What's the Deal with Oral Restrictions?

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JACOB'S LADDER
PEDIATRIC REHABILITATION

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Functional Movement & Anatomy of the Head, Neck and Mouth

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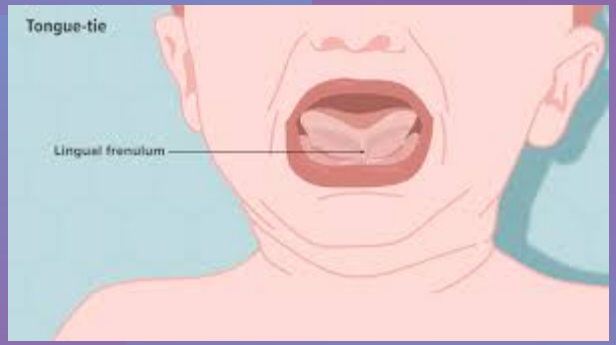
Introduction

What is an oral tie?



*A tethering of **short** tissue (frenulum) tying the tongue to the floor of the mouth*

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What is Movement?

- ★ Universal language for human expression
- ★ Movement ⇨ Precision ⇨ Skill
- ★ Disruption of movement impedes skill

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Elements of Movement

ROM

Ability of osteoanatomy and associated musculature to move limbs and carry out function

Synchronization

Important relationships between agonists, antagonists, and stabilizers

Proprioception

Awareness of positioning/movement in space

Neurological Feedback

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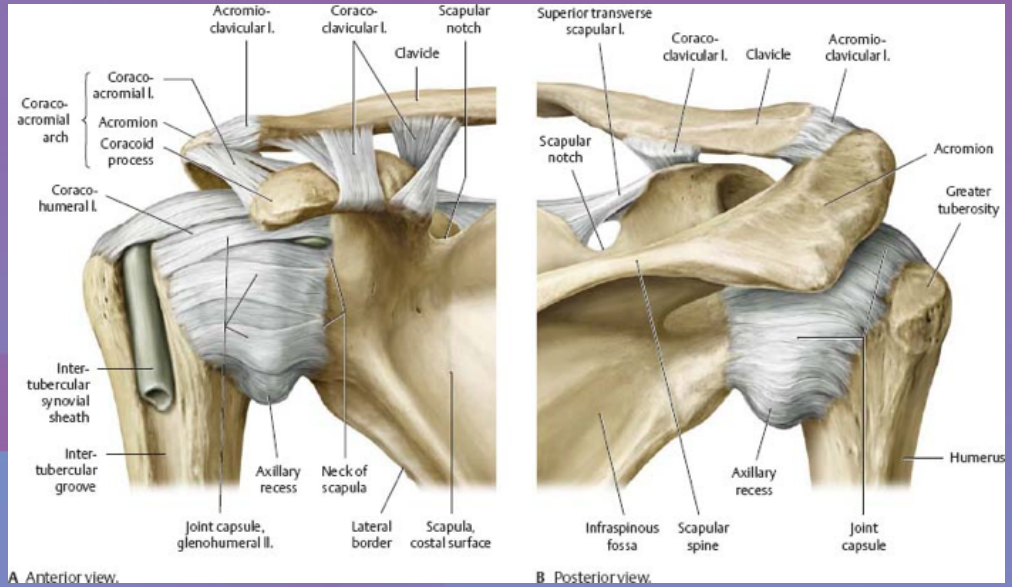
Joint Benefits and Limitations



- A small amount of movement at the center of joint results with large ROM at distal end of extremity
- A small amount of tightness can result in significant compensation
- Lack of movement in *any* direction can result in tissue imbalance of associated muscle groups

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The Body is Like a Computer…

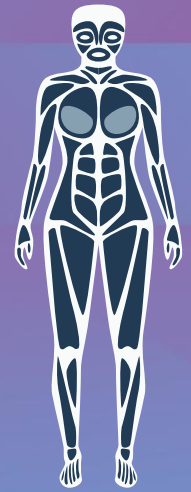
★ If it is not told what to do, it will not do it; if it is not used, it will become useless

Over time, the body accepts this as normal

The body now recognizes poor joint position as neutral

The body will adapt and function in poor alignment

Poor joint alignment can lead to pain, fatigue & destruction of tissue



★ **Lack of movement also limits flexibility**
  - **Without sufficient flexibility, the body will move inefficiently--potentially resulting in pain, weakness, and decreased skill**

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Fascia

- Connective tissue that covers and binds everything together in the body
- Sensory organ that communicates with the sensory systems
- Characterized by mechanical continuity
  - Effects posture and movement

