

"Pediatric Oral Motor Dysfunction: from Breathing to Breastfeeding and Beyond"

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Why would you see an infant?

- NMSK?
 - Preferential head position
 - Inability to move head in all ranges of motion
 - Assymetric limb movement

- Non NMSK?
 - Colic?
 - Crying?
 - Inability to feed?

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Why would you see an infant?

- How early are biomechanical dysfunctions making changes that might be detrimental to the overall development of the infant as it grows into a toddler, preschool, school age child or adolescent?

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Role of the Chiropractor

- What Role does Chiropractic play in Epigenetics?
 - "It is now recognized that the environment, and more specifically, our perception (interpretation) of the environment, directly controls the activity of our genes. Environment controls gene activity through a process known as epigenetic control."
 - [Bruce Lipton, PhD](#)
 - "Mind Over Genes: The New Biology."

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Role of the Chiropractor

- What Role does Chiropractic play in Epigenetics?
 - Chris Kent proposed two ways that correction of **vertebral subluxations** may affect genetic mechanisms:
 - Chiropractic care could influence basic physiological processes affecting oxidative stress and DNA repair.
 - Correction of vertebral subluxations may change a person's perception of the environment and facilitate constructive, appropriate responses to environmental change.

* Dynamic Chiropractic - January 1, 2013, Vol. 31, Issue 01; Christopher Kent, DC, Esp.

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"Pediatric Oral Motor Dysfunction: from Breathing to Breastfeeding and Beyond"

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Role of the Chiropractor

- Treat oral muscles and connective tissue (empower parents and patients to do multiple times a day) to
 - Improve the mobility/flexibility of the associated tissues of the mouth
 - Muscles of the tongue, jaw, head and neck
 - Fascia of the floor of the mouth, neck, chest (and on down...)
- Optimize joint mobility and alignment
 - Cranium, cervical spine, shoulder girdle, thorax, pelvis and extremities
- Seek structural stability
- If structural stability cannot be maintained...
 - Intervention may be required

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1989 / 1978 / 1979 / 1978 / 1979 / 1978



Role of the Chiropractor

- When is a limitation of matter in play?
 - Collagen/elastin ratio
 - Familial ligamentous laxity
 - Low tone
 - Developmental Delay? Genetics? Neurologic injury?
 - Tethered oral tissue
- When and what referral is appropriate?
 - SLP? OT? PT?
 - Revision of the tongue
 - Orthodontic apparatus to spread the palate or encourage mandibular growth
 - James Bronson (ALF) - <http://www.oralhealthgroup.com/features/introducing-the-advanced-light-force-alf-appliance/>

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Role of the Chiropractor

- How can we collaborate appropriately and effectively?
 - Revision of the tongue
 - Preparation of tissue before revision
 - "Abilitation" of the tissue post revision – integration of the novel movement of the tongue and "awakening" the original circuitry
 - Orthodontic apparatus to spread the palate or encourage mandibular growth
 - Cranial and spinal alignment and muscular symmetry

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Protocols for chiropractic treatment

- Chiropractor
 - Scope of practice
 - Biomechanical evaluation and treatment
 - Oral evaluation
 - Suck, swallow, breathe
- Parents – at home program
 - Tummy time
 - Facial Massage
 - Oralmotor Exercises



Chiropractic Evaluation and Treatment of Musculoskeletal Dysfunction in Infants Demonstrating Difficulty Breastfeeding Vallone S, Journal of Clinical Chiropractic Pediatrics, 2004; 6(1):349-61.

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And so we begin...

- What do we need to know to figure how what we need to do!
- Do you do hands on and "intuit" what your patient needs?
- Or is there a methodically, cultivated method of assessing and understanding what you are treating before laying on of hands?

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The History

To plan the appropriate intervention, every practitioner that interfaces with the dyad need to look at form and function through a new lens and discern neuromusculoskeletal from other issues like

- lack of knowledge on the part of the mother,
- anatomical variants like an inverted nipple,
- Genetic syndromes
- interventions employed during birth (like the effects of medication) or
- injury to the nervous system like an anoxic incident or stroke perinatally or during the birth process.

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History

- Gestational and Birth History
- Initial Vital signs
- Early Feeding history
- Mom's milk supply
- Feeding Interventions
- What is happening at feeding time
- Weight loss or gain
- *Explore the diaper*
- Other possibly associated complaints

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History

- Gestational and Birth History
 - Mom's age, nutritional history and any known genetic anomalies (like MTHFR), history of previous physical injuries, surgeries, known anomalies, any potential for challenges (hormonal conditions, constraint issues), previous pregnancies, miscarriages, live or still births and their "story" and her emotional state, ease of conception, pregnancy, onset of labor, interventions employed, fetal presentation, labor and delivery, post partum recovery

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History

- Gestational and Birth History
 - Can give us information about mom's hormonal integrity, her emotional state, any risk of constraint or presentation problems that could result in physical constraint (like an asynclitic presentation, nuchal cord, etc).
 - Initial Vital signs
 - Length, Weight, Head circumference, APGAR Scores (measure

System	Score	0	1	2
A - Activity	None	Flaccid, no grimace	Facial Grimace	Active
P - Pulse	None	Below 100 bpm	100-120 bpm	Over 120 bpm
G - Grimace	None	Minimal response or no response	Some response	Full response
A - Appearance	Blue, pale	Blue, pale	Red, pink	Red, pink
R - Reflexes	None	None or weak	Some	Vigorous

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<http://www.abclawcenters.com/practice-areas/diagnostic-tests/apgar-score-for-assessment-of-the-newborn/>



History

- Early Feeding history
 - Breast or supplementation; success or challenges (failure to latch, seal, transfer, pain, slipping off, etc.)
- Mom's milk supply
 - When did it come in? Ample or insufficient? Milk Ejection Reflex (MER)?
- Feeding Interventions
 - Lactation support, finger feeding, SNS (supplemental nursing system), nipple shield

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History

- What is happening at feeding time
 - Feeding well, chomping, chewing, popping on and off, sliding off, eating spaghetti, thrusting at nipple, arching away from breast, falling asleep, crying hysterically
- Weight loss or gain
 - Was there a loss from birth weight? Is the baby gaining (how much, how fast?)

