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The Mystique of the Frenulum: cutting through the confusion

DAVID L. ROTHMAN, DDS, DABPD, FAAPD, FACC, FICD, FFFA

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Affirmation

- ▶ No financial ties to drug or equipment companies to disclose
 - ▶ Personal or family
- ▶ I have received supplies for workshops given at meetings
 - ▶ No direct payments to me



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4 out of 5 Dentists RECOMMEND Sugarfree Gum

- ▶ HUH???
- ▶ WHAT ABOUT THE ONE WHO DOESN'T???
- ▶ Where's the science?
- ▶ Perception versus Reality



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What is a myth?

- ▶ A myth expresses and confirms society's religious values and norms. It provides a pattern of behavior to be imitated, testifies to the efficacy of gods with its practical ends and establishes the sanctity of gods.
 - ▶ Hanks, Lauri (1984). "The Problem of Defining Myth." in Dundas, Alan. *Sacred Narrative: Readings in the Theory of Myth*. University of California Press. p. 49.
- ▶ A popular belief or tradition that has grown up around something or someone
 - ▶ Meriam-Webster
- ▶ A widely held but false belief or idea.
 - ▶ Google
- ▶ Myths became reality when repeated over time



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What is science?



- ▶ Science is a **systematic** enterprise that builds and organizes knowledge in the form of **testable** explanations and predictions about the universe. The earliest roots of science can be traced to Ancient Egypt and Mesopotamia in around 3500 to 3000 BCE
 - ▶ Wikipedia
- ▶ A branch of knowledge or study dealing with a body of **facts or truths** **systematically** arranged and showing the operation of general laws: the mathematical **sciences**. Systematic knowledge of the physical or material world gained through **observation and experimentation**.
 - ▶ Dictionary.com

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Science

- ▶ Can be biased
- ▶ Can lead to false conclusions
- ▶ Not bulletproof
- ▶ Mechanisms set to limit the bias



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Were you taught myths in Dental School?

HOSE 300, UNIVERSITY OF HOUSTON

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You do what you were taught in dental school despite life and research passing you by

- ▶ Journals
- ▶ Throwaways
 - ▶ Check for the ads next to the articles
- ▶ Lay publications
- ▶ Internet
- ▶ Influencers
- ▶ Peer reviewed?
- ▶ Bias?

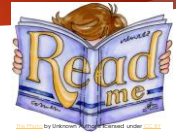


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How to Read Research

- ▶ Peer reviewed?
- ▶ Reputable journal not a throwaway
 - ▶ Filled with ads or case reports
 - ▶ Who is paying for the journal?
- ▶ Do people pay to publish their research?
 - ▶ Many new journals take \$\$ to publish
 - ▶ Pressure to publish or perish leads to junk though peer reviewed work
- ▶ Resident research projects
 - ▶ Short term
 - ▶ Lit reviews



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How to Read Research

- ▶ Size of population
- ▶ CONTROL
 - ▶ All research is skewed to those with disease
- ▶ "No" results are rarely published
- ▶ P values v Confidence intervals
 - ▶ Determined by NNT (number needed to treat)
 - ▶ Can be significant at the 95% interval $p \leq 0.05$
 - ▶ Rejects the null hypothesis but doesn't tell you if **treatment makes sense**

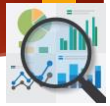


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Is it significant?

- ▶ Formulas for determining size of study to make it valid
 - ▶ NNT
- ▶ Meta analysis
 - ▶ a **meta-analysis** uses a statistical approach to combine the results from multiple studies in an effort to increase power (over individual studies), improve estimates of the size of the effect and/or to resolve uncertainty when reports disagree.
 - ▶ Many studies from multiple sites following similar protocols
 - ▶ Inclusion?
 - ▶ Are results valid?
 - ▶ Few people publish if studies show no effect

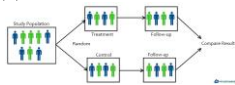


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What is and how large is the population? Control?

- ▶ If you don't get treatment what happens?
- ▶ Inclusion in study means you are seeking treatment but doesn't mean that people not seeking treatment are not doing well
 - ▶ Self selected population with generalizations made
- ▶ What's the control?
 - ▶ Is it people seeking treatment or the general population?
 - ▶ Demographics of the control population
 - ▶ Are you your own control?
 - ▶ R v L
 - ▶ N.A. v Europe v Asia???



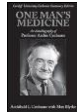
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And in summary...

