Clinical Perspective

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TREATMENT FOR THE YOUNG CHILD

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There has been much controversy regarding the earliest age at which a patient should be enrolled in orofacial myofunctional therapy. It appears that, as with other controversies surrounding this topic, problems arise from misinterpretations of statements and philosophies in the professional literature, incomplete understanding of the myriad of conditions related to orofacial myofunctional disorders, and inaccurate perceptions of what therapy can and should be expected to accomplish. It is conceivable that many of the early proponents and writers overstated the deleterious effects of tongue thrusting on dentition. Early clinicians observed a problem and attempted to develop treatment programs to alleviate the apparent "causes" of that problem. When research methodology and technology caught up with clinical efforts, it became apparent that some of the principles on which early treatment programs were based were inaccurate. In some instances, the "new" insights and information provided by researchers resulted in conclusions and recommendations that went too far in a conservative direction.

This journal special issue provides an opportunity to combine current updated information from clinicians and researchers. Intervention strategies specific to the young child will be addressed in this article. Some researchers and clinicians, historically, have proposed that therapy not be initiated before a certain age or stage of dental development. In terms of what we have learned regarding growth and development, factors that influence dentition, and maturation of orofacial-muscle functions, it is certainly wise to be cautious about recommending therapy for the young child. However, there are instances in which some type of intervention is warranted. The purpose for therapeutic intervention with the young child is to make appropriate changes in the muscular environment that will facilitate normal growth and development. In certain cases and with certain conditions, early intervention may be indicated.

For a historical perspective, several selected reports will be reviewed. It is important to keep in mind that much of the literature of the 1960s addressed children with open bites. Much of the criticism of orofacial myofunctional therapy with the young child focuses on the "simple open bite." For example, Anstendig (1966) typifies the position of those who believed in early intervention. In discussing the child with open bite and tongue thrust, he summarized: "This open bite can only be corrected after the thrusting habit is eliminated, otherwise any attempt to treat the malocclusion will fail. However, if the

general dentist can recognize this condition in children as young as six years of age, not only is it easier to correct the habit, but it is possible that the teeth will return to proper alignment without the aid of orthodontic treatment" (p. 75).

There are probably some children with open bites who have been enrolled in myofunctional therapy unnecessarily — because the "simple open bites" may self-correct with growth and development. Hanson (1975) stated that "there is a disproportionate amount of attention paid in the literature to open bite and tongue thrust, since patients with open bite constitute a relatively minor portion of the caseload of most therapists who work with tongue thrust" (p. 146). Analysis of present caseloads indicates that young patients most often enrolled in therapy have Class III malocclusions, with the tongue at rest and during swallowing apparently pushing the mandible down and forward. Other young patients have posterior lingual crossbite or severe anterior or bimaxillary protrusion. Careful evaluation by a dentist or orthodontist should identify those children who need therapeutic intervention.

Barrett and Hanson (1974) stated the position held by many authorities: That the child should be at least eight years of age before orofacial myofunctional therapy is initiated. Incidence studies consistently show a progressive decrease in tongue thrust swallow with increase in age (Fletcher et al., 1961; Werlich, 1962; Andersen, 1963; Hanson and Cohen, 1973). Based on these studies, and theories regarding development and maturation of the swallow (Fletcher, 1970; Proffit and Norton, 1970), it is apparent that many children who thrust in preschool and early elementary years will self-correct without therapeutic intervention. There was always the fear, and the criticism, that children might be treated unnecessarily who would have made the transition to a correct swallowing pattern if no therapy had been done.

The Hanson and Cohen (1973) longitudinal study provided clinicians with the first valuable prognostic indicators regarding which children may remain tongue thrusters and which may spontaneously correct. Barrett and Hanson (1974) believe that "tongue thrust" in children beyond the age of eight years is not usually self-corrective, even after orthodontic treatment is complete" (p. 94).

