

The Functional Assessment of Tethered Oral Tissue (TOTs) Part II

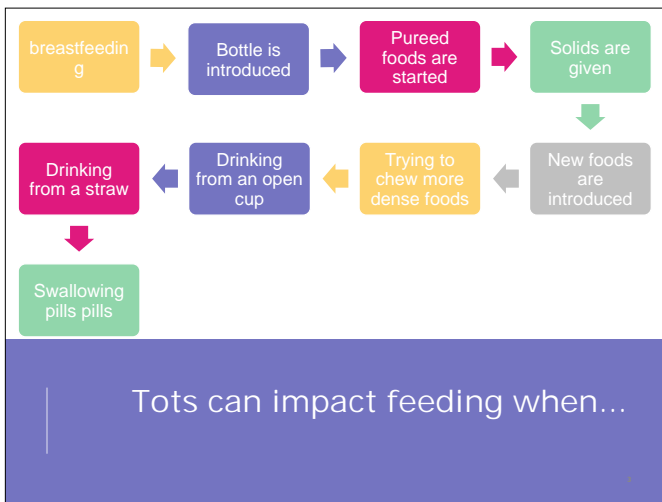


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SLP'S ROLE IN POST-FRENECTOMY CARE FOR CHILDREN WHO PRESENT WITH FEEDING CHALLENGES

Robyn Merkel-Walsh, MA, CCC-SLP & Lori Overland, MS, CCC-SLP, C/NDT, CLC

ABSTRACT

Introduction:

1. Current literature on the prevalence of feeding issues in children with a diagnosed oral-motor disorder is limited.
2. The importance of post-op care of children who have had a frenectomy and
3. The SLP's role in the post-op care for children who present with feeding challenges.

LEARNING OUTCOMES

1. Participants will have an improved understanding of the role of the SLP in post-op care with children with a diagnosis of ankyloglossia.
2. Participants will list two reasons why post-op care is necessary and
3. Participants will list the role of the SLP in post-op care and post-op exercises to target feeding skills for a pediatric frenectomy patient.

DISCUSSION

Ankyloglossia (tongue-tie) is an embryological error of tissue present at birth that restricts the tongue's range of motion. About 10% of infants are born with tongue-tie (Laine, Jones, & Durkin, 2006), but a recent study suggests that tongue-tie can affect the majority of infants (Wang, 2016). Wang (2016) reported that 90% of infants with tongue-tie, but a minority of physicians, believe tongue-tie is primarily associated with oral feeding problems (Bishop & Laxton, 2009) and 80.6% of mothers strongly followed frenectomy (Barnard) their child's ability to breastfeed (Shankar & Hickey, 2013). There are studies that indicate lactation consulting and consulting is critical into breastfeeding challenges of tongue-tied infants (AARMA, 2016; Gama, 2002) however not all cases of ankyloglossia are identified in the breastfeeding period.

An International Board Certified Lactation Consultant (IBCLC) should be the primary specialist performing post-op care with ankyloglossia patients (Chakari, 2017), which may be appropriate for breastfeeding, physicians must also consider that some children are experiencing feeding challenges with bottle, spoon, cup, straw and solid feeding (Pratt, 2015). The ASHA Scope of Practice informs us that SLP's role includes conducting a comprehensive assessment, including clinical and instrumental evaluation, identifying normal and abnormal swallowing anatomy and physiology, and identifying signs of possible or potential disorders in the upper aerodigestive tract (ASHA, 2016).

The SLP's role also includes orofacial myofunctional disorders including oral aversion, i.e., with lip-ties, cleft subululation, macroglossia, oral-motor dysfunction, etc. (ASHA, 2016). The current review, ankyloglossia (Merkel-Walsh & Overland (2017) discussed that the SLP's role in the assessment and treatment of ankyloglossia disorders not only the structure, but the impact on function in regards to feeding and speech. Assessment should consider oral feeding and feeding skills that are impacted by the lingual restriction (Barnard, 2015; Merkel-Walsh & Overland, 2016). These need deficits that become targeted goals of a post-operative program to support the necessary oral motor skills for a safe and effective, durable feeding plan. (2017; Sherry & Kelly, 2009; Overland & Merkel-Walsh, 2013; Farnsworth Impact beyond breastfeeding and speech.

IMPACT OF ANKYLOGLOSSIA

ANATOMY

- Ankyloglossia is a congenital condition that restricts the tongue's range of motion.
- It is caused by a short or fused lingual frenulum.
- It can affect the tongue's ability to move up, down, forward, and backward.
- It can lead to feeding difficulties, speech delays, and dental problems.

SYMPTOMS

- Difficulty breastfeeding or using a bottle.
- Difficulty speaking clearly.
- Difficulty with oral hygiene.
- Difficulty with oral surgery.

TREATMENT

- Frenectomy (surgical removal of the frenulum).
- Speech therapy (to improve oral motor skills).
- Feeding therapy (to improve feeding skills).

CONCLUSION

The SLP's role in feeding disorders that are subsequent to ankyloglossia are not clearly defined in most oral research studies (Meredith & Macmillan, 2010). Research clinical guidelines and research studies on feeding, pre- and post-op interdisciplinary collaboration or evaluation is critical for positive prognosis and functionality.

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Merkel-Walsh & Overland TOTs Protocol Breast Assessment

ASSESS

1. As the nipple touches the philtrum, does the infant have a gape response?
2. Are the infant's head and neck slightly tilted back?
3. Do the bottom lip and tongue reach the breast first?
4. Does the tongue depress and come forward to the gums/lower lip to meet the nipple?
5. Is the nipple/breast tissue is drawn into the infant's mouth, and stabilized with the anterior and mid tongue, lips, fatty sucking pads and palate?
Is the tongue grooved front to back?
6. Is the upper lip slightly everted and the lower lip flanged to stabilize the nipple?

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Merkel-Walsh & Overland TOTs Protocol Breast Assessment

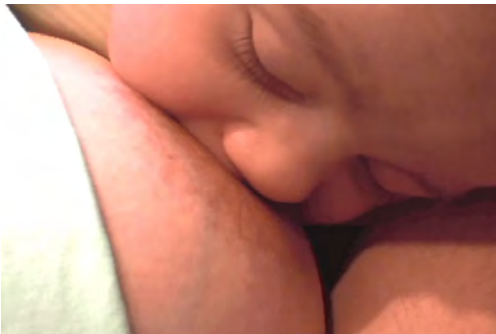
1. Are the cheeks are rounded vs. dimpled or indented?
2. Is the latch asymmetrical?
3. Do the back of the tongue and jaw lower to create negative pressure which facilitates the transfer of milk?
4. Does the tongue remain cupped from front to back to facilitate oral transport of the bolus?
5. Can the infant coordinate suck, swallow, breathe????

