

OSTEOPATHIC CONSIDERATIONS FOR THE PEDIATRIC GI PATIENT

PART I: FEEDING

PART II: CONSTIPATION

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INTRODUCTIONS

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OBJECTIVES: Part I

1. Identify anatomical considerations which may affect feeding, including suckling and latching
2. Describe osteopathic considerations for the feeding infant including innervation, biomechanics, lymphatics and circulation
3. Review pertinent osteopathic research on the feeding infant
4. Perform Osteopathic Manipulative Treatment for the infant with feeding issues

Disclosure Information

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PART I: FEEDING

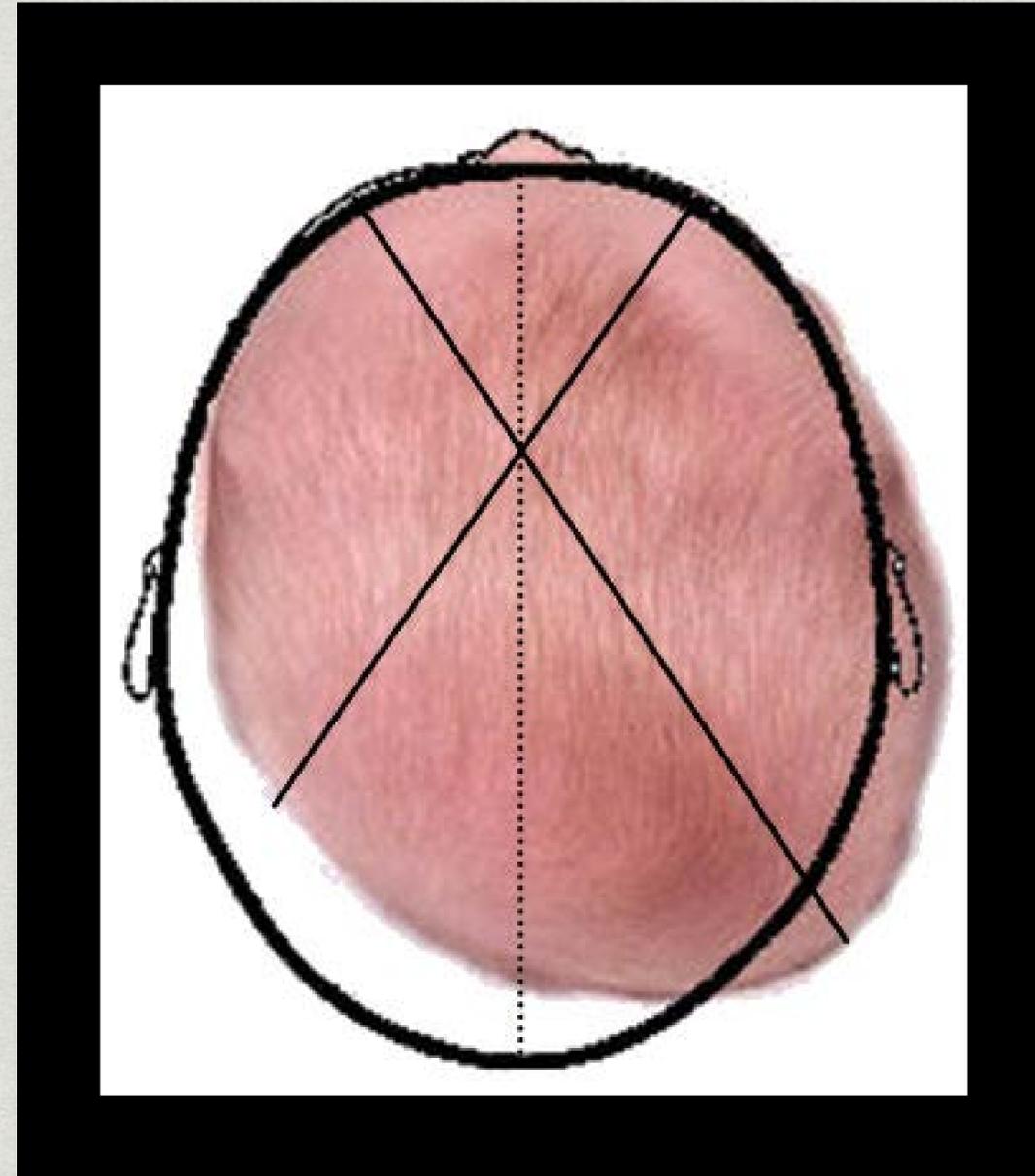
OSTEOPATHIC CONSIDERATIONS FOR INFANT
FEEDING AND LATCHING

When to consider OMT

- * Poor Latch- Clicking, Poor Seal, etc
- * Painful Latch
- * Bleeding/Cracked/Creased nipples
- * Tires easily while feeding/always asleep at the breast
- * Poor Weight Gain
- * Eats only on one side/or does much better on one side
- * Frequent Spitting up
- * Choking or Gagging
- * Engorged Mother

Or just look at the baby!

- * Signs of birth trauma
 - * Bruising – face/body
 - * Cephalohematoma/caput succedaneum
 - * Molding/overriding sutures
 - * Clavicular crepitus/asymmetry of UE
- * Plagiocephaly
- * Torticollis
- * Facial asymmetry



History

- * Birth history

- * Vaginal/C-section
- * Complications with pregnancy or delivery
- * Assisted Delivery
- * Length of labor/pushing
- * Birth weight
- * Medications used

- * Feeding history

- * Family history

- * Interventions

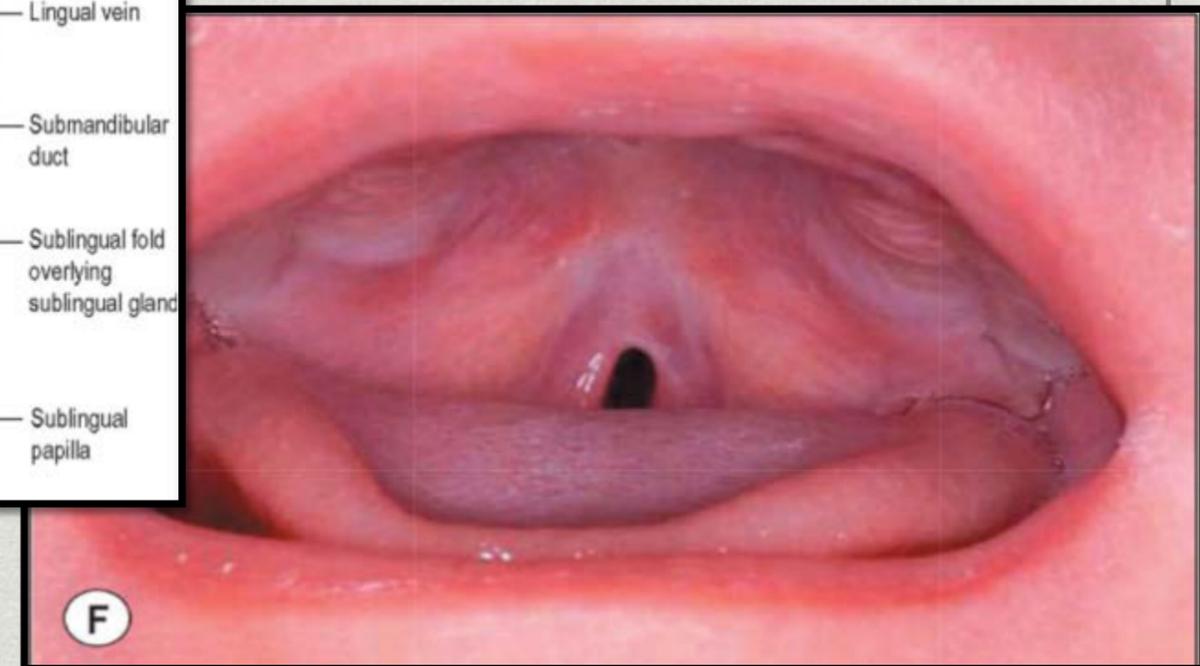
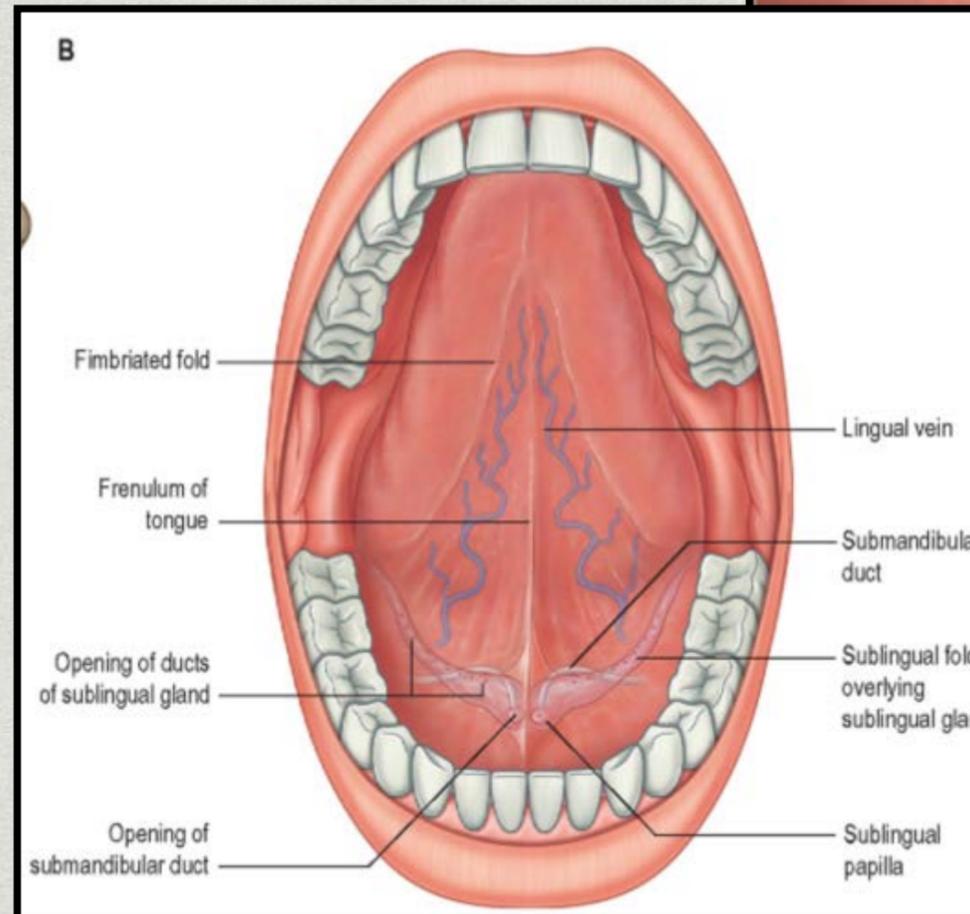
- * Revisions, CST, chiropractor

- * Other symptoms:

- * reflux, torticollis, side preference, hiccups, colic

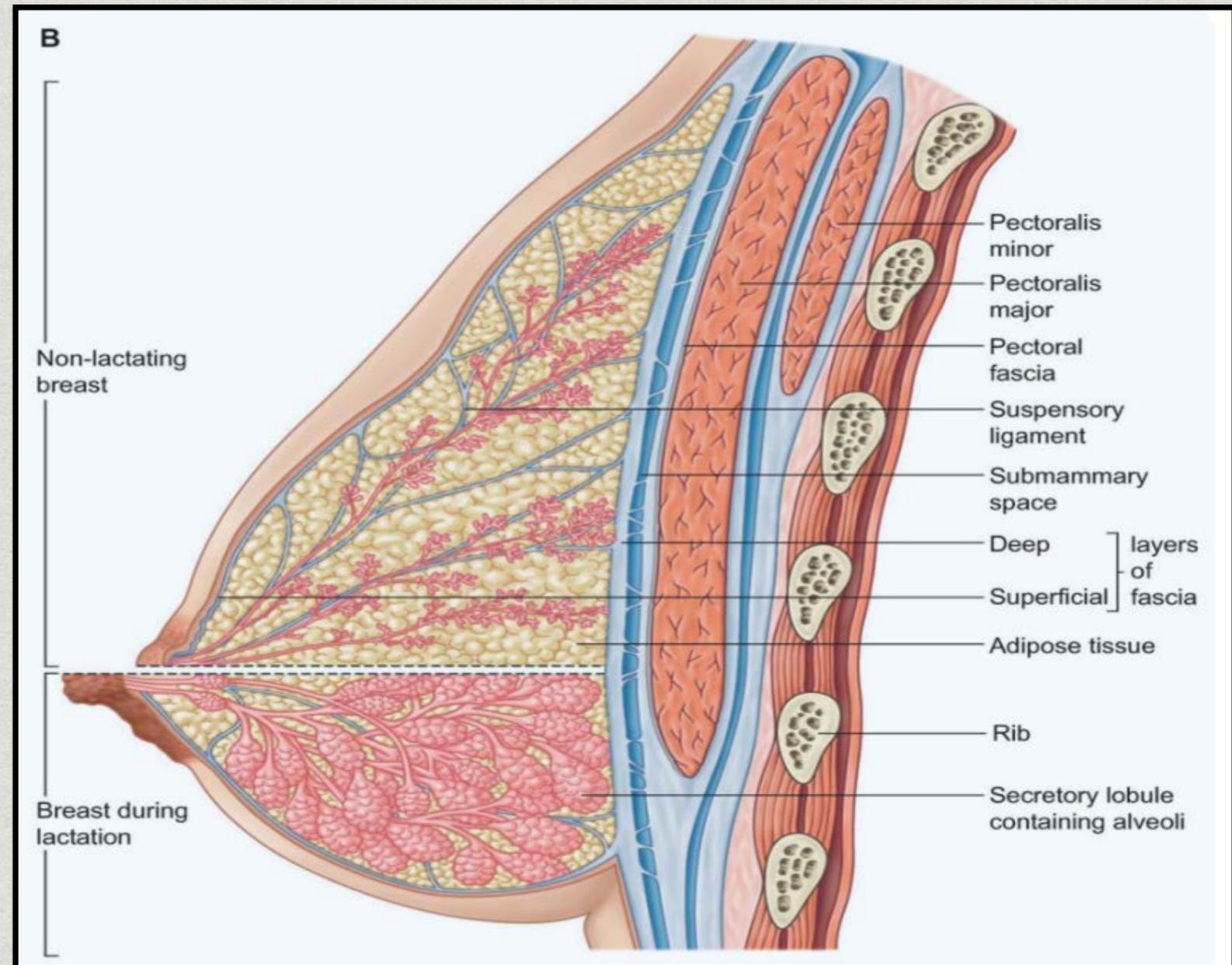
Differential Diagnosis Includes:

