Tutorial

Considerations for Treatment: The Young Child

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Optimal Age for Treatment

Much has been written about the age at which a patient should be enrolled in oral myofunctional therapy.

Frequently mentioned is "the clubfoot analogy". Neither child, parent, nor physician would recommend doing nothing about a clubfoot, knowing the damage it can do with increasing age. Why, then, delay therapy for tongue thrust unnecessarily, when there seems to be justifiable reason for believing that tongue pressures can result in malocclusion? Day (3) expressed the sentiments of many of us who work for oral myofunctional disorders. He stated:

I have long been an opponent to the attitude of some major groups of orthodontists who insist on waiting until a developing malocclusion has run its full course before intercepting the etiological factors involved, thereby mitigating the severity of the problem as well as the treatment of same. No other health profession lets a pathology run its full course before attempting to stop its progress. I have personally devoted my time in orthodontics to intervention and prevention, is possible, of severe malocclusions. I know of no etiological factors causing malocclusions that surpass myofunctional causes in producing severe malocclusions.

The field of oral myology has in many ways paralleled the specialty of orthodontics. When many of us started doing tongue thrust therapy, a number of years ago, we would not treat patients until they were 10, or 12, or 14. This was primarily because the orthodontists would not treat until certain ages. There is a realization now that early detection and intervention - interceptive orthodontics - can prevent or minimize some problems. The American Association of Orthodontists "has recommended that the proper age for a child's first visit to the orthodontist is 7 years." (4).

Goldberger (5) states the position held by many authorities - the child should be at least eight years of age before the procedures of tongue thrust

FIGURE 1. Declining incidence of tongue thrust with increasing age, as reported in three separate studies. Solid line denotes Fletcher et al.; dotted line denotes Werlich; broken line denotes Hanson and Cohen. From R. Barrett and M. Hanson, *Oral Myofunctional Disorders* (St. Louis: C.V. Mosby, Co., 1974), p. 78.

are initiated. Incidence studies, which consistently show a progressive decrease in abnormal swallowing with an increase in age, certainly lend credence to this position. If one accepts the theories regarding the development and maturation of the swallow, it is apparent that many children who thrust in the preschool and early-elementary years will self-correct with an increase in age. The Hanson and Cohen longitudinal study (6) provides us with valuable prognostic indicators regarding which children may remain tongue thrusters and which may spontaneously correct. Although the study did not establish any definitive cause and effect relationships, it did identify numerous correlations between

certain associated oral behaviors or conditions and the retention of the "infantile" swallowing pattern. Barrett and Hanson (7) believe that "tongue thrust in children beyond the age of eight years is not usually self-corrective, even after orthodontic treatment is complete."

Mason and Proffit (8) recommend that swallowing therapy be delayed until puberty regardless of whether speech therapy or orthodontic procedures have been initiated previously. Their position is based partially on longitudinal studies which indicated that "many tongue thrusters evolve into a normal adult swallow pattern between 8 and 12 years of age without therapy." (9, 10). The pubertal growth spurt seems to provide a much more favorable oral environment by increasing the size of the oropharyngeal air space.

Incidence

Research studies have produced somewhat conflicting data on the incidence of oral myofunctional disorders in the population. These discrepancies have probably resulted from differences in the diagnostic

TABLE 2.
Incidence of Tongue Thrusting

Definition Used	Mean Age				
	4-9	5-8	6-7	7-5	8-2
"Conservative"	57.9%	43.8%	51.7%	35.4%	35.0%
"Liberal"	86.5%	79.2%	79.2%	72.5%	70.8%

SOURCE: M. Hanson and M. Cohen, Effects of form and function on swallowing and the developing dentition, *Am. J. Orthod.*, 1973, 64:63-82.

criteria used. Tulley (9) surveyed fifteen hundred eleven-year-olds and found only 2.7% to have tongue thrust and malocclusion. At the other extreme, Ward, Malone, Jann, and Jann (11) determined that approximately 75% of early-elementary-age school children exhibited "abnormal swallowing." Bell and Hale (12) established as incidence of 80% among five and six-year-olds. Tulley's 2.7% is so low and so at variance with other studies that one must wonder what the tongue had to do before it was considered to thrust. The findings of Ward et. al. and Bell and Hale, although they appear to be somewhat high, are in line with a "liberal" definition of tongue thrust.

