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Tongue Thrust: A Review

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Certification of the Supervisor

I certify that this project entitled "**Tongue Thrust A Review** " was prepared by fifth-years student Athraa Ameer Ali under supervision at the College of Dentistry/ University of Baghdad in partial fulfilment of the graduation requirements for the Bachelor degree in Dentistry.

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Date:

Dedication

This graduation project is dedicated with gratitude to Allah who has been with me through my lifetime. To my Mother who always motivate and support me to achieve success, you mean the world to me. To my father may your soul rest in peace and I hope you're proud of me.

Acknowledgment

First of all I would like to present my thanks to "**Allah**" for inspiring me with energy and strength to accomplish this work and I pray upon this great prophet Muhammed (peace be upon him).

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Introduction

Introduction

A habit is a repetitive action that is repeatedly performed and being done automatically (**Subtelny, 1973**). Our mouth is a primary location for expression of emotions. Also it is a source of relief in passion and anxiety in both children and adults. It gives a soothing feeling when the region is stimulated with tongue, finger or sometimes a nail (**Singh et al., 2011**).

An anterior open bite can be caused due to a number of factors like unfavorable growth pattern, hereditary, pacifier and digit sucking habits, retained infantile swallowing habits, enlarged lymphoid tissue, tongue function and tongue posture. Thus to manage such complex and challenging malocclusions, a dentist often requires a combination of behavior modification and orthodontic and dentofacial orthopedic therapies (**Yami et al., 1999**).

Unfortunately, correction of the anterior open bite is only a part of the treatment. Smithpeter J, Lopez-Gavito and their colleagues in their research studies found a relapse of anterior bite by more than 3mm within 10 years of treatment in more than 35% of the patients who were treated with conventional orthodontic appliances (**Lopez et al., 1985**).

Many authors agree that secondary dysfunctions, such as poor tongue posture at rest can still persist after the correction of abnormal function. The continuous and gentle pressure exerted by the tongue against the anterior teeth can have very significant and deleterious consequences. Therefore modification of the tongue behavior is thus likely to improve the stability of corrected anterior open bites (**Shahraki et al., 2012**).

Aims of study

The aim of this study is to explain what is the tongue thrust? what are the causes? and discuss how we could diagnose it, prevent it, or even treat it.

Chapter one

Review of literature

Chapter one

Review of literature

1.1 The tongue

The tongue is a muscular organ formed by a complex arrangement of intrinsic and extrinsic muscles. Generally, the intrinsic muscles change the shape of the tongue, and the extrinsic muscles are in charge of moving it in different directions (Kajee *et al.*, 2013).

1.2 Muscles of tongue

1.2.1 Intrinsic muscles (Sanders and Mu, 2013)

- a- The superior longitudinal muscle shortens and widens the tongue and curls it upward (dorsiflexion).
- b- The inferior longitudinal muscle shortens and widens the tongue and curls it `
- c- The transverse muscle elongates and narrows the tongue.
- d- The vertical muscle flattens the tongue.

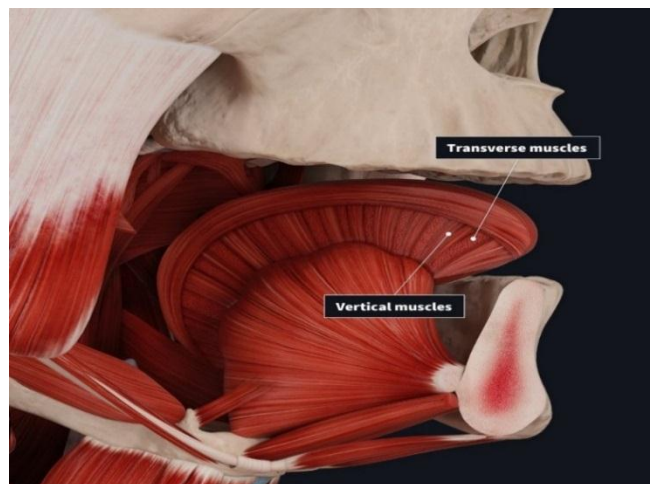


Figure1: Intrinsic muscles of the tongue (Sanders and Mu, 2013)

