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Journal Club

Sleep Medicine Conference

Myofunctional Therapy for Pediatric OSA

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ZzZaghi MD

Myofunctional Therapy

Exercise 3: Touch Chin: Pull the tongue forward and try to touch your chin and hold for 10 seconds, then relax. Repeat 10 times.

Exercise 4: Push Tongue Right: Push your tongue forward and push it to the right and hold for 10 seconds, then relax. Repeat 10 times

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Myofunctional therapy is a program used to correct the improper function of the tongue and facial muscles. It involves strengthening of the tongue and oro-facial muscles by teaching individuals how to reposition muscles to the appropriate position.

SLEEP

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MYOFUNCTIONAL THERAPY TO TREAT OSA: REVIEW AND META-ANALYSIS

Myofunctional Therapy to Treat Obstructive Sleep Apnea: A Systematic Review and Meta-analysis

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Meta-Analysis

- Meta-analysis is a statistical technique for combining the findings from multiple independent studies.
- Benefits of Meta-Analysis:
  - Precision: Provides a precise estimate of treatment effect
  - Balance: Considers due weight to the size of different studies included
  - Completeness: Complete coverage of all relevant studies
  - External Validity: Overcoming bias of individual studies
  - Transparency: Explore the robustness of the main findings, identifies limitations and weaknesses of existing data
- Must be carried out with rigorous systematic review, appropriately selected inclusion, exclusion criteria, and evaluation of quality of the studies included.

Levels of Evidence

" A well-designed meta-analysis can provide valuable information for researchers, policy-makers, and clinicians. "

Levels of Evidence for Therapeutic Studies*

Level	Type of evidence
1A	Systematic review (with homogeneity) of RCTs
1B	Individual RCT (with narrow confidence intervals)
1C	All or none study
2A	Systematic review (with homogeneity) of cohort studies
2B	Individual Cohort study (including low quality RCT, e.g. <80% follow-up)
2C	"Outcomes" research; Ecological studies
3A	Systematic review (with homogeneity) of case-control studies
3B	Individual Case-control study
4	Case series (and poor quality cohort and case-control study
5	Expert opinion without explicit critical appraisal or based on physiology bench research or "first principles"

*From the Centre for Evidence-Based Medicine, http://www.cebm.net.

Oxford Centre for Evidence-Based Medicine. OCEBM Levels of Evidence Working Group. The Oxford 2011 Levels of Evidence. 2011.**http://www.cebm.net/index.aspx?o=5653**.

Meta-Analysis: Myofunctional Therapy

Objective:

To identify the role of myofunctional therapy in the treatment of sleep apnea.

Specific Aims:

- To determine whether myofunctional therapy is effective in treating sleep apnea by improving AHI and lowest oxygen saturation.
- To assess whether it improves snoring and sleepiness.
- To evaluate the quality of the evidence in support of this treatment.

Methods- Search Strategy

- **4 databases** were searched: MEDLINE, Scopus, Web of Science and the Cochrane Library.

➔ Studies evaluating myofunctional therapy as treatment for OSA in both children and adults

➔ Pre and post-treatment sleep study or sleepiness data.

➔ All languages included.

Exclusion: Studies in which patients underwent other procedures that could also account for changes to sleep apnea.

Systematic Review

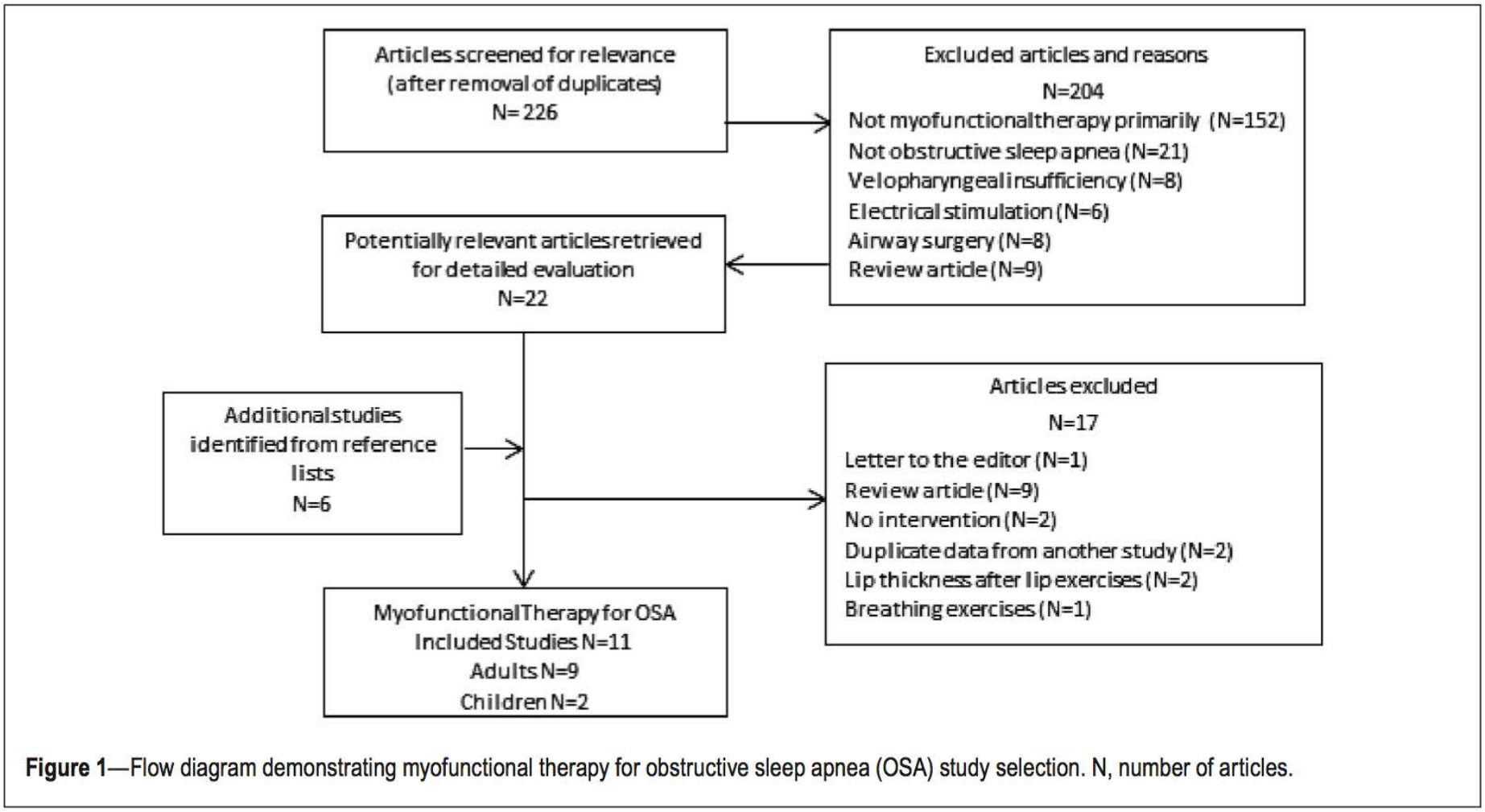

Figure 1—Flow diagram demonstrating myofunctional therapy for obstructive sleep apnea (OSA) study selection. N, number of articles.

