

Social Environmental Factors in Japan Affecting the Development of Proper Eating Behaviors

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Myofunctional Disorders in the Developing Dentition

The word anticipation is a developmental descriptor for the mixed dentition stage. Permanent teeth proportionately filling the small spaces left from the exfoliation of deciduous teeth do not always occur. Many factors influence dental arch formation and the successful eruption of teeth that create a normalized, Class I occlusion. The debate on the influence of function and form is narrowing and taking a greater look at the environmental stress factor potential created by the musculature; mastication, eating and deglutition patterns; perioral functioning effects of digit sucking and speech patterns; parafunctional habits, such as bruxism, clenching, lip propping, and other behavioral patterns. Especially noted are those of tongue, lip, and mandibular rest posturing. (Benkert, 1997)

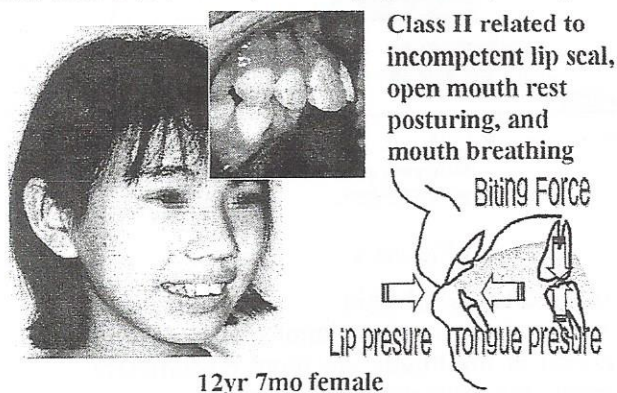


Figure 1: Class II related to MFDs

The most popular time individuals seek a professional opinion is when dental malocclusions visually appear in the developing dentition. Of those cases presented, we quite frequently encounter Class II malocclusions. Most of these cases are etiologically related to orofacial myofunctional disorders (MFDs) (figure 1). In those cases we easily recognize how functional disorders affect the developing occlusion and cranio-facial morphology. The natural phenomena of losing deciduous teeth and the retention of any orofacial and/or perioral habits are usually noted as definite etiologic anomalies, which disturbs the establishment of correct orofacial/perioral functioning. The phenomena, habit retention, and other explanations can cause incorrect rest posturing, tongue thrusting,

and/or other dysfunctions such as temporomandibular dysfunction (TMD). The first two, rest posturing and tongue thrust, are the most typical causative factors of MFDs. (Benkert, 1997)

This list, however, does not define how each factor obstructs the proper development of the orofacial and perioral function in the daily life of children. This article focuses on the unfavorable environmental factors surrounding the acquisition of mastication and swallowing behaviors in children. Many factors including airway problems may exist. The etiologic relational interchange between factors creates negative feedback within the individuals (figure 6). Each factor disturbs the process of developing correct functional activity. This impacts the functioning and complex formation of the entire perioral complex in either a direct or indirect manner. In addition, multiple factors may create a negative synergistic effect on development.

Unfortunately, even though these problems exist and are present on a constant basis, family members do not easily recognize them. To the patient and parent, the problems may be completely invisible. Usually, at some point, however, the effects of the dysfunction becomes recognizable even to them.

Development and aging of Eating Functions

The process and ability to produce speech sounds has a widely accepted timetable. Eating functions develop along a similar growth pattern only on a different age schedule (figure 2). Sucking function is formed through the fetal reflexes such as rooting. This reflexive action develops both before and after the birth of the individual.

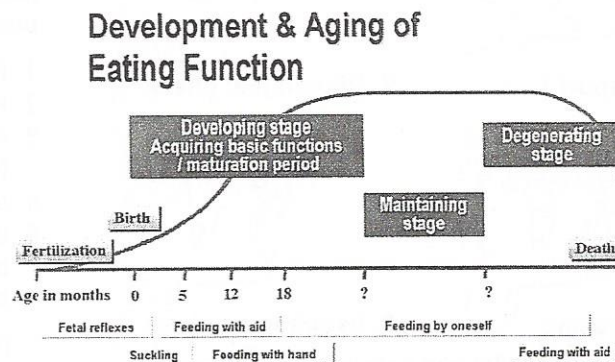


Figure 2

After initially completing the sucking function development around 6 months of age, eating function is acquired through the long-term training in a step-by-step manner, along with the disappearance of the fetal suckling reflexes. Maturation of function occurs through cognition, muscle development of gross motor to fine motor skills, and the millions of repetitiously correct eating experiences.