- * Cleft lip/palate
- * Hypotonia
- * Ankyloglossia
- * Dysmorphic features – especially micrognathia
- * Macroglossia
- * Airway issues – malacias, stenosis, etc.



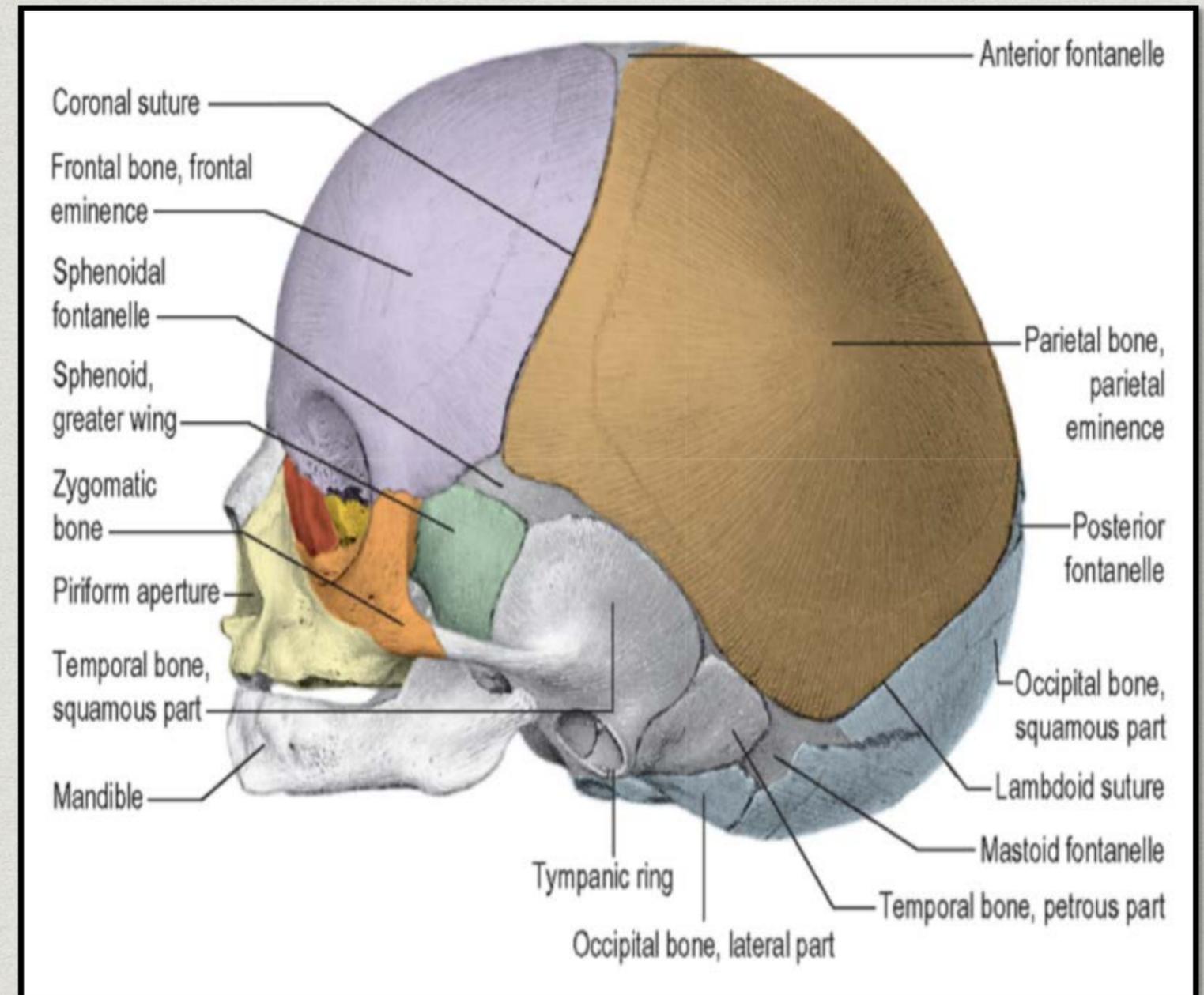
Maternal Anatomy

- * It takes two!
- * Inverted nipples
- * Engorged breasts
- * Over or under production
- * Clogged ducts
- * Mastitis
- * Thrush



Cranial Anatomic Considerations

- * **Neurocranium** – 9 bones
 - * Occipital (4 parts at birth)
 - * 2 parietals
 - * 2 Frontals (2 parts at birth)
 - * 2 temporals (2 parts at birth)
 - * Sphenoid (3 parts at birth)
 - * Ethmoid



