighteen second cycle and the next person may palpate a twenty-six cycle on the same newborn. Fortunately, the precise timing of the cycles is *not* a critical factor in the Brain Score. Their main purpose is to immediately identify the severely restricted neonate who is facing a challenging lifetime without treatment. The paradoxical beauty of a zero cycle is that there can be no palpation discrepancy for any provider; nothing is moving.

Since poorly applied therapy may further compromise a vulnerable newborn, correct technique is a necessity. Treatment is very gentle with *no* force applied; the central nervous system is very fragile and still developing at birth. If the neonate has not positively responded to this therapy within the first hour of life, a specialist must evaluate the child.

The Brain Score Components

The brain cycle: The brain cycle is the amount of seconds that the brain inherently moves in one expansion phase and one contraction phase. The provider can feel and time the two phases of the cycle with her hands on the side of the newborn's head. Generally, the longer the brain "breathes", the better the central nervous system functions.[16]

Six cranial parameters effectively measure the quality of brain motion. The amplitude or the breath of movement, the speed or how fast the brain is moving, and the acceleration from a cycle end position are important factors. The motion must be smooth and not sluggish or ratcheting, and the cerebral hemispheres need to be moving in synchronicity. Finally, if the provider applies some medial pressure to the hemispheres, the brain should have the inherent power to quietly move through it.

As the provider helps to release the strain from trauma in the surrounding dura and associated fascia, all six of these aspects can dramatically improve as the brain "breathes" in longer cycles. With all factors considered, the brain cycle is the best indicator to monitor the function of the craniosacral fascial system.

The question of the appropriate length of a "normal" brain cycle often arises in clinical practice. Researchers have not determined a specific "normal" value by age, sex, or other criteria; it can clinically vary from individual to individual and from moment to moment as the central nervous system reacts to the changing internal and external body environments. Upon completion of craniosacral fascial therapy, one can expect the neonate's brain cycle to easily be more than fifty seconds (twenty-five seconds in brain expansion and twenty-five seconds in brain contraction). Liem and others have recently reported brain cycles in the range of three hundred seconds.[20]

With our experience in the field of brain-injured children, we have come to anticipate the cycle for untreated grown children with autism, cerebral palsy, and epilepsy to be zero or "locked down". If we assume this zero cycle was present at birth due to a specific brain injury, the exceptional benefit of neonatal therapy is that the body's ability to heal most effectively can begin *immediately*.

A zero brain cycle can indicate that children may not only be predisposed to serious neurological compromise but much more commonly to a host of other pediatric conditions such as colic, reflux, and asthma. Thus, a zero cycle does *not* necessarily lead to the very few children who may develop autism, cerebral palsy, and/or epilepsy. Each component of the score and Brain Score itself have *no* diagnostic value since only a medical doctor can identify the true nature of a disease after a careful evaluation of many other factors.

For grown children with less severe brain conditions such as ADHD, strabismus, and reading (dyslexia) and speech disorders, there may be minuscule brain movement with an anticipated brain cycle of zero to four seconds. Children with the more common childhood diseases such as asthma, earache, headache, rhinitis, esophageal reflux, neck ache, colic, and scoliosis may have more brain motion in the zero to eight second range. Brain cycle values can vary due to individual circumstances, and many children may also have more than one illness.

The sacral cycle: The provider palpates the sacral cycle by holding the sacrum and timing the flexion (brain expansion) and extension (brain contraction) phases of the cycle in seconds. In the central nervous system the sacrum moves with the brain in

synchronicity through the dural tube, which surrounds the spinal cord and can slide about ten to fifteen millimeters.

Since the body's fascia is interconnected, strain in one distant part can cause symptoms elsewhere by disrupting normal neurophysiology. This is a different way of looking at symptoms and disease. Thus, trauma to the pelvic fascia in utero and/or at birth may diminish the neonatal sacral cycle, which can create a drag through the dural tube, limit the brain motion, and result in chronic headaches.

The shape of the head: Children's heads need to be as symmetrical as possible to create the most favorable environment for excellent neurophysiology. The cranial base, formed by the occipital, sphenoid, frontal, and temporal bones, requires openness. This allows normal brain motion and the twenty-four cranial nerves and their covering dura to physiologically pass through their respective foramina. The cerebrospinal fluid of the craniosacral system can then flow unhindered by impingement to the fine collagen tubules of the head and neck fascia.

