Orofacial Muscle Imbalance: Some Considerations in Referral

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Orofacial muscle imbalance, with its ancillary disorders of tongue thrust swallow, poor tongue posture habit, mouth breathing, thumb sucking, and other orolingual habits or activities, presents some problems related to the time when a referral should be made. These referrals may originate from the dentist, orthodontist, allergist, otorhinolaryngologist, neurologist, speech pathologist, or the myofunctional clinician, to mention a few. This paper is written to discuss some of the conditions which should be considered in determining if a referral should be made, and if so, to whom. Not all conditions warranting referral are discussed here. This author has chose those which deserve special attention and may not be getting.

Factors Contributing to Orofacial Growth and Development

The relationship of chronological age and orofacial development has been reported in the literature extensively (Moss, 1960, 1962; Moyers, 1971; Humphrey, 1968, 1969; Lamons and Gray, 1958; Schour and Massler, 1941; Sassouni, 1962). There are a variety of diseases or conditions which affect the normal growth process within the functional matrices of the organs of the lower face.

The Adenoid Facies

The adenoid facies as a clinical syndrome is well known. The effect upon the posturing of the tongue and mandible is to cause downward and forward movement, often associated with openbite dental malocclusion. Apparently, this is to establish patency of the airway for breathing. Similar movements are seen in the patient with chronically enlarged tonsils. Herein lies an important consideration. That is, to what extent is the upper airway chronically nonpatent? It does very little good to refer to the orthodontist or the myofunctional clinician a patient with chronic upper respiratory distress. The mouth-breathing patient will be unable to retain linguopalatal or bilabial contact over long periods of time when the condition of a nonpatent nasopharyngeal airway exists. Clearly the condition warrants medical or surgical intervention to alleviate the nonpatency if orthodontic or myofunctional treatment is to be successful. It should be stressed that medical intervention alone may not alleviate the *habit* of mouthbreathing. It may merely alleviate its primary cause—a must before other treatment programs may be successful.

The medical practitioner seeing these patients needs and deserves the information which may be provided by the orthodontist or the myofunctional clinician. Unless the physician is informed about the nature of the effect a nonpatent airway has upon the growth and development of the lower face, he or she will attend only to the disease history of the child related to infected tonsils or adenoids. Many of these children have a perfectly normal health history for diseases. Here we may not dealing with a disease process, per se, but a condition where tonsil or adenoid bulk alone is preventing a patent airway.

Other conditions may contribute to the problem. Often a child with a history of sinus infections and/or allergies may be mouthbreathing. Still others may have a small velopharyngeal area. This alone, and especially when coupled with mild enlargement of the tonsils or adenoids, may be enough to effect a nonpatency. All deserve referral to the physician with accompanying data. We cannot expect our medical colleagues to appreciate the effect these conditions may have upon the facial skeletal growth of the patient without data supporting the referral.

Lisping, Tongue Thrust, and Breathing

In his doctoral thesis, Hilton (1973) reported three males and *twenty* females as having frontal lisps in an orthodontic population. Analysis of this sex ratio difference was found to be significant beyond the .001 level. The sex ratio differences were linked by Hilton with the difference in postpubescent growth. Hilton's subjects ranged in age from eight years to just over twenty-two years. From his data he states empirically that the additional growth of the male larynx and related structures in puberty may provide the space necessary for adequate positioning of the structures involved in /s/ articulation. A comparable growth spurt in females does not occur. Coupled with this data are his findings that ". . . support . . . the premise that severely frontal lisping orthodontic patients present a syndrome of orofacial dysplasia arising from a chronically active cranial component of upper respiratory maintenance." In short, his findings point to lisping and tongue thrust as secondary symptoms of the more basic condition of a nonpatent airway—most often in the obstruction of nasal air flow. In his thesis, Hilton found that the size of the tonsils did not show a difference between his lisping and non-lisping subjects. This is somewhat of a surprising result in light of his other findings, especially when another study has shown a significant relationship (.01) between a history of tonsil disease (or tonsil presence) and tongue thrust (Wood, 1966). As Hilton states: "This might have been due, in part, to the factors of post-adolescent atrophy of the tonsils and adenoids and the transient nature of tonsil size variations in the normal case."

