

Tongue Thrusting Habit In Children: A Review

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ABSTRACT

Background: As there is interrelationship between the form and function, the different abnormal habits may affect the form of orofacial structures. The presence of one oral habit may induce the other. 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 segments. This article reviews etiological factors, clinical features, diagnostic methods and various treatment modalities for management of the tongue thrust habit.

Keywords: Tongue thrust, Swallowing patterns, Myofunctional therapy, Mechano therapy.

INTRODUCTION

Oral habits in children have concerned dental professionals for many years. They see in these habits as the possible harmful unbalanced pressures, which may bring to bear upon the immature jaw structures, the potential changes in position of teeth and occlusions, which may become decidedly abnormal, especially if the habits are continued for long periods of time.¹

The tongue thrust habit is the most controversial of all the oral habits. Some consider a retained infantile swallow a harmful habit, causing a malocclusion, while other believe, it as normal and that the soft tissue adjust to the dento-skeletal complex or vice versa.^{2,3}

Many authors defined tongue thrusting habit in different ways.⁴

Brauer (1965): Tongue thrust is said to be present if the tongue is observed thrusting between the

teeth that does not close in centric occlusion during deglutition.

Tulley (1969): Forward movement of tongue tip between the teeth to meet the lower lip during deglutition and in sounds of speech, so that the tongue becomes interdental.

Barber (1975): It is an oral habit pattern related to persistence of an infantile swallow pattern during childhood and adolescent and thereby produces an open bite and protrusion of anterior tooth segment.

Shneider (1982): It is a forward placement of the tongue between the anterior teeth and against the lower lip during swallowing.

CLASSIFICATION OF TONGUE THRUST

The James and Holt (1965) classified tongue thrusting habit into four types.^{2,3}

Type I: Non deforming tongue thrust

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Type II: Deforming anterior tongue thrust

Sub group 1: anterior open bite

Sub group 2: associated procumbency of anterior teeth

Sub group 3: associated 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 overbite

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 crossbite.

Tongue thrust can also be classified as simple tongue thrust and complex tongue thrust.⁴⁻⁶

Simple tongue thrust:

It is defined as tongue thrust with a teeth together swallow. It is usually associated with the history of digit sucking. It is associated with well-circumscribed open bite in the anterior region. In this type of tongue thrust posterior teeth remains in occlusion. As the patient swallows anterior lip seal is made partly with the teeth and partly with the lips.

Complex tongue thrust:

It is defined as a tongue thrust with a teeth-apart swallow. It is associated with well-circumscribed open bite in the anterior and posterior region. In this type of tongue thrust there is presence of anterior as well as posterior open bite. Complex tongue thrust is likely to be associated with chronic naso-respiratory distress, tonsillitis etc.

Prevalence:

The relative prevalence of oral habits in school-going children in India has been reported to

be as low as 3% in rural children to 29.7% among urban population.^{7,8}

ETIOLOGICAL FACTORS

Factors that can contribute to tongue thrusting include macroglossia, thumb sucking, large tonsils, hereditary factors, ankyloglossia and certain types of artificial nipples used in feeding infants. In addition, allergies or nasal congestion can cause the tongue to lie low in the mouth because of breathing obstruction, contributing to tongue thrusting.

Fletcher⁹ has proposed the following factors as being the cause for tongue thrusting.

1. Genetic Factor

Klein¹⁰ suggested that a type of maxillary structure which favours development of tongue thrust may be hereditary, e.g.: Constricted arch, Inherited orbicularis oris hypertrophy or genetically predetermined pattern of mouth behaviour.¹¹

2. Learned Behaviour

Improper bottle feeding, prolonged period of tenderness or soreness of gingiva and teeth can result in a change in swallowing pattern to avoid pressure on the tender zone, prolonged thumb sucking, prolonged tonsillar and other respiratory infections which cause adaptive patterns in tongue movements that are retained after the infection subsides.¹²

3. Maturational

a.) Tongue thrust can present as part of a normal childhood oral behavioural pattern that is gradually modified as age advances.

b.) Infantile swallow changes to a mature swallow once the posterior deciduous teeth start erupting. Sometimes the maturation is delayed and thus infantile swallow persists for a longer duration of time.¹¹

4. Mechanical restriction

a.) Constricted dental arches, which cause the tongue to function in a lower than usual position.

b.) Macroglossia, which limits space in the oral cavity and forces a forward thrust to manipulate the bolus.

c.) Enlargement of the tonsil and adenoid, which reduces the space available for lingual movement.

The following are some of the predisposing factors that can lead to tongue thrusting:^{10,11}

- Improper bottle feeding
- Prolonged thumb sucking
- Prolonged tonsillar and upper respiratory tract infections.
- Prolonged duration of tenderness of gum or teeth can result in a change in swallowing pattern to avoid pressure on the tender zone
- Upper respiratory tract infections
- Feeding practices: Prolonged bottle feeding and improper swallowing pattern has been attributed as one of the etiological factors of tongue thrusting.

