A Research Proposal Evaluating the Effectiveness of the Brain Score and Craniosacral Fascial Therapy for Neonates

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Abstract

This research proposal investigates the utility of the Brain Score and craniosacral fascial therapy for newborns. We will use sound research methodology to measure the Brain Score's reproducibility and reliability in assessing neonatal neurophysiology and the effectiveness of craniosacral fascial therapy on newborns and mothers-to-be to significantly decrease the incidence of many chronic pediatric diseases. The primary hypothesis states that fetal and birth trauma may cause tissue tightness, impair neurophysiology, and 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 craniosacral fascial therapy to be effective for children, toddlers, and infants with these chronic conditions, the most logical step through inductive reasoning is to propose research methods to investigate the practice of the Brain Score and craniosacral fascial therapy for neonates. If the Brain Score proves to be a reproducible and reliable test, it will alert professionals to at-risk newborns and indicate craniosacral fascial therapy to improve neurophysiology. We intend to prove the primary hypothesis by showing that newborn treatment to mitigate nine months of fetal and birth trauma significantly decreases the incidence of fifteen common diseases in children. The secondary hypothesis states that mothers may pass trauma through their own craniosacral fascial strain patterns on to their newborns during the fetal and birth period to eventually cause pediatric illness. We intend to prove that preventative craniosacral fascial therapy for mothers-to-be has a significantly positive effect on neonatal neurophysiology, thus decreasing the incidence of future pediatric disease.

INTRODUCTION

At the Family Hope Center we believe that fetal and birth trauma can cause many chronic diseases. The effects of a difficult pregnancy, multiple gestation, a long hard labor, the use of forceps/vacuum suction, a caesarian section, the umbilical cord knotted or wrapped around the throat, and other physical traumas can create tissue tightness, seriously impair the function of the brain, and sow the seeds of future illnesses.

We are involved with treating children having conditions that 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.

We believe that these children have fallen through the cracks of the global health care system at birth because of the lack of effective central nervous system assessment and treatment. Since prevention at birth is far superior to treatment for children with these fifteen conditions later in life, we are introducing the Brain Score as a screening tool to assess neonatal neurophysiology and craniosacral fascial therapy to help mitigate the effects of fetal and birth injuries. We believe that research will show that this Brain Score approach will significantly decrease the incidence of these fifteen diseases worldwide.

Birthing professionals now perform the Apgar score to check the critical vital signs that give life to the newborn. If a life-threatening situation presents, they can take appropriate medical action. If a low Brain Score indicates impaired neurophysiology, they can now offer craniosacral fascial treatment to help mitigate the nine months of fetal and birth trauma to the central nervous system. We also envision the mother-to-be having craniosacral fascial therapy before conception to ensure better hormonal function for her, less strain in her pregnancy, an easier birth, and better overall health for her newborn.

We framed this article as a research project specifically designed for medical journal publication. This philosophy presents a brand new approach with terms like “brain cycle”, “sacral cycle”, and “fascial strain” that are foreign to almost every medical doctor. We understand that the medical profession may initially view its major premise that fetal and birth trauma can be the underlying cause of many chronic illnesses with askance. No one in history has ever seriously pursued the answer to this basic question.

These principles, which can strongly influence the ability to thrive and the quality of life, have rung true in our experience for over thirty years. Now we eagerly present these concepts to research scientists around the world. The medical model and general public will demand rigorous research proving this approach’s efficacy before its utility on approximately one hundred and thirty million neonates per year worldwide. We believe that just as vaccines changed the face of pediatric medicine in the twentieth century, the Brain Score and craniosacral fascial therapy will dramatically alter neonatal and maternal health care in this century.

This research proposal investigates the utility of the Brain Score and craniosacral fascial therapy for newborns. We will use sound research methodology to measure the Brain Score’s reproducibility and reliability in assessing neonatal neurophysiology and the effectiveness of craniosacral fascial therapy on newborns and mothers-to-be to significantly decrease the incidence of many chronic pediatric diseases.

The primary hypothesis states that fetal and birth trauma may cause tissue tightness, impair neurophysiology, and 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 craniosacral fascial therapy to be effective for children, toddlers, and infants with the following fifteen chronic conditions, the most logical step through inductive reasoning is to propose research methods to investigate the practice of the Brain Score and craniosacral fascial therapy for neonates.

We have carefully observed that a restricted craniosacral fascial system for children appears to be pathognomonic for a wide spectrum of neurophysiological illnesses. We evaluate and treat children having conditions that 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]

If the Brain Score proves to be a reproducible and reliable test, it will alert professionals to at-risk newborns and indicate craniosacral fascial therapy to improve neurophysiology. We intend to prove the primary hypothesis by showing that newborn treatment to mitigate nine months of fetal and birth trauma significantly decreases the incidence of these diseases in children.

The secondary hypothesis states that mothers may pass trauma through their own craniosacral fascial strain patterns on to their newborns during the fetal and birth period to eventually cause pediatric illness. We intend to prove that preventative craniosacral fascial therapy for mothers-to-be has a significantly positive effect on neonatal neurophysiology, thus decreasing the incidence of future pediatric disease.