1.2.2 Extrinsic muscles

a- The genioglossus muscle protrudes the tongue (**Sanders and Mu, 2013**).

b- The styloglossus muscle retrudes the tongue and elevates its lateral margins (**Sanders and Mu, 2013**).

c- The hyoglossus muscle retrudes the tongue and depresses its lateral margins (**Sanders and Mu, 2013**).

d- The palatoglossus muscle elevates the posterior tongue, closes the oropharyngeal isthmus, aids in the initiation of swallowing, and prevents the spill of saliva from the vestibule into the oropharynx by maintaining the palatoglossal arch (**Walker *et al.*, 1990**).

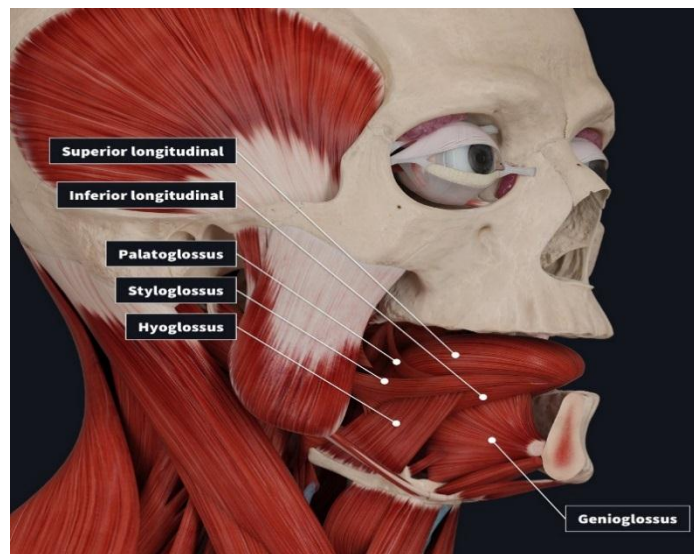


Figure 2: Extrinsic muscles of the tongue (**Sanders and Mu *et al.*, 2013**)

1.3 Tongue abnormalities (Byrd *et al*, 2003; Tarvade, 2015)

A- Microglossia.

B- Macroglossia.

C- Fissured tongue.

D- Median rhomboid glossitis.

E- Geographic tongue.

F- Coated/Hairy tongue.

G- Tongue thrust.