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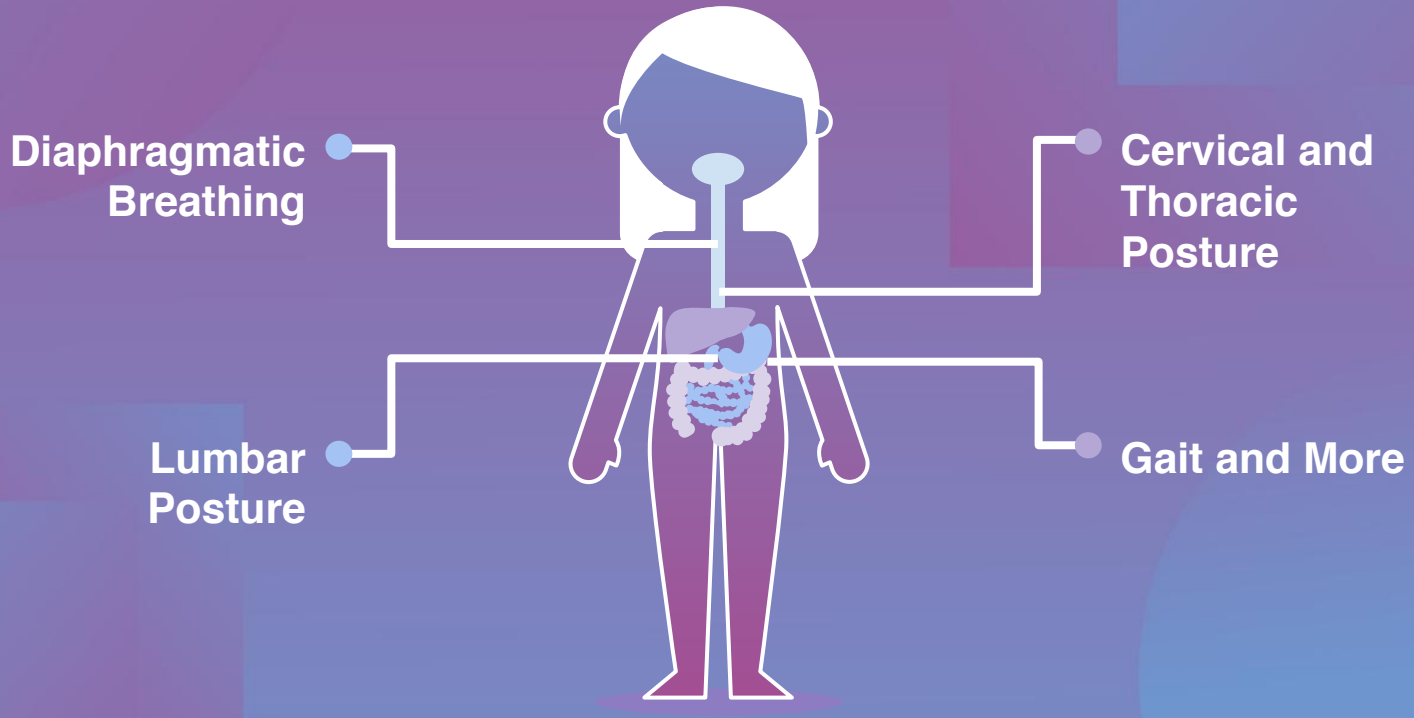
Fascia Has Direct Mechanical Connection Between Orofacial Function and:



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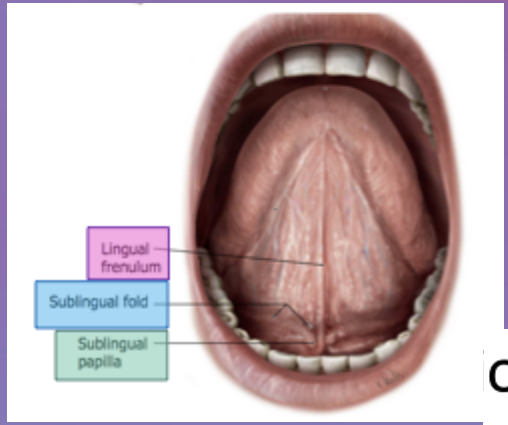
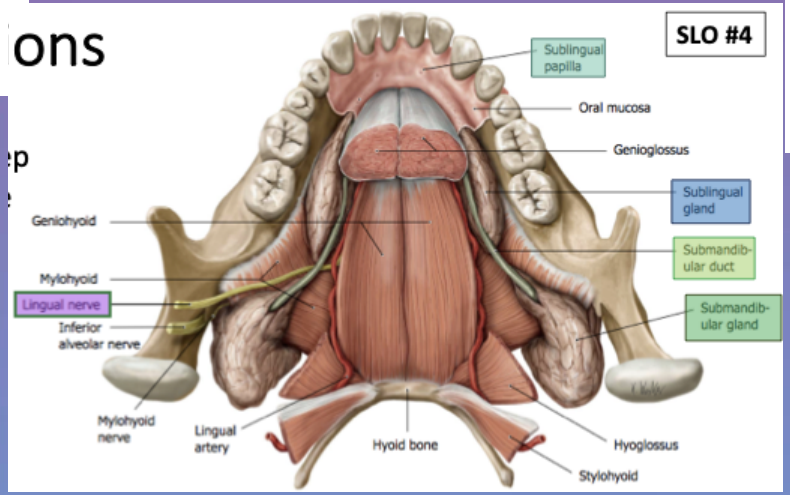
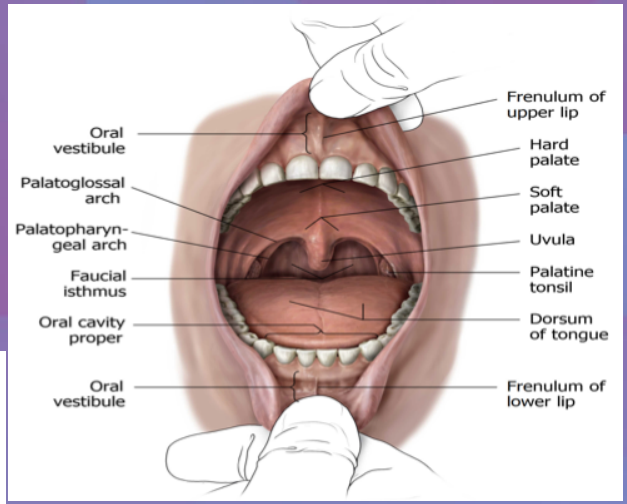
Oral Cavity and Mouth Anatomy







