

## INTRODUCTION

Infant feeding difficulties are a common complaint from parents. Feeding is a complex process which requires muscular/neurologic coordination for sucking and swallowing along with the integration of breathing and esophageal function. Somatic dysfunction, produced by the forces of labor and delivery, may adversely affect feeding in the neonatal period. This case describes a newborn with severe somatic dysfunction at birth and feeding difficulties, which improved after Osteopathic Manipulative Treatment (OMT).

## CASE DESCRIPTION

### History of Present Illness

One day old female born via spontaneous vaginal delivery at 40 weeks gestation to a 23 year old mother G2P1011 was seen at St. Barnabas Hospital for a routine new baby osteopathic structural exam and treatment. At the time of examination, both Mom and Dad expressed concern that their baby was unable to latch on to breast or bottle, was spitting up frequently, and not crying. They were also concerned over the baby's appearance as the head was misshapen with a large hematoma. At time of delivery patient's apgar scores were nine at one minute and nine at five minutes. At both times patient was reported to have good respiratory effort/crying, active motion, body pink with blue extremities and a cough or sneeze with response to nasal catheter. Birth weight was 2.75 kg, length 47cm, and head circumference 33cm. Mom reports that during delivery she pushed for greater than six hours and she received an epidural to help manage the pain.

### Perinatal History

Mom and Dad were poor historians and prior medical records were not available as they recently moved from California. Mom reports a being in a monogamous relationship with one lifetime partner, took prenatal vitamins and never smoked or did illicit drugs. Prior pregnancy terminated in a miscarriage. Mom reports that in California her obstetrician wanted to perform a cesarean delivery at 35 weeks because her "belly was not growing enough and the baby didn't have enough room inside."

### Physical Exam

General Exam: Well developed and term newborn. Adequate size for gestational age. Not in acute distress. Poor suck coordination.  
 Head: Molded with hematoma and asymmetric. Anterior and posterior fontanelles patent and appropriate for age.  
 Eyes/Ears/Nose: Eyes bilaterally react to light, red reflex present and without discharge. Ear size, shape and placement even bilaterally. Patent nostrils.  
 Cardiopulmonary: Blood pressure upper extremity 64/32 and lower extremity 69/31, Heart Rate 138, Respirations 40 with breath sounds equal bilaterally and no signs of respiratory distress.  
 Abdomen: Soft, without distension, no hepatosplenomegaly, three vessel cord.  
 Spine: Intact, no dimples.  
 Extremities: Five fingers/toes bilaterally, no clavicular fractures, and Barlow's and Ortolani tests negative.  
 Reflexes: Root, Moro, Upper/Lower Grasp, and Stepping all present.

## Osteopathic Structural Exam

Head/Cranium: Sphenobasilar synchondrosis compression, lateral strain with greater wings to the left, occipital squama rotated with opisthion to the right, bilateral condylar compression with occiput intraosseous strain and associated membranous strain. Reduced amplitude of the primary respiratory mechanism (PRM) noted throughout.

Cervical: Fascial strain extending into right thorax.

Thoracic/Lumbar spine: Flexed with left side bending.

Pelvis: Ilii bilaterally inflated and compressed medially with acetabular intraosseous strains.

Sacrum: Bilateral lower pole sacral iliac joint restrictions, right core link strain, and decreased PRM.

Lower Extremities: Bilateral hip internally rotated with medial compression right greater than left, right talipes equinovarus, right tibia-fibula intra and inter osseous strain.

Upper Extremities: Bilateral arms held in close proximity to the thorax.

Ribs: Decreased respiratory motion in bilateral upper ribs.

## Assessment and Plan

One day old female born at 40 weeks via spontaneous vaginal delivery with a prolonged active labor phase to a nulliparous mother. Patient was found to have a poor, ineffective, and not well coordinated suck and the above noted somatic dysfunctions, most notably a decrease in amplitude of the PRM, strains throughout the pelvis and lower extremities, compression within the condyles, SBS compression, lateral strain, and associated membranous strains. Overall, the tissues of baby girl felt dry and compressed, a typical finding with intrauterine growth restriction (IUGR) or Oligohydramnios. Mom reported a history of "baby not having enough room", however baby girl was of adequate size for gestational age so IUGR could be ruled out.

Osteopathic manipulation treatment (OMT) was performed to the areas of somatic dysfunction to increase amplitude of PRM, improve coordination of suck, improve distortion of the cranium, and promote growth and development. Patient tolerated treatment well, without complication and OMT was to be performed again the following day. It was recommended to the parents to bring the infant to the osteopathic manipulative medicine (OMM) clinic for further treatments.