- ▶ The Cochrane Reviews/ Cochrane Library/ Cochrane Collaboration
 - ▶ Cochrane is a British charity formed to organize medical research findings so as to facilitate evidence-based choices about health interventions faced by health professionals, patients, and policy makers. Cochrane includes 53 review groups that are based at research institutions worldwide.
 - ▶ Archie Cochrane, visionary physician
 - ▶ Systematic extraction of data that defines a question
 - ▶ Inclusion criteria
 - ▶ Study size
 - ▶ Outcomes
 - ▶ Funding sources



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Placebo Effect

- ▶ A sham intervention, medically or surgically, thought by the recipient to have a therapeutic effect
- ▶ Used in clinical trials to test efficacy of a treatment
 - ▶ Ethical?
- ▶ May produce relief through psychological mechanisms
 - ▶ Affect perception of the problem and trigger bodily changes
 - ▶ pain
 - ▶ Does not affect the underlying disease



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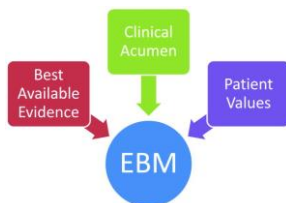
Evidence Based Medicine Evidence Based Dentistry

- ▶ ... an approach to medical practice intended to **optimize decision-making by emphasizing** the use of evidence from **well-designed and well-conducted research**.
 - ▶ Wikipedia
- ▶ ... conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions about the care of individual patients. EBM integrates clinical experience and patient values with the best available research information.
 - ▶ Swanson et al. *Plast Reconstr Surg* 2010 Jul; 126(1):286-294
- ▶ All in the name of creating practice guidelines

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Evidence Based Medicine



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Evidence Based Medicine

- ▶ Strength of Recommendation of Guidelines
 - ▶ Strong Recommendation
 - ▶ Net benefit to the patient
 - ▶ Weak Recommendation
 - ▶ Net benefit is inconsistent or based on lower quality evidence
 - ▶ Patient choices will vary based on their preferences
 - ▶ Good Practice Points
 - ▶ No direct evidence to support recommendation but may be standard of care
 - ▶ Unlikely to ever be studied

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Sage Advice Still True Today

- ▶ "We mentally offered...the advice of an old French physician, who on being asked his opinion of a new remedy that was highly praised for its extraordinary virtues in a certain disease...replied:
- ▶ "DEPECEZ VOUS DE VOUS EN SERVER PENDANT QU'IL GUERIT!"
 - ▶ (translation: hurry up and give it to him while he's still getting better)



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Tonsils and Tonsilectomies

- ▶ Clinical v functional exam v history
- ▶ Just because something looks wrong doesn't always mean it is
- ▶ Airway and CBCT scans
 - ▶ Is there a large enough series of normal to judge treatment necessity or predict efficacy?
 - ▶ Does a procedure open the airway and what is the 1,3,6,12 mo and does a change stay
- ▶ Guidelines for the removal of tonsils
 - ▶ OSA and SDB
 - ▶ Car pulmonale
 - ▶ Infections >3 per year
 - ▶ Cyst/tumor



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And Let's Look at What We Have Used and Done in Dentistry

- ▶ Uline to treat periodontal disease
 - ▶ Urea
 - ▶ Sargent's Paste
 - ▶ Arsenic
- ▶ Formocresol
 - ▶ Cresote is a registered toxin and carcinogen
- ▶ Chloral Hydrate
 - ▶ Breakdown product is a carcinogen
 - ▶ Sensitizes the heart to circulating catecholamines
- ▶ Unscientific and unsupported advice disseminated quickly by influencers on social media



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My Baby Can't Feed and I've been told he/she/they has a tongue-tie:

*Let's do a Frenectomy!
or
Maybe a Frenotomy
or
Maybe a Frenuloplasty
or
How about some counselling???*

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Definitions- harder than you think!

- ▶ Frenum
 - ▶ Not a discrete band of fibrous connective tissue
 - ▶ Fold of tissue that restricts tongue motion
 - ▶ Contains branches of the lingual nerve that control motor function of the tongue and its shape during function
 - ▶ MBH et al. Defining the anatomy of the neonatal lingual frenulum. Clin Anat. (2019) 32(4):624-33
 - ▶ MBH et al. What is a tongue-tie? Defining the anatomy of the in situ lingual frenulum. Clin Anat. (2019) 32(4):747-61
- ▶ Frenectomy
 - ▶ A frenectomy is the removal of a frenulum, a small band of tissue that prevents an organ in the body from moving too far from where to frenulum is several places on the human body.
 - ▶ Wikipedia
- ▶ Frenotomy
 - ▶ (i.e., frenulotomy or frenulotomy) is the procedure in which the lingual frenulum is cut. It is done when the fibrous tissue (usually short or thickened) of the frenulum restricts tongue movement.
 - ▶ <https://med.stanford.edu/newsroom/stories/2015/05/05/frenotomy.html>
- ▶ Frenuloplasty
 - ▶ Surgical alteration of a frenulum when its presence restricts range of motion between interconnected tissues.
 - ▶ Usually involve use a scalpel for frenulum lengthening.



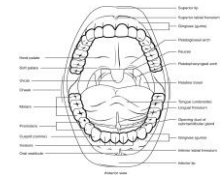
All mammals have frenula!

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Areas for Frenotomy/Frenuloplasty

- ▶ Anterior tongue tie
- ▶ Posterior tongue tie
- ▶ Upper lip tie
- ▶ Lateral ties
- ▶ We will limit this discussion to newborn infants with breastfeeding difficulties
 - ▶ 6 months and less



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And the Mass Media is Talking...