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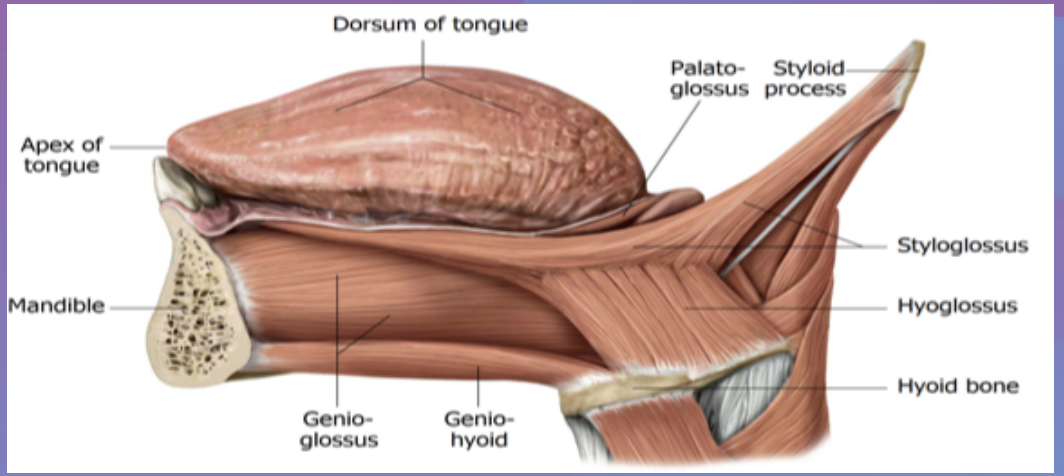
Tongue Anatomy & Actions

- Protrusion
- Retraction
- Depression
- Retraction and Elevation of posterior third
- Shape changes



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Functional Anatomy of the Head and Neck Musculature

Mariann?

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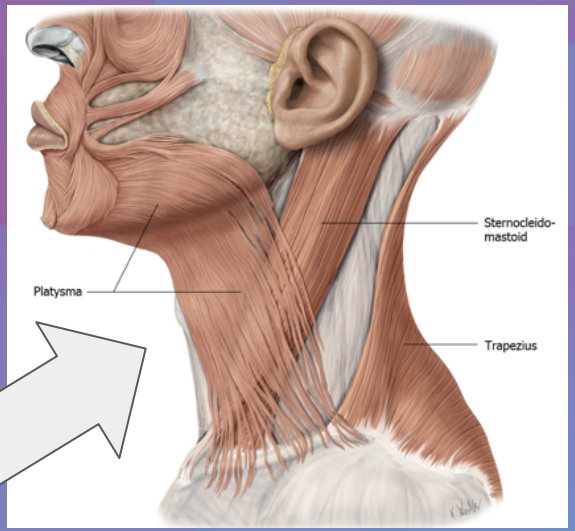
Platysma

Actions

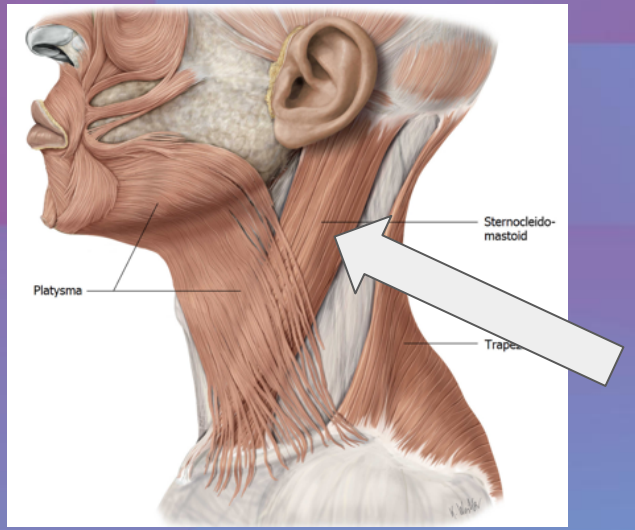
- Tenses the skin of the anterolateral neck
- Draws corners of the mouth lateral and inferior



Sternocleidomastoid (SCM)

Actions

- *Unilaterally*: rotates the head contralaterally and flexes (tilts) the head ipsilaterally
- *Bilaterally*: flexes/extends neck at atlanto-occipital joint



