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Orofacial Myofunctional Disorders: Part 2 - What Can I Do, presented in partnership with Cincinnati Children's

Presenter: Marsha Lee, M.S., CCC-SLP, COM

Moderated by:
Amy Natho, M.S., CCC-SLP, CEU Administrator, SpeechPathology.com

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Orofacial Myofunctional Disorders: Part 2 What Can I do?

Marsha Lee, M.S., CCC-SLP, COM
Speech Language Pathologist II
Certified Orofacial Myologist
Cincinnati Children's Hospital Medical Center
Division of Speech-Language Pathology

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Learner Objectives

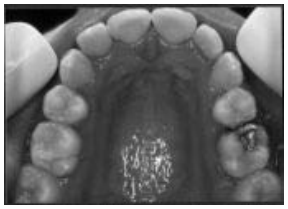
After this course, participants will be able to:

- Identify tongue thrust behavior and explain the causes and effects of orofacial myofunctional disorders (OMD).
- List five effective strategies to increase awareness of the typical lingual rest posture.
- Describe how the typical tongue rest posture can be used for improving speech sound productions.
- Identify proper dental terminology related to OMD.
- Identify the contraindications for treatment of OMD.

Anatomy Review

Structure Development

- Tongue is adult size by the age of 8 years.
- Maxilla is adult size by age 8 with some residual growth around age 12, when growth has been completed.



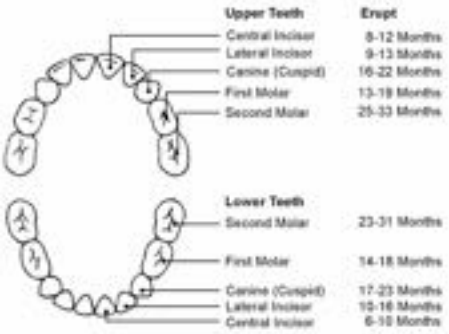
(Mason, Robert, Ph.D., DMD. Orofacial Myology: Beyond Tongue Thrust, Chapter 2) 1994.

Structure Development

- Mandible shows steady growth until age 8-10 years then goes through a prepubertal or pubertal growth spurt. Some continued growth is noted into the 20's.
- Tonsils and adenoids are maximum size by age 9-12 years. Then they begin to atrophy. At the age of 12, the tonsils are usually 2x the size that will be seen at age 20.

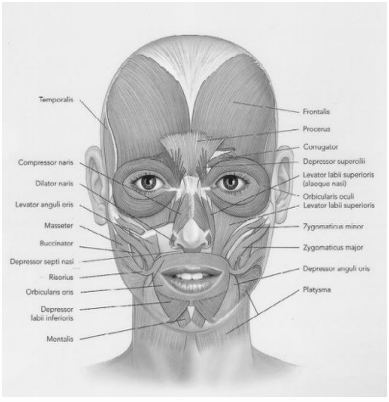
Mason, Robert, Ph.D., DMD. Orofacial Myology: Beyond Tongue Thrust, Chapter 2) 1994.

Normal Dental Eruption



Muscles of Expression

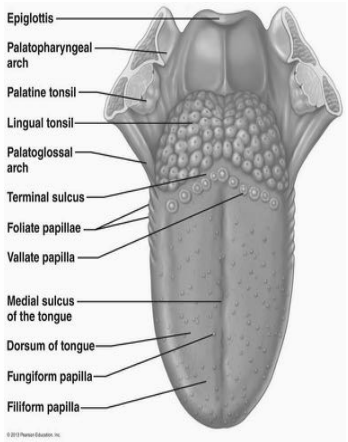
- Obicularis Oris
  - Most complex of the facial muscles
  - Encircles the lips and is the sphincter of the mouth
  - Fibers are borrowed from other muscles, interconnections
    to other muscles
  - No origin or insertion
- Levator Labii superioris- Elevates upper lip
- Zygomaticus major – pulls corner of mouth up and back - smiling
- Buccinator – lateral movement of cheeks, also compresses cheek while blowing
- Risorius – pursing by straightening them laterally
- Depressor Labii inferioris – lowers lower lip
- Mentalis – raises and protrudes lower lip
- Platysma – depresses mandible