Cranial Anatomic Considerations

* Viscerocranium/facial skeleton

* 13 bones

* 3 nasal bones

* 2 maxillae

* 2 lacrimal bones

* 2 zygoma

* 2 palatine

* 2 inferior nasal conchae

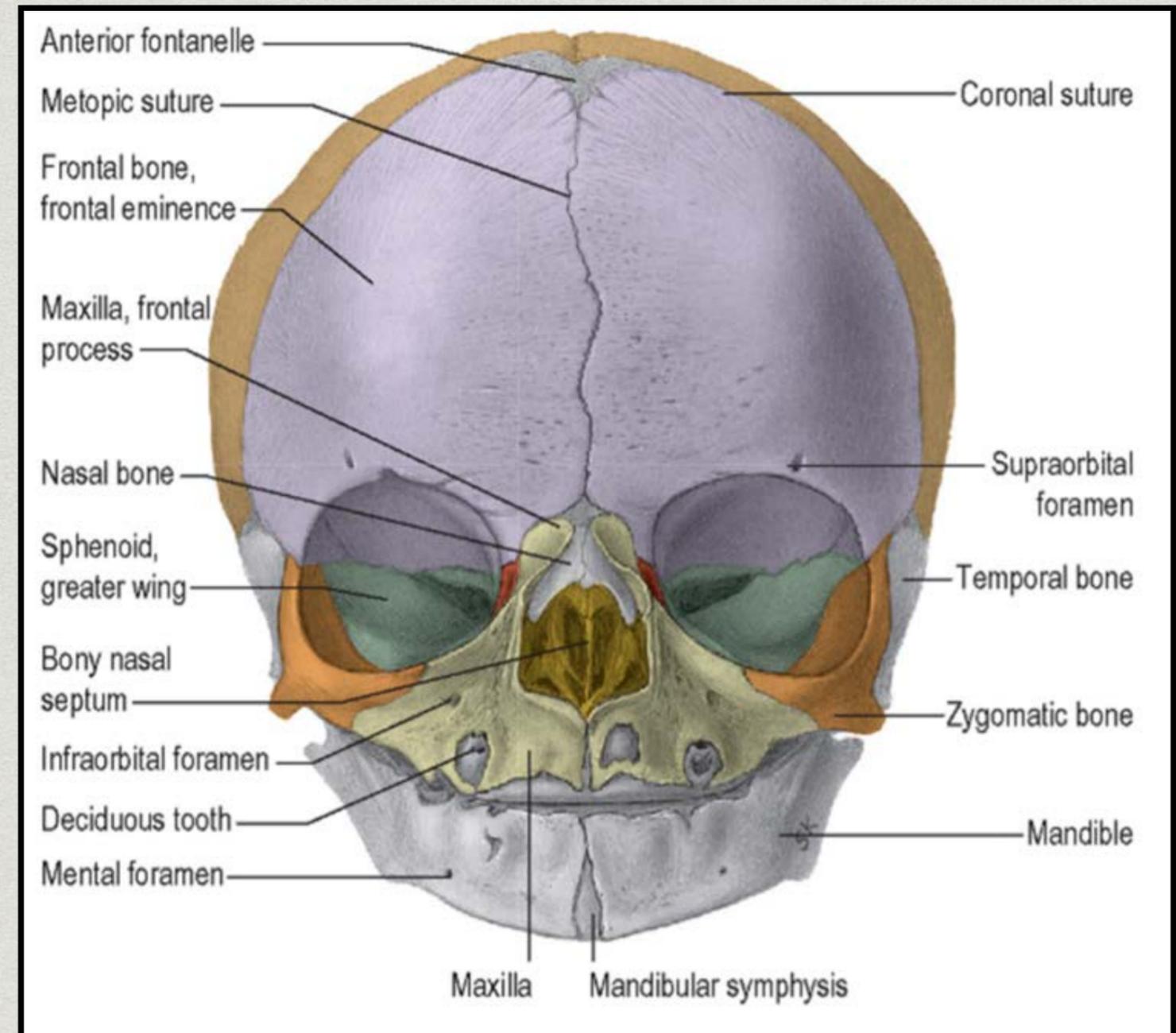
* Vomer

* Other

* Mandible

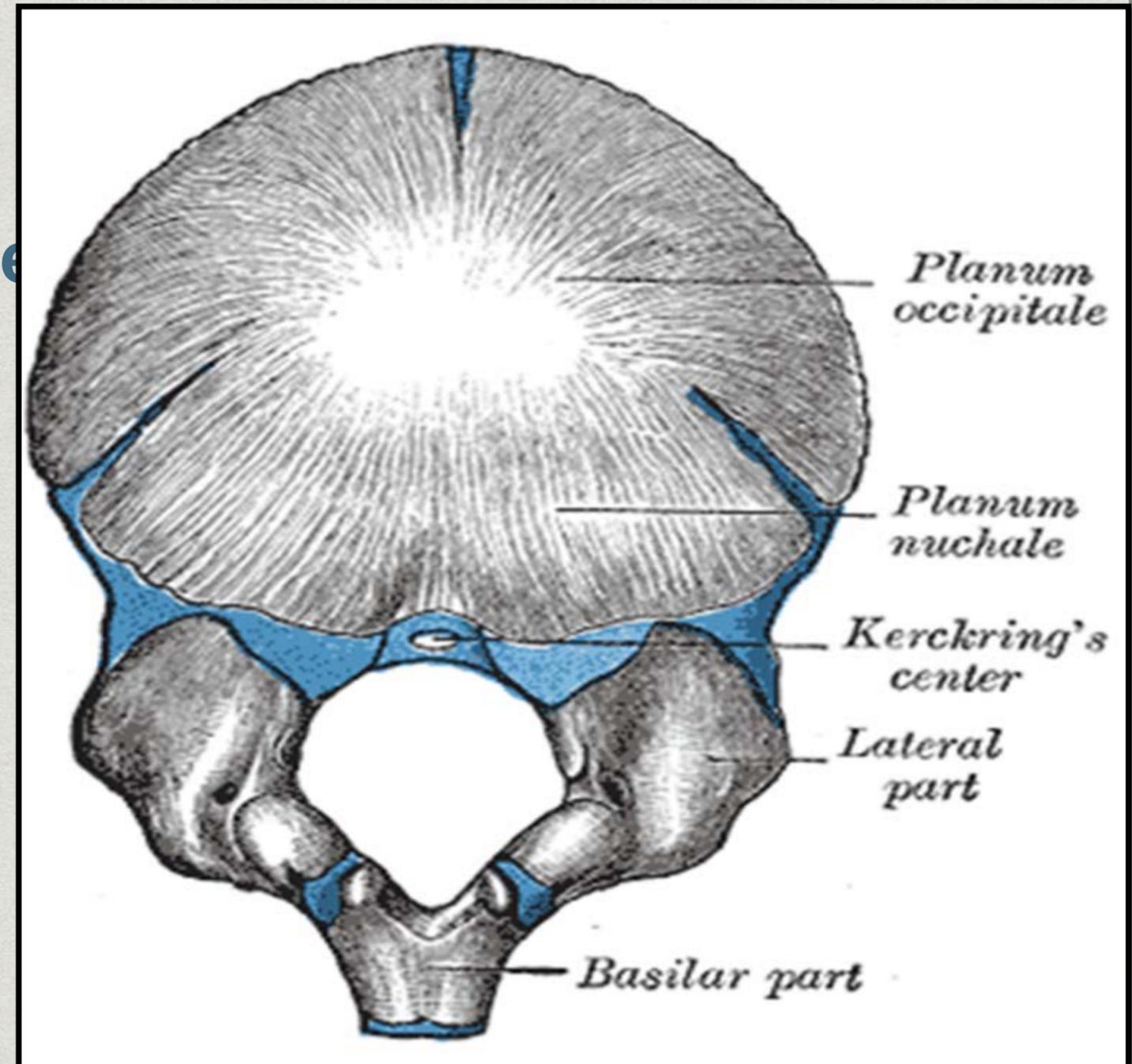
* Hyoid

* Middle Ear Ossicles



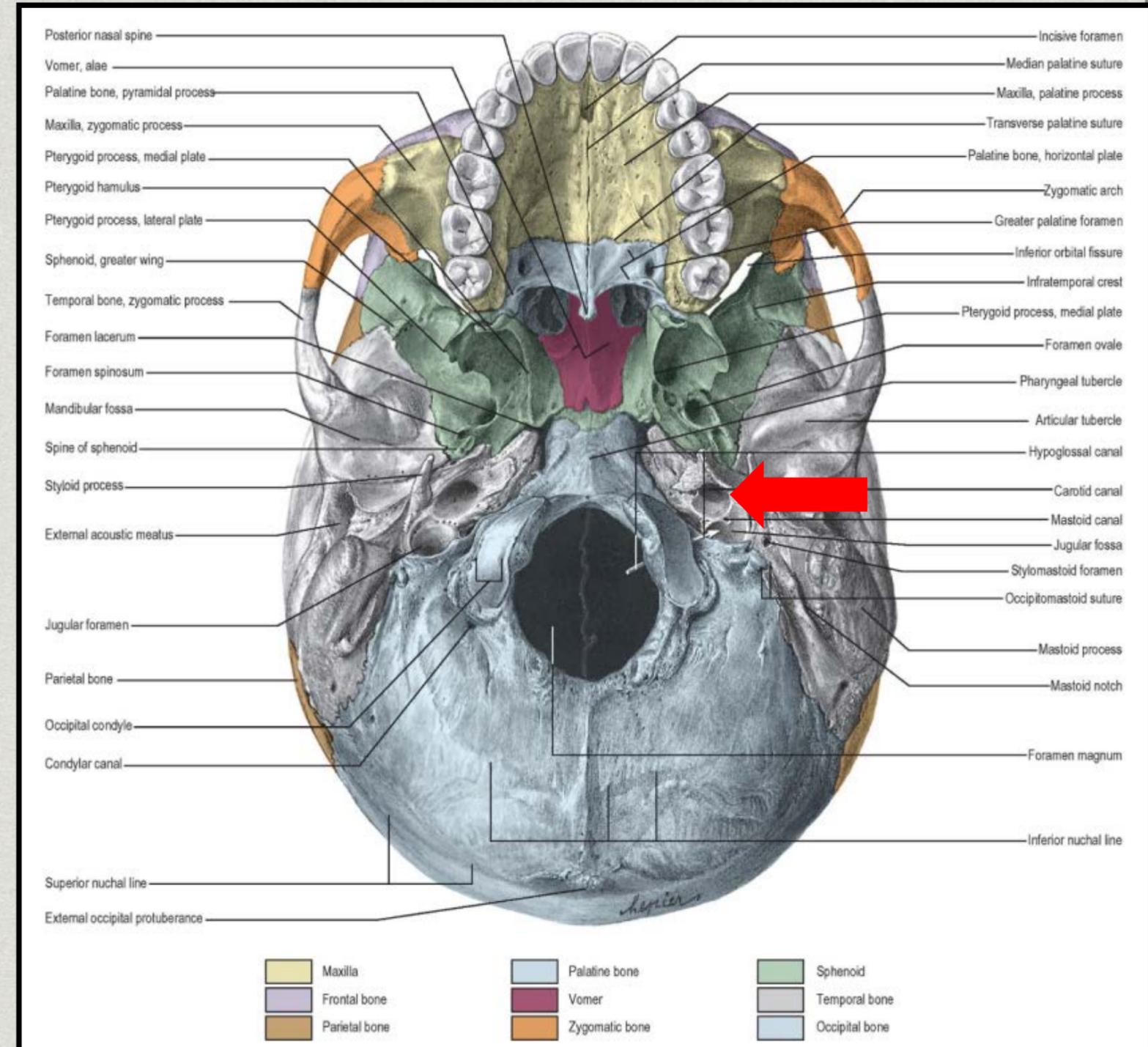
More on the Occiput

- * 4 parts at birth – 2 condylar parts, 1 squamous portion, and the basi-occiput
- * **Hypoglossal canal forms between the occipital condyles**
 - * CN XII
- * **Jugular foramen forms between temporal and occiput**
 - * CN IX, X, XI
- * **Cartilage easily compressible**
 - * birth trauma or intrauterine
 - * Swelling in this area can lead to compression



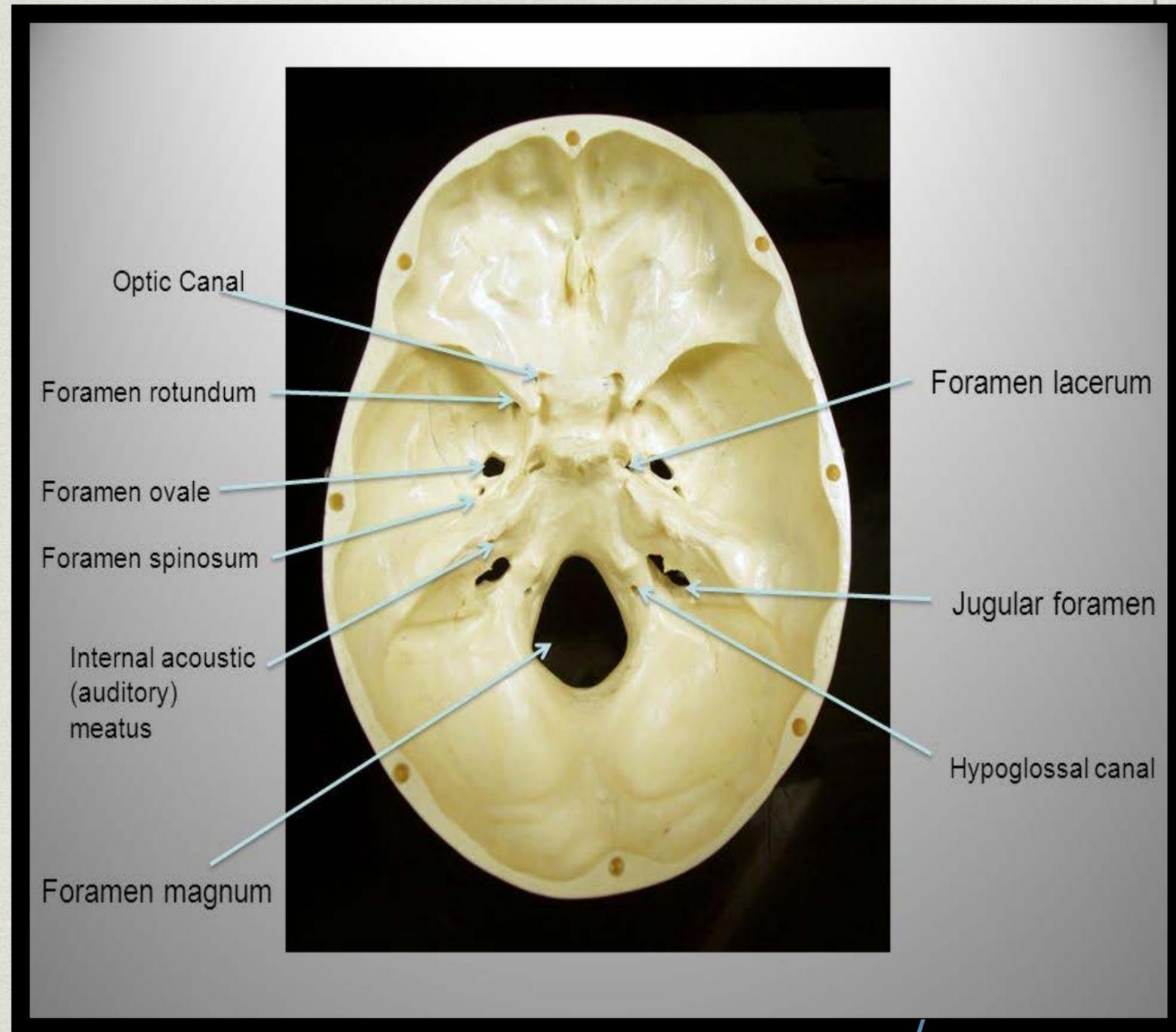
Glossopharyngeal Nerve IX

- * Branchial motor – stylopharyngeus muscle (elevates pharynx to allow swallowing)
- * Visceral motor – parasympathetic of parotids
- * Visceral sensory – from carotid sinus and body
- * General sensory – from TM, upper pharynx, posterior 1/3 of the tongue
- * Visceral afferent – taste from posterior 1/3 of tongue
- * Exits via the Jugular Foramen (Temporal/Occiput)



Vagus Nerve CN X

- * General visceral efferent – parasympathetic to glands of mucus membranes of pharynx, larynx, organs in neck/thorax/abdomen
- * Special visceral efferent – innervates skeletal muscles of pharynx/larynx
- * General somatic afferent – sensation from EAM and TM
- * General visceral afferent – from thoracic and abdominal viscera, aortic body and arch
- * Special visceral afferent – taste of epiglottis region of tongue
- * Exits via the jugular forament



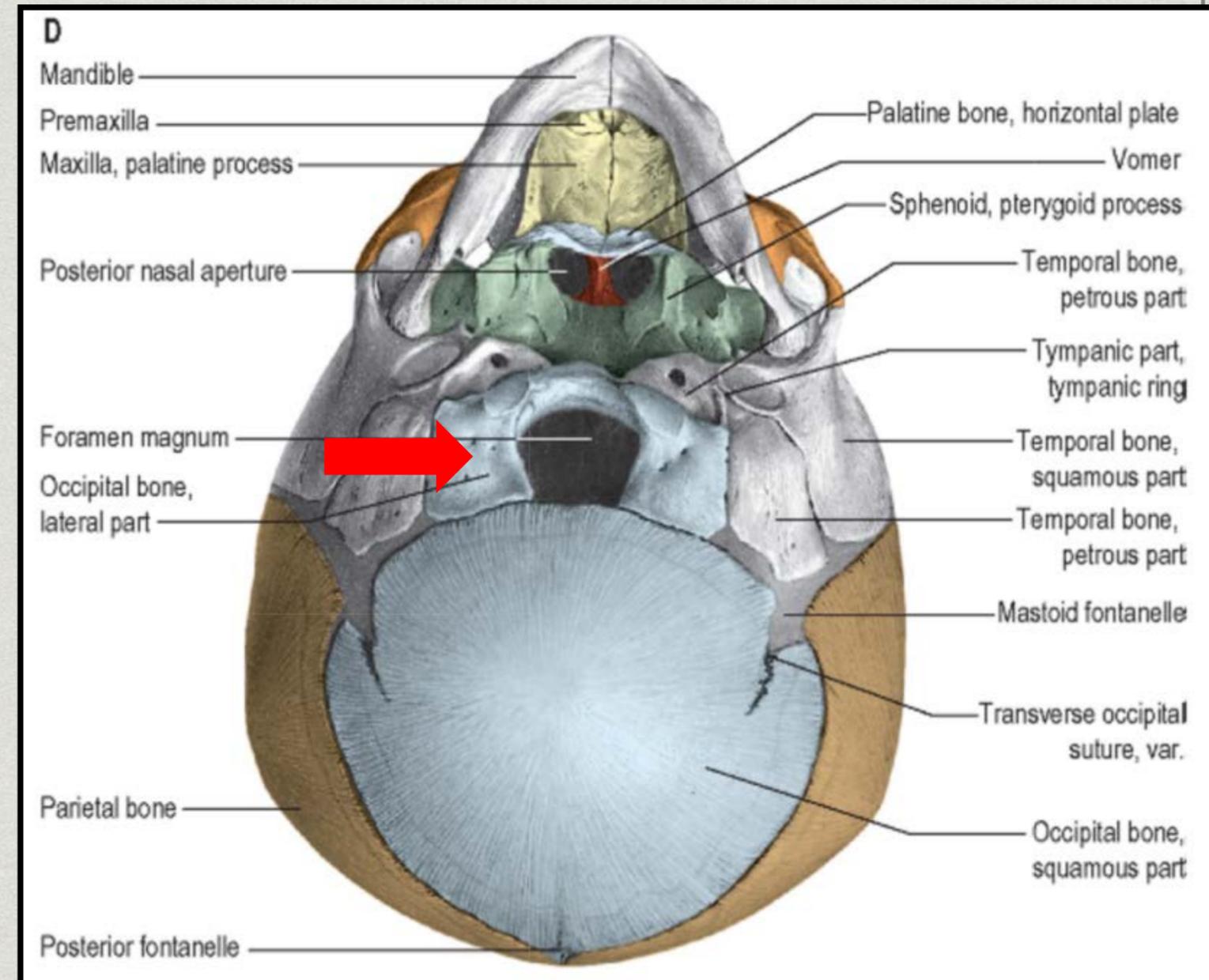
Spinal Accessory CN XI & Hypoglossal CN XII