Mason and Proffit (1974) recommended that swallowing therapy be delayed until puberty, regardless of whether speech therapy or orthodontic procedures have been initiated previously. They cite studies by Tulley

(1961) and Proffit (1972) which indicate that many tongue thrusters evolve into a normal adult swallowing pattern between 8 and 12 years of age without therapy. This rather conservative approach is based primarily on morphological data, and a view of the maturation of the swallowing pattern as an adaptation to growth changes in the size of the oropharyngeal airspace. They cite growth of the ramus of the mandible with accompanying downward shift of the tongue in the oral cavity; decrease in the amount of tonsil and adenoid tissue; and, vertical growth of the cervical vertebrae as the factors that allow the tongue to assume a more posterior resting position in the oral cavity, resulting in closer approximation of the dental arches. However, many dental clinicians, especially orthodontists, continue to believe that by waiting until puberty, when most anticipated growth changes have taken place, the patient has lost the opportunity to benefit from a normal oral environment in which growth and development can progress toward a spontaneous "normal" occlusion.

Many orthodontists continue to question the delay of therapy when there appears to be justifiable reason for believing that tongue posture and function may contribute to malocclusion. Day (1975) expressed the sentiments of many who work with orofacial myofunctional disorders, when stating: "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, if possible, of severe malocclusions. I know of no etiological factors causing malocclusions that surpass myofunctional causes in producing severe malocclusions" (p. 81).

It is difficult to make universal generalizations when dealing with the broad spectrum of human behavior, and the wide variety of oral motor patterns considered to be variant. Each candidate for treatment should be evaluated in terms of type, degree, and progression of malocclusion; presence of associated oral behaviors; and maturity, attitude and motivation of the child and parent. Although there may be much to gain by working with the young child — specifically in terms of preventing more serious subsequent malocclusions — case selection remains the key element in any argument for early treatment. It would seem just as foolish to set lower limits on age of patients for treatment, as it would be to set upper limits. The appropriate approach is to evaluate each patient on an individual basis.

Some general considerations relating to the initiation of treatment for orofacial myofunctional problems are presented in Table 1 (p. 35).

Digit Sucking

There is strong agreement among dental investigators that a digit sucking habit that persists while permanent teeth erupt can have a detrimental effect on the developing dentition. Studies have determined significant cor-

relations between digit sucking and Class II malocclusion (Popovich and Thompson, 1973) and between digit sucking and posterior lingual crossbite (Stewart, et al., 1982). Anterior open bite and anterior protrusion are commonly found in children with digit habits. The presence of a persistent thumb or finger in the oral cavity can exert sufficient pressure to shape the maxillary arch, the palate, or both. Proffit (1978) contends that the duration of an oral force is more critical than the magnitude of force. A prolonged digit habit, with pressure exerted against the teeth for many hours per day, can have an impact on the position and eruption pattern of the teeth. There is also evidence from radiographic research that digit sucking habits may contribute to root resorption (Moyers, 1973; Taylor and Peterson, 1983).

VanNorman (1985) suggests that by the age of five or six, a program to eliminate digit sucking should be initiated. She recommends a behaviorally based program (VanNorman, 1984, 1985). Other programs have been proposed by Barrett and Hanson (1974), Garliner (1971), and Pierce (1982). With some modifications, these programs can be used with children younger than age five years, but patient maturity is important in eliminating a digit habit.

It is usually recommended that the thumb or finger habit be eliminated before any type of orofacial myofunctional therapy is initiated. In most instances, therapy is delayed for six months or longer after elimination of the digit habit. The patient is then re-evaluated to determine whether or not therapy is indicated. A large number of children self-correct an anterior resting posture and swallowing pattern following elimination of the digit habit.

Diagnostic Indications for Intervention

Usually, a young patient is identified initially by the dentist or orthodontist as having an unacceptable oral posture or functional problem such as forward tongue rest posture or a tongue thrust swallow — which is thought to contribute to an orthodontic problem. The role of the orofacial myologist is to describe fully the oral behavioral characteristics, and to determine whether or not therapy is indicated. Although it is usually fairly easy to determine whether or not a child has a "tongue thrust," it is much more difficult to determine whether or not the child should be enrolled in therapy and what type of therapy is most appropriate for an individual child.

There are several excellent references available on diagnostic procedures (Garliner, 1971; Barrett and Hanson, 1974; Pierce, 1978). Diagnostic information is obtained through gathering case history information; informal observation of resting posture of the tongue, lips and mandible; formal and informal assessment of speech; examination of the oral mechanism; and evaluation of the swallowing of liquids, solids and saliva.

The purpose of the diagnostic session is to answer three questions: (1) Does the patient have an orofacial myofunctional problem? (2) Does it appear the oral rest posture or swallow pattern is detrimental to occlusion, articulation or cosmesis? (3) Is this patient an appropriate candidate for therapeutic intervention?