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Possible Implications of TOTs for Breast Feeding

	Buccal	Labial	Lingual
Impact of TOTs	decreased ability to stabilize the nipple inability to activate the cheeks during sucking which will result in a compensatory protrusion and retraction	reduced labial flanging poor labial seal stabilizing with gums maternal discomfort	decreased ability to cup the tongue front to back to support the breast decreased ability to stabilize a nipple decreased ability to establish a seal decreased ability to draw milk using negative pressure excessive jaw excursions phasic bite on the breast with a compression release pattern decreased ability to coordinate suck-swallow-breathe maternal discomfort

Assessment-Breast Feeding



Assessment-Breast Feeding



Bottle Assessment

ASSESS:

- When the teat is presented to the philtrum does the baby have a gape response?
- Does the tongue come out to the bottom lip to draw the teat in to the mouth? Is the tongue cupped front to back?
- Is the teat is drawn into the mouth and stabilized with the anterior to mid portions of the tongue, flanged lips, fatty sucking pads, and the

Note :

- The lips play a more important role in stabilizing the teat for bottle fed baby than for breast feeding.
- Unlike the breast, the bottle teat is not flexible and does not fill the oral cavity. The size, and shape of the teat may influence where it is stabilized.
- Milk transfer may be facilitated with negative pressure or a wave-like

Breast varies from bottle



Hernandez, A.M. & Bianchini, E.H.G. (2019). Swallowing Analyses of Neonates and Infants in Breastfeeding and Bottle-feeding: Impact on Videofluorography Swallow Studies. *International Archives of Otorhinolaryngology* DOI: 10.1055/s-0039-1677753



Quick Summary!!!!

Retrospective Study

25 Neonates/Infants under 6 m of age-in transition to or exclusively breastfed

Looked at breast vs. bottle feeding for movements such as: oral capture, oral control, wave like tongue movements, piston-like tongue movements, coordination of tongue and mandible movements,

Study Results

Statistically significant association between nipple capture, oral control, suction pattern, mandibular excursion, liquid flow and method used.

Additional factors associated with feeding method: impaired velopharyngeal closure, triggering of the swallow, food retention in the pharyngeal recesses, laryngeal penetration and GER.

Deficit in bottle nipple capture as compared to breast, decreased oral control with bottle, infants did better with slow flow, varying suction patterns (1:1, 2:1) within subjects, wave-like tongue movements predominated for breast and bottle

Continued

More piston like with bottle-but not statistically significant, smaller mandibular excursions for breast feeding, not significantly different but better coordination between swallowing and respiratory pause for breastfeeding

Most significant for feeding safety: deficit in velopharyngeal closure, and increased nasopharyngeal reflux during bottle feeds (note-occurred more at the end of a feed and bottle feeds were done after breast), few episodes of laryngeal penetration happened on the bottle

Genna, W, C., Saperstein, Y., Siegel, S.A., Laine, A.F., Elad, D. (2021). Quantitative imaging of tongue kinematics during infant feeding and adult swallowing reveals highly conserved patterns. *Physiological Reports*. Vol. 9 (3). 1-16



NEW ! 2021

torticollis

- Impacts rhythm of feed

mismatch

- Breast vs. bottle
- Artificial nipple/teat

improvement

- Of feeds post-frenectomy

Spoon Assessment

- ASSESS**
- Does the upper lip mobilize down and forward to meet the spoon?
 - Does the lower lip, roll in slightly to stabilize the spoon?
 - Do the lateral borders of the tongue retract to facilitate oral transport of the bolus?
 - Do the cheeks contract to support removal of the bolus and to facilitate intraoral pressure for swallowing?
 - Is oral transport of the bolus and swallowing well coordinated?
 - Is there dissociated tongue tip elevation to initiate a swallow?


Possible Implications of TOTs for Spoon Feeding


	Buccal	Labial	Lingual
Impact of TOTS	Decreased ability to contract the cheeks to support the removal of a bolus and oral transport	Reduced upper lip mobility to support lip closure for spoon fed purees Reduced mobility of the upper lip to mobilize to clear the spoon	Suckle swallow pattern with purees



Assessment-
Spoon

Assessment-Spoon





Assessment-Spoon

Merkel-Walsh & Overland
TOTs Protocol

Solids Assessment

ASSESS:

Is there adequate jaw grading to bite through a variety of food textures?

Is there adequate jaw stability to maintain a repetitive lateral bite?

Is there adequate mobility through the tongue tip and lateral borders of the tongue to facilitate oral transport of the bolus, and to stabilize the bolus on the molars during mastication?

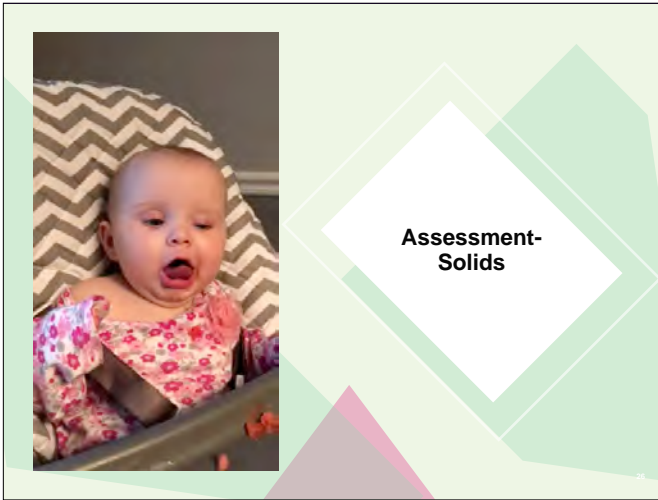
Do the cheeks contract to stabilize the bolus, and support chewing and swallowing?

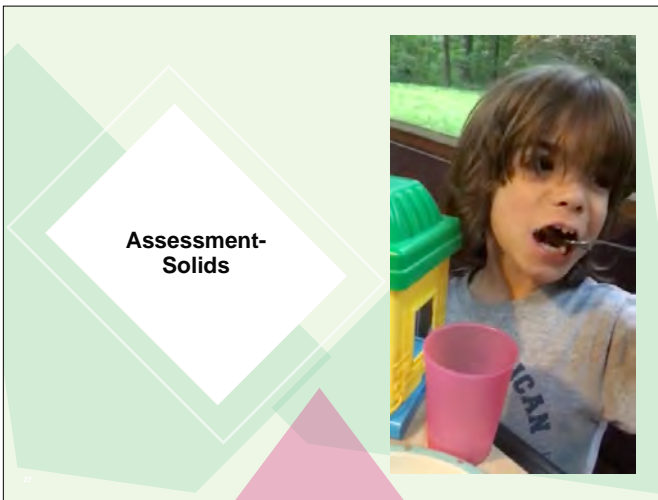
Is there lip closure to support swallowing?


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Possible Implications of TOTs for Solids


	Buccal	Labial	Lingual
Impact of TOTs	decreased suction in the cheeks during compression of a bolus inability to activate the cheeks to stabilize a solid bolus which will result in a scattered bolus inability to contract to support swallowing which will result in jaw, lower lip or tongue protrusion to support a swallow residual food in lateral sulci	reduced labial mobility to support intraoral suctioning for swallowing reduced labial closure to support chewing	mashing foods on the anterior third of the tongue difficulty collecting a bolus difficulty transporting a bolus difficulty lateralizing a bolus to the molars for chewing absence of a rotary chew gagging/choking/vomiting on solids Pooling of bolus in the front of the mouth







Assessment-Solids



Assessment-Solids

Merkel-Walsh & Overland
TOTs Protocol

Cup Assessment

ASSESS:


Is there adequate jaw stability?