Spinal Accessory CN 11

- * Motor to SCM and trapezius
- * SCM - bilaterally to flex and extend the head, but unilaterally it sidebends to same side and rotates to opposite side
- * Exits via the jugular foramen

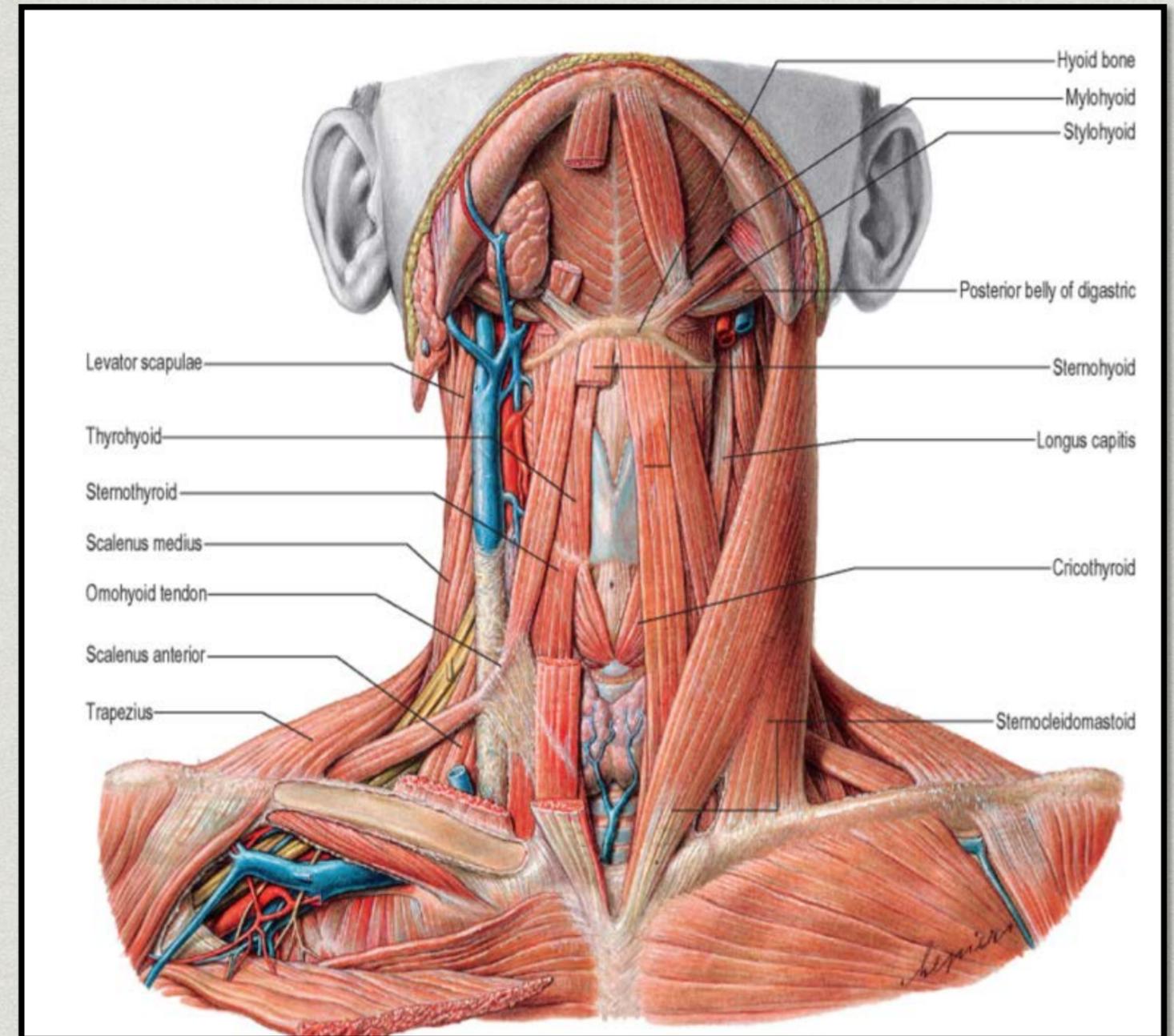
Hypoglossal CN 12

- * Motor to intrinsic tongue muscles
- * Exits via the hypoglossal canal



Hyoid & Intrinsic Tongue Muscles

- * In infants it extends straight from temporal bones, almost inside the mandible
- * In adults, more inferior (anterior to C3)
- * 6 muscles attach superiorly
 - * Middle pharyngeal constrictor muscle, hyoglossus, digastric, stylohyoid, geniohyoid, mylohyoid
- * 3 muscles attach inferiorly
 - * Thyrohyoid, omohyoid, sternohyoid



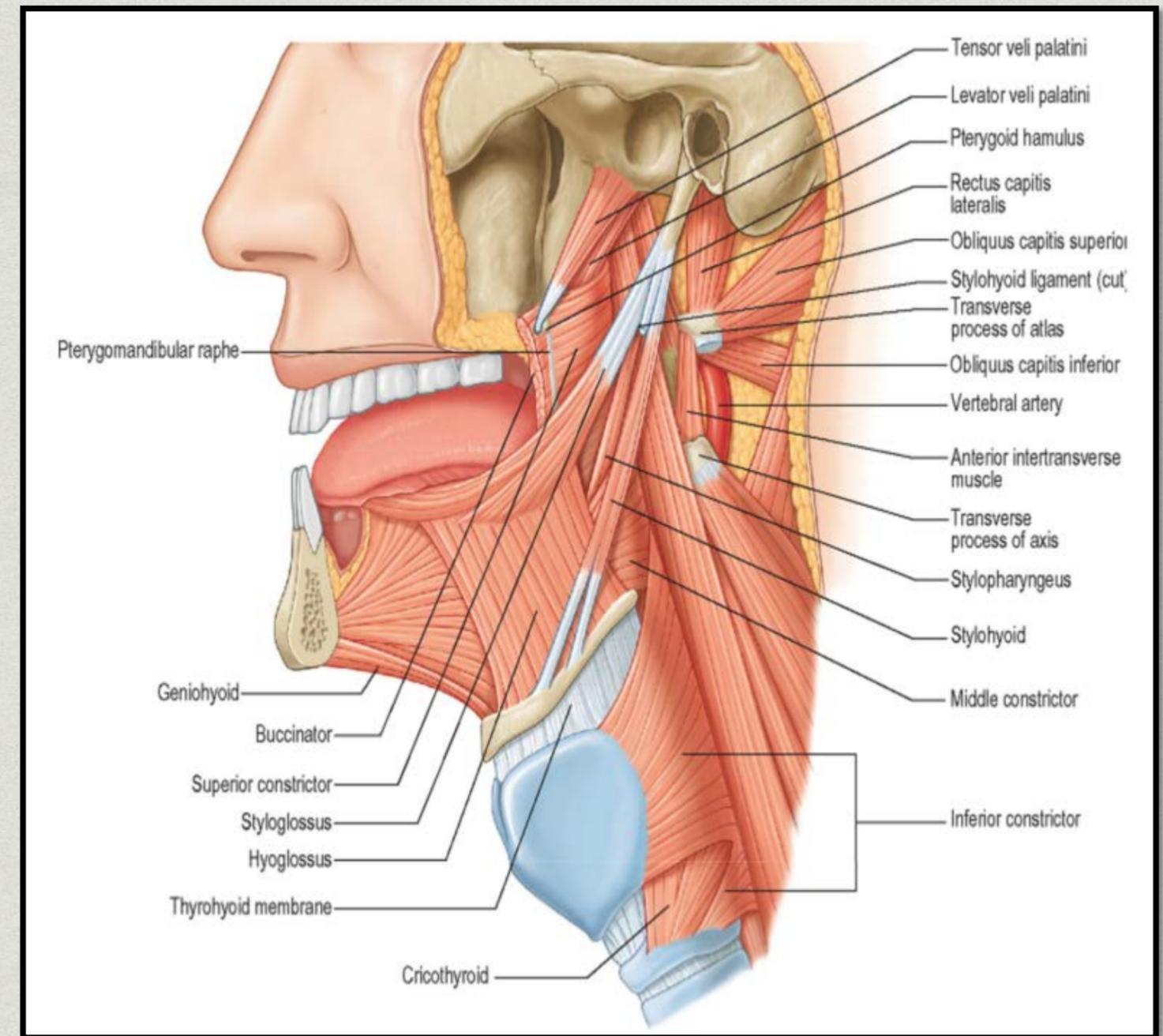
Tongue Muscles

Extrinsic muscles

- * Stabilize the tongue
- * Allow for protrusion, retraction, side to side
- * Genioglossus (mandible), hyoglossus, styloglossus, palatoglossus

Intrinsic muscles

- * Change shape, important for speech, swallowing, eating
- * Lengthen/shorten, curling, flattening/rounding
- * Superior longitudinal muscle, inferior longitudinal muscle, verticalis muscle, transversus muscle



Osteopathic Research

- * **AAO Journal – A Pilot Study: Osteopathic Treatment of Infants with Sucking Dysfunction**
 - * Only 6 patients enrolled -<6 months
 - * Compared pre-post feed fast estimations in breastmilk which improved to controls following OMT
- * **JAOA - Relation of disturbances of craniosacral mechanism to symptomatology of the newborn: study of 1250 infants**
 - * Looked at 1250 infants following birth to show how cranial strain patterns manifested sxs, including feeding dysfunction in newborns
- * **JAOA -Osteopathic Manipulative Treatment for the Treatment of Hospitalized Premature Infants With Nipple Feeding Dysfunction**
 - * Case study of premature twins who avoided placement of G-tubes after OMT treatment helped their PO nipple feeding
 - * Also addressed associated respiratory somatic dysfunction

Osteopathic Research

- * **JAOA -Entrapment neuropathy of the central nervous system**
 - * Entrapment neuropathy of CN 12 as exits hypoglossal canal associated with abnormal suck and swallow
- * **JAOA – Osteopathic Evaluation of Somatic Dysfunction and Craniosacral Strain Pattern Among Preterm and Term Newborns**
 - * Occipital bone presented with highest rate of intraosseous lesions, especially condyles
- * **Nationwide Children’s Hospital Latch study - Pilot (in process)**
 - * 11 patients enrolled
 - * Improvement noted in OMT and sham groups, but no statistical significance
 - * Mothers whose infants received OMT did report less pain following OMT

Suckling

- * Nutritive vs non-nutritive
 - * Nutritive not seen <32 weeks
 - * Non-nutritive lacks pressure to adequately withdraw milk
 - * Nutritive: burst 10-30 sucks at a rate of 2/second interspersed with 1-4 swallows
 - * Dependent on coordinated movements of tongue, hyoid, mandible, and lower lip
 - * Body of the tongue must fully touch the palate and then rapidly withdraw to create the negative force needed to withdraw milk

Suckling Assessment

- * Distal phalanx of fifth digit into the infant's mouth
- * Should feel both sides of the tongue moving toward palate symmetrically
- * Monitor motion of hyoid and mandible as well for symmetry and coordinated movements
- * Observe child feeding on breast or bottle



- * **Cranium**
 - * OA, Occipital Condyles, Temporal
- * **Tongue**
 - * Muscles, Hyoid
- * **Scapula**
 - * Omohyoid
- * **Mandible**
 - * Osseous, muscular
- * **Sternum** (5 parts in infant)
- * **Cervical spine**
- * **Clavicle**
- * **Thoracic spine**
 - * Sympathetic tone balance