Because of their need to overlap to pass through the birth canal, the cranial bones are primarily composed of malleable cartilage and membranous tissue. If a torqued maternal pelvis engages the fetal head for an extended period of time or if doctors use forceps or vacuum suction to assist in delivery, neonates can present with distorted craniums or cone-shaped heads. Doctors and therapists may fabricate headgears to help return their craniums to normal symmetry.

The provider can observe the shape of the head, but many children have an unnoticeable but still palpable asymmetry where the bones on one side of the cranium are internally or medially rotated, and the bones on the other side are externally or laterally rotated. The smaller facial bones forming the eyes, nose, and jaws usually follow the same distorted pattern in palpation. Less commonly, the bones may be bilaterally internally or externally rotated.

After the first visit of therapy, the distorted larger cranial bones with smooth rounded edges and open connective tissue fontanels and sutures can dramatically shift to a freer, more balanced position. Symmetry becomes much more difficult to achieve for adult patients because the ossified bones are fully-grown with closed fontanels and sutures with serrated edges, which form by the age of five or six. Thus, five minutes of therapy with a newborn may be more corrective than twenty hours of therapy with an adult.

The umbilical cord wrapped around the throat and/or body: The provider makes this assessment by observation during the delivery. Some children are born with the cord wrapped once or many times around their throat and/or body. Strain in the critical throat area may induce asphyxia, and the birthing team must quickly intervene to save their lives.

Once the newborns are stable, a compromised brain score will necessitate therapy to release their hidden throat fascial strain; this pressure directly affects the quality of breathing, speaking, and swallowing and indirectly compresses the vagus (X) nerve. This nerve innervates the organs responsible for swallowing, speaking, breathing, maintaining heart rate, and digestion. Without corrective therapy, asthma, esophageal reflux, speech defects, swallowing disorders, and irritable bowel syndrome, may plague these children for a lifetime.

The Brain Score Table

Please note: Because of its neurophysiological importance, the brain cycle is taken once but counted *twice* to form the five components of the Brain Score.

5 Components	0 Point Value	1 Point Value	2 Point Value
The brain cycle	0-4 seconds	5-50 seconds	51 plus seconds
The brain cycle	0-4 seconds	5-50 seconds	51 plus seconds
The sacral cycle	0-4 seconds	5-50 seconds	51 plus seconds
The head shape	Distorted	Slightly asymmetric	Symmetrical
The umbilical cord wrapped around the throat and/or body	Yes, tightly around the throat/body or multiple loose throat/ body wraps	Yes, once loosely wrapped around the throat or body	No, the umbilical cord is not wrapped around the throat or body

Similar to the successful Apgar method, the provider measures the Brain Score from 0-10 points, zero being the worst score and ten being the best score. Each of the five components of the Brain Score has a zero, one, or two-point value. The zero-point value indicates a serious problem, the one-point value a moderate problem, and the two-point value acceptable neurophysiology. Because of the greater importance of the brain cycle component in clinical neurophysiology, the provider counts that point value twice and then tabulates all of the point values for the Brain Score.

The brain and sacral cycle point values are dependant on the number of seconds of each cycle. A cycle of four seconds or less denotes a zero-point value. One that falls between five and fifty seconds records a one-point value. A cycle greater than fifty seconds indicates a two-point value.

If the shape of the head is blatantly distorted on visualization or palpation, the provider notes a zero-point value. A cranium on palpation that is slightly asymmetrical where the large bones are in internal or external rotation gives a one-point value. A symmetrical head indicates a two-point value.

If the umbilical cord is tightly wrapped or has multiple loops around the throat or body, the provider gives a zero-point value. The cord wrapped loosely once around the throat or body indicates a one-point value. The cord not wrapped around the throat or body denotes a two-point value.

As a statistical baseline in her 1966 clinical study, Frymann found that only ten percent of the newborns were healthy, eighty percent had moderate craniosacral strain patterns, and ten percent were severely restricted.[9] If one extrapolates that concept to the world population, the Brain Scores would be expected to form a bell-shaped curve with most newborns falling into the eighty percent middle point range with the healthy and seriously restricted ten percent at the end ranges.

The clinical interpretation of the Brain Score may possibly indicate the child's predisposition for potential disease and thus the requirement for craniosacral fascial therapy: some fine-tuning in the healthy 9-10 score range, more help in the 5-8 moderate score range, and a lot of treatment in the seriously restricted 0-4 score range.

