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Integrative Pediatrics & Manual Therapies



OBJECTIVES

1. Understand the role of manipulative therapies in treatment of children
2. Define key aspects of manipulative therapies and their use
3. Understand the role of body based treatment in integrative care
4. Understand the physiological rationale for such treatment



National Center for
Complementary and
Integrative Health

NCCIH

- Body Based Therapies Include:
- Massage/ Soft tissue manipulation
- Chiropractic
- Osteopathic
- Acupuncture
- Feldenkrias/ Movement Therapies
- <https://nccih.nih.gov/research/statistics>

Manipulative Therapies

- Soft Tissues:
 - Involving manipulation of the dermis, fascia, lymphatic, muscles to effect changes to the body structure or physiology
 - Hard tissues: Joints ligaments and their articulations

- Soft Tissue:
- Swedish Massage, Ayurvedic Massage, Counterstrain, Myofascial Release

- Hard Tissue: Chiropractic thrusting technique,
- Osteopathic HVLA, Muscle Energy

Medical Application of Manipulative Therapy

- Neuromusculoskeletal Medicine is that component of medicine concerned with implementing systems in understanding health and disease and managing patients. The practice of Neuromusculoskeletal Medicine directs special attention to the structural aspects of body function and their role in all disease processes, along with those strategies prescribed and or administered to enhance homeostasis within the body unit.

Principles

- The body is a unit; the person is a unit of body, mind, and spirit.
- The body is capable of self-regulation, self-healing, and health maintenance.
- Structure and function are reciprocally interrelated.
- Rational treatment is based upon an understanding of the basic principles of body unity, self-regulation, and the interrelationship of structure and function

Impairment in Structure Causes impairment in Function

- Restrictive Barriers of Function can be treated (Removed) using manipulative treatment.

Technique Types

- Indirect: Move tissue away from restrictive barrier to relax muscles and decrease and reset motor neurons
- Direct: Move through the restrictive barrier and re-establish proper range of motion.

Barriers Of Free Movement

- Chiropractic: referred to as vertebral subluxation
- vertebral subluxation complex is a dysfunctional biomechanical spinal segment which is fixated altering proper structural biomechanics.

Osteopathic

- *Somatic Dysfunction*
- Somatic dysfunction is defined as impaired or altered functions of related components of the somatic (body framework) system. It can include the musculoskeletal, nervous, or lymphatic systems.
- www.nationwidechildrens.org/somatic-dysfunction
- *Glossary of Osteopathic Terminology" (PDF). American Association of Colleges of Osteopathic Medicine. April 2009. p. 10. Retrieved 25 August 2012.*
- *Washington, K; Mosiello, R; Venditto, M; Simelaro, J; Coughlin, P; Crow, WT; Nicholas, A (October 2003). "Presence of Chapman reflex points in hospitalized patients with pneumonia.". The Journal of the American Osteopathic Association **103** (10): 479–83. [PMID 14620082](https://pubmed.ncbi.nlm.nih.gov/14620082/). Retrieved 7 December 2012.*

All Manipulation involves tactile kinesthetic stimulation

**TKS is associated with
increased production of**

**GH,
IL2,
VIP,**

decrease in cortisol levels

TKS

- **Facilitates weight gain in preterm infants**
- **Enhances attentiveness**
- **Alleviates depressive symptoms**
- **Reduces pain**
- **Reduces stress hormones**
- **Improves immune function**

Field, T. (1998). Touch therapy effects on development. *International Journal of Behavioral Development*, 22, 779-797.

Over 14,000 Studies
documenting effect of TKS

Procedures

- **Field, T. (1995). Massage therapy for infants and children. *Journal of Developmental and Behavioral Pediatrics*, 16, 105-111.**
- Data are reviewed on the effects of message therapy on infants and children with various medical conditions. The infants include: premature infants, cocaine-exposed infants, HIV-exposed infants, infants parented by depressed mothers, and full term infants without medical problems. The childhood conditions include: abuse (sexual and physical), asthma, autism, bulimia, burns, cancer, dermatitis, developmental delays, diabetes, juvenile rheumatoid arthritis, posttraumatic stress disorder, and psychiatric problems. Generally, the massage therapy resulted in lower anxiety and stress hormones and improved clinical course. Having grandparent volunteers and parents give the therapy enhanced their own wellness and provided a cost-effective treatment for the children.

Procedures

- Jones, N.A., & Field, T. (1999). **Massage and music therapies attenuate frontal EEG asymmetry in depressed adolescents.** *Adolescence*, 34, 529-534.
- EEG asymmetry, specifically (greater relative right frontal activation,) is associated with negative affect. Depressed adults show stable patterns of this asymmetry. The present study assessed the effects of massage therapy and music therapy on frontal EEG asymmetry in depressed adolescents. Thirty adolescents with greater relative right frontal EEG activation and symptoms of depression were given either massage therapy or music therapy. EEG was recorded for three-minute periods before, during, and after therapy. **Frontal EEG asymmetry was significantly attenuated during and after the massage and music sessions.**

Procedures

- **Hart, S., Field, T., Hernandez-Reif, M., & Lundy, B. (1998). Preschoolers' cognitive performance improves following massage. *Early Child Development & Care, 143, 59-64.***
- Preschoolers were given WPPSI subtests, including Block Design, Animal Pegs and Mazes, before and after receiving a 15-minute massage or spending stories with an experimenter. Results revealed that Performance on the Block Design improved following massage, and accuracy was greater on Animal Pegs in the massage group, particularly in more temperamental children.
- **Hernandez-Reif, M., Field, T., Largie, S., Diego, M., Manigat, N., Seoanes, M., & Bornstein, J. (2005). Cerebral palsy symptoms in children decreased following massage therapy. *Early Child Development and Care, 175, 445-456.***
- Twenty young children with cerebral palsy recruited from early intervention programs received 30 minutes of massage or reading twice weekly for 12 weeks. The children receiving massage therapy showed fewer physical symptoms including reduced spasticity, less rigid muscle tone overall and in the arms, and improved fine and gross motor functioning. In addition, the massage group had improved cognition, social and dressing scores on the Developmental Profile, and they showed more positive facial expressions and less limb activity during face-to-face play interactions.