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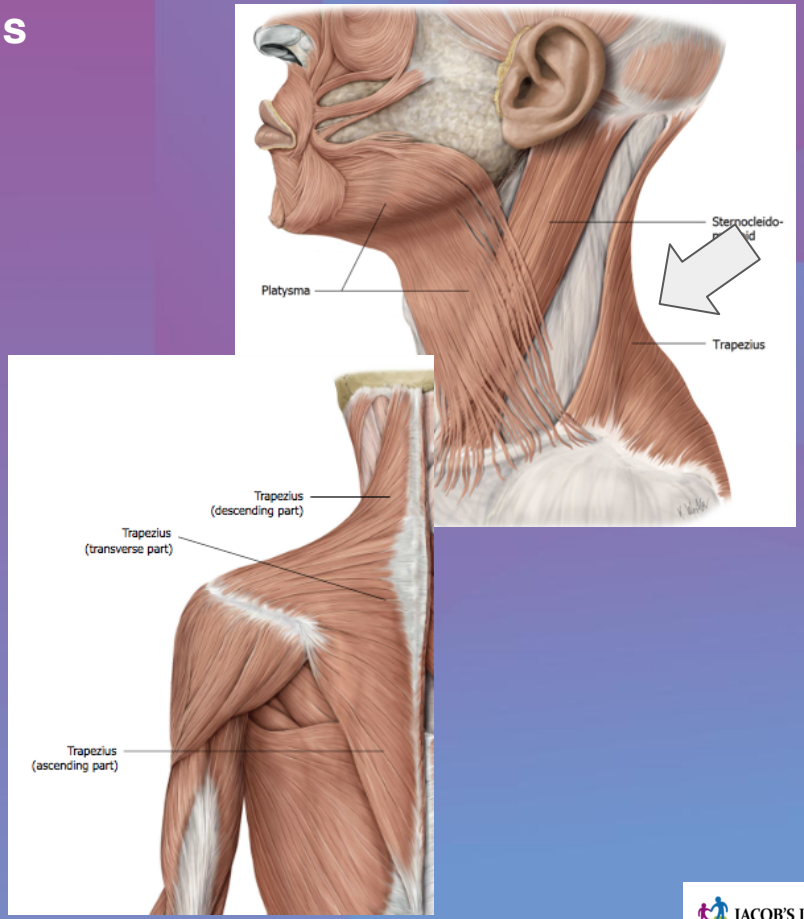
Trapezius

Actions

- Elevates, retracts, and rotates scapula superiorly.
- When shoulders are fixed: extends head (*bilaterally*), and laterally flexes head at the neck (*unilaterally*)



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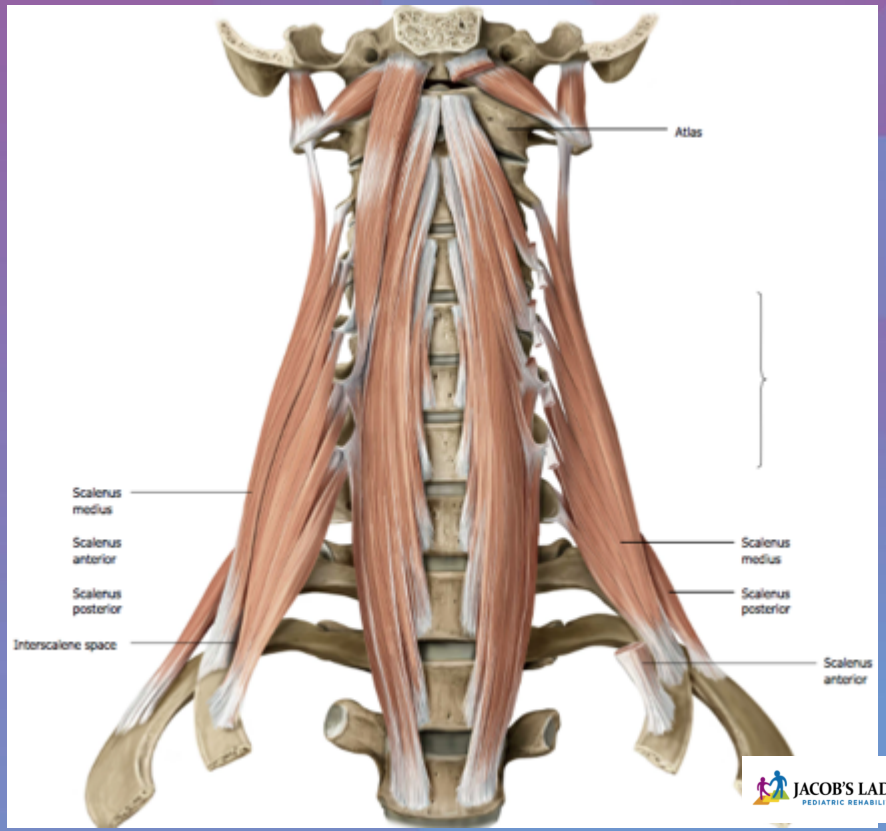
Scalenes

Actions

- Elevate ribs 1 & 2



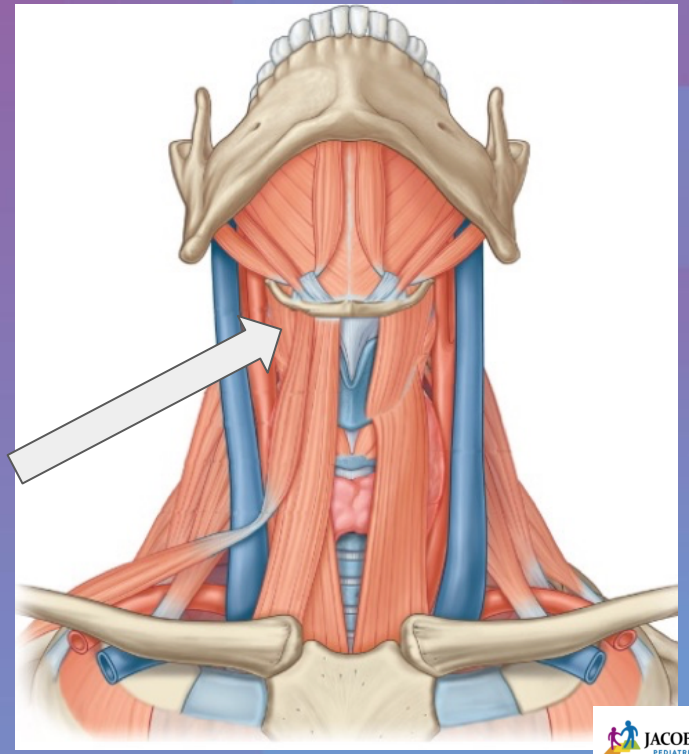
Hyoid

Attached Muscles:

