Clinical Perspective

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Rosemarie A. VanNorman

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Digit Sucking: It's Time For An Attitude Adjustment

or

A Rationale For The Early Elimination of Digit-Sucking Habits Through Positive Behavior Modification

Rosemarie A. VanNorman, C.O.M.

As a veteran oral myologist, in active practice for 13 years, concerned with the oral-facial muscle function in relation to dental and speech growth and development, it has been a tremendous source of frustration to me to have children sent to me who have developed severe dental malocclusion as a result of PROLONGED digit-sucking habits. Treatment to eliminate the digit-sucking habit is often neglected or approached with hesitancy because of the prevalence of a theory of psychological need which proposes that the elimination of the digit-sucking habit will lead the individual to substitute other aberrant behavior in its place. Acceptance of this unsubstantiated theory has resulted in vicious sequelae of atypical dental growth and development, oral-facial muscle dysfunction, and speech dysfunction. Most unfortunately, these children are also emotionally traumatized by negative responses from those in their environment to their digit-sucking behavior.

Parents of digit-sucking children have been counseled by medical and dental professionals, nationally syndicated columnists, and T.V. talk shows "not to worry". "Your child will stop when he is ready." "It's not harmful." Nowhere in the dental literature could I find, however, the categorical statement: digit-sucking habits are not harmful. In fact, the dental literature is replete with accounts of the deleterious effects of digit-sucking habits on normal dental growth and development. There are those children who have no apparent

damage, physical or emotional, as a result of digit-sucking habits, but it has been my experience that those children are the EXCEPTIONS rather than the rule.

Popovich and Thompson¹ found, in a study of 1,258 children, that there was a significant association between the incidence of Class II malocclusion and prolonged digit-sucking habits. Larson² reported that digit sucking can create strong anterior forces on the maxillary arch, thereby causing more anteriorly positioned maxillae. Increased frequency of posterior lingual crossbite has been found in those children with digit-sucking habits³. In my practice I have observed that 50 percent or more of those children with digit-sucking habits also have one or more teeth in posterior lingual crossbite.

Varying degrees of the notorious anterior open bite are the most common types of malocclusion associated with digit-sucking habits. It is rare to find an individual with an anterior open bite who does not exhibit a tongue thrust also. Werlich⁴ found in his study of 640 children that 98.5 percent of those with open bite were tongue thrusting. Rogers'⁵ study of two groups of children found those with open bite exhibited an incidence of 98.2 percent tongue thrusting and 92.8 percent tongue thrusting, respectively. Leech⁶ found 4 percent of his 500 subjects had anterior open bite, all of these 21 exhibited tongue thrust, 9 of the 21 had a "lisp", and just over 50 percent had a sucking habit.

It is an established orthodontic theory that excessive orthodontic forces, in terms of duration and amount, can cause external root resorption⁸. Taylor and Peterson⁷ randomly selected and studied the occlusal radiographs of 98 children

Address correspondence to:

Rosemarie VanNorman
11414 West Center Road, Suite 343
Omaha, NE 68144

aged two to four years. The purpose of their study was to determine if the force applied in digit sucking could also be a factor in root resorption. They found that 59 percent of the patients with digit-sucking habits demonstrated atypical root resorption patterns on the primary maxillary central incisors compared to only 8 percent of those without digit-sucking habits demonstrating such atypical root resorption. In their discussion they stated: "It is possible that exfoliation-related root resorption might be hastened and/or accentuated by digit-sucking habits."

Moyers¹⁰ stated: "If a primary tooth is lost prior to the onset of permanent eruptive movements (Nolla's stage 6), the permanent tooth is very likely to be delayed in its eruption, since the alveolar process may re-form atop the successor tooth, making eruption more difficult and slower." Therefore, the individual that exfoliates a tooth due to premature root resorption due to a digit-sucking habit prior to the onset of normal eruptive movements is likely to experience an abnormally extended period of time with an anterior open bite and associated tongue thrust. This damaging phenomenon of undesired root resorption due to a digit-sucking habit can also occur on *permanent* maxillary incisors when the habit is prolonged.