In a comprehensive study by Hanson and Cohen (6), 178 children were tested and retested over a three-and-one-half-year period. Each subject was evaluated on the basis of a liberal definition and a conservative definition. The conservative assessment required that the tongue must protrude between the upper and lower teeth during swallowing; the liberal assessment required only that the tongue contact the lingual surface of the anterior teeth during swallowing. The results are shown in Table 2.

The conservative definition used by Hanson and Cohen resulted in a count closely approximating the findings of Fletcher, Casteel, and Bradley (13) and Werlich (14). The Hanson and Cohen study was longitudinal and involved 178 children; the Fletcher and associates study (1,615 children) and the Werlich study (640) children were cross-sectional. Figure 1 shows that the results are remarkably consistent.

Throughout all the incidence studies, there is a marked decrease in tongue thrust with an increase in age until approximately age ten. The research seems to indicate that if the child has not developed a normal swallowing pattern by age ten, he is not likely to self-correct. The authorities do not agree on the exact age when the transition should be completed. Barrett and Hanson (7) suggest therapeutic intervention at age eight. Fletcher (15) recommends waiting until age ten, and Mason and Proffit (8) believe the child should be at least twelve. These are, of course, general recommendations. Each case must be evaluated on the basis of a number of factors other than

chronological age. It is important, however, for the myofunctional therapist to be fully aware of the effects of growth and development on the maturation of the swallow.

Stages In Maturation

Authorities have long considered the tongue thrust swallow to be an infantile swallowing pattern, and it has been referred to as such in the literature. The swallowing pattern which is considered to be aberrant in adolescents and adults is absolutely normal in infants and young children. Fletcher (15) gives an excellent accounting of the maturation of the swallow.

The Infant-Newborn Stage

Humphrey (16) reported that the fetus sucks and swallows before birth. Sucking and swallowing are well-developed reflexes in newborns and infants. They are classified as reflexive behaviors because they occur automatically or involuntarily when an object, such as a bottle, breast, or wandering thumb, touches the lips.

The infant's tongue is approximately one-half the size of the adult tongue. The infant's oral cavity is approximately one-fifth the size of the adult oral cavity (17). Therefore, in the infant, the tongue is large in relation to the size of the mouth. Because the oral cavity is simply not large enough to accommodate the tongue, it is necessary for the tongue to be positioned forward between the toothless gum pads, protruding to or between the lips. There are also basic differences in the bony structures and musculature surrounding the tongue and oral cavity. The chin is retruded, the palate is flat and wide. The hyoid bone and other supporting structures are crowded below the tongue. The extrinsic muscles responsible for movements of the tongue are horizontally oriented. Therefore, the infant tongue is capable of two basic movement patterns: thrusting forward and rocking back. During sucking and swallowing, the lips are pursed and sphincterlike, the mandible is thrust forward, and the tongue moves forward and back like a plunger.

Lewis and Counihan (18) observed the swallowing patterns of 286 newborns. Only five of the 286 did not exhibit a "tongue thrust" swallowing pattern. Examination of hospital records revealed that four of these five

had "feeding difficulties" entered on their charts. This seems to suggest that a tongue thrust swallow is not only normal but also essential in newborns and infants.

Any mother who has experienced the "agony of defeat" that accompanies the first attempts to feed a baby a few spoonfuls of rice cereal finds little consolation in the universality of her exasperation. The spoon goes in, the cereal comes out. Baby isn't being stubborn or expressing his dislike for rice cereal; he's simply doing the only thing his immature, reflexive neurological and physiological systems know how to do. A dual learning process occurs. Mom learns to put the cereal farther back on the baby's tongue, and the baby learns to close his lips and to stabilize his tongue against the alveolar ridge.

According to Graber (19), the infantile swallowing pattern "remains dominant until five or six months of age and starts to change only with the eruption of the lower incisor teeth." Given the anatomy of the infant's oral structure, there seems to be no other way in which he could swallow.

The Primary Tongue Thrust Stage

Teeth erupt, adding stability to the oral cavity. The hyoid bone descends and the jaws expand, enlarging the space available to the tongue. New experiences of solid foods, biting and chewing, even talking, call for neurological and muscular coordination of tongue movements. Swallowing is less reflexive and more under voluntary control.