CLINICAL FEATURES

Various extra oral and intraoral typical clinical features are seen in patients with simple and complex tongue thrusting habit.¹⁰⁻¹²

Extra oral findings

- Lip separation-greater at rest and in function
- Short and flaccid upper lip
- Increase in anterior facial height
- Speech is altered i.e. lisping, problems in articulation of **s, n, t, d, l, th, v** sounds

Intraoral findings

- Tongue movements are irregular from one swallow to another within individuals
- Tongue tip position at rest is lower

Malocclusion

- Proclination and flaring of maxillary incisors
- Increase in overjet
- Maxillary constriction
- Generalized spacing between teeth
- Anterior or posterior open bite
- Posterior cross bite

DIAGNOSIS

For normal development to occur, one must address habits that can have negative effects. Therefore, thumb suckers and pacifier users should be talked to at an early age, and terminating the habit before permanent teeth erupt is advantageous.

History should include following:

- Information regarding any other oral habits, e.g.: thumb sucking, mouth breathing.
- Information regarding any infection of upper respiratory system, inflamed tonsils for long duration.
- Information regarding parameters of habit performance e.g. intensity, duration and frequency.^{2,10,13}

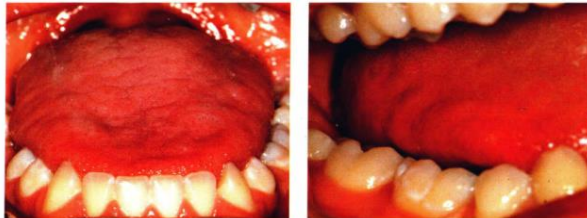
Functional analysis of tongue

Tongue and lip functions are synchronized in their activities. Thus it is possible to get idea about abnormal tongue function from observed lip musculature. E.g. : in infantile swallow pattern with tongue thrust, lower lip also shows marked activity. Ideally tongue should be examined without displacing either tongue or lips because when lips and cheeks are retracted with mouth mirror, normal tongue activity may be inhibited.



Functional analysis of tongue length

Clinically it is evaluated by asking patient to sit in upright position and then tongue and lip relationship examined gently. Then tongue is observed during various swallow. During normal mature swallow, tip of tongue should touch curvature of palate just behind the maxillary incisors¹⁴.



Functional analysis of tongue width

As during swallowing it may be difficult to observe various tongue movement and position directly, an indirect method is given by Dr. Everitt Payne et al called 'Payne technique'.¹² This technique measures where exactly tongue hit during normal swallowing.¹⁵



Functional analysis of lingual frenum

The revealing substance used in this technique is orabase with 1% sodium fluoresce solution in water soluble base. The procedure is as follow:

- Tongue is dried at areas where revealing substance is to be placed.
- A thin layer of substance is coated over the dry portion of tongue and patient is asked to swallow.
- Black light technique (i.e. dark room facility) will show exactly where all tongue moved during swallow because in dark room, sodium fluorescence will glow¹⁶.

Examination:

- Check for size, shape and movements of tongue

Functional examination:

Observe the tongue during various swallow

- Conscious swallow of saliva
- Conscious swallow of water
- Conscious swallow during mastication

Palpatory examination:

Place water beneath the patient's tongue tip and ask the individual to swallow

- **Normal:** mandible rises and teeth are brought together but no contraction of lips or facial muscles
- **Tongue thrusting:** marked contraction of lips and facial muscles

Place hand over temporalis muscle and ask to swallow

- **Normal:** temporalis contracts and mandible is elevated
- **Tongue thrust:** no temporalis contraction

Hold lower lip and ask patient to swallow

- **Normal:** swallow can be completed
- **Tongue thrust:** swallow can't be completed

Methods of swallow examination

- Patient is asked to sit upright with unsupported back and head.
- Observe unnoticed various swallow.
- Then small amount of water is placed in mouth and patient is asked to swallow.

TREATMENT CONSIDERATIONS

1. Age:

- It is self correcting by 8-9 years.
- Orthodontic correction is usually more successful if initiated during early mixed dentition stage of dental development.

2. Presence or absence of associated manifestation:

- Not indicated without malocclusion or speech problem.

3. Associated with other habit:

- Other habit should be corrected first

TREATMENT MODALITIES

- Myofunctional exercise
- Speech therapy
- Mechano therapy
- Surgical treatment

Myofunctional exercises

- Guidance of correct posture of tongue during swallowing by various exercises.
- Klein¹⁶ proposed a method in which the patient can be guided regarding the correct posture of the tongue during swallowing by asking the patient to place the tip of tongue in the rugae area for 5 min and then asking him to swallow.

Single elastic swallow



Single elastic swallow

- A small orthodontic elastic can be placed in the tongue tip and patient asked to swallow with the tip against the palate. If the swallow is correct, the elastic will retain; if incorrect the elastic will be swallowed.

2S and 4S exercises: This includes identifying the spot, salivating, squeezing the spot and swallowing.

- Use the pressure point on the papilla to show where the spot is.
- The tip is against this spot at rest position.
- The child then learns the 2S exercise; spot and squeeze.
- Spot should be at the rest position for the tip of the tongue.
- 'Squeeze' is done by squeezing the tongue vigorously against the spot with the teeth closed, followed by relaxing.
- When child get adapted to 2S exercise ask him to spot, salivate, squeeze against the spot and swallow; which is 4S exercise.¹⁷

Orthodontic exercise: The tongue tip is held against the palate using orthodontic elastic of 5/16" and sugarless fruit drop.