Hanson and Cohen's¹¹ 3½ year study of 178 children, ages 4½ to 5, found digit-sucking significantly correlated with a narrower palate at the premolar and canine levels, greater palatal length, greater palatal height at canine and premolar levels, less buccal crossbite, greater arch circumference, less overbite, more mouth breathing, more overjet, more dentalized speech sounds, and more mentalis muscle activity during swallowing. These researchers felt that the results of their study indicated "a strong possibility that structure and function act reciprocally and that many of our findings suggest that any crowding of the tongue, whether it be from a narrow maxillary arch, enlarged tonsils, or the presence of an intruding thumb, might well promote a tongue thrust habit". In their summary they cited certain diagnostic criteria as having prognostic importance pertaining to the retention of a tongue thrust pattern. "The presence of any

one of the following factors to a marked degree, or of any combination of them, is a potential predictor of a tongue thrust pattern likely to persist throughout the mixed dentition:

1. Mouthbreathing
2. Digit sucking
3. Enlarged tonsils
4. A high and/or narrow anterior palatal arch
5. Marked lip movement during swallowing
6. Any anterior malocclusion in the deciduous dentition
7. Dentalization of the lingua-alveolar consonants (s,z,t,d,l,n).

With the exception of number 3, enlarged tonsils, all of these factors can be significantly correlated with digit-sucking habits, assuming that the "mouthbreathing" can be interpreted to be open-lip posture, which is often the case since maxillary protrusion and excessive vertical height develop as a result of a prolonged digit sucking habit.

Fletcher, Casteel, and Bradley¹² studied 1,615 school children aged 6 to 18 years. They found a declining incidence of both tongue thrust and sibilant distortion as age increased. The group of individuals with tongue thrust, however, did not exhibit the same declining incidence of sibilant distortion with increased age as did the group whose individuals displayed no tongue thrust. In their total sample of 1,615 children, the incidence of tongue thrust was 668, the incidence of sibilant distortion was 230, and the incidence of simultaneous tongue-thrust swallow and sibilant distortion was 181. Their data indicated that subjects with a tongue thrust swallow were much more likely to have associated sibilant distortion than were the subjects without this pattern of swallowing. Although etiology was not considered in this study, it is not difficult to construct the progression of a digit-sucking habit to an anterior open bite to a tongue thrust to a high incidence of sibilant distortion.

Another established theory is that speaking and swallowing are initiated from the rest position of the tongue¹³. A low, anterior tongue carriage is the result of an open-lip posture. Although the open-lip posture is often related to airway inter-

ference, it can also be the result of protruding maxillary incisors and excessive vertical palatal height due to a prolonged digit-sucking habit. Maxillary protrusion due to a prolonged habit can also be significant in difficulty with correct articulation of bilabial plosives /p,b/, bilabial continuant /m/, and labio-dental fricatives /f,v/ because of the inability of the lips to make proper contact with each other and the teeth.

Milne and Cleall¹⁴ reported a forward tongue positioning into open spaces created by exfoliating primary maxillary incisors and subsequent speech distortion, both of which improved after permanent maxillary incisors erupted. One of the prime, acceptable reasons to postpone speech therapy for the /s/ misarticulation (lisp) is because of the "fronting" (interdentalization) of the tongue into the open spaces created by naturally exfoliating primary incisors. Yet, I routinely see children who have been in speech therapy for the /s/ misarticulation, with little or no correction occurring, and the child exhibits an open bite with associated tongue thrust and an active digit-sucking habit. I see little difference between the open space or open bite created by naturally exfoliating primary incisors and the open bite commonly caused by a digit-sucking habit. Accordingly, I see little difference in prognosis regarding speech rehabilitation when the presenting oral environments and conditions are so similar. In addition to the aforementioned speech misarticulations, this writer has observed a very high incidence of /r/ misarticulation in those individuals with a history of digit sucking.

There is general agreement among researchers that tongue thrust is universal in infancy^{15,16}. There is a declining incidence as age increases^{4,11,12}, which suggests that it is a developmental phenomenon. Although there is no research showing positive cause and effect relationship between tongue thrust and malocclusion, there is little doubt that tongue thrust does coexist with malocclusion, orthodontic relapse, and some misarticulations. There is significant evidence that suggests reciprocity between form and function¹¹. Prolonged digit-sucking habits can be significant etiologically in atypical dental growth and development because

the oral-facial musculature adapts to the resultant malformation to maintain a functional integrity, thereby perpetuating the malformation, the oral-facial muscle dysfunction, and the speech dysfunction. Moyers¹⁷ describes this sequence of events: "When the maxillary incisors have been tipped labially and an open bite has developed, it becomes necessary for the tongue to thrust forward during swallowing in order to effect an anterior seal. During digit-sucking, buccal wall contractions produce, in some sucking patterns, a negative pressure within the mouth, with resultant narrowing of the maxillary arch. With this upset in the force system in and around the maxillary complex, it often is impossible for the nasal floor to drop vertically to its expected position during growth. Therefore, digit suckers may be found to have a narrower nasal floor and a high palatal vault. The maxillary lip becomes hypotonic and the mandibular lip becomes hyperactive, since it must be elevated by contractions of the orbicularis muscle to a position between the malposed incisors during swallowing. These abnormal muscle contractions during sucking and swallowing stabilize the deformation."

