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# CRANIOSACRAL THERAPY:

## HELPING IMPROVE BRAIN FUNCTION

by Susan Vaughan Kratz, OTR, CST

### The Upledger model of autism spectrum disorder

Craniosacral therapy (CST) dates back to the 1970s from the clinical research of osteopathic physician John C. Upledger. Some of the first human subjects he offered his treatment ideas to were hospitalized children with severe autism. His model of autism spectrum disorders (ASD) is based upon many years of using craniosacral therapy methods in his clinical practice. According to Upledger, ASD is related, in part, to a loss of flexibility and probable inflammation of the membrane layers surrounding the brain. This argument is further supported by research at Johns Hopkins University showing “increased levels of pro-inflammatory cytokines, neuroglial activation and inflammatory changes” in the cerebrospinal fluid of the autistic patients studied.<sup>1,3</sup>

This compromise can create a restrictive force on the brain tissue that may cause strain on different brain structures.<sup>2</sup> When different brain parts have undue strain on them, the osteopathic model states that dysfunction follows. Behavioral challenges can be associated with specific brain area dysfunction. For example, the hypothalamus regulates internal body functions such as temperature regulation. The reticular activating system regulates sleep cycles. The autonomic nervous system regulates stress responses and the ability to deal with fight-or-flight regulation. The limbic system regulates emotional reactions to sensory information as well as down-regulating from reactions

of stress. Cerebellar dysfunction is related to sensory motor and coordination difficulties among other skills.

When tension exists in the tissues that surround the brain, the fluids that flow through and around it can be blocked. The fluid delivers nutrients, oxygen, hormones, and neurotransmitters as well as transporting wastes and toxins away. The lack of healthy fluid exchange can further irritate and inflame the system adding to the dysfunction of the brain.

What is observed as typical ASD behavioral impairment in sensory processing, social skills, communication skills, and thinking styles might be the effects of inner chaos created, in part, by the abnormal grasp, squeeze, and irritation of the membranes on the brain. Craniosacral therapy has been shown to help the individual with autistic features gain a calmer and more relaxed state of being by decreasing structural stress and strain. It is also theorized that when the brain can achieve this state, it is in a better position to heal and reorganize itself.

That being stated, Upledger and his proponents stress that CST does not cure autism and its related difficulties. CST does not treat the “behaviors of autism.” It does, however, treat the brain dysfunction of autism. It can augment and enhance the effects of other strategies. This article hopes to summarize how one occupational therapist has included advanced levels of CST within her practice of sensory integration and other neurodevelopmental treatments for people of all ages.



### What is the craniosacral system?

The three layers of membranes that surround the brain and spinal cord (meninges) plus the volume of cerebral spinal fluid constitute the craniosacral system. The tissues extend through the bones of the skull, face, and mouth (the cranium), and then down to the tailbone (the sacrum). Not only does this system protect the brain and spinal cord as a shock absorber, but it also serves to facilitate the electro-chemical conduction of nerve signals. As cerebral spinal fluid is produced within the brain itself, it swells the cranium cavity. The fluid is reabsorbed once reaching a certain pressure gradient and the brain narrows and contracts. This cycle creates the craniosacral rhythm, which can easily be detected throughout the body as the fluid courses through its pathways. The sensation of feeling this rhythm is similar to detecting the subtle movement of fluids within a full water balloon held in one's hands.

### The actual method of CST

CST is often referenced with the older practice of cranial osteopathy. This treatment style differs from CST in that osteopathic doctors attempt to improve the bone structure of the head by manipulating the spots where head bones join together. Dr. Upledger theorized that the problems aren't held in the bones as much as the problems are held in the underlying tissues. The CST method is for the therapist to place their hands on the bones and use them as "handles" to ever-so-gently stretch the underlying membranes. Basic CST is, in essence, about treating the membranes and helping to improve the flow and exchange of fluids. It is not about realigning head bones.

### How is craniosacral therapy performed?

It is performed by a person trained specifically in the methods of detecting craniosacral rhythm using specific locations of the body where it is most helpful to release the connective tissue system. The meninges are part of the connective tissue system. Using a light touch, generally no more than the weight of a nickel, the practitioner monitors the flow of the rhythm to detect potential locations where



*CST with a person who can lie still on a table*

restrictions and imbalances are held in the tissues. Then, gentle stretch is placed upon these tissues to help soften, lengthen, and release restrictions.

Think of the analogy of trying to get Saran Wrap to smoothly cover a loaf of bread, but it becomes folded or twisted. The meninges are a lot like that as it wraps around the brain and spinal cord. The goal of this therapy is to smooth and straighten the tissues so the organ underneath it functions better. (This therapy also can address other health issues in other organs and areas of the body. The techniques are the same as when working on the nervous system.)