https://lookfordiagnosis.com/mesh_info.php?term=Muscles+De+La+Face&lang=4

Muscles of the Tongue

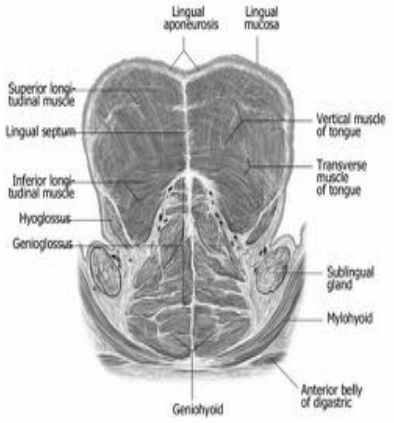
- 8 Constituent muscles
  - 4 contained entirely within the tongue (intrinsic)
  - 4 other originate from nearby skeletal structures (extrinsic)
  - The tongue is divided into two lateral halves by a median fibrous septum the extends the entire length of the tongue
    - This division can be seen on the surface by the midline groove and beneath by the lingual frenum



http://2.bp.blogspot.com/-qANCKGrUV2I/VAktXjAD76I/AAAAAAAACI8/BYeeDwasEnw/s1600/Tongue+Diagram.jpg

Intrinsic Muscles of the Tongue

- Superior longitudinal – shortens, widens tongue, turns tip and sides up forming concave dorsum
- Inferior longitudinal – shortens, widens tongue, depresses tip forming convex dorsum
- Transverse – narrows, elongates tongue
- Vertical – flatten, widens tongue tip



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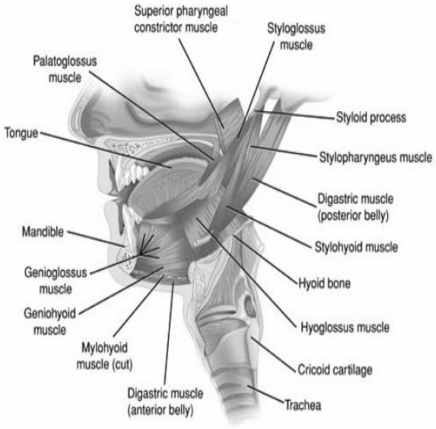
Extrinsic muscles of tongue



- Genioglossus – protrude and retract tongue, depress midline, elevate hyoid bone
- Hyloglossus – depresses and retracts tongue, depresses side of tongue
- Styloglossus – draws tongue upward and backward, elevates side of the tongue
- Palatoglossus – Constricts the faucial isthmus, elevates posterior of tongue

http://classconnection.s3.amazonaws.com/844/flashcards/2475844/png/hyoglossus1355942544584.png

Review of the Basic Principles of Assessment

OMD Assessment

- Case History
- Oral-Facial Examination
- Swallowing
- Articulation
- Readiness for Therapy

Assessment - Case History

- Respiratory Issues
  - Asthma
  - Allergies
  - Sleep apnea
  - Snoring
  - Chronic upper respiratory infections
  - Sinus problem
  - Tonsils/Adenoids
  - Frequent colds

Assessment - Case History

- Dental
  - Development
    - Premature loss of teeth
    - Frenectomy
  - Orthodontics/Appliances
    - Palatal expansion
    - Braces
    - Retainers

Assessment - Case History

- Eating Habits
  - Excessive liquid intake
  - Resistance to; or excessive chewing
  - Fast/slow eating
  - Digestive problems
  - Tongue thrusting during swallows

Assessment - Case History

- Oral Habits
  - Thumbsucking
  - Nail biting
  - Extended bottle/pacifier use
  - Lick lips excessively
  - Chew gum excessively
  - Anterior resting posture of tongue
  - Mouth-breathing

Assessment - Case History

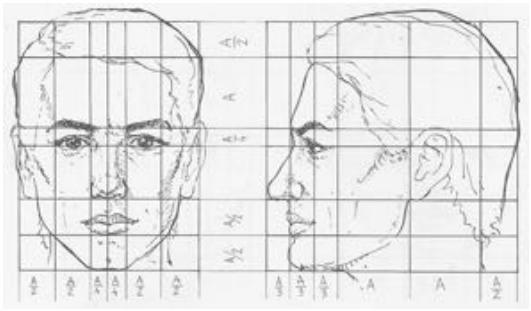
- Previous Treatment
  - Speech therapy for articulation
    - How long
    - Which sounds were addressed
  - Orthodontia
    - Palatal expansion
    - Previous appliances

  Was it successful?