Does the upper lip come down and forward to meet the cup, while the lower lip rolls in slightly to provide stability? Is there adequate lip closure to valve for a swallow?
Do the cheeks contract to support sucking and swallowing?

Is there adequate tongue tip mobility and retraction through the lateral borders of the tongue?

Is there adequate jaw-lip-tongue dissociation and grading for age-appropriate swallowing.

Is there adequate coordination of suck, swallow, breathe?



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Straw Assessment

ASSESS Is there adequate lip rounding?

:

Is there adequate cheek contraction to support lip rounding, sucking, and swallowing?

Is there adequate jaw stability to support dissociation of jaw/tongue movement?

Is there stability through the lateral borders of the tongue to support tongue retraction and dissociated tongue tip movement?


Possible Implications of TOTs for Straw


	Buccal	Labial	Lingual
Impact of TOTs	reduction in intraoral suction for straw drinking results in tongue protrusion to stabilize the straw	reduced ability to round the lips for straw drinking reduced labial mobility to support sucking reduced labial mobility to support intraoral suctioning for swallowing	Reduced jaw-tongue dissociation Reduced contraction through the lateral borders of the tongue Reduced tongue tip mobility Tongue stabilizes the straw

Assessment-
Straw



**Assessment-
Straw**


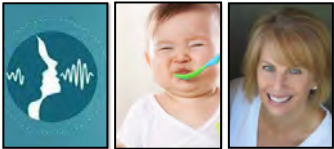




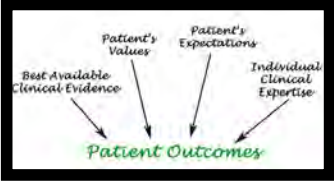
**Assessment:
Straw**

Self-Limited Diets

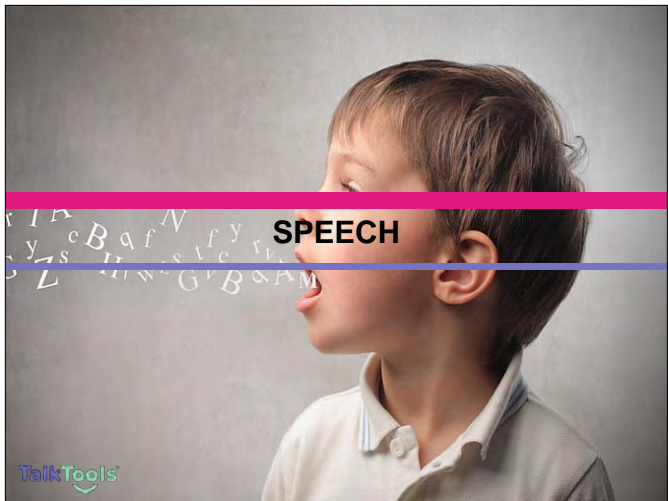
“Three Structures in a Child’s Mouth That Can Cause Picky Eating”
written by Melanie Potock
ASHA Leader 2017

“Consider Experience as Part of Evidence-Based Practice to Evolve Our Profession”
written by Robyn Merkel-Walsh
ASHA Leader 2017



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TALKTOOLS BRINGING THE BEST OF SPEECH AND LANGUAGE TO YOU

Presented by the **2013 ASHA Convention**, **Robyn Merkel-Walsh, MA, CCC-SLP, COMS**
TalkTools, Charleston, SC

IAOM INTERNATIONAL ASSOCIATION OF ORTHOGONAL APPLIANCE

INTRODUCTION

Presentations regarding 1) Compensatory orthodontic, 2) orthodontic malocclusion, 3) orthodontic malocclusion with language, 4) orthodontic malocclusion with orthodontic malocclusion, 5) orthodontic malocclusion with orthodontic malocclusion, 6) orthodontic malocclusion with orthodontic malocclusion.

OBJECTIVES

- 1) Participants will be able to identify all malocclusion types of orthodontic malocclusion.
- 2) Participants will be able to identify orthodontic malocclusion with orthodontic malocclusion.
- 3) Participants will be able to identify orthodontic malocclusion with orthodontic malocclusion.

DISCUSSION

Orthodontic malocclusion ranges from about 2% (Lima, James & Coombs, 2003) to 10% (Nanda, 2004). Malocclusion & Speech (2013). However, it is not clear how often orthodontic malocclusion is associated with orthodontic malocclusion. Some studies suggest that orthodontic malocclusion is associated with orthodontic malocclusion. Some studies suggest that orthodontic malocclusion is associated with orthodontic malocclusion. Some studies suggest that orthodontic malocclusion is associated with orthodontic malocclusion. Some studies suggest that orthodontic malocclusion is associated with orthodontic malocclusion.

LIBERATURE REVIEW

- 1) Studies have shown that orthodontic malocclusion is associated with orthodontic malocclusion.
- 2) Studies have shown that orthodontic malocclusion is associated with orthodontic malocclusion.
- 3) Studies have shown that orthodontic malocclusion is associated with orthodontic malocclusion.

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TOTS and SPEECH CONSIDERATIONS

- 1) Assess articulation of the vowels with orthodontic malocclusion.
- 2) Analyze placement of the sounds and note any orthodontic malocclusion patterns.
- 3) Accept that if the orthodontic malocclusion is structural it is, therefore not developmental.

CONCLUSION

Orthodontic malocclusion is associated with orthodontic malocclusion. Orthodontic malocclusion is associated with orthodontic malocclusion. Orthodontic malocclusion is associated with orthodontic malocclusion.

REFERENCES

1) Study of orthodontic malocclusion. Study of orthodontic malocclusion. Study of orthodontic malocclusion.

2) Study of orthodontic malocclusion. Study of orthodontic malocclusion. Study of orthodontic malocclusion.

3) Study of orthodontic malocclusion. Study of orthodontic malocclusion. Study of orthodontic malocclusion.

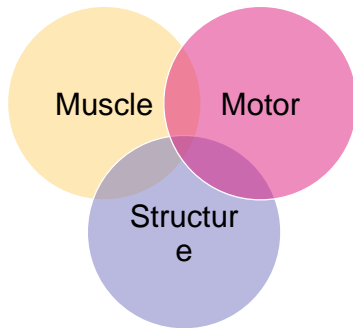
Speech pathologists should be clinicians who help individuals remediate not compensate.

Robyn Merkel-Walsh
DIAMOND
MIO

TOTS Assessment Merkel-Walsh & Overland 2013

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We need a Task Analysis of Speech





Improve Speech Sound Articulatory Placement

- An incorrect oral rest posture of the tongue and lips can result in the tongue initiating speech productions from an abnormal rest position. In such situations, correcting the OMD can positively impact the correction of speech production errors.
- When an OMD is related to an abnormal lingual or labial or mouth open behavior pattern that coexists with speech production errors, the articulation errors can be expected to be corrected more easily once the behavior pattern has been corrected in therapy.

