The ENT Manifestations of Tongue and Lip Tie

Bobby Ghaheri, MD
The Oregon Clinic
Portland, Oregon
www.DrGhaheri.com

Overview

- Physics
- The Palate
- Sleep Apnea
- Dental Problems
- Speech
- Adult effects

Facial Skeleton (child)

Facial Skeleton (10 yo)
Facial Skeleton (adult)

**Bone formation and stress**

- Wolff's Law (Julius Wolff, 1836-1902): Remodeling of bone occurs in response to physical stresses—or to the lack of them—in that bone is deposited in sites subjected to stress and is resorbed from sites where there is little stress. In essence, a bone's form follows its function.

- Mechanotransduction

**Bone formation and stress**

- The phenomenon of twisted growth: humeral torsion in dominant arms of high-performance tennis players. [Taylor et al. (2009)]

**The Palate**

- Hard palate - bony roof of mouth. Consists of different bones fused together (maxilla and palatine bone interacting with vomer and pterygoïd plates)

- Soft palate - muscular roof of mouth. Consists of 5 sets of muscles intertwined with each other
How Do Forces on the Palate Affect Structure?

• “It seems reasonable to suggest that the initial volume of the palatal-facial sutural complex is primarily determined by the pressure of a breastfeeding baby’s tongue/mother’s nipple against the (still patent) mid-palatal, incisive, and to a lesser extent, transverse palatal sutures.”

Kevin Boyd, DDS

How Do Forces on the Palate Affect Structure?

• English translation: when the tongue has the ability to rest against the palate, it will spread the bones of the palate out away from the midline, resulting in a flat, broad appearance

What Affects Palate Development?

• Time in birth canal
• Genetics
• Tongue position
• Forceps delivery
The Palate

Resting tongue position

Tongue Position

Tongue Position
Disrupted Tongue Position

- What happens when the tongue isn’t permitted to be in its normal position within the oral cavity?
- What’s the domino effect that results?
- What about bottle feeding?
The impact of a high palate

- Orthodontic issues - a higher palate can cause dental crowding
- 89% of youth, ages 12-17 years, have some occlusal disharmony. 16% of youth have a severe handicap malocclusion that requires mandatory treatment.9
- Nasal congestion - the palate is also the floor of the nose. If the palate goes up, there's less room for the septum, which can then buckle.

Deviated Septum

End Effects on Midface

- Prolonged breastfeeding helps palate formation and subsequent dental development
- Prolonged breastfeeding helps prevent non-nutritive sucking
- Breastfeeding helps to avoid maxillary constriction

Obstructive Sleep Apnea

- Defined as the obstruction (apnea) or shallowing (hypopnea) of breathing that disrupts sleep architecture
- Can result in decreased blood oxygen and increased carbon dioxide levels
- Typically diagnosed with sleep study
### Symptoms
- Daytime fatigue
- Excessive drowsiness
- Headache
- Snoring
- Teeth grinding in sleep
- Bedwetting
- Behavioral concerns
- Difficulty concentrating
- Mood changes (irritable, depressed)
- Hyperactivity in children
- Frequent awakenings

### Long Term Risks
- Increases the risk of many disorders
- High Blood Pressure
- Stroke
- Diabetes
- Heart attack and sudden cardiac death
- Arrhythmia

### How Do We Obstruct?
- The location of obstruction can vary from person to person
- Most common in children is enlarged tonsils and adenoids
- In adults, multifactorial - deviated septum, large base of tongue, poor muscle tone, throat collapse with forceful inspiration

### How Do We Obstruct?
- Growing field of airway dentistry - the idea that malocclusions can affect the oral airway isn’t mainstream
- Preventing the malocclusions if possible (breastfeeding) or treating them (orthodontia) may improve airway
Pediatric Factors

- Tonsils/Adenoids
- Tongue Tie
- Bottle feeding and non-nutritive sucking (pacifier and thumb sucking)
- Small jaw (micrognathia)
Tongue Position

• If the tongue is retrodisplaced within the oral cavity, higher chance of obstruction
• Tongue tie results in a change of tongue position within the oral cavity
• Different muscles used for compensation in untreated TT and bottle feeding - these can affect tongue position as well

Airway Development

• If a cause of a narrowed airway is known early on, treatment of that problem can affect long term health
• 90% of craniofacial volume is complete by age 12. The largest increase happens in the first 4 years of life.

Reference:

The Teeth

• Remember how malocclusion can develop - as palate goes up, the maxillary arch becomes narrowed
• What can the ties do specifically!
Physics Reminder

- In the battle between muscle and bone, muscle always wins
- The bone affected will remodel based on the stresses put upon it

Diastema

- A gap between teeth (typically maxillary) caused by the physical presence of tissue (class 4 lip tie) or stress placed on the bone in that area (class 3 or 4 lip tie)

Dental Diastema
Dental Diastema

Orthodontic Myths

- “Don’t revise the lip tie until the adult teeth come in because the scar tissue will cause abnormal dental spacing”
- You can’t even see scar tissue once healed
- This is ancient dogma - no evidence behind the statement at all

What Should You Do?
The Myth

- "My doctor said that one day my toddler would just fall and rip their lip tie and the problem would take care of itself"
- Would that avoid diastema formation were it to happen?

Treatment Plan: Trauma!

1 Week Post-Laser

1 Month Post-Laser
Mandibular Teeth

Treatment Philosophy

- I won’t treat babies with a lip tie to “prevent” a diastema
- I try to convince parents to wait until all the maxillary teeth have come in before deciding on treatment

Dental Decay

- Best paper by Larry Kotlow, 2010
- Demonstrates the correlation between class 3 and 4 lip ties and premature dental decay of the maxillary incisors
Dental Decay

• The problem is not night nursing (Weston Price has already shown that)
• Only a minority of children with ULT develop this pattern of decay (ties that "hood" are more susceptible)
• Revising the ULT typically halts the decay
Speech Issues

- There are no well-designed studies that show an improvement on speech outcomes following tongue tie revision
- Is this the fault of the study?
- Is this because the surgery was done incompletely?

Speech Issues

- The most common sounds involved in the setting of ankyloglossia are the alveolar consonant sounds and palatal sounds
- R, S, L, D, N, Z, CH, TH, SH
- Spanish/Russian rolled R sound (many other languages also)

Phonetic Alphabet

Alveolar Movement
TT and Speech

What About Adults?

- Dental Malocclusion
- TMJ
- Speech Issues
- Social Considerations

Adult Teeth

- We’ve already shown how TT/ULT can affect teeth - if malocclusion develops, we try to compensate
- Chronic muscle tension from compensation can result in TMJ dysfunction
TMJ Symptoms

- Jaw pain
- Headache and migraine
- Limited jaw movement
- Worn/chipped teeth
- Neck pain
- Upper back pain
- Tinnitus
- Aural fullness
Adult Speech Issues
- Have often had speech therapy in their past
- Remember the era - when we were kids, TT was not a focus
- Many adults will report speech fatigue
- Can affect confidence - presentations, meetings
- Persistent lisp

Social Problems
- Kissing
- Messy eating
- Stress/Anxiety

Conclusions
- Tongue Tie and Lip Tie go far beyond direct local effects on the structures to which they're attached
- Understanding the domino effects makes us better diagnosticians
- We can't treat what we don't understand

Future Challenges
- It will be critical to determine specific criteria for who does and doesn't need treatment
- Prophylactic treatment can be a slippery slope
- Paradigm shifts in medicine take a long time