David L. Rothman DOI 2024 <https://www.theatlantic.com/health/archive/2021/09/tongue-exercise-little-evidence/620053/>

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And again



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And The New York Times



David L. Rothman DOI 2024 <https://www.nytimes.com/2023/12/18/health/tongue-tie-release-breastfeeding.html>

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Trends

- ▶ Data from National Inpatient Survey, Healthcare Utilization Cost and Utilization Project, Agency for Healthcare Research and Quality
- ▶ 1997-2016
- ▶ Dx of ankyloglossia increased 2012 to 2016: 110.4%
 - ▶ Projected 2022: 100,000
- ▶ Treatment of lingual frenectomy 2012-2014: 52.8%
- ▶ No increase in pediatric discharges
- ▶ M>F
- ▶ Private insurance > Medicaid
- ▶ Higher income zip codes
- ▶ Zip codes in south and west
- ▶ Eric X. Wei, David Tunkel MD, Emily Boss MD, Jonathan Walsh MD. Ankyloglossia: Update on Trends in Diagnosis and Management in the United States, 2012-2016. *Otolaryngology-Head and Neck Surgery* 163(5) p. 1029-1031

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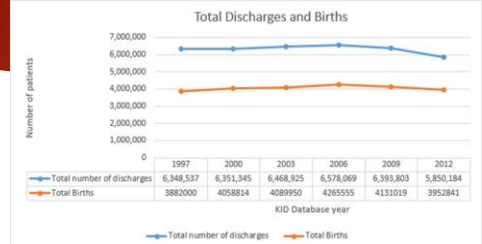
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Factors contributing to rise

- ▶ Increases in breastfeeding rates
- ▶ Availability of lactation specialists
- ▶ Awareness of ankyloglossia
- ▶ Overdiagnosis by healthcare professionals
 - ▶ Letran V, Osterbauer B, Buen F, Yalamanchil R, Gomez G. Ankyloglossia: last three-years of outpatient care at a tertiary referral center. *Int J Pediatr Otorhinolaryngol*. 2019; 126: 1-3
 - ▶ Eric X. Wei, David Tunkel MD, Emily Boss MD, Jonathan Walsh MD. Ankyloglossia: Update on Trends in Diagnosis and Management in the United States, 2012-2016. *Otolaryngology-Head and Neck Surgery* 163(5) p. 1029-1031

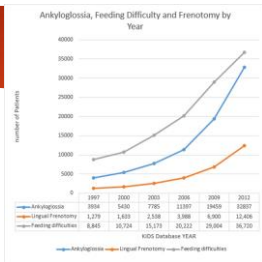
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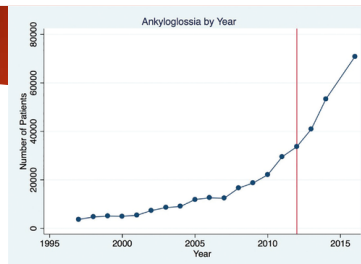
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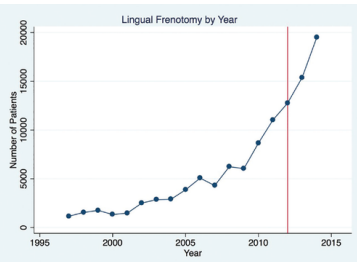
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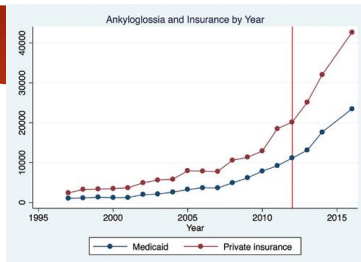
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Eric X. Wei, David Tunkel MD, Emily Boss MD, Jonathan Walsh MD, Ankyloglossia: Update on Trends in Diagnosis and Management in the United States, 2012-2016. *Otolaryngology-Head and Neck Surgery* 163(5) p. 1029-1031

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Eric X. Wei, David Tunkel MD, Emily Boss MD, Jonathan Walsh MD, Ankyloglossia: Update on Trends in Diagnosis and Management in the United States, 2012-2016. *Otolaryngology-Head and Neck Surgery* 163(5) p. 1029-1031

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Table 1 - Ankyloglossia Group

| | Younger Tie (ICD-9 758.8) | | All Discharges | | OR | P value |
|---------------------|---------------------------|--------------------|----------------|-------------------|------|---------|
| | N | % [95% CI] | N | % [95% CI] | | |
| All discharges | 32,837 | | 385,084 | | | |
| Age group | | | | | | |
| <1 year | 32,456 | 98.8% [91.1,106.6] | 429,998 | 73.0% [70.7,75.3] | | |
| Sex | | | | | | |
| Male** | 20,872 | 63.6% [58.6,68.5] | 299,791 | 51.2% [49.3,53.1] | 1.67 | <0.0001 |
| Female | 11,944 | 36.4% [33.4,39.3] | 285,141 | 48.8% [47.1,50.5] | | |
| Payer | | | | | | |
| Medicare | 113 | 0.3% [0.2,0.5] | 20659 | 0.4% [0.3,0.5] | 0.97 | 0.783 |
| Medicaid† | 10806 | 32.9% [29.6,36.3] | 284528 | 48.6% [46.6,50.7] | 0.52 | <0.0001 |
| Private insurance** | 19749 | 60.1% [54.8,65.5] | 255028 | 63.6% [61.7,65.5] | 1.96 | <0.0001 |
| Uninsured | 948 | 2.9% [2.4,3.4] | 207468 | 5.5% [5.1,5.9] | 0.81 | <0.0001 |
| Other | 1176 | 3.6% [3.0,4.2] | 214178 | 5.6% [5.2,6.0] | 0.99 | 0.714 |
| Missing | 46 | 0.1% | 13010 | 0.3% [0.2,0.4] | 0.54 | <0.0001 |

