

Tutorial

An Introduction to Oral Myofunctional Disorders

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An Introduction to Oral Myofunctional Disorders

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We are here to learn about a human behavior associated with dental health. Any respectable study of human behavior should be preceded by research on animals. To this approach we are indebted for rescuing us all from the dreaded potential destroyer of the world, cyclomates. You all recall it was found to produce cancer in mice. Consistent with this procedure, we offer as evidence, visual evidence, the results of a recent investigation involving an N of two — two cats. More specifically, these two cats are cats belonging to Dr. Mary Pannbacker. This is significant, because Dr. Pannbacker was for years a skeptic concerning the importance of tongue thrust. After her research with cats, and later applications of the results of that research to humans, she authored a manual for the correction of tongue thrust.

In the first cat, the tongue thrust is very evident. Tongue thrust at rest has been recognized to be probably the most pernicious of all aspects of tongue thrust.

The apparent tongue thrust in Mary's second cat confirms the hypothesis that 100% of cats have a tongue thrust. Trained observers in the audience readily recognize the associated strabismus. Research on these two cats produced the following findings:

- (1) An incidence of 100% of tongue thrust was found in adult domesticated cats.
- (2) Tongue thrust is correctable in cats.
- (3) Establishment of normal

resting postures of the lips and tongues in cats is accompanied by the elimination of strabismus.

The next step, then, after studying animals is to investigate the same behavior in humans.

The results of three independent investigations into the incidence of tongue thrust in children essentially agree as to the incidence of tongue thrust in children, and as to the declining incidence as age increases. Generalizing from the three studies, and from research on infants, we can say that all infants are tongue-thrusters, about 2/3 of four-year olds, 1/2 of five-year olds, and 1/3 of eight-year olds are tongue thrusters. The incidence begins to plateau at about the age of eight, and may drop to 15 to 25% by adulthood.

The term oral myofunctional disorders "refers to a collection of oral habits that are variably related to psychological and physiological factors. The most common of these is called tongue thrust. It has several other names as well, such as deviate swallow, infantile swallow, and abnormal swallow. They all refer to the same habit. The term "tongue thrust" is currently being used by more people than the other terms. It refers to a habit wherein the tongue exerts more than the ordinary amount of pressure against the teeth, chiefly the anterior ones.

A more precise definition is one I have included in several articles. It is a cumbersome definition, hence not likely to gain wide acceptance, but it is, I believe, accurate.

"When in resting position, the anterior or lateral portions of the tongue contact more than half the surface area of either the upper or lower incisors, cuspids, or bicuspids, or protrude between them; or when, during the swallow of any two of the three media (liquids, solids, and saliva) there is a visibly observable increase of (1) force, (2) degree of protrusion, or (3) amount of surface area of the teeth contacted by the tongue, there is a tongue thrust."

Some of the other harmful oral habits are thumb or finger-sucking, biting or chewing of various objects, cheek-biting, tongue-sucking, bruxism, or teeth-grinding, nail biting, and resting the jaw on the hand.

There seems to be little doubt that teeth are very movable. The orthodontist applies relatively light, constant pressures to the teeth, moving them slowly over a long period of time. Teeth respond to pressures, of this there can be no doubt. They are normally held in a state of equilibrium, and when this balance is upset to a significant degree, they tip, rotate, over-erupt, under-erupt, or move bodily.

There is strong evidence that persistent tongue-thrusting is related to malocclusion. Whether it is one of the chief contributors to malocclusion, we do not know. We do know that several factors determine occlusal patterns, including the initial part of eruption, proprioceptive feedback, and variations in muscular and skeletal growth.

A number of studies have found a statistically significant relationship between the occurrence of various malocclusions, including open bite, overjet, and overbite, and tongue thrust. The existence or degree of any cause-and-effect relationship, however, has not been adequately established.

A study of 1000 of Barrett's patients analyzed incidence of tongue thrust according to type of thrusting pattern. Barrett's types of tongue thrusts are based on the location of the thrusts and the nature of the accompanying malocclusion. Types 1 through 6 are all anterior thrusts. The most common malocclusion is an overjet, found in types 1 and 2. Those two patterns together accounted for about 3/4 of the 1000 subjects (738 subjects). The next most common anterior malocclusion found was an open bite, which occurred in 8.9% of the subjects. My findings on my own patients agree very closely with those of Barrett. Some orthodontists are more troubled by the open bite patient than by others, and give more attention to that malocclusion when they study and write about the effects of tongue thrust. Type 5 pattern, associated with a closed bite, was found in 5.7% of Barrett's patients. Important, though, is the finding by other researchers that approximately four out of every five patients with closed bite have a tongue thrust. It is often very difficult to notice the thrusting pattern in these patients, because of the double wall of teeth which block the examiner's view when the teeth are in occlusion. If there are no diastemas to peek through, you may have to hold the bite open with a tongue depressor when you check for tongue thrust as these patients swallow.