The primary tongue thrust stage covers basically the preschool years, extending from infancy until the beginning of mixed dentition. According to the incidence studies, many children retain an infantile swallowing pattern throughout these years, while others mature to a normal swallowing pattern. The Hanson and Cohen study (6) indicated that 57.9% of the four-year-nine-month-old children tested were tongue thrusters (by conservative definition); therefore 42.1% were swallowing correctly. The terms "normal" and "abnormal" appear to be inappropriate in describing the swallowing pattern of the child between six months and six years. It appears to be more "normal" for the young child to thrust (57.9% vs. 42.1%).

The Transitional Tongue Thrust Stage

During the period of mixed dentition, deciduous teeth are being shed and permanent teeth are erupting. This is a time when many changes are taking place within the oral peripheral mechanism. The mandible and maxilla may be growing at uneven rates. At any rate they are growing, thereby reducing the size differential between the "large" tongue and the "small" mouth. The extrinsic muscles of the tongue change their orientation, and the intrinsic muscles mature, allowing finer coordination and control.

It is somewhat difficult to determine whether or not a child between the ages of six and ten is thrusting because of the great variability in swallowing. The child is learning to adapt to the changes within his oral cavity. There may be a greater tendency to thrust the tongue forward or laterally to "plug up the holes." As with the acquisition of any new behavior, the child may switch back and forth between the old and the new as he seeks to accommodate. In the previous section, it was established that swallowing habits diagnosed as tongue thrust decrease during this period. It is interesting to note, however, that the Hanson and Cohen study (6) identified twenty-five children who had been swallowing correctly at age four years nine months and became thrusters by age eight years two months.

Milne and Cleall (20) report a longitudinal study of subjects with a mean age of six years eight months initially. Each of the subjects was judged to have Class I occlusion and normal swallowing pattern. Data were obtained for three phases of development:

Phase I: maxillary deciduous central incisors present

Phase II: maxillary deciduous central incisors absent

Phase III: maxillary permanent incisors fully erupted

Their findings were not surprising. In Phase II, there was more of a tendency toward forward positioning of the tongue during swallowing and during speech. Lip seal was greatest in Phase II. Occluding of the molars increased progressively with maturation (i.e., Phase I: 9 out of 22; Phase II: 13 out of 22; Phase III: 15 out of 22). Their conclusion appears to be logical. "An increase in tongue thrust when the maxillary incisors were not present

should be considered an adaptive measure to changes in the local environment." The presence of tongue thrust may be a normal but transient occurrence during mixed dentition.

The Mature Stage

Fletcher (15) states that by ages ten to twelve, the child should be using a mature swallowing pattern. This correct swallowing pattern is described by Pierce (21) as including the following components:

1. The food, liquid, or saliva to be swallowed is gathered and "trapped" on the dorsum of the tongue. The tongue is raised, and a seal is formed with the tongue in contact with the alveolar ridge

anteriorly and touching the lingual surface of the molars and adjacent gums laterally. The tip of the tongue presses against the SPOT, a position on the alveolar ridge behind the upper front teeth. The middle and back of the tongue push upward against the palate.

2. The molars are firmly occluded.
3. The swallow is accomplished with no tensing of the facial muscles.

During the first decade of life, the child should progress through four stages of swallowing: the infant-newborn stage, the primary tongue thrust stage, the transitional tongue thrust stage, and the mature stage. The changes in the swallowing

TABLE 3.
Considerations for Treatment at Various Age Levels

Age (in years)	Pros	Cons
3-5	Early detection and remediation may help prevent malocclusion or its aggravation; habit has less strength at this age, should be more responsive to therapy	Motivation necessary for consistent carrying out of practice assignments difficult to achieve; some children will receive unnecessary treatment
6-8	Diastemata and missing teeth provide front-row view of offending tongue during training and practice sessions, making it easy for child to determine when doing exercise improperly; boundaries for tongue movements irregular, constantly changing, thus encouraging "scanning" behavior, a necessary part of relearning; children at this age very impressionable—will do everything they are asked to do for clinician who provides proper incentives	This is transitional period — some clinicians argue it is easier to teach child with stable oral environment because of more consistent sensory feedback; according to some authorities, thrusting begins now due to tongue's tendency to fill gaps between teeth—therapy must compete with this tendency
9-17	Both extremes of motivation evidenced, but most youngsters in this group anxious about physical attractiveness; also, have enough foresight now to strive for long-range goals, such as permanently good dental health; success in therapy can be prerequisite for initiation of orthodontics—"reward" of beginning to get dental work done often comes to patient immediately after therapy.	Many in this group so busy with homework, athletics, music lessons, paper routes, etc., hard to keep their minds on such relatively uninteresting activities as lip and tongue postures, manner of swallowing; due to inner striving for independence, many resent regimen of practicing
19 and over	Almost without exception, motivation excellent; behavioral base-line stable—wherever tongue rests, whatever manner of swallowing or nature of oral structures, behavior is consistent	Many adults skeptical about changing habit so deeply ingrained—lack of confidence sometimes hinders progress; structures relatively rigid—palatal expansion to make room for resting and functioning tongue rarely possible; teeth do not move in response to tongue retraining