When working with an ASD individual, the initial focus often is on the cranium to locate an area that has the greatest motion response to the craniosacral rhythm. Delicate release and pumping techniques are used to create improved motion in that area. The increased motion is used as a dynamic biomechanical tool – one hand is used to continue to increase motion and direct fluid flow, while the other hand is used to encourage motion in non-moving

areas. Little by little, small changes create larger changes that enhance the mobility of the whole system.<sup>2</sup>

Increased balanced motion of the membrane surrounding the brain helps flush toxins and inflammation out of the brain tissue. As this occurs, it naturally can elevate biochemical processing, which increases the function of neurons and neurological pathways. Newfound motion of the brain tissue and fluid helps decrease the abnormal and often enormous strain the brain has been under. This allows the brain cells a greater ability to process and react to information of all sorts.<sup>2,1</sup>

Craniosacral therapy is not just intended for the effects of autism; it is a treatment of choice for the whole body since tissue restrictions anywhere can adversely affect the membrane surrounding any organ or structure. CST helps elevate the body's natural healing and compensatory mechanisms by facilitating neurological function. This, in turn, can elevate the structure and function of the body as a whole, thereby aiding the correction of other dysfunctional systems such as the digestive and immune systems.<sup>2</sup>

### Some detractors against craniosacral therapy

Some people have intensely argued that recognizing craniosacral rhythm has been proven to be inconsistent between multiple therapists and therefore the entire theory is flawed. However, this argument only suggests that recognizing the rhythm may be difficult to detect and record by people who have not been trained to perceive the subtle rhythms that are proven to exist in the human body. It does not prove that the rhythm does not exist, nor that this intervention has no merit. The scientific evidence of the craniosacral system's existence is very well documented. Neurosurgeons even recognize that the meninges pulsate.

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*CST with a child who needs to move and experience sensory input in order to tolerate the light touch of CST*

Clinical data on the outcomes of the therapy are being collected worldwide. Several clinical trials for a variety of ailments are currently in process.

**Indications for craniosacral therapy:**

1. Self-injurious behaviors, such as head banging, hair pulling, biting, teeth grinding. These pain-inducing behaviors may be a result of coping with a greater pain within the individual's nervous system. Tight membranes can hurt.
2. Extreme stress behaviors and a constant state of fight-or-flight, aggression, or fear responses.
3. Sensory motor behaviors where an extreme need to get deep pressure input is frequent, especially pressure to the head.
4. Symptoms related to events such as high fevers, illnesses, or vaccine administrations.
5. Birth injury, such as where the birth process was prolonged, induced with strong medications, any use of vacuum extraction, or any other birthing experience that suggested a physical struggle.

**ONE CASE STUDY:**

Michael is currently 15 years old. He has been receiving craniosacral therapy from advanced level trained therapists over the span of five years. His changes can be, in part, attributed to his responses to CST because he was receiving no new interventions, no additional therapies beyond his long-term established Individualized Education Program, no medical interventions, no changes in his special education environment, no dietary changes, and the family situation remained steady and stable.

Michael was initially referred to our clinic for additional help to address ongoing and newly occurring difficulties in his manifestation of autism spectrum disorder. This included severe mood swings, severe behavioral problems, aggression towards others to the point of hurting them, self-abuse at a high level, and difficulties with self-control and self-regulation. Michael was 10 years old on admission and essentially nonverbal, though he was able to utilize some rudimentary nonverbal communications with those familiar to him. He was independent in his ambulation and could follow some simple verbal directions from his caregivers.

Family was very concerned about his behaviors for safety and staff management. His family physician had been unable to identify any physical etiology, and he had not yet entered puberty. He was very tense almost all of the time, and this could escalate quickly into a high pitched "yell." He would then run around hitting and scratching people. This most often occurred at mealtime, both if he was fed separately and if the family tried to eat together. There were outbursts occurring at bedtime, sometimes before being put to bed and sometimes after he was in bed for a while. Once asleep, Michael seemed to sleep soundly and could sleep up to twelve hours. Falling asleep, however, was the habitual problem.

Extensive sensory motor and sensory profiles were taken as baseline, along with functional observations and activities of daily living. Sensory processing dysfunction included: auditory processing, self-regulation with sound intolerances, vestibular processing concerns, multi-sensory processing, lowered endurance and muscle tone, lowered strength, behavioral and emotional modulation to sensory input, inattention and distractibility to some input, and poor registration to input (proprioception – body position sense).

Michael required a variety of levels of assistance for all of his self-care abilities. Michael needed verbal cues and frequent physical prompts to wash and dry his hands and to put on his clothes and shoes. He needed clothes laid out and shoes opened and handed to him. He could not orient right and left sides of clothing items. He could eat with a fork and spoon but needed his food cut. He was bladder trained and could self-toilet, but he needed to be taken or reminded constantly to avoid accidents. He could do a bowel movement on the toilet only if directed by an adult who was monitoring a schedule. He had frequent incontinence of bowels.