Results

Table 1—Adult pre- and post-myofunctional therapy outcomes.

Authors, Year	Study Design	N	Age (years)	BMI (kg/m²)	AHI (events/h)		low O_2 (%)		ESS	
					Pre-MT	Post-MT	Pre-MT	Post-MT	Pre-MT	Post-MT
Suzuki et al., 2013*	PCS	6	22.0 ± 0.5	23.8 ± 1.8	15.1 ± 3.4	9.2 ± 1.5	90.0 ± 2.9	96.8 ± 0.8	–	–
Kronbauer et al., 2013	PCS	8	(40–65)	–	–	–	–	–	11.75	4.25
Diaferia et al., 2013	RCT	27	45.2 ± 13.0	25.0 ± 7.4	28.0 ± 22.7	13.9 ± 18.5	83.7 ± 7.7	84.9 ± 8.8	13.7 ± 3.2	7.5 ± 3.7
Baz et al., 2012	PCS	30	44.1 ± 7.5	33.6 ± 2.0	22.3 ± 4.5	11.5 ± 5.4	84 ± 4	87 ± 5	16.4 ± 2.0	9.3 ± 2.9
Guimaraes et al., 2009	RCT	16	51.5 ± 6.8	29.6 ± 3.8	22.4 ± 4.8	13.7 ± 8.5	83 ± 6	85 ± 7	14 ± 5	8 ± 6
de Paula Silva et al., 2007	RCR	1	60	23.3	44	3	83	92	–	–
Berreto et al., 2007	RCS	2	46 ± 12.7	24.2 ± 2.9	44.5 ± 5.7	6.0 ± 3.7	78 ± 1.4	85 ± 2.8	12.5 ± 0.7	4.5 ± 3.5
Guimaraes et al., 2003	ABS	10	–	–	36.1	11.3	–	–	11	7.6
Guimaraes et al., 1999	RCS	20	(33–55)	–	–	−48%	–	–	–	–
Total		120	44.5 ± 11.6	28.9 ± 6.2	24.5 ± 14.3	12.3 ± 11.8	83.9 ± 6.0	86.6 ± 7.3	14.8 ± 3.5	8.2 ± 4.1

*Study authors confirmed the reported oxygen saturation data was for lowest oxygen saturation. –, not reported, %, percent; ABS, abstract; AHI, apnea-hypopnea index; BMI, body mass index; ESS, Epworth Sleepiness Scale; events/h, events per hour; kg/m², kilograms per meter squared; low O_2, lowest oxygen saturation; MT, myofunctional therapy; N, number of myofunctional therapy patients in the study; PCS, prospective case series; RCR, retrospective case report; RCS, retrospective case series; RCT, randomized controlled trial.

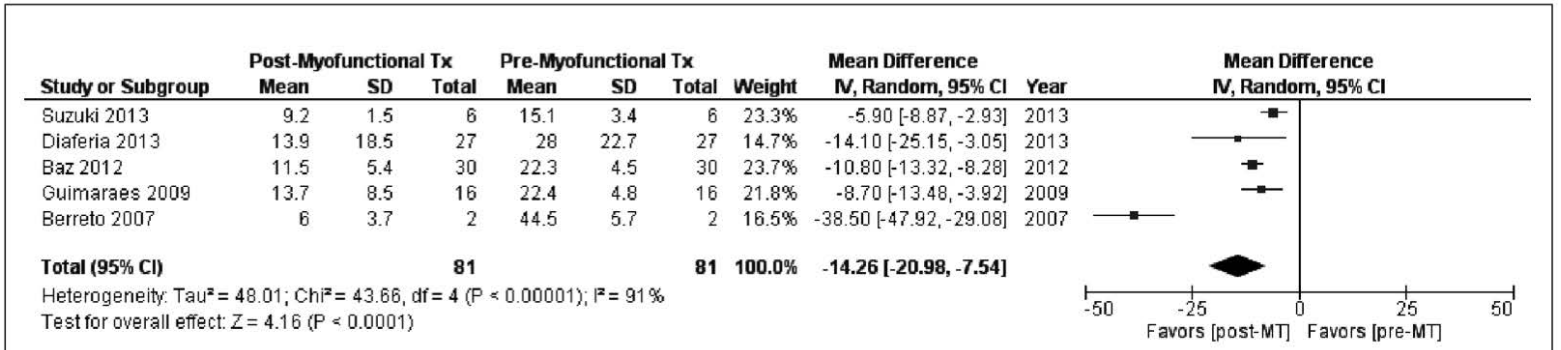

Figure 2—Adult premyofunctional and postmyofunctional therapy outcomes for apnea-hypopnea index (events per hour). CI, confidence interval; MT, myofunctional therapy; SD, standard deviation; Tx, treatment.

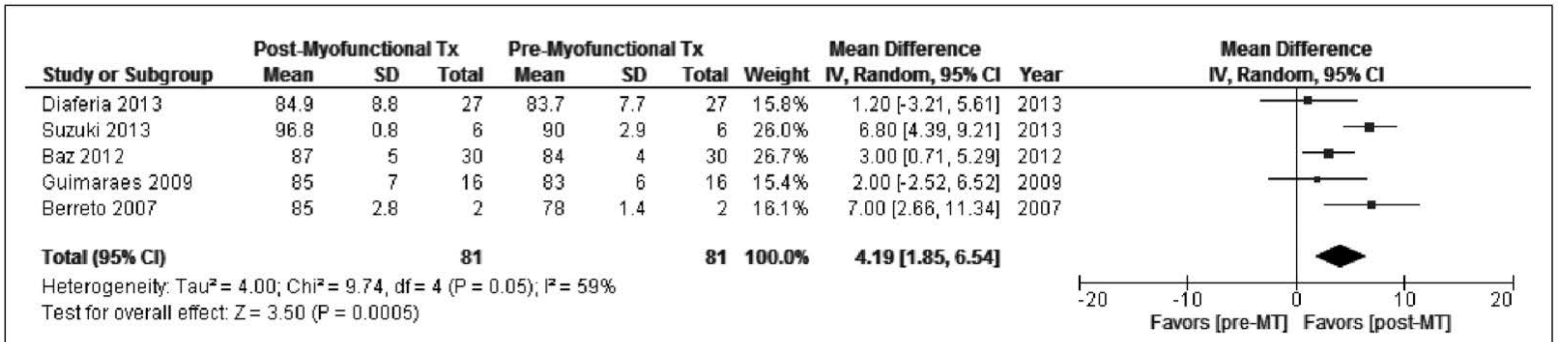

Figure 3—Adult premyofunctional and postmyofunctional therapy outcomes for lowest oxygen saturation (percent). CI, confidence interval; MT, myofunctional therapy; SD, standard deviation; Tx, treatment.