Throughout the diagnostic session, the clinician

TABLE 1
Considerations for Treatment at Various Age Levels

Age (yrs)	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 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 and other activities that it is difficult 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 habits so deeply ingrained — lack of confidence sometime 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

Reprinted with permission from Pierce (1978), based on data from Barrett and Hanson (1974).

observes the patient's resting posture and swallowing. Rest posture is usually easy to assess visually because the patient assumes a habitual resting posture whenever attention is diverted. Swallowing, however, may be more difficult to assess because patients are aware that their behaviors are being observed. As a result of bringing swallowing to a conscious rather than a subconscious level, they may modify their natural swallowing pattern. Some patients may overexaggerate protrusions of the tongue, whereas others will try actively to keep the tongue from coming forward. The clinician must be aware that the swallowing pattern the patient uses during the diagnostic session is similar to, but not always the same as, the habitual swallowing pattern.

Many of the factors that enter into the question of whether or not the patient has an orofacial myofunctional disorder currently have no quantifiable indices. How much pressure does the tongue exert against the teeth? How much movement in the facial muscles is too much?

How high and narrow can the palatal arch be without being too high and narrow? The examiner's challenge, therefore, is to conduct a thorough evaluation of the oral behaviors and presenting morphology, and make reasonable correlations between these observations. Keen observation, combined with knowledge of growth and development of the oral structures and maturation of the swallowing pattern, enables the clinician to identify significant oral habits and postures.

It is easier to identify forward resting tongue posture, lips apart resting posture, and tongue thrust swallowing patterns than it is to determine whether or not such conditions are harmful. Many individuals swallow with a tongue thrust pattern over a lifetime — without any apparent problems with dental occlusion or speech. At present, there is insufficient evidence of a link between the variety of problems referred to as tongue thrust and dental occlusion to state categorically whether or not tongue thrust causes orthodontic or speech problems. Weiss and

Van Houten (1972) introduced the terminology "benign" and "detrimental" to differentiate between a thrusting pattern that *does not* appear to be doing any damage (benign), and one that is *closely associated* with malocclusion and/or misarticulation, (detrimental). Research seems to substantiate the clinical impression that tongue pressures during swallowing probably do not have as significant an effect on occlusion and articulation as do resting postures (Gould and Picton, 1964; Weinstein, 1967; Proffit, et al., 1969; Posen, 1972).

If there is a problem of oral posture or function and if it appears to be detrimental to occlusion, articulation or cosmesis, the clinician must make decisions regarding what type of treatment would be most appropriate. It is important for the clinician to participate as a member of the "team" with the referring dentist or orthodontist.

Specific Treatment Considerations With Younger Children

After gathering pertinent case history information; observing the patient swallowing liquids, solids and saliva; assessing habitual resting posture of the tongue, lips and mandible, the clinician must decide whether or not to recommend intervention and what goals and type of treatment would be most appropriate. As a conservative approach to such decision-making, certain guidelines and recommendations seem warranted:

1. If tonsils or adenoids appear to be enlarged, or if there are known and recurring allergies or sinus problems or other airway interferences, refer the patient for medical evaluation and management, then re-evaluate the patient following medical intervention.
2. If the dentist or orthodontist plans to undertake rapid palatal expansion treatment, recommend that the patient have the treatment, followed by re-evaluation six months after completion of treatment.
3. If the patient appears to be a candidate for a lingual frenectomy, discuss this recommendation with the referring dentist, for referral to an oral surgeon, then re-evaluate the patient six months after the surgical procedure has been done.
4. If thumb or finger sucking is present and active, attempt to eliminate it and re-evaluate the patient in six months.
5. If examination findings indicate that there are no morphological factors contributing to a forward rest posture or tongue thrust swallow, and that the behaviors seem to be related only to habit pattern or lack of oral-motor maturation, therapeutic intervention would seem to be indicated. Whether the child should be enrolled in a complete orofacial myofunctional therapy program or a modified oral rest posture program is subject to clinical interpretation. If it appears that a tongue and lip rest posture program alone is likely to be successful and to enable the patient to self-correct the swallow pattern, that would be the treatment of choice. However, if the young patient appears to have a severe or persistent tongue thrust swallow pattern with a wide variety of the typically associated oral behaviors, then it may be advisable to recommend a complete therapy program. Most treatment programs currently available can be modified somewhat

and used successfully with a young patient. *Swallow Right* (Pierce, 1982) was published specifically for the young child.