THE PROBLEM STATEMENT

Children with these fifteen diseases have fallen through the cracks of the global health care system today because of the lack of central nervous system assessment and treatment at birth. The Apgar score is the time tested standard to quickly measure the vital signs (skin color, heart rate, reflex irritability, respiration, and muscle tone) to save a life, but lacks effective parameters to assess neonatal neurophysiology. This important criterion can strongly dictate the quality of one’s life.

Since no one now or in the foreseeable future can totally control fetal and birth trauma, we propose researching the evaluation of the Brain Score and craniosacral fascial therapy. Even though no one can precisely predict who will contract any of these fifteen conditions, a newborn with a low Brain Score can be significantly more susceptible. With early life-altering treatment this child may regain normal neurophysiology, prevent a condition(s) in childhood, and become a healthier adult. His ability to think, focus, concentrate, and thrive can also markedly improve to create a more abundant and happier life.

A more intriguing question explores if the mother’s craniosacral fascial strain patterns can cause chronic illness to her child. Instead of genetically inheriting a disease from the mother, can a child structurally inherit it? If the Brain

Score method proves to be scientifically valid, it can provide the missing neurological assessment and treatment procedures to help mothers and neonates significantly reduce the worldwide incidence of many common illnesses.

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 study of 1250 newborns Viola Frymann D.O. found in 1966 that about 90% of the neonates had craniosacral restrictions; only about 10% had normal craniosacral motion.[9] This study showed the connection between normal fetal and birth trauma and the function of the central nervous system in a large number of births. She also recommended a long-term study, following the children into adolescence.

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 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 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]

Barnes found in the 1970s that trauma to the body 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] Fascial restrictions can especially have a deleterious effect in the tiny body of a vulnerable newborn.

THE CRANIOSACRAL FASCIAL SYSTEM

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

The lymphatic system returns this fluid to the venous system and onto the liver, heart, and lungs. Oxygenated blood then flows from the heart, through the aorta and carotid arteries, to the blood brain barrier of the choroid plexus. Blood exudates filter through the tight endothelial cell wall junctions and astrocytes of the capillaries to form the cerebrospinal fluid in the ventricles, thus completing the cycle.

Since the body systems are healthy for almost all neonates, the most important factors for a well-functioning craniosacral fascial system are the brain gently expanding and contracting or "breathing" to pump the fluid, and the entire fascial web being open for the fluid to flow unimpeded.[16] An unrestricted fascial system is mandatory in health for the proper cellular exchange of nutrients and waste products.[19] As examples, birth trauma can adversely affect the infant's brain motion, and childhood intramuscular vaccines can result in fascial restriction.[16] We believe that the quality of the cerebrospinal fluid flow in the craniosacral fascial system can be the key to unlock the answer to many pediatric illnesses.[16]

The distinct quality of the fascial web is that it can hold all of the following fetal and birth traumas for a lifetime: a confined fetal position for months, a multiple birth that creates a premium for space, a breech birth, the cranium wedged and engaged in the pelvis for an extended period of time, a long labor, a twisting compressive ride through the birth canal, a forceps delivery, a vacuum assisted delivery[12], a caesarian section, a wrapped umbilical cord around the body, a knotted umbilical cord, and an initial breathing delay. Birth may be the most challenging human life experience.

Neonatal craniosacral fascial therapy can help the tiny body release the tissue tightness of these traumas individually, like peeling the layers of an onion[1], to help restore normal neurophysiology and prevent a lifetime of suffering. Emotions may surface for children and adults in their mind-body connection, but the only concern for newborns can be the physical aspect of the gestation and birth. Fortunately, they have a very tiny onion.

The craniosacral fascial system may be significantly more compromised in adults because of a lifetime of remembered and forgotten traumas and the toxic lifestyle factors of the Western culture. Restriction of craniosacral motion, blockage of cranial and spinal nerve sheaths, a tight fascial web, a clogged lymph system, a diseased liver, a congested heart, impaired lungs, and/or narrow hardened arteries can diminish the function of the entire system. Thus, a quicker and better therapeutic result would be anticipated with newborns.

RESEARCH METHODOLOGY

The first research stage will test the reproducibility/reliability of the Brain Score and then the reliability of the combined Brain Score and craniosacral fascial therapy approach with a group of neonates and birthing professionals. If this testing proves that the Brain Score is a reproducible screening tool and that craniosacral fascial therapy reliably increases the Brain Score, the second stage will examine if this approach can significantly decrease the global incidence of the following fifteen pediatric diseases: asthma, earache, headache, colic, esophageal reflux, neck ache, scoliosis, rhinitis, strabismus, ADHD, reading and learning disorders, autism, cerebral palsy, and epilepsy.

If this phase is successful, the third stage will explore the interesting concept if craniosacral fascial therapy for mothers-to-be results in a significant increase in the Brain Score for newborns and a corresponding decrease in the incidence of these illnesses. Does the physical structure of the mother hold the key to chronic pediatric diseases?