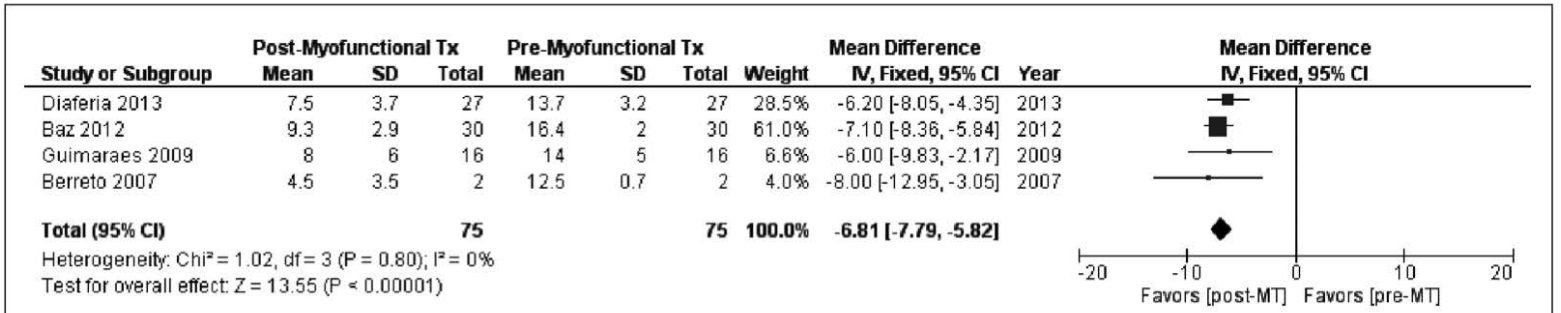

Figure 4—Adult premyofunctional and postmyofunctional therapy outcomes for Epworth Sleepiness Scale. CI, confidence interval; MT, myofunctional therapy; SD, standard deviation; Tx, treatment.

Table 2—Snoring outcomes based on mean values pre and post-myofunctional therapy.

		Subjective Snoring		PSG %TST Snoring	
Authors, Year	**N**	**Pre-MT**	**Post-MT**	**Pre-MT**	**Post-MT**
Baz et al., 2012	30	Yes = 30; No = 0	Yes = 16; No = 14	14.05 ± 4.89%	3.87 ± 4.12%
Guimaraes et al., 2009	16	Very loud	Similar to breathing	–	–
de Paula Silva et al., 2007	1	Snoring	Decreased snoring	–	–
Berreto et al., 2007	2	Disturbs bedpartner	Light snoring	–	–

MT, myofunctional therapy; %TST, percentage of total sleep time. Snoring outcomes are based on quantified definitions pre- and post-myofunctional therapy by all studies except de Paula Silva et al. (case report).

Summary of Results

1. Myofunctional therapy provides a reduction in AHI of approximately 50% in adults and 62% in children.
2. Improvements to daytime sleepiness and snoring.
3. Shown effective in children and adults of all ages studied thus far.

   Youngest patient: 3 years old

   Oldest patient: 60 years old.
4. Important role in preventing relapse.

Preventing Relapse

Critical role of myofascial reeducation in pediatric sleep-disordered breathing

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C. Guilleminault, Y.S. Huang, P.J. Monteyrol, R. Sato, S. Quo and C.H. Lin

Sleep Medicine, 2013-06-01, Volume 14, Issue 6, Pages 518-525, Copyright © 2013 Elsevier B.V.

- 24 children with sleep apnea were cured following adenotonsillectomy and/or orthodontia.
- All were referred for myofunctional therapy.
  - Patients who completed therapy: (n=11) No relapse· Average AHI= 0.5 ± 0.4
  - Patients who did not pursue therapy: (n=13) Mild relapse. Average AHI 5.3±1.5
- Important role of myofunctional therapy in preventing recurrence of sleep apnea.

Limitations /Criticism

- Heterogeneity- Studies were done by different groups using potentially very different techniques.
- Critics:
  - Agree that myofunctional therapy can have a role if performed properly.
  - But they worry that many of the approaches may have flaws in terms of the specific techniques that are used.
  - Need for larger studies and to focus on better understanding the physiology and mechanism and by which therapy achieves these demonstrated results.

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ORIGINAL ARTICLE

Mouth breathing, "nasal disuse," and pediatric sleep-disordered breathing

Seo-Young Lee · Christian Guilleminault · Hsiao-Yean Chiu · Shannon S. Sullivan

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Review Article

Model of oronasal rehabilitation in children with obstructive sleep apnea syndrome undergoing rapid maxillary expansion: Research review

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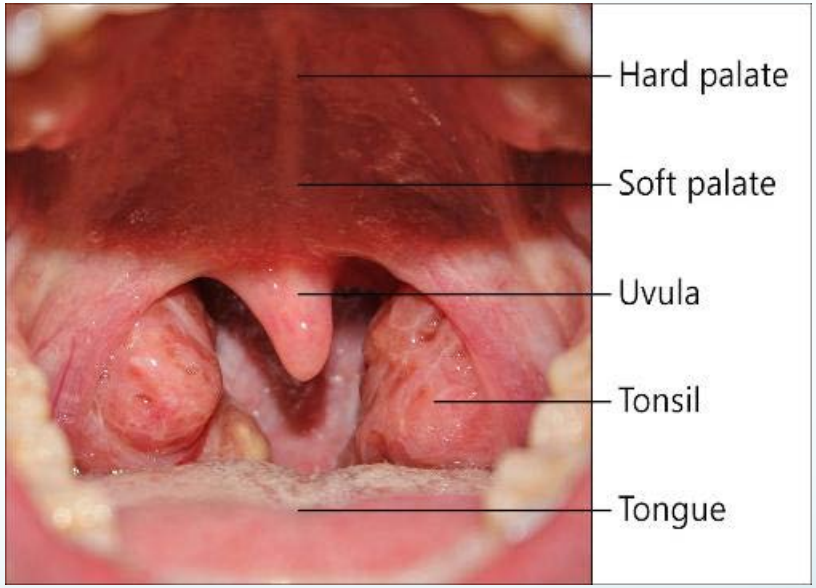
ABSTRACT

Rapid maxillary expansion (RME) is a widely used practice in orthodontics. Scientific evidence shows that RME can be helpful in modifying the breathing pattern in mouth-breathing patients. In order to promote the restoration of physiological breathing we have developed a rehabilitation program associated with RME in children. The aim of the study was a literature

Mouth breathing, "nasal disuse," and pediatric sleep-disordered breathing

Seo-Young Lee · Christian Guilleminault · Hsiao-Yean Chiu · Shannon S. Sullivan

- Tonsillectomy & Adenoidectomy
  - Third most common surgery performed on children
  - > 530,000 annual procedures
  - 1 in 7 ambulatory surgeries under age 15.



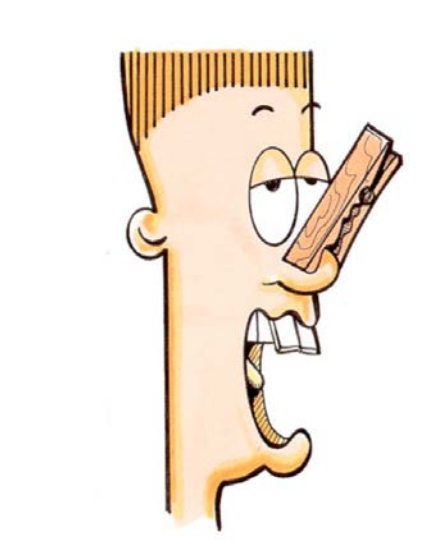
➔ Improves but often does not eliminate pediatric OSA.