6. If the evaluation reveals a tongue thrust swallowing pattern, but it does not seem to be adversely affecting the dentition, speech or cosmetic appearance, therapy would not be warranted.

These rules-of-thumb serve to remind the orofacial myologist of the existence of factors other than tongue thrust that can account for the developing malocclusion. The overall goal should be to promote normal posturing and growth rather than to superimpose normal function on an abnormal oral environment. Aberrant tongue posture and function may be an adaptation to the abnormal form — rather than contributing factors to the presenting malocclusions. When any of these "wait-and-see" recommendations are made, it is advantageous for the orofacial myologist and dentist to work closely in assuring that data, such as x-ray films and study models, are made for comparison at the six-month follow-up.

Rationale for Rest Posture Therapy

One of the few facts that most orofacial myologists, orthodontists and researchers agree on about orofacial myofunctional problems is that the pressures exerted by the resting posture of the tongue and lips have more of an impact on the dentition than the pressures exerted by the tongue during swallowing. Initially, this was a difficult concept for many to understand and accept because the early pressure studies (Kydd et al., 1963; Lear and Moorrees, 1969) suggested that the force of the tongue pushing against the teeth during swallowing was greater than the restraining forces of the lips and cheeks. When viewed simplistically, in terms of a "balance" of muscle forces, it seemed apparent that a tongue thrust swallow represented an "imbalance," which was assumed to cause malocclusion. One questionable aspect of this reasoning was that persons with "normal" occlusion demonstrated this same discrepancy between tongue and lip/cheek pressures.

Proffit (1978), in considering the factors influencing the position of teeth, identifies four primary factors and several additional secondary factors that may account for some type of equilibrium in tooth position. The primary factors are: (1) Intrinsic forces on the dentition applied by tongue and lips. (2) Extrinsic forces: habits such as thumbsucking and orthodontic appliances. (3) Forces generated from dental occlusion. (4) Forces transmitted from the periodontal membrane.

The proponents of orofacial myofunctional therapy have, until recently, placed too much emphasis on the strong but intermittent pressures exerted by the tongue during swallowing. Perhaps not enough emphasis has been given to the light but prolonged pressures exerted by the tongue and lips at rest. Proffit (1978), an orthodontist, stated "all clinical orthodontics is based on moving teeth by deliberately altering the force equilibrium on the dentition. Teeth can be moved effectively by a force of only a few grams provided that the force is maintained continuously. . . . The duration of force is a more critical variable in orthodontic treatment than the force

magnitude. The same is true for external pressure habits, such as thumbsucking. The greater the duration of the habit, the greater its impact on the teeth is likely to be . . . by analogy, resting pressures of tongue and lips have durations which are entirely consistent with importance in equilibrium; but short-acting pressures during speaking and swallowing should be discounted because the total duration of these pressures is a few minutes per day" (p. 177-178).

Orofacial myologists and orthodontists have, for years, documented changes in the occlusion of patients who have completed an orofacial myofunctional therapy program. Such favorable changes in occlusion may have come about because therapy changed the rest posture of the tongue and lips as well as the swallowing pattern. Emphasis on rest posture should be the central focus of all orofacial myofunctional therapy programs — especially for the young child who appears to have a problem in dental development related to orofacial posture and function.

Type of Treatment: Recommendations

One of the obstacles to establishing a firm recommendation as to whether or not a young child should be enrolled in therapy has been the limited choices in the mind and experience of the orofacial myologist. Should a child be enrolled in a comprehensive therapy program or should we "wait-and-see" if the child outgrows it? One alternative to the traditional therapy program is an abbreviated program with the major focus on oral rest posture.

The goals of rest posture therapy with the younger patient are to achieve a closed resting posture of the lips, and to reposition the resting tongue posterior to the incisors at the roof of the mouth.

These goals are accomplished primarily through the use of muscle exercises drawn from the repertoire of treatment techniques in the literature. Andrianopoulos and Hanson (1987) characterized successful therapy as follows: "Most strengthening exercises are considered superfluous" (p. 133). Rest posture therapy should emphasize normalizing function rather than strengthening muscles.