- Mary Billings, MS, CCC-SLP, COM®
- Dianne Fonsagrives, MS, CCC-SLP, COM®
- Honor Franklin, PhD, CCC-SLP, COM®
- Patricia Grant, MA, CCC-SLP, COM®
- Sandra Holtzman, MS, CCC-SLP, COM®
- Gloria Kellum, PhD, CCC-SLP®
- Robert Mason, DMD, PhD
- Patricia Taylor, MEd, CCC-SLP, COM®
- Elaine Wolkoff, MS, CCC-SLP, COM®

Speech, TOTs and EBP

A literature review of a correlation between tongue-tie and speech revealed:

Early studies in the 1950s reported improved speech post ankyloglossia release (Brown, 1959; Oldfield, 1959.)

Williams & Waldron (1985) suggested that before a cause-and-effect relationship between tongue-tie and oral motor and speech can be established, an objective and replicable system of measurement must be defined.

Messner & Lalakea (2002) found that while some children with tongue-tie learned to compensate and developed normal speech, up to 71% had certain symptomatic error patterns as a result of limited lingual range that impacted speech sounds and the rate of articulation.

Speech, TOTs and EBP

Merdad & Mascarenhas (2013) point out that the lack of an accepted definition and classification of ankyloglossia makes comparisons between studies almost impossible. In an effort towards clarity, there have been several attempts at classification through protocols by Fernando, Martinelli, Marchesan, Kotlow, Hazelbaker and Coryllos & Genna, but no single descriptive measure has been universally adopted amongst professionals (Merkel-Walsh & Overland, 2018b). Others have attempted to standardize the visual inspection of the frenum (Ghaheeri, 2014; Martinelli, Marchesan & Berretin-Felix, 2018).

Speech, TOTs and EBP

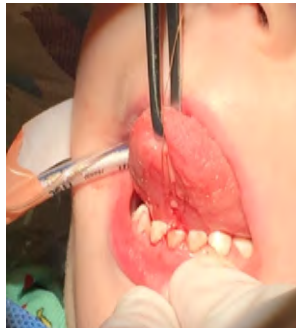
Meaux, Savage & Gonsoulin (2016) looked at speech pre- and post-frenectomy in two subjects. Study found that subjects significantly decreased fronting (90% to 10%) and fronting/stopping (40% to 0%).

Baxter and Hughes (2018) published a five subject case study. All five patients showed improvement in speech after frenectomy.

2019: Daggumati, S., Cohn, J. E., Brennan, M. J., Evarts, M., McKinnon, B. J., & Terk, A. R. (2019). Speech and Language Outcomes in Patients with Ankyloglossia Undergoing Frenulectomy: A Retrospective Pilot Study. *OTO Open*.

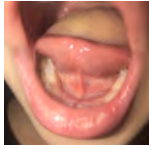
Children with preoperative moderate and moderate-to-severe speech and language impairment attained better speech and language outcomes after frenulectomy as compared with children with mild and mild-to-moderate impairment (100% vs 82%, $P = .015$). Sutured closure after frenulectomy was associated with better speech and language improvements (100% vs 83%, $P = .033$). One could consider observation of patients with mild and mild-to-moderate speech and language impairments.

Sutured closure might result in better improvements in speech and language impairments. This pilot study sheds light on the potential impact of a larger study currently underway.

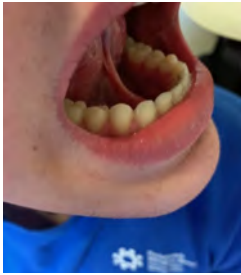


2019: Ito, Y., Shimizu, T., Nakamura, T., & Takatama, C. (2015). Effectiveness of tongue-tie division for speech disorder in children. *Pediatrics International: official journal of the Japan Pediatric Society*, 57(2), 222–226. <https://doi.org/10.1111/ped.12474>

- **Background:** The aim of this study was to determine the effectiveness of tongue-tie division (frenuloplasty/ frenulotomy) for speech articulation disorder in children with ankyloglossia (tongue-tie).
- **Methods:** Articulation test was done in five children (3-8 years old) with speech problems who underwent tongue-tie division. The test consisted of 50 pictures of common Japanese words with 2-3 syllables. The patients were interviewed by a speech therapist and asked to pronounce what the picture card showed. Misarticulations of substitution, omission, and distortion were assessed. The preoperative results were compared with postoperative examinations at 1 month, 3-4 months, and 1-2 years.
- **Results:** Nineteen substitutions that were observed in four patients preoperatively decreased to 10 in three patients at 1 month, 7 in three patients at 3-4 months, and 1 in one patient at 1-2 years postoperatively. Five omissions that were observed in four patients preoperatively decreased to 3 in three patients at 1 month, 2 in two patients at 3-4 months, and 1 in one patient at 1-2 years postoperatively. Thirteen distortions that were observed in five patients preoperatively decreased to 8 in four patients at 3-4 months but increased to 11 in three patients at 1-2 years postoperatively.
- **Conclusions:** Substitution and omission improved relatively early after tongue-tie division and progressed to distortion, which is a less-impaired form of articulation disorder. Thus, distortion required more time for improvement and remained a defective speaking habit in some patients.



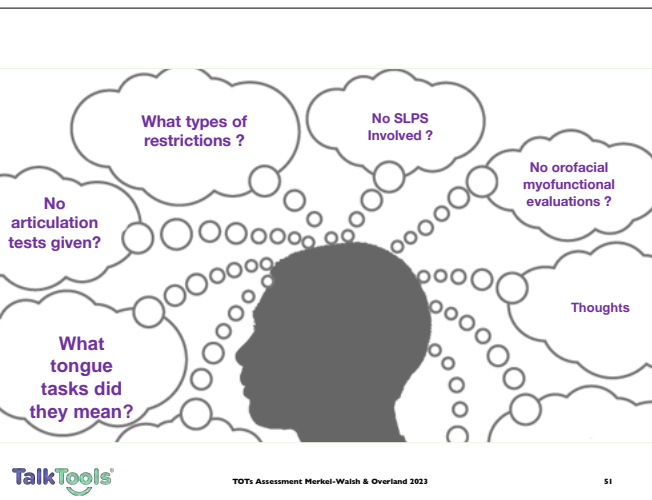
2019: Daggumati, S., Cohn, J. E., Brennan, M. J., Evarts, M., McKinnon, B. J., & Terk, A. R. (2019). Caregiver perception of speech quality in patients with ankyloglossia: Comparison between surgery and non-treatment. *International journal of pediatric otorhinolaryngology*, 119, 70–74. <https://doi.org/10.1016/j.ijporl.2019.01.019>



Results: The caregivers of seventy-seven patients participated in the phone survey: 46 (60%) children in the surgical group and 31 (40%) children in the non-surgical group who participated in the phone survey. There were no differences in difficulty with speech ($p = 0.484$) and tongue mobility ($p = 0.064$) between the two groups.

However, patients that underwent surgical intervention for ankyloglossia reported less difficulty with tongue tasks ($p < 0.001$) compared to those who were not surgically treated.

Additionally, 50% of patients that underwent surgery had a documented family history of ankyloglossia which was significantly higher than 16.1% in the non-surgical group ($p = 0.002$).
Conclusions: It appears that children with ankyloglossia might have similar speech quality following frenulectomy in comparison to speech quality without treatment. Children who undergo frenulectomy may experience improvements in tongue tasks. This data should encourage further research on the management of speech concerns in children with ankyloglossia.