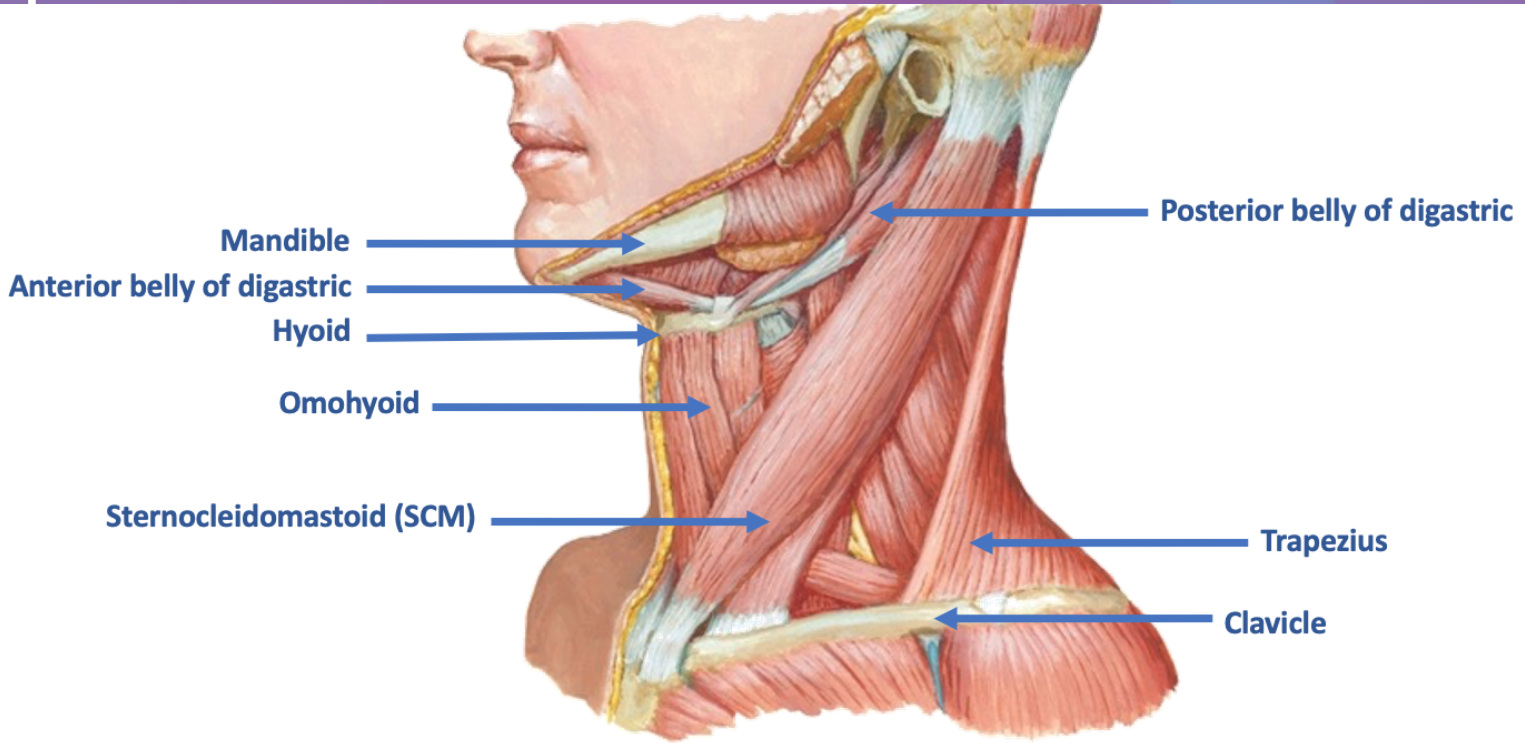
- Suprahyoid muscles
- Infrahyoid muscles
- All anteromedial to hyoid bone

Function:

- Aides in swallowing, phonation, preservation of airway
- Assists with posture of the head
    - Connects mandible to c spine



At-a-Glance



https://www.youtube.com/watch?v=Kg24avD9-2s

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02

Discussion of Ties and Classifications

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How does this Happen?

- ★ Not a lot of research
- ★ Possible genetic link
- ★ Connection to folic acid vs. folate
- ★ Event happens at critical period in utero when lip and tongue should start to free from roof and floor of mouth
- ★ Decreased movement in utero that would help ”unzip” tie

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Definitions

★ Tongue tie: placement/structure of the lingual frenulum restricts range of motion of the tongue, leading to functional delays