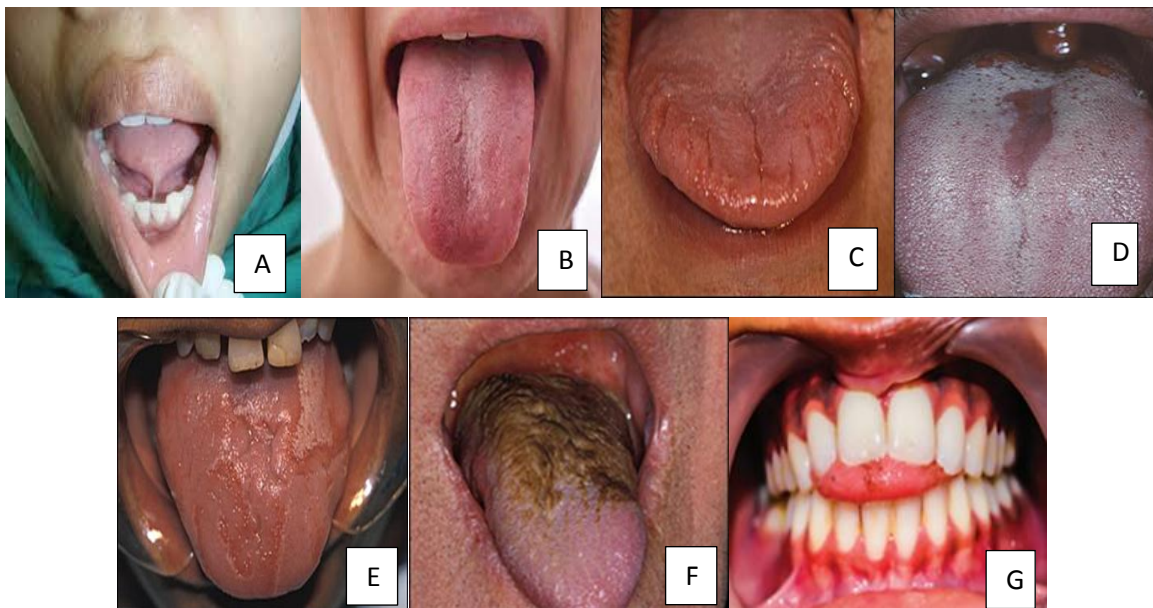


Figure 3: A- Microglossia, B- Macroglossia, C- Fissured tongue, D- Median rhomboid glossitis, E-Geographic tongue, F- Hairy tongue (Byrd *et al*,2003). G- Tongue thrust (Tarvade, 2015)

1.4 What is the tongue thrust?

The tongue thrust as the forward movement of the tongue tip between the teeth to meet the lower lip during deglutition and in sounds of speech, so that the tongue becomes interdental. Tongue thrust is an oral habit pattern related to the persistence of an infantile swallow pattern during childhood and adolescence and thereby produces an open bite and protrusion of the anterior tooth segment (**Tulley, 1969**).



Figure 4: Tongue thrust (**Singh, 2007**)

1.5 Etiology

Tongue thrusting can be caused by various factors, which are as follows (**Phulari, 2013**).

1.5.1 Genetic factors (**Gowri, 2009**)

- Inherited hyperactivity of orbicularis oris with specific anatomic configuration and neuromuscular activity may predispose to tongue thrusting.
- Genetically predetermined pattern of oral behavior.

A- Persistence of infantile swallow pattern (Phulari, 2013)

There is considerable evidence, which indicates that tongue thrust in many patients is merely retention of the infantile suckling mechanism. Infantile swallow normal in neonates, gradually disappears with eruption of teeth and mature swallow is usually established by 4–5 years. If this natural transition to mature swallow does not take place, the infantile swallowing reflex persists as tongue thrusting.

- **In infantile swallow (Peng *et al.*, 2004)**

The tongue is placed between the gum pads and the tip of the tongue is in contact with lower lip. Active contractions of lips and facial muscles especially buccinators. Mandible is stabilized by contraction of facial muscles and Tongue to lower lip posture is adapted by infants at rest.



Figure 5: Infantile swallow (Singh, 2007)

- **Mature swallow (Singh, 2007)**

- ✓ Cessation of lip activity with lips relaxed.
- ✓ The tip of the tongue is placed against anterior palate behind upper incisors and posterior teeth are in occlusion during swallowing.
- ✓ Mandible is stabilized by contraction of muscles of mastication.
- ✓ Downward and forward growth of mandible and vertical growth of alveolar bone increases intraoral volume and assists in normal posture.

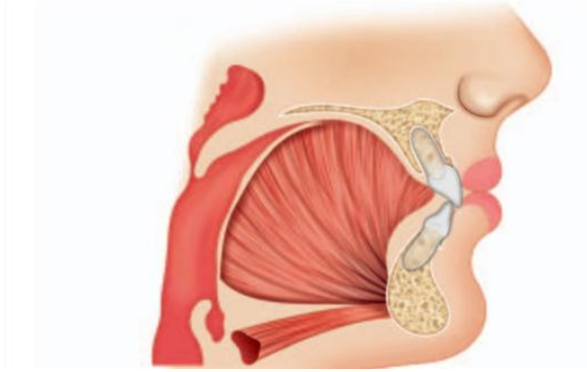


Figure 6: Mature swallow (Phulari, 2013)

B- Adaptive learned behavior (Phulari, 2013)

- Improper bottle feeding.
- Prolonged tenderness of gums or teeth and thus the child learns to keep teeth a part during swallowing.
- Prolonged tonsillar/upper respiratory tract infection, which causes adaptive tongue patterns that are retained even after the infection subsides.
- Tongue held in open spaces during natural exfoliation of primary teeth or extractions.
- Prolonged thumb sucking habit has been observed to result in an increased tendency to develop tongue thrusting habit. When there is no oral seal due to increased overjet or open bite caused by thumb sucking habit, compensatory tongue thrust develops to establish oral seal and partial vacuum required for swallowing act.