The following general principles will apply to each of the three stages. Since the Brain Score will be a global screening test, the study populations will include pregnant mothers and mothers-to-be from five continents (North America, South America, Europe, Asia, and Australia). Each birthing team will present at a hospital setting and consist of at least one physician, one nurse, and possibly a midwife, doula, and massage therapist.

They will participate in standardized training on the application of the Brain Score and craniosacral fascial therapy for neonates and women in such a manner as to validate its use and effectiveness. The Brain Score approach will be paper-based to meet the portability requirements of the diverse clinical settings.

The patient population will consist of women of childbearing age and pregnant women. The birthing professionals will screen the women 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 present to the women the risks and benefits of the application of the Brain Score and craniosacral fascial treatment for their newborns and themselves.

Stage one: The initial research phase addresses these two questions: In examining the reproducibility/reliability parameter, will different providers have similar pre and post therapy Brain Scores for the same neonate? With the treatment/reliability factor, will the Brain Scores improve significantly and consistently after craniosacral fascial therapy?

The first question looks at the practitioner dependency of the manual technique; the goal is to determine the reproducibility of the Brain Score. Fifty births on each of the five continents will be included in this study for a total of 250 births. At each birth two or more providers will independently perform the Brain Score, and their results will be compared. When they have completed craniosacral fascial

therapy as a team on the neonate, each person will independently retake the Brain Score, and their findings will again be compared. The results of the statistical analysis of these comparisons will determine the reproducibility and reliability of the Brain Score.

The more important second question addresses the reliability of the effectiveness of the Brain Score approach, whether craniosacral fascial therapy significantly and consistently improves the Brain Score. The pre and post treatment Brain Scores for the previous 250 neonates will be statistically compared. A significant and consistent improvement of the Brain Score after therapy will determine the reliability factor of this approach.

Stage two: The second phase addresses the most important question regarding the effectiveness of this approach in disease prevention: Can the Brain Score and craniosacral fascial treatment at birth significantly decrease the occurrence in children for each of the following fifteen conditions: autism, cerebral palsy, epilepsy, ADHD, asthma, reading and speech disorders, strabismus, earache, esophageal reflux, headache, colic, rhinitis, neck ache, and scoliosis? The goal will be to show as ten-year-old children a clinical outcome improvement of at least 50% for the incidence of each disease in the Brain Score approach group as compared to the untreated control group.

To have statistically significant results, 10,000 neonates, 2,000 from each of the five continents, will participate. This size sample is required to make the less prevalent diseases like cerebral palsy (10/5,000), scoliosis (20/5,000), autism (35/5,000), strabismus (50/5,000), and epilepsy (125/5,000) statistically significant. The other ten conditions will be more commonly found in the world population. This sample may seem large, but it only represents about one in 13,000 global births for one calendar year. More trained hospital birthing staffs will also be needed on each of the five continents. The 10,000 newborns will be divided into two equal groups:

Group One: The control group will have 5,000 neonates (1,000 from each continent), born in the conventional manner without the use of the Brain Score and subsequent craniosacral fascial treatment at birth.

Group Two: The variable group will have 5,000 neonates (1,000 from each continent), born in the conventional manner and also adding the Brain Score and craniosacral fascial treatment at birth. Their initial Brain Scores will be recorded, and treatment will continue until the final Brain Score reaches the 6-8 point range, depending on the initial score of the wrapped/knotted umbilical cord parameter. If the cord is not wrapped around the body or knotted, the goal of the final Brain Score will be an 8. If the cord is loosely wrapped around the body or loosely knotted, the goal will be a 7. If the cord is tightly wrapped around the body or tightly knotted, the goal will be a 6.

The providers will give craniosacral fascial therapy for up to one week to reach the specific numerical goal. None of the children will receive any further treatment for the duration of the study.

Since medical doctors will diagnose each of these fifteen diseases by the age of ten, all of the parent(s) or guardian(s) in both groups will be contacted then to record their child's incidence of disease by a charting method. Fifteen questions will be asked requiring a simple yes/no answer: "Has your child had (each of the fifteen conditions) during his lifetime?" The results of the tabulated outcomes will statistically determine on a global scale the effectiveness of the Brain Score and craniosacral fascial therapy at birth to significantly decrease the rate of these important pediatric diseases.

Stage three: The third phase addresses a very intriguing question. If the mother-to-be has craniosacral fascial therapy before the conception and during her pregnancy, if needed, will the Brain Score significantly improve for her neonate, thus lessening the chance of chronic diseases for him/her? Can a woman's craniosacral fascial strains, due to a lifetime of injuries even back to her own birth, be structurally passed on to her newborn over the nine month gestation and birthing period to eventually cause him/her disease(s) in childhood?