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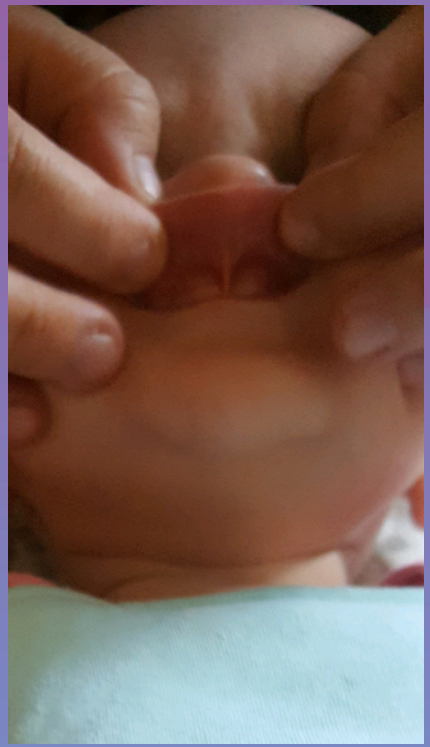
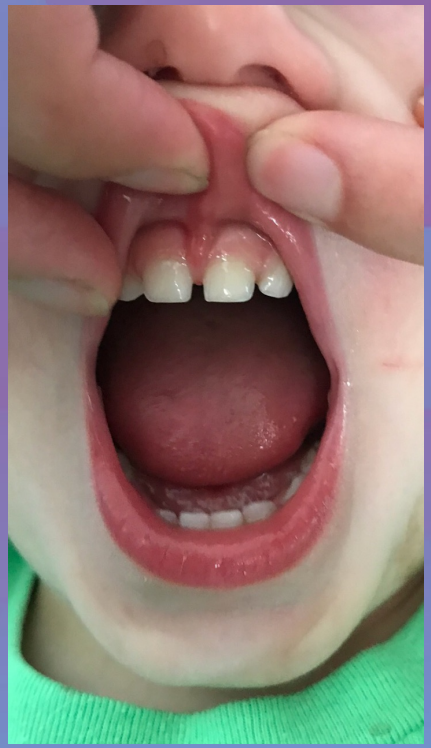
Definitions

- Lip tie: placement/structure of the labial frenulum that restricts ROM of the lips, leading to functional deficits





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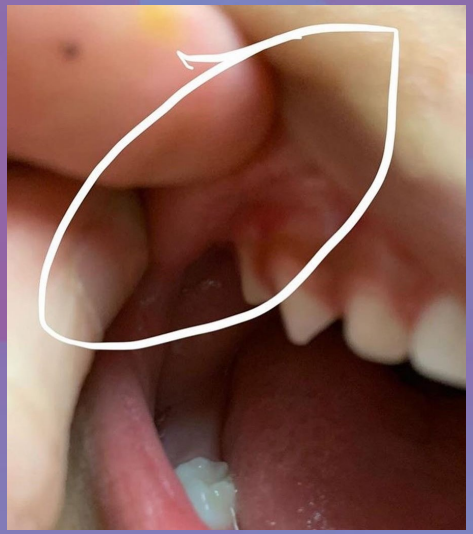
Definitions

- Buccal tie: presence of mucosal tethers from the cheek to the gums leading to functional delays



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Kotlow Diagnostic Criteria

- ★ Class IV: the lip attachment inserts into the zone where the two upper front teeth will emerge and extends beyond the maxillary alveolar ridge into the palatal area
- ★ Class III: inserting into the zone just forward of the palatal area between the area of the future two front teeth
- ★ Class II: the insertion zone into the area of the free and attached gingival
- ★ Class I: minimal visual attachment

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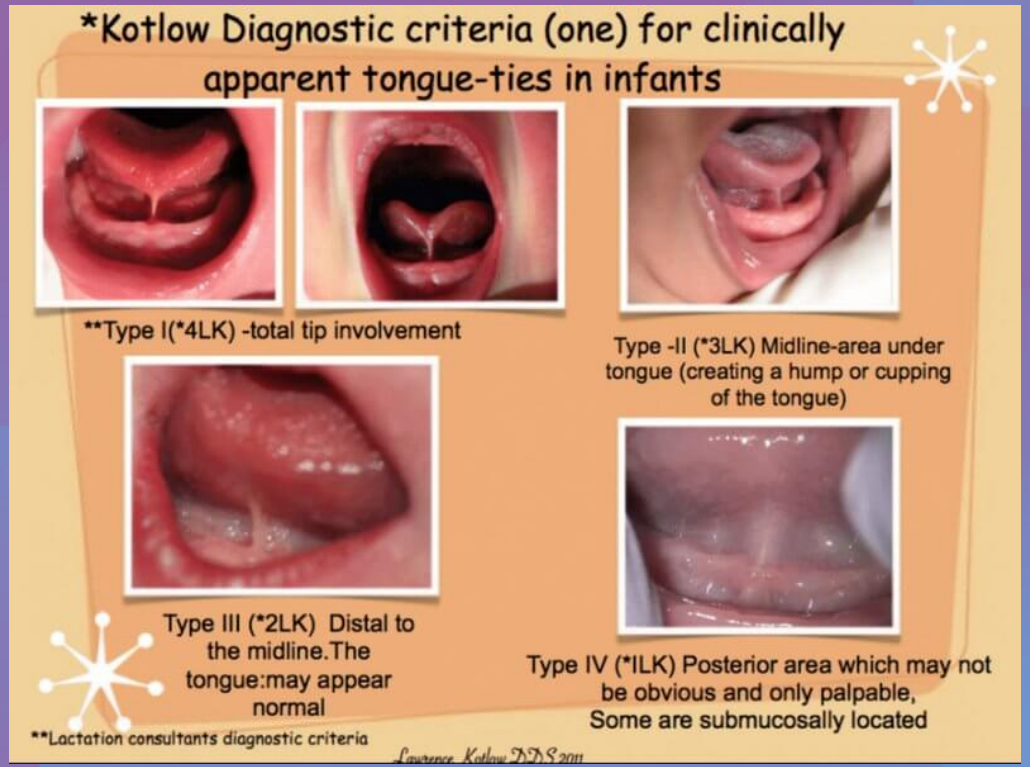
Kotlow Diagnostic Criteria



