

## MANAGEMENT OF ORAL HABITS: NON-NUTRITIVE SUCKING AND TONGUE THRUSTING

Prolonged digit or pacifier sucking and tongue thrusting habits have long been associated as causative factors in a variety of malocclusions. C.R. Johnson summarized the prevailing sentiment in 1939 when he stated: "It has been established and is generally accepted that thumb and finger sucking may be an etiologic factor in malocclusion.

Graber brought attention to the importance of the oral and facial musculature, including the tongue, when he stated: "It is important to recognize the finger habit is only part of the picture... The real danger, then, is for the finger habit to change the occlusion sufficiently to allow the more potent muscle forces to create full-fledged malocclusions."

Although the exact nature of the relationship between oral habits and malocclusion is not clearly defined, these habits certainly warrant consideration and, intervention by the general dentist-orthodontist team.



**Fig 1: Before and after habit appliance placement.**

### Non-Nutritive Sucking

Non-nutritive sucking may be defined as the sucking of an object (usually a digit or pacifier) not related to the ingestion of nutrients. The reported prevalence of non-nutritive sucking varies from 50 to 70 percent in the first year of life, and decreases, with most children having stopped by the age of 4. Persistence of habits beyond this age may be referred to as a chronic non-nutritive sucking habit.

The etiology of chronic sucking has not been clearly established. The Freudian psychological theory states that prolonged sucking is indicative of emotional problems, implying that interference with the behavior will lead to further difficulties, including symptom substitution.

The more universally accepted learning theory suggests that chronic sucking is simply a learned habit or prolonged infantile mechanism that has never been stopped, and that appropriate therapy should not cause emotional problems, nor lead to symptom substitution.

Physiologically-designed pacifiers have been shown to decrease the occurrence of chronic sucking habits. Presumably, this is due to the relative ease of stopping pacifier use and the likelihood that digit sucking will not replace it. Prolonged use of an improperly designed pacifier, conversely, can cause a malocclusion which can become more severe than that caused by digit sucking. Compensatory muscle function exacerbates the developing malocclusion in these situations.

The most common form of digit habit is thumb sucking. Classically the volar surface of the thumb contacts the anterior palatal

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-rior palatal tissues and the palatal surfaces of the maxillary anterior teeth, providing protrusive and intrusive forces. The reverse side of the thumb contacts the mandibular incisors with an intrusive and retrusive force, while the tongue tip presses anteriorly on the lower incisors. Furthermore, the perioral musculature (buccinator, mentalis, orbicularis oris) contracts while sucking, imparting lingually directed forces on the posterior segments of the dental arches, particularly the maxilla.

Subtely using cineradiographs demonstrated extreme variability in thumb and tongue position during sucking. These changes which can significantly affect the nature and direction of the forces transmitted to the oral structures.

The possible effects of chronic sucking habits on the oral structures are determined by the forces present. The direction of force as described above, is somewhat variable. Graber points out that three modifying factors: duration, frequency and intensity, are extremely important and must be “recognized and evaluated before the question of damage to the teeth and the investing tissues is answered.”

Numerous studies of the relationship between chronic non-nutritive sucking and malocclusion have been performed with varied results. Possible effects may be divided into two categories: dental and skeletal.

Dental effects include: 1. Labial inclination and/or displacement of maxillary incisors with increased overjet, 2. Supra-eruption of posterior teeth, 3. Decreased overbite or anterior open bite, 4. linguoversion of mandibular incisors, 5. posterior crossbite, and 6. Class II molar relationship.

Skeletal effects include: 1. labial inclination and/or displacement of maxillary incisors with increased overjet, 2. Class II apical base relationship and 3. anterior and superior distortion of maxillary anterior alveolar process.

Literature on the subject indicates a general agreement that non-nutritive sucking can cause dental and alveolar changes in the anterior segment of the maxilla. At the same time, there is consid-

erable disagreement regarding the latest stage of development at which these changes may be self-correcting and as to the effects of chronic non-nutritive sucking on the posterior segments and the apical bases (skeletal effects). Review of the literature, however, reveals that Class II molar and apical base relationships may well be exacerbated and posterior crossbite encouraged by chronic non-nutritive sucking. Additionally, spontaneous correction of some components of dental malocclusion is likely if the habit stops by the early mixed dentition.



**Fig 2: Occlusal view of a Rake.**

## **Tongue Thrusting.**

Tongue thrusting may be defined as abnormal tongue, peri-oral, and facial muscle posture and activity during deglutition and/or at rest.

Normal swallowing patterns change as the child develops. In a neonate, the infantile or visceral swallow, including tongue thrust activity, is necessary for normal feeding. There is a shift to the adult or somatic swallow with the eruption of the primary dentition. Such a swallow is considered the norm by the age of 4 or 5. This “normal” swallow is classically characterized by decreased use of the perioral muscles, by the teeth and the lips being in contact, and by the tongue remaining within the confines of the dental arches. Excessive epipharyngeal lymphoid tissue can delay deglutition maturation and enhance forward tongue posture, as shown by Linder- Aronson.