Type 8, the bilateral thrust, fortunately occurs in only about 4% of the patients referred to us. Most of us agree that this type of thrust is the most difficult to correct.

Not everyone agrees, of course, that therapy to correct tongue thrust really works. We agree that much more research is necessary before we can tell how well it works, for which patients, and in the hands of which clinicians. The effect of the Joint Committee Statement, issued a few years ago, has seemed to be to polarize dental and speech specialists into those who believe in oral myofunctional therapy and those who do not. The U.S. is generally geographically divided into areas of believers and non-believers. Certainly, in many areas of the country, most orthodontists believe in therapy so strongly that they refuse to treat patients with a tongue thrust until they have satisfactorily completed therapy for its correction.

It is probably completely safe to say that therapy is more successful for certain therapists than for others, more successful with certain patients than with others. Anyone who would disagree with this statement would have to be pretty closed-minded. A third important variable in the effectiveness of therapy is the patient.

The patient with an extreme malocclusion, who is immature and poorly motivated, who is willing to lie about whether he practices faithfully, who does not practice faithfully, who is severely mentally retarded, and who has a number of harmful oral habits, is a tough one, and will test your mettle.

The clinician should have had good general training in at least one area related to oral myofunctional

disorders, such as dentistry, speech pathology, or psychology. This should have been supplemented by training in at least two different approaches to the remediation of oral habit disorders. She should have had opportunity to observe competent clinicians and to be observed by a competent clinician. Her personality should be adaptable, she should have plenty of patience, and her conduct should demonstrate a high level of professionalism.

When should patients receive tongue thrust therapy? This is completely an individual matter. The question can be considered in two ways: (1) according to the chronological or developmental age of the patient, and (2) according to anticipated orthodontic treatment timing.

First, it is convenient to divide patients into four age groups: A primary dentition group, a mixed dentition group, a pre-adult group, members of which have mostly permanent dentition, and an adult group.

The youngest group, usually consisting of four and five-year olds, is not treated by too many oral myologists. For the past few years I have been accepting more of these patients for treatment than I formerly did. I used to think that if I could not effectively take the child through the whole "program" there was no use helping him at all. Now I consider each separately, and ask instead, "Can he benefit from partial therapy?" and if so, "What aspects of his problem can we help him with now?" If there is a worsening malocclusion, or a severe, stable one, or a mouth breathing problem, or a severe related speech disorder, or if the child is usually intelligent and

cooperative, I will usually accept him for treatment. I will at least see the child, and try to determine whether he needs help at this time from *any* specialist, such as an ear-nose-throat doctor, or an oral surgeon, or an allergist. Often these little patients do better than do their older siblings.

I apply the same considerations to children in mixed dentition. Generally, these patients are from six to eight or nine years of age. There is a great deal of variability in maturity and attitudes in this age group. Some children are not yet ready to accept any responsibility for practicing until much later in their development. Others are more receptive than children in any other age group. I do presently accept patients in this age group unless they have no significant malocclusion or speech problem or unless they demonstrate an unwillingness to carry out practice assignments.

The nine or ten to 17 year old group constitutes about 75% of my practice. By this time, most of them have become quite conscious of their physical appearance; hence motivation to have straight teeth is generally good. They are, for the most part, good patients, but some may rebel against practice requirements, or against having to be monitored by a parent as they practice. A great motivating influence is the requirement that therapy be successfully completed before orthodontic treatment begins. Orthodontics often follows therapy immediately for this group.

Adults are usually well-motivated, faithful practitioners, and consequently make good progress. Many are apprehensive about their own ability to modify habits of long standing, and need

constant encouragement until they begin to see evidence of habituation.

The second consideration, after chronological or developmental age, is the timing of the various elements of the total treatment process. A basic decision concerns whether to do oral myofunctional therapy before, during, or after orthodontic treatment. The answer, of course, is that each case must be decided upon individually. There are advantages and disadvantages to each approach.

Most clinicians I am acquainted with prefer to see most of their patients before orthodontic work begins. Once in a while, when the malocclusion is minimal, the therapy can obviate the necessity for orthodontic work. When therapy is initiated, there is some assurance that the patient is cooperative and that the orthodontist can stop worrying about the tongue problem. Good clinicians succeed in motivating the patient for orthodontics as well as for tongue thrust therapy, which is a big help to the orthodontist. A great concern of mine, that of establishing a new habit in an oral cavity supplied with extraneous materials, and developing a habit partially dependent upon those temporary cues, is allayed by completing therapy before bands are attached.