Unfortunately, we cannot avoid the degenerating stage that later comes with the aging process. While all humans start their life eating with the aid of another, many also close their life with similar aid.

The swallowing sequence is the integrated movement of perioral muscle functions made possible through the continuous actions in each phase (figure 3). (Palmer, 1997; Palmer, Hiiemae, Liu, 1997)

We should realize that training of the eating function is nothing more than the integration of the separated actions under voluntary control. This process has its own schedule related to the timing and disappearance of fetal reflexes and the development ability in each organ.

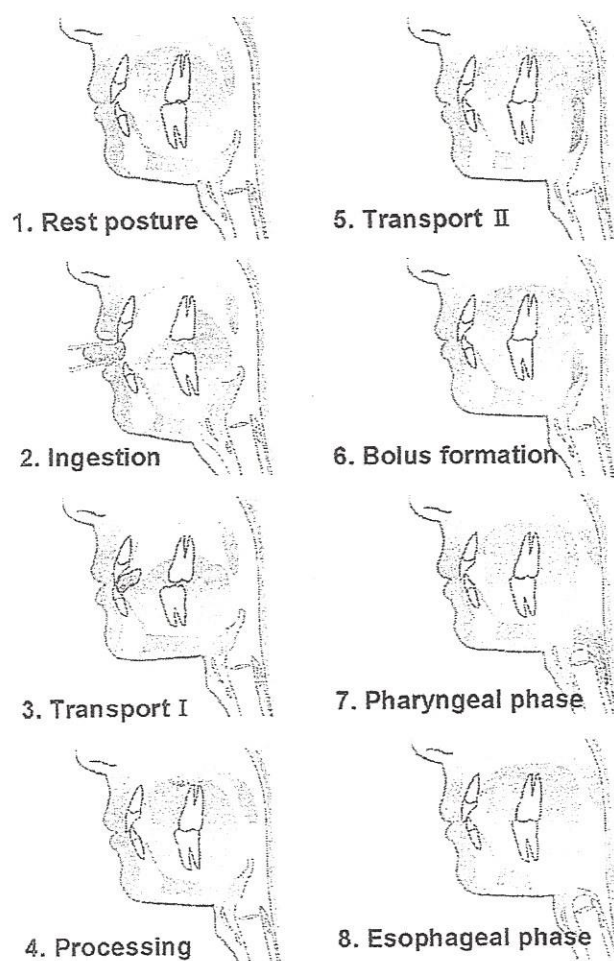


Figure 3: swallowing sequence (solid food)

A similar situation exists during speech function. It is for these reasons that the acquirement of such functions has a critical point or zone in each individual's life. As long as the deviated behavior pattern exists, the construction of a corrected, new pattern imposed upon the former one becomes more difficult.

Orofacial Myofunctional Therapy Relationship to Eating Function Development

There are several ways of approaching MFDs at the different stages of functional behavior development. In addition to optional treatment choices, obstructive factors are plural in most of the cases and maintain a strong relationship to each other. Consequently, when we treat the MFD, we should first discriminate on the following points (figure 4).

1. What are the primary causes of the MFD?
2. The patient is in which stage of the aging process: development or function?
3. How does each factor relate to the other?

MFT according to the developing stages of eating function

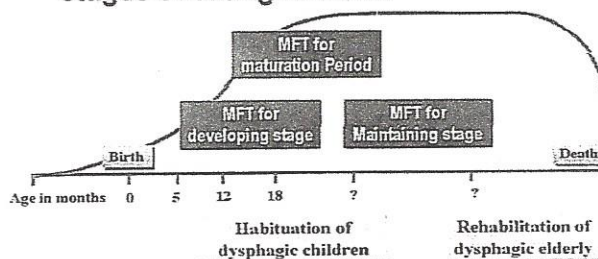


Figure 4

Factors related to dysphagia

When we analyze myofunctional disorders and plan an action of treatment, we must discriminate diagnostically the dysphagia information being provided. The diagram in figures 5 and 6 provides information by professors from the Department of Oral Health at Showa University from their textbook on eating dysfunction which explain myofunctional factors related to dysphagia. Five categories are presented (figure 5): (Kaneko, Mukai, Omoto, 1987)

1. Neuromuscular disorders
2. Poor experience of sensorimotor system
3. Asynchronization, or lack of synchronized function of the orofacial muscle complex
4. Imbalanced morphologic development
5. Improper environmental factors such as posture, texture of food, tableware and methods of assisting with aid.

To the five categories listed, we would like to add the *social environment factor* category.

