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## **Introduction to the Craniosacral System and Neuromotor Dysfunction**

**Richard MacDonald, D.O., and Christine A. Nelson, Ph.D., OTR**

### **Learning Outcomes**

The Participant Will be able to:

1. Describe the general concept of craniosacral therapy.
2. List the major areas of evaluation.

### **Disclaimer**

The information in this article is not a substitution for qualified professional training, it is for educational awareness only. Craniosacral techniques should only be used by trained and qualified individuals. Numerous seminars and training courses are available for therapists wishing to be trained in these techniques.

### **Introduction**

The craniosacral system is a self-contained unit that consists of the bones and membranes of the cranium, and the spinal column that ends in the sacrum and coccyx. Inside this system circulates the cerebrospinal fluid, which brings nutrients to the brain and removes toxins. In any surgery that opens the spinal column this fluid can be observed to pulsate as it moves toward the opening. The self-generated rhythm of this pulsation is influenced by subtle physiological motion in the occipital area and the sacrum. Each pair of bones in the cranium has their direction of motion and, with experience, may be palpated by using a very light touch.

The cranial system motion is closely related to, but not identical with the respiratory rhythm or the cardiac rhythm. This life-sustaining motion is affected by almost every event that causes a change in the total organism. An increase in temperature or an infectious process that causes inflammation of the membranes will cause some slowing of the motion in the cranial bones. This motion is not always restored without some external assistance as the interaction of these fine bones may lack alignment that moves efficiently.

A cranial treatment is a process of restoring symmetrical balance to the motion. The first and most important step is to release the cranial base, where the occiput sits over the first

cervical vertebrae. Even this change alone may be sufficient to relax the individual who has no serious trauma, or even those with chronic migraine or stress.

The craniosacral system is sensitive to systemic changes within the body. It may slow or alter its motion in the presence of meningitis, encephalitis, anesthesia or medications that are toxic to the particular individual. Infants who have had a rapid or a difficult birth have a system that is more susceptible to a second experience that affects the responsiveness of the craniosacral system.

Craniosacral rhythm is closely linked to respiration, and early compression of the cranium tends to suppress adequate respiration for developmental movement patterns to be fully expressed. Acquired head trauma also impacts the craniosacral system as the membranes of this system are part of the comprehensive soft tissue system of the human body. At a deep level the craniosacral system reflects the state of the entire organism.

It is not possible to predict precise behavioral changes that may result from cranial treatment. There are indirect and direct techniques that are used to make change. Selection of specific intervention depends on the preparation and experience of the practitioner. The work itself originated in medical osteopathy with the work of Dr. William Sutherland in the 1940s, although training seminars by Dr. Rex of the Ursa Foundation and the Institute of Dr. Upledger, are open to therapists and other professionals. When the work is applied to individuals with neuromotor dysfunction, it is very helpful to integrate treatment of the craniosacral system with other soft tissue interventions that prepare for movement control. Improvement in sleep patterns and basic physiological function are seen frequently in infants and small children.

As this intervention influences basic physiological function it changes the base on which neuromotor performance is developed and improved. For example, physical movement of the eyes may improve so that optometric intervention begins at a more advanced level. New freedom in head movement on the neck introduces rotational movement patterns in the body.

After a treatment the person may sleep more than usual, or may have more energy than usual, as the body contributes to its own healing. A number of sessions may be necessary to make the functional changes that are needed. Chronic tensions in this system may be related to allergies, stress from soft tissue imbalances in the body or even emotional states. The work and the findings must be related to the individual and his or her life experience. The craniosacral system is a sensitive and important monitor of general well-being, and offers another avenue by which help may be offered.

Manipulative management through cranial-sacral intervention is both diagnostic and corrective in nature, and can assist the infant to mobilize dysfunctions of motion. Correction of some dysfunctions at an early age may aid in the prevention and/or treatment of various problems such as dyslexia, autism, tourette syndrome, colic, attention deficit disorder, behavioral problems, epilepsy, middle ear infection, neuromotor dysfunction, and strabismus.

Manipulative management can also mobilize dysfunctions caused at birth and pre-birth. Problems such as colic, poor sucking technique, cranial asymmetry, torticollis, excessive crying, constipation, pylorus spasm, and seizures can be helped through cranial-sacral treatment.