The literature on oral facial growth and development highlights the importance of the rest posture of the tongue and lips (Brodie, 1952; Meredith, 1953; Vig and Cohen, 1979). Treatment of unacceptable postures, from an orthodontic standpoint, is compatible with the goal of establishing an oral environment in which normal growth and development can occur. For some young children, such therapy is a conservative effort to attempt to influence or promote normal patterns of growth.

The typical rest posture program might consist of sessions once a week for four to six weeks, with a follow-up scheduled in one month, and additional follow-up appointments scheduled at six-month intervals. Specific exercises which could be used in a rest posture therapy program can be found in Pierce (1986).

Rest posture therapy is recommended for children who have "incompetent" lips. Lip incompetence is defined in dentistry as the inability to close the lips without strain — resulting in an habitual lips open resting posture. For

some children with lip incompetence, dental development can be altered by this posturing; therefore, these children should be identified by a dental specialist. The overall purpose of lip exercises is to achieve functional lip closure by reducing or eliminating lip incompetence. The exercises increase strength and tonicity in the lip muscles (Barber and Bonus, 1975; Ingervall and Eliasson, 1982; Owman-Moll and Ingervall, 1984). Before treatment, the upper lip usually rides high, exposing the upper incisors and gingival tissue, whereas the lower lip is flaccid and usually protrudes in a pout. After successful treatment, the patient should be able to maintain a comfortable closure without stressing the circumoral musculature. There is consistently a vast improvement in cosmesis, an important sequelae of such treatment.

Rest posture therapy is also recommended for children who position the tongue against the lingual surface of the incisors or between the upper and lower anterior teeth. As with the lips, there can be a discrepancy between the size of the tongue and the size of the oral cavity. The literature on growth and development, particularly as it relates to the shaping of the palate, seems to emphasize the need for the tongue to be positioned in the roof of the mouth as soon as possible, so that the contouring of the palate and possibly the shaping of the mid and lower face regions can get full advantage from morphological factors.

Tongue exercises position the tip of the tongue on the maxillary anterior alveolar ridge, the dorsum of the tongue against the hard palate, and the back of the tongue against the soft palate. As with lip exercises, the purpose is not to strengthen the tongue muscles but rather to reposition the tongue to assume a comfortable, nonstressful resting position at the roof of the mouth.

The success of changing the habitual resting posture of the tongue is more difficult to assess than with lip posture. Lip posture can be seen at a glance. However, if lip closure therapy has been successful, it is difficult to determine whether or not the tongue is in its intended position. The best clinical indications of correct or incorrect tongue resting posture are the fleeting glances when the unguarded patient's lips part for a smile or to begin talking, eating or drinking. In these brief moments, the alert parent or clinician can assess whether the tongue rises from the floor of the oral cavity or descends from above to initiate its activity of talking or eating.

Fortunately, patients who have successfully attained a comfortable, relaxed, lips-closed resting posture seem relatively at ease with this posture. In such instances, it is usually possible to break the lip seal manually to get additional information and clarification about resting tongue posture. As with lip posture, the cosmetic improvement from repositioning the tongue is significant in terms of how the child is viewed by parents, teachers and friends.

Most orofacial myologists who are experienced with younger patients would contend that therapy for lip and tongue rest posture often leads to a significant improvement in occlusion. If so, this is attributable to altering the oral-facial muscular environment to enable normal growth and development to occur.

Summary

The large majority of patients referred to orofacial myologists have been, and will continue to be, in the 10 to 15 year age range, primarily because this is the age when most individuals begin orthodontic treatment. As more pedodontists and general dentists have become aware of developing malocclusions, and the possible detrimental effects of tongue and lip-resting posture and tongue thrust swallowing, there has been an increase in the number of young children referred from a preventive point of view. Guidelines have been provided to enable the orofacial myologist to function as a member of a team in determining the best course of treatment for each child. There are certainly instances in which

medical management, surgical intervention or orthodontic treatment are indicated. These recommendations should be made by the dental specialist, perhaps in consultation with the orofacial myologist. There are other instances in which therapy for tongue thrust or rest-posture therapy are indicated. With the young child, we can afford to take the more conservative approach — rest posture therapy — because there is sufficient time later to do additional therapy if needed. The overall goal is to create as normal an oral environment as possible so as to facilitate normal growth and development. Correcting the resting posture of the tongue and lips also improves the cosmetic appearance and enhances the opportunity for good occlusion.

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