C- Mechanical Restriction (Wright, 1995)

Constricted arches which cause tongue to function in a lower than usual position.

a- Macroglossia: Large tongue limits the space in oral cavity and forces a forward thrust.

b- Enlarged tonsils and adenoids: Reduces space available for tongue movement.

D- Neurological Disturbances (Singh, 2007)

Hyposensitive palate which precipitates crude patterns of food manipulation and swallowing

- Moderate motor disability and loss of precision in oral function.
- Disruption of tactile sensory control and coordination of swallowing.



Figure 7: Abnormally large tongue causing a tongue thrust (Singh, 2007)

1.5.2 Psychogenic factors (Phulari, 2013)

Children who are forced to discontinue other oral habits like thumb sucking may develop tongue thrusting habit.

1.5.3 Modern view (Singh, 2007)

Tongue thrust is seen in 2 circumstances:

- a- Younger children with reasonably normal occlusion: It is a transitional stage in normal physiologic maturation.
- b. Individuals of any age with displaced teeth (incisors): It is an adaptation to the space between teeth (overjet and anterior open bite) since correcting tooth position should cause change in swallowing pattern.

1.6 Classification of tongue thrust

1.6.1 Etiologic classification (Brauer *et al.*, 1965; Shanker, 2009)

- a- Physiologic tongue thrust this comprises the normal tongue thrust swallow of infancy.
- b- Habitual tongue thrust is developed due to repeated placement of the tongue.
- c- Functional when the tongue thrust is an adaptive behavior developed to achieve an oral seal.
- d- Anatomic tongue thrust due to macroglossia (enlarged tongue)
- e- Endogenous tongue thrust due to macroglossia

1.6.2 Backland classification (Singh, 2007)

a- Anterior tongue thrust:

When the tongue thrusting is present in anterior region leading to anterior open bite.



Figure 8: Anterior tongue thrust (Singh, 2007)

b- Posterior tongue thrust:

Lateral thrusting in case of missing posterior teeth leading to posterior open bite



Figure 9: Posterior tongue thrust (Singh, 2007)

1.6.3 Moyers classification (Brauer *et al.*, 1965; Shanker, 2009)

a- Simple tongue thrust:

The buccal teeth are together with a forward positioning of the tongue between the anterior teeth during swallowing this usually results in production of an incomplete overbite or anterior open bite.



Figure 10: Simple tongue thrust (Singh, 2007)

b- Complex tongue thrust:

The buccal teeth apart during swallowing the tongue is positioned between them and does not fill the upper jaw pressure of muscles of the cheek narrowing the upper arch leading to buccal crossbite usually unilateral.



Figure 11: Complex tongue thrust (Singh, 2007)

1.6.4 James Braner and Holt classification (Tarvade *et al.*, 2015)

Type I: Non-deforming tongue thrust

Type II: Deforming anterior tongue thrust

- Sub-group 2: Anterior proclination
- Sub-group 3: Posterior cross-bite.

Type III: Deforming lateral tongue thrust

- Sub-group 1: Posterior open-bite
- Sub-group 2: Posterior cross-bite
- Sub-group 3: Deep over-bite.

Type IV: Deforming anterior and lateral tongue thrust

- Sub-group 1: Anterior and posterior open-bite
- Sub-group 2 : Proclination of anterior teeth
- Sub-group 3 : Posterior cross-bite

1.6.5 Pickett's classification (Singh, 2007)

a- Adaptive tongue thrust: The tongue adapts to an open bite caused by missing teeth/thumb sucking.

b- Transitory tongue is put forward only for a short period forceful and rapid.

c- Habitual due to postural problem a habit or presence of open bite.

1.7 Effects of tongue thrusting.

Depending on the duration, frequency and intensity of tongue-thrusting habit some/all of the following features can be seen (**Phulari, 2013**).