2019; Gaudiano, N., Bergstrom, B., Dralle, A. & Throneburg, R. (2019). Tongue-Tie and Speech Articulation. Poster presentation at the 60th Annual Illinois Speech-Language Hearing Association Convention, Rosemont, IL.



This research investigated speech articulation in two adolescents with ankyloglossia, or "tongue tie", pre-and post-frenectomy. It explored the improvement in speech intelligibility between one client who had the surgical release by a general practitioner (ENT; scissor release) and who received speech remediation by a SLP without training in orofacial myofunctional disorders from another client who had the surgical release by a surgeon with expertise (board certified DMD; laser release) and received therapy from a SLP who had training in OMD from the IAOM.

Significant progress was gained in the client who received care from those with extensive training in the structure and function of the orofacial complex.



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Does TOTs Impact Speech ?

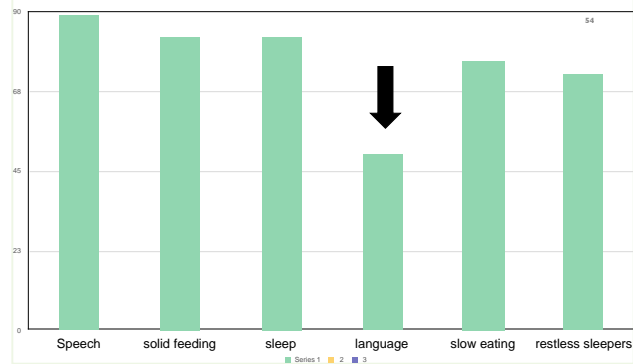
Baxter, R., Merkel-Walsh, R., Stark-Baxter, B., Lashley, A., & Rendell, R.R., (2020). Functional improvements of speech, feeding and sleep after lingual frenectomy tongue-tie release: a prospective cohort study. Clinical Pediatrics, 1-8



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Functional Improvements



Baxter et al., continued

Findings	Concerns
<ul style="list-style-type: none"> • 89% parents reported improved speech • 83% improved solid feeding • 83% improved sleep • Found a connection of speech delay in 50% of patients (8/16) • Those 8 children said words within a week of the procedure 	<ul style="list-style-type: none"> • Study relied on parent reports which could be prone to bias • Study could be improved with validated instruments for assessment • Control group is difficult to achieve • Results would definitely be impacted by the quality of the release

In Contrast



This study provides preliminary evidence of no difference between tongue mobility and speech outcomes in young children with or without intervention for tongue-tie during infancy. This study assists with clinical decision making and makes recommendations for families not to proceed with surgical intervention for tongue-tie during infancy, for the sole outcome of improving speech production later in life.

Salt, H., Claessen, M., Johnston, T., & Smart, S. (2020). Speech production in young children with tongue-tie. *International journal of pediatric otorhinolaryngology*, 134, 110035. <https://doi.org/10.1016/j.ijporl.2020.110035>

Test Used?

VMPAC Motor Speech Test

Toddler Phonology/ DEAP



Noted

Significantly more children in the UTT group had previously seen speech pathologists, in comparison to the NTT group

Children within the UTT group no longer presented with a tongue-tie, as indicated by their lingual frenulum function score (Note you cannot suddenly not be tied its congenital !)

A Kruskal-Wallis one-way ANOVA revealed a significant difference in previous speech pathology services.

No children in the NTT had previously received speech pathology services.

19% of children within the TTT group had seen a speech pathologist previously; all of whom had attended due to problems with alveolar and palato-alveolar sounds (/l/, /s/, /r/, /j/, /z/). This indicates that a high proportion of TTT children required assistance to develop new motor programs for sounds which required tongue movement, following their tongue-tie release.



2021; Tripodi, D., Caocciagano, G., D'Ercole, S., Piccini, F., Maiolo, A., & Terzi, M. (2021). Short lingual frenulum: From diagnosis to laser and speech-language therapy. *European journal of paediatric dentistry*, 22(1), 71-74. <https://doi.org/10.23904/ejpd.2021.22.01.13>

Conclusions: It is essential to establish diagnosis criteria to which the clinician should refer in order to decide the treatment plan. This study shows that combined laser and speech-language therapy leads to better results than the resection treatment of the frenulum with laser technique alone.

Research Synopsis

Types of surgery matters

Therapy matters

Location of restriction matters

Expertise of clinician matters

Functional implications matters

Similar sound errors have been found

Research Synopsis

Altered tongue position impacts speech

There is a limited amount of researchers

We are closer to objective measurements

Studies have shown improved speech post frenectomy

The combo of surgery and speech is better

Children with ankyloglossia seem to need new motor plans

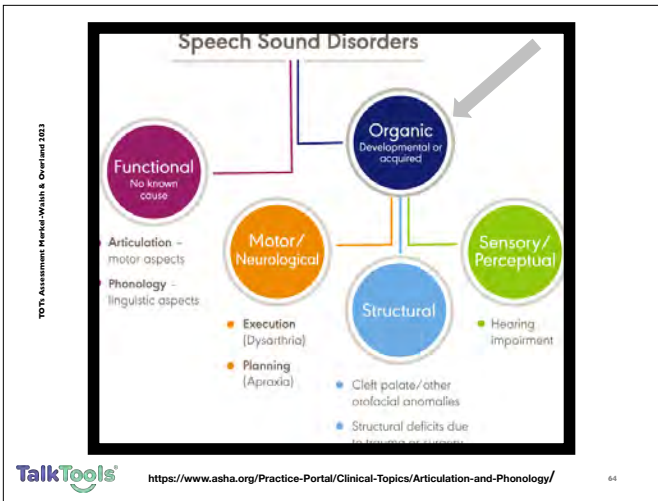
Merkel-Walsh & Overland
TOTs Protocol

International Phonetic Alphabet

International Phonetic Alphabet (IPA) *ˌɪntəˈnæʃnəl fəˈnetɪk ˈælfəbet*

Consonants (multisyllabic)

	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			ʀ					ʁ		
Tap or flap		ɸ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			



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TOTs Protocol

Speech


- 1 **ACOUSTICS (GFTA-3)**
- 2 **Placement of Sounds**
(Muscle Based Articulation Test by Sara Rosenfeld-Johnson)
- 3 **Analyze the patterns of the errors**

***If the etiology of the speech sound disorder is structural this is NOT a developmental speech sound disorder ***


<https://talktools.com/blogs/from-the-experts/aoppspa-position-statement-oral-motor-therapy>

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In Order to teach placements, we must understand them.....




Jaw



Lip



Tongue



Cheeks

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Buccal and Labial

Bilabials

BILABIALS	Buccal	Labial	Lingual
Impact of TOTs	Reduced contraction in the cheeks for /w/ production	Reduced /poor lip closure for the bilabial production of /p/, /b/, and /m/ Reduced/poor lip rounding for the production of /w/	If tongue tip is interdental, lip closure may be impacted.