** too small for sensitivity
†, ‡, §, ¶, and non-emergizing CI

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And it's not just the US

- ▶ 2002-2014
- ▶ Ankylosis dx 229% increase
- ▶ Frenotomy rates 420% increase
- ▶ Lisonek M, Liu S, Dzakpasu S, Moore AM, Joseph KS. Changes in the incidence and surgical treatment of ankyloglossia in Canada. *Paediatr Child Heal*. 2017; 22: 382-386.

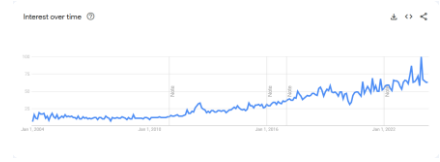


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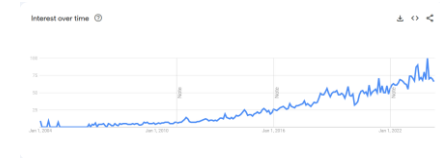
Google Searches for Ankyloglossia- US



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Google Searches for Tongue Tie- US



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Searches for tongue tie around world



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Frequency of Tongue and Lip Ties

- ▶ Flat, off, no definition of the normal frenum or range in variations
 - ▶ Naham et al. 2014
- ▶ Tongue-tie is present in 7% to 11% of newborns.
 - ▶ Drops to 2% by 10 without intervention
 - ▶ JADA Dec 2022
- ▶ Upper lip tie
 - ▶ Frenum goes to edge of alveolus
 - ▶ 82% of both
 - ▶ Poor intermaxillary sep with Koffow scale
 - ▶ Senta-Manns et al. 2017
- ▶ Posterior tongue tie
 - ▶ No definition other than by palpation
 - ▶ Short, thick, dense



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And, again, how frequently?

- ▶ Prevalence of ankyloglossia according to different assessment tools.
 - ▶ Cruz PV et al. JADA Nov 2022 <https://doi.org/10.1016/j.jada.2022.07.011>
 - ▶ Variations in assessment yield different numbers
 - ▶ Visual v functional classification?
 - ▶ If all depends on who is looking
 - ▶ Approximately 9-11% in infants and drops in children and adolescents to 2%
 - ▶ "Moreover, we raise the question whether ankyloglossia is a condition that remains as a person becomes older or whether the tongue frenulum undergoes a change in its position with craniofacial development"
- ▶ 834 percent increase in reported diagnoses of tongue tie in babies from 1997 to 2012
- ▶ 864 percent increase in frenotomies during that time as inpatients
- ▶ **doesn't count those treated as outpatient**
 - ▶ Walsh J, Links A, Rossi E, Tunkel D. Ankyloglossia and Lingual Frenotomy: National Trends in Inpatient Diagnosis and Management in the United States, 1999-2012. Otolaryngology-Head and Neck Surgery. 2017;156(4):753-762.

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Demographics

- ▶ First time breast feeding and first-born infants
- ▶ Internet access
- ▶ Genetic or family predilection
- ▶ Does being told your child has a tongue-tie cause anxiety and impact your perception of breast feeding?
- ▶ Majority of children diagnosed with tongue tie do not appear to have difficulty feeding
 - ▶ Association or Causality?

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Posterior Frenoplasty/Frenotomy

- ▶ There is no validated assessment tool
 - ▶ Functional v visual
- ▶ There have been no Randomized Control Trials
 - ▶ Described by Cayrolis in a newsletter not in a peer reviewed journal
- ▶ Low quality studies
 - ▶ Hong et al 2010: 19 patients, no outcome or followup measures
 - ▶ O'Callahan et al 2013: procedures 2004-2011 but sent out survey in 2010
 - ▶ Pransky et al 2015: retrospective, no validated instrument, no rct
 - ▶ Ghoshel et al 2017: 2 procedures simultaneously, cannot measure outcome
- ▶ Complex problem of impaired function and interplay in the dyad requiring multidisciplinary approach
 - ▶ Douglas, 2013