1.7.1 Extraoral features (Gowri *et al*, 2009)

a- Incompetent lips.

b- Increased of anterior facial height.

c- When tongue thrusts between anterior teeth, the posterior teeth are rendered out of occlusion. As a result, the posterior teeth may supraerupt and can gradually eliminate the interocclusal clearance between the upper and lower teeth. This increases the anterior facial and can also cause an open bite.

d- Nasolabial angle is decreased.

e- Hyperactive mentalis activity with puckering of chin (in case of anterior tongue thrust).



Figure 12: Effects of tongue thrusting: A- Incompetent lips, B- Increased facial height, C- Decreased nasolabial angle (Phulari, 2013)

1.7.2 Intraoral features (Burford *et al.*, 2003)

- a- Maxillary anterior proclination.
- b- Generalized spacing between the teeth.
- c- Constricted arches near molar region due to lowered posture of tongue.
- d- Retroclination or proclination of mandibular anteriors.
- e- Degree of proclination or retroclination of mandibular incisors depends upon the type of tongue thrust present.



Figure 13: Patient with tongue thrust habit its effect on maxilla (Phulari, 2013)

1.7.3 Intermaxillary relationships (Phulari, 2013)

- a- Increased overjet.
- b- Anterior open bite.
- c- Posterior open bite in case of lateral tongue thrust. It may be unilateral or bilateral.
- d- Hampered speech.
- e- The tongue tip at rest is observed to be at a lower level in the tongue thrust patients.
- f- Upward and backward movement of mandible with the tongue moving forward.



Figure 14: Tongue thrust habit and mild anterior open bit (Phulari, 2013)

1.8 Management

1.8.1 Diagnosis (Tarvade *et al.*, 2015)

1.8.1.1 History (Tarvade *et al.*, 2015)

- a- Any upper respiratory tract infections.
- b- Digit sucking habit.
- c- Neuromuscular problems.
- d- Swallow pattern in siblings and parents to check for hereditary factor.

1.8.1.2 Extra oral examination (Singh, 2007)

The facial profile is examined to confirm favorable/unfavorable growth pattern, steepness of mandibular plane angle and anterior facial height.

1.8.1.3 Tongue examination.

- a- Tongue posture at rest: It can be examined using lateral cephalogram or by seating the patient upright. In these patients, tongue usually assumes a lower posture at rest with the tip touching the cingulum/lingual fossae of lower anteriors, instead of resting behind upper incisors (Van Dyck, 2018).

b- Tongue activity/function observed during swallowing: Tongue activity is observed during swallowing act to know whether tongue thrust is simple/complex, anterior or lateral (**Phulari, 2013**).

1.8.1.4 Differential diagnosis (Singh, 2007)

Abnormal tongue posture is related to malocclusion and skeletal morphology. In Class III the tongue lies below occlusal plane and in Class II the tongue is positioned forward. Two significant variations may be seen in tongue posture.

1.8.1.4.1 Retracted (Balata *et al.*, 2012)

- Tip is withdrawn behind all the incisors seen in 10 percent children.
- Associated with posterior open bite because of edentulous/multiple loss of posteriors.
- Loss of positional sense due to removal of periodontal ligament, tongue retracts to establish contact with the alveolus and used to obtain a seal when swallowing.

1.8.1.4.2 Protracted (Moyers, 1964)

Resting tongue is between the upper incisors. Serious, since it results in an anterior open bite and two forms:

a- Endogenous protracted

Retention of infantile swallow pattern. Mild open bite and no certain treatment surgery caused relapse due to failure of tongue to adapt to the new posture.

b- Acquired adaptive transitory adaptation to enlarged tonsils and pharyngitis.

1.8.2 Considerations in treatment (Phulari, 2013)

a- Self correcting tongue thrusting habit does not require any orthodontic treatment. It often self-corrects by 7–8 years of age by the time the permanent anterior teeth erupts completely.

b- Tongue thrusting without malocclusion or speech disturbance treatment is generally not recommended when tongue thrust is present without any kind of malocclusion to any speech disturbances.

c- Tongue thrusting with malocclusion orthodontic correction of the malocclusion caused by tongue thrusting will usually eliminate the tongue thrusting habit.

d- Associated with other oral habits if the patient has both thumb sucking and tongue thrusting, the thumb sucking should be treated first.