### **Evaluation of the Neuromusculoskeletal System**

The pressure used by the osteopath during evaluation and treatment is very gentle, equally the weight of a nickel or 5 grams.

#### **Lower Extremity**

- Hips and Legs

The position of the legs of the infant and the symmetry of motion is evaluated in supine in both passively and actively. The hips are checked several times to assess for any partial or full dislocation.



- Vertebral Evaluation

General and segmental motion of the vertebral column is evaluated. Areas of cross-over curves may show more dysfunction than mid-curves in the infant. The thoraco-lumbar junction with its respiratory diaphragm and numerous cephalo-caudal flowing structures,

as well as the psoas muscles bilaterally can restrict motion when fascia and/or rib vertebral restrictions are present.

The cervical-thoracic junction (C6-T5) may show restrictions in motion, especially in backward bending. This finding may be indicative of future respiratory and/or ear-nose-throat infections.



- Sacral-Lumbar-Dural Evaluation

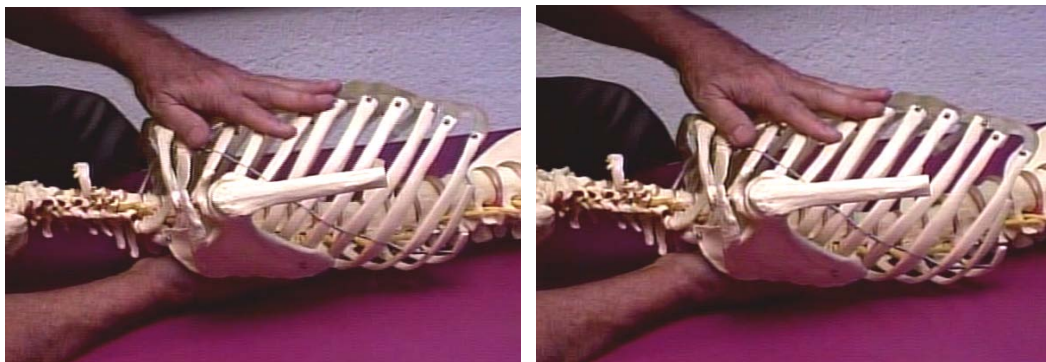
Symmetrical motion of the sacroiliac joint, L5-S1 motion, asymmetry of the sacral motion as it flexes and extends around its fulcrum, and the motion of the dura from a caudal testing position is evaluated.



- Rib Cage and Respiratory Diaphragm

Proper mobilization of the rib cage vertebrae and respiratory diaphragm will affect the lymphatic drainage of the entire body, allowing lymphatic drainage to flow more normally into the bilateral subclavian veins.

Rib cage motion cannot be over emphasized. The rib cage should have symmetrical motion right to left. It should follow the respiratory activity. The respiratory diaphragm can be thoroughly evaluated by checking the motion of the abdomen and rib cage in inspiration and expiration.

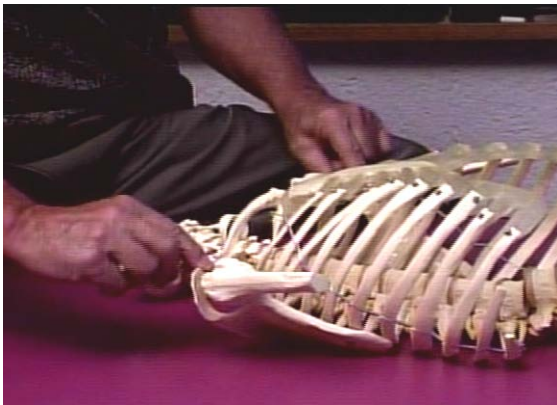




## Upper Extremity

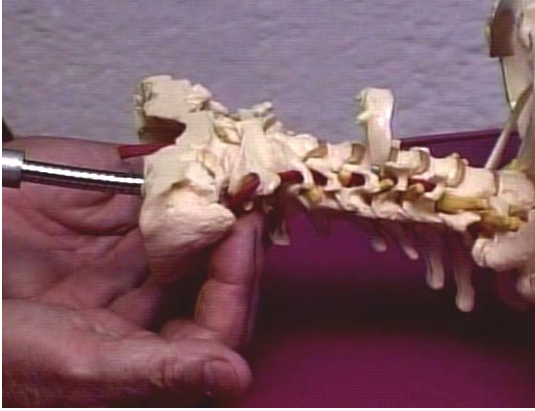
- Shoulders and Arms

Bilateral evaluation of the shoulders and arms is necessary to make sure that the clavicles are intact and that the shoulders and arms have a full range of motion. Here ability of the infant to easily open the hands and grasp with some strength is an important test to rule out spasticity or hemiplegia.



