

A Simple and Effective Method of Correcting Deviate Swallowing Habits

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I. Introduction

Deviate swallowing patterns such as tongue thrust habits have caused much concern, frustration and controversy in the dental profession. Knowledgeable dentists have long recognized the problems these habits can cause such as various malocclusions, instability of orthodontic results and failure of removable prostheses. Many methods have been devised to counter this problem, but most have been ineffective or cumbersome.^{1 2 3} As a result, some dentists now use the ostrich philosophy and simply ignore the habits or hope they will go away by themselves. From the high number of adults I see with tongue habits, many of which have previously had orthodontics and subsequent relapse, I would say this philosophy will result in much failure and frustration.

II. Etiology

Historically, a lot of attention has been given to bottle feeding as a primary cause of tongue habits.³ According to Falk, a much stronger correlation exists between mouth breathing (80%) and digit sucking (50%) as a causative agent.⁴ Since this is the case, it is imperative that these habits be eliminated before the tongue habit can be successfully treated.

The patient should be checked by having them clamp the lips together while holding first one nostril then the other closed to evaluate the nasal airway capacity. If it is patent, the habit can usually be corrected by having the patient hold a popsicle stick between the lips sideways for one hour each day to reestablish the dominance of nasal breathing. Those patients with airway obstructions are referred for ENT evaluation or allergy therapy. Digit sucking habits can usually be broken, *if the patient wants to stop*, by using an Ace bandage wrapped on the elbow at bedtime. This acts as a reminder by impeding circulation if the arm is bent for digit sucking while sleeping.³

Recently in gnathological circles, some clinicians have stated that occlusal interferences cause most tongue habits. The mechanism being that the tongue is

interposed between the teeth to avoid the interferences. Theoretically, the tongue habit should correct spontaneously with occlusal correction, but this has not always proven to be the case, so subsequent therapy would then be necessary.

Another structural problem, lingual ankyloglossia, prevents normal tongue function, so the resulting low tongue posture will most likely result in an abnormal swallow. This condition is often associated with Class III malocclusion and can be easily checked by having the patient open wide and touch the roof of the mouth with the tongue. If this is not possible because of the restriction of the lingual frenulum, then a frenectomy is indicated. The patient should be observed for some time to see if normal function returns or if therapy will be needed.

In Falk's chapter in Clark's Clinical Dentistry, he states that a large segment of the tongue-thrust population are the result of dental displacement patterns.⁴ In other words, something else causes the malocclusion and the tongue fills the space. This is the case with loss of lip and masseter tonus in mouth breathers, resulting in anterior migration of teeth. The same can happen with digit sucking as well as genetic type malocclusions. Unfortunately, correction of the malocclusion does not always correct the tongue habit, so it is advisable to combine tongue therapy with the orthodontic treatment.

III. History and Clinical Exam

The history should include questions about mouth breathing, digit sucking habits, bottle feeding, abnormal gag reflex, drooling and speech problems. An evaluation should be made of tongue movements while touching above and below the lip right and left lateral movements, protrusion as well as touching the palate with the mouth wide open. Any abnormalities such as inability to make a tip or lateral deviations when protruding should be noted. Any unusual size, length or tonus abnormalities may be significant. Functional tests such as blowing and whistling both in and out as well as having the patient read a paragraph to note abnormalities of speech can be helpful in making a diagnosis.

The nasal airway should be checked as described previously while evaluating lip competency and tonus. Presence of a narrow palate with a steep vault and sharply defined rugae indicate lack of normal tongue contact. This is often accompanied by a posterior crossbite as a result of the low tongue posture. Other dental clues to deviate swallow include opposing teeth that do not touch in full occlusion and labial tipping of incisors with spacing. Very deep anterior

overbites may be due to a lack of posterior eruption because of abnormal tongue function. This can be verified by the presence of a tooth-apart swallow.

The best way to check the swallow is to squirt a small amount of water in the patient's mouth and part the lips with your finger just as the swallow begins. This should be done several times without mentioning what you are looking for because some patients will try to alter their swallow if they know you are looking for a tongue thrust. A normal swallow will always have posterior tooth contact, relaxed lips and the tongue placed in the palate. Most abnormal swallows have the teeth apart with hyperactivity of the orbicularis oris and mentalis muscles in an attempt to get an anterior seal. The tongue may come forward or into any number of positions over the posterior teeth.