Results of Treatment To Eliminate Digit-Sucking Habits

I have devoted much of my clinical practice to working with youngsters to help them discontinue digit-sucking habits. I have observed that when the sucking habit is eliminated, and there is an absence of other etiological factors, i.e., airway interference, there is often a very noticeable improvement in occlusion and/or correction of developing dental malocclusion, oral-facial muscle dysfunction, and speech dysfunction.

I have also observed a lack of improvement in those children who have a posterior lingual crossbite from cuspid to molars if the crossbite has not been corrected, even though the digit-sucking habit has been eliminated. The anterior open bite cannot close if the crossbite condition remains uncorrected. I have difficulty understanding the hesitancy of some dental professionals to treat this

Figure 1A - 6 year old with anterior open bite, maxillary protrusion, right posterior crossbite, anterior tongue thrust and an active digit habit.

Figure 1B - Same child, 9 months post treatment: Program to eliminate digit sucking and appliance to correct crossbite.

Figure 2A - BEFORE - Child with active digit habit.

Figure 2B - AFTER - Same child six months after elimination of digit habit. No orthodontic treatment.

Figure 3A - BEFORE - Child with active digit habit.

Figure 3B - AFTER - Same child one year after elimination of digit habit.

condition EARLY. Certainly it is logical to expect synergistic muscle function to become "hardened" or more habituated when present over extended periods of time. It would seem appropriate to correct the posterior lingual crossbite as early as possible in order to promote more normal development and function.

It's Time For An Attitude Adjustment

It is amazing to me that the Freudian theory on digit sucking, which developed into the belief that attempts to eliminate the sucking habit would result in a substitution of other aberrant behavior, has been perpetuated for over 60 years with NO CLASSICAL DATA to support it. It is even more amazing when the tremendous costs of atypical dental growth and development are considered. Conversely, many of the youngsters who come to me for help in the elimination of a digit habit are already emotionally wounded BECAUSE OF the habit and have very low self-esteem AS A RESULT OF the negative response to the sucking behavior from those in their environment. I imagine this is one reason pediatricians frequently counsel parents, "Not to worry; ignore it. The child will discontinue the sucking habit when he is ready", in an attempt to protect the child from punitive measures parents or others may employ. They have probably seen or heard about some of the barbaric appliances which are based on the principle of aversive conditioning. I also find it amazing, given the low success ratio for these appliances, that the insurance companies continue to pay benefits for their use.

Over a period of time, children come to depend on the digit sucking as a source of solace and comfort when they are upset. Consequently, negative responses and punitive measures only serve as a stimulus for *increased* sucking behavior. It's counterproductive.

Understanding the Behavior

Three independent studies^{7,18,19} have found an incidence of digit sucking between 43 percent and

45 percent. Traisman and Traisman¹⁹ studied 2,650 infants and children from birth to age 16 and found 45.6 percent had digit-sucking habits at some point during the observation. With the advent of ultrasound, babies are now routinely observed sucking a digit in utero. It is a very normal, pleasurable, almost mesmerizing activity which over a period of time becomes so habitual the children are often totally UNAWARE they are doing it. As the mother of a finger-sucker and from visiting with parents of digit suckers I found that they tend to be very happy, contented little babies. They drag around all kinds of paraphernalia from a special "blankie", a piece of satin, stuffed toys, pillows, mom's nightgown, to dad's football jersey. I had one little boy who wore earmuffs year around because he liked to caress the soft fur while sucking his thumb. They twirl their hair until there are bald spots and remove debris from their noses with their index fingers while sucking their thumbs, but they are most generally NORMAL.