**Common
Areas to
Aim OMT
for Feeding
Issues**

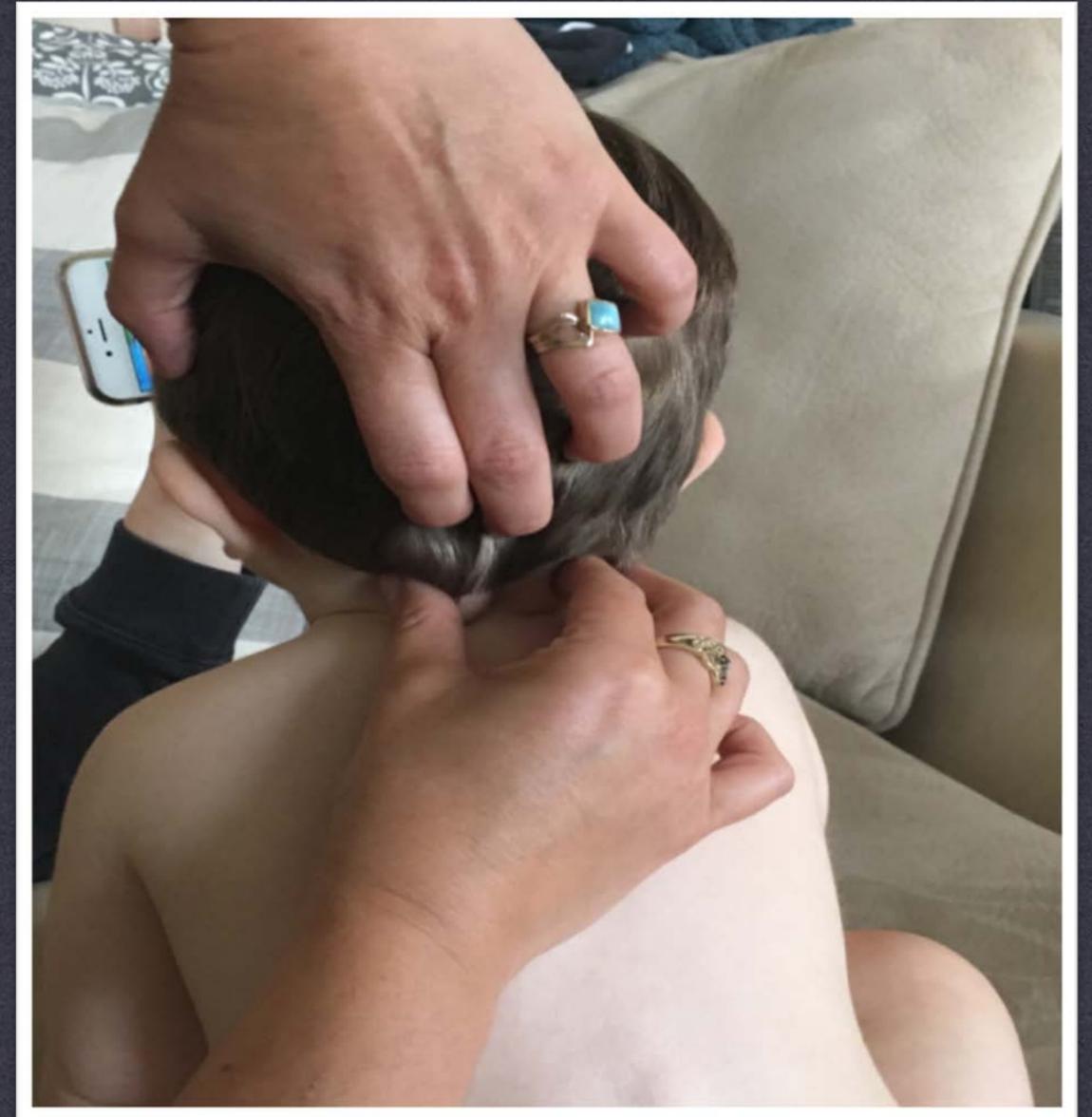
OMT: CONDYLAR DECOMPRESSION

- * Infant is supine- head cradled in both hands of the physician
- * Physician curls fingers into the craniocervical space so ring fingers lie on the approximate plane of the condyles and middle fingers approximate the plane of the atlas
- * Use the ring fingers to introduce a firm but gentle force in a lateral direction to lift and spread the tissues posteriorly and away from atlas (Move the wrists)
 - * Middle fingers may be used to decompress atlas from occiput
- * Performed until balanced tension felt between occiput and atlas and position maintained until change in tissue texture or improved freedom of motion



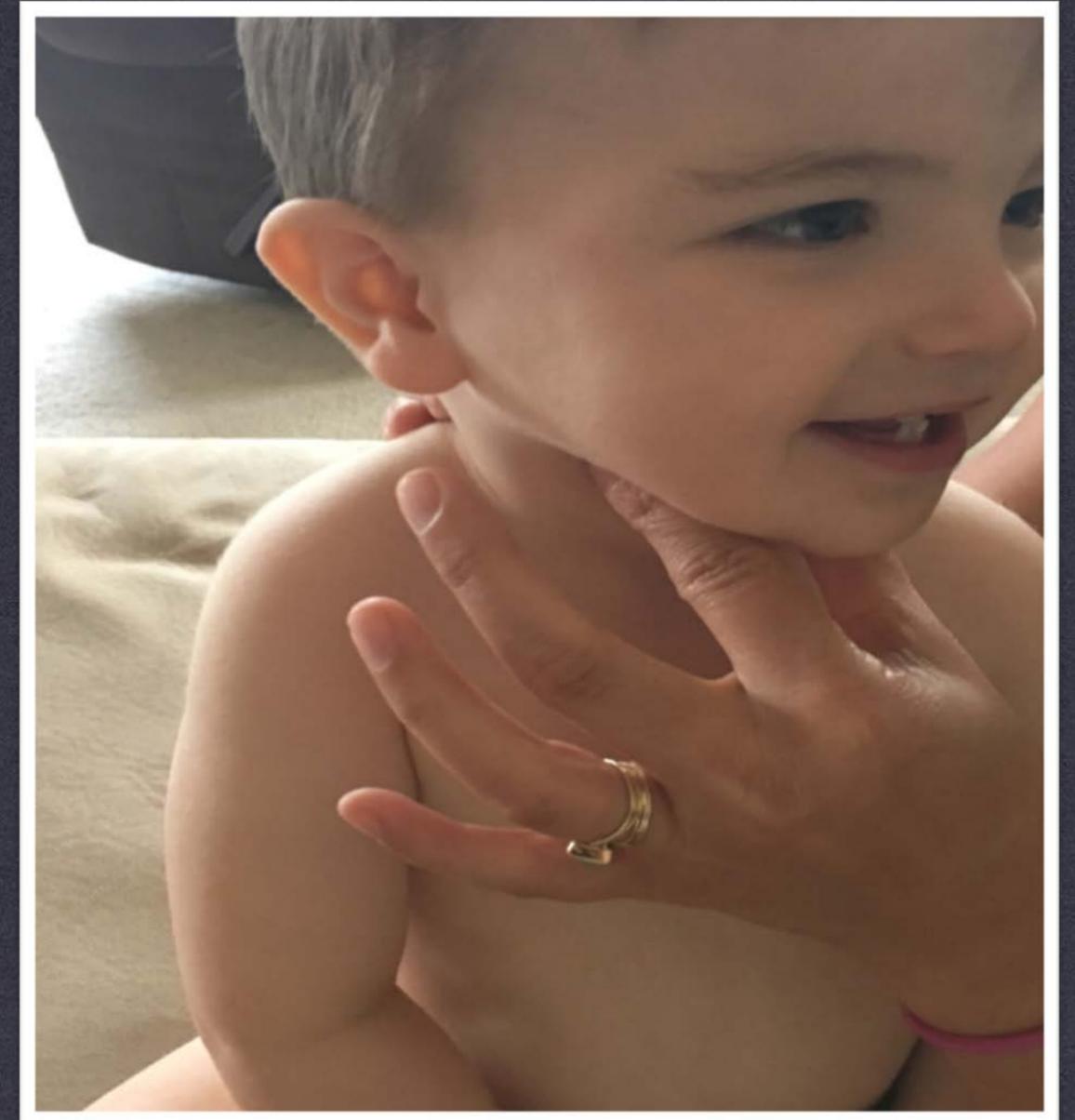
OMT: OCCIPITO/ATLANTAL BALANCED LIGAMENTOUS TENSION

- * Infant is supine and physician at head of the bed cradling the occiput in one hand. Middle finger of the physician's opposite hand contacts the inion, and then slides anteriorly and inferiorly – curving around the occiput to rest above spinous process of C2
- * The hand on occiput moves posteriorly to flex the occiput while stabilizing C1-2 with index finger
- * Introduce side-bending, translation, or rotation to achieve a point of balance in the tissue
- * Maintain the position until there is a change in tissue texture, improvement in mechanics, or resolution of the strain



OMT: HYOID BALANCING

- * Infant is supine and physician uses one hand to gently contact hyoid and the other to contact scapula and clavicle
- * Balance tensions in omohyoid and associated tissues between these hands
- * Once balance is achieved the position is maintained until there is texture changes, improved motion, or resolution of the strain



OMT: TONGUE INHIBITION

- * Treat mandible and hyoid first
- * Infant is supine, and physician monitors the cranium with one hand. Their other hand is gloved and they should use the fifth digit is placed under the tongue superior to the sublingual fold at the root of the genioglossus.
- * Apply a gentle pressure just lateral to the frenulum to assess genioglossus and apply force and tissue unwinding pressure until a change is felt
- * Finger then moved posteriorly along root of the tongue to anterior edge of hypoglossus (and possibly styloglossus) and pressure is repeated until a release is felt
- * Repeat on the opposite side (total of 4 points of contact)





PART II: CONSTIPATION

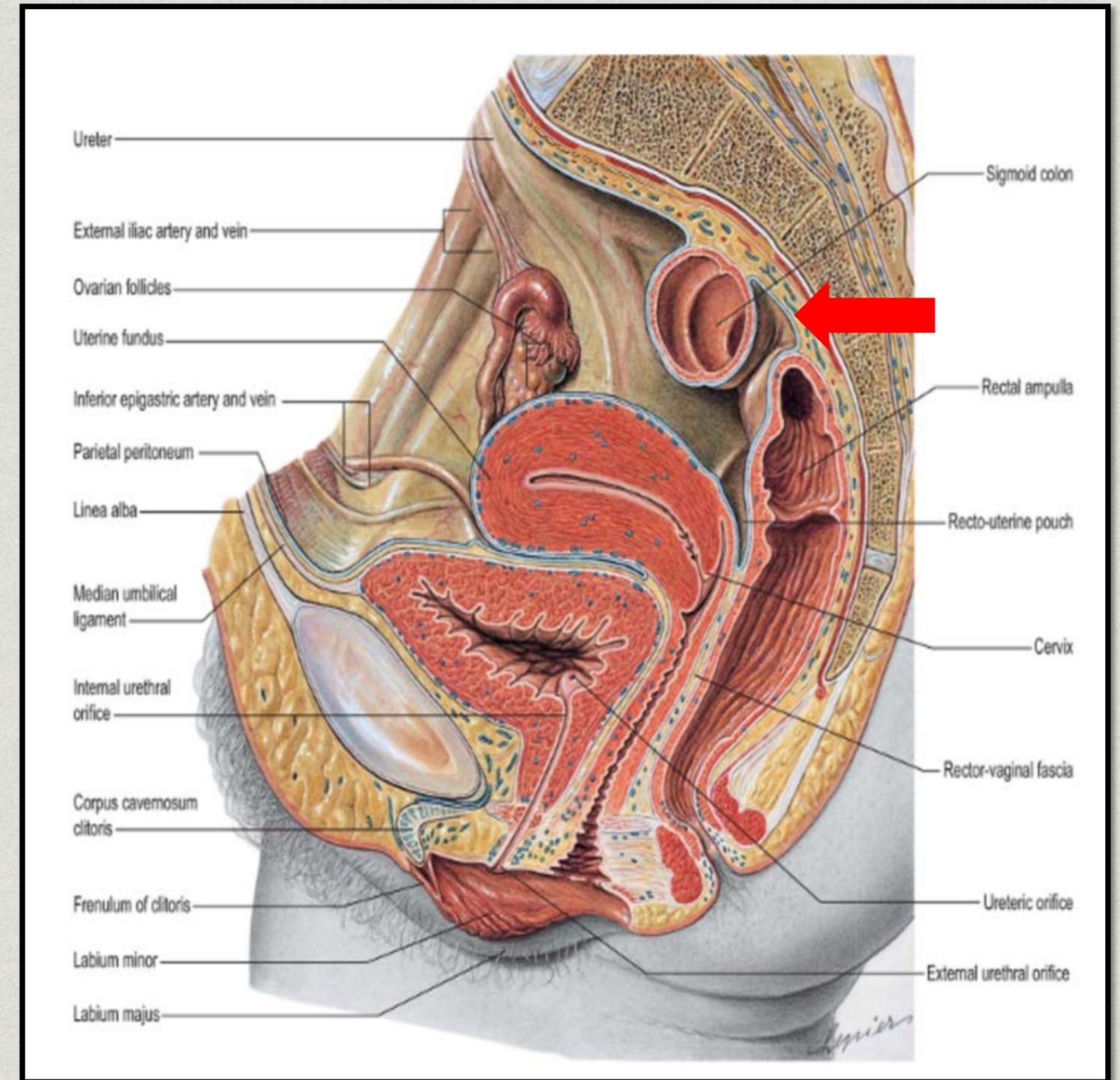
OSTEOPATHIC CONSIDERATIONS FOR THE
CONSTIPATED INFANT

Objectives Part II

1. Identify **anatomical considerations** which may affect the infant/child with constipation
2. Describe **osteopathic considerations** for constipated child/ infant including autonomics, biomechanics, lymphatics and circulation
3. Review pertinent **osteopathic research** on the constipated infant/child
4. Perform **Osteopathic Manipulative Treatment** for the constipated infant/child