Mouth breathing, "nasal disuse sleep-disordered breathing

Seo-Young Lee · Christian Guilleminault · Hsiao-Yean Chiu · Shannon S. Sullivan

Chronic mouth breathing

- Abnormal orofacial growth
- Increased upper airway resistance



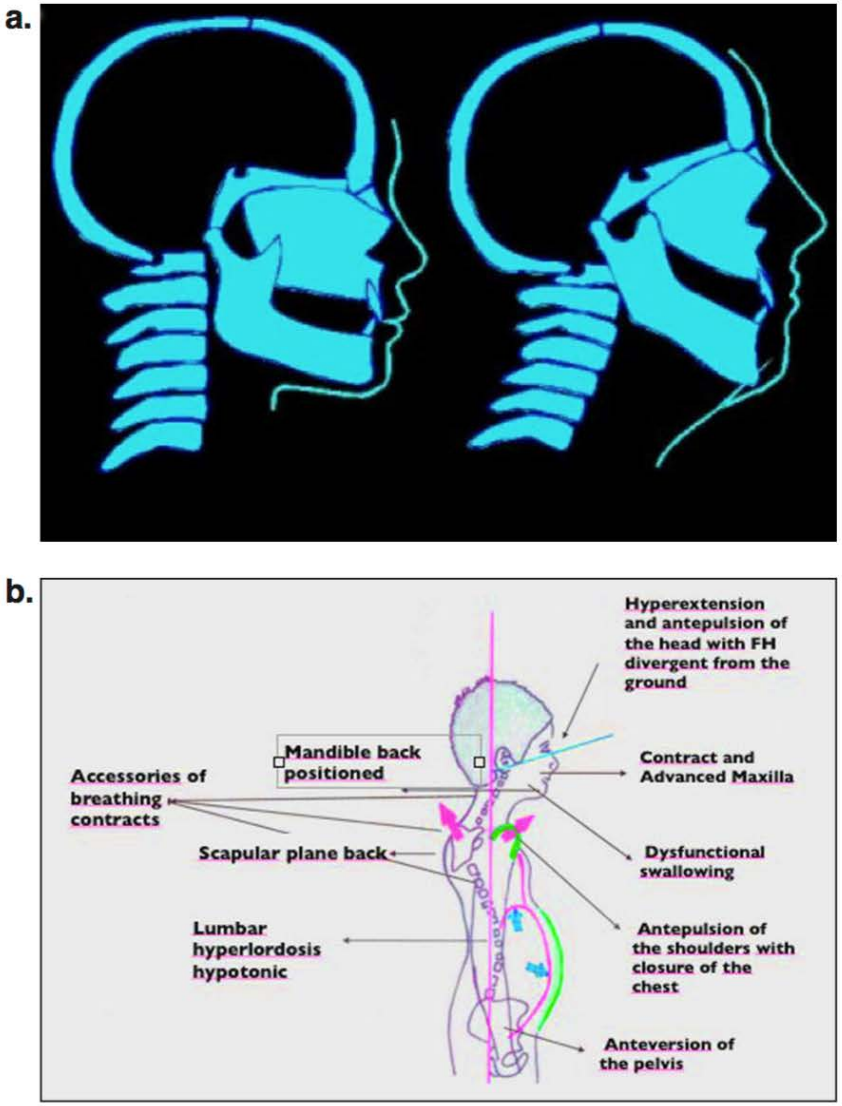


Figure 1A. Postural characteristics of patients affected by oral breathing: Cephalic Posture (**a**), Body Posture (**b**).

Denotti · Ventura · Arena · Fortini

Objectives

Primary

- How frequent is mouth breathing before T&A in SDB children?
- How much improvement do they experience after surgery?

Secondary

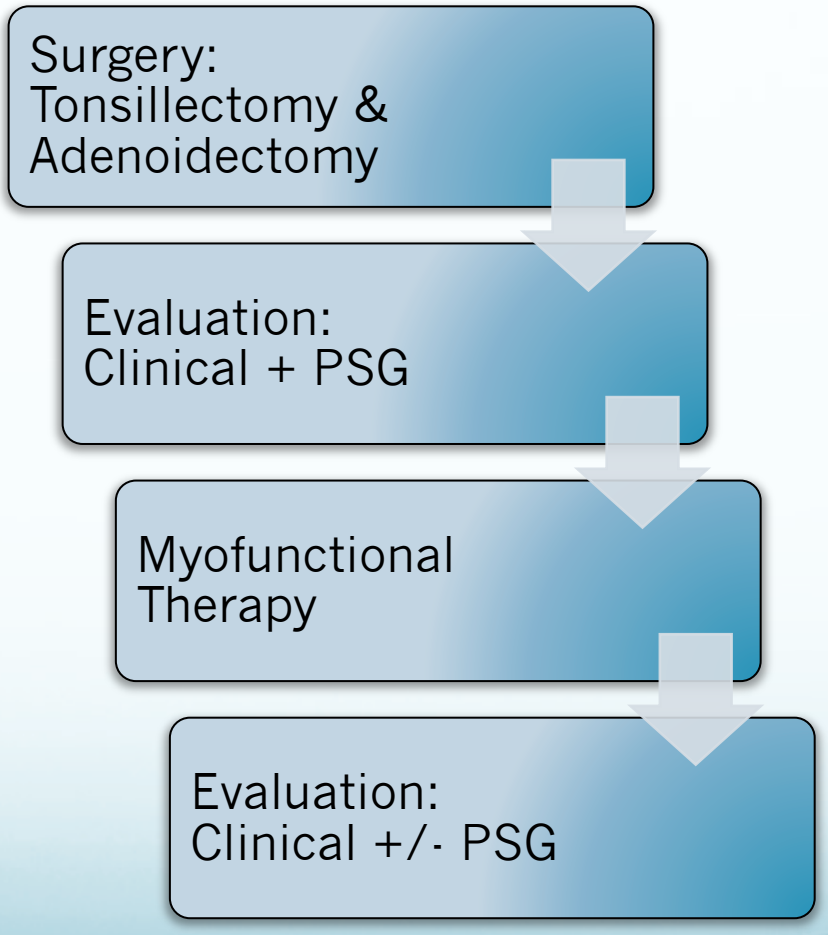
- Aimed to identify a possible approach in treating persistent mouth breathing
- Exploring the effect of myofunctional therapy on nasal breathing and PSG findings.