Procedures

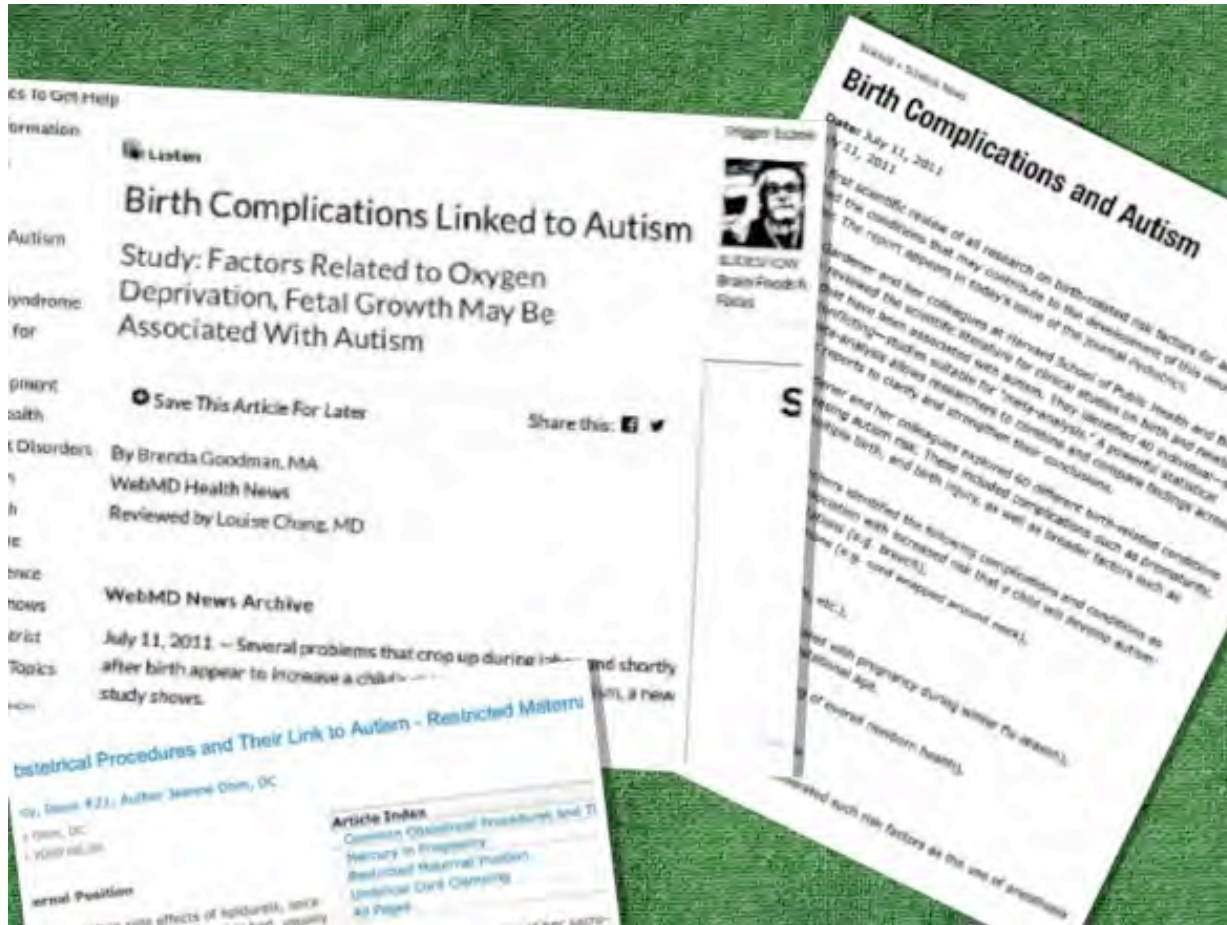
- Escalona, A., Field, T., Singer-Strunk, R., Cullen, C., & Hartshorn, K. (2001). **Brief report: Improvements in the behavior of children with autism following massage therapy.** *Journal of Autism and Developmental Disorders*, 31, 513-516.
- Twenty children with autism, ages 3 to 6 years, were randomly assigned to massage therapy and reading attention control groups. Parents in the massage therapy group were trained by a massage therapist to massage their children for 15 minutes prior to bedtime every night for 1 month and the parents of the attention control group read Dr. Seuss stories to their children on the same time schedule. Conners Teacher and Parent scales, classroom and playground observations, and sleep diaries were used to assess the effects of therapy on various behaviors, including hyperactivity, stereotypical and off-task behavior, and sleep problems. The children in the massage group exhibited less stereotypic behavior and showed more on-task and social relatedness behavior during play observations at school, and they experienced fewer sleep problems at home.
- Field, T., Lasko, D., Mundy, P. & Henteleff, T., Kabot, S., Talpins, S. & Dowling, M. (1997). **Brief report: Autistic children's attentiveness and responsivity improved after touch therapy.** *Journal of Autism & Developmental Disorders*, 27, 333-338.
- 22 autistic preschool children who had attended a special preschool half days for 2 years were assigned to 2 groups, touch therapy and a touch control group. Touch aversion decreased in both the touch therapy and the touch control groups, off-task behavior decreased in both groups, orienting to irrelevant sounds decreased in both groups, but significantly more in the touch therapy group.

Procedures

- **Hernandez-Reif, M., Field, T. & Thimas, E. (2001). Attention deficit hyperactivity disorder: benefits from Tai Chi. *Journal of Bodywork and Movement Therapies*, 5,120-123.**
- Thirteen adolescents with Attention Deficit Hyperactivity Disorder (ADHD) participated in Tai Chi classes twice a week for 5 weeks. Teachers rated the children's behaviour on the Conners Scale during the baseline period, after the 5 week Tai Chi session period and 2 weeks later. After the 10 Tai Chi sessions the adolescents displayed less anxiety, improved conduct, less daydreaming behaviours, less inappropriate emotions, and less hyperactivity. These improved scores persisted over the 2-week follow up (no Tai Chi period).

- *What if the functional restriction or barrier occurs at birth?*

Highly Associated With Initial Birth Trauma



Autistic children are 12 times more likely to suffer birth trauma or complication than their non-autistic siblings.

A British study reported on high rates of autism in one specific hospital near London. This hospital had an autism birth rate 21 times higher than that of neighboring hospitals. It was the policy of this hospital to schedule all mothers for elective C-sections one week prior to their due dates.

- *Osteopathy*
- *Osteo---gr. Structure of the living organism or structure of life*
- *Pathos---gr. Deep force within the organism which causes blockage or “suffering” in all aspects of ones life*

Birth

- Is the process of
- coordinated,
- efficient, involuntary contractions that lead to progressive cervical effacement, dilatation, descent, and delivery of the new born baby



All Births Are Not Ideal

- **Poor maternal nutrition**
- **structural inadequacies before pregnancy**
- **drug use**
- **psychosocial stress**
- **inadequate preparation for labor**
- **inadequate first breath secondary to anesthesia use**