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History – Explore the diaper

- How many wet diapers?
- How often is the baby stooling?
- Color, consistency, odor
 - Do you know what seeds are or what they mean?
 - Do you know that blood can be invisible to the eye?
 - Occult blood
 - What does mucous mean?
 - Yeast?
 - Food intolerance or sensitivities?

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<http://www.theprettyu.com/how-often-should-a-newborn-poop/>

- Photographs of what poop should look like
- Frequency of poops?
 - I disagree that 1x a week is fine!
 - Breastfed babies usually poop after very feeding
 - Bottle fed babies less frequently – more difficult to digest, etc but should still be several times a day

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History

- Other possibly associated complaints
 - Gas/Flatulence
 - Explosive Stools
 - Burping difficulties
 - Hiccups
 - Bloating
 - Snoring/Mouth breathing
 - Sleep apnea
 - Sleep disordered breathing
 - Colic
 - Reflux

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• **Examining layer by layer –**

- Visual assessment by all providers and parents
- May involve assessment of brain or soft tissue structures or bone and articulations
- Familiarizing ourselves with why we look and what we are looking for requires an understanding of the anatomy – books exist to “name” things – indulge yourself in visuals to get a sense of what is where if you are not an anatomist

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Function (of one structure) affects another Structure.....

- If the tongue is tethered to the floor of the mouth
- It is unable to elevate or deviate laterally
- Thus it fails to spread the maxilla
- Resulting in a narrow, elevated palate

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Function affects Structure..... Structure affects Function

- The inability to breath through the nose can result in a change in the architecture of the palate
- A change in the architecture of the palate due to a tongue tie can affect development of the sinuses and nasal breathing

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Visual Assessment




- **Head Shape**
- **Motion**
 - Neck
 - Trunk
 - Extremities
- **Mouth**
 - Gape (temporomandibular joint and mandible (jaw))
 - Lips
 - Tongue
 - Cheeks
 - Roof of mouth

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Visual Assessment

- **Function**
 - Latch
 - Transfer
 - Suck/Swallow/
 - Breathe Synchrony



- Reflexes
 - Suckle
 - Root
 - Digitally stimulated
 - Lying in the prone position across the mother's chest and abdomen
 - » Crawl
 - » Root
 - » Latch
 - » Suckle
- Palmar and plantar grasp
- Babkin reflex



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Examination

- **Facial Features**
 - uneven or one appears more anterior
 - Nose is not midline or nostrils appear uneven
 - Wry smile as the mandible deviates left or right
 - Receding chin or mandibular retraction
 - Mandibular width (dental arch)
 - Mandibular length (oblique or inferior development)

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Examination

- Lips
 - Symmetry . Peaking . Buckling (deep philtrum)
- Cheeks
 - Concave . Convex . Muscular engagement (are the muscles “awake”)
- Hard Palate
 - Height
 - Width (dental arch)
 - Torus formation

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Do you watch the Dyad feed?

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<https://www.youtube.com/watch?v=6Hdhiii573A>

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Rule out Structural Pathologies

- Skull fracture (forceps)
- Dislocated Mandible
- Cervical fracture (nuchal cord)
- Fractured clavicle
- Brachial Plexus Injury
- Dislocated shoulder
- Hip dysplasia
- Etc.

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- Midline "Defects"
 - Stork Bites
 - Other birth Marks
 - Lipomas
 - Umbilical hernia
 - Heart defects
 - Torticollis? (is this a defect or a compensation?)
 - Pyloric stenosis
 - Anal stricture or stenosis (or is it a tight anus due to autonomic dysregulation?)



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Head Shape



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"Something's just not right!"



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"Something's just not right!"

- An odd face?
 - Flat face?
 - Protruding forehead (one or both sides)?
 - One eye more open or protruding than the other?
 - One eyebrow higher than the other
 - Ears unlevel?
 - Nose not in the midline or nostrils uneven?
 - Wry smile?
 - Receding chin?
 - Chin to the right or left of midline?
 - Ear height difference
 - One ear forward, one ear back

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Wong K-S and Lin J-L. An underrecognized cause of respiratory distress in a neonate. CMAJ 2006;174(11)

- Midnasal obstructions are often due to nasal edema from inflammation and infections.
- Chiropractors!
 - Evaluate the Glabella
 - Look for crease across the nasal bridge
 - Distract anterior with gentle pinching motion

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Cranial Bones

- 5 Bones:
 - 2 paired:
 - Parietal Bone
 - Temporal Bone
- 3 Single:
 - Frontal Bone:
 - Metopic suture
 - Sphenoid Bone
 - Occipital Bone

<http://affinity-health.adam.com/content.aspx?productId=39&pid=1&gid=002320&print=1>

<http://affinity-health.adam.com/content.aspx?productId=39&pid=1&gid=002270&print=1>

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Breech -
<http://richmondhillgachiropractor.com/2012/12/12/the-webster-technique-for-breech-presentation/>

External version -
http://www.pennmedicine.org/encyclopedia/ency_images/encymulti/images/en/19160.jpg