**Initial treatment plan:**

A trial of craniosacral therapy to the meningeal tissues, dural tube, intracranial membranes, as well as supporting fascial network was instituted in the fall of 2004. The therapist providing the training was an occupational therapist who had 20

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years experience with sensory integration and neurodevelopmental therapies for the entire autism spectrum. Weekly one-hour sessions were scheduled as the initial trial. Within three months, Michael's responses and outcomes gave valid reason to continue the interventions.

Subjective clinical findings in the initial stage of CST included: significant cephalad drag on dural tube (membrane surrounding the spinal cord); cranial base compression with suspected tension on vagus nerve at osseous outlet; circular compression over superior skull (vacuum extracted birth) with cephaloplagy (misshapen) of parietal bones (top of head); bilateral temporal bone compression (bones behind the ears were pulled inward tightly); and restricted intracranial membranes in all directions (like shrink-wrapped plastic a size too tight).

**The first aim of craniosacral therapy is to reduce any tissue tension or restrictions on vital nerves and centers that may be contributing to that sympathetic and chronic state of stress.**

craniosacral therapy is to reduce any tissue tension or restrictions on vital nerves and centers that may be contributing to that sympathetic and chronic state of stress.

Michael was demonstrating a positive response to the intervention in that regard.

Michael still was demonstrating hypersensitivity to sound. He was extremely sensitive to any intervention in and around the vestibular apparatus or the temporal bones (bone where the ears are attached). In fact, he vomited on two occasions with minimal treatment to

participated in the sessions, lying down on a treatment table for anywhere from 30-60 minutes, which was itself a huge change in his tolerance and trust in his environment.

Michael's grandmother and/or mother attended every session. A few strategies for a home program have also been taught to them, and they performed these techniques within the realm of their own comfort level and understanding of anatomy and physiology. Within four months of weekly sessions, the frequency of treatment sessions was reduced to bimonthly sessions.

Following is a summary of the collected observations from family, school special ed staff, and speech therapists of changes and progress (some expected, but some surprising) Michael demonstrated following the initial six sessions over the span of six weeks and five hours of direct intervention:

1. Cessation of all headaches (unexpected progress so not identified as a specific need at onset of treatment). Family members were certain when Michael had his frequent headaches.
2. Increased tolerance of other students around him at school with an obvious reduction in aggression.
3. Better work performance at school (general observation, not specifically measured).
4. Very few episodes of incontinence, even using the bathroom at school. He previously would never use the school's bathroom.
5. Noticeable reduction in aggression to others outside of school.
6. Purposefully seeking out others to play with, instead of hurting them.
7. Increase in active attempts to talk, verbalize, and vocalize.
8. Typing better with speech therapist and paraprofessional at school in early facilitated communication efforts.
9. Observable improvement in deep inhalation with respirations. Prior to intervention, breathing was rapid and shallow.
10. Having better days, in general, the first two weeks. However, Michael did have a few smaller episodes the last two weeks of treatment. Grandma was taught the technique of inducing a still point (which is believed to induce a parasympathetic state) and Michael then slept through the night and had a very good day the next day.

### **Therapist's interpretation of responses:**

Several of the noted changes can be attributed to improved parasympathetic functioning of the nervous system with a reduction in Brandon's sympathetic bias (a common struggle with sensory dysfunction). With chronic sympathetic nervous system firing, many other areas of function can be impaired. The first aim of

these areas. I suspect he has a significant vestibular processing issue and great care will be given moving forward to avoid stressing that center, while at the same time attempting to resolve underlying tissue restrictions. Following the second incident, Michael took my hands and placed them back on his head behind his ears, indicating he wanted me to continue working at that spot. Michael eagerly

### **Summarizing additional progress notes:**

Michael continued to make progress even after the frequency was reduced to bimonthly craniosacral therapy sessions. We have tested reducing the frequency. He continues to demonstrate early signs of increased stress if he goes longer than 3-4 weeks without a session.

Some additional changes that have been observed over the course of the last three years have included, but are not limited to:

1. There is currently no longer any concern with elopement or running away from group activities in any environment. Michael remains attentive, calm, and relaxed 90 percent of the time. There are no longer any behavioral strategies needed to control unsafe or aggressive outbursts. Many people have commented that they are no longer afraid of him. His calm, alert, attentive state of readiness has helped him benefit from his special education programming and less staff time is required to manage his behaviors.
2. Michael can now be dropped off at the outside door of the school and walk by himself to his classroom without getting lost or demonstrating any problematic behaviors. He has also become 50 percent more independent in transitioning himself between his middle school classrooms.