But What If

- The process of birth is not a
- coordinated
- efficient
- natural

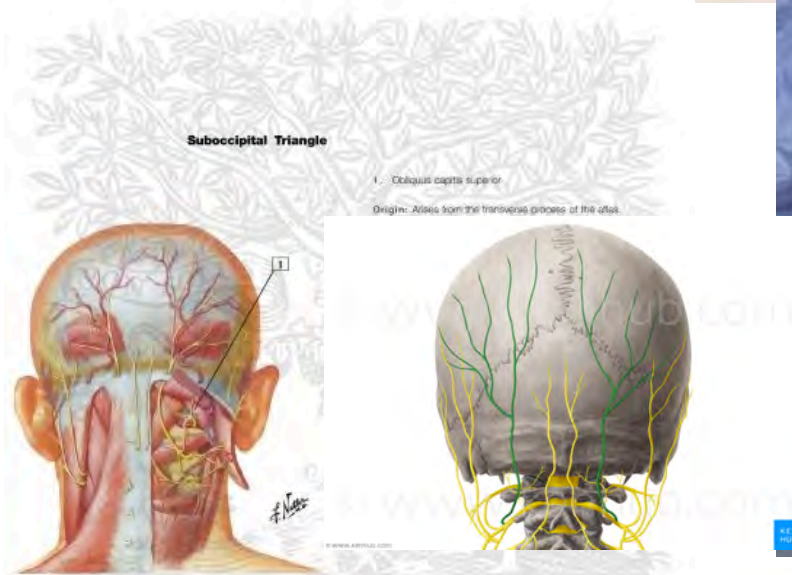


What if the LABOR IS

- **Prolonged**
- **complicated**
- **difficult**



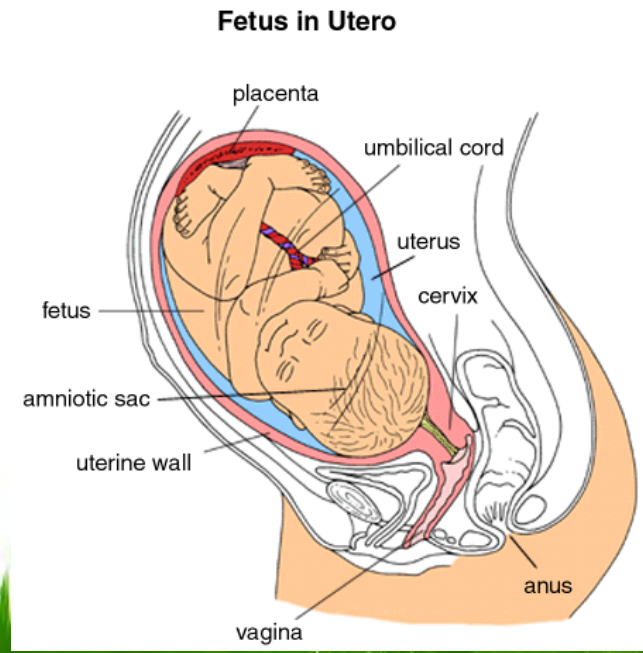
In both a cesarean section and a vaginal delivery an infant's neck can be hyperextended. Strained muscles and connective tissue can compress the blood vessels and nerves.



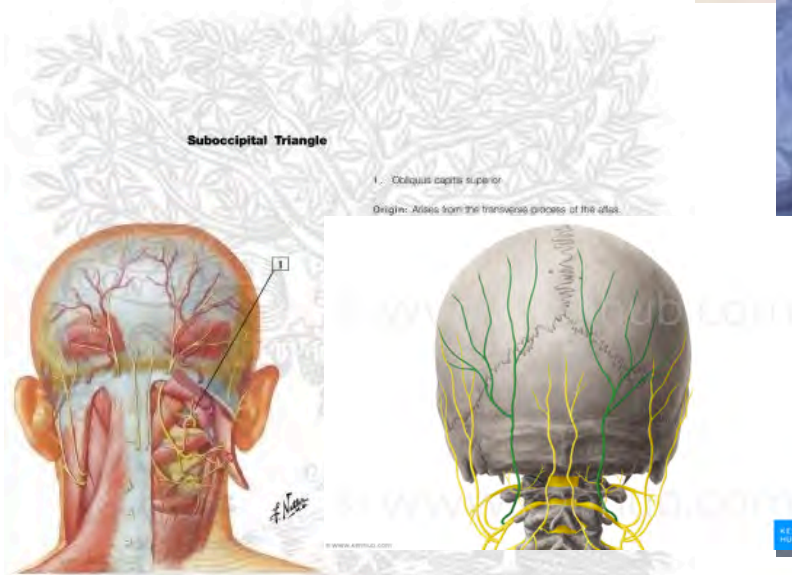
ELSEVIER

During a normal delivery

- As the head descends into the pelvis the pubic bone exerts pressure on the presenting part of the skull
- If these forces exceed the limit of the tissue the baby's head may become strained. If these strains are not treated they become dysfunction.



In both a cesarean section and a vaginal delivery an infant's neck can be hyperextended. Strained muscles and connective tissue can compress the blood vessels and nerves.



ELSEVIER



Extreme Extension



Signs & Symptoms

- **First Born**
- **Prolonged labor**
- **Rapid Labor**
- **Induced Labor**
- **Multiple Labor**
- **C-Section**
- **High Risk Pregnancy**
- **Maternal Illness**

- **Respiratory Problems**
- **Poor Suckling**
- **Irritability**
- **Sleeplessness**
- **Vomiting**
- **Eye Movement Problems**
- **Ear Infections**
- **Recurrent Infection**

Was there

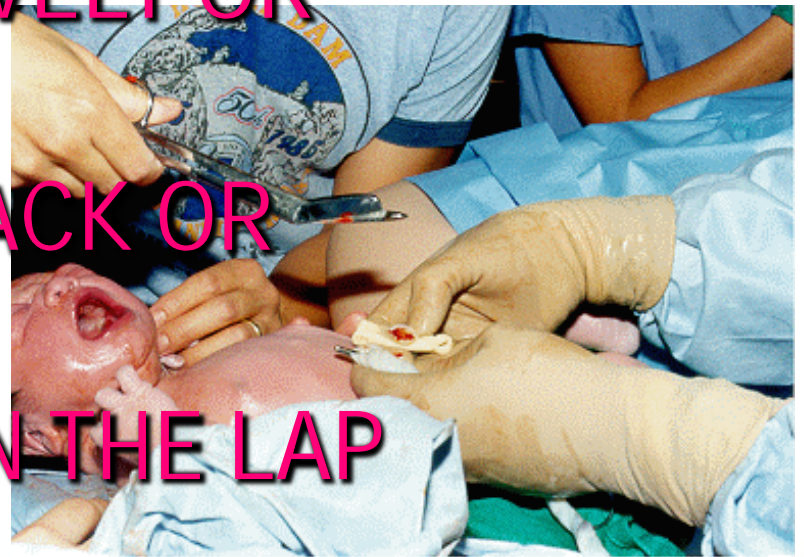


■ DIFFICULTY IN LEARNING TO SUCK EFFECTIVELY

■ CHILD CRY EXCESSIVELY OR INCONSOLABLY

■ THROW HIS HEAD BACK OR ARCH HIS SPINE

■ PREFER TO STAND IN THE LAP RATHER THAN SIT



**THESE ARE SIGNS THAT
TRAUMA HAS OCCURRED**

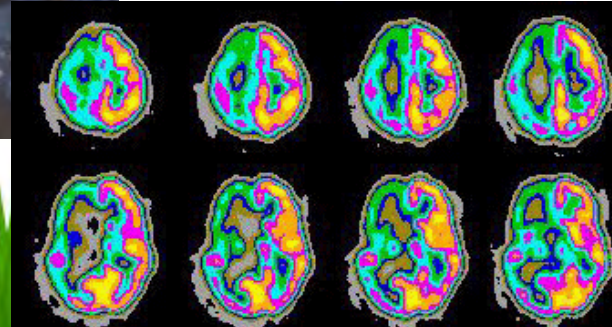
**TO THE SOFT TISSUE
OF THE BABY**

***IN A BABY ALL
TISSUE IS SOFT
TISSUE***

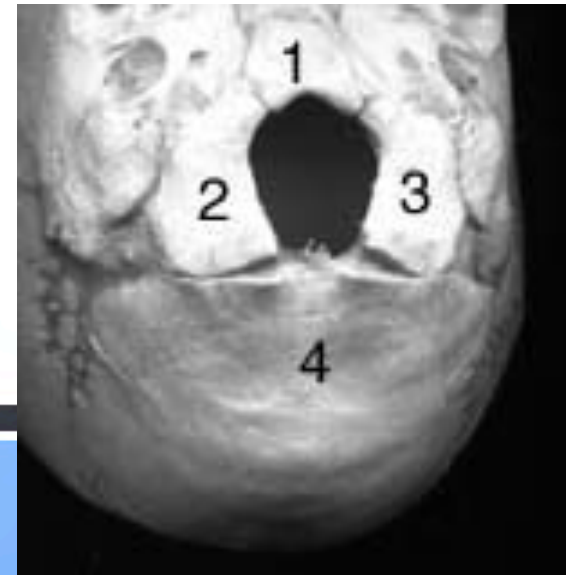
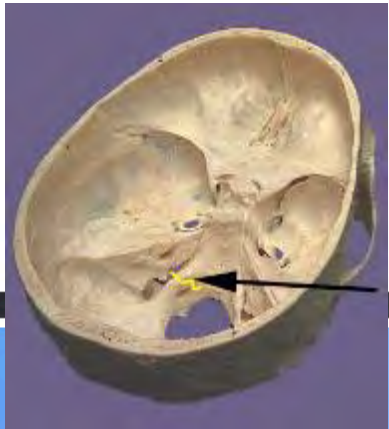


