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Nutrition and dental health

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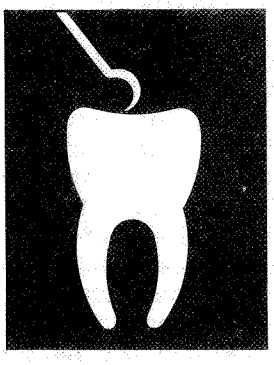
Quick Facts

- Fluoride intake by children from birth to 18 years old has been shown to reduce dental caries by making stronger teeth.
- Dental caries are caused by bacteria in the mouth fermenting carbohydrates resulting in the production of lactic acid; tooth enamel then demineralizes.
- Simple carbohydrates such as table sugar, honey, corn syrup, molasses and dextrose are easy for bacteria to ferment; by cutting back on foods high in simple carbohydrates it is possible to decrease dental caries.
- "Nursing bottle syndrome" can be prevented by not allowing a child to fall asleep with a bottle.
- Regular brushing, flossing and visits to the dentist are important for good dental health.

Good nutrition is essential for good physical health. Nutrition also plays a key role in the development and maintenance of a healthy mouth, especially the teeth and gums. The foods we consume daily have an effect on our teeth. At the same time the health or lack of health of our teeth and gums affects what we are able to eat. Good dental health begins early in life and must be practiced throughout life.

Tooth development begins shortly after conception, usually between the sixth and eighth weeks of gestation and continues throughout pregnancy. It seems to take severe nutritional deficiencies on the part of the mother before obvious changes in tooth formation are seen in the child. However, slight deficiencies may cause changes in tooth structure that will leave a tooth at greater risk for decay later in life. A good diet during pregnancy is always important.



However, nutrient excess as well as nutrient deficiencies may play a role in congenital anomalies of the mouth. Therefore, self-supplementation is to be avoided during pregnancy.

Fluoride Intake

Good nutrition is equally important during infancy, childhood and adolescence. During these growth periods, primary and permanent teeth are being mineralized. This occurs before they erupt into the mouth. Fluoride intake from birth has been shown to reduce dental caries (tooth decay) by as much as 60 percent. During tooth development, fluoride is incorporated into the tooth structure making the tooth strong and decay resistant.

At present many community water supplies are fluoridated at the rate of 1 ppm (1 part per million). This rate has been proven safe and effective at reducing dental caries. The normal daily intake from fluoridated water is about 1 milligram per day. When teeth are forming, an intake of more than 2 parts per million may cause fluorosis, a condition in which tooth enamel becomes roughened, mottled and discolored. However, teeth remain strong and resistant to decay.

If one lives in an area where drinking water has little or no fluoride, prescription fluoride drops or tablets may be prescribed by your doctor.

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An alternative to supplements is the daily use of fluoridated toothpaste and mouthwash.

The Decay Process

Brushing after meals and snacks is one of the best ways to remove sugars and food particles from tooth surfaces.

The decay process begins when the bacteria that are always present in the mouth break down components of saliva. These components precipitate out of saliva and adhere to tooth enamel. This is the start of dental plaque. Dental plaque is a clear gelatinous material that allows the bacteria of the mouth to remain on the teeth. If dental plaque is not removed frequently (at least once a day) by proper brushing and flossing, the plaque becomes tightly attached to the tooth and only mechanical cleaning can remove it. This is why frequent visits to a dentist and regular thorough cleaning by a dental hygienist is very important.

Inside this dental plaque, the bacteria ferment dietary carbohydrates for a food source. During this fermentation process, lactic acid as well as other acids are produced. These acids cause demineralization of the tooth enamel. As the tooth becomes demineralized the bacteria can move into the tooth, decay begins, and a cavity is formed.

Untreated dental caries are painful and can result in tooth loss. Pain or loss of teeth may cause malnutrition. These conditions often prevent a person from chewing and eating adequate amounts as well as eating certain hard, high fiber foods.

Since carbohydrates are needed as a food source for bacteria, by cutting back on simple carbohydrates, the rate of dental caries can be reduced. Sucrose (table sugar) is known to be the carbohydrate bacteria prefer. However, other simple carbohydrates such as fructose, lactose and glucose are easy to ferment and also support growth of bacteria. Simple sugars are found in many foods and have many names. Some of these are table sugar, corn syrup, honey, molasses and dextrose. By reading labels on food products it is possible to limit foods that have a high concentration of simple sugars and thus reduce the chance of dental caries.

Complex carbohydrates (starches) also can be fermented by bacteria but the process takes longer. However, many complex carbohydrates are sticky and become lodged between teeth and gums. This allows the bacteria time to ferment the carbohydrate. Meats and foods high in fiber such as fresh fruits and vegetables help clean the teeth of food particles and sugars during the chewing process. These foods also promote saliva flow, which helps rinse the teeth of food particles. Saliva also neutralizes the acid.

Although fresh fruits and vegetables do contain carbohydrate that can be fermented by bacteria, the fiber content counteracts the effect and helps clean the teeth, therefore protecting against dental caries. When we eat, we provide food for mouth bacteria. Eating three meals a day is important for adequate energy and nutrient intake, but snacking between meals presents special dental health problems.

The snacks most people enjoy tend to be high in simple sugars (examples might be dried fruits such as raisins, sweet rolls, candy bars, pop or caramel corn). Snacking does not need to be completely omitted. In many situations, snacking is important for good physical health. This is especially true for young and growing children who need the calories and nutrients from snacks for proper growth. One can choose snacks that are not harmful to the teeth. These snacks also tend to be very nutritious. Good snacks could include cheese, yogurt, meats, plain nuts (not recommended for children younger than school age), peanut butter, fresh fruits and vegetables, unsweetened breads or cereals, as well as popcorn.

Nursing Bottle Syndrome

One preventable dental problem that affects young children is known as "nursing bottle syndrome." This syndrome is characterized by rapid decay of the primary upper teeth and some of the lower back molars. The lower front teeth are seldom affected. This condition develops when a child is given a bottle that contains a carbohydrate liquid or a sweet pacifier at bed and/or nap time. While the child is awake and sucking, saliva flow helps wash sugars away from teeth. As the child falls asleep sucking and saliva flow decreases, the sugars in the liquid pool around the teeth providing an excellent feeding ground for bacteria.

The decay that results from this practice of bedtime feeding is painful to the child. If left untreated, infections and abscesses are possible. Premature loss of upper teeth may lead to the child developing poor "tongue-thrust." This could cause poor alignment of permanent teeth and future orthodontic and speech problems. All of these problems can be avoided by never allowing a child to fall asleep with a bottle.

Good dental health is possible by remembering the following steps:

- See your dentist regularly.
- Brush and floss teeth often (a minimum of once a day); after each meal or snack is best.
- In areas with a low fluoride level in the water, one can help increase tooth strength by using a toothpaste or mouthwash containing fluoride.
- Limit intake of foods that are high in simple carbohydrate or very sticky; snack wisely.
- Good dental health begins early in life.

References

Nutrition: Principles and Application in Health Promotion. Carol West Suitor and Merrily Forbes Hunter, J. B. Lippincott Co., 1980.

Nutrition: Concepts and Controversies. Eva May Nunnelley Hamilton and Eleanor Noss Whitney, West Publishing Co., 1979.

Diet, Nutrition and Dentistry. Patricia M. Randolph and Carol I. Dennison, C. V. Mosby Co., 1981.