**3.** Without working on specific skills or motor planning, Michael can now dress himself independently, only requiring the clothing laid out in proper orientation. He can put on and close velcro shoes, though his speed of performance is still somewhat problematic.

**4.** Part of his nonverbal difficulties included an inability to direct, execute, and control tongue movements. Just this summer he was able to stick out his tongue and lick ice cream successfully off a cone.

**5.** Michael stays on task as often as 50 percent of the time and needs 90 percent fewer verbal cues and physical prompts.

**6.** Last year, at the age of 14, Michael was able to take a long car trip to the West Coast without any meltdowns the entire trip. He was able to stay overnight in unfamiliar surroundings and even slept through the nights. On the trip, instead of being fearful and anxious with new people and situations, he was consistently social and tolerant of events. On a subsequent family trip via air travel, Michael had not one stress episode on the plane, acclimated to the beach house, participated in family activities, and actively engaged in recreational activities with family members.

**7.** Formerly, Michael had a long history of food aversions and a diet that severely limited textures and tastes. In fact, specific treatment to address oral sensitivities previously did not produce significant changes. He had to be coerced, prompted, and encouraged to eat every meal. However, indirectly during his process of receiving CST, Michael began and is now guiding himself toward food when he is hungry as well as starting to communicate his food preferences. Though he still eats rather slowly, he eats large and full meals and tries new foods – at least a trial bite – willingly without stress. If he doesn't like a new taste, he will politely push it away.

**8.** Michael can now type single phrases at home and in school using facilitated communication, and he can do so with several different people. He also started tolerating working on two-hand typing in school.

**9.** Michael is exhibiting a sense of trust in people and settings.

**10.** Michael is also understanding more and more commands and his follow through with requests has increased – not only with adults, but even with his classmates' requests.

**11.** Michael has not had a single bowel movement accident for one-and-a-half years. Though still needing some assistance, he can now complete wiping hygiene following a bowel movement 50 percent of the time. Previously, he was too fearful to even attempt this task.

**12.** Michael no longer shows symptoms of sound sensitivities. He no longer covers his ears with his hands. He allows a good deal of CST work around his ears and temporal bones. In fact, he even asks for it.

**13.** Last year Michael was in such a reliable state of being calm and focused, his family sent him to a bike riding training camp (this was after years of trying to ride a regular bike). Until then he was only able to ride a large tricycle. Within one week, he mastered riding a two wheeled bike with no training wheels and he continues to do so. Now he can take up to a six-mile bike ride with his family, though he still cannot motor plan the foot brake.

**14.** Michael demonstrates a [new] remarkable ability to "go with the flow" and not require rigid schedules, routines, furniture arrangement, etc. Prior to the onset of CST, Michael frequently and predictably had major tantrums and fear reactions entering new situations. By way of example, many times the family had to leave a store prior to even entering because Michael got scared and freaked out in the parking lot, often requiring maximal physical restraint from a group of adults. But just recently, his family had to attend to an emergency medical situation forcing them to leave Michael in the care of a family friend with no preparation time. These friends were just about to go to a wedding and they said if Michael could come to the wedding, they would take him. Michael surprised everyone by remaining calm, alert, interested, and

engaged through the entire ceremony, even though it was an unfamiliar church, unfamiliar people, and even in an unfamiliar part of town. This same person told the family she wouldn't hesitate to take Michael anywhere at any time. In fact, just this summer, he went camping with these same friends (without his primary caregivers).

### Summary:

Michael not only responded to initial craniosacral therapy with some significant progress in reducing sympathetic nervous system behaviors (fight-or-flight, fear, anxiety, aggression, terror), he continued to gain spontaneous skill development as prolonged treatment appeared related to keeping his parasympathetic nervous system prominent. Parasympathetic manifestations include: calmness, relaxation, readiness to learn, readiness to be social, and learning from sensations. The initial gains occurred fairly quickly (five sessions), and newly-emerged skills were demonstrated spontaneously throughout the course of long-term CST. Dr. Upledger's theory is that injury and other brain dysfunction blocks the system from developing. If CST can remove those barriers that block the organ from functioning well, than development can proceed on its own course.

One supposition about why we see these kinds of positive changes following CST treatment is that the lower brain centers dominate when stress is chronic and this, in turn, may deprive the higher brain centers (executive functions). Of course, there are many other theories of why these changes occurred for Michael. The most important thing to close with here is that:

- ❖ His family's quality of life greatly improved because Michael improved;
- ❖ The level and intensity of caregiver and special ed staff requirements were greatly reduced; and
- ❖ Michael started showing evidence that he was enjoying his life and was mastering skills.

None of this existed prior to the onset of CST in his programming.