Assessment - Oral-Facial Exam

- Facial Features
  - Symmetry/tone
  - Observation of facial 1/3's and 1/5's
- Lips/Tongue/Palate
  - Structure, Position, Movement
  - Inter-labial gap measurement
  - Measurement of upper and lower lip length

Facial structures



https://pacificgraphicdesign.files.wordpress.com/2013/01/head-anatomy-proportions-1.jpg

- Assessment of the face includes assessment of facial profile
  - Facial profile reference points
    - Bridge of nose
    - Base of nose
    - Most prominent point of chin
    - Base of chin
- Should be able to connect points 1 and 3 with straight line or slightly convex line

Facial structures

http://www.weightlossexercisediet.com/images/ideal-facial-proportions.jpg

- Facial height
  - Upper face – from hairline to eyebrows
  - Mid-face – between b=the bridge of the nose and the base of the nose
    - Usually accounts for about 40% of the overall facial height
  - Lower face – base of nose to base of chin
    - Should be about 20% greater than midface
    - Divided into 3rds
      - Base of nose to lowest part of upper lip 1/3
      - Highest part of lower lip to base of chin 2/3

Assessment - Oral-Facial Exam

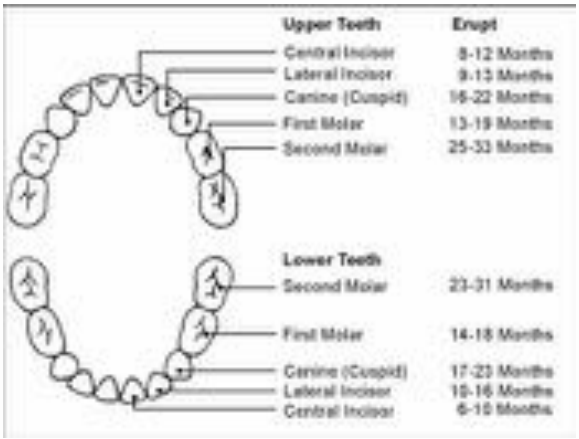
- Teeth
  - Measurements of centric occlusion and centric relation
  - Measurement of maxillary arch width
- Oral-pharyngeal
  - Observation of velar structure and movement during phonation and swallowing

Tongue on the SPOT

- Tongue resting against the upper alveolar ridge
  - /n/ is the best locator
- Typical resting posture for the tongue
- Nose versus mouth breathing
- Lips are closed most of the time
- Some space exists between the teeth (freeway space)
- Typical tongue tip placement for swallowing

Dentition

- Primary dentition
- AKA baby or deciduous teeth
  - 20 baby teeth
    - Should be fully erupted by age 3
    - Shedding begins around age 6



Dentition

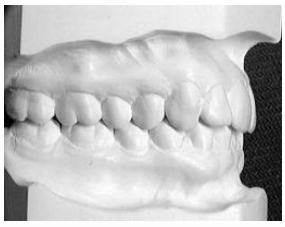
- Mixed dentition
  - Characterized by the presence of both primary and permanent teeth
    - Covers about 6-7 years

Dentition

- Permanent dentition
  - Begins at the exfoliation of the last primary tooth

Dentition

- Occlusal patterns
  - Angle's classifications, used since the 1920s
    - All classifications based on the alignment/position of the upper first molars, in that the cusp of the upper molar occludes in the buccal groove of the lower molar
  - Class I – normal relationship of the molars, but line of occlusion incorrect because of malposed teeth, rotations, or other causes



Dentition

- Class II – lower molar distally positioned to the upper molar, line of occlusion not specified
  - Division I – molars normal, upper incisors protruded
  - Division II – upright central incisors, labially flared lateral incisors and anterior deep bite
- Class III – lower molar mesially positioned relative to upper molar, line of occlusion not specified
  - Frequently referred to as underbite

