For Want of T-L-C

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In this era of computers and minicalculators, when it seems that everything can be reduced to numbers, sometimes it is good to look to some of the more basic values in life, as we trace cause and effect. All physiologic and psychosocial phenomena do not lend themselves to a mathematical straitjacket. In this category are certain behavioral manifestations of the infant and the young child. Of particular interest to us is the subject of deviate swallowing, or tongue thrust habits.

While orthodontic textbooks have called attention to the neuromuscular aspects of malocclusion for a long time, it has remained for many professionals, who are non-dentists, to stress the clinical and therapeutic aspects of abnormal tongue function. Considerable controversy has been engendered, both in the speech and in the dental literature, with claims and counterclaims. An excellent article by Dr. Marvin Hanson in the October 1975 International Journal of Oral Myology puts up some of the differences of opinion. Undoubtedly, further objective research will resolve some of the seeming contradictions. However, the purpose of this communication is to elucidate some of the possible etiologic factors, based on the author's own experience and long-time study of the problems of finger sucking, thumb sucking, tongue thrusting, abnormal swallowing, etc.

Those who read the International Journal of Oral Myology understand the physiology of deglutition, and it is unnecessary to indulge in a detailed description. Bosma has pretty well established the pattern of normal oral physiology in his excellent work at the National Institutes of Health. The infantile deglutitious pattern, built around the suckle-swallow, was described by this author in 1963. Infants indulge in suckling in utero. It is probably the most sophisticated, functional maneuver performed by the newly-born, as the mouth, which is the sole avenue of communication with the outside world, is the all-important area responsible for nutrition, sensory gratification, euphoria, and, apparent, infant sexuality. The kinesthetic, neuromuscular proprioceptive feedback mechanisms are better developed here than in any other part of the body. The tongue moves forward and backward in a continuous plunger-like fashion. The sphincteric action of the lips and associated muscles, and the forward thrust of the mandible, are parts of the infantile deglutitious pattern. The tongue is narrow and elongated and lies low in the floor of the mouth, with the tip usually interposed between the anterior gum pads at rest (Fig. 1).
INFANTILE (VISCERAL) SWALLOW

Fig. 1. Infantile swallowing mechanism. Plungerlike action is associated with nursing. Cheek pads flow between posterior gum pads during nursing, unopposed by peripheral portions of tongue. Associated with the tongue-thrust is the anterior positioning of the mandible. The condyle may be felt gliding rhythmically forward and backward in the nursing act. Note concave midline contour of dorsum of tongue. Postural rest position of the tongue is with the tip interposed between the anterior gum pads. (From Graber, T. M.: The, “Three M’s”: Muscles, malformation, and malocclusion, American Journal of Orthodontics 49: 418-450, 1963.)

In the normal course of events, this pattern remains dominant until five or six months of age and starts to change only with the eruption of the lower incisor teeth. Over a period of months, the tongue and associated perioral muscles undergo a gradual change in function. The tongue, itself, retracts within the oral cavity, with the tip behind the upper and lower incisors. There is a reducer sphincteric action and less overt metallic function. The mandibular thrust gradually fades away. Coincident with this is the development of the articular eminence in the temporomandibular joint. No longer is there a flat, bony condylar path, which is associated with the suckle-swallow maneuver. Tongue function on the inside of the dental arch is essentially opposed on the outside by what the orthodontist calls the buccinator mechanism (Fig. 2). The orthodontist sees ample evidence of the extreme plasticity in responsiveness of the teeth and alveolar bone when this morphological-functional balance is not established. Narrow maxillary arches, protruding upper incisors, retruding lower incisors, as well as anterior or posterior open bite are all possible with aberrant muscle function.

Harvold has shown that the dominance of mouth breathing may induce a new pos-
MATURE (SOMATIC) SWALLOW

A

HUMPED UP TONGUE
PERISTALTIC TONGUE PALATE APPROXIMATION
REDUCED PERI-ORAL SPHINCTER
MOMENTARY INCISOR CONTACT
NO MANDIBULAR THRUST

B

SHALLOW CENTRAL FURROW
TONGUE PERIPHERY BETWEEN OCCLUSAL SURFACES
HIGHER TONGUE POSITION

Fig. 2. Somatic swallowing mechanism. The dorsum is less concave and approximates the palate during deglutition. The tip of the tongue is contained behind the incisors; peripheral portions flow between opposing posterior segments. Anterior mandibular thrust has disappeared. An articular eminence has formed in the temporo-mandibular joint. (From Graber, T. M.: "The Three M's": Muscles, malformations, and malocclusion, American Journal of Orthodontics 49: 418-450, 1963.)