This research stage will include 100 women with the intention to conceive from each continent for a total of 500 women. The control group of 250 women will have no craniosacral fascial therapy before or after conception. The variable group of 250 women will have craniosacral fascial therapy before conception, and therapy will cease when they reach a craniosacral cycle of 100 seconds. If they have a traumatic episode like a fall or a car accident before or during their pregnancy, the women will only have additional craniosacral fascial therapy until they return back to that 100-second cycle.

The providers will perform the Brain Score at each vaginal

birth. The initial Brain Scores of the neonates from the treated mother's group will be compared to the initial Brain Scores of the neonates from the untreated mother's group. Statistically significant positive results of this comparison will indicate if mothers can pass their craniosacral fascial strain patterns and chronic diseases on to their children.

BRAIN SCORE METHODOLOGY

The Brain Score gives the birthing professional a quick general assessment of neonatal neurophysiology. It consists of the following four parameters: the umbilical cord wrapped around the body or knotted, the shape of the head, the length of the brain cycle, and the length of the sacral cycle. Trained physicians, nurses, therapists, midwives, and doulas can perform the Brain Score directly after the final Apgar score, and again after they have completed two sessions of craniosacral fascial therapy to re-evaluate the child. Since central nervous system problems requiring the neonatal intensive care unit (NICU) can develop quickly after birth, the provider must perform this approach as soon as possible.

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

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

Palpating the brain and sacral cycles can be a practitioner dependant skill.[20] One provider may feel an eighteen second cycle and the next person may palpate a twenty-six second cycle on the same newborn. Since the cycles can vary from moment to moment as different hands are holding the body, the precise timing of the cycles is not a critical factor in the Brain Score.

The importance of the Brain Score is to quickly identify three general groups of neonates. The first group includes the low-scoring newborns who are at-risk and face a challenging lifetime without craniosacral fascial treatment. The second and largest group includes the moderately restricted children who are more likely to develop some chronic pediatric conditions like earaches, asthma, allergies, ADHD, learning disorders, and headaches. The third group includes the healthier high-scoring newborns who just need some minor refinement of their craniosacral fascial systems.

THE BRAIN SCORE COMPONENTS

The umbilical cord wrapped around the body or knotted: The provider makes this first objective assessment by observation during the delivery. Some children are born with the cord knotted restricting blood flow. Other children are born with the cord tightly wrapped many times around their body; it can create fascial strain of up to 2,000 pounds per square inch that can restrict the entire craniosacral fascial web. Strain in the critical throat area may induce asphyxia and cyanosis, and the birthing team must quickly intervene to save their lives. We evaluate and treat brain-injured children who have not taken their first breath for up to ten minutes. The quality of this first breath may be an important factor in the ultimate function of the craniosacral fascial system.

Once the newborns are medically stable, a compromised Brain Score will necessitate craniosacral fascial therapy to release their hidden throat fascial strain that is also restricting their brain motion. This pressure can affect the local soft tissues responsible for swallowing, speaking, and breathing and also may compress the vagus (X) nerve, which innervates the tissues responsible for swallowing, speaking, breathing, slowing the heart rate, and digestion. Thus, two separate pathological throat mechanisms may overlap to cause the same disease(s).

Emergency measures to save these children at birth are without question an absolute imperative. But without the Brain Score and therapy immediately afterwards to discover and correct their unseen fascial throat/vagus (X) nerve strain, illnesses such as asthma, speech defects, reflux, swallowing disorders, and gastritis may plague these children their entire lives.

The shape of the head: The provider can observe and then palpate for a few seconds the shape of the cranium. The most subjective component of the Brain Score should not take

minutes to ponder over. He/she must determine the head shape as his/her first clinical impression and quickly move on to measure the brain cycle.

The head 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 spreading out factor allows for normal brain motion and the twenty-four cranial nerves and their covering dura to physiologically pass unstrained through their respective foramina and fissures in the cranial base. The cerebrospinal fluid can then flow unhindered by impingement to the fine collagen tubules of the head and neck fascial system.

Many neonates 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, sinuses, and jaws usually follow the same distorted pattern in palpation. Less commonly, the bones may be bilaterally internally or externally rotated.

Because of their need to overlap to pass through the birth canal, the large fetal cranial bones are initially 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 acutely distorted craniums, cone-shaped heads, or superficial hematomas. Doctors and therapists, who may not be aware of the dangers of restricting brain motion, may fabricate headgears to help return their craniums to normal symmetry.

After the first visit of craniosacral fascial 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. To reinforce the critical importance of treatment at birth, five minutes of therapy with a newborn may be significantly more corrective than five hours of therapy with an adult.

The brain cycle: The brain cycle is the total amount of seconds that the brain inherently moves in one expansion phase and one contraction phase. The provider can time this objective parameter with her hands on the side of the newborn's head and add the two phases together to form the brain cycle measurement. A healthy newborn would be expected to have a brain cycle of one hundred seconds (fifty seconds in brain expansion and fifty seconds in brain contraction) or more. Empirically, we have found that the longer the brain "breathes", the better the central nervous system functions.