Class III

Bilateral open bite

Key dental terms for SLPs

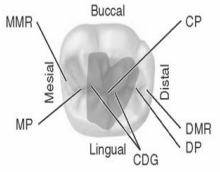
- Alignment – line of adjustment of the teeth
- Ankyloglossia – partial or compete fusion of the tongue with the floor of the mouth or the alveolar crest, caused by the lingual frenum being abnormally short or abnormally attached
- Bruxism – grinding of the teeth
- Buccal border – surface closest to the cheeks
- Cementum- layer of bonelike tissue covering the root of a tooth
- Central incisor – first tooth on either side of the median line in either jaw
- Centric occlusion – relationship of the teeth to each other when the jaws are closed so that the lingual cusps of the maxillary bicuspids and molars and the buccal cusps of the mandibular bicuspids rest in the deepest parts of the sulci of the maxillary bicuspids and molars; relationship when jars are completely closed and at rest

Key dental terms for SLPs

- Cuspid – third tooth from the medial line, has a single point or cusp
- Deciduous teeth – baby teeth
- Diastema- a space between two teeth, commonly between the central incisors
- Distal border – away from medial line following the curve of the dental arch
- Fixed appliances - orthodontic appliances, usually retainers following orthodontic treatment, that cannot be taken out by the patient.
- Freeway space – space between the maxillary and mandibular antagonist teeth when the mandible is suspended in postural rest position; should be 2-3 mm
- Frenulum or frenum – fold of mucous membrane that serves to check the movement of a part or organ
  - Labial- at the midline that attach the upper and lower lip to the alveolar tissue
  - Lingual – along midline of inferior surface of tongue extending to the floor of the mouth

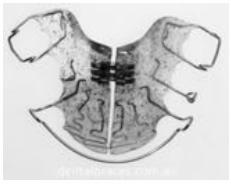
Key dental terms for SLPs

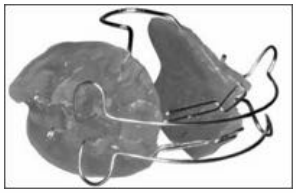
- Incisal – looking through the mesial and distal grooves of the molars, surface of tooth that touches the cheeks
- Incisor – any of the four front teeth of either jaw
- Lateral incisor – second tooth from the medial line
- Lingual border – surface of the tooth next to the tongue
- Mesial border – toward from medial line following the curve of the dental arch
- Occlusal – looking at the side surface of the tooth, looking at the cusps, surface that touches another tooth
- Occlusion – contact of the teeth of both jaws when closed or during those excursive movements of the mandible that are essential to the function of mastication
- Relapse- tooth movement after braces have been removed



Key dental terms for SLPs

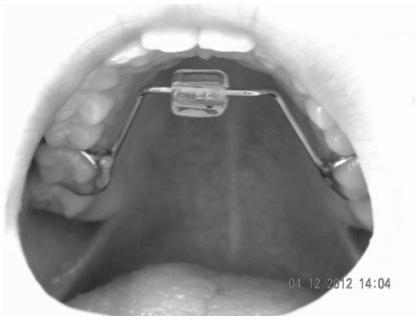
- Removable appliances - orthodontic appliances, usually retainers following orthodontic treatment, that can be taken out by the patient.





Removable appliances

Fixed appliances



Types of tooth movement

- Tipping – movement of the crown of a tooth while the root remains relatively stationary, such as in flaring an incisor facially or lingually
- Rotated – tooth that is turned on its axis
- Extrusion – involves force applications that move the tooth away from bony attachment toward opposing teeth, closing down an open bite
- Intrusion – involves remodeling alveolar bone by slowly moving the tooth further into the alveolus, completed with light, continuous and slow orthodontic force

Orofacial Myofunctional Disorders or Tongue Thrust

What is it?

What is an Orofacial Myofunctional Disorder?

The preferred term, as this refers to all facets of this disorder, commonly known as tongue thrust:

- Abnormal tongue placement or lip movement for swallowing, but also
- Abnormal lip and tongue resting posture
- Articulation differences or distortions
- Oral/digit habits
- Structural abnormalities

Tongue Thrust: A Definition

Hanson and Mason in 2003, define tongue thrust as follows:

- When in resting position, the anterior or lateral portions of the tongue contact more than ½ of the surface of either the upper or lower incisors, cuspids, or bicuspids, or protrude between them; or
- when, during the moving or swallowing of any 2 of these 3 media (liquids, solids, saliva) there is an observable increase of (1) force, (2) degree of protrusion, or (3) amount of surface area of the teeth contacted by the tongue

Why does an SLP need to know about OMD?