Labiodentals

LABIODENTALS	Buccal	Labial	Lingual
Impact of TOTs	Reduced contraction in the cheeks for /f/ and /v/ production	Reduced /poor lip retraction for the production of /f/ and /v/. Errors include omissions, p/f, b/v, w/f, w/v or θ/f or ð/v	

Lingual

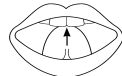
Focus on Lingual Placements for Ankyloglossia



Lingual Protrusion



Lingual Retraction

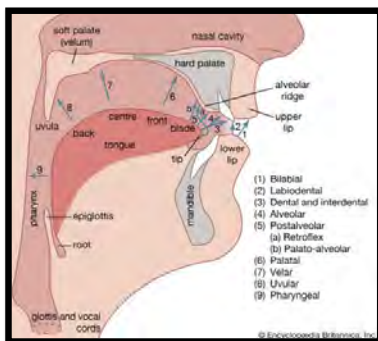


Lingual Elevation



Back Tongue Side Spread

Interruptions 3-9



Ankyloglossia Can Impact Oral Placements Due To:

Fascia

- Tight fibers
- Intertwined Fibers
- Poor communication of the fibers

Location

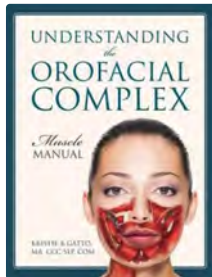
- Range
- Agility
- Limitation of the other structures (ex. High palatal vault)

Length

- Relationship to the Maximal Mouth Opening (MMO)
- Ability to assume standard placements

Illustrations :
Kristie Gatto MA, CCC-SLP/COM®
<https://orofacialcomplex.com/>

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According to Gatto:



The extrinsic lingual muscles change the POSITION of the tongue in the mouth. Originate outside the lingual body :Genioglossus ,Hyoglossus, Styloglossus , Palatoglossus



The intrinsic lingual muscles change the SHAPE of the tongue. Originate inside the lingual body: Superior longitudinal, Inferior longitudinal, Transverse, Vertical

Intrinsic Muscles

01

superior longitudinal
• t/d/n/l/s/z

02

inferior longitudinal
• t/d/n/l/s/z

03

vertical muscle
t/d/n/l/s/z
r/ʒ/dʒ/f/f/ʃ

04

transverse muscle
θ/ð
t/d/n/l/s/z

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Extrinsic Muscles

01

Genioglossus
• θ/ð

02

Hyoglossus
• k/g

03

Styloglossus
k/g

04

Palatoglossus
k/g

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Lingual Elevation

T/D/N/L/S/Z

Jaw High to Medium

Lips Parted

Tongue Retracted with Tip Elevation

Transverse-Elongation

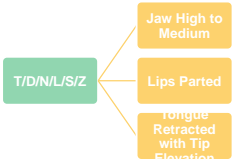
Superior Longitudinal-Tip Elevation

Inferior Longitudinal-Integral part of tip release



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Lingual Elevation



Vertical-flatten the tongue and push it out bilaterally to contact the roof of the mouth



Lingual-Alveolars

LINGUAL-ALVEOLARS	Buccal	Labial	Lingual
Impact of TOTS			Reduced/absent tongue tip elevation for t/d/n/l/s/z Interdental productions which will not be scored on the GFTA-3 Lateral distortions of s/z Interdental lisp

Speech Sample



Lingual Retraction

k/g

- Jaw Low
- Lips Parted
- Tongue Retracted

Hyoglossus – Retract inward Lower Tongue Tip	Palatoglossus- Lifts back of tongue up and soft palate down	Styloglossus – retract and lift up

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TOTs Protocol

Velars

VELAR	Buccal	Labial	Lingual
Impact of TOTs			Impaired /poor tongue retraction can result in weak /k/ and /g/ production. There may be a nasal quality to these phonemes. Some TOTs patients can not get an approximation, and there is suspected VPI .

Back Tongue Side spread

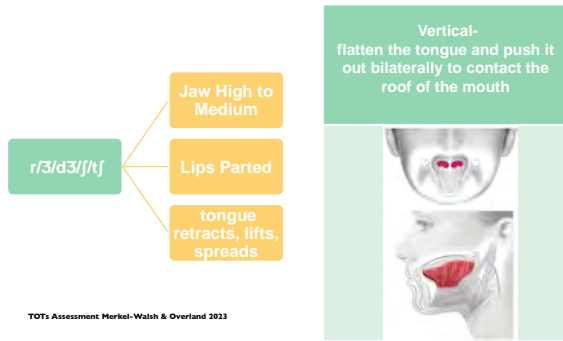
r/3/d3/f/fj

- Jaw High to Medium
- Lips Parted
- tongue retracts, lifts, spreads

Hyoglossus- Contribute to grooved fricatives	Styloglossus- May elevate the tongues margins to form the groove	Palatoglossus- raising the back of the tongue for velar phonemes and groove the back of the tongue

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Back Tongue Side spread



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TOTs Protocol

Palatals

PALATAL	Buccal	Labial	Lingual
Impact of TOTS	Reduced ability to support cheek contraction for /r/, /ʃ/, /tʃ/, /dʒ/ and /s/	Reduced ability to protrude the lips for /r/, /ʃ/, /tʃ/, /dʒ/ and /s/	Reduced ability to retract the tongue with back side spread for /r/, /ʃ/, /tʃ/, /dʒ/ and /s/
	Lips may be flat and distort the sound is cheeks are not contracted		



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Speech

Buccal	Labial	Lingual
Reduced ability to support cheek contraction for /r/, /ʃ/, /tʃ/, /dʒ/ and /s/	Reduced /poor lip closure for the bilabial production of /p/, /b/, and /m/	Reduced/absent tongue tip elevation for /d/n/l/s/z
Reduced contraction in the cheeks for /w/ production	Reduced/poor lip rounding for the production of /w/	Interdental productions which will not be scored on the GFTA-3
Reduced contraction in the cheeks for /l/ and /v/ production	Reduced ability to protrude the lips for /r/, /ʃ/, /tʃ/, /dʒ/ and /s/	Lateral distortions of /s/z
	Reduced /poor lip retraction for the production of /l/ and /v/.	Interdental lisp
	Errors include omissions, p/f, b/v, w/l, w/v or θ/f or ð/v	Impaired /poor tongue retraction can result in weak /k/ and /g/ production.
		Reduced ability to retract the tongue with back side spread for /r/, /ʃ/, /tʃ/, /dʒ/ and /s/
		Reduced contraction in the lateral margins for /θ/ and /ð/



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ORAL HABITS

Nail Biting

Prolonged pacifier

Thumbsucking

Tongue sucking

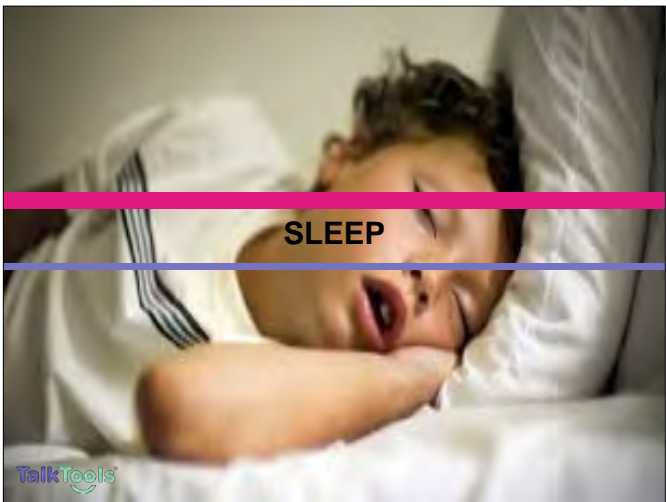
Chewing on non-edibles

Bruxism

Drooling

Seeking oral stimuli

Oral Habits



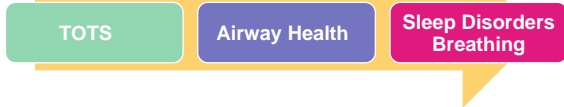
SLEEP

Sleep

Cioffi Izu, S., Harumi Itamoto, C., Pradella Hallinan, M., Ulson Pizarro, G., Tufik, S., Pignatori, S. & Raimundo Fujita, R. (2010). Obstructive sleep apnea syndrome (OSAS) in mouth breathing in children. *Brazil Journal of Otorhinolaryngology*, 75(5). Retrieved from : http://www.scielo.br/scielo.php?pid=S1808-86942010000500003&script=sci_arttext&tlng=en