Methods

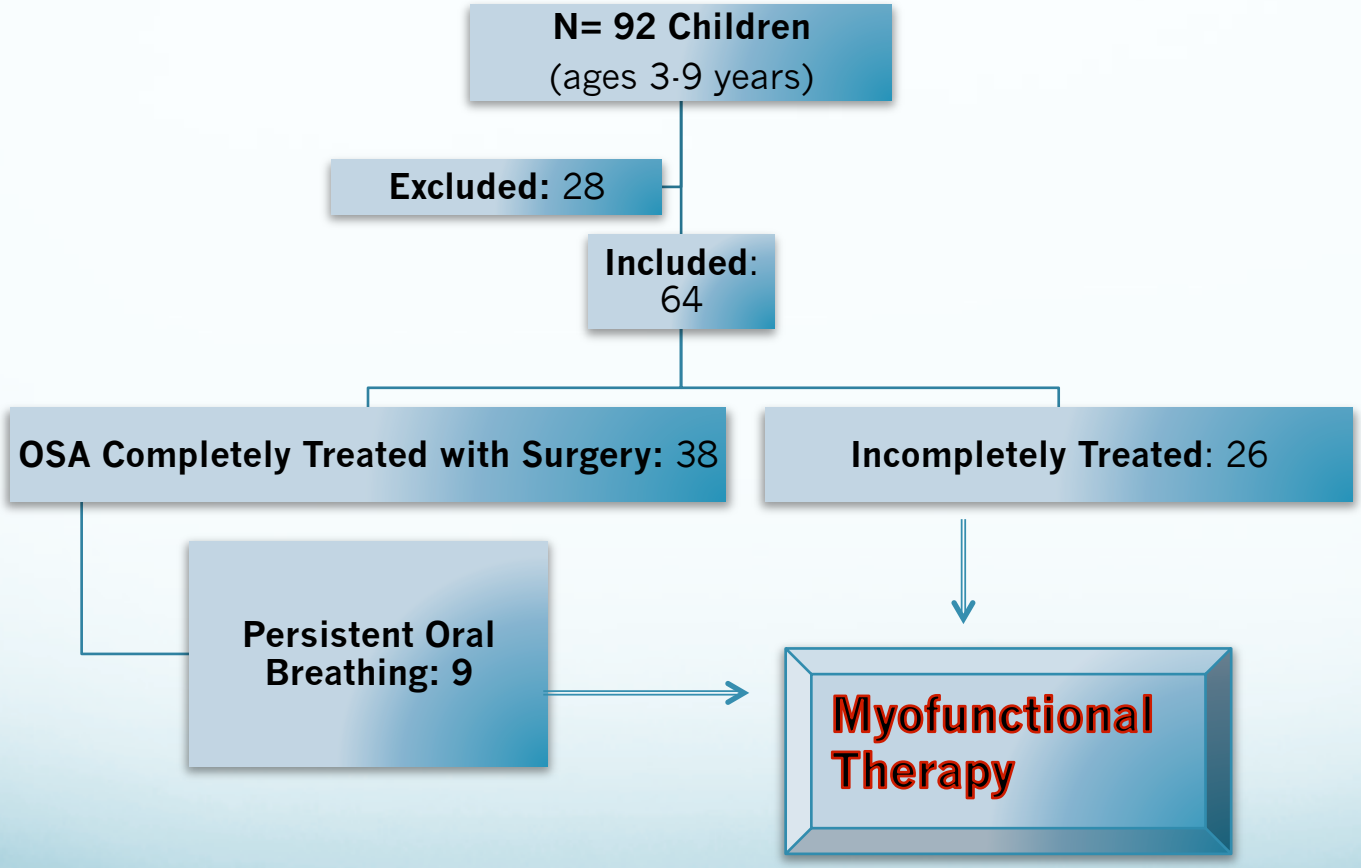
Retrospective Chart Review

- Inclusion Criteria
  - Pre-pubertal children
  - Complete clinical exam
  - Pre and Post-Op PSG
- Exclusion Criteria
  - Overweight/obese children
  - Craniofacial malformations
  - Asthma
  - Treatment via allergy desensitization

Methods


Surgery:
Tonsillectomy &
Adenoidectomy
Evaluation:
Clinical + PSG
Myofunctional
Therapy
Evaluation:
Clinical +/- PSG

Results


N= 92 Children
(ages 3-9 years)
Excluded: 28
Included: 64
OSA Completely Treated with Surgery: 38
Incompletely Treated: 26
Persistent Oral Breathing: 9
Myofunctional Therapy

Myofunctional Therapy

Exercise 3: Touch Chin: Pull the tongue forward and try to touch your chin and hold for 10 seconds, then relax. Repeat 10 times.

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Myofunctional therapy is a program used to correct the improper function of the tongue and facial muscles. It involves strengthening of the tongue and oro-facial muscles by teaching individuals how to reposition muscles to the appropriate position.

Table 1 Disease characteristics before and 6 months after T&A

	Before T&A		After T&A		*p*
	n	(%)	*n*	(%)	
Disease characteristics					
Overall symptoms	64	(100)	26	(40.6)	
Fatigue	53	(82.8)	24	(37.5)	<0.001
EDS	38	(59.4)	1	(1.6)	<0.001
Poor sleep	43	(67.2)	8	(12.5)	<0.001
Snoring	51	(79.7)	0	(0)	<0.001
Inattention	8	(12.5)	4	(6.3)	0.344
Hyperactivity	13	(20.3)	1	(1.5)	<0.001
Parasomnia	15	(23.4)	1	(1.6)	0.001
					<0.001
Tonsil scale					
2.5	2	(3.1)	0	(0)	
3	40	(62.5)	0	(0)	
4	22	(34.4)	0	(0)	
Mouth breathing (≥35 % of TST)	63	(98.4)	35	(54.7)	<0.001
PSG findings					
AHI, mean±SD	8.58±3.15		1.71±1.21		<0.001
AHI ≥1.5	64	(100)	29	(45.3)	<0.001
SaO_2 nadir, mean±SD	89.97±1.75		96.30±1.44		<0.001
Flow limitation, mean±SD)	76.88±8.61		7.81±10.91		<0.001

Statistics were performed by paired *t* test and McNemar test

SD standard deviation, *AT* tonsillectomy and adenoidectomy, *EDS* excessive daytime sleepiness, *TST* total sleep time, *PSG* polysomnography

Table 2 Breathing parameters depending on presence of mouthing breathing, based on PSG performed 6 months after T&A (n=64)

	Mouth breathing (n=35)	Without mouth breathing (n=29)	p
Time spent mouth breathing (%)	44~100 %	0~10.3 %	
Age, mean±SD	5.16±1.31	4.77±1.38	0.58
Male/female	20:15	14:15	0.161
Overall symptoms	26 (74.3)	0 (0.0 %)	<0.0001
AHI, mean±SD	2.34±1.19	0.96±0.71	<0.0001
AHI ≥1.5	24 (68.6 %)	3 (10.3 %)	<0.0001
Flow limitation, mean±SD	13.85±11.64	0.57±1.55	<0.0001
SaO_2 nadir, mean±SD	95.71±1.48	97.00±1.04	<0.0001

Mouth breathing means presence of mouth breathing during 35 % or more of total sleep time. Statistics was performed by paired t test for repeated measures

SD standard deviation, *AHI* apnea-hypopnea index, *TST* total sleep time

Table 4 Distribution of AHI, flow limitation, and SaO_2 between the myofunctional therapy group and the non-myofunctional therapy group at 12 months after T&A (n=18)

	Myofunctional therapy (n=9)		Non-myofunctional therapy (n=9)		p
	Mean	(SD)	Mean	(SD)	
AHI	1.1	(1.19)	2.94	(1.37)	0.015
Flow limitation	0.56	(1.67)	19.44	(14.24)	0.003
SaO_2	96.11	(1.05)	94.56	(1.67)	0.037

Statistics was performed by Mann-Whitney test

Legend: two of the asymptomatic and with normal PSG after T&A children are in the nine "untreated children" subgroup and now present abnormal findings at +12-month PSG with persistence of mouth breathing during sleep

Summary of Results

- Mouth breathing was noted before any treatment, for a minimum of 35% of TST on PSG in 63 out of 64 children who met the inclusion criteria.
- Post-T&A, there were still 35 children (55.5 %) with persistent mouth breathing during sleep.
- Findings suggest the presence of "nasal dis-use" during sleep.
- Removal of obstructive upper airway tissues does not systematically mean return to normal nasal breathing during sleep.
- Myofunctional therapy, prescribed with an aim to eliminate mouth breathing and reestablish nasal breathing, was associated with clinical and PSG improvement in all children who followed the recommendations.