The Brain Score's Significance

In this hypothesis the Brain Score can act as a beacon to monitor the initial function of the central nervous system and a harbinger to mandate correction to improve overall health. Without treatment an infant with a low score may be more prone to contracting many chronic diseases that can start in childhood and last a lifetime.

As a clinical case study, a hypothetical boy born to a nulliparous woman somewhere in the world today has normal fetal development and delivery, great Apgar scores in the 8-10 range, and a healthy appearance. But his neurological health may be severely compromised with a Brain Score of two with no one present to administer corrective therapy.

Latent meningeal strain from fetal and/or birth trauma may create physical pressure on specific areas of his brain and/or cranial nerves (I-XII). This dural tightness may impair his brain's normal functional activity and pumping ability, affecting the flow of nourishing cerebrospinal fluid into his cranial and spinal nerve sheaths that terminate in the fascial component.

This physical injury may also have traumatized his full-body web, possibly backing up the fluid system and indirectly causing additional tightness to his cranial, dural tube, and sacral components. In this hypothesis the cumulative effects of this unresolved trauma may play out in time through the malfunction of his cranial nerves and/or brain in the following childhood scenario.

Cranial Nerve Impingement Conditions

He may soon have trouble with newborn suckling due to pressure at the base of his occiput (hypoglossal XII) affecting the motor function of his tongue. He may be colicky in the first few months of his life because of osseous pressure at the jugular foramen (vagus X) creating digestive disturbances and/or sacral pressure causing painful fascial strain around his intestines in his abdominal cavity.

If this same fascial pressure extends superiorly into his upper alimentary canal, doctors may diagnose him with esophageal reflux. In extreme situations he may also either have torticollis (spinal accessory XI) with the affected sternocleidomastoid muscle or loss of vision (optic II) due to dural pressure in the optic canal of the sphenoid bone.

Commonly, earaches may set in before the age of one due to temporal bone misalignment and strain (vestibulocochlear VIII). Ensuing blockage of the Eustachian or auditory tubes may allow harmful bacteria to proliferate in the middle ears leading to chronic ear infections. As a toddler he may contract strabismus (oculomotor III, trochlear IV, and abducens VI) because of facial birth trauma involving strain in his eyeball and surrounding orbital fascia and/or misalignment of the seven bones of his eye (frontal, zygoma, maxillary, lacrimal, ethmoid, palatine, and sphenoid).

He may develop swallowing (glossopharngeal IX and vagus X), taste (facial VII), speech difficulty (vagus X and hypoglossal XII), and asthma (vagus X) by the age of four because of constant throat fascial strain. Today the medical model may regard all of the above illnesses as "routine" for children whose only hope for improvement is to "grow out of it."

Later a doctor may diagnose him with ADHD and headaches (trigeminal V) when his first grade teacher says that he cannot sit still and concentrate in school. Fascial strain and misalignment in his sphenoid, maxillary, ethmoid, vomer, and inferior nasal concha bones may cause sinus blockage and rhinitis (olfactory I) later in grade school.

As his craniosacral fascial system tightens with the typical boyhood traumas, he may develop neck aches and a scoliotic pattern. Strained cranial dura against the hard parietal bones may squeeze the sandwiched middle mengineal arteries causing his migraine headaches (trigeminal V) as he starts to clench and brux his teeth (trigeminal V) at night.

He may have developed a tongue thrust (hypoglossal XII) from his initial uncorrected birth-suckling condition that has now manifested into dental malocclusion. If orthodontic treatment with bands and arch wires, elastics, and possibly a headgear commences to correct his occlusion, his craniosacral fascial system may tighten more or even "lock down" to a zero brain cycle as a result of the restrictive dental forces applied at every five-week visit. Since orthodontic care usually lasts a minimum of two years, the effects on his central nervous system may be profound by exacerbating any of the above illnesses.

After orthodontic treatment is complete, he may also wear a maxillary retainer, which may continue to restrict his craniosacral fascial system, to hold his teeth in place. If the orthodontist has not addressed his original tongue thrust condition, his teeth may relapse after active therapy requiring complete retreatment, much to the financial dismay of his parents.

In summary, these childhood conditions may continue to plague him for the rest of his life. If a birthing provider had taken his Brain Score and had followed with therapy, and pediatric professionals had monitored his craniosacral fascial system every year as a part of his routine wellness care, none of these diseases would have likely manifested.