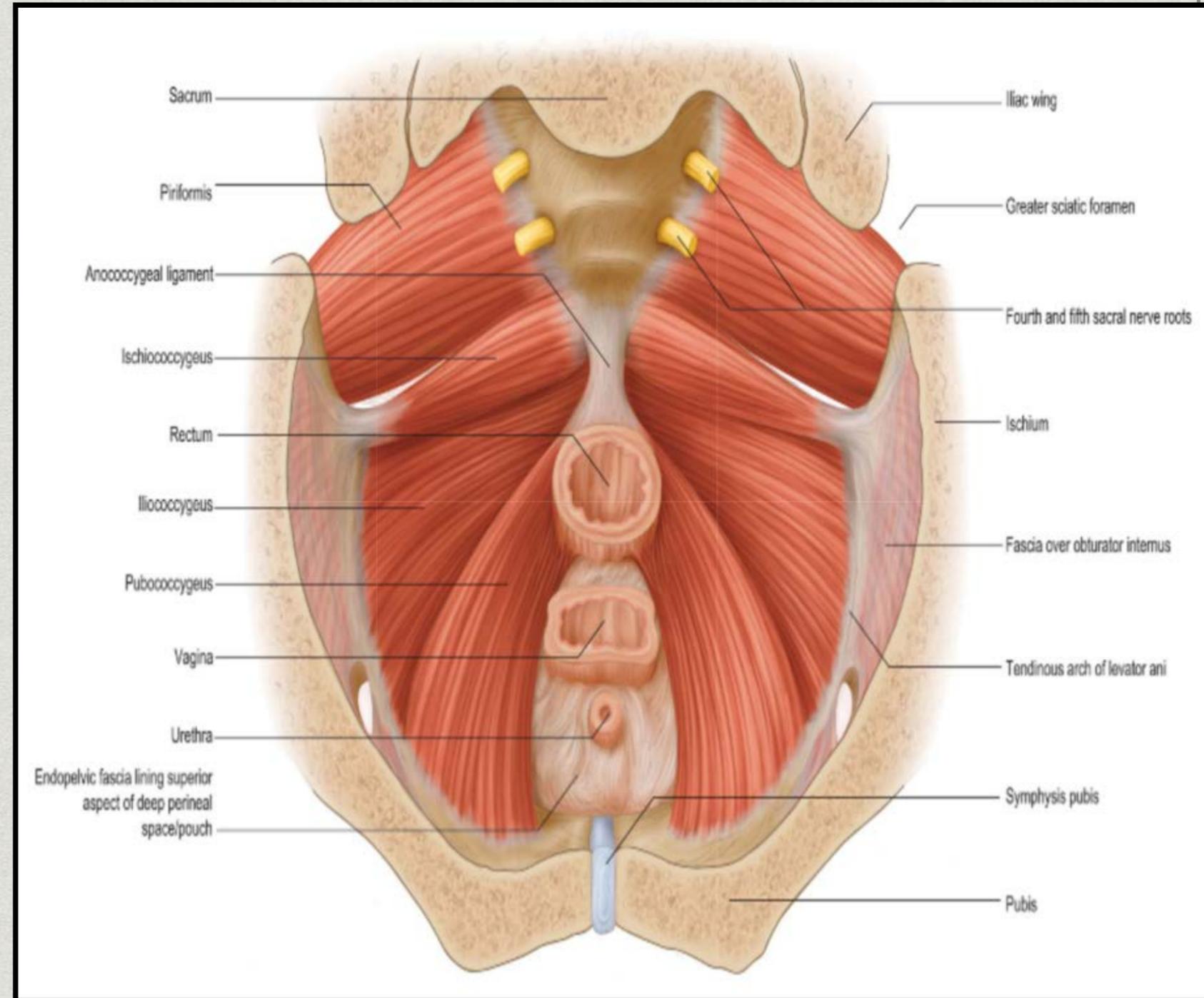
Anatomic Considerations- Biomechanics

- * Sigmoid colon becomes the rectum at the 3rd sacral segment
- * Rectum turns posteroinferiorly and narrows
- * Passes through the pelvic diaphragm and becomes the anal canal
- * This angle helps maintain fecal continence
- * “In children with chronic constipation the anal canal is positioned more obliquely”²
- * May alter fecal elimination
- * “Has been shown to alter electromyographic and manometric characteristics of sphincter mechanics”²



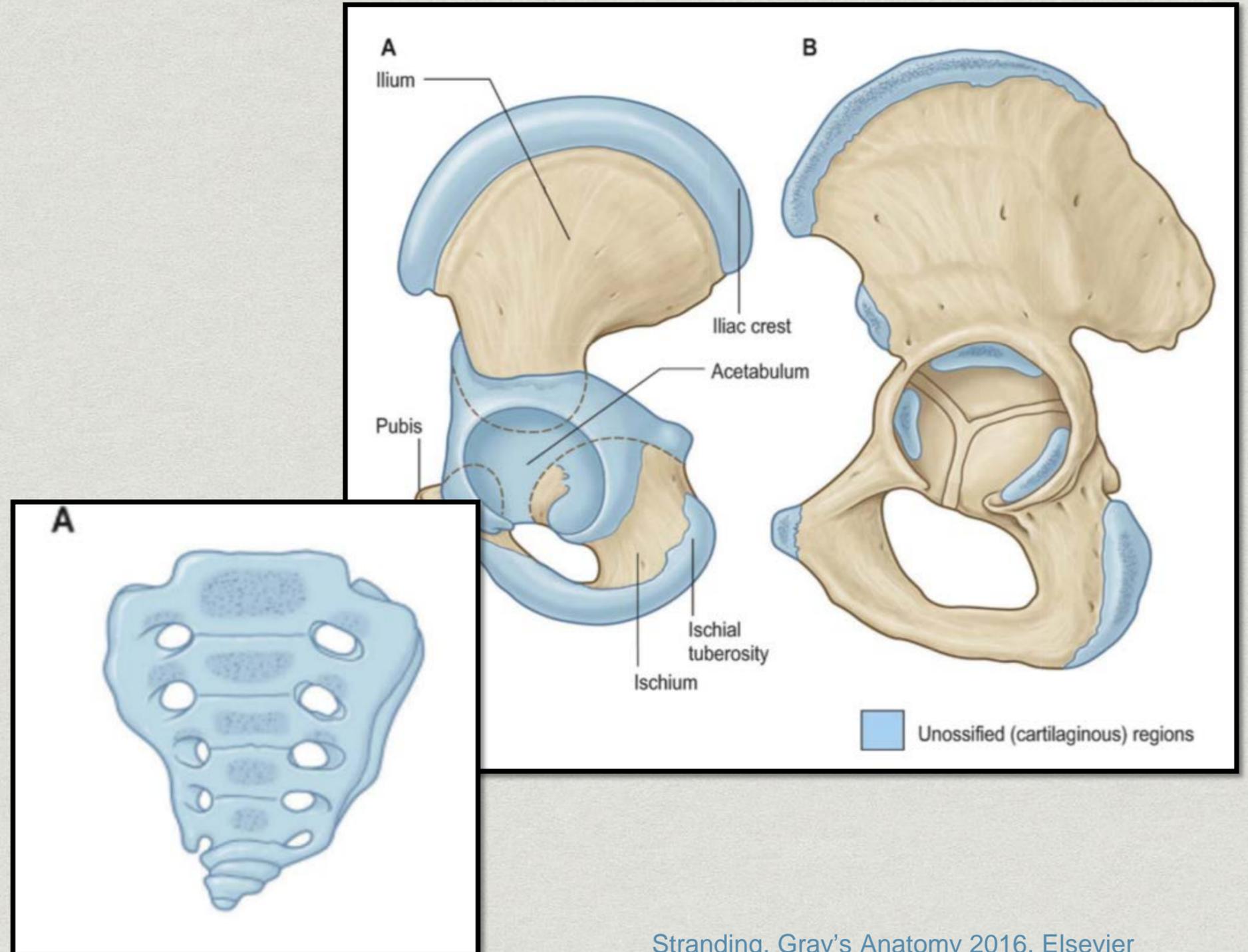
Anatomic Considerations Biomechanics

- * Puborectus- a supportive band assisting in closing
- * Internal sphincter
- * External sphincter
- * Connections with the perineal body of the pelvic diaphragm
- * Anococcygeal ligament



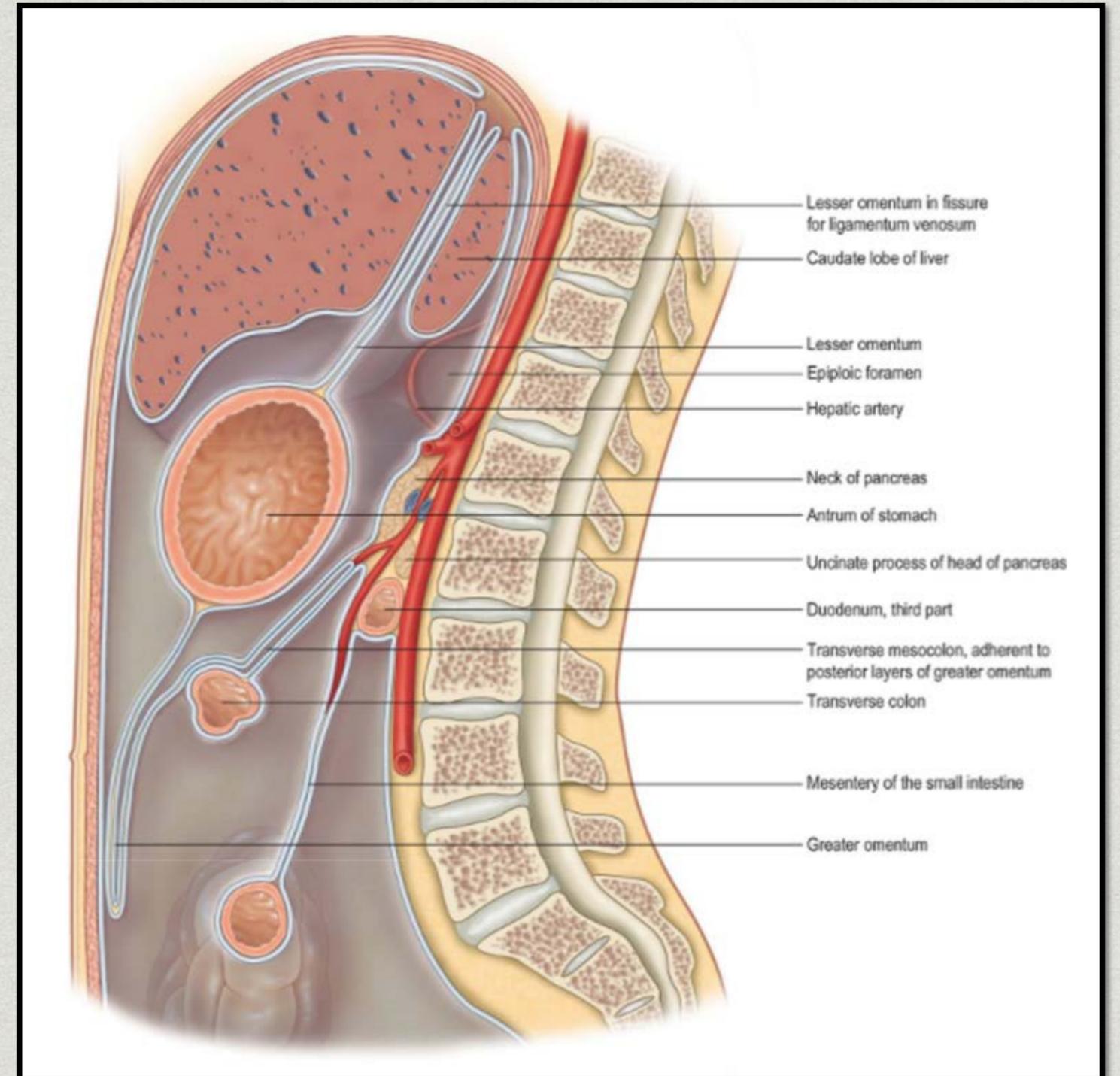
Anatomic Considerations- Osseous

- * Pediatric Sacrum
 - * 5 parts
- * Pediatric Innominate
 - * 3 parts



Anatomic Considerations- Visceral

- * Mesenteric attachments
 - * Greater Omentum
 - * Lesser Omentum
- * Mobility of visceral organs
 - * Stomach
 - * Small Bowel
 - * Colon
 - * May affect peristalsis/circulation