Employing such tactics as covering an infant's hands with mittens to discourage the habit serves only to frustrate parents and child. The best course of action is simply to ignore it until the child has reached the age of reason, which is usually around age 5 or 6. Many children will discontinue the habit themselves as they become more active in playtime or when they start school. However, when the child is 5 or 6 and there appears to be no cessation of the behavior, and there is damage occurring, it is time to consider help. Ignoring the behavior beyond this point will only increase the developmental damage as well as more firmly habituate the behavior. It is logical to assume the longer a habit is present the more difficult it is to terminate. Older children definitely experience more difficulty than younger ones when discontinuing the behavior. Particularly on the subconscious level, the older child has to work much longer to eliminate the sucking habit while sleeping than does a younger one. There are many adults who still suck a digit in their sleep.

Timing

Because children come to depend upon the sucking behavior as a source of solace when upset, choosing a time to initiate therapy for elimination of the habit is a very important consideration.

Divorce, arrival of a new sibling, starting kindergarten, even a family move can be unsettling for a youngster, and an adequate adjustment period is essential prior to beginning treatment.

Positive Behavior Modification

Positive behavior modification is essentially a three-stage process.

1. Establishing a baseline of behavior — a thorough knowledge of when the child sucks his thumb or finger, such as during school, after school, evenings, bedtime, during T.V. — is a necessary first step.

2. Utilization of POSITIVE motivational techniques, motivating the child to WANT to terminate the habit, is of course the most critical phase of treatment. My goal at this point is to establish open communication, comradery, and rapport with the child. I assure him that the digit-sucking behavior is very normal in infants and children. That old thumb or finger is just SO DELICIOUS that it simply becomes a habit and, much of the time, he is totally unaware that he sucks it. Motivation to discontinue the habit is based solely on his interest in his own dental growth and development, then instilling in him the CONFIDENCE that he CAN OVERCOME THE HABIT if he so desires. I utilize dental models, "before and after" photographs of other children's teeth, audio-visuals, and, most importantly, compassion and simple friendly personal persuasion.

3. A systematic program of reminders and reinforcement is undertaken once the child has expressed the desire to "give it a try". Tape on the thumb or finger during the day and a "Smilie Sam" or a "Smilie Samantha" puppet sock at bedtime are used effectively at this stage of treatment. The child makes a progress chart or calendar to record his daily progress, and he is reinforced on a daily basis

through positive responses from parents as well as through telephone communication with me. Reward and prizes are given when the habit is terminated.

I see these youngsters once a week for 3 weeks, with a recheck visit in 6 months. I have experienced over 90 percent success through this program. Oral myologists all over the United States are reporting comparable success ratios.

For additional information, the reader is referred to an article previously published in the July 1984 I.J.O.M.²⁰

Several years ago, I developed an evaluation questionnaire for parents to complete post-elimination of the digit-sucking habit. I now have hundreds of these completed evaluations and use them in educating the various health professions as to the value of this approach to the digit-sucking problem. Following are some of the questions on the evaluation.

How soon after beginning my program did your child begin to discontinue the sucking habit? The response is most generally "immediately". The conscious habit is usually eliminated within the first week. The subconscious or sleeping habit varies with the age of the child. The older the child is, the longer it takes to eliminate the subconscious habit totally.

Do you feel the discontinuance of the sucking habit led to other emotional problems? The most general comment is: "None at all." However, some parents report increased irritability for the first couple of days as well as difficulty falling asleep. Many parents comment that they feel the children are more active and happier as a result of the discontinuance of the digit sucking. School teachers often refer youngsters to me. The teacher is not necessarily cognizant of dental damage, but the children are so satiated with the sucking behavior that they fail to progress and interact with the other children.

Do you feel your child gained in self-confidence and self-esteem as a result of being able to "KICK THE HABIT"? "Absolutely", "definitely", "my child is very proud of him/herself", and "It has been a positive growth experience", are the

comments. This is not surprising. They are so PROUD to have overcome this "monkey on the back", without coercion, because they WANTED to.

Final Thoughts

There is little doubt that digit-sucking can be a significant etiological factor in atypical dental growth and development, oral-facial muscle dysfunction and speech dysfunction.

Treatment to eliminate the sucking behavior is often neglected because of perpetuation of the time-worn and unsubstantiated Freudian theory of substitution behavior.

The technique of positive behavior modification to terminate the digit-sucking behavior has been practiced successfully by hundreds of therapists for many years.

It's time to educate the world about this well-kept secret. Documentation of improved dental, speech, and emotional growth and development is germane.

The human mouth is the ultimate source of communication. Attractive, healthy dentition is essential to communication and the well-being of the whole person. Dental malocclusion is a pathology; it does not make sense to allow a pathology to develop to its full potential before initiating treatment. Little mouths deserve a big chance to grow straight

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