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Upper Lip Tie

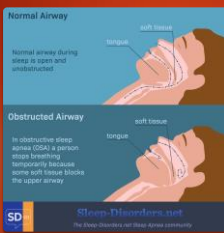
- ▶ What is normal?
 - ▶ Natural regression as alveolus grows and teeth erupt
- ▶ Increases chances of caries
 - ▶ Oral hygiene
- ▶ Possibly limits feeding
 - ▶ Lip blister?
 - ▶ Flanged lip and fish mouth
 - ▶ Lower lip sticks upper lip no
- ▶ No studies support
 - ▶ Early clinical studies on small populations but no RCTs
 - ▶ Do not support frenum cut in newborns for breastfeeding
 - ▶ A "classification" does nothing other than describe a visual review, not functional



Unvalidated visual scale

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Nor is it about sleep disordered breathing and tongue ties

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Classification Systems

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Inclusion Criteria for Scales

- ▶ Small numbers of children
- ▶ Majority presented for breast feeding difficulties
- ▶ Self selecting population
- ▶ If a LC, RN, DDS or MD said you had a tongue tie then does that make you hyperalert to any deviations?



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Do these actually cause a feeding problem or just look funky? What's normal? What about in functional not photographic state?

*Kotlow Diagnostic criteria (one) for clinically apparent tongue-ties in infants



| Clinically Inapparent | Normal Range of Free Tongue ¹⁰ (Greater Than 14 mm) |
|-----------------------|--|
| Class I | Mild AG 17 mm to 14 mm |
| Class II | Moderate AG 9 mm to 11 mm |
| Class III | Severe AG 3 mm to 7 mm |
| Class IV | Complete AG < 3 mm |

¹⁰Free tongue is defined as the length of tongue from the insertion of the lingual frenum into the base of the tongue to the tip of the tongue.¹⁰

Should be attributed to Mirko, 1974

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Tongue Ties

- ▶ No validated **Diagnostic Criteria** other than subjective reports of difficult feeding and an open-mouthed clinical exam
- ▶ If children were **dying** at the same rate that they were receiving frenotomies or tongue tie release surgeries (forget the rate at which they are diagnosed) for feeding problems the population would be dying off and there would be a public health epidemic declared
 - ▶ Show a control population that has a higher morbidity and mortality rate without treatment
- ▶ Is it a disease of people who can afford a lactation specialist?
 - ▶ Or a disease of dentists with lasers?
 - ▶ Laser sales
 - ▶ Done with scalpel and scissors
 - ▶ Or reading a post on social media?

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Questions that should be asked about results of a frenum procedure?

- ▶ Do tongue-ties cause a problem with infant feeding?
 - ▶ Taking subjective self-reported studies and trying to make them objective
 - ▶ Are they EC3R?
- ▶ Is the improvement seen the expectation of improvement?
 - ▶ Placebo effect
- ▶ Is the mother/child dyad changed after surgical or non surgical intervention?
- ▶ Is the reported improved latching and feeding result of the need for comfort following a painful procedure?
 - ▶ Babies that have had circumcisions suck to attenuate the pain associated with the procedure
 - ▶ South Moll et al. The use of nipple flow during the procedure: the physiologic pain response to neonatal circumcision: a randomized controlled study. Arch Child Health. 2013; 89(1):4-8
- ▶ Need to do a one month, three month, six month, one year follow-up and check if there are any other effects or changes?
 - ▶ Are their long term effects to the dental arches and G&D of the craniofacial complex
 - ▶ Tongue function
 - ▶ Arch growth
 - ▶ Mandibular



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So, Do Frenectomies Improve Breastfeeding?

- ▶ Berry J, Griffiths M, Westcott C. A double-blind, randomized, controlled trial of tongue-tie division and its immediate effect on breastfeeding. Breastfeed Med. (2012) 7(3):189-93.
 - ▶ Mothers were more likely to report improvement in breast-feeding than were observers following both frenulotomy and sham procedure however according to mothers and observers, nearly half of infants who underwent sham procedure were breast-feeding better.
 - ▶ Amount of pain mothers reported decreased more with frenulotomy than with sham procedure, the differences were not statistically significant

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So, Do Frenectomies Improve Breastfeeding?

- ▶ Buryk M, Bloom D, Shope T. Efficacy of neonatal release of ankyloglossia: a randomized trial. Pediatrics. (2011) 128(2):280-8. 10.1542/peds.2011-0077
 - ▶ Difficulty breastfeeding and Hazelbaker assessment
 - ▶ Sham v procedure
 - ▶ Nipple pain and effectiveness of feeding
 - ▶ Immediate and 2 week assessments
 - ▶ Pain scores decreased immediately for both groups though more for sx
 - ▶ Feeding improved immediately in sx but 2 weeks later both groups had improved

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So, Do Frenectomies Improve Breastfeeding?

- ▶ Emond A, Ingram J, Johnson D, Blair P, Whitelaw A, Copeland M, et al. Randomised controlled trial of early frenotomy in breastfed infants with mild-moderate tongue-tie. Arch Dis Child Fetal Neonatal Ed. (2014) 99(3):F189-95. 10.1136
 - ▶ 107 children 8-16 days old
 - ▶ Ankyloglossia (Hazelbaker)
 - ▶ Randomized to frenulotomy and routine breast feeding support
 - ▶ @5 days, breast feeding efficacy and maternal nipple pain were the same

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So, Do Frenectomies Improve Breastfeeding?