Limitations

- Retrospective review
  - Follow up bias
  - Confounding
- Only had 18 children come back at 12 months for in-laboratory PSG.
- Non-compliant children were included in non-myofunctional therapy group

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Luca Levrini[a], *Paola Lorusso*[a], *Alberto Caprioglio*[a], *Augusta Magnani*[a], *Giovana Diaféria*[b], *Lia Bittencourt*[c], *Silvana Bommarito*[b,*]

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Model of oronasal rehabilitation in children with obstructive sleep apnea syndrome undergoing rapid maxillary expansion: Research review

- Background: Rapid maxillary expansion can be helpful in restoring physiologic nasal breathing.
- Adequate functional rehabilitation amplifies the success of restoring normal breathing pattern
- Review a model of orofacial rehabilitation in children with OSA undergoing treatment with rapid maxillary expansion
  - Nasal saline rinses
  - Pharmacologic Treatment
  - Postural Techniques
  - ***Muscular training***

Table 1 – Local rehabilitation—work at home program.

Body area	Therapy	Type of exercise	Number of repetition/ timing for each exercise	Daily frequency
Nasal area	Blow the nose	–	–	At least 3 times per day
	Nasal washes	–	–	At least 2 times per day
	Muscular training	n.2 amongthe following exercises: wet gauze,siren, foot of the nose,alternate ventilation, piglet,bunny	n.10 or n.5 per nostril	2–3 times per day
	Massages	n.2 among the following exercises: slow circular movements, tap the nose, pinch the nose	–	2–3 times per day
Lips	Muscular training	n.2 amongthe following exercises: kiss,pencil,button, inflated cheeks,patch, button-bottle, lip massages or upper lip stretching in patients with only upper lip hypotonia	n.10/10 min	2–3 times per day
Jaw elevator muscles	Muscular training	n.2 among the following exercises: count to10,TIII,CIUUU, peg	n.10	2–3 times per day

Table 2 – General rehabilitation—work at home program.

Therapy	Type of exercise	Number of repititions for each exercise	Daily frequency
Body training	n.3 among the following exercises: breathing awareness, diaphragm mobilization, perception of breathing sensations, sniff-test, diaphragmatic-abdominal mobilization, supine position and extended legs, supine position and flexed legs	n.10	2–3 times per day

Breathing Exercises

These exercices have to be practised once a day :

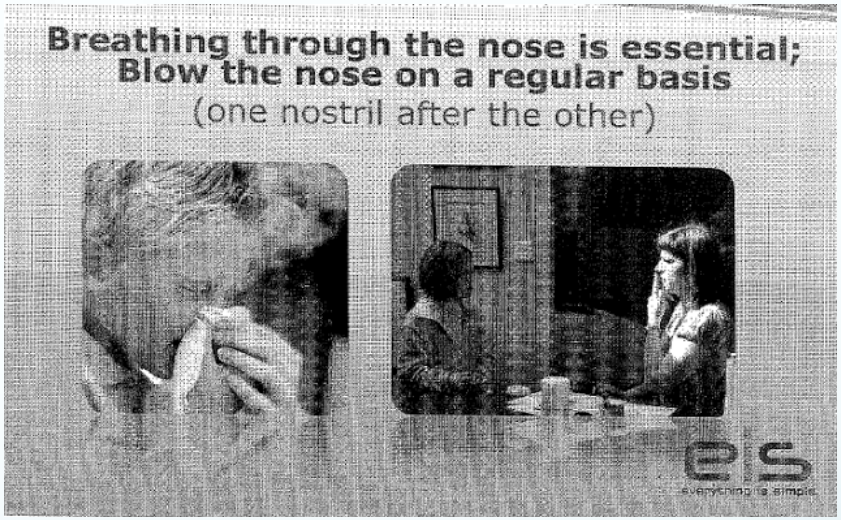
Exercise 1 : Breathe in completely through the nose during 10 seconds then expire completely. (repeat 10 times)

Exercise 2 : Breathe in through one nostril while closing the other one, then expire through the other one while keeping the first one closed and reverse (repeat 5 times per nostril)

eis
everything is simple

Instructions to blow the nose

- Blow the nose one nostril at a time keeping the head down and the mouth closed.
- It is helpful to include nasal hygiene in their daily routine in order to establish a habit in the child.
- This is why we suggest the patient to blow the nose always after brushing teeth: the patient will do this two-three times a day at least, more if necessary.
- It is really important to use paper towels and replace them frequently..



Nasal Washes

Nasal Exercises

- Wet a folded gauze with cold water, squeeze it and inhale several times through the gauze keeping the mouth closed.
- Not only there will be a muscular benefit derived from the forced inspiration but also a positive effect on the mucosal membrane.
- The benefits are linked to the airway humidification caused by the cold water particles in the gauze. Ten repetitions.

Siren

- Breathe through both nostrils, close one of them with a finger, then exhale forcefully through the previous nostril to produce a sound comparable to a ship's siren.
- Perform five repetitions per nostril and then other five repetitions emitting a louder sound.

Foot of the nose

- Put the thumb under one of the nostril, like it is its foot.
- Exhale forcefully through the previous nostril, then move the thumb under the other nostril and inhale.
- During the exercise the child must check they are performing a thoracic-abdominal breathing by placing a hand on the abdomen.
- Because of inhalation and exhalation are always performed through the same nostril, carry out five repetitions, then invert the role of the nostrils during the further five repetitions.

Alternate ventilation

- Put the thumb of the left hand on the left nostril being careful not to bend the cartilage of the nose and inhale through the right nostril.
- Put the left index finger on the right nostril and exhale through the left nostril. Five repetitions per nostril.

Piglet

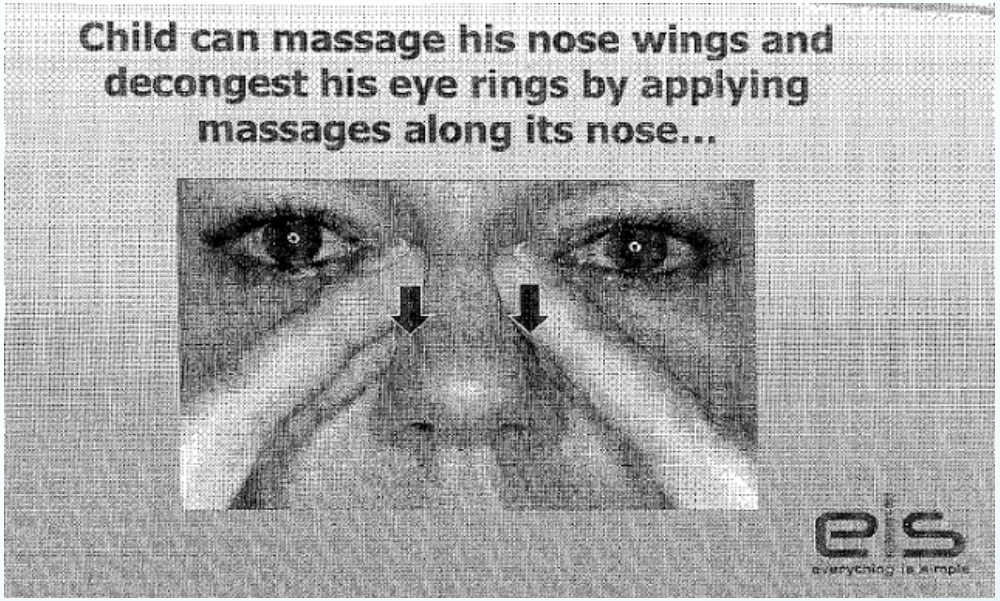
- While keeping the mouth half-opened, inhale wrinkling the nose, dilating the nostrils to emit a noise like a grunt, then relax the involving muscles and exhale.
- This exercise allows the elevator muscle of the nose and the dilator muscle of the nostrils to train and it also has an effect on pharyngeal muscles.
- Ten repetitions.