Traumatic Brain Injuries

He may have physical pressure on his medulla oblongata causing significant problems with his cranial nerve function, basic breathing, and CO_2/O_2 receptor reflex. In addition, many of his primary reflexes, such as his birth cry, tonic neck reflex, Moro startle reflex, grasp reflex, and Babinski reflex can be nonfunctional or delayed. Damage may have occurred in his pons causing critical basic awareness issues in feeling pain, visual tracking, facial expressions, and chewing. With these injuries doctors may diagnose him with cerebral palsy.

If he has an injury in his midbrain area involving the aggregate of his basal ganglion (putamen, substantia nigra, caudate nucleus, globus pallidus, and subthalamic nucleus), cerebellum, thalamus, and/or hypothalamus, he may present with moderate to severe difficulties with his basic metabolism, convergence of vision, eye muscle function (strabismus), creeping on his hands and knees, hearing and locating sounds, and expressing emotional content of language. Doctors may diagnose him with ADHD if he is injured in the sensory areas of his midbrain.

If he is hurt in his limbic area involving his amygdala, hippocampus, fornix, stria terminalis, cingulate gyrus, mamillary bodies, and/or frontal lobe, physicians may diagnose him with autistic spectrum disorder. This may cause him to have difficulty

making visual contact, being curious, relating to others, transitioning between situations, regulating emotions, working with others, and delaying gratification. He may also have trouble with short-term memory, fight or flight responses, and appropriate sexual conduct. He may characteristically display emotional disconnection, sensory disintegration, difficulty in concentration, and cortical disorganization.

Doctors may diagnose him with dyslexia if an injury occurs in his cortical area involving the auditory and visual pathways. This injury can prevent him from receiving and processing information properly, leading to problems in writing, memorizing instructions, and using language effectively. If he fails to achieve cortical dominance, retrieval issues in reading comprehension and speech conditions such as stuttering can also occur.

If he has seizures and/or convulsions due to a cortical birth injury, physicians may diagnose him with epilepsy. Chronic hypoxia, poor internal absorption, toxicity, allergies, mineral and vitamin insufficiencies, hormonal imbalances, and fever from an illness can also be causative factors.

In summary, neonatal brain injuries can take a great toll on the individual, family, and society. If a provider had taken his Brain Score and implemented therapy at birth, and professionals had initiated therapeutic care at the first clinical signs of a neurological problem, one would have expected the most positive possible outcome for him and his family.[21]

Craniosacral Fascial Philosophy

The rationale for therapy is to manually help the newborn relieve the craniosacral fascial strain patterns that may cause many future conditions. McPartland and Skinner report that you must reawaken the intuitive and instinctual aspects of your mind to realize that the body in its innate wisdom knows best how to heal itself.[22] That concept shifts your responsibility from the scientifically knowing, analyzing, and fixing mode to the role of simply facilitating the body to heal itself.[16] This theory is also in harmony with Jealous' realization that treatment results improve proportionately as you let go of your rational mind.[23]

Magoun describes this general treatment principal beautifully: "The operator does not do the actual correcting. He merely holds the mechanism in whatever position is most favorable for the innate forces within the body, such as the pull of the meninges or the fluctuation of the cerebrospinal fluid, to restore normality." [24] Becker correspondingly adds: "The inherent capacities of the body will more readily assist the physician in the correction of the traumatic patterns." [25] Sutherland's philosophy also concurs by using no force in treatment and making no attempt to fix or manipulate any structure.[26]

To distinguish craniosacral fascial therapy from other approaches, the craniosacral system is fully enmeshed in and ultimately an important part of the full-body fascial web.[14] If this web is traumatized at birth, it can strain the craniosacral structures at up to 2,000 pounds per square inch[15], altering the neonate's neurophysiology.

Conventional craniosacral treatment can gently begin to open the mechanism to a "normal" cycle range of six to ten seconds.[12, 13] Not until you unleash the strains in the fascial web, which remembers all past traumas, can the entire craniosacral fascial system

open up to a cycle of one hundred seconds or more. When you add this powerful dimension to craniosacral work, we believe that the greatest chance for health exists.

The Clinical Setting

The birthing period can be the perfect time for this treatment since the mother and child are readily available for extended therapy, and the tiny body can correct quickly without dealing with a lifetime of physical traumas, emotional issues, and dental work. The newborn can also present a unique window of opportunity because membranous tissue and cartilage, which are more malleable and flexible than bone, now make up the cranium. Within a period of months these tissues will become more calcified and less workable.