It seems that the data collected by Hilton points to the early identification and treatment of children presenting difficulty breathing through their noses. A recent article discusses growth processes and the rationale for tongue thrust therapy (Mason and Proffit, 1974). This article proposes that since lymphoid tissue diminishes in size with age, accompanied by a normal enlargement of the oropharyngeal airway, the treatment of the tongue thruster at an age prior to puberty is not indicated even with a concommitant dental malocclusion. With many children most authorities agree with these writers. However, with some children manifesting a host of symptoms, among which are tongue thrust swallow, mouth breathing, underdeveloped or collapsed palatal arch, and nonpatent airway, the policy of delaying therapy seems ill advised. Obviously, these children need the correction of the respiratory problems. But as we see in children who are mouthbreathing in whom medical or surgical intervention has alleviated the cause, the habit remains. This researcher doubts even these writers would argue with the premise that

synergistic muscular action becomes habitual when present over long periods of time. If one were to couple Hilton's ideas with those of Mason and Proffit, an argument could be made for delaying /s/ therapy until after puberty. To what extent early identification, medical or surgical intervention, and therapeutic prophylaxis may prevent the underdevelopment or collapse of the palatal arch is yet to be determined. The investigation of this problem is currently underway at the University of Nebraska at Omaha and Creighton University.

Clearly, then, a referral to the physician is warranted followed by a re-evaluation of the patient's orofacial problem once respiratory prophylaxis is effected. One small sidenote—in some patients, the most intensive medical treatment program does not alleviate the condition affecting the respiratory airway. This is particularly true for those patients presenting a condition of chronic allergy.

Macroglossia

Macroglossia is frequently seen as a problem associated with dental malocclusion and tongue thrust. In my practice, I often see this problem associated more with a bilateral openbite malocclusion, sometimes involving the position of the incisors. The difficulty in delineating the disorder is the subjectiveness of the diagnosis. The questions may be posed: Is the tongue abnormally large? If so, in relation to what? In a paper much criticized for presenting questionable measurements, Meldrum and Fletcher, (1965), attempted to quantify tongue size. Most other investigators use even more subjective criteria (Brodie, 1952; Subtelny and Sakuda, 1965; Rin, 1961).

Although it is difficult to quantify the size of the tongue in relationship to its surrounding bony capsule, an observant clinician will be able to tell when such a condition exists. That during the growth years, the tongue is normally large in relation to the surrounding structures must be taken into account. The question is, to what extent is the size of the tongue affecting its function and the growth of the lower face? Once answered, the problem of what may be done about it remains.

At times, the patient with an apparent large tongue manifests a unilateral or a bilateral posterior crossed bite. If palatal expansion is feasible, the orthodontist may wish to consider this treatment before referral is made for myofunctional therapy. The additional space created in such patients may improve orolingual space relationships, enhance the myofunctional clinician's chances for success and reduce the chances for orthodontic relapse. The evidence such a course of action has upon the success of either treatment program is lacking. However, it would appear to make sense in light of the existing problem of tongue size and its available space in the mouth.

The literature sites the possibility of treating patients with large tongues by surgical intervention. That is, a segment of the tongue is removed to reduce its bulk. One such patient was reported to have marked speech articulation and rate problems as a consequence. (Sholly, 1974). With the interference of neuromuscular patterns and neurosensory feedback mechanisms, this result is not surprising. It does not appear to be a treatment of choice.

Muscles of Mastication

Clinically, the patient presenting orofacial muscle imbalances may display extremely weak muscles of mastication. Clearly, some mandibular adductors are intact since the mouth can be closed but extreme weakness is present. The patient will often be unable

to sustain a contracted posture for even a few seconds and frequently sudden loss of tonus, jerking, or merely a fading of tonus is evident.