1.8.3 Treatment

Advantages of postponing tongue therapy until treatment of malocclusion is begun include (**khinda et al., 1999**)

a- In absence of obvious predisposing factors, correction of malocclusion results in disappearance of habit.

b- Gives maximum opportunity for transition to mature adult swallow.

c- Therapy is most effective when carried out with orthodontic treatment.

1.8.3.1 The treatment of tongue thrust based on age (Singh, 2007)

It can be divided into various steps it involves interception of the habit followed by treatment of the Malocclusion Since tongue thrust decreases with age treatment must be.

- 3-11 years Normal occurrence, not to be concerned, reassure parents.If child is under 7 yrs, there is no need to be concerned since speech sound that elicits a lisp are not matured until 7-8 years of age. Conservative approach Demonstrate correct swallow and observe the child.
- 11 years or older Tongue thrust is not a normal pattern. Treatment options may include correction of malocclusion myofunctional therapy , muscle exercise [by asking the patient to place the tip of the tongue in the rugosa area for 5 min and then swallow } oral screen and habit breaking appliance.

1.8.3.2 Myofunctional Therapy

It is based on the fact that form of the occlusion adapts to function. The sum total of forces exerted by the muscles through well motivated, controlled tongue function, and lip exercises, child can be trained to develop a new swallowing pattern and through this altered tongue and lip function correct a malocclusion or for orthodontically treated patients, prevent relapse. Functional therapy is attempted before appliance treatment by exercises of the cervical and facial muscles for the improvement of proprioception, tone, and mobility (**Shanka, 2009**).

The orofacial myofunctional therapy in tongue thrust helps to (**khinda, 1999**)

- a- Improve of tongue elevation strength and tongue motility
- b- Correct tongue resting posture and tongue placement while swallowing
- c- Improve maxillary constriction.
- d- Prevent relapse of corrected malocclusion
- e- Improve sleep disordered breathing.

1.8.3.2.1 Orofacial myofunctional exercises for tongue thrust

1.8.3.2.1.1 Lip exercises (Woods *et al.*, 2021)

A- Lip puffing exercise

The child is asked to force air in between the lips and teeth and puffing out the lips as much as possible (**Proffit *et al.*, 1975**).



Figure 15: Lip puffing exercise (Woods *et al.*, 2021)

B- Lip movements and “oo-ee” sound

The child is asked to spread the lips and purse them as in an exaggerated “oo-ee” (**Woods *et al.*, 2021**).

C- Ballooning exercise

The child is asked to blow into a balloon till its full capacity followed by letting the air release and then repeating again (**Straub *et al.*, 1962**).



Figure 16: Ballooning exercise (**Woods *et al.*, 2021**)

D- Button pull exercise

A thread/string is passed through a big button of about 2–3 cm. The patient is asked to keep the button between lips and teeth. The thread is pulled outside at the same time the button is being held tightly in place by the lips. This improves the strength of the lips (**Barber, 1975**).

1.8.3.2.1.2 Tongue exercises

A- Tongue spot

The child is asked to locate the spot behind the upper incisors on the palate. Hold the tongue at the spot for 10 seconds and repeat 10 times (**Gil *et al.*, 2018**).

B- Tongue click

Placing the tongue against the roof of the mouth (at the spot) snap it down, to make a clicking or popping noise (**Gil *et al.*, 2018**).

C- 4S exercise

4S stands for spot, salivate, squeeze, and swallow. The tongue is taken to the “Spot”, behind the maxillary incisors, patient is asked to hold the tongue there as he salivates, followed by squeezing the spot and then swallowing with the teeth brought together while maintaining the tongue at the position. It is advisable to follow this swallowing exercise at least 40 times a day to imbibe this new swallowing pattern (**Khemka *et al.*, 2015**).