Factors related to Dysphagia

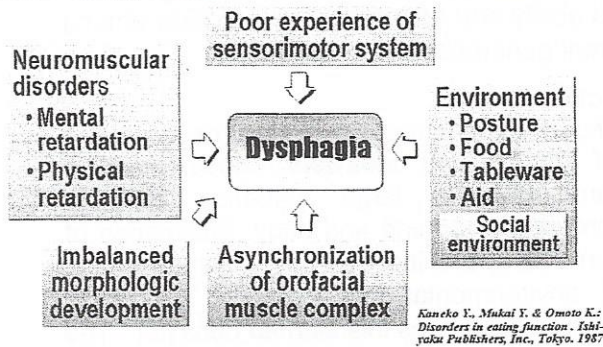


Figure 5

When abnormal patterns are established during the growth and developmental stages it permits the appearance of obstructive behaviors. We clinically observe one negative behavior facilitates another and magnifies the situation. For example, when incompetent lip seal patterns are established, an increase of abnormal stimulation is placed on the perioral musculature and structures. This in turn produces a decline in the synchronization of the orofacial muscle complex. The development of other functions is then retarded and assists the abnormal pattern becoming internalized. Further, this leads to the development of other abnormal patterns (Figure 6). Hence, form development begins to follow the abnormal function. (Modified from Kaneko, Mukai, Omoto, 1987, Benkert, 1997)

A cycle of the Neuromuscular systems related to MFDs

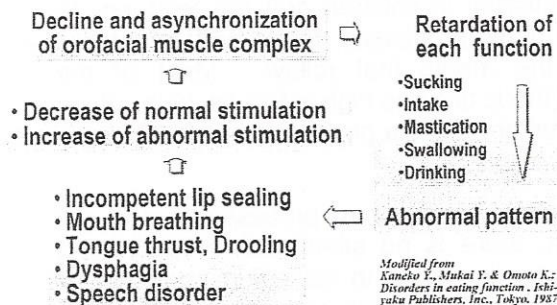


Figure 6

Plasticity of the neuromuscular system supports these phenomena. When the obstructive factor is not removed within the early phase of the acquiring stage, a vicious cycle prolongs and establishes the new incorrect pattern. It then becomes more difficult to interrupt or break the cycle and return to normal function. (Annunciato, 1995; Kaneko, Mukai, Omoto, 1987)

Environmental Changes Surrounding Children

To further define and identify etiologic factors of MFDs, changes in the social structure related to the

eating behaviors and customs of Japanese people should be mentioned. These influences caused continuous change during the recent past half of a century. Societal changes significantly influenced the overall eating behaviors in Japan today.

After World War II ended, the environment with its social structure, and its economic mechanisms changed on a massive scale. The entire earth's social scale changed massively as well. In Japan, the change affected the daily lives of almost all people. A social change example is the increasing ratio of nuclear or smaller families within the Japanese society. With this societal change as a backdrop, we witnessed the enhancement and significant increase of women working in the business scene. This was usually done without the maintenance or increase in the nursing (childcare) environment. Also, expansion of suburban, regional residential areas and prolonged commuting times for work increased.

Within the environment surrounding children, the education and examination systems reduced the free time in children's schedules. Even the amount of time for required for extra study or lessons crammed into their school, home, and daily life increased.

Changes of the Eating Behavior

Highly developed and competitive economic activities influenced and changed the eating behaviors of the Japanese people. It produced a phenomenon that shortened the time taken or required for each meal. Technologies simplified home cooking methods and enhanced the usage of processed foods. In general, the kinds of ordinary foods they were used to ingesting and also cooking methods were altered into a more Westernized style. The amount of fat intake increased. Additionally, each family member now dines out more frequently. The overall opportunity of having meals with all family members present decreased.

Eating Behavior of Children

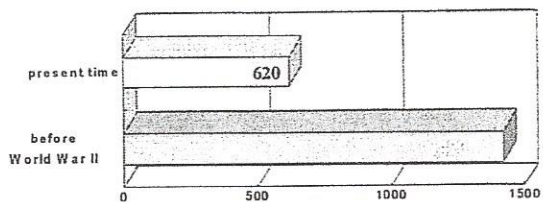
Increase of nuclear, smaller families, creates difficulty in passing the cultural heritage and traditions down among the generations. Young parents often suffer from lack of knowledge about childcare and parenting. This often includes experience in teaching correct eating methods and behaviors due to the lack of ordinary support from their own parents or elders. Less knowledge and experience in this area reduces the repetitive basic training formerly taught about eating. This is true even beginning at the weaning stages. The accurate discipline of eating behaviors is affected by the ability of being home with children through the various ages of growth and development.