Six cranial parameters effectively define the quality of brain motion. The amplitude or the breath of movement, the speed of motion, 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 cranium, the hemispheres must have the inherent power to quietly move through it. As the provider helps to release the soft tissue strain in the surrounding dura and fascia, all of these aspects can dramatically improve as the brain expands and contracts in longer cycles.

The question of the appropriate length of a "normal" brain cycle often arises in craniosacral fascial clinical practice. Researchers have not determined a specific value by age, sex, race, or other criteria. The cycle 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 therapy, the goal is for the neonate's brain cycle to be one hundred seconds or more. Liem and others have recently reported adult brain cycles in the range of three hundred seconds.[21] Clinically we have recorded in children and adults brain cycles of up to one thousand and eighty seconds or eighteen minutes, nine minutes in brain expansion and nine minutes in brain contraction. In time research will elucidate this fascinating area.

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

A zero second 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, esophageal 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; only a medical doctor can identify the true nature of a disease in a child after a careful evaluation of many other factors.

For 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 diseases such as asthma, earache, headache, rhinitis, esophageal reflux, neck ache, colic, and scoliosis may have more brain motion, but still under the ten second marker. These rules are only general guidelines; brain cycle values can also vary because many children may also have more than one illness.

The sacral cycle: By holding the sacrum the provider objectively times the sacral cycle in seconds by adding the flexion (brain expansion) and extension (brain contraction) phases. A healthy newborn would be expected to have a sacral cycle of one hundred seconds (fifty seconds in flexion and fifty seconds in extension) or more.

In the craniosacral system the sacrum moves in synchronicity with the brain through the dural tube, which surrounds the spinal cord and slides about ten millimeters in an adult. This tube must be unrestricted for optimal craniosacral motion. Sacral motion is a critical factor in neonatal health because pelvic craniosacral fascial strain may later contribute to colic, abdominal pain, constipation, bedwetting, and reproductive issues.

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 thinking about the cause of symptoms and disease. Thus, fetal and/or birth trauma to the pelvic fascia may diminish the neonatal sacral cycle, which can create a drag through the dural tube, restrict the brain motion, and in time result in a pediatric condition(s).

THE BRAIN SCORE TABLE

Figure 1

4 Components	0 Point Value	1 Point Value	2 Point Value
The umbilical cord	Tightly wrapped/knotted	Loosely wrapped/knotted	Not Wrapped/knotted
The head shape	Severe distortion	Moderate distortion	No distortion
The brain cycle	Under 10 seconds	10-99 seconds	100 plus seconds
The sacral cycle	Under 10 seconds	10-99 seconds	100 plus seconds

Similar to the Apgar method, the provider measures the Brain Score from 0-8 points, zero being the worst score and eight being the best score. Each of the four components 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 good neurophysiology. Upon assessing each of the four components, the provider adds all of the point values to formulate the Brain Score.

If the umbilical cord is tightly wrapped around the body indicating craniosacral fascial strain or knotted indicating blood flow conditions, the provider gives a zero-point value. The cord wrapped loosely around the body or the cord loosely knotted means a possibility of trauma and indicates a one-point value. An unwrapped cord with no knotting denotes a trauma-free two-point value.

If the shape of the head is severely distorted on visualization/palpation like a cone head from vacuum-assisted birth or a lopsided head from a difficult forceps delivery, the provider notes a zero-point value. A moderately distorted cranium on palpation, which may denote compromised brain function due to the slightly asymmetrical cranial position of internal and external rotation, gives a one-point value. A symmetrical head with no distortion indicates a normal two-point value. As the provider palpates many heads, this subjective parameter will become more objective.

The brain and sacral cycle point values are dependant on the number of seconds of each cycle. Trauma can create a lower cycle that can indicate impaired central nervous system function. A problematic cycle of less than ten seconds or in the single digits denotes a zero-point value for each component. A moderately restricted cycle that falls from ten to ninety-nine seconds or in double digits records a one-point value for each component. A good cycle of one hundred seconds or more or in triple digits indicates a two-point value for each component.

As a statistical baseline in her 1966 clinical study involving 1,250 neonates, Dr. Frymann found that about ten percent of the newborns had good craniosacral health, about eighty percent had moderate craniosacral strain patterns, and about

ten percent had severe craniosacral restriction.[9] If one extrapolates those percentages to the world's neonatal population, the Brain Score values would be expected to form a bell-shaped curve with most newborns falling into the eighty percent moderately-involved middle point range. The other twenty percent would be evenly split with good high scores and poor low scores at both ends of the curve.

The clinical interpretation of the Brain Score indicates the child's predisposition for potential disease and thus the requirement for craniosacral fascial therapy: some fine-tuning in the good 7-8 range, more help in the 4-6 moderately restricted range, and a lot of treatment in the seriously restricted 0-3 range. The therapeutic goal would be a final Brain Score in the 6-8 range, depending on the original status of the umbilical cord.

