RELATIONSHIP OF DIETARY INTAKE AND ORAL HEALTH
*HOSHANG RUMI SUKHIA BDS, BSc, MS

INTRODUCTION

Dental health education objectives train the patient towards daily dietary maintenance and to obtain an optimum oral hygiene through out life. Its role is to influence the attitude and behavior of the patient to maintain oral health and prevent oral infections and diseases. Oral health programs have specific goals to achieve, as they seek to prevent the initial occurrence of the disease (Primary prevention) and at the same time they aim to diagnose and arrest the infection through early detection and care (Secondary prevention). Nutrition is one of the essential requirements for good health and childhood is a time when eating patterns and food habits are established for the remainder of a person’s life. Therefore, nutritional practices of childhood are at the very heart of the prevention of many future pathologic states.

The growth and developmental changes during the ages of 6-12 are fast and noteworthy. Daily energy consumption and nutrient elements needed to regulate this growth and development increase during this period. Since children are frequent snackers, a major concern about snacking is that it may result in a nutritionally unsound diet. Another point about dietary factors is that they exert a local or direct effect upon the dentition by reacting with the enamel surface and by serving as a substrate for cariogenic microorganisms. There is a worldwide comparison of sugar consumption related to caries levels. For example, there is an increased caries level amongst Eskimos following increased availability of sugar. Furthermore, animal experiments have proven a relationship between sugar intake and caries, as rats fed by stomach tube not develop caries.

Within this multi-factorial content, sugars are the major cause of dental caries. Dental caries could be defined as a dynamic process characterized by episodic demineralization and remineralization occurring over time. If the destruction phase predominates, disintegration of the mineral component results, leading to cavity formation. But although the consumption of sugary products has shown a rise in recent years, caries has not shown an increase in western countries. The assumption is that this may be due to more frequent tooth brushing and greater use of fluoride toothpaste.

The aim of this study is to determine the relationship between the caries experience of children and their tooth brushing and dietary habits.

MATERIALS AND METHODS

A total of 83 children aged between 6-11 years were examined orally in the presence of their parents. The male to female ratio was 39:44. All the subjects were healthy, free from systemic or congenital disease, and without present or past medical history likely to effect their dietary pattern or caries susceptibility. None of the subjects were on drugs, medication or pills. They were all urban city dwellers in the mixed dentition.

All the initial examination, the birthday, gender, height, weight and child’s history of previous dental experience were recorded. The frequency of dental visits and the type of oral treatment procedures were recorded, i.e., scaling, extractions or restorative fillings etc. Tooth brushing habits and the number of decayed teeth were noted. All examinations were performed with the child seated in the dental chair using an overhead light, explorer and mouth mirror. The patients were provided a chart (Diet Record Intake Chart) in the presence of the parents to record the food and liquid intake with the time and quantity indicated on the chart for 3 consecutive days. The chart mentioned the patient’s name, age and sex and provided an easy lay out for the patients to record their daily diet. The socio-economic status could be judged from the occupation of the parents and the type of school attended by the subject. If sweets were ingested, then specific column was given to specify the type of ingredient taken. The chart was divided into 3 specific days (date to be provided by the patient) with

* Assistant Professor & Head of Department of Orthodontics, Jinnah Medical & Dental College, Karachi. Correspondence Address: Gulzar Bldg., Abdullah Haroon Road, Saddar, Karachi, 74400.
the times mentioned. The chart was returned on the next appointment. Initially 94 children were selected, out of which 83 presented the diet charts after the 3 days period. The subjects were divided according to their age; Group A (6 yrs), Group B (7 yrs), Group C (8yrs), Group D (9 yrs), Group E (10 yrs) and Group F (11 yrs) consecutively. The independent variables noted were the gender, age, tooth brushing habits, previous dental experience and the average daily intake of nutrients.

RESULTS

A wide variety of carious lesions were encountered in both the sexes. The incidence of occlusal caries (Fig. 1) was far greater than the other types. This could be due to the sweet and sticky diet that renders the occlusal surface susceptible far quicker than other areas of the teeth. The ratio of mandibular teeth caries was noticed to be more than the maxillary dentition (Fig. 2), and could be due to gravity playing its role in keeping the food lodged in the mandibular dentition. The teeth mostly affected by the caries attack in the group were the primary molars followed by the newly erupted permanent molars (Fig. 3) as they are the teeth which bear the brunt of the diet in the late 1st decade and early 2nd decade of life. However, no specific difference is noted between the carious rate of females (Fig. 4) as they encountered carious lesions in the same teeth. The carious incidence, however, greatly varied in all ages of the study group (Fig. 5).

Apprehension and anxiety were noticed in both the male and female patients. It was concluded that females demonstrated higher anxiety levels than males in relation to dental treatment procedures.

The patients presented themselves mostly for restorative dental procedures and preventive measures. This was attributed to the increased caries level encountered in these age levels.