- The majority of speech sound errors for OMD patients are anterior distortions.
- Tongue thrust swallowing is an anterior thrusting of the tongue.
- Treating the articulation errors without recognizing and treating the biological functions of the tongue (resting posture and swallowing) may frustrate the patient and the clinician with limited success in therapy. (Pierce, 1980)

Prevalence of OMD

- Nearly all newborns
- About ½ of the children in first grade
- The prevalence decreases gradually and inconsistently through childhood but is fairly consistent in adolescence and adulthood at the 30% level.
- In the general population, 30-40% of individuals have an orofacial myofunctional disorder.

Orofacial Myology Second Edition Hanson and Mason

Causes of Tongue Thrust

- Oral habits: thumb/finger sucking, extended pacifier use
  - Habits that push the upper front teeth outward
  - This can also create an inward pressure on the lower teeth, in particular the molars.
- Respiratory issues: tonsils/adenoids, allergies, mouth breathing
  - Possible airway obstruction
  - A low and anterior positioning of the tongue on the teeth and flaccid appearance of the lips is likely

Causes of Tongue Thrust

- Premature loss of baby teeth
  - May result in the tongue moving forward into the spaces created by the missing teeth
- Lack of lingual coordination
  - Causes difficulty in effective tongue movements and posturing
- Malocclusions/dental treatment

Causes of Tongue Thrust

- Tongue size: macroglossia
- Hereditary/genetic influence
  - Where a child inherits mouth, jaw, or tooth structure, which may encourage tongue thrust habits
- Neurological: hypotonia, oral sensory deficiencies
- Cranial and body postures

Effects of OMD

- **Effects on oral/facial development**
  - Lips
  - Cheeks and Chin
  - Tongue
  - Palate

Low facial tone/lips parted/ messy eater

Cheeks show low tone, upper lip long, lower lip shorter

Effects on Lips

- Anatomical changes, such as lip incompetence may be seen due to lack of appropriate lip closure.
- Lip closure may be obtained by individuals with OMD, however muscle strain of the oral/facial muscles is noted.

Low facial tone

Muscles not in use atrophy, lose tone and function inefficiently

Low facial tone/lips parted

Muscles not in use atrophy, lose tone and function inefficiently

Effects on Cheeks and Chin

- Occasionally cheeks are more floppy in appearance, rather than appearing to have good muscle tone.
- Muscles of the face may not be doing their jobs appropriately or effectively.
- There may be an over development of the mentalis muscle, observed by contraction during swallowing.

Open lip and mouth posture/ low facial tone/tongue forward during swallow

Effects on Tongue and Palate

- Articulation disorders
  - Interdental tongue positioning for sound pattern productions, particularly for sibilants /s, sh, ch, z, and j/, but may also occur on /t, d, n, l/.
- Dental problems
  - Tongue thrusting interferes with proper growth and development of teeth
- Swallowing problems
  - Ineffective chewing

Functional activities

- Rest posture
- Effects on Articulation
- Effects on Swallow function

Tongue on the SPOT

- The tongue does not have to protrude between the teeth to be in an atypical position
- If the tongue is resting on the lingual surface of the teeth, this can also be atypical, yet not as easily detectable
- The tongue should not touch the lingual surfaces of the teeth for rest, speech, or swallowing
- An anterior tongue position in any placement can cause misalignment to dental structures

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Articulation

LOOK and LISTEN!!!!!!!

- Atypical tongue position may not result in acoustically incorrect speech sound
- Lingual-alveolars that are produced with the tongue as lingual-dentals are incorrect

Articulation or OMD?

When is it more than just an articulation disorder or is it OMD?

- When the defining term is "lisp"
- When sibilants are difficult to correct in treatment
- When the articulation diagnosis is accompanied by enlarged tonsils, open mouth posture, anterior open bite, and/or mouth breathing
- When single word productions are good but connected speech is difficult to master, particularly over a long period of time.