A SECOND PROBLEM

At delivery the neck may be hyper extended upon the occiput (base of skull) causing compression of the occiput (base of skull) on the atlas (first cervical vertebrae) and muscle imbalance affecting nerve supplies and blood flow to the brain



this may cause compression of the jugular foramen causing irritation to the vagus nerve and jugular vein which pass through this area



The jugular foramen which contains the vagus nerve and jugular vein which drain 98% of the blood leaving the skull is an area particularly vulnerable to injury



An anatomical dissection of a human torso, showing a cross-section of the abdominal wall. The image displays various muscles, including the external oblique and internal oblique, and the white, fibrous covering known as fascia. The dissection is performed on a dark surface, and the lighting highlights the texture and color of the tissues.

The fascia is the white covering over the muscles

If there was significant trauma the consistency of the fascia will be changed

it may cause the the problem to persist for years

The vagus nerve is the longest of the cranial nerves.

Has branches that go to the :

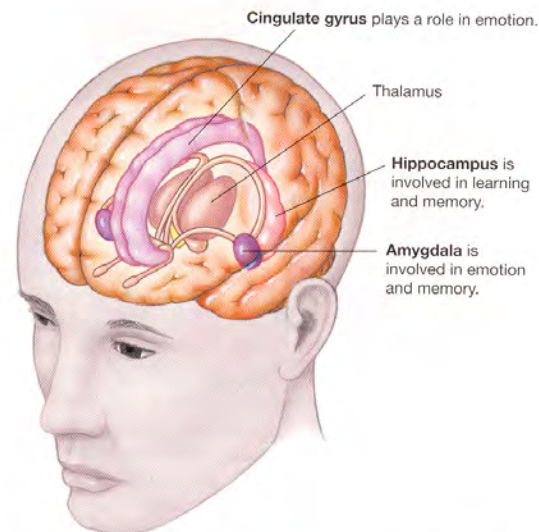
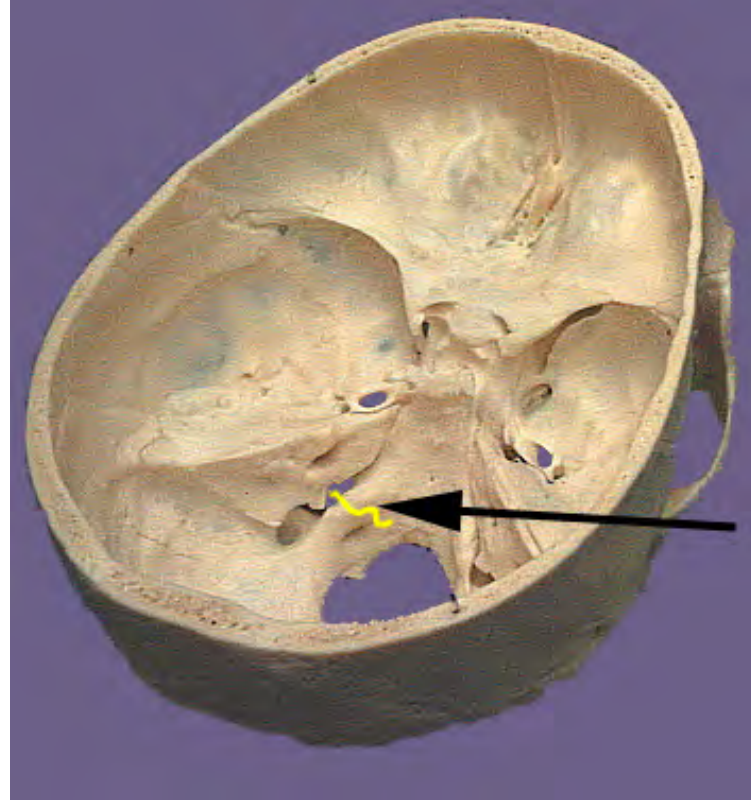
EAR

HEART

GASTROINTESTINAL SYSTEM

AND DEEP IN THE BRA

THE AMYGDALA



● Figure 9-13 *The limbic system* Anatomically, the limbic

An illustration on the left side of the slide. It features two hands, one from the top and one from the bottom, reaching towards each other. The background consists of stylized clouds in shades of blue and green, a large gear with a jagged edge, and a partial sun or moon in the bottom right corner. The overall style is flat and modern.

Figure 1

Brainwaves in seizure, ADHD,
and autism spectrum disorders

SEIZURE DISORDER

Left Temporal Lobe &
Amygdala
30-100 cps (gamma waves)

HYPERACTIVITY/ ADHD

Frontal Lobe & Amygdala
10-14 cps (alpha waves)

AUTISM

Frontal, Prefrontal and
Temporal Lobes & Amygdala
1-7 cps (delta waves)

GASTROINTESTINAL DYSBIOSIS

**HYPERSENSITIVITIES TO THE ENVIRONMENT
INCLUDING SOUND PERCEPTION,
ELECTROMAGNETIC FIELD REACTIONS**

**YEAST OVERGROWTH, DEVELOPMENT OF GLUTEN-
CAESIN-SOY SENSITIVITY,**

**HYPERPRODUCTION OF NEUROTRANSMITTER SUCH
AS SEROTONIN**



**TO LOSS OF RECEPTIVE (UNDERSTANDING) AND
EXPRESSIVE (BEING ABLE TO SPEAK)LANGUAGE.**



If fascia (connective tissue) is damaged during delivery

- **The tissue becomes more solid resisting deformation or change in shape causing the nerve and blood flow problems to persist**