Huang, Y., Quo, S., Berkowski, J.A. & Guilleminault, C.S. (2015). Short lingual frenulum and obstructive sleep apnea in children *International Journal of Pediatric Research*, 1:1, ISSN:2469-5769.

Villa, M.P., Evangelisti, M., Barreto, M., Cecili, M. & Kaditis, A. (2019). Short lingual frenulum as a risk factor for sleep-disordered breathing in school-aged children. *Science Direct*. Retrieved from : <https://doi.org/10.1016/j.sleep.2019.09.019>



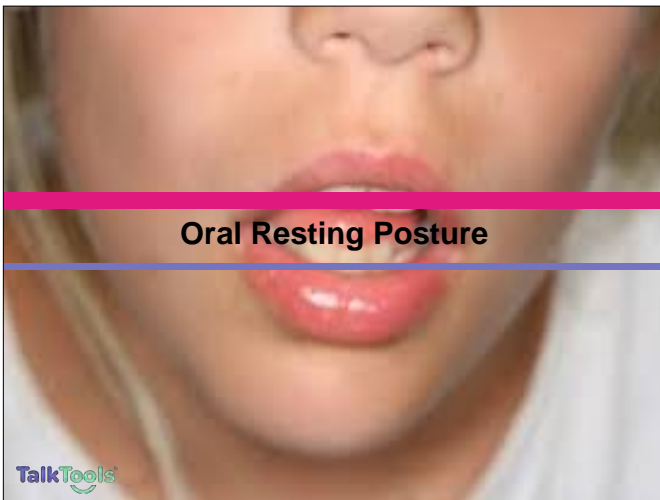
Nicole Archambault: TOTs and SDB

The Tongue Was Involved, But What Was the Trouble?
The search for the cause of a preschooler's difficult behavior leads to a surprising discovery.

ASHA Leader 2015



- Snoring nightly.
- Mouth breathing or open lips position.
- Grinding teeth (a micro-arousal that alerts the body to breathe).
- Restless sleep.
- Waking multiple times (from snoring, grinding teeth or body movement to open the airway).
- Enuresis (often from a diuretic hormone produced by an overworked heart).
- Waking in the morning feeling tired, even after ample sleep.
- Complaining of being or appearing tired during the day.



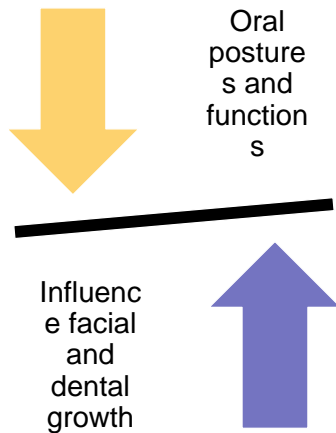
What is Wrong With This Picture?



Incorrect Rest Posture

- Low jaw
- Parted lips
- Tongue forward
- Tongue interdental
- Mouth breathing





Review: The Function-Form Balance

- **Oral resting posture** is significant in maintaining the right balance for dental eruption, tonsil and adenoid size and the formation of the palate.
- The **palatal vault** will influence the floor of the sinus if the palate is too high congestion can become problematic. The septum may deviate.
- Congestion causes **open mouth posture** which leads to more **infections, lingual displacement, differential dental eruption** and subsequent **speech and feeding problems.**



Long Face Syndrome

Epigenetics of Long face syndrome, also referred to as skeletal open bite, is a relatively common condition characterized by excessive vertical facial development. Its causes may be either genetic or environmental. **Long face syndrome** is “a common dentofacial abnormality.”

Billings & Davidson (2018) . Make the Connection , NYC Conference

Proffit (2012). Contemporary Orthodontics

Photos by ArchWire, The Breathe Institute



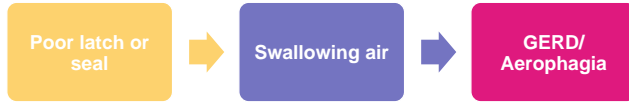
MEDICAL

Medical Issues

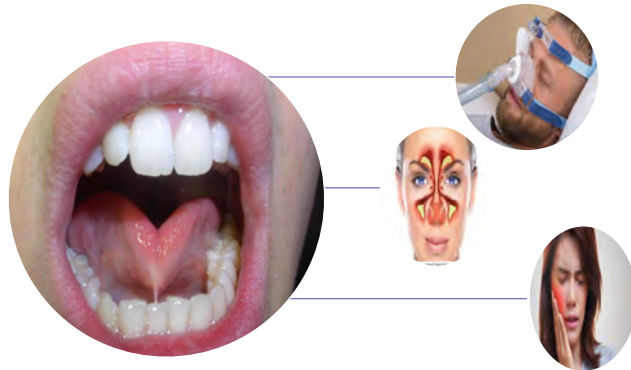
Brooks, L., Landry, A., Deshpande, A., Marchica, C., Cooley, A., & Raol, N. (2019). Posterior tongue , base of movement, and pharyngeal dysphagia: what is the connection? *Dysphagia*, 1-4.

Kotlow, L. (2001). Infant reflux and aerophagia associated with maxillary lip-tie and ankyloglossia. *Clinical Lactation*, Vol. 2-4, 25-29.

Siegel, S.A., (2016). Aerophagia induced reflux in breastfeeding infants with ankyloglossia and shortened maxillary labial frenulum (Tongue and Lip Tie). *International Journal of Clinical Pediatrics*, 5(1):6-8.



That's not all !





What is a 5 Step Screening Tool

5 Step Screening Tool

1

• To assess for oral restrictions, we need to look for structural clues to TOTs.

2

• To assess for oral restrictions, we need to look for functional clues to TOTs.

3

• To assess for TOTs, there are several visual inspection maneuvers and tools that can assist with a screening.

5 Step Screening Tool

4

• To assess TOTs we need to assess range of motion . We will assess multiple positions of the lips and tongue to properly assess buccal (cheek), labial (lips) and lingual (tongue) range of motion.

5

• To make the proper referrals considering the TOTs team.



