



Chiropractic Newsletter

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The Cranial Floor and the Infant Occiput

The human body is an amazing and absolutely beautiful piece of ingenuity! As a chiropractor who focuses on breastfeeding support, and as a regular instructor in that specialty, I zero in on the infant's skull (cranium) for the answers to many questions. I LOVE anatomy and how it allows me not only to explain what's going on, but also to put the pieces of a puzzle back together, and make the whole thing work again. Each day in my clinical practice, I'm like that little kid who is constantly taking the radio apart, putting it back together and learning how all of the pieces work together. Now... I'm not literally taking the pieces of a human apart, but you get the point. Lately, I've been fascinated by the cranial floor—composed mostly of the Occiput and the adjacent Temporal bones. I am endlessly in awe of what it does and how perfectly it is designed. Let's talk about these amazing structures in more detail.

The Occiput is an incredible piece of technology! Most of us think of it as just “the back of the head”. But if we look at it closer, especially the newborn Occiput, it is a very detailed and intricate piece of the puzzle. The newborn Occiput is actually in 4 separate pieces, connected only by cartilage.

The Squamous Part Is the larger, rounded part that forms the back of the head. It initially develops in four segments and is fused in the third month of fetal development. That is all we can see of the Occiput from the outside, but it definitely doesn't end there.

The Lateral Part This segment is in two parts connected by cartilage at birth. This is part of the “cranial floor,” meaning that they lie flat at the bottom of the skull. These two segments make

up most of the Foramen Magnum (which houses the brain stem) and form the Occipital condyles, which then link perfectly (just like a Lego) to the first neck vertebra (often called the Atlas). This union of the condyles of the Occiput and the Atlas form a “pivot” joint, with the second neck vertebra (the axis), meaning that it has a wide rotational range of motion and allows for all of the rotation of the head. These two lateral parts don't fully fuse (become solid) until 4 to 6 years of age. This means that there is significant movement possible between these segments of the Occiput.

The Basilar Part Lies just in front of the Lateral parts and is the bottom most part of the Occiput in the cranial floor. This piece unites with the Sphenoid bone and forms the Sphenobasilar joint. The Sphenobasilar joint plays a crucial role in the flow of CSF (cerebral spinal fluid) and the alignment of the palate, but that's a whole other article!

The fibrous joints between these segments are a game changer when it comes to the motion of the Occiput and how that affects the overall cranium.

The first fibrous connection we come to is between the bigger Squamous part and the lateral parts. This allows the Occiput to bend...A LOT...while still allowing the lateral and the basilar parts to remain flat to the cranial floor. This is a very wise built-in protective measure and example of the body's innate wisdom. If the Occiput was solid and not able to bend there, then the brain stem would be severely compromised during the birth process. This joint acts as a cushion, giving way and allowing the brain stem to remain stable in the Foramen Magnum.

At the same time, the fibrous parts of the lateral segments, which make up the

Foramen Magnum and surround the brain stem, also act as a buffer for the sometimes drastic torsion of the upper cervical spine (neck). Remember that those two structures are attached together by a “Lego-like” fitted joint. In the case of upper cervical misalignment and strain, which often occurs during the birth process, the fibrous nature of the Occipital condyle acts as a spring, also protecting the brain stem region from further injury. Distortion of their mutual relationships may and frequently does distort the Foramen Magnum.

It may surprise you to learn that the measured forces of birth, ranging from an “uncomplicated” to a very difficult delivery, range from 29 to 79 pounds of pressure exerted on the newborn's delicate spine and cranium (1). That range is actually almost exactly the same force measured that causes a significant injury to an adult during a motor vehicle accident (2)! If it were not for these innate protective mechanisms in the newborn body, there would be catastrophic injuries sustained just trying to enter this world.

An osteopathic doctor by the name of Viola Frymann was a groundbreaking woman in her profession as well as a founding member and past president of Osteopathic Physicians and Surgeons of California (OPSC) and of the Cranial Academy. She dedicated much study and attention to newborn anatomy and physiology. In her book, “The Collected Papers of Viola M. Frymann: Legacy of Osteopathy to Children” (3J), she reminds us of other very important residents of the cranial floor:

- The Hypoglossal nerve passes through the Hypoglossal canal, which is right behind each Occipital condyle in the Lateral part and is

housed in cartilage. This nerve is the main motor nerve to the tongue and allows the actions of sucking, achieving a seal necessary for milk transfer, and speech.

- Immediately nearby is the Jugular Foramen. Bilaterally, the jugular vein leaves the skull here and provides drainage for 95% of the blood from the head.
- Also living in the Jugular Foramen are the Glossopharyngeal and the Accessory nerves, which control the action of swallowing and...drum roll please...the all so famous Vagus nerve! The Vagus nerve has a huge role in our basic life-sustaining functions, as it controls the digestive system, circulatory system, and respiration just to name the main ones.

This point bears repeating: Distortion of the mutual relationships of the segments of the Occiput may and frequently does distort the Foramen Magnum...and all of the cranial nerves and blood vessels located nearby.

Sooooo... what is the main point with all of this anatomy geek rambling? The take-home message is this—The newborn cranium is not fused to each other segment and has a unique pattern of motion. This motion, as shown in the newborn Occiput, acts as a protective measure against the potentially damaging forces of birth.

However, as a result of the osseous nature of it all and the extra motion that is possible, the Cranium (and the cranial floor) is also often distorted during the birth process. This can result in a myriad of newborn difficulties. One consequence that often shows up immediately is difficulty with breastfeeding. The alignment of the Occiput, and its effect on the bones that

it is attached to (including the Temporal bones), in turn impacts the alignment of the jaw and the palate. It also impacts the mobility and strength of the tongue by way of tethering it at the origin and insertion points AND compromising the cranial nerve that controls it all... the Hypoglossal nerve.

Due to its effect on the brainstem, and the Vagus nerve, and the cerebral spinal fluid pressure, the stability of the newborn Occiput is critical for the lifelong development and neurological health of the child.

So, what now? Your child may be affected by a cranial floor compromise if he or she has or is experiencing any of these things:

- A difficult birth, prolonged labor or pushing period, or any excessive force during the birth process.
- A distorted head shape (elongated, narrowed, shortened, wide) or a preference to turn his or her head in one direction.
- Difficulty with breastfeeding, including a poor latch (that is often painful for the parent), restricted or weak tongue function, a high palate, falling asleep at the breast, or poor transfer (not getting enough milk).
- General fussiness and inability to be settled.
- Excessive digestive distress: gassiness or reflux (spitting up).
- Difficulty swallowing.
- Showing any signs of developmental delays or neuro-diversities.

In any of these situations, he or she will need some help to reestablish the normal alignment of the cranial

floor. Seek out a qualified pediatric chiropractor who has been trained specifically in infant cranial work. These adjustments are incredibly gentle, performed with the pressure that you might press on your eyeball and have been found to be safe and effective for a variety of common newborn challenges (4) AND can help to just ensure the optimal health for your baby! Who doesn't want that for our children?

-Lynn Gerner, DC

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