Furthermore, family policy about a child's eating behavior has also changed. Imbalanced diets frequently exist today. Eating snacks between meals routinely is no longer limited. Children frequently cram foods into their mouth and run off to school quickly without any concern for the nutritional balance of their diet. Irregularity in eating habits is easily ignored due to busy lifestyles. This translates to external (social) factors creating an influence on the functional environment's effect on growth and development.

Chewing Frequency and Duration

The recent study by Dr. Saito compared the average meal before and after World War II. The past and present frequency and duration of meals such as spaghetti or hamburger steak was compared.

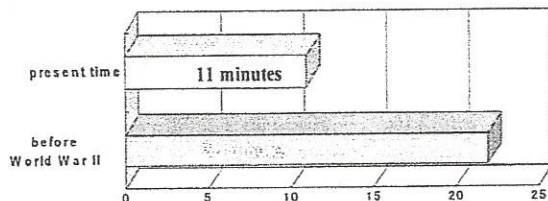
Frequency of chewing cycles during a meal before and after World War II



Research on the frequency and duration of chewing during a meal in a different era: Saito S. 1987

Figure 7

Duration of chewing during a meal before and after World War II



Research on the frequency and duration of chewing during a meal in a different era: Saito S. 1987

Figure 8

The post-War figures are almost one half of the pre-War frequency and duration of meals. The frequency of biting and chewing was reduced to 620 times from the 1,420 times prior to the War (figure 7). The duration, as shown, is eleven minutes compared to the previous twenty-two minutes (figure 8). (Saito, 1987)

The types of foods used in the study are very similar with foods consumed today. The results indicate a decrease in chewing frequency of foods

and a decrease in the duration time for eating brought about significant functional change. The reduced ability and attention to mastication among the current generation is the end result.

Obstructive Factor

Childhood experiences in eating become the basis of future eating behaviors. These repetitive behaviors have a large influence on the development of the mind and body. Elimination of repetition eating training at infancy stages and a lack of environmental influences to encourage chewing time decreases this learned behavior. The lack of a pleasant, nurturing atmosphere to encourage proper habit formation may also produce those children who cannot and do not chew their food enough nor swallow correctly.

Mastication is not a spontaneously acquired function according to the physical development of the child. It is a learned ability that is acquired through proper practice of the eating experience, as we know of it today. Therefore, we can find originating, causative factors in children who cannot bite and chew by evaluating the weaning period during the infancy and toddler stages. We assess delays occurring in the beginning or the continuation of improper training methods of eating patterns at these early ages.

Lack of Feeling Hungry and the Movement Towards Softer Foods

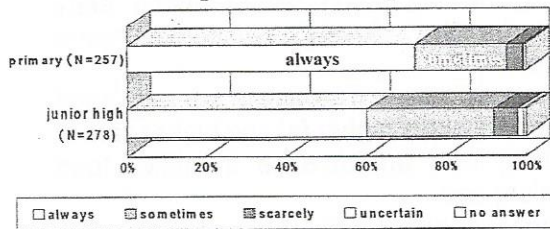
A lack of feeling hungry in daily life could be viewed as one consideration for the loss of proper eating behaviors. Changes in life styles by reduced physical activities in children and the tendency to consume many processed foods will eventually influence the meals that follow. Most of the processed foods are also high in fat with high caloric counts. This produces a physiologic lack of hunger as the end result.

On the other hand, when processed foods are mostly soft, there is no stimulation to create an extended chewing effort in achieving nourishment for the body. A behavior pattern develops that eventually leads to children avoiding foods that require heavier chewing forces. This further continues the softer food cycle.

Customs of Water Intake with Meals

It is suspected the general decrease in biting and chewing efforts brings about the establishment of deviated swallowing patterns in children. The results of recent research conducted among students in 1996 on the customs of water intake consumed during meals are shown in figures 9 and 10. (Japanese Association of Health Education, 1996)

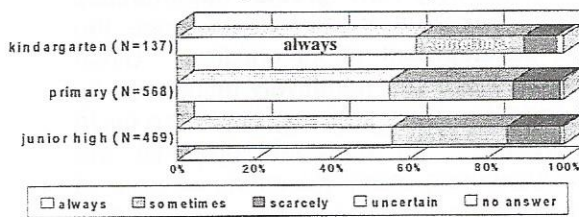
Q) Do you drink water, tea, milk, or other liquid with every meal ?



Report from the committee on the development of oral functions; Japanese association of health education, 1996

Figure 9

Q) Does your child drink water, tea, milk, or other liquid with every meal ?