Oral habits were noted and was concluded that the most common oral habit remained pencil biting and nail biting in the school age group. Both these habits were more prevalent in the females than compared to the male subject. Teeth grinding or bruxism was also noted in both the sexes. However, oral habit eventually decreased with maturity (Fig. 6). Tooth brushing habits were compared between the male and female patients of the same age, and was noted that females inculcated the habit earlier than boys. Also noted was the fact that both sexes steadily developed the oral hygiene with increasing age. Besides carious teeth, a number of different oral hygiene diseases were observed (Fig. 7). The presence of calculus and plaque was present in both the sexes. Due to which associated gingivitis and halitosis was prevalent. As observed from the graph that tooth brushing is di-
rectly linked to the number of carious teeth, as a difference is noted with the daily brushing patients and the patients who never brushed. Males had a tendency to develop pit and fissure caries whilst females had an increased percentage of smooth surface caries. However, the percentage of tooth brushing as compared to other oral hygiene procedures was higher in the school aged children. Chlorhexidine mouthwash prescribed to a small percentage of the group. Chlorhexidine is a positively charged bactericidal and fungicidal antiseptic, which is attracted to the negatively charged proteins on the surface of the teeth and oral mucosa, and in saliva from where it gradually leaches out.

Various dental procedures were employed during treatment of this group. Majority of the oral hygiene cases were preventive and restorative in nature. All the teeth were not restored as the badly decayed were extracted. Extraction percentage also included the teeth orthodontic treatment planning.

**DISCUSSION**

Diet can affect the dentition in 2 ways, firstly while the tooth is forming before eruption, and secondly a localized effect after the tooth has erupted into the oral cavity. The post eruptive local environment is a more causative agent and sugar is termed as the most important dietary factor in this local effect. Nunn et. al. studied children exposed to a feeding program in which their normal diet was supplemented with a sweetened commercial mixed together with sweet biscuits. It was observed that the study groups had more caries level than normal children in the same category.

It was observed that each child in the questionnaire took one form of a sugar containing diet daily. It was also observed that 58.5% of children preferred a confectionery diet, i.e, chocolate, chewing gums etc in between meals. Only 2.5% preferred milk or milk products. Also the chewing gum of choice was a product containing sugar.

All researchers in this field, although generally accepted, do not supported the main association between the frequency of sugar intake and dental decay. However, as sugar becomes available to the general population, both the quantities of sugar consumed and the frequency of intake, increases. The same results were achieved in this survey as a relationship between the average daily intake of sugar and the carious level is inter correlated.

As mentioned earlier specific sites on the tooth are particularly prone to decay, and are mostly the sites where plaque accumulation can occur unhindered, e.g. in approximal tooth surfaces, pits and fissures and cervical margins. The composition and volume of saliva can also affect the caries susceptibility. Saliva acts as an intra-oral antacid because of its alkali pH at high flow-rates and buffering capacity. Increased salivary flow has its benefits as it decreases plaque accumulation and aids in clearance of foodstuffs.

Protective factors in the diet against caries formation include inorganic phosphates and the cation calcium. Since the caries process involves dissolution of enamel which is very largely calcium and phosphates, any increase in the concentration of these 2 ions in plaque or saliva surrounding the tooth would result in the dissolution of less enamel. The presence
of calcium and phosphates during remineralization phases also increases repair of the lesion. Phosphates have the additional advantage of being good buffers and their presence in plaque resists the depression of plaque pH towards the 'critical pH'. This is the reason for the importance of Ca and P in the diet.

A calcium phosphate ratio of 1:1 is desirable, which is found to be 0.57 weight in man. Variations in human dietary Ca/P ratio, particularly low P content, have been associated with cariogenecity, but no significant difference was found in the caries scores of children with high or low dietary Ca/P ratios in previous studies. Fluoride tooth pastes were mostly utilized by the percentage of tooth brushing subjects. Fluoride has both pre-eruptive and posteruptive benefits on the developing dentition. Pre-eruptively the enamel formed has improved crystallinity and increased crystal size, which renders it less soluble to attacking acids. Post-eruptive affects of fluoride are that it inhibits demineralization and promotes remineralization of early caries. Furthermore it also decreases acid production in plaque. However, increased fluoride levels in the diet can lead to fluorosis or mottling of enamel and is endemic in areas with high concentration of fluoride in drinking water. Clinically visualized as white opacities to severe pitting and discoloration. The age has a considerable impact on the carious rate. Caries experience increases with age. But the decrease in the caries rate with age may be due to the shedding of primary teeth.

Dental caries experience of children who brush daily was found to be significantly lower than that of children who never brushed. This relationship of tooth brushing in correlation with carious rate is in accordance with other studies. If a counseling message is to be formulated the eating habits of the individual must be known. For a valid assessment of dietary habits a written 3 day or more dietary record is generally suitable for private practice.

The advantage and disadvantage associated with diet chart keeping is the possibility that the child’s diet could be changed during the recording period, either to simplify the task or because of record keeping parents were made aware of the diet. Also, children may eat certain foods, especially snacks without their parent’s knowledge, especially school age children. Therefore, it could be assumed that those foods may be unreported. For this reason, the diet-recording task was given to both the parent and the child in order to gain the participation of the child in the study. It was however, noted that all the children were enthusiastic about this task, and tried not to miss the items they drank or ate in school.

It is evident that socio-economic levels and dietary habits. Healthy eating habits and a healthy relationship with food are learnt in childhood. Parents set a strong example for children in attitudes about food selection, both at meals and snacks. Early dental health education, besides focusing on the child’s diet, should include a discussion about the family diet.

**REFERENCES**