- ▶ Emond A, Ingram J, Johnson D, Blair P, Whitelaw A, Copeland M, et al. Randomised controlled trial of early frenotomy in breastfed infants with mild-moderate tongue-tie. Arch Dis Child Fetal Neonatal Ed. (2014) 99(3):F189-95. 10.1136
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 - ▶ Randomized to frenulotomy and routine breast feeding support
 - ▶ @5 days, breast feeding efficacy and maternal nipple pain were the same

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Frenotomy for Tongue-tie in Newborn Infants Cochrane Review

- ▶ Tongue-tie, or ankyloglossia, is a condition whereby the lingual frenulum attaches near the tip of the tongue and may be short, tight and thick.
- ▶ Tongue-tie has been cited as a cause of poor breastfeeding and maternal pain.
- ▶ Frenotomy, which is commonly performed, may correct the restriction to tongue movement and allow more effective breastfeeding with less maternal nipple pain.
- ▶ This is not about speech or periodontal issues treated later in life caused by tongue movement issues



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Tongue Ties: Cochrane Review

Surgical release of tongue-tie for the treatment of tongue-tie in young babies

- ▶ **Review question:** Tongue-tie is a potentially treatable cause of breastfeeding problems - if a baby is tongue-tied and is having feeding difficulties, does releasing the tongue-tie help?
- ▶ **Background:** Tongue-tie is a condition whereby the membrane between the tongue and the floor of the mouth is too tight or too short. This may cause feeding problems for the baby and/or nipple pain for a breastfeeding mother.
- ▶ **Study characteristics:** Five randomised controlled trials enrolling 302 infants met the inclusion criteria.
- ▶ **Key results:** In an infant with tongue-tie and feeding difficulties, surgical release of the tongue-tie does not consistently improve infant feeding but is likely to improve maternal nipple pain. Further research is needed to clarify and confirm this effect.
- ▶ **Quality of evidence:** The quality of the evidence is very low to moderate because overall only a small number of studies have looked at this condition. The total number of babies included in these studies was low and some studies could have been better designed.

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Cochrane: Why it is important to do this review

- ▶ Diagnosis and management of tongue-tie remain controversial. It is uncertain whether ankyloglossia is a congenital oral anomaly requiring treatment or a normal variant.
- ▶ One survey (Messner 2000a) found that most lactation consultants believe tongue-tie to be a frequent cause of infant breastfeeding difficulties that could be solved by frenotomy.
- ▶ In marked contrast, 90% of paediatricians and 70% of otolaryngologists believe that tongue-tie never, or rarely, causes a feeding problem (Messner 2000a).
- ▶ Medical organisations such as the American Academy of Pediatrics (Corylos 2004) and the National Institute for Health and Care Excellence (NICE 2005) now acknowledge that tongue-tie, or ankyloglossia, is a significant clinical entity that should be treated as early as possible to minimise breastfeeding problems.
- ▶ Given that breastfeeding benefits both infants and mother, it is important for the clinician to address any condition that may impair breastfeeding (Edmunds 2011).

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Tongue Tie Cochrane Review

- ▶ 497 studies reviewed
- ▶ 209 remained after duplicates removed
- ▶ 182 excluded because didn't meet quality or inclusion criteria
- ▶ 27 assessed for eligibility
- ▶ 1 study included for qualitative synthesis
- ▶ 5 studies in meta analysis

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The 5 Big Boys! (and look who's names are not on there)

- ▶ **Berry 2012:** Berry J, Griffiths M, Westcott C. A double-blind, randomized, controlled trial of tongue-tie division and its immediate effect on breastfeeding. *Breastfeeding Medicine* 2011;12(2):280-8. PMID:21768316
- ▶ **Buryk 2011:** Buryk M, Bloom D, Shope T. Efficacy of neonatal release of ankyloglossia. *Pediatrics* 2011;128(2):280-8. PMID:21768316
- ▶ **Dallberg 2006:** Dallberg S, Botzer E, Grunis E, Mirmouris FB. Immediate nipple pain relief after frenotomy in breast-fed infants with ankyloglossia: a randomized, prospective study. *Journal of Pediatric Surgery* 2006;41(9):1598-1600. PMID:16952598
- ▶ **Emond 2013:** Emond A, Ingram J, Johnson D, Blair P, Whitelaw A, Copeland M, et al. Randomised controlled trial of early frenotomy in breastfed infants with mild-moderate tongue tie. *Archives of Diseases in Childhood Fetal and Neonatal Edition* 2014;99(3):F189-95. PMID:24024995
- ▶ **Hogan 2005:** Hogan M, Westcott C, Griffiths M. Randomized, controlled trial of division of tongue-tie in infants with feeding problems. *Journal of Paediatrics and Child Health* 2005;41(5-6):246-50. PMID:15953522

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Cochrane Review on Tongue Tie The Conclusions