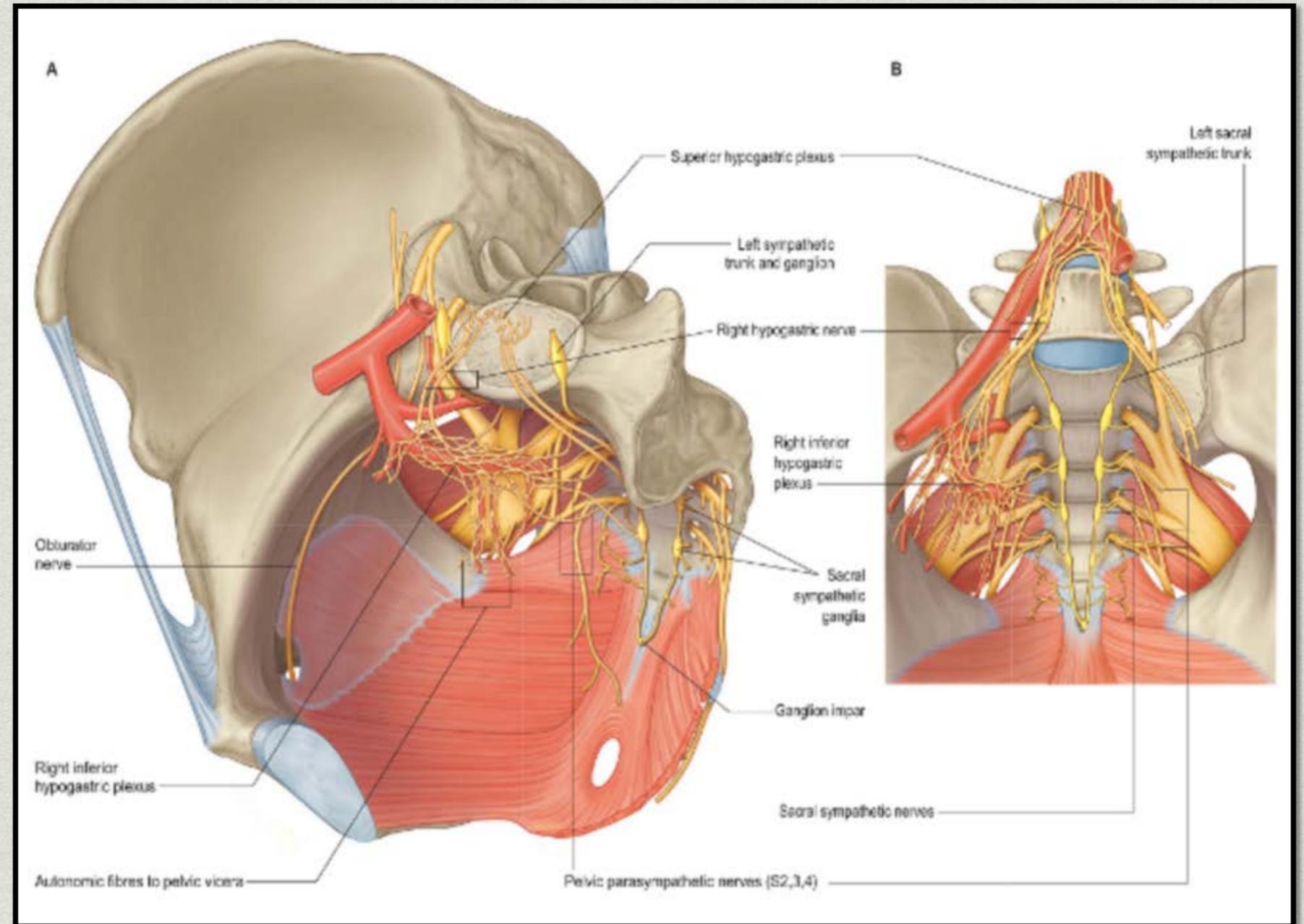
Anatomic Considerations Autonomics

* Sympathetics

- * Small Intestine
 - * T7-10
 - * Celiac Ganglia
 - * Superior Mesenteric Ganglia
 - * Inferior Mesenteric Ganglia
- * Large Intestine
 - * T10-L2

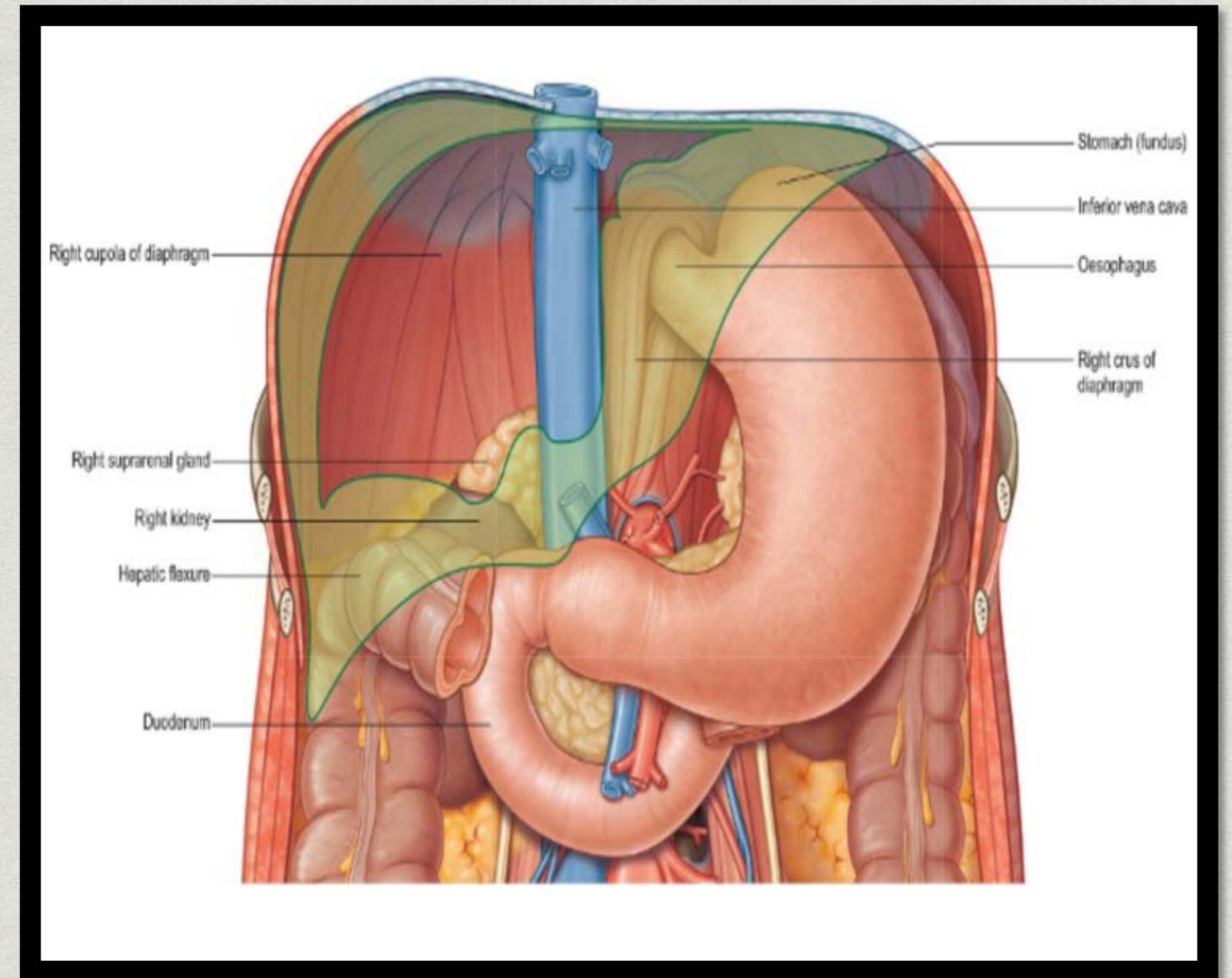
* Parasympathetics

- * Vagus
- * Sacral S2-3-4



Anatomic Considerations Circulation

- * Diaphragm Motion
- * Lymphatic Motion
- * Colonic Motion at the flexures and transverse colon



Osteopathic Research

* Case Reports:

* **JAOA- OMT for Colonic Inertia³**

- * Adult Patient referred for low back pain, constipation symptoms improved short term with OMT
- * “The continuity of the fascia of the musculoskeletal system and gastrointestinal system seemed to be playing a role in the patient’s colonic inertia”³

* **IJOM- Osteopathic approach to chronic constipation in Prader-Willi Syndrome⁴**

- * Significant improvement with OMT in 18yo

* Pilot Studies:

* **Journal of Manipulative and Physiologic Therapeutics**

- * OMT for children with cerebral palsy and constipation
- * 13 children, group 1 OMT only, group 2 OMT and medications- Both groups improved

* **Journal of Bodywork and Movement Therapies**

- * A review of literature on massage for Constipation

* **Journal of Digestive Diseases- Treatment of refractor irritable bowel syndrome with visceral osteopathy**

- * 31 adults- improved symptoms with IBS

* **Chiropractic and Manual Therapies- effect of osteopathic manipulative treatment on gastrointestinal function and length of stay of preterm infants:**

- * 350 pre-term infants in the NICU- 162 received OMT- OMT group had reduction of gastrointestinal symptoms and excessive length of stay.