Another method advocated by Garliner to check the tongue position during swallowing is the Payne technique.³ This involves placing fluorescent Orabase paste on the tongue at the dorsum, tip and both sides, then having the patient swallow. Using an ultraviolet light, the spots the tongue has contacted can readily be seen. This is even more effective if the you distract the patient and check them a second time so that you get a true unconscious swallow. This method is most effective in evaluating progress during therapy.

IV. Methods of Treatment

There have been many methods used to correct abnormal tongue habits. Mechanical devices such as tongue spurs offer temporary help, but the habit often returns when they are removed. Use of functional appliances that retrain muscle function are supposed to eliminate tongue thrust, but my experience has proven otherwise. The same can be said for elimination of traumatic occlusal interferences with orthodontics or surgery. Each of these methods has obviously had isolated successes, but they are too inconsistent.

Myofunctional therapy has had a better rate of success, but the length of time required to do the exercises and eliminate the habit through conscious effort has been too much for all but the most highly motivated patients.^{1 2 3} The problem seems to be that an individual swallows 1,600 to 2,500 times daily without conscious thought. It takes a great deal of time and effort to retrain a reflex action with conscious action. For this reason, myofunctional therapy has gained a poor reputation for effectiveness and is looked on by many orthodontists with great suspicion.

A speech pathologist from Detroit, Dr. Mervyn Falk, introduced a new method of treatment in 1976 that recognized the reflexive nature of swallowing.⁵ He demonstrated a subcortical method of affecting the swallow act through use of a series of procedures known as neuromuscular facilitation (NF). This technique was developed by Road for treatment of neuromuscular dysfunction by occupational and physical therapist. It uses sensory stimuli such as brushing, icing, pressure and resistance to obtain a desirable motor response at the reflex level. When done repeatedly and followed each time by a meaningful activity such as eating for reinforcement, it conditions the nervous system to respond with more purposeful movement patterns.⁶

Falk's first experimental use of NF was on eleven children age six to thirteen that had been diagnosed as tongue thrusters by their referring orthodontist.⁵ They were treated six months then observed six more months with no therapy. Casts made at the three, six and twelve month intervals were evaluated and found to demonstrate a reduction in the distortion of anterior dental relationships after NF treatment. Nine of the eleven children showed no relapse of the tongue habit during the six month post-treatment period. Since some of these patients were younger than the recommended age of conscious level treatment, it would seem that cooperation by conscious application of tongue placement principles is unnecessary.⁵

Falk's second study compared NF treatment with the conscious-level technique. Identical groups of ten patients, each with tongue thrust habits and deviate anterior dental relationships were treated with one of the two methods for six months and followed for six more months. Casts taken at three, six and twelve month intervals were evaluated by fourteen orthodontists. This comparison revealed a statistically greater improvement at all time intervals of the NF treated group with the difference becoming greater at the longer intervals. Neither group had any regression following the six months of treatment.⁷

The results of these studies have been verified in my own practice. I had a therapist use the conscious-level technique on my patients with tongue thrust habits for about seven years. They saw her once a week and were required to do thirty minutes of exercises three times a day. There was a fairly high percentage of failure due to noncompliance. Nine years ago, we began using the NF technique and now enjoy a much better percentage of success. The patients only have to be seen by the therapist once a month, which can be coordinated with their orthodontic adjustment. The exercises require only a total of ten minutes a day. The only difficulty is that some patients cannot believe something this simple and

easy will work, so they fail to take it seriously enough. On the other hand, the consistency of results has been very gratifying and has enabled me to successfully treat almost all the problem cases with tongue thrust habits with a minimum of relapse tendencies.

V. Clinical procedure for Neuromuscular Facilitation

Falk's technique for subcortical treatment of tongue thrust habits utilizes brushing, icing and pressure in that order. The following description of the exercises are from Falk's chapter in Clark's Clinical Dentistry:⁴

“The first procedure, brushing, is intended to reduce the flaccidity of the tongue that is observable in tongue-thrust patients. Brushing is accomplished with a #6 still-bristled oil paint brush. The tongue is maintained in a hyperextended position and the lateral margin is brushed with a light, slow stroke first from the labial commissure on one side to the midpoint of the tongue and then from the commissure of the other side to the midpoint of the tongue. Stimulation is maintained for ten seconds only, since responsiveness is minimal after this period of time. Each side is stimulated the same number of times, since deviation to the more frequently stimulated side can be noted after a prolonged period of stimulating one side of the tongue more often than the other.