Lemon candy exercise:

- Instead of the elastic, a lemon candy is put on the tongue tip.
- Patient is asked to hold the candy against the palate by tongue tip and then asking the child to swallow.

Other exercises to tone the muscles are

- Whistling, Reciting from 60 to 90, Yawning, Gargling

LIP EXERCISES

- **Tug of war** (Button pull exercise): A string is tied to two buttons, and one button is placed between the lips of the patient while the other is held by a parent in the same position. It is designed to strengthen both lips.



Tug of war

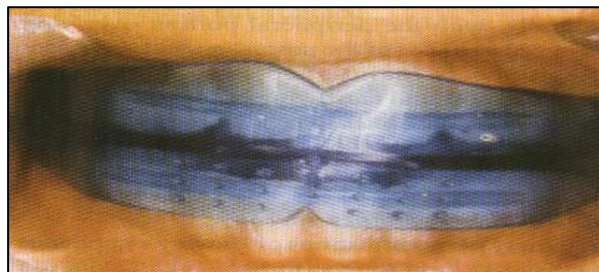
- **Marshmallow Twist Exercise:** Specially designed kits with plastic discs weighing exactly the same as marshmallows are used. A specially designed type of string is placed in patient's mouth and he lifts the disc by extending the lower lip. When he can lift one disc easily, two are put on the string and so on until he is able to lift ten discs. It strengthens the lower lip.



Marshmallow twist exercise

- **Lip Massage:** The lower lip is placed over the upper lip and massages it. It is intended to exercise several orofacial muscles and at the same time extend the upper lip¹⁸.

PRE-ORTHODONTIC TRAINER FOR MYOFUNCTIONAL TRAINING



Pre-orthodontic trainer

- Aids in correct positioning of tongue with the help of tongue tag.
- The tongue guards prevent tongue thrusting when in place.
- Correct method of swallowing should be practiced once or twice a day, once the patient is familiar with new tongue position¹⁹.

SPEECH THERAPY

- It is used for training of correct position of tongue.

- Repetition of words beginning with 'S' sound and simple multiplication tables of sixes.
- Speech therapy is not indicated before 8 years.

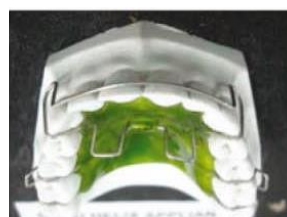
MECHANO THERAPY

- Both fixed and removable appliances can be fabricated for mechano therapy.
- Purpose of tongue thrust appliance (Indicated in mixed dentition period):
- Restrains the anterior tongue movement during swallowing.
- Re-educates tongue position.
- Maintains tongue in the confines of dentition.
- Interocclusal clearance is maintained and due to this over eruption and narrowing of maxillary buccal segments is prevented.
- Mature swallowing pattern is stimulated, as tongue adapts to new position and function²⁰.

REMOVABLE APPLIANCE THERAPY

Hawley's appliance with tongue crib

- The crib is used as a reminder.
- Labial bows used to close the open bite.
- The acrylic covering the entire palate provides anchorage.
- It should be worn for six months.



Hawley's appliance with palatal cribs, Tongue trainer

FIXED HABIT BREAKING APPLIANCE WITH TONGUE CRIB

- Crowns and bands are given on first permanent molars and a 0.040 inch stainless steel U shaped lingual bar is adapted.
- Base bar is fabricated after which crib is formed.

- Depending on the severity of open bite, 4-9 months are required for correction of malocclusion²¹.

ORAL SCREEN

- It is a simple functional appliance that takes the form of a curved shield of acrylic placed in labial vestibule.
- Oral screen works on the principles of both force application & force elimination.
- An additional screen is placed on lingual aspect of teeth.
- Avoids the outward thrust of the tongue and controls the proclination of the anteriors.
- Controls abnormal muscle activity.

BIONATOR

- In case of open bite appliance-type of bionator, the maxillary acrylic portion is modified so that even the anterior area is covered²².
- Its purpose is to prevent the tongue from thrusting between the teeth as tongue is responsible in most cases of open bite. For complex tongue thrust, fixed orthodontic treatment is recommended followed by myofunctional therapy during retention phase (after age of 13).
- For retained infantile swallow, orthognathic surgery is recommended to correct the skeletal malformation²³.



Oral screen



Bionator

Myofunctional therapy

CONCLUSION

From embryonic period to maturity, swallowing process is going on and it is considered

normal when the tongue is placed in proper position while swallowing, but sometimes due to altered position of tongue various malformations of oral structures is seen. We are aware of some very important functions of tongue like speech, its role in deglutition and taste, but the same tongue can create negative impact on oral structures because of improper position while swallowing. When the improper positioning of tongue continues it becomes habitual. So before this habit create some malocclusions, proper examination of swallowing patterns and according treatment plan is very important.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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