When fascia is in a solid state

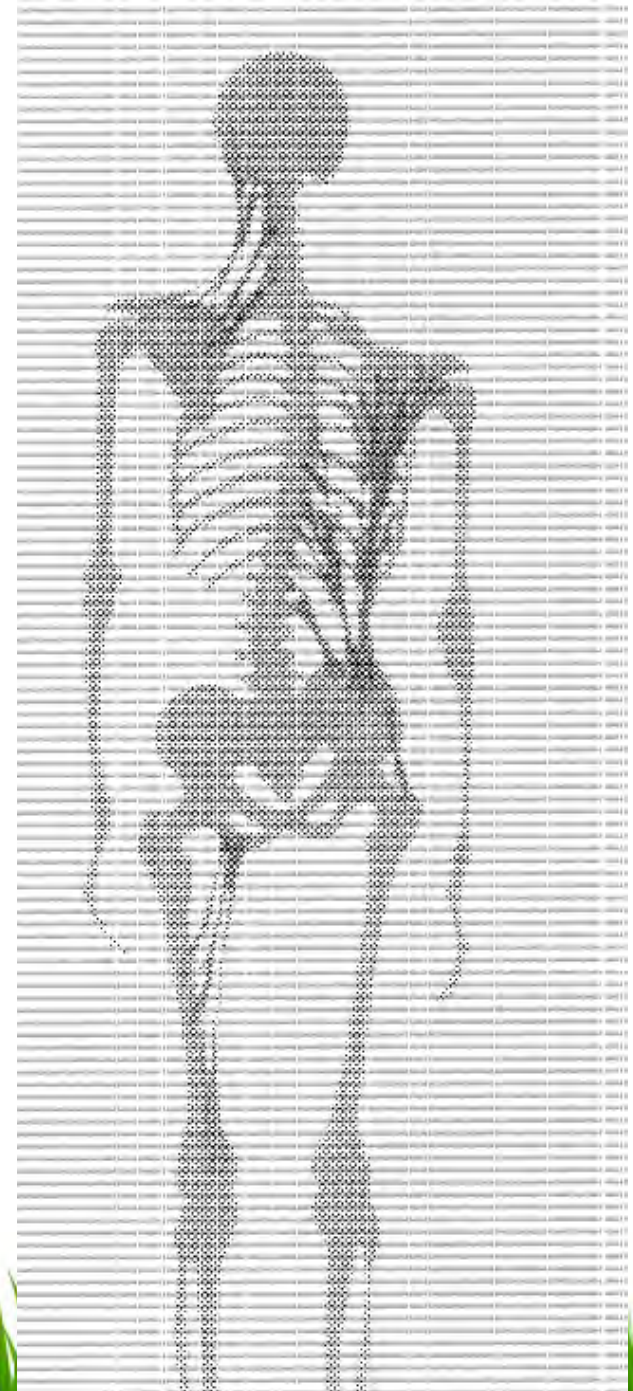
- Adhesions can form within the fascial layers themselves as collagen fibers become intertwined and glued to each other. This type of adhesions is called cross linkages.
- The underlying muscles conform to the shape of the fascia
- Muscles change their basal rate of firing (gamma gain)



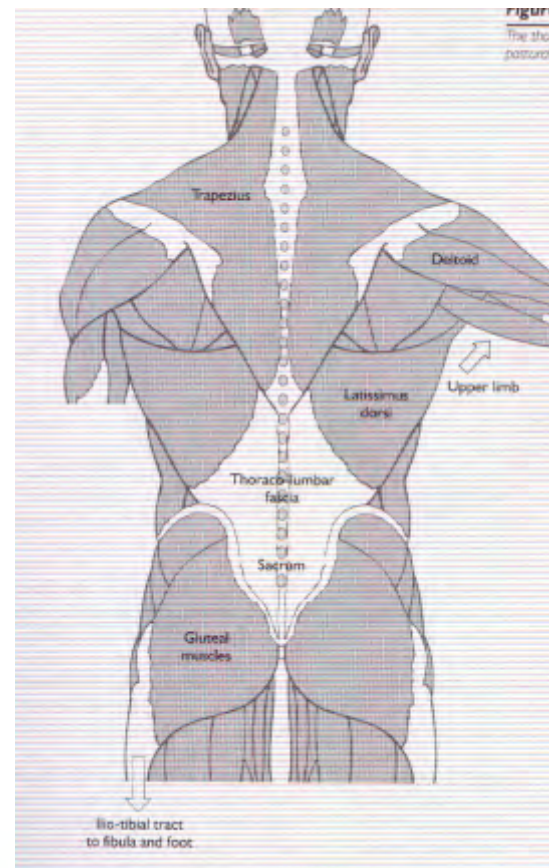
- Animal studies show in order to change a fascial strain the tissue must be manipulated in a special fashion over a certain period of time
- ***Fast forms of ultrasound, physical therapy or massage will relax muscles but will not affect fascial tissue effectively . Therefore, underlying dysfunction will return.***



- **Because the fascia and muscle are responsible for positioning the bones in the body, restricted fascia will pull osseous structures out of physiological alignment, causing**
 - **dysfunctional movement,**
 - **breathing,**
 - **low muscle tone**
- dysfunctional posture patterns**



- When fascia becomes damaged as a result of a traumatic incident, its matrix twists, shortens and contracts; and in so doing,
- inhibits circulatory flow
- increases nerve stimulation
- decrease lymphatic return



Gentle Osteopathic Manipulation

- When muscles are placed in states of relative shortening and gentle sustained stretch is applied the fascia behaves more as a liquid. By moving in directions of ease we can allow the collagen fibers to unwind, and for adhesions to break

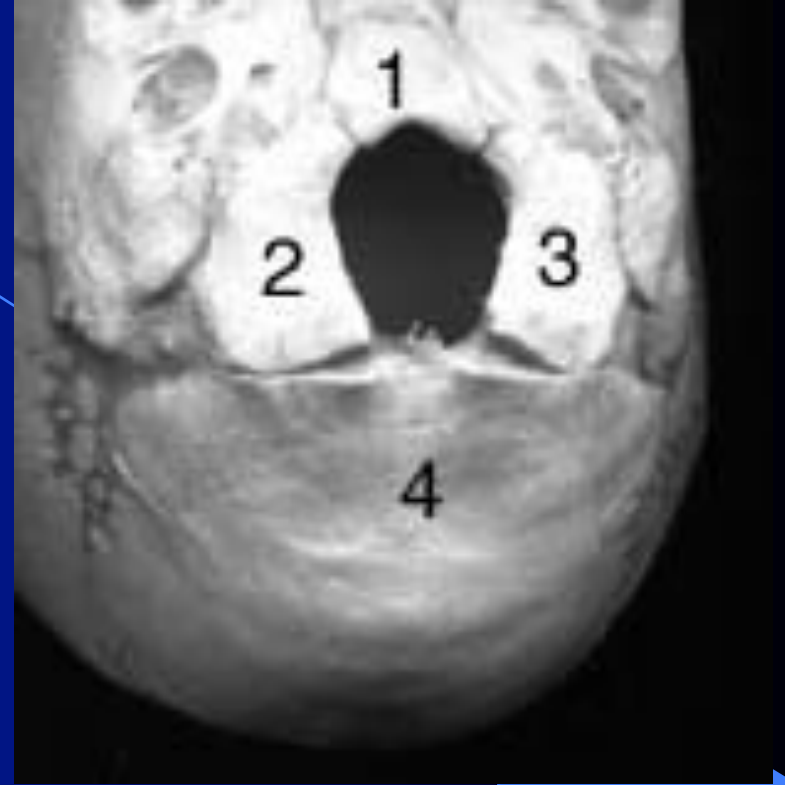


pressure gradient

- **There may be as much as a 100mm/Hg difference in one side of the skull compared to the other during delivery.**
- **Further, these difference often cause the bony plates to override one another**
- **Instrumentation -forceps- and especially vacuum extraction can further cause changes in pressure gradients (vacuum extraction commonly causes bleeding around the dura)**

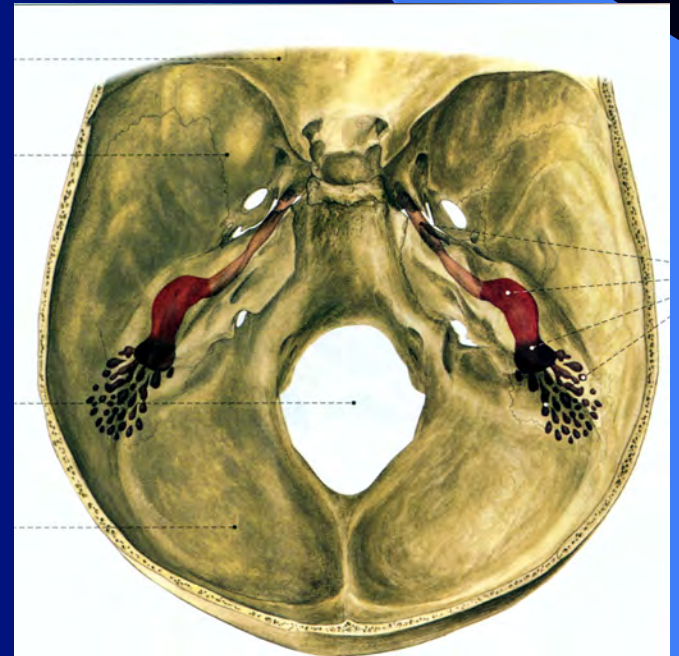
Occipital Bone

- 4 parts at birth
- squamous 1
- basilar 1
- articulates with sphenoid anterior
- condylar 2
- articulates with the lateral masses