Bunny

- Keeping the mouth closed, inhale imitating a rabbit sniffing, then relax the muscles and exhale causing the nostrils opening.
- Ten repetitions.

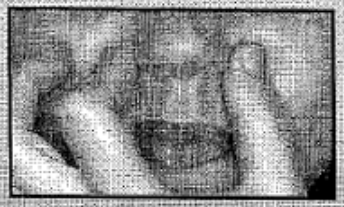
Nasal Massages

- Assuming that rubbing the region of the nasal wings improves ventilation, we suggest to perform the following exercises.
- – Slow circular movements: Massage the wings of the nose using the tip of the index finger in slow circular movements, then inhale.
- – Tap the nose: Gently tap the wing of the nose from the top downwards with the index.

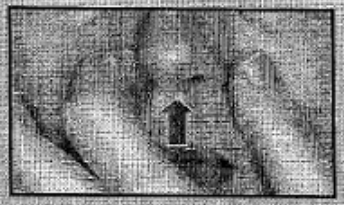


-Second exercise (5 times per nostril) :

-breathe in through one nostril while closing the other,
-then breath out through other nostril while closing the first and reverse.
-Do not press heavily on nose wings.

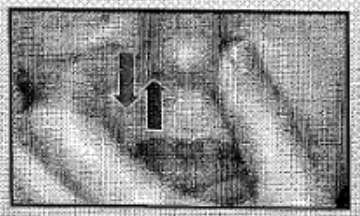


Position at start : lips closed



Press on right nostril :

Breathe in through left nostril

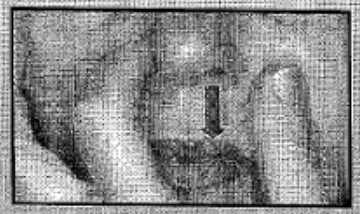


Press on left nostril :

Breathe out through right nostril –

then breathe in through right nostril

and start again



Press on right nostril :

Breathe out through left nostril

Local rehabilitation of the lips

- **Kiss:** Strongly push the lips forward like kissing, then bring them upwards trying to almost touch the nose; after- wards, pull them to the right before then to the left. Five repetitions.

Pencil

- Hold a pencil between nose and upper lip, so that it does not fall down, even tilting the head down.

Button / Spoon

- Hold a button or spoon between upper lip and lower lip.

Inflated cheeks

- Keep the mouth closed and inflate the cheeks, then try to push all the air in the mouth against the lips.
- Five repetitions.

Patch

- Put a paper patch that can be easily removed on the lips, then try to remove it just using the lips, no hands or tongue.
- Five repetitions.

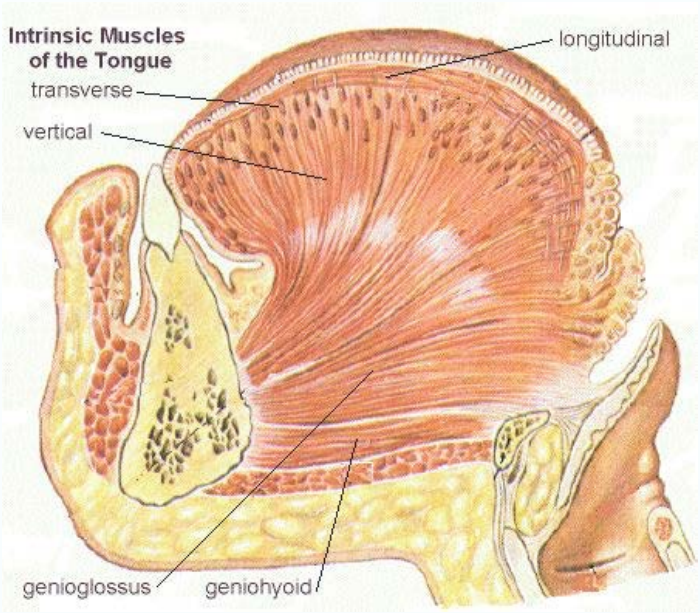
Lip Massages

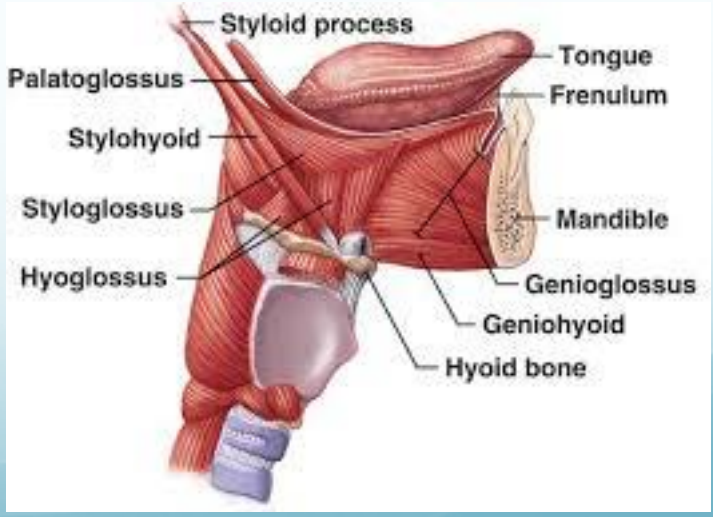
- Lip massages: Lift the lower lip to the point that it covers the upper lip, then massage it with thoroughly.

- Upper lip stretching: Stretch the upper lip downward using one hand and pull down the lower lip with the other hand to avoid the contraction of the mental muscle, if it has an increased tone.

Local rehabilitation of the tongue

- The purpose of the tongue exercises is to maximize the mobility of the muscles styloglossus, genioglossus, hyoglossus, palatoglossal muscle superior longitudinal and transverse.
- The patient is requested to move the tongue tip in clockwise and counter clockwise directions within the vestibule of oral cavity for 20 times in each direction, three times a day, in the morning, afternoon and night, every weekday.