The purpose of brushing is to create increased tonicity of the tongue mass. This form of stimulation results in a narrowing of the tongue and reduction in the flaccidity due perhaps to increased activity of the superior longitudinalis muscle. In approximately six weeks, it may be observed that the typical broad, flat configuration of the tongue originally notable upon extension is eliminated, and tonicity of the mass is significantly increased. At the same time, reaction of the long superior musculature to brushing can be visually observed in a reflexive, undulating motion of the dorsum of the tongue.

Next, icing behind the upper central incisors at the level of the incisal papilla is performed. A stick of ice of appropriate dimension is best made with a tube from commercially available lip balm. This is accomplished by exposing all except an approximate one-half inch of the lip balm and cutting this off at the top of the tube. The remaining lip balm is then lowered to the base of the tube to permit the introduction of water into the remainder of the tube. The cap is replaced on the tube, and the tube is positioned in inverted fashion into the freezing compartment of a refrigerator. When the ice is formed and the cap removed, the amount of ice extending beyond the wall of the tube is of sufficient length to ice the intended tissue. Icing is performed in a transverse direction for ten seconds

with care being taken to remain behind the upper central incisors. The reflexive property of the appropriate tongue musculature directs the blade of the tongue to the area iced. It is important, therefore, to prevent any other tissue from being touched with the ice stick. It can be observed that the tongue tip is rarely in contact with the primary palate during the normal swallow act. Focus and treatment for tongue thrust, then, is to condition the blade, rather than the tip, to elevate. In addition, the width of the central incisors is used to make use of the tongue in the narrowed, pointed configuration that results from the brushing, which precedes the application of ice.

The next phase of treatment uses pressure to the dorsal, lateral, and inferior tongue areas. For approximately the first six weeks, only dorsal and inferior pressures are used. Lateral pressure is added when there is notable response to brushing and to dorsal pressure, since lateral pressure tends to result in responses that are similar to the responses elicited with brushing and dorsal pressure. Dorsal pressure is accomplished with the rounded end of a commercially available cocktail stick. Caution is taken to be certain that the round end is perfectly smooth. With the tongue resting in a relatively relaxed position within the lower dental arch, light pressure is applied in a rapid, alternating fashion over the anterior surface of the tongue. The reflexive response of the tongue is to withdraw in a posterior direction.

After several weeks, the response to dorsal pressure appears to attenuate, and in addition, the desired response to brushing can be observed. It then becomes desirable to modify the pressure procedure and to add lateral pressure. Dorsal pressure is modified by having the patient position the tongue tip in a relaxed fashion on the lower lip. Pressure is then applied as before and tongue retraction is again observable. Stimulation is maintained for ten seconds for either procedure.

Lateral pressure to the tongue is performed with the handle of the stick. Light pressure is applied first to one side and then the other in a slow alternating pattern, moving back and forth three times on each side. Both narrowing and retraction of the tongue mass may be observed as responses to lateral pressure after a period of time.

Inferior lingual pressure is next applied. This is accomplished with an extended index finger placed over the geniohyoid muscle. The patient assumes a position of readiness for the swallow act, and digital pressure is then momentarily applied. The patient is instructed to swallow immediately after pressure is removed. This procedure is followed four times. Since there is generally a lack of

sufficient saliva to swallow given an immediate repetition of this procedure, it is advisable to instruct the patient to drink a small amount of water between applications in order to moisten the oral and pharyngeal tissues. Each swallow should then be performed as naturally as possible.

Treatment Modifications

In general, the procedures for treatment as described are sufficient to result in the desired alteration of tongue configuration and function. At times, however, certain swallow patterns need to be treated in a somewhat different fashion. These tend to be associated with severe Class II, division 1 relationships (Angle's classification of malocclusion) or with symptoms of lingual paresthesia, which, when present, is generally found in one of both posterior quadrants.