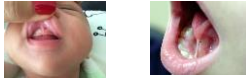
- ▶ The effect of frenotomy on tongue-tied preterm infants has yet to be studied.
- ▶ The optimal age to perform frenotomy in infants remains unclear.
- ▶ The effect of tongue-tie on early infant weight gain and on maternal difficulties in establishing a breast milk supply remains to be clarified.
- ▶ It has yet to be demonstrated whether frenotomy in breastfeeding infants with tongue-tie and feeding difficulty leads to a longer duration of breastfeeding.
- ▶ Whether frenotomy is a painful procedure that requires analgesia or anaesthesia has yet to be established, as no study to date has quantified infant pain during and after frenotomy.
- ▶ There is NO increase in weight gain between a child who has undergone the procedure and one who has not

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Cochrane Review Implications for practice

- ▶ Frenotomy causes a short-term reduction in nipple pain among breastfeeding mothers and an inconsistent positive effect on infant breastfeeding. Owing to the small number of studies and the high incidence of methodological issues, definitive benefit **has not been proven**.



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Johns Hopkins says...



WHAT YOU NEED TO KNOW

- Tongue-tie typically affects boys more often than girls.
- Tongue-tie is not the only reason for breastfeeding difficulty.
- Surgical treatment of tongue-tie may not improve breastfeeding.
- Tongue-tie does not cause speech delay, but can affect articulation, pronunciation, and the ability to form sounds and pronounce words.
- Tongue-tie diagnosis and treatment in breastfeeding mothers may be controversial.

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Canadian Agency for Drugs and Technologies in Health, 2016 Jun 15

- ▶ Systematic review
- ▶ "Altogether, given the minimal harms and probable benefit, albeit of **uncertain** magnitude and probable benefit, frenectomy may be a viable treatment option for infants of mothers who **wish** to breastfeed and are experiencing difficulty
- ▶ The evidence underlying these conclusions from **poor quality NSRs**, and does **not adequately address** the question of whether frenectomy provides a meaningful incremental benefit over other treatments or procedures to improve breastfeeding, particularly in the long-term. Many potential confounders that could have contributed to variation in the observed outcomes were not controlled for."

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That being said...

- ▶ In older children, may lead to stripping of attached gingiva lingual to the lower incisors
 - ▶ No studies done on this
 - ▶ May be valid procedure?
 - ▶ Could it have been prevented?
- ▶ Does it lead to sleep apnea?
 - ▶ Quite the reach especially because the tongue is tethered and can't fall back in the airway
 - ▶ Is a tongue tie a natural preventer of SIDS or airway obstruction in newborns
 - ▶ Recommended preventive treatment is using a pacifier to bring the tongue forwards
 - ▶ AAP sleep recommendations for newborns to 6 mo
 - ▶ Walsh F, Kelly D. Partial airway obstruction after lingual frenotomy. *Anesth Analg.* 1993;80(5):1046-1047.



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And how to do the tongue tie surgery?

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Surgical Intervention

- ▶ Scissors/scalpel and hemostat
- ▶ Cautery
- ▶ Lasers

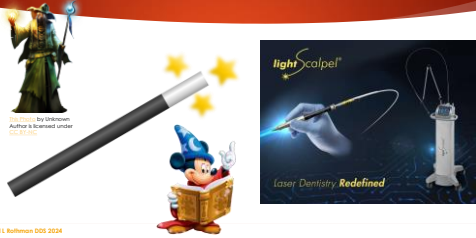


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The Magic Wand



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Laser Sales in Dentistry



- ▶ North America region accounted for the largest revenue share of 44.5% in 2022
- ▶ Precise targeting, reduced bleeding, minimized trauma to surrounding tissues, and faster healing times
- ▶ This growth can be attributed to rapid urbanization and an increasing disposable income
- ▶ Ties b/h laser companies and other businesses
 - ▶ BMW/Biolase

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And Ads and Classes

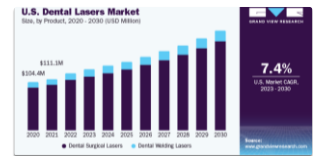


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Laser Sales in Dentistry

- ▶ The global dental lasers market size was valued at USD 331.7 million in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 7.6% from 2023 to 2030
- ▶ Revenue forecast:
 - ▶ 2023: \$352.6 million
 - ▶ 2030: \$589.1 million



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Interventions other than surgery to improve feeding

- ▶ **A brief gestalt intervention changes ultrasound measures of tongue movement during breastfeeding: case series**
 - ▶ Repositioning (gestalt) improves breast feeding outcomes and reduces maternal nipple pain
- ▶ **Results**
 - ▶ Ultrasound demonstrated that the distance from nipple tip to junction of the hard and soft palate decreased, intra-oral nipple and breast tissue dimensions increased, and nipple slide decreased after a brief gestalt intervention.
- ▶ **Conclusion**
 - ▶ These preliminary findings suggest that changes in fit and hold impact on infant tongue movement and intervention in larger cohorts is required.
- ▶ Douglas PS, Penatto SL, Geddes DT. A brief gestalt intervention changes ultrasound measures of tongue movement during breastfeeding: case series. BMC Pregnancy Childbirth. 2022 Feb 1;22(1):74. doi: 10.1186/s12884-021-04363-7. PMID: 35105336; PMCID: PMC8809464.

