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Diet and Dental Health (1955)

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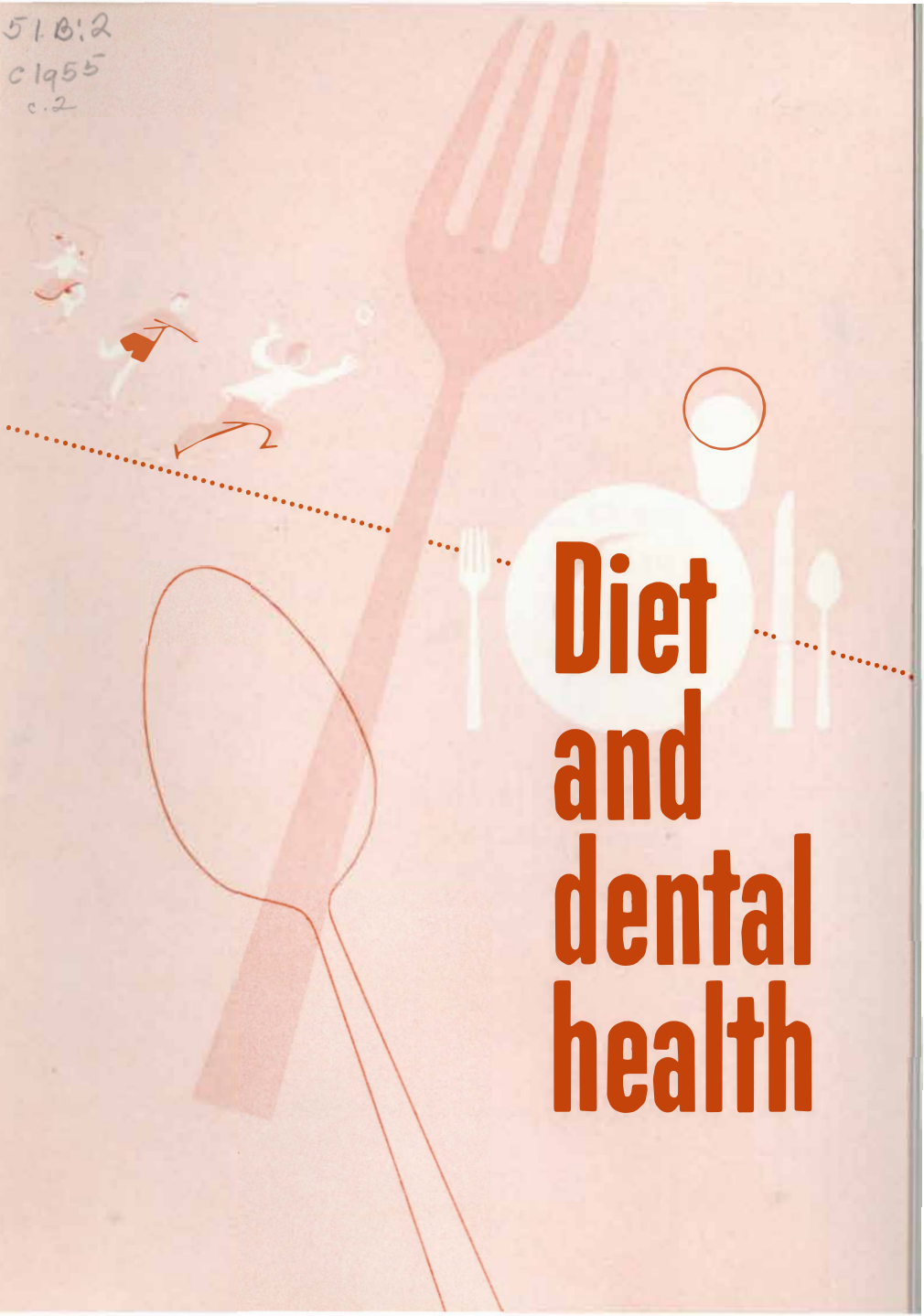

Diet and dental health

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Proper foods are essential to good physical health. Every boy and girl wants to be strong and healthy; but because many children do not eat the correct foods, they suffer from malnutrition. They are underweight or overweight, do not have enough energy to play or study well and are subject to diseases which well-nourished children avoid.

In this country it is possible to buy almost any kind of food that we want. Nevertheless, malnutrition does occur because many people do not pay enough attention to the kind of food they eat and do not understand the value of different foods to the body. They select their food in a helter-skelter manner. Malnutrition in the United States is often the result of poor eating habits rather than lack of money.