Rating the Tie (Hazelbaker Score)

	Score			
Appearance Items	0	1	2	Hazelbaker Score
Appearance of tongue when lifted	Heart- or V-shaped	Slight cleft in tip apparent	Round or square	
Elasticity of frenulum	Little or no elasticity	Moderately elastic	Very elastic	
Length of lingual frenulum when mid-mouth only with jaw closure tongue lifted	<1 cm	1 cm	>1 cm	
Attachment of lingual frenulum to tongue	Notched tip	At tip	Posterior to tip	
Attachment of lingual frenulum to inferior alveolar ridge	Attached at ridge	Attached just below ridge	Attached to floor of mouth or well below ridge	
			Total	

	Score			
Function Items	0	1	2	Hazelbaker Score
Lateralization	None	Body of tongue but not tongue tip	Complete	
Lift of tongue	Tip stays at lower alveolar ridge or rises to	Only edges to mid-mouth	Tip to mid-mouth	
Extention of tongue	Neither of the above, or anterior or mid-tongue humps	Tip over lower gum only	Tip over lower lip	
Spread of anterior tongue	Little or none	Moderate or partial	Complete	
Cupping	Poor or no cup	Side edges only, moderate cup	Entire edge, firm cup	
Peristalsis	None or reverse motion	Partial, originating posterior to tip	Complete, anterior to posterior	
Snapback	Frequent or with each suck	Periodic	None	
				Total

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Physical Signs of Ties

- ★ Gap in teeth
- ★ “heart-shaped” tongue
- ★ ”milk tongue”
- ★ Lip blisters/callus
- ★ Indentations of lip and/or cheeks

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Physical Signs of Ties

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3. Effects of Ties on Various Aspects of Development and Function

Potential Delayed *Motor* Milestones

- ★ Decreased head and/or neck control
- ★ Decreased shoulder girdle development and stability
  - ○ Lack of weight bearing due to pain or discomfort from tie; resistance to tummy time
- ★ head/neck preference (R v. L)
- ★ All subsequent motor skills often delayed as a result
  - ○ Fine and gross (ex: not reaching for objects)
  - ○ Lack of proximal strength and proper posture prevent development of distal fine motor skills
- ★ Delayed activation and integration of primitive reflexes
  - ○ Roll, crawl, etc.

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Potential Delayed *Oral Motor* Milestones

★ The tongue must be free to:
- Move food around in mouth
- Position the bolus in center of mouth
- Reach the palate to create a seal
- Swallow properly and safely

If the tongue is not moving freely, the child will struggle to lateralize the food in their mouth to follow this progression

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Potential Delayed *Oral Motor* Milestones

- ★ Poor coordination of oral musculature for eating
- ★ Poor suck/swallow/breath pattern
  - Difficulty latching on
  - Difficulty sustaining latch
    - Unable to maintain efficiency without extreme energy expulsion--irritability or sleepiness
  - Taking in a significant amount of air
    - Reflux, choking, hiccuping, spitting up, projective vomiting, and/or significant abdominal discomfort/gas

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As a result the child may...

- ★ Compensate with accessory muscles
- ★ Require liquids to help swallow and cleanse food from mouth
- ★ Reject food that is difficult to chew
- ★ Use fingers to move the food around in the mouth
- ★ Persistent gagging, choking, dribbling due to lack of control of their food
  - ○ Possible aspiration
- ★ Given title of “messy”, “picky”, or “loud” eater
  - ○ Can lead to behavioral problems or decreased self-image

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Speech Implications

- ★ Delayed speech
- ★ Poor enunciation
  - Specifically: S, Th, N, L, R, D, T

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Potential Delayed *Sensory* Function

- ★ Poor sleepers
- ★ Resistance to certain textures
- ★ Absence of reflex integration
- ★ Interoceptive challenges: constipation, reflux, poor motility, poor hunger cues

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Additional Potential Symptoms/Difficulties

- ★ Sleep Apnea
- ★ Dental Problems
  - ○ Gingivitis
  - ○ Cavities
  - ○ Tongue thrusting
    - ▪ Open bite
    - ▪ Open mouth resting posture
- ★ TMJ symptoms
- ★ Tension in neck, back, and/or shoulders
- ★ Headaches

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Red Flags and Symptoms

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Functional Signs for Bottle/Breast

- Poor suck
- Poor Seal
  - Top lip rolls under when latching to bottle
- Anterior Spillage
- Poor lip protrusion
- Poor tongue movement
- Gagging/coughing/aspiration
- Tongue clicking (excess gas)
- Rescue breathing
- Poor endurance/falls asleep
- Aversion to eating/wants to eat all the time
- Poor weight gain
- Reflux