pattern appear to be attributable to maturation of the neuromuscular system and to developmental changes in the size, shape, and orientation of the oral cavity. Approximately 75% of the population weaves its way through the above stages and emerges with a "correct" swallow.

In evaluating the young child, it will be important to keep in mind the "normal" sequence of swallowing maturation and to be aware of any developmental or behavioral factors which tend to influence the size and shape of the oral cavity or to foster an open-mouth, low-tongue resting posture.

Pros and Cons

Table 3 is reproduced from R. Pierce, *Tongue Thrust: A Look at Oral Myofunctional Disorders* (21) and contains much of the information provided by R. Barrett and M. Hanson in *Oral Myofunctional Disorders* (7).

Rules of Thumb

It is always difficult to make generalizations when dealing with a species as unique and variable as the human. Each individual patient should be evaluated in terms of maturity; type, degree, and progressiveness of malocclusion; and presence of associated oral behaviors.

Almost without exception, the best approach with the young child is the "wait-and-see" approach. Over the years, I have developed the following guidelines to assist me in determining whether or not to enroll a young child in therapy.

—If thumb sucking is present, eliminate it and reevaluate in 6 to 12 months.

—If there is airway interference (enlarged tonsils or adenoids, allergies, etc.), get the necessary medical treatment and reevaluate in 3 to 6 months.

—If the palate is too high and/or narrow and the referring dentist plans to do rapid palate expansion, create a more favorable oral environment, then reevaluate 6 months after appliances are removed.

—If the lingual frenum needs to be clipped, encourage the surgery, and reevaluate in 3 months.

In each of the above cases, the oral myofunctional therapist functions as a member of the "team," working closely with the dental or medical professionals

in coordinating the best of treatment for the patient. Good records (x-rays, impressions, etc.) are important to compare the effects of the treatment on the dentition.

—If no other factors are identified which might be affecting the teeth . . .

—If the child seems "mature" and the parent seems to be "in control" . . .

—If the resting posture is dreadful but the tongue appears to be able to fit into the oral cavity . . .

. . . recommend oral myofunctional therapy

—If the tongue protrudes at rest and during swallowing, but it doesn't appear to be doing any damage to the teeth or adversely affecting speech . . .

. . . don't do therapy.

Final Thoughts

Much of the criticism of doing oral myofunctional therapy with the young child centers around the "simple open bite." There are probably some children with open bites who have been unnecessarily enrolled in therapy. In my own professional experience, I do not see young open bite cases because those are not the patients who are referred to me. The dentists and orthodontists in my community have stopped referring these patients to me, because for so many years now I have sent these patients back to them, refusing to treat. The young patients I do enroll in therapy are primarily Class III with the tongue (at rest and during swallowing) down in the floor of the mouth, pushing the mandible down and forward. That's what I get: "orthodontic garbage" — Class III's, crossbites, and a few severe anterior or bimaxillary protrusions. I haven't seen a "simple open bite" in years! Part of our responsibility as therapists is to educate our referral sources as to the type of patients who benefit from oral myofunctional therapy.

I believe that there is much to gain by working with the young child, specifically in terms of preventing serious malocclusions; however, I warn that case selection must be based on consideration of the factors we've discussed.

I feel that it's just as foolish to set lower limits on the age of patients as it would be to set upper limits. Yet, many of us have for many years said: I don't treat patients until they're 8 or 10 or 12 or 14. As the practicing clinician or the

referring dentist, you have a right to set whatever age limits you feel most comfortable with. I am suggesting that you evaluate each patient thoroughly and base your decision on factors other than age.

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