Skull:
http://pregnancy.about.com/od/laborbirth/ss/pictureguidechildbirth_5.htm

Twins: <http://forum.sedty.com/t324715.html>

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Caput succedaneum or cephalahaematoma?

http://intranet.tdmu.edu.ua/data/kafedra/internal/magistr/classes_stud/English/Second%20year/Family%20Medicine/17%20Health%20Problems%20of%20Infants.htm

http://o.quizlet.com/i/aFXbBL3LTu7lxOPzj52NVA_m.jpg

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Video of cranial bone movement

- <https://www.youtube.com/watch?v=UXVUGb-PV4M> (CST mvmts)
- <https://www.youtube.com/watch?v=J2oVjn2ALLE> (Charles Swenson)
- <https://www.youtube.com/watch?v=RuZUgNU39a0> (birth)
- https://www.youtube.com/watch?v=ZDP_ewMDxCo (birth)

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<http://newborns.stanford.edu/PhotoGallery/Molding1.html>

<http://www.informationdailynews.com/mrs/mrs-kay-plastic-surgery.html>

craniokids.org

pubs.rsna.org

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Positional Plagiocephaly

Most common cause of abnormal skull shape in infant (recommended protocol of back/side positioning during sleep to decrease the incidence of SIDS (Sudden Infant Death Syndrome))

Kadom and Sze AJR:194, March 2010

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Examination – Head Shape

- Perfectly Round
- Wider in the coronal plane (brachiocephalic)
- Occipital region is flattened or asymmetric (plagiocephalic)

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Talking through Cranials

- C01
- Frontals
- Parietals
- Sphenoid
- Temporals
- Glabella
- Hyoid
- C01
 - Condyles
 - Sphenobasilar junction
 - Translation on Atlas

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Examination – Head Shape

- Elongated in the sagittal plane (scaphocephalic)
- Midline protrusion from the anterior fontanel to the nasal bridge (trigonocephaly – early fusion of the metopic suture)

**Adapted from Dosman
201222 and Fysh 200221.

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Head Shape

The head will expand as the brain grows where there is space to go!

- Metopic Synostosis: **Trigonocephaly**
- Sagittal Synostosis: **Scaphocephaly**
- Mono-coronal Synostosis: **Ant Plagiocephaly**
- Mono-Lambdoid Synostosis: **Post Plagiocephaly**
- Bi-coronal Synostosis: **Brachycephaly**

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<https://www.childrenscolorado.org/conditions-and-advice/conditions-and-symptoms/conditions/craniosynostosis/>

<http://neurosurgery.ufl.edu/patient-care/diseases-conditions/pediatric-craniosynostosis/>

It is important to distinguish positional plagiocephaly (a non-surgical condition) from lambdoid synostosis and unilateral coronal synostosis, which require surgery to correct the problem.

cincinnatichildrens.org

<http://craniokids.org/>

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<http://www.cdc.gov/ncbddd/birthdefects/craniosynostosis.html>

Right coronal synostosis before and after endoscopic repair

<http://neurosurgery.ufl.edu/patient-care/diseases-conditions/pediatric-craniosynostosis/>

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“Soft Tissue”
of the
Face, Head and Neck
And how they relate to
breastfeeding

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- **Muscle**
 - Tone
 - High
 - Low
 - Motor function
 - Coordinate incoming sensory information (external and internal) and execute appropriate action


- Shortens/lengthens
 - Functionally
 - To move a joint
 - Dysfunctionally
 - Failing to move a joint
 - Restricting joint movement



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The "Other" Soft Tissue: FASCIA


- The Connective Tissue that provides shape to the human form
- Mostly thought of in terms of it's relationship to muscle tissue – structurally impossible to separate



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The "Other" Soft Tissue: FASCIA

- Highly intertwined with the Autonomic Nervous System (ANS), as both myelinated and unmyelinated nerve fibers have been found and documented in literature.
- Intimately connected to the CNS
 - Stretch receptors attach to the collagen fibers in fascia
 - Ruffini and Pacinian corpuscles interwoven through limb and lumbodorsal fascia



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Fascia

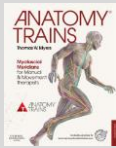
- Myofibroblast
 - Contractile fibers in fascia, epimyseum and perimyseum
 - Have the ability to alter tissue tension (tone), contract and relax within short periods of time
 - C fibers in the epimysium cause a reflex via the CNS reducing the excitability of the gamma muscle spindles thereby reducing muscle tone.
- Fibrocyte
 - Responds to mechanical strain through a process called mechanotransduction
 - Stresses applied to any cell induce changes in cell morphology
 - Mechanical changes in fibroblasts have been observed to occur after 2 hours of applied tension.

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Tom Myers – Anatomy Trains

<https://www.anatomytrains.com/about-us/certified-teachers/tom-myers/>



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Where is the interference?

- Is it neurological?
 - Interference in motor function due to anoxia or injury
 - Fight or Flight
 - Or neurologic input or output interfered with due to structural change?
- Is it structural?
 - Wry neck/torticollis?
 - Gape reduced because the chin is fixed on the chest?
 - Is it a tethered oral tissue?

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The **Moro reflex** is an infantile reflex normally present in all infants/newborns up to 3 or 4 months of age as a response to a sudden loss of support, when the infant feels as if it is falling. It involves three distinct components: spreading out the arms (abduction) unspreading the arms (adduction) then often crying.

An exaggerated Startle or Moro: an indicator of high sympathetic tone

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Muscles

- Development of muscles
- Floppy or spastic
- Swollen or bruised
- Symmetry from right to left
- Symmetry from back to front

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Observe Muscle Action

- Do they lift limbs to the same height?
 - This could be muscle or joint
- Do they lift the eyelids equally, smile evenly, wrinkle forehead across the entire forehead?
- Do they pucker and tuck lips under or allow them to flange?
- Do they retract the chin or pull the jaw to one side or the other

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Or is it both?