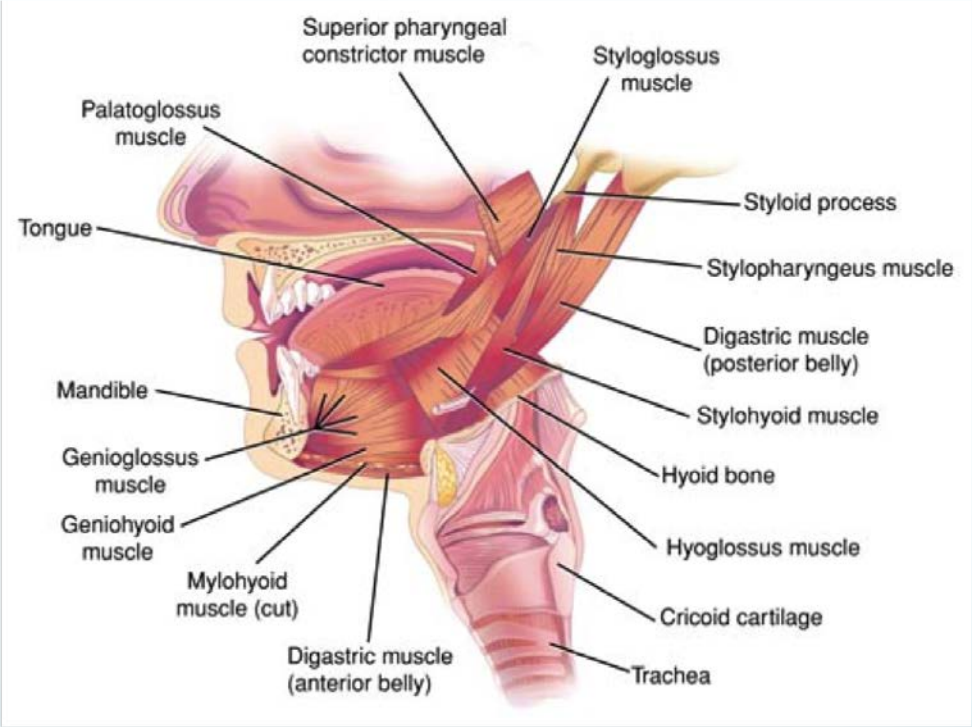


Exercises of the muscles velopharyngeal sphincter

- Exercises of the muscles velopharyngeal sphincter: executed to maximize the mobility (isothonic exercise) and to increase the tension (isometric excercise) of the muscles uvula, palatopharyngeus, tensor and levator soft palate.
- The patient was oriented to emit a /ra/ syllable extending the /r/ consonant, with change of head position to facilitate the muscles mobility, that is, the patient could hold his head straight up or bend it down or up as he wished to facilitate the proper movement of the cited muscles, while producing the syllable.
- Three series of 10 repetitions were executed, three times a day, in the morning, afternoon and night every day of the week.

Exercises of suprahyoid muscles and tongue

- To increase mobility (isotonic exercise) and tension (isometric exercise) of suprahyoid muscles:
- Mylohyoid.
- Genyohyoid.
- Digastric.
- And, the tongue genioglossus, hyoglossus, palatoglossus, styloglossus, superior longitudinal and transverse.



Tongue Exercises

- Description: the patient positions the tip of the tongue at papilla incisive, and then open and close his oral cavity forcing the tongue, but not projecting the jaw forward, while maintaining his head bent backwards.
- Repetition: 30 times interleaving with swallows keeping the head at the same position, three times a day, in the morning, afternoon and night, every day in the week [61].

Soft Palate

- The patient was oriented to:

a) open wide his oral cavity, position the tongue against mouth floor and produce abrupt sounds of open vowel /a/, generating the elevation of the soft palate (isotonic exercise), in a rate of 3 series of 10 repetitions; and

b) emit a sustained /a/ vowel, to keep the velum raised and contracted, while keeping the tongue in the mouth floor, making 10 repetitions, three times a day, in the morning, afternoon and night, every day in the week.

Local rehabilitation of the jaw elevator muscles

- Count to ten: Tighten the teeth with the lips in a half-closed way and keep this position counting to ten; at the same time place the index and middle finger on the posterior area of both of the cheeks in order to feel the muscular contraction, then relax. Ten repetitions, each one for 10 s.
- Tiii: With tightened teeth and half-closed lips, pronounce strongly the sound TIII, exhaling across the teeth. Ten repetitions.
- Ciuuu: With tightened teeth and half-closed lips pronounce the sound 'CIUUUU' and move, by blowing out air, a piece of paper placed on the palm of the hand. Ten repetitions.

General rehabilitation

Breathing awareness

- Place the hand on the abdomen, just below the chest, and slide it upwards during inhalation, downward in exhalation. Ten repetitions.

Diaphragm mobilization

- Supine position, lay one hand on the upper chest and the other one on the abdomen; slowly breathe through the nostrils imagining that the hands are placed on the plates of a scale and are alternatively raised and lowered during breathing. Ten repetitions.

Perception of breathing sensations

- While sitting, slowly inhale, then stop breathing for two- three seconds and slowly exhale, perceiving the warm air flow incoming and the cold one outgoing. Ten repetitions

Sniff-test

Exhale three times quickly and as many times slowly paying attention to the movement of the diaphragm. Ten repetitions.

Diaphragmatic-abdominal mobilization

- While sitting with crossed legs, perform a total exhalation, then expand the chest in apnea contracting the muscles of the rib cage; voluntarily contract the belly, slowly let the air through the lips, then slowly relax. Ten repetitions.

Alexander technique

- In our program we suggest to integrate the mentioned breathing exercises with the so-called ‘Alexander technique’.
- Form of physical therapy aimed at the correction of posture by keeping head, neck and trunk in their natural alignment.
- It does not involve exercises, rather these are lessons of musculoskeletal proprioceptive education during which an adequately trained instructor teaches the learner, via explanations and hand contact, to adjust their posture; the instructor modifies patient’s movement habits and their body response to external stimuli.

11. Conclusion

If RME is supported by an adequate functional rehabilitation, the possibility to change the breathing pattern is considerably amplified. The physical exercises (local and general ones) and the nasal washes represent the crucial points of our program that should be customized for each patient. Awareness, motivation and collaboration of the child and their parents, as well as the cooperation among specialists, such as orthodontist, speech therapist, pediatrician and otolaryngologist, are necessary conditions to achieve the goal.

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MYOFUNCTIONAL THERAPY LOS ANGELES

SANDA VALCU-PINKERTON

CERTIFIED DENTAL HYGIENIST AND MYOFUNCTIONAL THERAPIST

Sanda believes that providing great dentistry involves truly working with people, and not just treating their teeth. Besides her 25+ years of experience working in a clinical practice as a Registered Dental Hygienist (RDH), she has continued to increase her knowledge and skills by becoming a certified Orofacial Myotherapist. She works with patients of all ages to help train the Orofacial muscles to develop optimally. Sanda's outstanding work facilitates straighter teeth, better breathing, & greater overall health.

" I am very excited to be on this journey of helping patients acquire optimal function, beauty and symmetry through orofacial myofunctional therapy. The program provides much deeper insight and knowledge as to what causes the oral/facial disorders and more importantly, how to reverse it. Once we have accomplished an understanding of how interconnected everything really is between our mouths and body, we can work on achieving proper balance between the lips and tongue at rest and while swallowing. The best part of Myofunctional Therapy is helping patients end chronic pain and become healthy!

For more information:

- Interested reader is referred to:
- http://www.myofunctionaltherapyla.com
- http://myofunctionaltherapy.blogspot.com/
- http://aomtinfo.org
- http://sleepsurgeon.com

Zaghi MD

Thank you!