Common sense would indicate that the lower the Brain Score value, the greater the possibility of neonatal brain injury. The parents would not pick up the first symptoms of an injury until later in life when the child would not be reaching his neurological goals. Assuming the parents institute healthy living factors at birth, we anticipate that with therapy the long-term well-being of all non-brain-injured newborns would be excellent.

THE BRAIN SCORE'S CLINICAL SIGNIFICANCE

In this hypothesis the Brain Score acts as a beacon to monitor the initial function of the central nervous system and a harbinger to mandate craniosacral fascial correction. 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 example, a hypothetical boy born to a nulliparous woman somewhere in the world today has normal fetal development, labor, and delivery, great Apgar scores in the 8-10 range, and a healthy appearance. But his neurological health, quality of life, and ability to thrive may be severely compromised with a Brain Score of two with no one present to administer craniosacral fascial therapy.

Latent meningeal strain from fetal and/or birth trauma may have created physical pressure on specific areas of his brain and/or cranial nerves (I-XII). This dural tightness may have impaired his brain's normal functional activity and pumping ability; this affects the flow of nourishing cerebrospinal fluid throughout his brain and spinal cord down into his cranial and spinal nerve sheaths that terminate in his collagen fibers. Therapy needs to be performed now at the birth, since the passage of time may cause irreparable damage.[12]

This physical injury may also have traumatized his full-body craniosacral fascial web, possibly backing up this cerebrospinal fluid system and indirectly causing additional tightness to his cranial, dural tube, and sacral components. The cumulative effects of this unresolved trauma may play out in time through the malfunction of his cranial nerves and 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 just superior to foramen magnum (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 between his occiput and a temporal bone at his jugular foramen (vagus X) creating digestive disturbances and/or sacral restriction causing painful fascial strain in his abdominal cavity, which can lead to constipation and future bedwetting.

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 his head tilted towards the affected sternocleidomastoid muscle or loss of vision (optic II) because of dural pressure on the nerves in the optic canals of his sphenoid bone.

Commonly, earaches may occur before the age of one due to temporal bone misalignment/restriction and neck fascial strain pulling on that bone (vestibulocochlear VIII). Ensuing blockage of the Eustachian or auditory tubes, that normally permit ear fluid drainage into the paranasal sinuses, may allow harmful bacteria to incubate in his middle ears. Pressure in these confined spaces may lead to chronic ear infections, damage to the incus, stapes, and malleus causing hearing loss, and inner ear disturbances leading to vertigo. Surgeons may perform myringotomy to allow for proper drainage of the infection.

As a toddler he may contract strabismus (oculomotor III, trochlear IV, and abducens VI) because of facial trauma involving fascial strain in one or more of the six major muscles of his eyeball (superior rectus, lateral rectus, inferior rectus, medial rectus, superior oblique, and inferior oblique) and the remaining orbital fascia. Misalignment and restriction of the seven bones of his eye (frontal, zygoma,

maxillary, lacrimal, ethmoid, palatine, and sphenoid) may cause a cranial neuropathy involving one or more of these three eye muscle nerves.

He may develop swallowing (glossopharngeal IX), taste (facial VII), speech disorders (vagus X and hypoglossal XII), and asthma, cardiac irregularities, and hyperactive peristalsis (all vagus X) by the age of four because of cranial and throat fascial strain. Currently the medical model may regard all of these previously mentioned illnesses as "routine" for children whose only hope for natural improvement is to "grow out of it."

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

As his craniosacral fascial system tightens with the typical boyhood traumas, he may develop neck aches and/or scoliosis. Strained cranial dura against his hard parietal bones may squeeze his sandwiched middle mengineal arteries causing migraines (trigeminal V) as he starts to clench and brux his teeth (trigeminal V) while he sleeps.

He may have developed a tongue thrust (hypoglossal XII) from his uncorrected birth-suckling condition. Over the years this has passed through the speech disorder phase and manifested into a dental malocclusion as the forces of his powerful tongue, utilized for swallowing about 2,000 times a day, spreads his anterior permanent teeth.

If orthodontic treatment with bands and arch wires, elastics, and possibly a headgear commences to correct his occlusion, his entire craniosacral fascial system may tighten even more to a zero brain cycle due to the new dental pressures. When his maxillary bones cannot expand and contract, his adjacent ethmoid, vomer, and sphenoid bones can start to immediately restrict, setting up a domino effect tightening his entire craniosacral fascial system.

As the orthodontist continues to apply these dental forces at every visit for two to three years, the neurophysiological effects on his brain may be profound by initiating or exacerbating any of the previously mentioned illnesses. Unknown to most people, routine dental care like teeth cleaning, fillings, root canals, and tooth extractions can dramatically alter brain function.

After active orthodontic treatment is completed, 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 the cause of his original tongue thrust condition, his teeth may relapse after therapy requiring more treatment, much to the financial dismay of his parents.