This is also a great chance to start the correction of the craniosacral fascial strain in the mother's pelvis and rest of her body from dystocia, epidural anesthesia, cesarean section, episiotomy, and/or other traumatic procedures. The trauma of the birth may have restricted *her* craniosacral fascial system and predisposed her to postpartum neurological conditions like low back pain, migraine headache, and depression. Since the mother can be the key element in the birthing equation, effective treatment now can result in a higher Brain Score and better neurophysiology for her next newborn.

In a Perfect World

In this supposition the contemplating mother-to-be will have complete therapy before conception to give birth to a neonate with a higher Brain Score. The pituitary area of the brain is important in the birthing process. Anatomically, dural strain of the diaphragma sellae from trauma can apply direct pressure to the blood vessels around and the 50,000 fibers of the vulnerable infundibulum and restrict the transmission of neurohormonal messages from the hypothalamus to the pituitary gland.

Treatment will maximize the function of her endocrine system, which is responsible for regulating the birthing process from the formation of her oocytes to the milk secretion of her mammary glands. Specifically, the anterior lobe of the pituitary gland fabricates the follicle-stimulating hormone (FSH), luteinizing hormone (LH), and prolactin (PRL), and the posterior lobe stores and releases oxytocin. Craniosacral fascial therapy can also be effective to initiate fertilization for some infertile women.

Before conception she will mitigate any abnormal pelvic strain that can cause her suffering during the pregnancy and/or at the labor. At the same time she will have avoided the possibility of passing these strain patterns on to her vulnerable fetus. With her improved physiology, she will also increase her chances of having a natural birth. If she has any physical trauma during gestation, you will help her release that strain pattern. She will also live a healthy lifestyle and seek appropriate medical care as needed in preparation for the birth.

We will prove the hypothesis that under these ideal conditions the neonate will have a higher Brain Score and better neurophysiology. The mother will have a less painful and complicated natural birth with the newborn experiencing fewer traumas. Both mother and child will also require less corrective therapy. When you connect all the dots of this postulation, the root of many common childhood diseases such as asthma, ADHD,

earaches, headaches, and learning disorder appear to arise from birth but are ultimately caused by the lack of structural homeostasis of the contemplating mother-to-be.

Craniosacral Fascial Treatment

Treatment is strongly predicated on clearly "listening" to the craniosacral fascial strain patterns that the little body presents and trusting that she knows best how to heal herself.[22] Can you put aside your ego and let go of your thinking, analyzing, controlling, scientific mind?[23] Can you trust that the motion you are feeling is true? Similar to the Tao philosophy, can you *just be* in the present moment to facilitate the newborn's healing? This mindset is just as important as any manual technique.

The clinical approach adds that fascial dimension to the craniosacral modality. For example if you have completed the compression of the fourth ventricle procedure[12, 13] of an adult patient and are gently following sphenobasilar flexion and extension, quietly feel for any fascial strain pulling on the occiput. If that bone starts to slowly move in any direction, follow that fascial strain pattern traversing into the neck and possibly down into the trunk of the body. The fascia will tighten in its strain pattern, reach a still point, and then the entire craniosacral fascial system will release.

In the same manner for the neonatal technique, let her occiput rest in one hand and her sacrum in your other hand. Quietly "listen" for any fascial strain pulling on either or both bones, and carefully follow their strain patterns. You may also feel strain between your hands in her spinal cord or core link[22] area that is creating a twisting or tumbling effect. Remembering her earlier gestation, labor, and delivery traumas, she is starting to heal through a craniosacral fascial unwinding process. Neonatal therapy becomes a whole body event.[4, 16, 22, 23, 26, and 27]

Birthing professionals have reported that treatment replicates the physical strains of birth. In other words the fascial unwinding reproduces the observed trauma of delivery in reverse. If the fetal cranium was trapped in the mother's pelvis in a certain position for example, more time was needed for the complete release of that compressive trauma. This observation is consistent with Barnes' philosophy that the fascia remembers.[14]

As you reach a still point in her system, her structures can release. Her brain and sacrum can now open to a longer cycle, reflecting a higher Brain Score. After allowing a few minutes for homeostasis as she acclimates to her new neurophysiology, repeat this procedure. At completion her fascial system may be quite relaxed with her appendages limp. Retake her brain score to evaluate the effectiveness of therapy and reassure her parents. The expectation is a final perfect score in the 8-10 range, depending on the original unchanging umbilical cord point value.