For these patients, protracted treatment time is generally necessary, and the treatment plan usually is modified after approximately three months. Brushing is then done with the tongue relaxed within the lower dental arch. Brushing, icing, and alternating pressure with the rounded end of the mixing stick are all applied in that sequence to the area previously described as being iced alone. Lateral and inferior pressures are performed in the same fashion as before.

Treatment Time

Patients are instructed to follow their treatment programs prior to eating a meal or snack and to integrate two additional times each day into a regimen that is followed for six months. This generally results in the use of the program five or six times daily. Only patients who have reduced their daily applications or for whom modifications are necessary tend to require more than six months of treatment.

When tongue retractions for the swallow act has remained observable for approximately three months, a reinforcement period of six months is initiated. A reinforcement schedule requires the patient to perform the same treatment routine followed immediately prior to this period. The regimen is used before breakfast and before the evening meal for a six-month time period. Such a reinforcement schedule is intended to prevent regression while gradually withdrawing the patient from treatment.

Comments

Simultaneous with the treatment of the tongue pattern, molar approximation and nasal vegetative respiration must be established in order to complete the treatment of a deviant swallow pattern. It does not seem necessary to provide exercises for the patient in order to achieve strength of the masseter or orbicularis oris musculature, however, since these muscles are routinely used for other functions. Instead, conscious functioning of the mandible so as to maintain the desired molar relationship and conscious maintenance of lip closure for the purpose of nasal vegetative respiration are urged in conjunction with NF for the tongue. In general, patients tend to achieve the total swallow pattern within the first six months of treatment.

When the desired lip and molar relationships are not established in this time period, the tongue pattern, may, nevertheless, be normalized. Treatment is not considered completed, however, until this triad (normal lip and molar relationship and tongue pattern) is demonstrable. The reinforcement period for tongue function may still begin as continued patient effort to establish habitual lip and molar approximation continues. It would appear that there need be no concern for oral vegetative respiration during sleep. Effort during only the waking hours appears adequate for meeting this need.

It is necessary for the clinician to examine patient monthly when NF is utilized, except at the beginning of treatment, when an examination is scheduled one week following initial instruction to be certain that procedure are being properly followed.

All patients are examined for regression three weeks after the cessation of treatment and again after three months; rarely has regression been noted. Random post-treatment examination of patients after as long as two years has indicated no relapse.

The method presented here will work on patients of all ages, including adults. Unlike previous conscious-level exercises, there is no restriction on younger children under age ten or on patients with mental or physical handicaps. Neuromuscular facilitation techniques were originally developed to help post-polio and cerebral palsy patients, so it gives the clinician a very powerful mechanism for effecting changes in normal patients.

It is possible to delegate this therapy to a qualified staff member that has the ability to motivate patients. I have had good success using Certified Dental Assistants after sending them to several courses to build confidence and credibility.

Once this program has been instituted in your practice, you will find it is definitely worth the time and effort involved in setting it up.

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BIBLIOGRAPHY

1. Straub, W. J.: Etiology of the perverted swallowing habit. *American Journal of Orthodontics*, 30:603, 1951
2. Barrett, R. J., Hanson, M. L.: *Oral myofunctional disorders*, St. Louis, C.V. Mosby, 1975
3. Garliner, D: *Myofunctional therapy in dental practice*, Brooklyn, Bartel Dental Book Co., 1972
4. Falk, M. L.: Neuromuscular facilitation for the control of tongue-thrust swallowing, Clark, J. W., *Clinical Dentistry*, Vol. 2, Ch. 29, Philadelphia: Harper and Row, 1987
5. Falk, M. L., Wells, M., Toth, S.: A subcortical approach to swallow pattern therapy, *American Journal of Orthodontics*, 70:419, 1976
6. Moore, J. C.: Neuroanatomical and neurophysiological factors basic to the use of neuromuscular facilitation techniques. In West, W (cd): *Occupational Therapy for the Multiply Handicapped Child*, Chicago, University of Illinois, 1965
7. Falk, M. L., Delaney, J. R., Litt, R. L.: Comparison of selected cortical-level and reflexive-level treatment programs for establishing normal deglutition patterns, *Angle Orthodontist*, 49:73, 1979