## Cervical and Cranial Evaluation

Bilateral equality of the side bending motion of all cervical segments is tested in neutral. Bilateral symmetry of the sternocleidomastoid and full rotation is necessary to evaluate for potential torticollis.



Cranial symmetry is assessed by palpation of the vault, anterior and posterior fontanels, and general cranial motion. A common area for compression is the occipital-atlanto (OA) articular area. Decompression of that area is always necessary as well as decompression of the condyle parts bilaterally. If compression of the OA is present from head extension on the neck at the end of the delivery process, cranial nerve 9, 10, 11, and 12, can be affected. The magnitude of this can affect the infant from the mouth to and including the bowels.



After normalizing the OA, recheck the vault. Then become more intent of the sphenobasilar motion. It is a common finding to have sphenobasilar compression in newborns, as well as dysfunctions in flexion and extension, torsion, side bending or rotation, lateral strain and vertical strain of the sphenobasilar articulation.

Before decompressing the sphenobasilar area it is important to decompress the frontal bone in anterior motion which will allow the decompression of the sphenobasilar area to be accomplished more easily.





Decompression of the parietal area is a two phased approach. The first is a medial gentle bilateral compression which will help mobilize the boney parietal resistance. Then a repositioning of the hands to allow for gentle traction to mobilize the membrane system. Allow time to release the dura at least the level of C2-3 through the foramen magnum. This release also allows the temporal bones to have more potential mobilization.



When sphenobasilar dysfunctions do not completely mobilize, the temporal bone may be the problem, because they articulate bilaterally at the cranial base with the sphenoid bone anteriorly and the occipital bone posteriorly. When temporal bones have dysfunctional motion the sphenobasilar will be affected and vice versa.

Ear-pull technique bilaterally will help bilateral-medial compression. This is a gentle posterior-lateral technique which is maintained for a short while to assist effective mobilization.



Bilateral assessment of the temporal bones for internal and external rotation dysfunctions is also necessary and can be accomplished from the mastoid area bilaterally. Loss of external rotation on the right may demonstrate potential dyslexic problems. Prevention and correction occurs with the mobilization of all the neuromusculoskeletal dysfunctions found.



### **Oral Evaluation**

Use a finger cot on your finger to evaluate the hard palate in its flexion and extension phases. The suck and swallow can also be assessed at this time. The suck should be equal in strength on flexion and extension phases of cranial motion.

Influence of the hard palate, the maxilla, and palatine bilaterally will effect ethmoid and sphenoid motions, thus the entire body. V-spread through the sagittal suture of the hard palate, the pituitary and the coronal suture. Recheck the sphenobasilar motion and recheck the cervical region plus the bilateral hand clasp to observe differences and/or improvements.



Recheck all areas where motion dysfunction has been found.

**Osteopathic Evaluation and Treatment of Newborns and Infants**  
**Richard MacDonald, D.O.**

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## **Introduction to the Craniosacral System and Neuromotor Dysfunction**

### **CEU Verification Exam**

1. Each pair of bones in the cranium has their direction of motion and, with experience, may be palpated by using a very light touch.
  - a. True
  - b. False
  
2. Craniosacral rhythm is closely linked to respiration, and early compression of the cranium tends to suppress adequate respiration for developmental movement patterns to be fully expressed.
  - a. True
  - b. False
  
3. Chronic tensions in the craniosacral system may be related to allergies, stress from soft tissue imbalances in the body or even emotional states.
  - a. True
  - b. False
  
4. Proper mobilization of the rib cage vertebrae and respiratory diaphragm does not effect lymphatic drainage.
  - a. True
  - b. False
  
5. A common area for compression is the occipital-atlanto (OA) articular area.
  - a. True
  - b. False
  
6. Decompression of the parietal area helps allow the temporal bones to have more potential mobilization.
  - a. True
  - b. False