- So often it's a combination of factors. Any one factor might have been overcome with simple compensations that go unnoticed but when occurring together, breastfeeding dysfunction results.
- The presence of a structural anomaly like a tongue tie in the presence of a structural misalignment causing the chin to flex to the chest could make it impossible for a neurologically sound infant to breastfeed.

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Muscles of the Face and Breastfeeding

- Muscles that affect jaw position and mobility
 - Temporalis
 - Masseter
 - Submandibular
 - Ptyergoids
- Muscles of the mouth and lips
 - Obicularis oris
 - Elevators and depressors

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Where are the images?

Dig out your Atlas

- Search on line for amazing slide shows and images to help you visualize your work
 - <http://www.slideshare.net/DeepakKumarGupta2/muscles-of-mastication-50519321>

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**Function affects Structure.....
Structure affects Function**

Increased tension in the temporalis muscles and the muscles of mastication and pterygoids due to headache pain can result in reduced gape and compression of the temporomandibular joint

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**Function affects Structure.....
Structure affects Function**

- Inability to form a seal around the nipple when nursing can result in increased activity and tension of the pterygoids and other muscles of mastication with resultant reduction in mandibular excursion (gape) and compression of the temporomandibular joint

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- **Temporalis**
 - Circular strokes
- **Masseter**
 - Circular strokes
- **Buccinator**
 - Circular strokes
 - Submandibular muscles
 - Circular strokes along the underside of the mandible
- **Hyoid**
 - Myofascial release w/ anterior inferior draw

- Sliding 'translation': (Forward and backwards)
- protraction (protrusion), retraction (retrusion)
- occurs in the upper joint cavity
- Hinge motion: (Upwards and downwards)
- elevation, depression
- lower joint cavity
- Gliding: Side-to-side movement (excursion)
- Resting position: Occlusion
- teeth are slightly separated

https://www.studyblue.com/notes/n/pharyngeal-oral-anatomy/deck/2507536

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Movement at the TMJ

- Watch it on U Tube
 –<https://www.youtube.com/watch?v=bvGNiDLyX8E>

https://www.studyblue.com/notes/n/pharyngeal-oral-anatomy/deck/2507536

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Treating the Mandible

- Compression
- Decompression
- Lateralization

<http://img.medscapestatic.com/pi/meds/ckb/01/33701tn.jpg>

https://www.studyblue.com/notes/n/pharyngeal-oral-anatomy/deck/2507536

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Hyoid Release – Hands On!

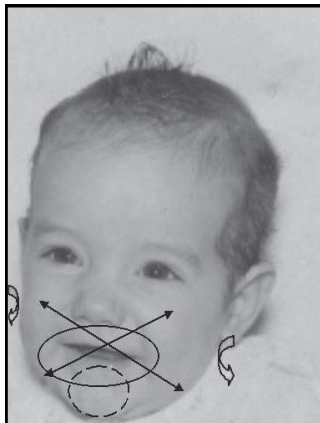
- A bone suspended by soft tissue
- Does not articulate with any other bone
- illustration

<http://efullcircle.com/omohyoid-muscle/>

<https://cerebrovortex.files.wordpress.com/2014/07/hyoid-anatomy.jpg>

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- Temporal Ear Pull
 - Pull earlobe anteriorly along the jaw line and laterally
- Orbicularis Oris
 - Circular massage with fingertip*
- Zygomaticus*
- Levator Labii superioris*
- Levator anguli oris*
- Depressor anguli oris*
- Depressor labii inferioris*
- Mentalis*

Are Frena Muscle or Fascia?

<http://www.suggest-keywords.com/YnVjY2FsICBzaGVsZg/>

<https://www.studyblue.com/notes/note/n/osce/deck/11057983>



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Muscles of facial expression



- Functions
 - regulators of 3 openings
 - eyes
 - mouth
 - nose
 - Sphincters (circular), dilators (radial)
 - Facial expressions: secondary effects of their contractions
- Supplied by
 - 7th cranial nerve
- Developed from
 - 2nd pharyngeal arch

- Actions
 - Frontalis
 - look upwards without moving head
 - Corrugator supercilii
 - frowning
 - vertical wrinkling of forehead
 - Orbicularis oculi
 - tight closure of eyes






Muscles of facial expression

- Facial expressions
 - Smiling & laughing
 - zygomatic major
 - Grinning
 - risorius
 - Sadness
 - levator labii superioris
 - levator anguli oris
 - Grief
 - depressor anguli oris
- Anger
 - Dilator naris
 - depressor septi
- Contempt
 - zygomatic minor
- Doubt
 - mentalis
- Surprise
 - Frontalis
- Horror & fright
 - platysma

Muscles that Move the Head and Neck

<http://www.motionworkspt.com/content/common-compensations-neck-scalenes-deep-anterior-neck-flexors>

http://www.hss.edu/conditions_congenital-muscular-torticollis.asp

<http://www.bethesdaweb.com/torticollis-program>

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1989 / 1978 / 1979 / 1978 / 1979 / 1978



<http://teachmeanatomy.info/head/areas/posterior-cranial-fossa/>

- <http://www.wisegeek.com/what-is-the-function-of-the-vagus-nerve.htm>

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1989 / 1978 / 1979 / 1978 / 1979 / 1978



ORALMOTOR EVALUATION

LIPS – do they flange

<http://www.medicinenet.com/script/main/art.asp?articlekey=26015>

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Or is there a restrictive tether? Frenum.....Lip Tie