Connection between OMD and Articulation

- In a study of kindergarten through 6th graders, 77% of those with abnormal /s/ and /z/ productions, also had an abnormal lingual rest posture
- And 50% of those were also tongue thrusting

(Wadsworth, et al 1981)

OMD and Speech

- Inappropriate interdental and linguadental sound productions seem to dominate the speech articulation problems found in OMD.
- Many patients with OMD may have speech which is characterized by frontal lisping.
- These patients may also show prolonged need for traditional speech treatment services, unless the musculature issues are also addressed.

Orofacial Myology: Beyond Tongue Thrust 1994

Speech Video

Speech Video

Speech Video

OMD related to swallowing

- An area of OMD also relates to dysphagia, as orofacial myofunctional differences may have a negative impact on the oral-preparatory or the oral phase of swallowing. These difficulties may manifest themselves in
- poor bolus formation,
- poor or uncoordinated posterior transfer of a bolus through the oral cavity,
- use of extraneous facial muscles for the process of initiating a swallow,
- and/or in the forward tongue movement during or immediately following the swallow.

Swallowing Video

Swallowing videos

Anne Swallowing Video

Swallowing Video

Swallowing Video

Biting/Chewing Video

Swallowing Video

Swallowing video

Swallowing video

Swallowing video

Swallowing video

OMD Team

- As in many other facets of speech pathology, this disorder is treated most efficiently by a team, which may contain the following professionals or individuals:

- General/Pediatric dentists
- Speech Pathologist
- Oral & Maxillofacial surgeon
- General physician
- Certified Orofacial Myologist
- Parents/family
- Allergist
- Otolaryngologist
- Periodontist
- Orthodontist
- Patient

Goals of Treatment

Goals for Therapy

Therapy goals should include:

- Habituating a typical rest posture
- Habituating a typical swallow function
- Habituating appropriate tongue movements for speech sounds.

Contra-indications for Treatment

- Age
- Upper airway
- Cognitive level
- Motivation/Family involvement
- Severe malocclusion
- Co-existing neurological disorders i.e. hypotonia, CP

Intervention

- Treating the articulation errors without recognizing and treating the biological functions of the tongue (resting posture and swallowing) may frustrate the patient and the clinician with limited success in therapy.

(Pierce, 1980)

When is the best time?

- In many cases, OMD treatment before braces is a good option
- Some patients are not referred until after at least one set of orthodontia
- Palatal expanders will put the brakes on treatment
- After the age of 5 years is usually good
- Some teenagers are not good candidates due to too many other activities.

Training for evaluation and treatment of OMDs

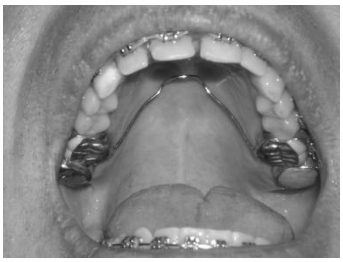
- The IAOM requires a 28 hour introductory course for training on evaluation and treatment of OMD.
- There is a certification process which requires a test and a site visit

How to Get More Training

- IAOM website (www.iaom.com)
  - continuing education courses
  - contact information for orofacial myologists in your area
  - publications and research
- ASHA website

Case Studies

Jeff at Evaluation



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Jeff at Evaluation

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Jeff

- Evaluated 11/5/2008
- Significant orofacial history
- Middle school through high school he noted that his mouth posture was not like others
- Jeff reported attempting to work on modifying his mouth and lip postures independently
- He reported pain in the mentalis area
- He reported that his speech was “terrible” and he had difficulty in swallowing
- In 1983, he underwent maxillary and mandibular surgery and subsequent orthodontics to correct his open bite
- He also had a procedure on his chin/mentalis
- 2 years after the surgery the open bite recurred and his lower lip was noted to roll outward
- Jeff reported that discomfort in his chin was noted after this procedure
- He reported that he was a mouth breather through college and felt like his tongue filled his entire mouth

- He did indicate that everything felt comfortable, as there was no space above or below his tongue in his mouth and he could feel his tongue touching his front teeth.
- He reported that it was difficult to put his lips together
- His speech was not clear and mouth position continued to be different than others that he encountered
- In 2007 he underwent maxillary surgery for the placement of a maxillary expansion device, which remained in place until October of 2008
- Braces were placed on his teeth in early 2008
- He reported that his open bite felt larger after the expansion, at the time of the November 2008 initial OMD evaluation

Jeff after 2nd orthognathic surgery





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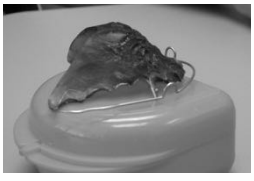
Jeff end of treatment




Seen for 21 sessions in total; treatment break around surgery.