In summary, the child's neurophysiological status can dictate the quality of his/her life. If a birthing provider had taken his Brain Score and had followed with therapy, and health care professionals had monitored his craniosacral fascial system and offered treatment, if needed, throughout his childhood, 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 craniosacral fascial 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 quality of life outcome for him and his family.[22]

CRANIOSACRAL FASCIAL TREATMENT PHILOSOPHY

The rationale for therapy is to manually assist the newborn in relieving the craniosacral fascial strain patterns that may cause future conditions. In order to reach this goal, 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.[23] 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 outcomes improve proportionately as you let go of your rational mind.[24]

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." [25] Becker correspondingly adds: "The inherent capacities of the body will more readily assist the physician in the correction of the traumatic patterns." [26] Sutherland's philosophy also concurs by using no direct force in treatment while making no attempt to fix or manipulate any structure.[27]

To distinguish craniosacral fascial philosophy from other craniosacral approaches, the craniosacral system is fully enmeshed in the powerful full-body fascial web.[14] If this web is strained from fetal and birth trauma, it can restrict the craniosacral structures at up to 2,000 pounds per square inch[15], dramatically altering neonatal neurophysiology.

Conventional craniosacral treatment can gently begin to open the newborn's primary respiratory mechanism to the currently accepted craniosacral range of six to ten second cycles.[12, 13] But not until you help the tiny body unleash the fascial strains of fetal and birth traumas can the craniosacral fascial system open up to more acceptable cycles of one hundred seconds or more. When you add this powerful fascial dimension to conventional craniosacral therapy, we believe that the greatest chance for health exists.

THE CLINICAL SETTING

The birthing period can be the perfect time for craniosacral fascial treatment since the tiny body can correct quickly without dealing with a lifetime of physical traumas, emotional issues, and dental work. The mother and child are also readily available in the hospital for therapy. The newborn presents with a unique therapeutic 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 ossified and less workable in therapy.

This is also a great opportunity to start the correction of the craniosacral fascial strain in the mother's pelvis and rest of her body for her general well-being and the health of her future children. Trauma from dystocia, epidural anesthesia, episiotomy, cesarean section, and/or other procedures may have restricted her craniosacral fascial system and predisposed her to postpartum conditions like low back pain, migraine headache, and depression. We believe that all mothers need to be checked for craniosacral fascial strain after delivery and, if needed, have corrective therapy.

THE ULTIMATE GOAL

The contemplating mother-to-be will have craniosacral fascial therapy before conception to give birth to a healthier neonate. We intend to prove in the second hypothesis that

the root of the previously mentioned fifteen pediatric diseases, that appear to arise from fetal and birth injuries, may ultimately be caused by the lack of structural homeostasis to the mother-to-be as a result of a lifetime of unresolved physical traumas.

The function of the female pituitary gland is an important key in the birthing process. The endocrine system is responsible for regulating the formation of her oocytes to the milk secretion of her mammary glands. Specifically, the anterior lobe of her pituitary gland fabricates the follicle-stimulating hormone (FSH), luteinizing hormone (LH), and prolactin (PRL), and the posterior lobe stores and releases oxytocin. The pituitary gland also controls the function of her thyroid, adrenal cortex, growth organs, pancreas, and skin.

Cranial trauma can cause dural strain of the diaphragma sellae; this 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 her hypothalamus to her pituitary gland. Craniosacral fascial therapy can release this dural pressure to create hormonal homeostasis and also possibly to initiate fertilization for some infertile women.

Therapy can also help to mitigate any abnormal pelvic strain that can cause her pain during her pregnancy, labor, and/or delivery. At the same time she can pass less strain on to her vulnerable fetus to increase the neonatal Brain Score and decrease the incidence of future pediatric disease. She can also decrease her chances of having a cesarean section and episiotomy in the hospital with a natural birth.

If she has any physical trauma during gestation, therapy can help her release that strain pattern. In addition, she can live a healthy lifestyle and seek medical care as needed in preparation for the birth. We strongly believe that this approach will be incorporated into the global protocol for all mothers-to-be.

NEONATAL CRANIOSACRAL FASCIAL TREATMENT

Therapy is primarily predicated on clearly "listening" to the craniosacral fascial strain patterns without trying to mechanically fix the little body. You are trusting that she knows best how to heal herself.[23] Can you put aside your ego and let go of your thinking, analyzing, controlling, rational scientific mind?[24] Can you also trust that the brain motion and fascial strain you are feeling is true? Can you detach yourself from the treatment outcome, even if working with a loved one? Similar to the Tao philosophy, can you just be in the present moment to facilitate the newborn's healing? Your mindset may be more important in her healing process than any manual technique.

This clinical approach uniquely adds the fascial dimension to the craniosacral modality. For example if you have completed the compression of the fourth ventricle procedure[12, 13, 28, 29] of an adult patient and are gently following sphenobasilar flexion and extension, quietly listen for any neck fascial strain pulling on the occiput. If the head and neck start to slowly move in any direction, follow that fascial strain pattern down into the trunk of the body. The fascia will tighten to a still point, and then the entire craniosacral fascial system will release. The brain and sacral cycles can now open to higher values.