D- Touch nose exercise

Touch nose exercise involves protruding out the tongue and trying to touch the tip of the nose. This has to be held in this position for 10 seconds and repeated 10 times (**Maguire *et al.*, 2000**).

E- Touch chin exercise

In this exercise, the child is required to protrude out the tongue to try to lick the bottom of the chin. The position should be held for 10 seconds and should be repeated 10 times (**Maguire *et al.*, 2000**).

F- Hold of tongue blades and push the tongue

This exercise strengthens the muscles of the tongue and the throat. In this exercise, the child is expected to keep two tongue blades/ice cream sticks on the incisal edge of lower anterior teeth with 2–3 cm of the blade extending inside the mouth. Then, the child is required to try and lift the tongue blades against the resistance of the firmly held blades (**Woods *et al.*, 2021**).



Figure 17: Hold of tongue blades and push the tongue (Woods *et al.*, 2021)

G- Monkey face exercise

Ask kids to put their tip of tongue over front teeth under upper lips. In the case of a full monkey face, more than a tip of the tongue covers front teeth below the upper lip. hold it for 10 seconds. This is a fun exercise and strengthens muscles. First place an orthodontic rubber band on the tip of the tongue. Place the tip of the tongue against the roof right behind the upper front teeth. Occlude your teeth in a regular bite. Do not bite forward Keep the lips apart and swallow while keeping your lips apart and teeth closed Two sets of 30 swallow practices are recommended every day (Umemori *et al.*, 1999).



Figure 18: Monkey face exercise (Woods *et al.*, 2021)

H- Teeth counting exercise

Ask children to count teeth with the use of the tongue. This helps by movements of the tongue in all the directions and challenging yet funny exercise for children (Hanson *et al.*, 1969).



Figure 19: Teeth counting exercise (Woods *et al.*, 2021)

1.8.3.2.1.3 Cheek exercises

These exercises use a combination of water, tongue movements, and puffing to strengthen the cheek muscles. While holding water in the mouth the child is required to shift the water sideways. Alternatively, the patient can puff his/her cheeks with air. The child shifts the air from one cheek to the other while ensuring that no air escapes from the mouth or the nose. This is to be repeated a minimum of 5–10 times and should be performed 5 times a day (Rood *et al.*, 1956).

1.8.3.2.1.4 Mirror exercise for the soft palate

Exercising the uvula while looking into the mirror is an effective way to improve the strength and tonicity of muscles in the soft palate and the pharynx (woods *et al.*, 2021).

1.8.3.2.1.5 Jaw exercises

Handheld massagers held to the jaw for a few seconds at a time are known to stimulate the muscles of mastication. Vibration is very stimulating in short bursts and helps in relaxing the taut muscles. Open the jaw wide and say aaahhh!! And

hold for 3–6 seconds. Massage the jaw gently toward and away from the lips (**Rood *et al.*, 1956**).

1.8.3.2.1.6 Breathing exercises

Breathing exercises include a combination of pranayam, balloon blowing, and water holding in the mouth, all while performing breathing through the nasal cavity. For pranayam, the air is inhaled and exhaled rapidly through the nose keeping the mouth shut, but relaxed. Balloon blowing exercise has a high degree of compliance from child patients. A deep breath is taken through the nose and this air is exhaled into a balloon. The balloon is expanded to its maximum capacity by exhaling more breaths into it. This can be repeated 3 times a day (**Khemka *et al.*, 2015**).

1.8.4 Myofunctional training (Phulari, 2013)

a- Tongue tag

For the proprioceptive positioning of the tongue tip as in myofunctional and speech therapies.

b- Tongue guard

Stops tongue thrusting when in place and forces child to breathe through the nose.

c- Lip bumper

Discourage overactive mentalis muscle activity.

D- Jaw positioning edge to edge class I jaw position

It is produced when in place (same as most functional appliances). Combined with prevention of tongue thrusting and forcing the child to breathe through the nose.

1.8.5 Orthodontic trainers (Nagda *et al.*, 2019)

Tooth Guidance Molded into the anterior section (similar to orthodontic arch wire).