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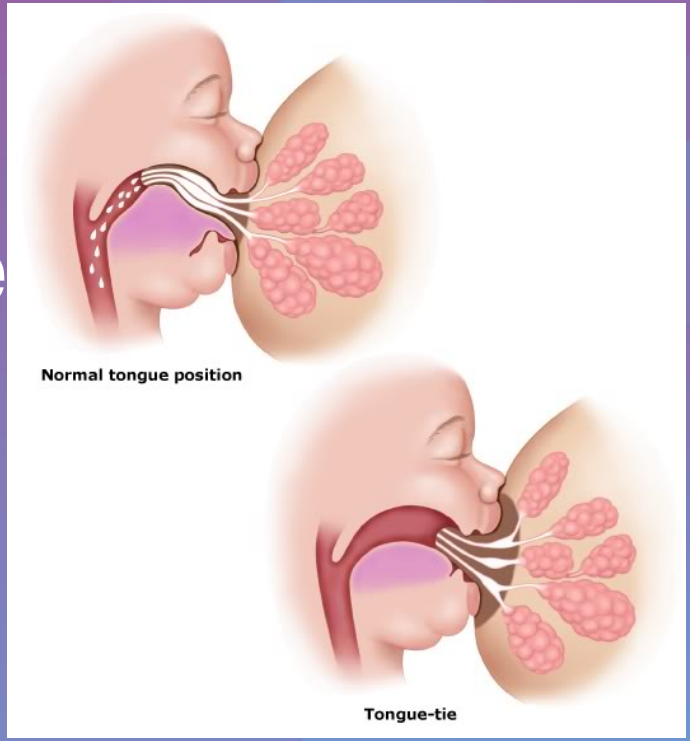
Signs for Breastfeeding Mom

★Nipple pain/trauma
★Supply does not come in/maintain
★Mastitis/clogged ducts



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Signs for Solid Feeding

- ★ Does not transition to puree/solid
- ★ Limited food preferences
- ★ Does not clear spoon/mouth
- ★ Minimal chewing
- ★ Pocketing
- ★ Grazing/extended meal times
- ★ Gagging/choking
- ★ Poor weight gain

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Signs for Language Development

- ★ Limited sounds/words
- ★ Mumbling
- ★ Inability to imitate oral motor movements

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How Do I Know What to Look For?

Normal Tongue Movement:

★ Protrude out, up and down
★ Lateralize
★ Pull back
★ Tongue and jaw should move independently of one another
★ Frenulum should be at midline (look for possible anterior tie)

Normal Lip Movement:

- Close
- Pucker
- Should be able to lift lip up without gums turning white
- Frenulum should attach above where teeth come in

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Red Flags for Momma

- ★ Creased/flat/blanched nipple after feeding
- ★ Cracked/blistered/bleeping nipples
- ★ Discomfort while nursing
- ★ Plugged ducts
- ★ Thrush/mastitis
- ★ Sleep deprivation

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Red Flags for Infant

- ★ Difficulty latching or falls off breast easily
- ★ Gumming or chewing the nipple while nursing
- ★ Unable to hold pacifier or bottle
- ★ Gassy
- ★ Poor weight gain
- ★ Excessive drooling
- ★ Baby is not able to drain breast fully
- ★ Choking on milk
- ★ Popping off breast for air
- ★ Falling asleep during feedings
- ★ Marathon nursing session
- ★ Clicking noises while sucking
- ★ Biting
- ★ Callous or blister on upper lip

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Red Flags for Toddler

- ★ Overstuffs mouth or pockets food
- ★ Nibbling on food
- ★ Needs to have a drink when eating
- ★ Child has been on reflux medications
- ★ Mouthing fingers and other non food items
- ★ Eating non food items
- ★ Excessive drooling and open mouth posture
- ★ Has not transitioned from bottle
- ★ Delayed motor milestones

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What do I do now?

★Refer to OT/ST for oral motor/sensory strategies
★Refer to pediatric dentist for revision
★Refer to ENT for revision
★Refer to pediatrician for referral

We cannot tell the parent what to do, but rather educate them on the possible implications

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What is a “Revision”?

- ★ Child may be put under with general anesthesia, in office with CO2 (laughing gas), a local anesthetic, or lidocaine

- ★ A laser is used to cut the tie (some practitioners use scissors)
- ★ Minimal discomfort/swelling resolves after 24 hours in most cases
- ★ Need to follow up with ST who will instruct family on stretches to: increase coordination, ensure it does not reattach

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Resources and Wrap Up

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PediEAT for 6-15 months Screener

My child…	Never	Almost Never	Sometimes	Often	Almost Always	Always
1. prefers to drink instead of eat	☐	☐	☐	☐	☐	☐
2. gags with textured food like coarse oatmeal	☐	☐	☐	☐	☐	☐
3. gags with smooth foods like pudding	☐	☐	☐	☐	☐	☐
4. sounds gurgly or like they need to cough or clear their throat during or after eating	☐	☐	☐	☐	☐	☐
5. coughs during or after eating	☐	☐	☐	☐	☐	☐
6. burps more than usual while eating	☐	☐	☐	☐	☐	☐
7. moves head down toward chest when swallowing	☐	☐	☐	☐	☐	☐
8. throws up during mealtime	☐	☐	☐	☐	☐	☐
9. throws up between meals (from 30 minutes after the last meal until the next meal)	☐	☐	☐	☐	☐	☐
10. has food or liquid come out of nose when eating	☐	☐	☐	☐	☐	☐

Additional Recommended Resources

- ★ TalkTools: Merkel-Walsh & Overland TOTs Protocol
- ★ *Tongue Tied* by Richard Baxter, DMD, MS
- ★ Assessment, Incidence, and Effect of Frenuloplasty on The Breastfeading Dyad (from Hazelbaker .26)
- ★ Feeding Flock https://www.feedingflock.com/tools

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REMEMBER!

★ The body is one big unit

★ Dr. Kotlow says… the most important sign is mom's report, whether it be her symptoms or what her child is doing

★ Our job is to educate and empower the parent to advocate for their child

★ When in doubt, flip the lip and tip the tongue!

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Thanks

Do you have any questions?

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