Jugular Foramen

- Anterior lateral to the condylar part between condylar part and petrous portion of the temporal bone
- jugular vein
- cranial nerve
- CN IX sucking
- CN X Vagus- Vomiting
- CN XI Torticollis

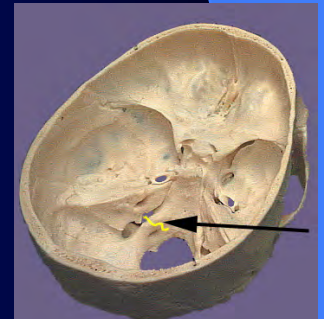
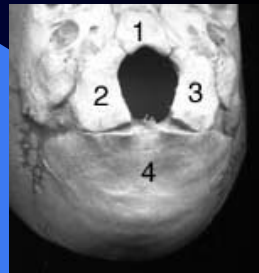


**this may cause compression
of the jugular foramen
causing irritation to
the nerves which pass
through this area**

IX,X, XI

CN X vagus

CN XI torticollis



Nerves

- **Hypoglossal N. passes between base and lateral masses**
- **involved in tongue movement and suck response**
- **compression may cause problems sucking, latching on, swallowing**

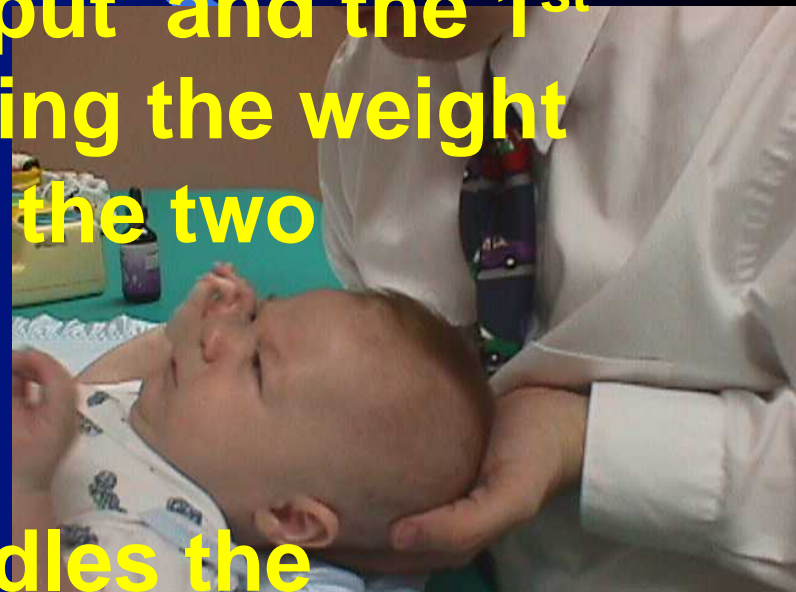
First Breath



The progressive contraction and neck extension has profound significance in the initiation of pulmonary respiration. The respiratory activity associated with vigorous vocal activity of the newborn serves to expand the cranial mechanism restoring free physiologic motion.

Technique of Occipital Atlantal (OA) Decompression

- two fingers at the base of the infant's skull between the occiput and the 1st cervical vertebra allowing the weight of the head to fall onto the two fingers.
- The opposite hand cradles the cervical spine. The technique is completed as the tissue under the two fingers is noticed to soften or relax.



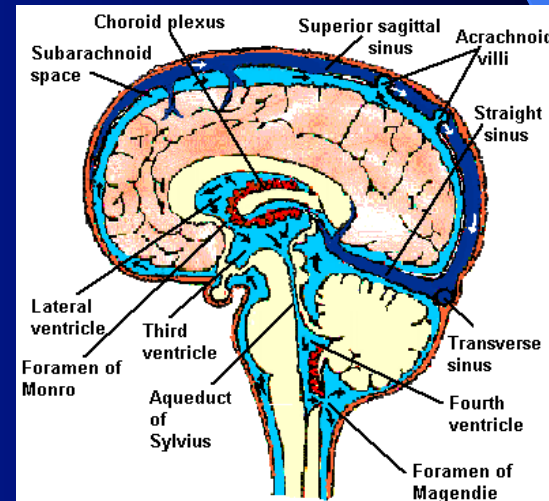
Mechanisms of Birth Trauma

- **1 - Direct Trauma**
- **2 - Hypoxic Imprinting of Tissue**
- **3 Hypoxic Autonomic Dysrhythmia**



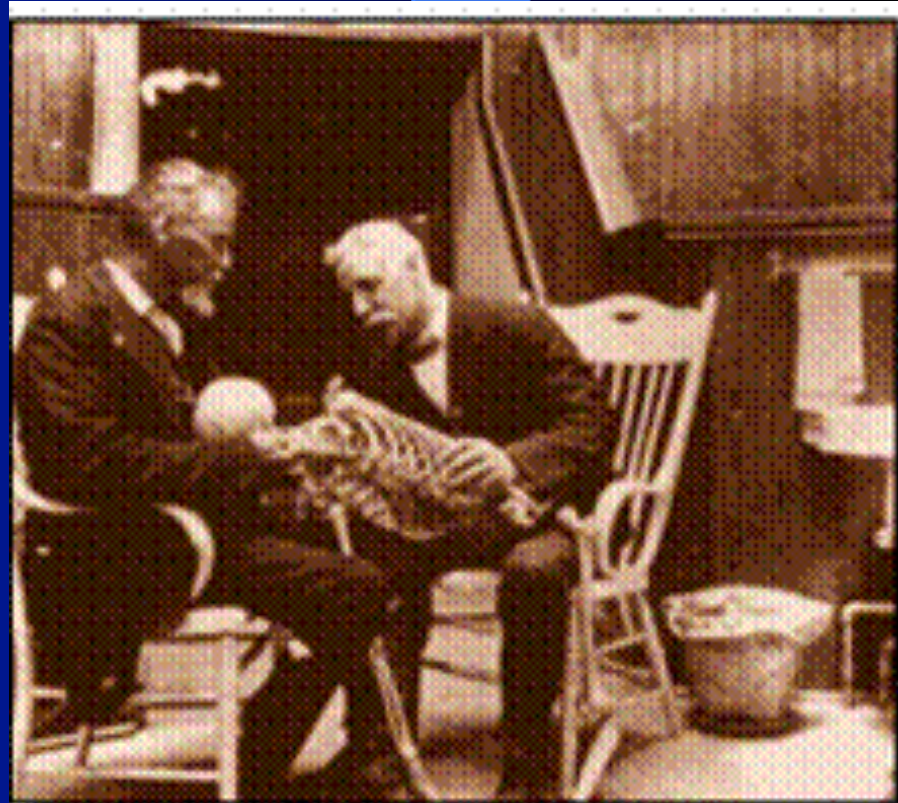
Direct Trauma

- **Injury caused by passage through the birth canal, instrumentation, or sudden pressure changes as in caesarian section**