- a- Tooth channels
- b- Labial bows

1.8.6 Appliance therapy

1.8.6.1 Using removable appliance

Various removable orthodontic appliances are used to break tongue-thrusting habit along with the correction of resultant malocclusion (Singaraju *et al.*, 2009).

A- Habit breaking appliance with tongue crib (Abraham, 2013)

This appliance is used to treat tongue-thrust habit and it parts:

- Active component—bow
- As a remainder—tongue crib
- Retentive components
 - ✓ Clasps—C clasp or Adam’s clasp on maxillary 1st molars
 - ✓ Plate—acrylic base plate.



Figure 20: Removable orthodontic appliance (Phulari, 2013)

B- Nance palatal arch appliance

In this appliance acrylic buttons can be used as a guide to place the tongue in the correct position (Tarvade *et al.*, 2015).



Figure 21: Acrylic buttons of the nance palatal arch appliance (Phulari, 2013)

C- Oral screen

Another effective means of controlling abnormal muscle habits like tongue thrusting and at the same time utilizing the musculature to effect a correction of the developing malocclusion is vestibular/oral screen (Singh, 2007).



Figure 22: Double oral screen can be used to treat tongue thrusting habit (Singh, 2007)

1.8.6.2 Using fixed orthodontic appliances

Fixed orthodontic appliance with fixed rake or crib can be used to correct tongue thrust habit (Phulari, 2013).



Figure 23: Fixed orthodontic appliances with removable crib can be used to correct tongue thrust habit (Phulari, 2013)

1.8.6.3 Surgery (Tarvade *et al.*, 2015)

a- Skeletal malocclusion: The treatment of the retained infantile swallow behavior beyond adulthood is difficult and often consists of orthognathic surgical procedure to correct the skeletal malocclusion.

b- Tongue thrusting due to excessive lymphoid tissue: Surgical reduction of lymphoid tissue will eliminate tongue thrusting.

Chapter Two

Discussion/Comments

Chapter Two

Discussion/Comments

The tongue thrusting is a human behavioral pattern in which the tongue protrudes through the anterior teeth during swallowing, speech and at rest. The effect of tongue thrust on dentofacial development depends on several factors: the frequency of swallowing or how often the tongue exerts force on the teeth, the severity of the force exerted on the teeth, the counteraction of these factors by other muscular structures such as the lips, the resistance of dentoalveolar structures to displacement, and finally the resting posture of the tongue when no swallowing is occurring (**Cheng *et al.*, 2002**).

It is important for orthodontists to understand the effect of tongue function in the correction of malocclusion and stability after treatment. It has been reported that tongue thrust may be initiated during orthodontic treatment, especially when treatment creates temporary open spaces or interferences with intercuspation or reduces tongue space (**Piyapattamin *et al.*, 2002**). **Cheng *et al.* (2002)** proposed that all tongue dysfunctions should be corrected for the stability of treatment.

Myofunctional therapy is often indicated for correction of tongue thrust swallowing. It has been demonstrated that both myofunctional therapy and crib therapy are successful in correction of tongue thrust swallowing (**Alexander and Sudha, 1997; Cayley *et al.*, 2000**). However, **Subtelny (1970)** did not find any benefit for tongue thrust treatment. Using a standard procedure, tongue thrust assessment can be achieved simply by practitioners, parents or teachers. With respect to the high incidence of tongue thrust in orthodontic patients, and considering the possible relationship between deviated swallowing and dentofacial morphology, it is suggested that dentists observe patients of all ages for evidence of tongue thrust swallowing.

Chapter Three

Conclusion/ Suggestions

Chapter Three

3.1 Conclusion

- Tongue thrust considered to be normal up to 4-5 years of age, however, it can lead to serious problems in the oral cavity if these habits persist beyond the eruption of the permanent teeth.
- It is important to diagnose the tongue thrust and control it at an early age in order to prevent any deleterious effects at future.
- Elimination of the etiology is the primary and the most important step in the correction of the tongue thrusting habit.

3.2 Suggestions

- Make a survey about the prevalence and the incidence of tongue thrust in the Iraqi population.
- Make a review about the difference between fixed and removable habit bracket.

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