The tural position of the mandible, which is lower than normal, creating a lower tongue position as well as a lowered mandibular posture, with resultant narrowing of the maxillary arch and the creation of a pseudo Class II malocclusion. So, the concerns of Zickefoose, Hanson and others over potential malformation and malocclusion are valid. The lack of deglutitional maturation, or the prolongation of the infantile deglutitional pattern may well be associated with the abnormalities just described.

One other element must be added to this malformation mosaic. This is the habit of finger and thumb sucking. The association of such habits with malocclusion has long been recognized. However, the overly simplistic cause-and-effect association has led to some inaccurate interpretation. The author of this communication himself was guilty of this
oversimplification early in his professional career. However, in the course of studying over 1,500 thumb, finger, and tongue problems, and having to treat them since 1947, a fairly clear picture has evolved.

Oral gratification is all-important. Natural nursing is Nature's way of providing not only the food that is necessary, but the sensory and sexual gratification the child apparently needs, giving the warm glow of security and euphoria. Proximity to the mother is essential with bodily contact and shared warmth seemingly desired by the infant. As any observer of those creatures who make up the mammal world knows, this is not unique with the human species. Even with breast feeding and holding of the child, infants will also turn to the built-in pacifier, the finger, during the first 16 to 18 months, when the mother is not around. With sufficient gratification, the finger habit is usually spontaneously dropped as the child turns to more mature activities and becomes more of a social creature, depending on others besides the mother.¹⁰

When the child does not receive sufficient orofacial stimulation and satisfaction, when the child does not have adequate euphoric experience, when the child does not have his maternal security blanket, so to speak, there may be behavior modifications. These behavior modifications involve normal activities, but the incidence, intensity and timing may be such as to produce abnormal consequences. The subject has been one of major interest to this author ever since he made his first trip to primitive areas in the Philippines in 1959. Further studies in aboriginal areas of Australia, primitive sections of Africa, and, most recently, in the highlands of Indonesia and New Guinea have substantiated the conclusions now put forth.

Natural nursing is the way of life in primitive areas. Whether a mother is in Indonesia or Africa, the child receives his sustenance, fondling, warmth, and security in ample measures through breast feeding and constant bodily contact. The mother has time for the child, even in the most rigorous, harsh, and primitive living conditions. If she must work in the fields, the child is often tied to her back so that she is always there.

It is an established fact that malocclusions are of a significantly lower incidence in these primitive areas than in our "civilized" society. Open bites are almost nonexistent. So-called "tongue thrust" or the suckle-swallow maneuver disappears between six and twelve months of age, spontaneously. Finger sucking is an occasional activity which disappears in the primitive environment at about 18 months of age, if it exists at all. Generally, it is a minor activity. If this is the case in India, Thailand, Cambodia, Indonesia, Australia, New Guinea, the Philippines and Africa, where the author has made it a point to observe children in primitive settings, why do we have the problem in the United States and the "Western World"? It is my opinion that natural nursing is an essential ingredient, a common denominator in all these cultures. No so for a large segment of our children in this country. The artificial substitute of a bottle and a schedule, the lack of sufficient "togetherness" of mother and child in our complex and demanding society, particularly, during the first year of life, may well be the difference. The poorly designed bottles and nipples, which hardly provide gratification and euphoria much less the exercise associated with natural nursing, are not calculated to give the same effect. Nursing has been equated with food only, unfortunately. It is much more than that. The average bottle requires from one-quarter to one-third the amount of oral stimulation to achieve the same amount of liquid. The all-important length of time of each nursing incident is much less with the bottle than in the natural environment. The arbitrary timetable of administration of food to the helpless infant is not calculated to enhance security and a feeling of well-being. Of course, millions of children adjust, but a significant number do not. They turn to the
built-in placebo, the substitute, the thumb. Thumb sucking and finger sucking become an intense and satisfying emotional gratificational experience, a part of the security envelope, as a child retreats within his own world of fantasy. One of the most dramatic differences between a finger-sucking child and one who has matured normally is the relative social immaturity, the introvertive nature of most of these victims of a mechanized society. Not all children are introverted; some become hyperkinetic, as a defense mechanism. Obviously, not all children fit into this pattern. But a significantly large number do, giving us a finger-sucking habit of considerable proportion, associated with malocclusions and malfunctions of the stomatognathic system.