The source of this injury is often fascia

- “We Begin with the Fasca and we end with the fascia”
- Fascia is the great organizer of the body



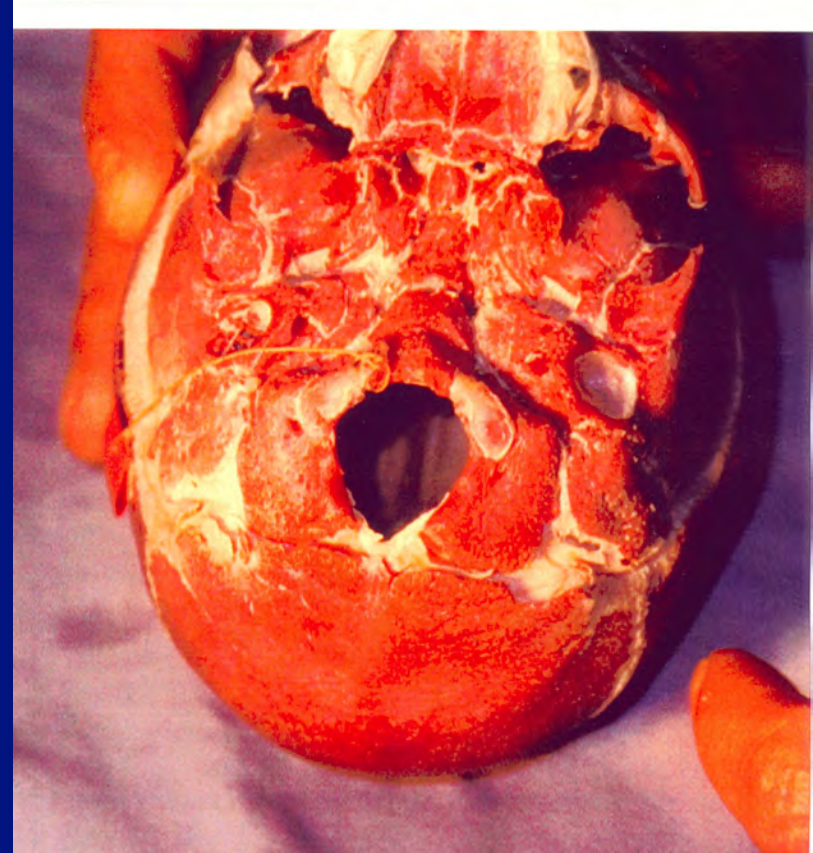
Fascia

- Fascia consists of
- collagen fibers
- Bathed in a liquid bath called ground substance.
- Ground substance is colloidal.
- colloids-- have the unique ability to behave as either liquids or solids depending upon the forces applied to them



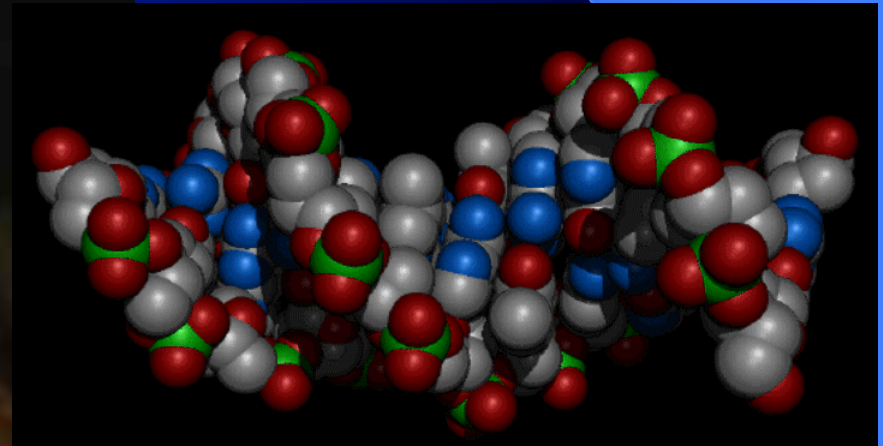
If fascia is impinged upon

- **By a high velocity force over a short period of time**
- **Or held in a constant position for a prolonged period of time**
- **The tissue becomes more solid resisting deformation or change in shape**

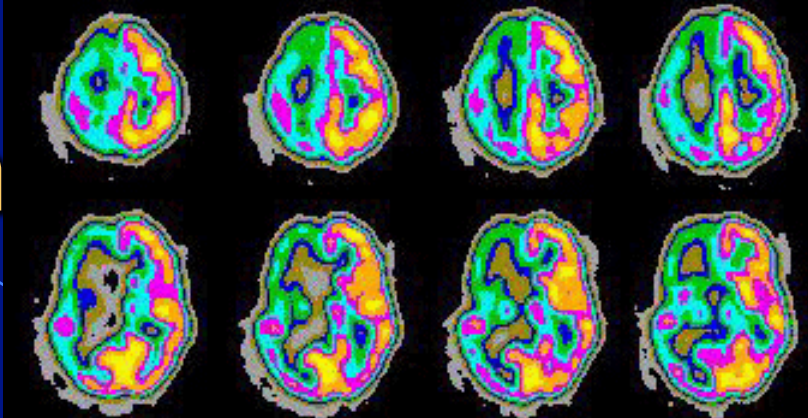


Hypoxic Imprinting of Tissue

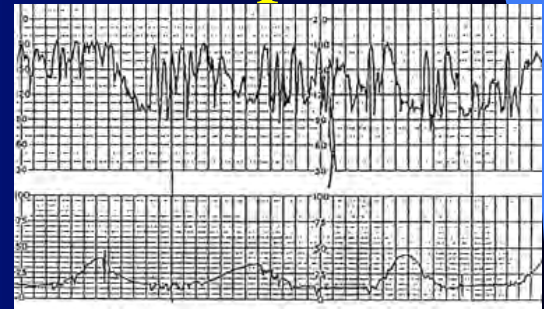
- Distortion patterns in cranial soft tissue reflecting the position of the body in moments of relative hypoxia



Hypoxic Autonom Dysrhythmia



- Hypoxic Autonomic Dysrhythmia
- Autonomic dysfunction due to compromise of autoregulatory behavior associated with hypoxia
- fetal distress
- precipitated and maintained by membranous-cranial articular strain patterns



10 yo ADHD child on 37mg of Ritalin(methylphenyldate)

ADHD patient 94% of time in low HRV entrainment

82



94



6



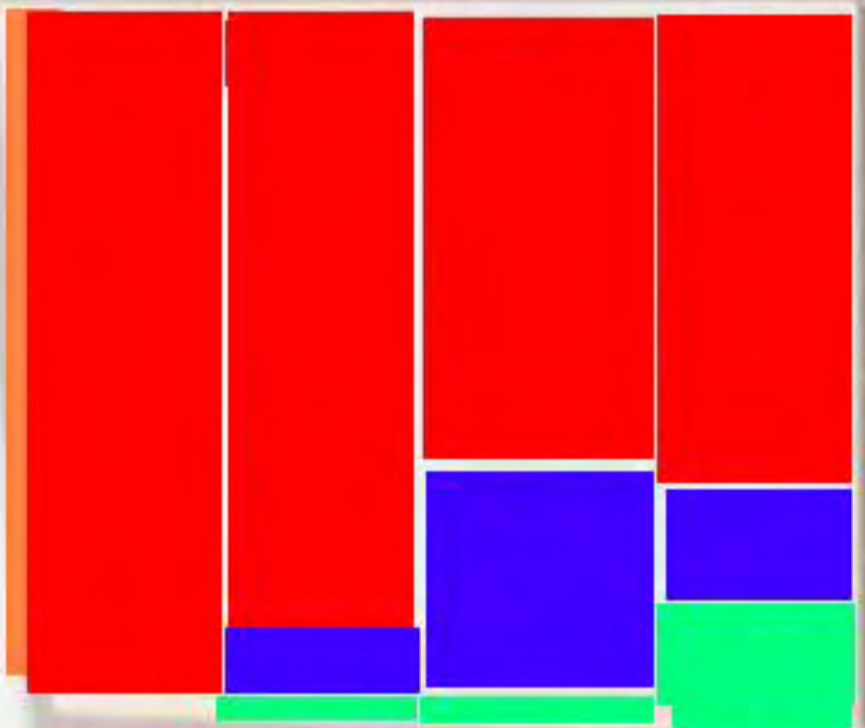
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10 year old with symptoms of ADHD on 30 mg Ritalin