Some dentists, however, who have the oral myofunctional work done in their office, find it advantageous to begin orthodontic treatment and therapy concurrently. They contend that early stages of orthodontics seldom interfere with the execution of the exercises in the early stages of therapy, and one visit to the office by the patient serves two purposes.

Those patients who are in their teens or older, and ready for orthodontic procedures, need not wait for several months to complete therapy before those procedures are initiated. I have one serious reservation of this approach, and that deals with the use of a headgear or neckgear in the early phases of orthodontic treatment. Since the establishment of "lips-together" resting habits seems basic to the success of therapy for other aspects of the disorder, I always begin working on these habits before attending to any of the other habit components. However, the metal bar anterior to the anterior teeth makes proper lip resting postures impossible to achieve, in most patients. An appliance which seriously interferes with *all* phases of habit retraining is the palate-expander. Often the bridge placed in the upper arch is large, and placed in a location which precludes proper lingua-palatal sealing.

The third alternative, that of postponing oral myofunctional therapy until after orthodontic work has been complete, assures all involved that the therapy was not administered unnecessarily. The patient threatened with orthodontic relapse is well-motivated to comply with therapy requirements. On the other hand, often the tongue thrust is undetected until the teeth move beyond the ability of a retainer or positioner to restore them to their correct position, and bands have to be re-applied.

Those of you who are dentists and do not plan to personally administer the oral myofunctional therapy have the serious problem of knowing to whom to send your patients for such therapy. If you have a certified clinician in your area, you are fortunate. Most

speech pathologists, dental hygienists, and behaviorists have not had the special training required to handle this disorder. One of the major purposes of the International Association of Oral Myology is to provide such specialized training. If you will contact that organization at P.O. Box 50185, Tucson, Arizona 85703, they will provide you with information on any scheduled training courses.

In order for a clinician to competently treat oral myofunctional disorders, he needs a thorough knowledge of the anatomy and physiology involved in chewing, swallowing, and talking; he needs a broad understanding of normal and abnormal human behavior; he needs experience and expertise in motivating children and adults; and he needs to have received adequate supervised training in the field of oral myology.

The oral myologist need not be a speech pathologist, but he should have some knowledge of the speech problems most commonly experienced by children with tongue thrust. The tongue tends to move away from rest position as little as possible to get the sounds produced. Since rest position of the tongue is anterior to its position in normal swallowers, it tends to remain too far forward as linguo-alveolar sounds are produced. This makes the "s" and "z" sounds sound like a "th" sound, but does not affect to any appreciable degree the way the t, d, n, and l sound to the listener. It is more important to *watch* the tongue thruster as he speaks than it is to listen.

An important study was done recently at the University of Utah, by Margaret Christensen. She divided a group of ten five- and six-year old children into two groups, one of which received therapy for tongue thrust followed

by therapy for a frontal lisp, and the other (also tongue thrusters) received therapy only for the lisp. She found that those children who received both types of therapy corrected both the tongue thrust and the lisp in the same amount of therapy time that was required to correct only the lisp in the children of the other group. This finding supports Overstake's clinical research, in which he found that a strikingly large number of subjects self-corrected a lisp following tongue thrust therapy.

How can you tell which patients are likely to spontaneously change from a tongue thrust pattern to a non-thrusting pattern, and which patients are going to do well in therapy? The following factors contraindicate either spontaneous self-correction or success in therapy: lingual crossbite, which tends to limit the amount of lateral space available for tongue. A high narrow palate, which also crowds the tongue and makes a light linguo palatal seal difficult to achieve, large tonsils, which usually mean large adenoids. The adenoids make nose breathing difficult, so the patient breathes through the mouth. The enlarged tonsils block the oral passageway and encourage the tongue to rest and function more anteriorly in order to keep the airway open. Mouth-breathing must be largely eliminated if the results of oral habit retraining are to be permanent. A deep overbite appears to restrict the vertical dimension of the oral cavity, again preventing the tongue from functioning normally during swallowing. Finally, thumb or finger sucking tends to narrow the palatal arch, and since the digit occupies the space needed by the tongue for normal swallowing, normal function is impossible while the sucking is occurring.

The diagnostic procedures for oral habits may follow a different

sequence than that normally followed in the diagnosis of speech problems. It is important to do first things first.