Modern life has de-emphasized the pleasures of eating around the family table. We tend to gulp our food on the run, without appetite, without interest, without pleasure. We forget that when we enjoy the food we eat, it is better digested.

The cells of our body must have certain essentials in order to work properly. These essentials are called nutrients and must be obtained from the food we eat. *Unless we have an adequate supply of nutrients every day, the cells become starved and eventually sicken and die*. This is tissue starvation. A person may believe that he is well fed; yet his tissues are actually starving if he eats great quantities of carbohydrates (sugars and starches) and neglects to eat enough foods rich in proteins, minerals and vitamins. He may not feel hungry, but his cells and tissues are being deprived of elements needed for growth and maintenance.

The cells that form the teeth, the gums and the bone surrounding the teeth need all the basic nutrients for the same reasons that the cells of the liver and heart and other parts of the body need them—in order to grow properly and to do their work efficiently.

diet in the development of the teeth and jaws

While the teeth are developing in the jaws, they must receive adequate amounts of building materials, such as proteins, minerals, fats and other nutritive elements found in foods. The only way in which the cells can get these minerals is to draw them from the blood. The blood in turn receives the nutritional elements from the small intestine. If they are not available there, the blood must draw them from the storehouses of the body. It must take calcium from the bones and proteins from the muscles. It can therefore be readily understood why a growing child must eat an adequate and balanced diet in order to supply the materials from which growing tissues are built. If the diet is inadequate, the body reserves soon become used up. When this happens, the growing tissues become malformed or stop growing.

The cells that form the teeth and bones need calcium to construct sound teeth and bones. The enamel of the teeth develops within the jaws over a long period of time (four months before birth to about eight years of age—with exception of the third permanent molars, the crowns of which are completed at between 12 and 16 years of age). During this time, an adequate intake of calcium is necessary for the proper calcification of the enamel. If the intake is inadequate, defective enamel which is poorly calcified or pitted (hypoplastic) may develop.

Once the teeth are completely formed and calcified and have erupted into the mouth, they do not need any more calcium and cannot acquire any. Nor do they ever lose any calcium. Bone on the other hand, is always re-forming and calcifying, even in the adult, and the bone cells require calcium throughout life.

diet and dental health

There are three major types of dental disorder: TOOTH DECAY (dental caries), PERIODONTAL DISEASE (disease of the tissues surrounding the teeth) and MALOCCLUSION (irregularities in tooth position and jaw relationship).

There is no evidence of a direct connection between the quality of the diet and the development of malocclusion. However, the relation of the diet to periodontal disease and to tooth decay has been clearly established.

diet and tooth decay

Tooth decay is the result of bacterial attack on the *surface* of the *erupted* tooth. Dental decay does not affect the enamel of the tooth developing within the jaw. Since the erupted adult tooth cannot get any calcium from the blood, the start of decay is not related to the amount of calcium in the diet of the adult.

Fluorine is a dietary essential during the time tooth enamel is forming in order to develop decay-resistant teeth. Except for this element, however, the development of decay-resistant teeth in humans through dietary means has not been demonstrated.

The relation of sugar to tooth decay has been well established. Dental scientists have shown that acid-forming bacteria which attack tooth enamel require a food that can be broken down quickly to form acids. Sugars on the tooth surface can be turned into acids remarkably fast by certain bacteria normally present in the mouth.

Excessive amounts of carbohydrates in the diet, particularly sugars, are a major factor in causing tooth decay.

Each time we eat a sweet, the teeth are attacked by acids. If we nibble on candies, cookies and other sweets five or six times a day between meals, the number of acid attacks during the day is multiplied enormously, so that the neutralizing mechanism of the saliva can no longer cope with the acids.

Sweets eaten between meals are particularly dangerous because they stick to the teeth for comparatively long periods of time. They are not brushed off the teeth by other foods (coarse vegetables and fruits) as when sugar is eaten at mealtime. To halt decay, cut out sweets. If you *must* eat a sweet now and then, brush your teeth immediately afterward. The table entitled "Hidden Sugar" (see pp. 10-11) shows the number of teaspoonfuls of sugar that are hidden within confections and desserts.

For many years it was supposed that if the body were supplied with large quantities of calcium and vitamin D, decay would surely be prevented (especially in the teeth of children). Unfortunately this is not true.