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Megan initial evaluation age 8 years 10 months

At the time of the evaluation, she had a limited but continuing thumb sucking habit; reduced mainly due to a broken arm which made sucking her preferred thumb difficult.

Seen initially for evaluation in May of 2006

- continuing thumb sucking habit; due to broken arm unable to easily suck the preferred thumb.
- History of torticollis and frequent pneumonias for about 18 month period during years
- developmental milestones WNL

- At the time of the eval in 2006; she had mixed dentition; bilateral open bite, NL tonsils, NL palate and velum
- Open bite on the right from cuspid to the posterior molar
- On the left, open from cuspid to posterior molar, however this molar was occluded the mandibular posterior gum tissue, as there no posterior teeth present
- Tongue maintained forward and resting at the lingual surface of the maxillary teeth and flared bilaterally, although more on the left to fill the space created by the missing molars

- Tongue protrusion was noted with swallowing of liquids
- Masseter and mentalis contraction were noted inconsistently with liquids or solids
- During speech, forward tongue position noted on sibilants and lingual-alveolars (s, z, sh, ch, J, d, n, l, tr, and s blends).
- Able to maintain her tongue in a typical rest posture for 15 seconds and then 20-25 seconds and then 60 seconds during the initial evaluation.
- A moderate to severe orofacial myofunctional disorder was diagnosed and was found to affect swallowing, dentition, and speech.
- Treatment was not recommended to begin at the 2006 assessment, due to an upcoming palatal expansion.
- Home program given for rest posture

Seen for second assessment June 2008 – age 11 years 1 month

- Megan's teeth had not erupted to allow for the expansion as recommended.
- Had surgery to remove some gum tissue around the molars to allow teeth to emerge
- Was to have follow up with orthodontist a week after this assessment to determine if expansion is able to proceed.
- Found to have a severe OMD with forward and deviating to the right tongue thrust during swallowing of liquids and solids, at rest, and forward tongue position during speech.
- Persistent open bite from left posterior molar to second molar on the right
- Factors complicating her case included: severe open bite, strong forward tongue position, slow eruption of teeth, and postponement of maxillary expansion.





Megan age 12 years 11 months

Seen for 22 sessions






Mary age 15 years 9 months

Mary age 15 years 9 months

- Braces removed day before evaluation
- Clear removable maxillary retainer and fixed mandibular retainer when her braces were removed.
- When retainers were in her mouth, she was in a slightly open position, allowing for forward and bilateral tongue movement during swallowing of solids and liquids, which also slightly affected her speech producgtions
- When this retainer was removed, the open bite was significantly reduced and the lateral tongue thrust was reduced. Speech was also noted to be better
- She was sent beck to the orthodontist for a re-fitting of her retainer.
- She was placed in a modified retainer.
- She was seen for a recheck 3 weeks after the initial assessment and no treatment was recommended.

Margaret age 15 years 9 months

Eric age 12 years 10 months






Eric age 12 years 9 months

- Difficulty in getting teeth to occlude, even with orthodontics
- Had maxillary expansion at the age of 9 years
- Has seasonal allergies
- Oral measurements at evaluation between maximum opening and max. opening with tongue on the spot 46.79mm and 15.75mm
- Diagnosed with mild to moderate OMD with anterior tongue movement on swallowing of solids and liquids, forward tongue posture at rest, and an impact on his speech.

- Shortened lingual frenum noted and sent for repair.
- Lingual frenectomy completed in June 2014
- Treatment started about 2 weeks after frenectomy

- Seen for 10 sessions

Adult thumb sucking patient

Cheryl- age 47






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Kathleen- evaluation

Seen for ____ sessions;

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Resource

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