<http://www.mommpotamus.com/tongue-tie-qa/>
www.StacieBingham.com

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The Tongue

- Tethering
 - Anterior
 - Posterior
- Movement
 - Lateralization
 - Elevation
 - Curling
 - Cupping
 - “Bunching” (posterior retraction and elevation)
 - Thrusting
 - “Flicking”

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Modified Mallampati classification

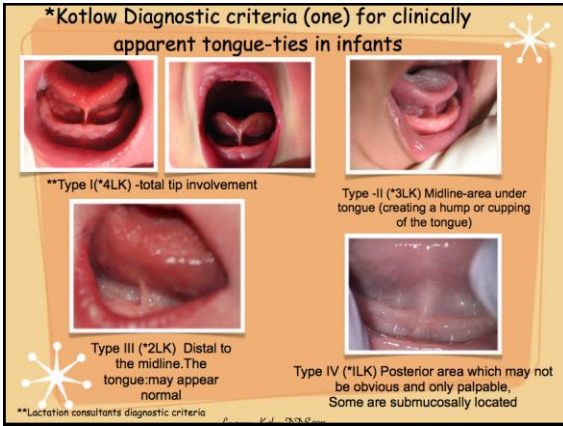
See the list below:

- Class 0: Ability to see any part of the epiglottis upon mouth opening and tongue protrusion
- Class I: Soft palate, fauces, uvula, pillars visible
- Class II: Soft palate, fauces, uvula visible
- Class III: Soft palate, base of uvula visible
- Class IV: Soft palate not visible at all

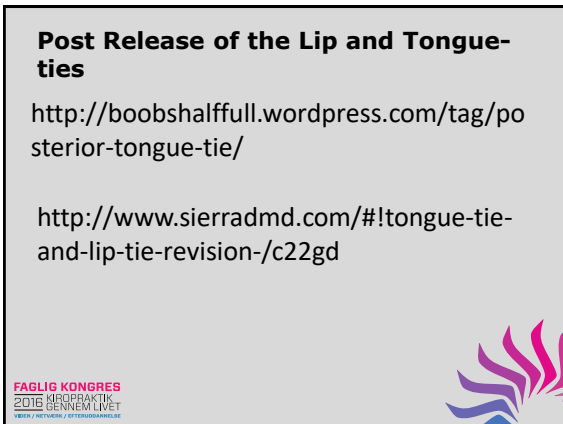
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<http://emedicine.medscape.com/article/2172419-overview>









Websites to support your learning experience

- www.kiddsteeth.com
- <http://www.drghaheri.com/blog>
- <http://brianpalmerdds.com/>
- Search the web!

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Nothing exists in isolation!

When what we do (alone) isn't "nailing it"...

looking through different lenses helps us see how the parts connect to form and function as a whole and promotes a more successful long term outcome.

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Collaborative care with other health care professionals

- Who else's "lenses" can we try to see through?
 - Pediatrician
 - IBCLC (hospital vs private)
 - Dentist or Surgeon (oral surgeon, ENT, otolaryngologist, pediatrician, neonatologist)
 - PT/OT/SLP
 - Other Manual Therapists

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Tongue Function

- Resting posture of the tongue should be on the palate
 - Where?
 - Alveolar ridge
 - Incisive suture

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The Palate

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http://intranet.tdmu.edu.ua/data/kafedra/internal/stomat_hir/classes_stud/en/stomat/%D0%A1%D1%82%D0%BE%D0%BC%D0%B0%D1%82%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%8F/ptn/%D0%A5%D0%B8%D1%80%D1%83%D1%80%D0%B3%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%B0%D1%8F%20%D1%81%D1%82%D0%BE%D0%BC%D0%B0%D1%82%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%8F/5/9%20semestr/05.%20Congenital%20nonunions,%20postoperative%20defects%20and%20palate%20deforities.htm

<http://www.oralhealthgroup.com/features/introducing-the-advanced-light-force-alf-appliance/>



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- <http://oralmaxillo-facialsurgery.blogspot.com/2010/05/congenital-malformations-mouth-and.html>

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1415-54192007000600008

<http://www.breastfeedingmaterials.com/ask-barbara-kay/biting-high-palate-poor-feeding-in-37-weeker>



<http://averaorg.adam.com/content.aspx?productId=117&pid=2&gid=9039>

- <http://www.breastfeedingmaterials.com/ask-barbara-kay/biting-high-palate-poor-feeding-in-37-weeker>




Tongue Function

- Injury or reflexive tension in the muscles of the neck and under the mandible can result in altered tongue function
 - Nuchal cord
 - Shoulder dystocia
 - Fascial torsion to broken clavicle
 - Congenital Hip Dysplasia
- Tethered oral tissue
 - Tongue Tie (anterior/posterior)
 - Lip tie
 - Buccal ties

How oral motor dysfunction influences cranial and spinal biomechanics

Reduced cranial and spinal movement

- Distorted cranial rhythms
- autonomic dysregulation
 - the crying baby
 - colic and GERD
 - SIDS/ disordered sleep and sleep apnea

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What to look at when there is compensatory Tongue Function

- Intrinsic and extrinsic muscles of the tongue that contribute to compensatory movement in a restricted tongue
 - Demonstrated by ultrasound videos
- Hyoid bone
- C01
- Increased Flexor Tone

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What to look at when there is compensatory Tongue Function

- Intrinsic and extrinsic muscles of the tongue that contribute to compensatory movement in a restricted tongue
 - Genioglossus
 - Hyoglossus
 - Geniohyoid
 - Styloglossus*
- Other associated muscles
 - Pterygoids
 - Muscles of Mastication
 - Muscles control the lips and mouth closure

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teachmeanatomy.info



How can a muscle of the tongue affect the position of the C01 junction?