## Treatment

Baby Girl was treated twice with OMM before being discharged home with parents. On the initial exam she was found to have visible distortion of the cranium with holding of the upper extremities tight to the thorax. Baby Girl was not able to latch or suck when a gloved finger was introduced and had a very weak cry. Gentle OMT, utilizing osteopathy in the cranial field, balanced ligamentous tension, and myofascial release was performed to the areas of somatic dysfunction. Treatment was focused on the inter/intraosseous cranial strains, membranous strains, and compressed condyles to reduce crowding of CN XII at the foramen magnum to allow for a more effective latch and suck. Treatment was also directed to the pelvis/sacrum/lower extremities to improve the PRM and remove the strains that contributed to the talipes equinovarus.

## Treatment continued

After the first treatment, upon returning baby girl to the parents the father exclaimed "her head looks so much better and the hematoma is smaller!" The next day before the second treatment the parents reported the patient was able to latch and feed well and the frequency of spitting up decreased. Upon examination baby girl was found to be sucking on her fist, reaching her arms away from her thorax, the talipes equinovarus had reduced to a mild inversion, and the symmetry of her cranium drastically improved. The hematoma was nonexistent. The second OMT was directed to continue removing the inter/intraosseous and membranous strains and to improve amplitude of the PRM. By the end of the treatment there was a notable change in the quality of tissues. Baby girl felt full of fluid, had a full cry and increased PRM. Continued outpatient OMT was recommended, however the patient was lost to follow up.

## DISCUSSION

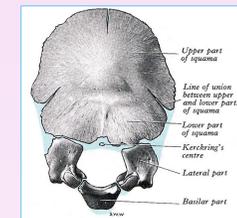
Sucking and swallowing in the infant is an essential skill for survival. The act of infant feeding does not just involve sucking and swallowing but rather the integration and coordination of sucking, swallowing, breathing and esophageal function. [1,2] This involves a complex series of motor and sensory actions involving the lips, tongue, mandible, palates, pharynx, larynx and esophagus requiring the involvement of at least 26 muscle pairs, 5 cranial nerves, and cervical/thoracic spinal nerves. [3] Each of these structures can be affected by somatic dysfunction caused by the forces of labor and delivery. The severe cranial somatic dysfunction in the cranial base in this case likely produced entrapment neuropathy of CN 12 affecting the strength and coordination of suck, as well as CN 10 and 11 affecting swallow, and contributing to her spitting up. [1,3,4]

The infant skull is very pliable, a necessity for the birthing process, and therefore is highly susceptible to the mechanical forces that present during labor and delivery. [4] At birth the cranium has no formed sutures, and many bones are in parts, which allows for compression and molding of the head as it flexes, rotates and extends to pass through the bony pelvis. The developing occiput is especially vulnerable to these compressive forces as the OA is the only fully formed articulation in the head, and absorbs much of the forces of labor. This includes the condyles themselves, which are in 2 parts at birth, with CN XII passing between them. [1,4,6]



## Discussion continued

At birth the occiput is comprised of four parts united by cartilage: the basiocciput, the two lateral masses or condylar parts and the squama with its upper most area formed in membrane. The four parts form the margin of the foramen magnum through which the spinal cord passes. Through the junction of the condylar parts and the basiocciput is the hypoglossal canal from which CN 12 passes, a nerve important in motor innervation of the tongue. The junction between the anterolateral border of the condylar part and the temporal bone forms the jugular foramen through which CN 9, 10, 11 and the internal jugular vein pass. CN 10 and 11 are important for motor innervation for the muscles of the pharynx and larynx. [1,4,6]



During delivery the occiput can be crowded anteriorly into the facets of the Atlas, with rotation of the squama adding to the distortion of its 4 parts. The degree of strain is related to the compressive forces, length of labor, disproportion between the passage and passenger, or pull of the membranes. Difficult births with greater forces increase the likelihood of affecting nearby cranial nerves. [1,4,6] In this case the patient was found to have bilateral condylar compression likely causing entrapment of CN 12, affecting the motor function of the tongue and the ability to suck. The rotation of the squama would have carried the R lateral mass laterally, crowding the jugular foramen, likely affecting CN 10 and 11 impacting ability to swallow.

## CONCLUSION

Difficulties with feeding is a common problem in infants. Approximately 25 to 45% of full term normally developing infants and as many as 80% of preterm or other types of developmentally delayed infants experience difficulties with sucking and swallowing. [2] These difficulties can result from ineffective coordination of the muscular and neurologic components that can be created by somatic dysfunction caused by forces of delivery and labor. [1,4,6] Only Osteopathic physicians are trained to recognize and treat these dysfunctions, preventing immediate and long term impediments to growth and development. The response of this baby to OMT suggest her feeding issues were caused by the severe somatic found in her cranium. The tenets of osteopathic medicine state that structure and function are reciprocally interrelated and this case is an example of how OMT of the cranial base somatic dysfunction can improve suck and swallow in an infant.

## References

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