Screening Tool

1. Gather data

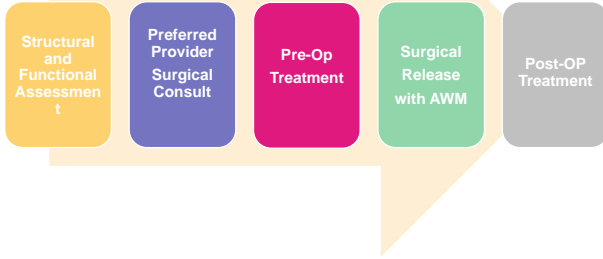
2. Fill out form

3. Make referrals

4. Design a Pre-op and Post-op plan

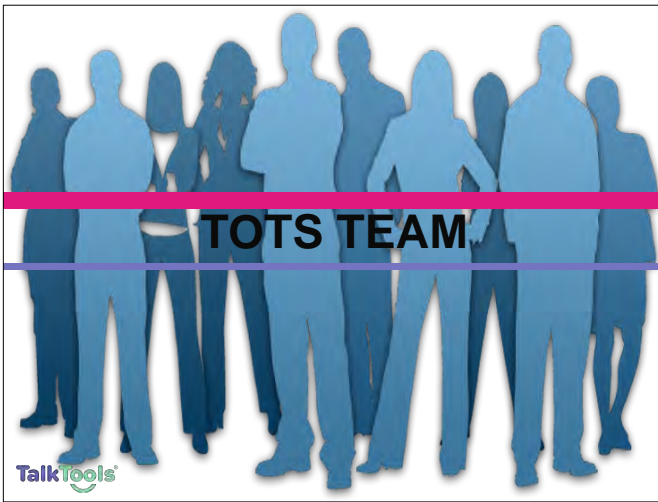
Ideal Scenario

5 Step Screening Tool

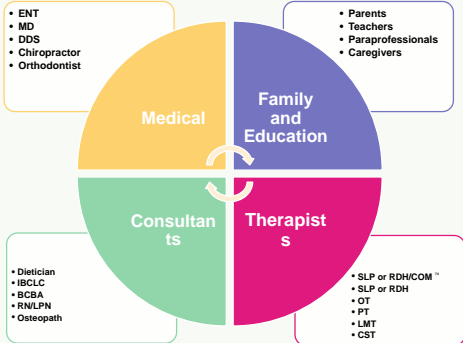


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It Takes a Village



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Scope of practice

Merkel-Walsh, R. (2019). SCOPE: It's Not Just a Mouthwash. Annual Convention of the International Association of Orofacial Myology, New Orleans. Retrieved from: <https://cdn.shopify.com/s/files/1/1545/7007/files/FINALSCOPE4.pdf?452>

“National organization and state licensure gives us guidelines of what we can practice. Taking a class and knowing a skill does not necessarily mean we should do it.”



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Example of a TOTs Team

IBCLC	SLP	RDH	OT	PT
Mother and infant dyad Breastfeeding support Food transition support Oral Motor support Referrals and collaboration	Articulation deficits Feeding deficits across lifespan 0-elderly > 4 SLP/COM® Oral motor Orofacial myology	Dental malocclusion Tongue thrust >4 RDH/COM® 0-3 screenings TOTs care Orofacial Myology	Feeding difficulties AWM Torticollis Sensory issues CST Sensory-motor integration NDT	Posture & alignment N C AL Head & neck issues All mus gro

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Know who to refer to.....

OMT: RDH and SLP

- Volitional imitation
- Practicing oral rest
- Articulation (SLP only)
- Targeting oral habits
- Working on respiratory control
- Saliva management
- Orthodontic appliances and management (Myobrace, ALF)
- Active wound management pre/post frenectomy

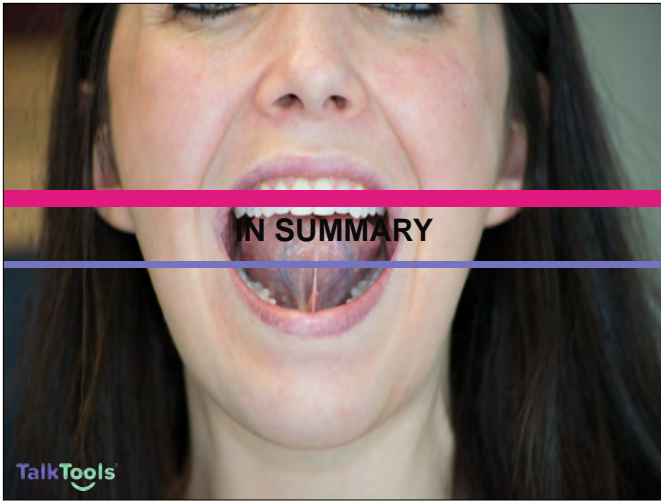
Feeding: IBCLC, SLP and OT

- Learning adaptive strategies
- Working with GI and nutritionist
- OT/ST feeding plan for a school
- Adaptive seating PT/OT
- IBCLC collaboration for breast feeding plan and transition to cups/straw/solids
- Consideration of respiration and feeding safety
- Consideration of NG Tube, trach etc.


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Conclusion



1. TOTs can have a functional impact across the lifespan.
2. There are structural and functional red flags.
3. Proper assessment includes structure, range of motion, functional skills, oral habits and medical considerations.
4. TOTs requires a team to address appropriate pre- and post-op care.

TOTs Assessment: Medical, Dental & Orthodontic 2023

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EBP


<http://oralmotorinstitute.org/resources/Orofacial-Myofunctional-Disorders-RefList.pdf>

<https://talktools.com/pages/tots-tethered-oral-tissues>

www.jaom.com

Facebook:
Oromyofunctional Study Group

THE PYRAMID OF EVIDENCE



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What's New ?

O'Connor, M. E., Gilliland, A. M., & LeFort, Y. (2022). Complications and misdiagnoses associated with infant frenotomy: results of a healthcare professional survey. *International breastfeeding journal*, 17(1), 39. <https://doi.org/10.1186/s13006-022-00481-w>

Conclusions: Complications and misdiagnoses are occurring after infant frenotomy. Physicians and dentists should work closely with lactation professionals to provide skilled breastfeeding support and to evaluate for other confounding problems that might impact infant breastfeeding before referral for frenotomy. Randomized controlled trials of optimized lactation support vs. frenotomy and of scissors vs laser in performance of frenotomy are needed.



NEW 2022

M. Batista Borges Pereira, "Tongue-and lip-tie beyond breastfeeding difficulties," *Jaw Functional Orthopedics and Craniofacial Growth*, Vol. 2, No. 2, pp. 64–72, Nov. 2022, <https://doi.org/10.21595/jfocg.2022.22790>

This mini-review will summarize evidence-based data regarding the cascade of consequences of tongue-tie and lip-tie in children and the main signs and symptoms of these anomalies in newborns. It will also discuss the available evidence on treatment options for TOTs, including pre- and post-surgical care that may enable better outcomes and prevention of possible complications. For a better understanding, tongue-tie and lip-tie will be addressed separately.

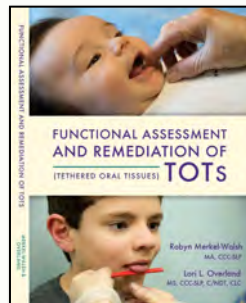
Full text: <https://www.extrica.com/article/22790/pdf>



Q and A



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<https://talktools.com>