The first and most important task is to determine whether, there is, in fact, a problem requiring treatment. The second task is to determine the scope and nature of the disorder. The third task, this one a purpose too often ignored by oral myologists, is to provide a basis for planning treatment and for periodically checking the effectiveness of the therapy.

Fourth, the diagnostician has an obligation to educate the patient and the parents regarding the problem and its relationship to the teeth and speech. Next, the motivation of the patient must be determined and improved when necessary. Finally, an investigation must be made into the possible cause and perpetuators of the disorder, in order that any that are still existent may be dealt with as effectively as possible.

In order to accomplish these purposes, the following procedures are recommended.

First, observe the patient, at rest, and during speech, noting breathing habits (whether through the nose or through the mouth), lip and tongue resting postures, and the manner in which the tongue-tip sounds are produced.

Then, examine the oral *structure* carefully, noting any irregularities in occlusion (molar and anterior), tongue size and surface, labial and lingual frena, inner cheek wall, hard and soft palates, uvula, and tonsils. Any condition which might restrict the movement of the tongue or limit the space available to the tongue is particularly important.

Third, examine *function*, during biting, chewing, and swallowing of food; during drinking, both "sip-at-a-time" and continuous drinking; during the posterior

movement and swallowing of saliva; and during the production of words containing the /t/, /d/, /n/, /l/, /s/, and /z/ sounds. Observe the movement of the lips during all the above functions as well.

Fourth, whenever possible, use *quantitative* measures, which constitute a baseline which can be referred to during re-evaluations. I recommend a simple procedure consisting of a 0-1-2 rating system, with "0" indicating no muscle activity, "1", some slight muscle activity, and "2" considerable muscle tension. Applied to masseter involvement, a "2" would be a favorable rating. Applied to circumoral muscle tension during swallowing, a "2" would be an unfavorable rating. A "2" tongue thrust denotes a strong contraction of the genioglossus muscle during swallows. If you have instrumentation for assessing the degree of muscle contraction, of course, its use is preferred over subjective assessments.

Fifth, take a purposeful case history, considering the total patient. Any pertinent past, present, or planned dental, medical, educational, or psychological treatment should be noted. Be sure that everything you ask is related to the oral myofunctional disorder.

Even though most of us no longer believe that children tongue thrust because they were bottle fed rather than breast-fed, there may be significant information in the feeding and weaning history. Certainly the dental history is important. Were there any injuries to the anterior teeth in early childhood? Was there an unusually long wait between the loss of deciduous teeth and the eruption of the permanent ones? Have the teeth

been unusually subject to decay?

The child's social adjustment is important, because it bears directly on his motivation. Determine whether the child has had to practice other skills in the past, and if so what his attitude has been toward the practicing. Has he ever received speech therapy or oral myofunctional therapy in the past? If so, what was its nature, and was it successful? If not, why not?

The sixth step is to explain your findings to the patient and parents. Discuss with them some of the possible causes and effects of the disorder. Explain that we all begin life as tongue thrusters, and that for some reason the patient has probably not switched to a non-thrusting pattern. Describe the proposed therapy if it is recommended, and hypothesize a prognosis. I prefer to explain the fee at this time, and establish conditions of payment. Be sure the practice requirements are thoroughly understood by patient and parents. Let the parents know of the importance of their active participation in therapy.

Then motivate, as needed, by using whatever combination of positive and negative consequences you think would be most effective for the particular patient to explain the importance of overcoming the tongue thrust or other habits. Tell what benefits come from complete cooperation. Use illustrative case histories, photographs of former patients, and models of their teeth to demonstrate positive results. Then get a commitment from the patient to practice faithfully and to be very aware of the tongue and lips for the next several months.

Summary: Tongue thrust and other oral muscle habits do exist

and can potentially move teeth, interfere with their normal movement, retard progress of orthodontic treatment, and contribute to orthodontic relapse. Therapy for these disorders has been proven to be effective, clinically, for over twenty years, in several areas of the United States and in several countries in the world. If the clinician is properly trained, and is able to work with patients effectively, therapy can modify the unwanted habits and complete carry-over can be achieved.

When to treat a given patient has to be an individual matter. It is unwise to *always* treat before orthodontics, or to always treat during orthodontics, or to never treat anyone under eight years of age. Speech therapy for lips has been shown to be more effective after the tongue thrust has been eliminated.

In order to effectively individualize therapy, careful diagnostic procedures must be followed. These were outlined in the article. The initial session should accomplish several purposes, including the acquisition of several data which will serve as a baseline from which to measure progress in therapy. The key to successful therapy is motivation.