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Policy on the Management of the Frenulum in Pediatric Dental Patients

- ▶ Recognizing evidence is **limited**, the American Academy of Pediatric Dentistry supports **additional research** on the causative association between ankyloglossia and breastfeeding difficulties or speech articulation problems and between hyperplastic labial frenulum and increased risk of caries or periodontal disease due to interference with adequate oral hygiene. **Further randomized controlled trials and other prospective studies of high methodological quality** are necessary to determine the effects of frenotomy/frenectomy. With all surgical procedures, an informed consent is necessary. Informed consent includes relevant information regarding assessment, diagnosis, nature and purpose of proposed treatment, and potential benefits and risks of the proposed treatment, along with professionally-recognized or evidence-based alternative treatment options – including no treatment – and their risks.³¹



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Alternatives to Surgery

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Breastfeeding Positions



<https://www.whattoexpect.com/first-year/lift-head/>

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- ▶ Neck musculature developed to hold head steady without support: 4 months
- ▶ Movement/Physical Developmental Milestones
 - ▶ <https://www.cdc.gov/ncbddd/actearly/milestones/milestones-4mo.html>
- ▶ Head must be supported and held against the breast
- ▶ Feeding position and head holding force

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Cradling and Head Support



<https://health.clevelandclinic.org/breastfeeding-positions>

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What about safety?

- ▶ **Safety and efficacy of maxillary labial frenectomy in children: a retrospective comparative cohort study.** Baxter RT, Zoghi S, Lashley A. *International orthodontics*, 2, June 2022
 - ▶ Authors are from the Alabama Tongue Tie Center, AL and The Breathe Institute, CA
 - ▶ Quality Journal with peer-review
 - ▶ 109 pt, 95 primary dentition, 14 mixed dentition
 - ▶ Complications of minor pain, swelling and bleeding for a few seconds
 - ▶ **DID THE PROCEDURE NEED TO BE DONE IN THE FIRST PLACE??**
- ▶ **Complications and diagnoses associated with Infant frenotomy: results of a healthcare professional survey.** O'Connor ME et al. *Inf Breastfeeding J*, 2022 May 21;17(1):37
 - ▶ Academy of breastfeeding Medicine: MD and DDS survey, 211 responses
 - ▶ 41% reported a complications
 - ▶ 209 infants had complication; 237 mixed (neuromuscular dysfunction); 65 inadequate breastfeeding support
 - ▶ Complications: repeat procedure 6% children; oral aversion 57 (laser/cosior); parental report of infant pain (posterior frenotomy); bleeding (cosior-laser)
 - ▶ Better evaluation and coordination needed for confounding problems before referral for frenum procedures

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And what about cost?

- ▶ Of necessary procedures
- ▶ Of unnecessary procedures
- ▶ To the families, insurance, public health service and Medicaid



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And what is the consensus statement of the AAO-HNS (2020)?

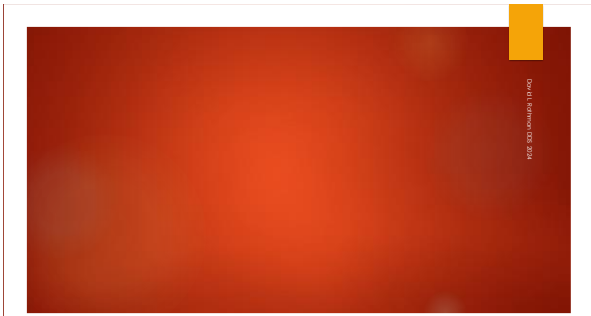
- ▶ "Ideally, a clinical guideline would be developed to assist practitioners faced with infants and children with possible ankyloglossia; however, the quality and quantity of existing high level evidence are insufficient for developing a multidisciplinary clinical practice guideline."
- ▶ Consensus that:
 - ▶ frenotomy in infants with ankyloglossia can lead to an improvement in breastfeeding, not all infants with ankyloglossia need to have a frenotomy, and there are other more common causes of breastfeeding difficulties.
 - ▶ frenulum procedure is also an option in older children with speech articulation and/or other mechanical social issues, but the evidence is limited and of relatively poor quality.
 - ▶ level of evidence surrounding intervention for the maxillary frenulum and possible upper lip tie is poor.
 - ▶ further study is needed to refine patient selection and outcome assessments in these areas.



Messner, A.H., Wash, J., Rosenfeld, R.M., Schwartz, S.R., Ishman, S.L., Balazs, C., Bellini, S.E., Djansezic, D.M., Choudhry, N., Levi, J., Meyer, A.S., Pabst, S., Simons, J.P., Wolf, D.L., Lambale, E. and Schwilke, L. (2020). Clinical Consensus Statement: Ankyloglossia in Children. *Otolaryngology-Head and Neck Surgery*, 142: 897-911. <https://doi.org/10.1177/0008719220931432>

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