Because the teeth are highly calcified, it was thought that they needed calcium for their strength. This is only partially true. While the teeth are developing within the jaw of a child, they *do* require calcium in order to be properly formed and calcified. The erupted teeth, however, cannot use the calcium in the blood stream since enamel and dentin do not contain blood vessels. It is clear, therefore, that while calcium is needed for the proper calcification of the developing enamel it is of no value to the erupted enamel and, therefore, has nothing to do with the prevention of tooth decay.

diet and periodontal disease

Tooth decay is primarily a disease of childhood and adolescence. Most of the damage caused by decay occurs before the age of 25. After that, periodontal disease causes the greatest loss of teeth.

There are two basic types of periodontal disease: (1) disease of the gingiva (gums) and (2) disease of the alveolar bone (bone surrounding the teeth). Healthy gums and healthy bone to support the teeth require proper local care and an adequate diet. Dietary deficiencies can and often do affect the health of the periodontal tissues, especially when oral hygiene is poor. In severe vitamin C deficiency, coupled with neglect of mouth cleanliness, the gingiva may become swollen and bleed easily. If the deficiency is allowed to continue, the bone holding the teeth may be destroyed, causing the teeth to loosen and fall out. In niacin deficiency (pellagra), the gingiva may become raw, painful and infected.

Although the enamel and dentin of the tooth need proper nutrition only while the tooth is growing and calcifying within the jaw, the gingiva and the bone require adequate nourishment even after the tooth has erupted into the mouth. Bone and gingiva are constantly undergoing repair. Unless this repair is made adequately, the bone and gingiva soon deteriorate because of the heavy chewing forces to which they are subjected. Proper daily maintenance and care of the gingiva are, therefore, essential to the health of the teeth and gums.

Care of the gums must include two things. The teeth must be kept clean and free of debris which is known to cause injury to the gums, and the gums must receive adequate nutrition through the blood stream.

Cleanliness is essential to the health of the mouth. A clean mouth is not only attractive but is biologically necessary to the health of all the soft tissues, especially the gingiva and tongue.

In an unclean mouth large numbers of bacteria are always present in the debris at the gum margins. These microorganisms may produce acids which cause decay and decalcification of the enamel around the necks of the teeth. This occurs frequently in the young. In older persons, excessive numbers of bacteria play a part in causing inflammation of the gums and in producing calculus deposits (tartar).

physical character of food

The physical character of food plays an important role in keeping the mouth clean and in providing the muscles used for chewing with the exercise they need. A person who does not exercise for a long time soon finds his muscles flabby, his circulation poor, the skin, eyes and hair sallow and dull. If we do not provide our chewing apparatus with exercise, the muscles lose their tone, the mucous membrane becomes dull and unhealthy, a cheesy material accumulates around the teeth and on the tongue, and the bone holding the teeth loses its normal character.

Ordinarily, cleansing of the mouth is accomplished to some extent by well-chewed fibrous foods. Foods that require thorough chewing, during which they literally sweep over the teeth, between the teeth and over all the soft tissues, cleaning them, are called *detergent* foods. On the other hand, foods that require little chewing and tend to cling to the teeth are termed *impacting* foods. Examples of detergent foods are fruits, such as apples and oranges, and raw vegetables, such as carrots and celery. Processed foods, such as cheese, bread and jams, or cooked foods, such as oatmeal and mashed potatoes, tend to *impact* between the teeth and cling to their surfaces.

The cave man kept his mouth clean through the action of cleansing (detergent) foods. Animals still do this. Modern man has overrefined and overcooked his food until it is no longer detergent. He must, therefore, use the toothbrush to keep his mouth clean. It is very important that the toothbrush be used regularly and carefully, especially immediately after meals, to remove sticky foods from the teeth. If you cannot brush your teeth because you are

away from home, you should at least rinse your mouth thoroughly with plain water immediately after eating. This will do much to keep the mouth clean and may help reduce decay.

In addition to toothbrushing, every person should include in his diet, *particularly at the end of each meal*, some detergent food. Detergent raw fruits and vegetables help keep the mouth clean. Instead of a sugar-laden piece of pie, which you do not need at the end of a meal, eat a fruit. It is much more healthful.

vitamin supplements

Vitamin pills are not a substitute for good dietary habits and they cannot make up for a faulty diet. If a person eats a balanced diet, he will not need additional vitamins. Current advertising to the contrary, very few people need to use vitamin preparations regularly. Like any other form of medication, they should be taken only after consultation with a physician, or dentist.

good diet for good health

Milk is a necessary food for growing bone as well as for growing teeth because of the calcium it contains. Tomatoes, citrus fruits and raw cabbage also are beneficial. The vitamin C in them helps to maintain the health of the gingiva and is necessary for the health of the capillaries (small blood vessels) and for proper bone growth.