As part of this adaptive picture, the child who has been artificially nursed, or who has not had the maternal contact needed, prolongs his infantile mechanisms. Not only is he socially immature, not only is he usually a poor eater, but he oftentimes maintains his infantile deglutitional pattern. The tongue and lips do not go through the normal maturational changes at six to 18 months. Indeed, sucking of the tongue and the thrust of the tongue may provide the gratification lacking from natural nursing. Between the "tongue thrust" and the finger-sucking habit, the child adapts to his environment as he grows up. The resultant narrow maxillary arches, protruding incisors, adenoidal facies, mouth breathing and open bite may all be tied in one way or another to the original problem of mother-infant relationship.

The above analysis is, admittedly, teleologic. Surely, there are many exceptions. Not all finger-sucking children have malocclusions. Not all deviate swallow children were bottle fed. There are environmental factors, undoubtedly, which influence the development of these oral mechanisms. For example, the child of a broken home very often is more likely to be a finger sucker, or, perhaps, a tongue thruster than one who has a happy environment. It is quite obvious that a multifaceted analysis must be made. Nevertheless, we have paid entirely too little attention to these primitive instincts which are so important for the mammal. And it would surely seem that the lack of similar problems in the primitive societies around the world, where the natural nursing pattern has been maintained, where the stresses of modern society are not present, where the mother-child relationship has not been destroyed—all these observations should provide food for thought as we attempt to treat the resultant morpho-functional aberrations in later life.

It is very difficult to determine cause and effect in these complex relationships. It has been my observation that finger sucking and tongue thrusting are associated phenomena. With the elimination of a finger habit by orthodontic appliances, the tongue thrust often disappears. However, we have placed numerous tongue cribs to eliminate the infantile deglutitional thrusting, converting tongue posture and function to a more mature status, only to see the finger habit disappear.

With increasing overjet or protrusion of the incisors, which may initially be attributable to tongue and finger activity, the lower lip becomes an associated deforming mechanism. Hyperactive mentalis, with the cushioning to the lingual of the maxillary incisors, enhances the discrepancy. Elimination of finger or tongue activity is not calculated to affect the lip action. Additionally, approximately 50 per cent of the children have what the orthodontist calls a "flush terminal plane" relationship. This means that the upper and lower side teeth contact each other in an end-to-end relationship, rather than intercusping in the manner we consider a normal occlusion. Normally, with the loss of the larger baby molars, there is a differential shifting of upper and lower teeth, with the end-to-end relationship being eliminated by greater forward drift of the lower molars. In finger sucking and tongue thrusting children, the flush terminal plane relationship may
be converted into a full Class II malocclusion, as the upper teeth are brought forward. After this has happened, autonomous adjustment cannot take care of the relationship. Elimination of "deviant swallow," finger habits, or even abnormal lip function will not correct the malrelationship.

Of course, the morphogenetic aspect is one of the greatest causes of malocclusions. To arbitrarily select local functional abnormalities as the cause, when it may be purely an adaptive maneuver is to do an injustice to orthodontic diagnosis. It behooves the general dental practitioner, speech therapist, hygienist, and even the pedodontist to get a complete orthodontic diagnostic assessment before attempting any type of therapy. Much of the controversy existing today in this field of deviate swallow is the result of inadequate diagnostic study and careful assignment of etiologic factors. Oftentimes the best approach of all is that of teamwork: an orthodontist, working with the myofunctional therapist, both playing their important roles in the therapeutic ministrations. Hence, a plea is made for better communication between all those who would work in this field—better communication and teamwork.

REFERENCES