The clinical goal of craniosacral fascial therapy is for the cranial, dural tube, and sacral structures to be moving freely and in synchronicity, while quietly sitting in a fully unwound fascial web.[16] The central nervous system can now function optimally, resulting in a high Brain Score and the ultimate goal - a healthy foundation to begin life.

Summary

Research in evaluating the use and efficacy of the Brain Score as a neonatal screening test is clearly indicated. When this research proves the Brain Score to be an

effective, reproducible, and reliable tool that consistently provides early detection and intervention, we will have met our ultimate goal of helping neonates and mothers around the world to become healthier and happier.

References

1. Gillespie, B. Healing Your Child. Philadelphia: Productions for Children's Healing, 1999.
2. The Sutherland Cranial Teaching Foundation. As the Twig is Bent. Teaching unit of the Cranial Academy, Fifth Printing, 1983.
3. Sutherland, W. The Cranial Bowl. Mankato, Minn: Free Press Company, 1939.
4. Still, A. The Philosophy and Mechanical Principles of Osteopathy. Kansas City: Hudson-Kimberly Publishing Company, 1902, page 39.
5. Sutherland, W. Contributions of Thought. Kirkland, Mo.: The Sutherland Cranial Teaching Foundation, 1967.
6. Sutherland, A. With Thinking Fingers. Kirksville, Mo: Journal Printing Company, 1962.
7. Arbuckle, B. The cranial aspect of emergencies of the newborn. *Journal of American Osteopathic Association* 1948; 47(9): 507-510.
8. Arbuckle, B. Effects of uterine forces upon the fetus. *Journal of American Osteopathic Association* 1954; 53(5): 499-508.
9. Frymann, V. Relation of disturbances of craniosacral mechanisms to symptomatology of the newborn: Study of 1,250 infants. *Journal of American Osteopathic Association* 1966; 65: 1059-1075.
10. Woods, R. Structural normalization in infants and children with particular reference to disturbances of the central nervous system. *Journal of American Osteopathic Association* 1973; 72: 903-8.
11. Frymann, V. Learning difficulties of children viewed in the light of the osteopathic concept. *Journal of the American Osteopathic Association* 1976; 76: 734-738.
12. Magoun, H. Osteopathy in the Cranial Field. 3rd Edition. Kirksville, Mo: Journal Printing Company, 1976.
13. Upledger, J., Vredevoogd, J. Craniosacral Therapy. Chicago: Eastland Press, 1983.
14. Barnes, J. Myofascial Release: The Search for Excellence. Paoli, Pa: Rehabilatation Services T/A Myofascial Release Treatment Centers and MFR Seminars, 1990.
15. Katake, K. The strength for tension and bursting of human fascia. *Journal of Kyoto Professional Medical University* 1961; 69: 484-488.
16. Gillespie, B. Brain Therapy for Children and Adults. Philadelphia: Productions for Children's Healing, 2000.
17. Juhan, D. Job's Body: A Handbook for Bodywork. Barrytown, New York 12507: Station Hill Press, 2003, page 73.
18. Kessel, R., Kardon, R. Tissues and Organs: A Text-Atlas of Scanning Electron Microscopy. San Francisco: W. H. Freeman and Company, 1979, page 15.

19. Norton, J. A challenge to the concept of craniosacral interactions. *Journal American Academy Osteopathy* 1996; 6: 15-21.
20. Liem, T. Praxis der Kraniosakralen Osteopathie. Stuttgart: Hippokates Verlag GmgH, 2003.
21. www.familyhopecenter.org. How We Can Help: Developmental Charts.
22. McPartland, J., Skinner, E. The biodynamical model of osteopathy in the cranial field. *Explore (NY).* 2005; 1: 21-32.
23. Jealous, J. Emergence of Originality Second Edition. Farmington, Maine: Biodynamic/Sargent Publishing, 2001.
24. Magoun, H. The temporal bone: troublemaker in the head. *Journal of the American Osteopathic Association* 1974; 73: 825-835.
25. Becker, R. Craniosacral trauma in the adult. *Osteopathic Annals* May 1976, 213-225.
26. Sutherland, W., Wales, A. Teachings in the Science of Osteopathy. Portland, Ore.: Rudra Press, 1990.
27. Peirsman, E., Peirsman, N. Craniosacral Therapy for Babies and Small Children. Berkeley, Ca.: North Atlantic Books, 2006.