Report from the committee on the development of oral functions; Japanese association of health education, 1996

Figure 10

The school children who answered "Yes" to the question of routinely drinking water, tea, milk, or other liquid with every meal is 60% in primary schools and 72% in junior high schools. Other results from this same research questionnaire answered by the parents' supports the results reported by the children. This eating behavior has been widely accepted by the parents of not only kindergarten children but also all the way through high school students as well. The results strongly suggest that many of the children, at the present time, do not swallow the bolus of food in a normal manner but, instead, pour the bolus of food into the pharynx with liquids. (Japanese Association of Health Education, 1996)

Eating Alone, Lack of Regular Meals, and Dining Out

As an outcome of increased financial welfare and busy life style schedules with families, the pattern of eating alone and dining out in Japan has increased. After children reach school age the ratio of mothers with regular jobs outside of the home increases. Along with this comes a slight reduction in the concern paid to the eating and dietary needs of the family. This is a naturally occurring reduction due to logistic planning and a busy schedule.

Children themselves are so busy with studying for examinations, additional studying with tutors or other lessons that they forget what is healthy for their diet and what is not. Regularly, there also is not enough time in the schedule to enjoy their meals in a relaxed and comfortable atmosphere.

The overall numbers of children eating prepared meals by themselves or who skip breakfast increased through the post-war years. Children used to take prepared foods from home, but convenience stores and fast food dining support this current style of eating behavior all day long. The dining out industry was established and developed to help make daily life more comfortable. Ironically, this same phenomenon encourages, prevents, or destroys the attainment of well-balanced and well-regulated eating habits.

The School Lunch (From nourishment to the guidance of eating behaviors)

One solution to address balanced nutrition is the school lunch program. In the revival period after World War II, the school lunch program began with plenty of food received as aid from the United States. It contributed significantly to improvement in the overall health status and promotion of physical growth among Japanese children suffering from hunger and insufficient nutrition. Moreover, it largely influenced the nutritional knowledge and eating behaviors they carried back home. Lately, the importance of the school lunch program was recognized as a necessary part of the educational process to improve health problems, which originate with an imbalanced diet.

Furthermore, recent studies indicate a relationship between eating and social behaviors in children. It suggests that eating behaviors affect study ability, promotion of humanity, and formation of basic life customs. In the background of these results, school lunch programs have been orientated as an educational process to modify eating behaviors and establish the health of the total body and mind.

School Lunch as an Education

As described above, healthy eating customs of children has decreased due to radical changes in the social structure and the mechanisms of its administration. For the parent with a child in such a situation, the school lunch, along with the advice of the school nutritional staff, largely influences the family's home eating habits and thereby improves their overall health status.

The frequency of eating lunch at school, however, is only one sixth of the total meals consumed in one year. Students eat at school everyday except on

weekends and holidays. Even though limited in its scope of meal coverage, this situation serves as a suitable basis for the formation of proper eating behaviors, development of various taste sensations, and the custom of ingesting various types of foods.

Popularization of School Lunch Programs

According to the national research in Japan on general hygiene and nutrition in 1995, the participation of school lunch intake in the Japanese elementary school was more than ninety-eight percent. This was an extremely high level when compared among the world population.

As a result, the site location with the highest ratio of where children eat lunch was in the classroom. The ratio of lunchrooms and cafeterias has also increased due to the popularity of the school lunch program. In the menu, a traditional meal with rice is most common. Moreover, the usage of pre-packaged foods has decreased and changed into a more home-like, handmade meal.

Conclusion

The post World War II social and economic changes influenced many things within the Japanese culture. One of those changes being noted is the eating habits and behaviors of children.

The studies indicate many contributing factors.

These factors include:

1. A decrease in the regimentation of repetitive biting and chewing being taught during early childhood in the closely monitored home environment;
2. dietary changes with an increase in pre-packaged and fast foods, with a higher fat and higher caloric intake along with an increase in softer food consumption; and
3. socio-economic behavioral changes related to business activities, intensity of schedules, and an overall attitude change toward the family meal as a social custom.

Additional study is needed to further identify and define the extent of the physiologic and orofacial functional changes created by socio-economic factors. Societies may have greater opportunities than presently being capitalized to influence the growth and development of its children. Since correct function has been negatively influenced by societal change, it makes sense to begin the cycle reversing process. It, however, presents the dilemma of answering many questions. Some of the biggest questions relate to whose role is it to initiate change, how should it be accomplished, and when do we begin? Simple questions, unfortunately, do not always have simple answers.

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