- The **Styloglossus**, the shortest and smallest of the three styloid muscles, arises from the anterior and lateral surfaces of the styloid process near its apex, and from the stylomandibular ligament.
- The styloglossus draws up the sides of the tongue to create a trough for swallowing. As a pair they also aid in retracting the tongue.

[Henry Gray](#) (1918) *Anatomy of the Human Body*

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TETHERED ORAL TISSUE (TOTS) AND ALTERATIONS IN ORAL MOTOR FUNCTION

- <https://www.youtube.com/watch?v=RNjR-EyEq1E>

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What to look at when there is compensatory Tongue Function

- Hyoid bone
 - Most frequently palpated in a retracted, elevated position (posterior/superior)
 - Potential airway occlusion
 - Forward head posture
 - Recruitment of the anterior cervical musculature, pectorals, etc.
 - How does this interplay with the posterior translation at C01

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How can a muscle of the tongue affect the position of the C01 junction?

- The **stylohyoid muscle** is a slender [muscle](#), lying anterior, and superior of the posterior belly of the [digastric muscle](#). It shares this muscle's innervation by the [facial nerve](#), and functions to draw the [hyoid bone](#) backwards and elevate the tongue.

[Henry Gray](#) (1918) *Anatomy of the Human Body*

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What to look at when there is compensatory Tongue Function

- C01
 - Posterior translation
 - The occiput
 - Cartilaginous ring
 - Condyles
 - Suboccipital triangle
 - The dural bridge
 - » The colicky or crying baby?

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2016 NORDISKE



Anatomy of the craniocervical junction (cranium and atlas)

- Anatomy of the neonatal cranial base (C0/occiput) including the condyles

<http://www.osteodoc.com/birthtrauma.htm>

[m](#)

[Dr. Mark E. Rosen, DO FCA](#)



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Anatomy of the craniocervical junction (cranium and atlas)

- Anatomy of the cranial base (C0/occiput) including the condyles

[Henry Gray](#) (1918) *Anatomy of the Human Body*






Anatomy of the craniocervical junction (cranium and atlas)

- Anatomy of the first cervical vertebra (C1/atlas)



[Henry Gray](#) (1918) *Anatomy of the Human Body*

³
Shapiro and Robinson, Embryogenesis of The Human Occipital Bone Am J Roentgenol 1976

Function of the craniocervical junction

- The movements permitted in this joint are:
 - Flexion and Extension
 - ordinary forward and backward nodding of the head.
 - Lateral flexion
 - Leaning to one or other side.
 - Rotation

Videos

- <https://www.youtube.com/watch?v=VpK99GIflLg>
- <https://www.youtube.com/watch?v=Ocp5XGW3z4k>
- <https://www.youtube.com/watch?v=i7FDS8z0XXE>
 - *C0, C1, C2
- <http://www.upcspine.com/anatomy2.htm>
 - Life University – movement of the atlas and occiput

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The Tea Cup Analogy

The articulation of C01

- C0 is the cranial base (occiput)
- C1 is the first cervical vertebrae (the atlas)

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<http://forums.thebump.com/discussion/4615084/anyone-s-baby-head-tilt-to-one-side>

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Rectus Capitis Posterior Minor

[Henry Gray](#) (1918) *Anatomy of the Human Body*

[BodyParts3D](#), © The Database Center for Life Science licensed under [CC Attribution-Share Alike 2.1 Japan](#)

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How do we adjust the neonate?

- Above all things – SPECIFICITY
 - Press and Hold
 - What does Fascia have to do with it?
 - Cranial Adjusting
 - SOT
 - Osteopathic Techniques
 - Upledger
 - Diversified
 - Finger thrust
 - Drop work

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Why address altered cranio-spinal biomechanics with Chiropractic?

- Craniofacial growth and development (M Fetzik)
 - Palate
- Autonomic and visceral function
- head carriage and posture
 - Increased flexor tonus started at the breast influences the toddler posture (increased AP curves (Buddha belly), anterior head carriage, toe walking, falling forward frequently)?

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Postural deficits in the toddler

- Increase in the AP curves
- Toes Walking
- Airway patency decreases
- Frequent falling

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Helse / Helsearbeid / Fysioterapeutikk



Full body ramifications of dysfunction of the craniocervical junction

http://www.fisioknesiterapia.biz/php/img/Spine_A_LRG_CRO P.gif

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[http://en.wikipedia.org/wiki/Saethre e% E2% 80% 93Chotzen_syndrome](http://en.wikipedia.org/wiki/Saethre%E2%80%93Chotzen_syndrome)

<http://drugline.org/medic/term/rib-cervical/>

<http://www.sciencedirect.com/science/article/pii/S0022347604009540>

<http://www.cbsnews.com/news/how-to-calm-a-crying-baby-pediatricians-video-goes-viral/>

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- Crying Babies
- Colic
- Constipation
- GERD
- Asthma
- Hyperactivity
- Anxiety
- Behavioral disorders


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Detectable postural alterations and associated compensations to dysfunction of the craniocervical junction

- Head tilt
- Head rotation
- Retracted chin
- Chin on chest
- Arching


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What to look at when there is compensatory Tongue Function


- Flexor Tone
 - Anterior cervical musculature
 - Respiratory function
 - Airway obstruction
 - » Mechanical
 - Labored breathing
 - Older child
 - narrow face, high palate, narrow dental arch and dental crowding (are they wearing braces already? Can the palate be expanded with a device?), enlarged tonsils, sinus congestion or recurrent infections, chronic or recurrent AOM
 - » Neurologic
 - Sympathetics
 - Hyperventilation

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What to look at when there is compensatory Tongue Function

- Flexor Tone
 - Shoulder/Scapula/Clavicle
 - Pectoral muscles
 - Omohyoid , Infrahyoid, Suprahyoid and Middle Pharyngeal muscles



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What to look at when there is compensatory Tongue Function

- Flexor Tone
 - Illiopsoas
 - Hamstrings
 - Toe Walking?
- AP curves of the spine
 - How does this affect the development of gait if begun in infancy?