Sometimes a check on the diet of these patients reveals a preponderance of soft foods. Oddly, the literature contains little data on the dietary habits of these people. It makes one wonder if the emphasis on soft foods, tenderized meats, and other foods, isn't affecting more than just dental hygiene. Orthodontic or medical investigations into the diets of patients along with the necessary adjustments may improve muscle tone and mouth-tongue posture enough to preclude the necessity for myofunctional therapy. It is a possibility worth considering.

Much research needs to be done here. It seems that we have neglected important considerations when we know that the mandible is a hinged bone, and may be unstable as a tongue anchor unless it is brought forcibly to the maxillae through masticatory muscle contractions. There is also very little data on the relationship of tonus in the muscles of mastication and effective nose breathing. In addition, the angle at which these muscles pull must be considered in light of data reported in the literature (Moss, 1971).

Lip Resting Postures

Frequently, the myofunctional therapist will encounter a problem wherein the client will rest the lips against the teeth. This is often the case in overjet of the upper anterior teeth. The incisive edge of these teeth are pressed into the lower lip border. The result may be to broaden or maintain the overjet and/or openbite condition. Regardless of the orthodontic implications, it is most difficult to approximate normal muscle function for mastication or swallowing when bilabial contact is difficult or impossible to attain. Here the referral is difficult. In some patients, the orthodontist may place headgear or bands in an effort to move the anterior teeth distally. If the angle of the overjet is severe, however, such pressure may cause the change in distal placement of the incisive edge to be counterbalanced by mesial shift of the roots. This is unhealthy since a significant shift may produce a condition whereby the bone surrounding the roots is reduced on the mesial side.

One such patient was fitted with a tongue crib anchored to the upper arch. The combined force of lip pressure distally and the removal of the tongue force mesially allowed the teeth to assume a more natural occlusal line without a traumatic shift of the root position in the alvelous. This has helped in permitting the lips to close more easily and has made lip toning exercises more effective.

The decision of when to refer is difficult. Should the clinician attempt lip exercises with the teeth severely labioverted? Should headgear, bands, or tongue cribs be used to effect distal displacement? In the patient referred to previously, the initial effect of the tongue crib was to introduce an immediate lisp in speech. It was found that the crib had been positioned too far back on the alveolar ridge to allow adequate tongue placement for speech articulation of the apical phonemes, particularly /s/. Through consultation, a position suitable for speech articulation as well as for orthodontic goals was found. Thus, it can be seen that referral alone may be ineffective if the lines of communication between the referring parties are not kept open.

Neuromuscular Symptoms

Occasionally, a patient will manifest difficulty in performing voluntary tongue movements and maintaining nonstressful tongue postures. Accompanying these problems

may be tongue tremors and fasciculations. Often there are overflow movements to the large muscle groups or general body tension accompanying attempts to move the tongue in isolation. These symptoms are seen more frequently in younger children which is obviously a product of a maturing nervous system. But when the symptoms are extreme and accompanied by a more general hyperkinetic symptomatology, neurologic referral is indicated. It is felt we may be seeing very mild oral dyspraxic symptoms or general symptoms of mild cerebral palsy.

The clinician must be careful that he is looking at real neurologic dysfunction rather than nervousness or anxiety brought on in the clinical setting. Usually a session or two of therapy is helpful to ascertain the extent of the problem if one exists. Research in the area of neuromuscular control is woefully lacking as reported by Moyers (1971) and Flower and Lawson (1971).

Summary

In the determination of when or to whom referral should be made to provide insight into the treatment of orofacial muscle imbalance, several considerations were presented. Along with the more typical referral reasons, the referring clinician may wish to consider growth factors, tongue size, patency of the nasal airway and related problems of lisping and tongue thrust, lip resting postures, diet, masticatory muscle tonus, and signs of neuromuscular dysfunction.

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