A single therapist can provide adequate neonatal care, but may have distinct physical limitations. A preferred team of two providers can treat the newborn more effectively in three-dimensional space. Since poorly applied therapy may compromise a vulnerable newborn, correct technique is an absolute necessity. It is of critical importance to fully support her head, neck, and body and also move in a gentle therapeutic flow as not to mimic shaken baby syndrome.

After one provider of the team does the Brain Score, they must tell the parents that the newborn may act out her traumas during the sessions. If the mother has already had treatment, she can have a better understanding of her child's experience. With one therapist on the cranium/upper trunk and the other on the sacrum/lower trunk or both thighs, each is "listening" for and following craniosacral fascial strain. Together they may feel pulling or torquing in her core link[23]. As the providers carefully support the child, she may lift up off the table, twist and turn, and even revert to the upside-down position. Neonatal craniosacral fascial therapy can become a whole body event.[4, 16, 23, 24, 27, and 30]

The newborn appears to be mitigating her earlier gestation, labor, and delivery traumas through a craniosacral fascial unwinding process. Birthing professionals have reported that this treatment appears to reproduce the trauma of delivery, but in reverse sequence from the presentation back into labor. This observation is consistent with the philosophy that the fascia remembers all of its past traumas.[14]

As she reaches a still point in her craniosacral fascial system,

her soft tissues can release. Her cranial bones can now shift to a more symmetrical position and her brain and sacrum can open to longer cycles, reflecting a better flow of cerebrospinal fluid. Please let her mother hold her for about five minutes before repeating this procedure so that she can establish neurophysiological homeostasis.

At the completion of her second treatment session, her craniosacral fascial system may be totally relaxed with her appendages limp. Many neonates can now have a symmetrical head and brain/sacral cycles of over 100 seconds. After she rests for five minutes in her mother's arms to allow her central nervous system to reset, one provider can retake her Brain Score and compare it to her initial score to evaluate the effectiveness of therapy.

A perfect Brain Score does not necessarily indicate that therapy has been completed; there still may be some deep fascial strain present in the body, which may eventually cause a condition(s). We consider the hundred second brain and sacral cycles as baseline starting points for pediatric health.

The therapeutic goal of completion is not to reach a specific numerical cycle, but for the provider to hold the neonate's craniosacral fascial web at the beginning of a visit and not feel strain anywhere in the body. Then the values of the presenting brain and sacral cycles will be normal for that child. Since children experience the usual physical traumas of growing up, we also encourage medical providers to follow up with re-evaluation and therapy at all well visits.

If a perfect score has not been attained, the providers can reassure her parents and treat her on a timely basis until her final score is in the 6-8 range, depending on the unchanging umbilical cord point value. If she has not positively responded to craniosacral fascial therapy in this first hour of life, the providers must notify her attending medical doctor.

In craniosacral fascial therapy the maternal therapeutic goal is for the baby to be completely happy and content. The neurophysiological goal is for the cranial, dural tube, and sacral structures to be moving slowly, freely, and in synchronicity, while quietly sitting in a fully unwound fascial web.[16] At this point we believe that the central nervous system can function optimally to give the child the best opportunity to thrive in life.

SUMMARY

Research in evaluating the efficacy of the Brain Score and craniosacral fascial therapy for newborns is clearly indicated. If the Brain Score proves to be a reliable tool that consistently indicates effective craniosacral fascial therapy for mother and child, we believe that this approach will significantly improve neonatal and maternal health for generations to come.

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. Lee, P. The living matrix: a model for the primary respiratory system. Explore 2008; 4: 374-378.
20. Norton, J. A challenge to the concept of craniosacral interactions. Journal American Academy Osteopathy 1996; 6: 15-21.
21. Liem, T. Praxis der Kraniosakralen Osteopathie.

Stuttgart: Hippokates Verlag GmgH, 2003.
22. www.familyhopecenter.org. How We Can Help: Developmental Charts.
23. McPartland, J., Skinner, E. The biodynamical model of osteopathy in the cranial field. Explore 2005; 1: 21-32.
24. Jealous, J. Emergence of Originality Second Edition. Farmington, Maine: Biodynamic/Sargent Publishing, 2001.
25. Magoun, H. The temporal bone: troublemaker in the head. Journal of the American Osteopathic Association 1974; 73: 825-835.
26. Becker, R. Craniosacral trauma in the adult. Osteopathic Annals May 1976, 213-225.
27. Sutherland, W., Wales, A. Teachings in the Science of Osteopathy. Portland, Ore.: Rudra Press, 1990.
28. Sergueff, N, Nelson, K, Glonek, T. Changes in the Traube-Hering-Meyer wave following cranial manipulation. American Academy Osteopathic Journal 2001; 11:17.
29. Nelson,K, Sergueef, N, Glonek, T. The effect of an alternate medical procedure upon low-frequency oscillation in cutaneous blood flow velocity. Manipulative Physical Therapy. 2006: 29:626-636.
30. Peirsman, E., Peirsman, N. Craniosacral Therapy for Babies and Small Children. Berkeley, Ca.: North Atlantic Books, 2006.

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