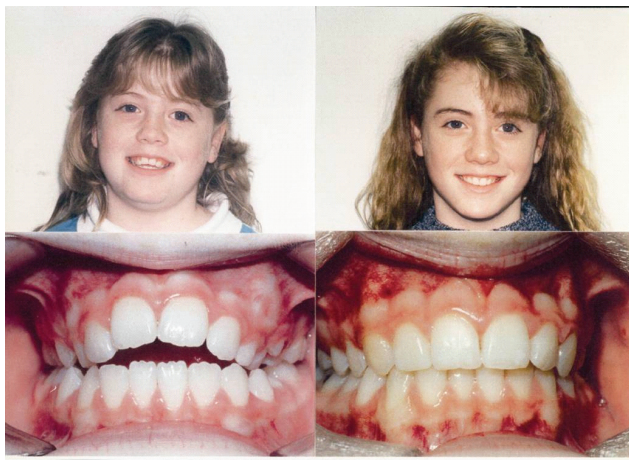
The concept of “normal” is questioned by several studies which demonstrate that “abnormal” swallowing patterns commonly persist into adulthood as demonstrated by tongue thrusting, failure of lips and teeth to contact, and activity of facial muscles.

Furthermore, these studies indicate that although these individuals exhibit such swallowing patterns, the majority of them do not exhibit corresponding malocclusions. A directed cause-and-effect relationship between posture/tongue thrust swallowing and malocclusions certainly must be questioned.

Graber discusses the relationship between non-nutritive sucking and tongue thrusting, stating that: "With the increase in overjet that accompanies so many finger sucking habits, normal swallowing patterns become increasingly difficult... Perioral muscle aberrations, compensatory tongue thrust during swallowing and abnormal mentalis activity may accelerate the malocclusion."

Subtelny and Subtelny agree, stating: "... This creates an opening for the manifestation of protrusive tongue activity during swallowing."

Although tongue problems may be caused by several other factors, including lymphatic tissue, a neurological deficit, a relatively large tongue, or a skeletal open bite, it is most commonly a compensation made necessary by the altered oral environment created by the original habit. Persistent tongue thrusting may then prevent spontaneous correction of, or even exacerbate, the existing mal-



**Fig 3 : Before and after treatment pictures. A habit appliance was also used.**

## Treatment

The decision to treat chronic non-nutritive sucking or tongue thrusting habits should be based on an affirmative answer to several questions: 1. Is the habit causing or enhancing a malocclusion? 2. Will cessation of the habit allow for self-correction of the malocclusion? 3. Will cessation of the habit prevent the malocclusion from worsening or progressing to the point where self-correction is no longer possible or definitive orthodontic treatment is compromised? 4. Is the child emotionally mature enough to accept treatment? This last question is important because there must be a desire on the part of the child to stop sucking, although this is less important for pacifier habits.

Treatment for chronic digit sucking and tongue thrusting during the mixed dentition should begin with the simplest form of therapy. For digit sucking habits, behavior modification may be attempted first, using rewards, encouragement and reminders. For tongue thrusting, a form of myofunctional therapy such as swallowing exercises may be attempted, although experience has shown the value of such procedures is questionable. Discontinuation of pacifier sucking should occur in the primary dentition. The success of these treatment modalities is judged by both cessation of the habit and significant improvement of the malocclusion.

If these treatments fail, palatal crib therapy may be indicated. This involves the use of a fixed or removable appliance in conjunction with explanation and positive reinforcement. It is important that the child views the appliance not as a punitive device, but as something that will help him or her accomplish a goal.

The appliance should be left in place until well after the habit stops, allowing for significant resolution of the malocclusion to occur. Change in the oral environment such as closure of the open bite, reduction of the overjet, and diminution of abnormal muscle activity should help prevent relapse of the malocclusion. Protrusive tongue posture activity will no longer be necessary to achieve an oral seal during swallowing. Although definitive orthodontic therapy may well be needed for complete resolution of the malocclusion, that therapy is likely to be more successful and stable without the presence of detrimental oral habits.

### References

1. Subtelny JD, Oral Habits: studies in form, function and therapy. Angle Ortho 1973
2. Johnson LR. The status of thumb and finger sucking. 1939

**\*\*\*Please note : all cases shown in this newsletter were treated by The Brace Place Doctors\*\*\***

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1. T, 2. F, 3. T, 4. T, 5. T,

*\*\*\*Please note CE credits will be awarded to all that qualify in the new year\*\*\**



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#### Our Next Issue Will Be On:

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1. T F Chronic sucking is a learned habit or prolonged infantile mechanism that has never been stopped.
2. T F Tongue thrusting is an abnormal tongue, perioral, and facial muscle posture and activity during deglutition and/or at rest.
3. T F Dental effects of chronic sucking include an increase in overjet, over eruption of posterior teeth, and an anterior open bite.
4. T F Non-nutritive sucking can be defined by the sucking of an object related to ingestion of nutrients.
5. T F Treatment of chronic sucking can range from behavior modification to the use of a palatal crib.