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Role of the Chiropractor

- What Role does Chiropractic play in Epigenetics?
 - "It is now recognized that the environment, and more specifically, our perception (interpretation) of the environment, directly controls the activity of our genes. Environment controls gene activity through a process known as epigenetic control."
 - [Bruce Lipton, PhD](#)
 - "Mind Over Genes: The New Biology."



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Role of the Chiropractor

What Role does Chiropractic play in Epigenetics?

- Chris Kent proposed two ways that correction of **vertebral subluxations** may affect genetic mechanisms:
 - Chiropractic care could influence basic physiological processes affecting oxidative stress and DNA repair.
 - Correction of vertebral subluxations may change a person's perception of the environment and facilitate constructive, appropriate responses to environmental change.

Dynamic Chiropractic - January 1, 2013, Vol. 31, Issue 01; Christopher Kent, D.C., Dab.

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Role of the Chiropractor

- Treat oral muscles and connective tissue (empower parents and patients to do multiple times a day) to
 - Improve the mobility/flexibility of the associated tissues of the mouth
 - Muscles of the tongue, jaw, head and neck
 - Fascia of the floor of the mouth, neck, chest (and on down...)
- Optimize joint mobility and alignment
 - Cranium, cervical spine, shoulder girdle, thorax, pelvis and extremities
- Seek structural stability
- If structural stability cannot be maintained...
 - Intervention may be required

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Role of the Chiropractor

- When is a limitation of matter in play?
 - Collagen/elastin ratio
 - Familial ligamentous laxity
 - Low tone
 - Developmental Delay? Genetics? Neurologic injury?
 - Tethered oral tissue
- When and what referral is appropriate?
 - SLP? OT? PT?
 - Revision of the tongue
 - Orthodontic apparatus to spread the palate or encourage mandibular growth
 - James Bronson (ALF) - <http://www.oralhealthgroup.com/features/introducing-the-advanced-light-force-alf-appliance/>

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Role of the Chiropractor

- How can we collaborate appropriately and effectively?
 - Revision of the tongue
 - Preparation of tissue before revision
 - "Abilitation" of the tissue post revision – integration of the novel movement of the tongue and "awakening" the original circuitry
 - Orthodontic apparatus to spread the palate or encourage mandibular growth
 - Cranial and spinal alignment and muscular symmetry

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Treatment Protocols

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Protocols for chiropractic treatment pre and post frenotomy

- Chiropractor
 - Scope of practice
 - Biomechanical evaluation and treatment
 - Oral evaluation
- Parents – at home program
 - Tummy time
 - Facial Massage
- Oralmotor Exercises

* Chiropractic Evaluation and Treatment of Musculoskeletal Dysfunction in Infants Demonstrating Difficulty Breastfeeding Vallone S, Journal of Clinical ChiropracticPediatrics, 2004; 6(1):349-61.

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Why Chiropractic BEFORE a PTT procedure?

- If there is any restriction in mandibular range of motion (a narrowed gape) the tissue is less accessible to the person performing the revision
- Reduce the risk of subluxing or dislocating the mandible during a procedure
- *remember – we are not anesthetizing our babies which would drug their muscles into relaxation and possibly allow their jaw to fall slack if only held taut by muscles

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Why Chiropractic BEFORE a PTT procedure?

- When patients are sent to me, it's often to confirm their opinion of the posterior tongue tie
- Do not assume all body workers (licensed physicians or otherwise) will recognize or even look at a tongue (tie)
- Knowing and Respecting your state/country scope of practice

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Chiropractor

- Be sure the Occiput and atlas are translating anteriorly and posteriorly – chin tucked and chin thrust forward. Make sure the mandible not only decompresses (drops) but also translates anteriorly). Stretch the pterygoids if tight by letting child bite on your finger or chew toy laterally between the gums.
- If there is an intense gag reflex, work slowly, cautiously, let child hold the toy or your hand or the spoon as well to decrease reactivity. If they've had to be defensive due to tongue tie or due to intubation, etc., they may have retained an exaggerated gag reflex.

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Gag Reflex (pharyngeal reflex)

- In a reflex arc, a series of physiological steps occur very rapidly to produce a reflex.
- In the case of the pharyngeal reflex:
 - the sensory limb is mediated predominantly by CN IX (glossopharyngeal nerve)
 - the motor limb by CN X (vagus nerve).
- The gag reflex involves a brisk and brief elevation of the soft palate and bilateral contraction of pharyngeal muscles evoked by touching the posterior pharyngeal wall. Touching the soft palate can lead to a similar reflex response. However, in that case, the sensory limb of the reflex is the CN V (trigeminal nerve).
- Hypersensitivity is generally a conditioned response, usually occurring following a previous experience. There are a variety of ways to desensitize one's hypersensitivity, from relaxation to numbing the mouth and throat to training one's soft palate to get used to being touched. Of course, the effectiveness of these techniques varies with the person.
- Absence could indicate an injury, disease or subluxation resulting in CN dysfunction

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**Date: Mon, 28 Mar 2005 10:17:16 -0500
Occupational therapy trick for hyperactive gag:**

- Tickle baby's lips so he opens voluntarily. Slide finger to palate, press firmly just behind the upper gum ridge (the very front of the hard palate), wait until baby relaxes, slide finger back further along the palate as accepted. If child starts to gag, retreat to gum ridge again and press strongly. Obviously one wants to use this sensitively, and teach parents to watch baby's cues to make sure that it is being accepted and tolerated.