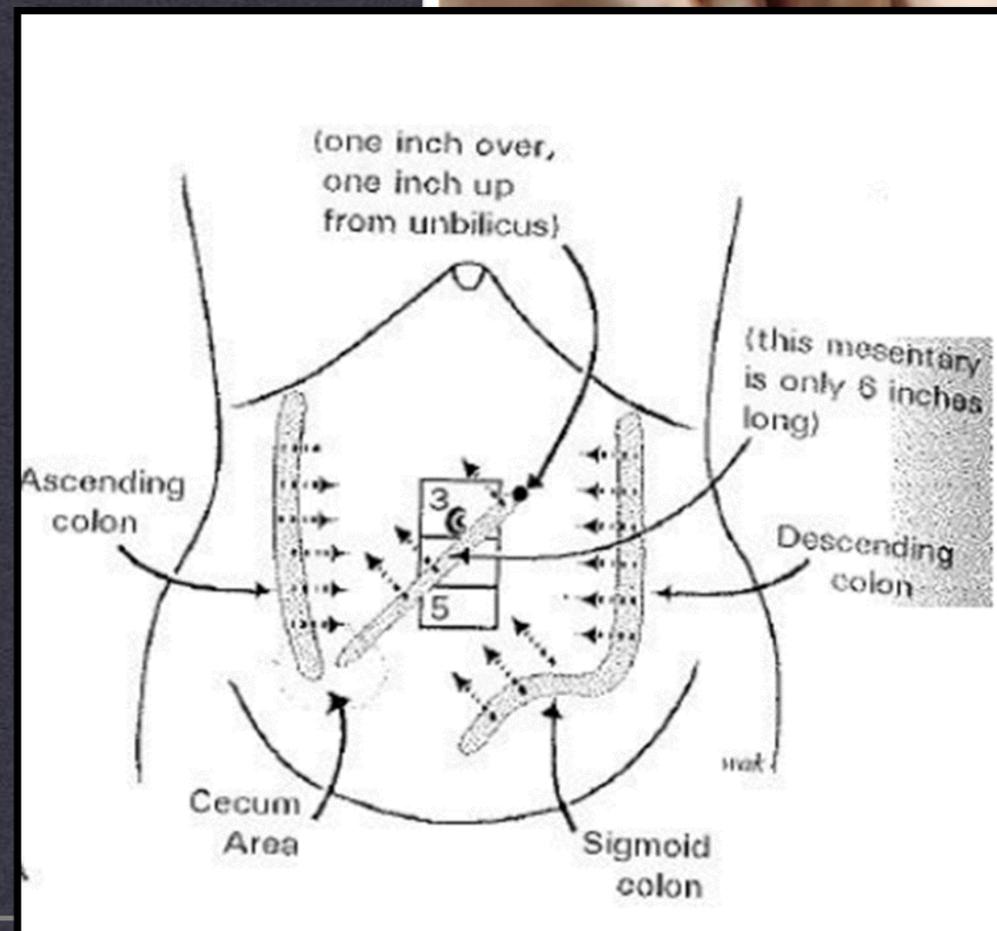
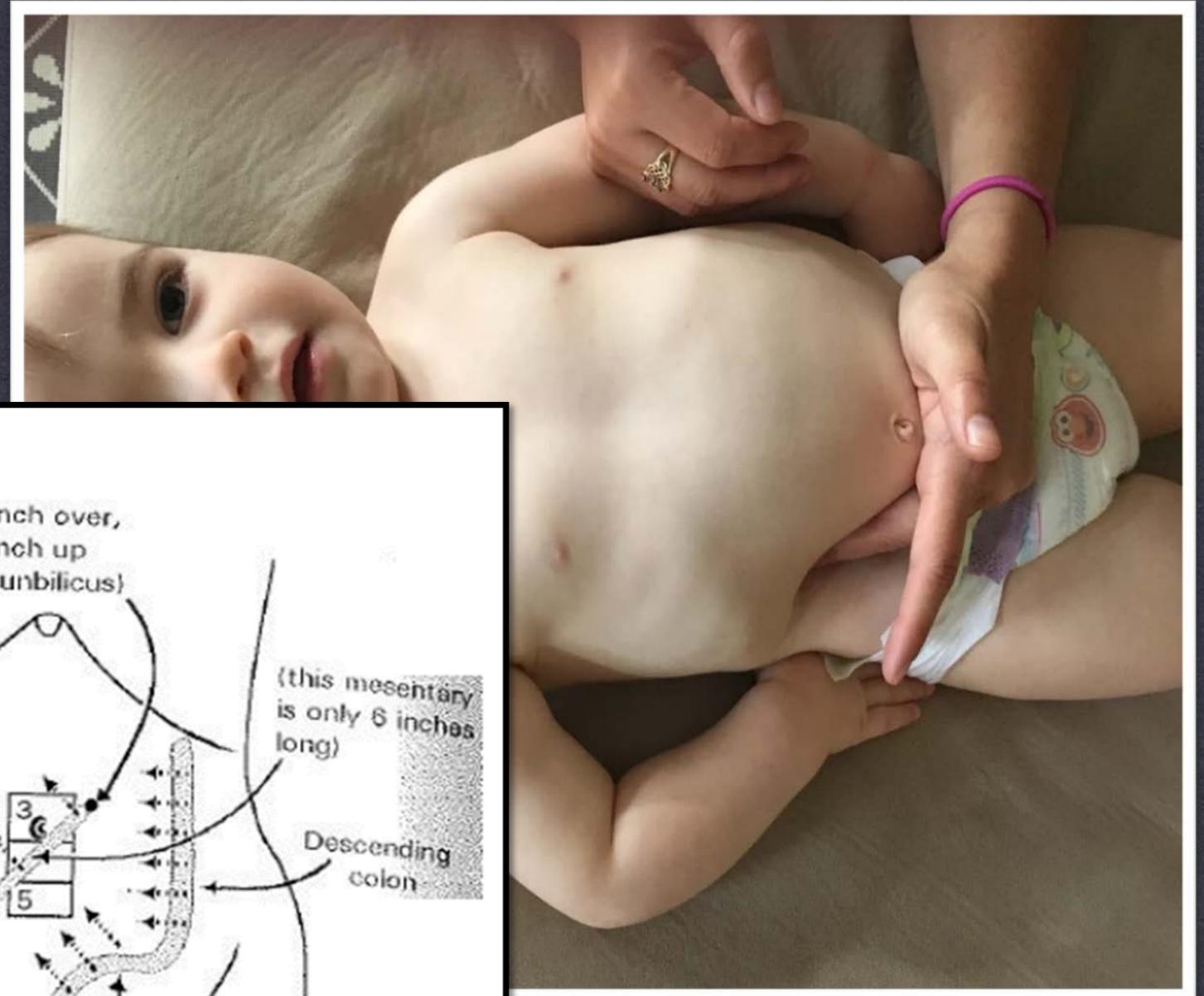
OMT: VISCERAL- MESENTERIC LIFT

- Gently engage the mesentery on an oblique angle from left inferior to right superior



OMT: LARGE COLON MFR

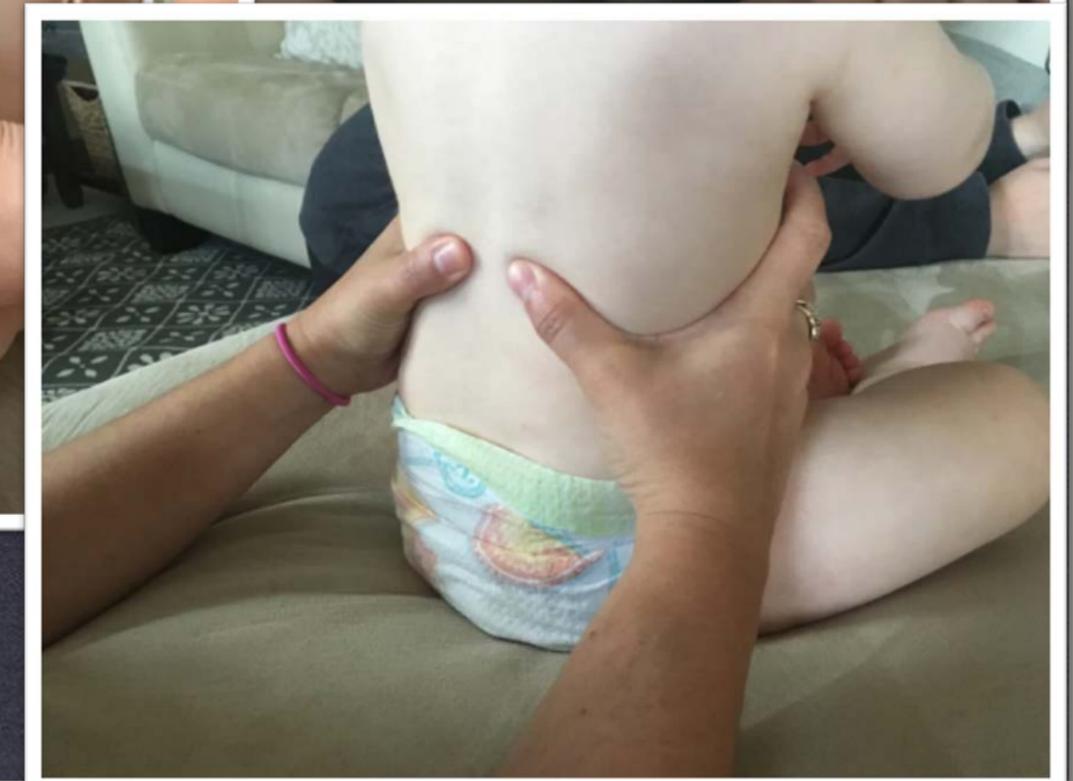
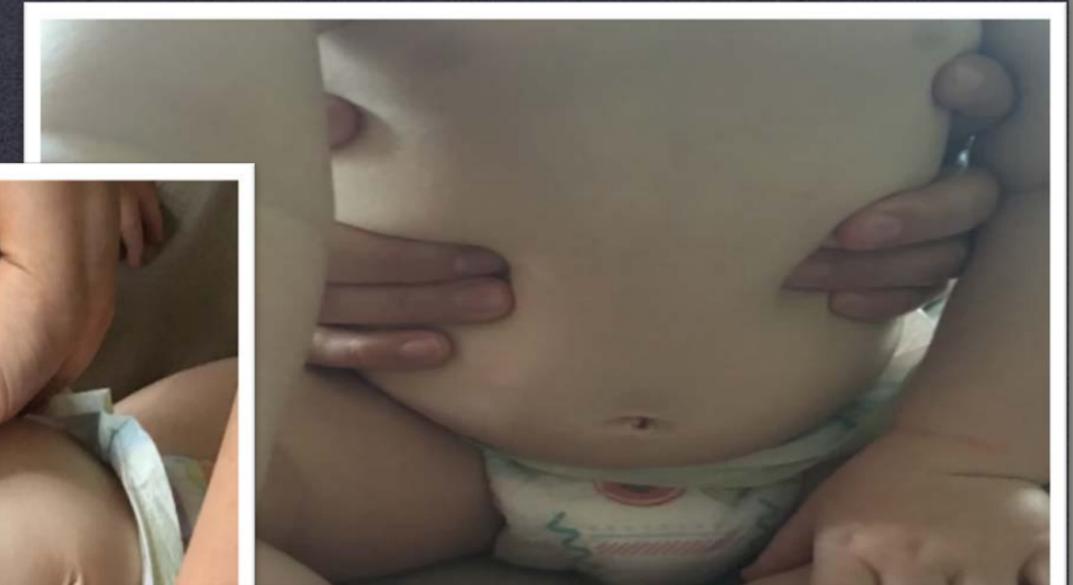
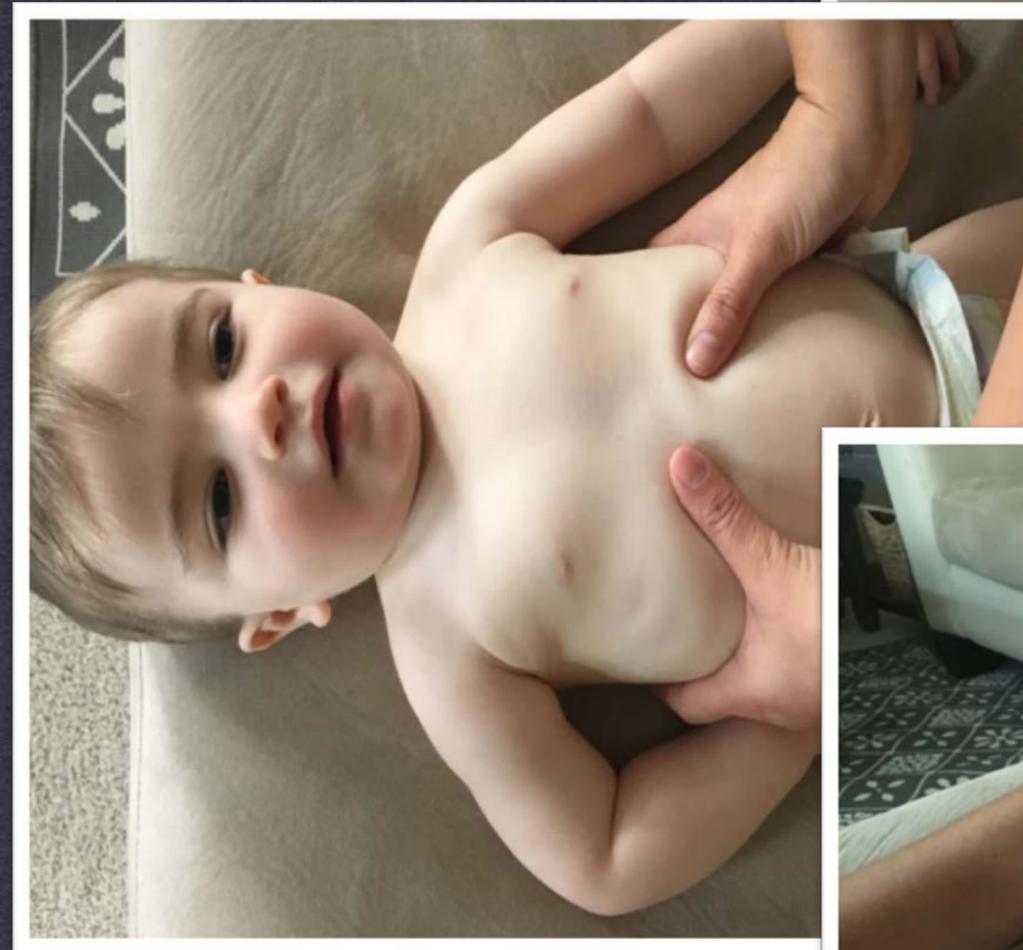
- Gently engage the ascending colon with a right to left motion
- Gently engage the descending colon with a left to right motion
- Gently engage the sigmoid colon from left inferior to right superior



Kuchera, Kuchera Osteopathic Considerations in Systemic dysfunctions

OMT: DIAPHRAGM MYOFASCIAL RELEASE

- **Seated**, have the child facing away, fingers along the 12th rib, thumbs at the costotransverse junction, index fingers just under the costal margin
- Thumbs create a lateral traction
- Motion test the ribs in all planes while monitoring at the anterior fascia
- Achieve balanced tension until tissues change
- **Supine**- thumbs on the anterior fascia of the diaphragm
- Traction with posterior finger on ribs
- Achieve balanced tension and wait for release



OMT: SACRUM/PELVIS DIRECT MFR OR BLT

- Seated or Supine, the posterior hand contacts the midline of the sacrum, the anterior hand contacts the ASIS
- Monitor motion with respiration
- Inhalation sacral counternutation
- Exhalation sacral nutation

- Either utilize balanced ligamentous tension with rotation, inflare/outflare of innominates and nutation/counternutation of the sacrum
- Or use direct myofascial release by moving directly into the barrier
- Fine tuning may include compression or decompression
- Release after a softening

References Part I

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