Progress over successive treatments

Entrainment Level Ratio



04/15/01

04/27/01

04/27/01

05/03/01

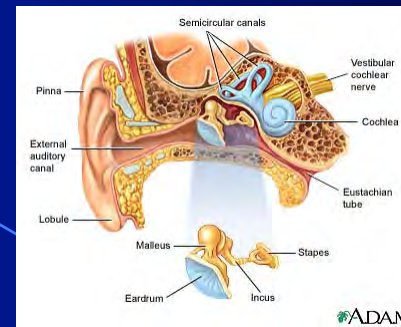
Osteopathic Studies

- **80% of exhibit dysfunction at birth**
- **Symptomatology of traumatic birth**
- **such as persistent**
- **vomiting,**
- **colic,**
- **torticollis,**
- **irritability**
- **newborns with skull asymmetry**
- **is often dismissed**
- **outward signs of underlying structural inadequacies**



Otitis Media & Birth Trauma

- Studies by Henrieta Fallor, MD presented at the 3d International Conference on Otitis Media showed that those babies who experience malposition or trauma are three times more likely to have OM in first six months of life
- A posterior occiput and c-section were the greatest risk factors



Eustachian tubes in children are shorter and more collapsible any structure placing tension on the Eustachian tube will increase the likelihood of obstruction or reflux.

- sucking dysfunction**
- temporal dysfunction**
- pharyngeal tightness**

Sucking Dysfunction

- **Lack of breastfeeding**
- separate muscular sequence is used by infants that breastfeed as compared to those that bottlefeed
- Irritation of the glossopharyngeal (CN IX) and the hypoglossal (CNXII) nerves resulting from compression of the jugular foramen and hypoglossal canal from trauma interfere with sucking

Irritation of CN XI

- **Tight Sternocleidomastoid**
- **prevents physiologic temporal motion**
- **---techniques that address temporal bone mobility**
- **relaxation of the sternocleidomastoid muscle can be helpful**



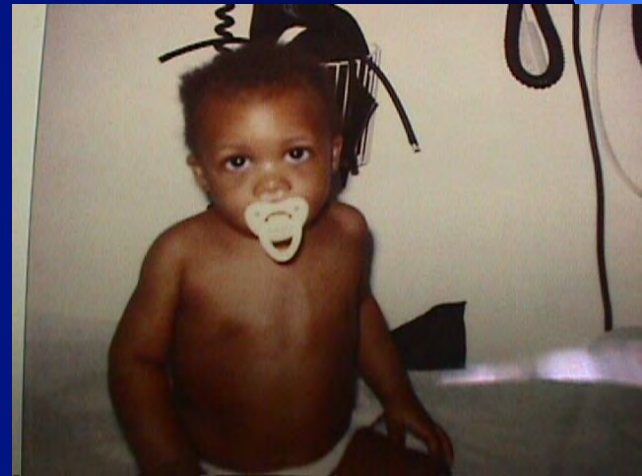
KCOM



- 158 children
- children with any degree of plagiocephaly had a 40% increase incidence of otitis media in first 6 months
- children with three or more cranial strain patterns at birth had a 73% increase risk of developing

Research & Practice

- **The difficulty with Osteopathic Research is it is difficult to design double blind studies without unethically withholding treatment from children who need it**
- **100 years of Osteopathic practice has taught us that**
- **there are factors which place children at risk**



Risk Factors

- **First Born**
- **Prolonged labor**
- **Rapid Labor**
- **Induced Labor**
- **Multiple Labor**
- **C-Section**
- **High Risk Pregnancy**
- **Maternal Illness**

Signs & Symptoms

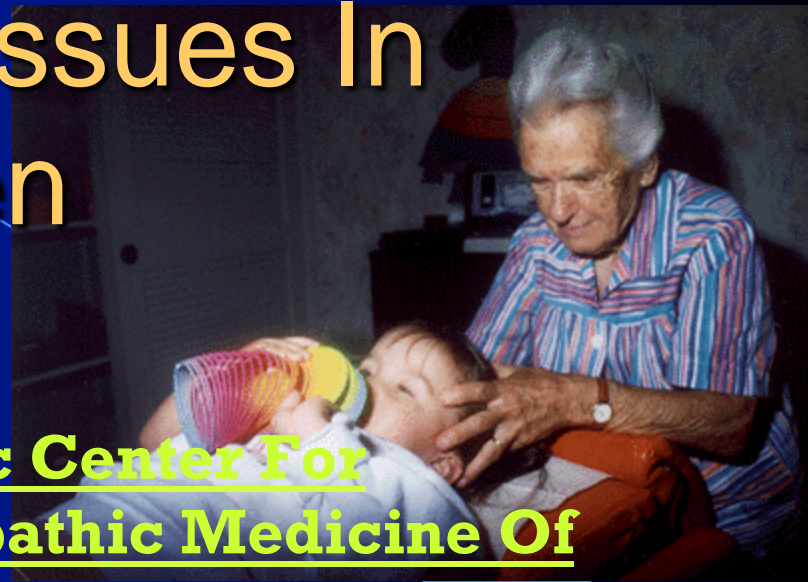
- **Respiratory Problems**
- **Poor Suckling**
- **Irritability**
- **Sleeplessness**
- **Vomiting**
- **Eye Movement Problems**
- **Ear Infections**
- **Recurrent Infection**

Late Effects

- **Hyperactivity**
- **Dyslexia**
- **Behavioral Problems**
- **Orthodontic Problems**
- **Scoliosis**
- **Learning Difficulty**



Neurological Issues In Children



- Research of The Osteopathic Center For Children -College Of Osteopathic Medicine Of the Pacific
- Effects of Osteopathic Medical Management on Neurologic Development In Children JAOA92(6):729-744
- Relation of Disturbances of the craniosacral Mechanism of the newborn:study of 1250 infants JAOA65:1059-1075
- Cerebrovascular Blood Flow Changes in the Middle Meningeal Artery Secondary to Cranial Osteopathic Manipulation in Children Int. J of Cerebrovascular Research 2001:1123-35

- 
- A close-up photograph of a baby lying in a bouncer. The baby is looking directly at the camera with a wide, open-mouthed smile. The bouncer's fabric is blue with a pattern of light blue circles and colorful cartoon characters, including a yellow bee and a white bear. The background is a solid blue color.
- *To find health should be the object of the doctor. Anyone can find disease.*

*The Osteopath seeks
first physiological
perfection of form*



***We look at it
[the body] in perfect
health which means***



***perfection and
harmony not in part,
but of the whole body.***





Integrative Medicine is and has always been the medicine of the future



www.osteopathiccenter.org