• Catherine Watson Genna, IBCLC

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Reflexive pharyngeal swallow

- Closely related to the gag reflex, in which food or other foreign substances are forced back out of the pharynx, swallowing generally pushes food through the digestive system into the stomach. This reflex in particular functions as a protective system for the upper respiratory tract as it not only forces the glottis to close, thereby preventing any substances getting into the airways, but also clears the pharynx of any residual substances by a swallow.
- This particular reflex is simply one of several aero digestive reflexes such as the reflexive pharyngeal swallow, the pharyngoglottal closure reflex, in which no swallowing occurs yet the glottis still closes, and the pharyngo-upper esophageal sphincter contractile reflex, occurring mainly during gastroesophageal reflux episodes. All either forcibly close the glottis or allow the pharynx to remove particles into the digestive tract that may have been forced back up by both this tract and the upper respiratory tract. These reflexes can also protect the airways from any food or liquids that may spill over from the hypopharynx. The hypopharynx is the bottom part of pharynx, and can be considered the first area where the digestive tract splits from the airways. However, if the maximum capacity of fluids that the hypopharynx can safely hold is exceeded, then this excess fluid spills into the larynx and from there into the lungs. Therefore, these reflexes prevent levels reaching this maximum volume.


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Chiropractor

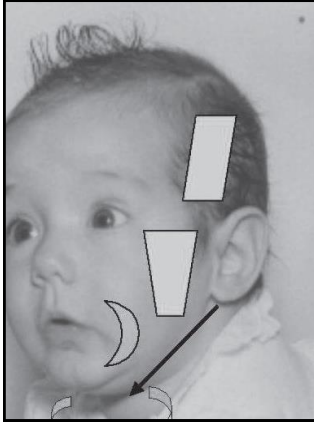
- Massage and relaxation of the muscles under the jaw with gentle fingertip massage, press and hold or myofascial release.
- It is very important to release the floor of the mouth. Fingertip pressure on either side of the midline frenum pressing gently posterior and inferior through the spongy mucosa until you feel the muscle underneath – usually tender for infant/toddler. You can press a finger under the jaw to feel your fingertip inside the mouth and press gently and just hold while they articulate their tongue to get away from you.

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Quality of life through chiropractic







- **Temporal Ear Pull**
 - Pull earlobe anteriorly along the jaw line and laterally
- **Orbicularis Oris**
 - Circular massage with fingertip*
- Zygomaticus*
- Levator Labii superioris*
- Levator anguli oris*
- Depressor anguli oris*
- Depressor labii inferioris*
- Mentalis*



- **Temporalis**
 - Circular strokes
- **Masseter**
 - Circular strokes
- **Buccinator**
 - Circular strokes
- **Submandibular muscles**
 - Circular strokes along the underside of the mandible
- **Hyoid**
 - Myofascial release w/ anterior inferior draw



Oral motor exercises

- Stretching pterygoids by allowing child to bite on your finger
 - Encourage reflexive lateral deviation
- Releasing the floor of the mouth
 - Encourage reflexive elevation of the tongue to the alveolar ridge and sweeping the palate
- Spreading the palate




Oral motor exercises

- Depressing the posterior tongue and drawing forward to extend past the gum and lower lip
 - Tug of war with finger or hospital grade pacifier
- To stimulate motor development in muscles involved in swallowing:
 - Pinch check between fingers and massage in C one way and one way back
 - One finger moving along gum line giving deep pressure where each tooth would be
 - Small flat spoon putting pressure down and back with tongue as if natural movement.



Other considerations...

Not only infants breastfeed



Breastfeeding with a PTT and LT

- This is not the only neurotypical presentation we see but one that we see frequently.
- Other presentations include
 - Lateral cervical flexion
 - Lateral cervical flexion with rotation
 - Hyperextension at CO1
 - Pan spinal lateral flexion
 - Plagiocephaly (flattening of a portion of the cranium)
 - Sphenoid translated laterally or torsioned
 - Temporomandibular joint moving asymmetrically
 - And almost any other combination you can think of !

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Other consideration

- The Older Breastfeeding Child
- Dental crowding
 - <http://www.drsherrard.com/services/pediatric-dentistry>
 - ALF and other devices
 - <http://www.bronsonfamilydentistry.com/upload/ALF%20Quantum%20Appliance.pdf>
 - <http://www.bronsonfamilydentistry.com/upload/ALF%20Functional%20Appliance.pdf>
- Hypertrophy of Lymphoid Tissue
 - Tonsils and Adenoids
 - <http://www.bronsonfamilydentistry.com/upload/Tonsil%20Article.pdf>
- Obstructive Airway Disease in the Child
 - SIDS
 - ADHD
 - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3004499/>
- Postural Implications
- Feeding issues with solid foods and liquids

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Plan and methods of treatment from a chiropractic perspective

- The “simple cases”
- The “compound cases”
- What happens when it doesn’t work or the changes we make don’t last?

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Plan and methods of treatment from a chiropractic perspective

- Case studies
 - Aiden (2-4 y.o.) -
 - Oral aversion/feeding issues
 - Articulation difficulties (speech)
 - Kendra (1 week - 4 y.o.) -
 - Breastfeeding/feeding dysfunction
 - » Had an anterior tongue tie released
 - GERD
 - Leo (8-26 mos old) -
 - feeding issues
 - failing to gain weight
 - Viviana (5 days old) -
 - breastfeeding dysfunction

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