The main point is that a good diet is necessary, not only for the gingiva, or the teeth, or the bones, or the muscles alone, but for good health of *all* tissues of the body.

In choosing fruits and vegetables, consider first, fruits or vegetables rich in vitamin C, such as oranges, grapefruit, tomatoes, green leafy vegetables and cabbage; and second, vegetables or fruits rich in vitamin A, such as yellow vegetables, yellow fruits and ripe tomatoes.

essential daily foods for adequate nutrition

milk	2 or more 8-ounce glasses for adults, 3 to 4 glasses for children
vegetables	2 or more servings other than potato, at least 1 raw; 1 green or yellow; 1 potato or more
fruit	at least two servings each day, one of them a citrus fruit or fresh tomato
eggs	one a day preferably, but not less than four a week
meat	1 or more servings (4 ounces cooked weight); may be meat, fish, poultry or cheese
butter	(or fortified margarine) three to six teaspoonfuls daily
whole grains	3 slices or more whole grain or enriched bread, 1 serving whole grain or enriched cereal

The above foods supply the essential protein, fat, carbohydrate, mineral and vitamin requirements for adults. In addition, children should be given the equivalent of one teaspoonful of cod liver oil in the winter months to meet their requirements for vitamin D. Active adolescents will usually need more than the suggested minimum amounts of food.

The foods listed above supply the recommended minimum daily dietary allowances suggested by the National Research Council.

hidden sugar

The approximate sugar content of popular foods expressed in teaspoonfuls:
100 grams sugar = 20 teaspoonfuls = ½ cup = 3½ oz. = 400 calories.

			sugar, teaspoonfuls
candy*	Chocolate bar	1 average size	7
	Chocolate cream	1 average size	2
	Chocolate fudge	1½" sq. (15 to 1 lb.)	4
	Butterscotch	1" x 1"	1
	Chocolate mints	1 medium (20 to 1 lb.)	3
	Chewing gum	1 stick	½
	Sweet lozenge	1 usual size	⅓
cake	Chocolate cake	1/12 cake (2 layer icing)	15
	Angel cake	1/12 of large cake	6
	Sponge cake	1/10 of average cake	6
	Cream puff (iced)	1 average custard filled	5
	Doughnut, plain	3" diameter	4
cookies	Macaroons	1 large or 2 small	3
	Gingersnaps	1 medium	1
	Molasses cookies	3½" diameter	2
	Brownies	2" x 2" x ¾"	3
custards	Custard, baked	½ cup	4
	Brown Betty	½ cup	9
	Gelatin	½ cup	4
	Cornstarch pudding	½ cup	3
ice cream	Ice cream	⅛ quart (½ cup)	5-6
	Sherbet	⅛ quart (½ cup)	6-8
pie	Apple	⅙ med. pie	12
	Cherry	⅙ med. pie	14
	Custard, coconut	⅙ med. pie	10
	Raisin	⅙ med. pie	13
	Pumpkin	⅙ med. pie	10

*Candy is from 75 to 85% sugar. Popular candy bars are likely to weigh from 1 to 5 oz. and may contain 5 to 20 teaspoons sugar.

			sugar, teaspoonfuls
sauce	Chocolate sauce	1 tbs. thick	4½
	Marshmallow	1 average (60 to 1 lb.)	1½
spreads	Jam	1 tbs. level	3
	Jelly	1 tbs. level	2½
	Marmalade	1 tbs. level	3
	Syrup, maple	1 tbs. level	2½
	Honey	1 tbs. level	3
milk drinks	Chocolate	1 cup, 5 oz. milk	6
	Cocoa	1 cup, 5 oz. milk	4
	Eggnog	1 glass, 8 oz. milk	4½
soft drinks	Sweet carbonated beverage	1 bottle, 6 oz.	4⅓
	Ginger ale	6 oz. glass	3⅓
cooked fruits	Peaches, canned in syrup	2 halves, 1 tbs. syrup	3½
	Sweet cider	6 oz. glass	4½
	Rhubarb, stewed, sweetened	½ cup	8
	Apple sauce (unsweetened)	½ cup scant	2
	Prunes, stewed, sweetened	4 to 5 med., 2 tbs. juice	8
dried fruits	Apricots, dried	4 to 6 halves	4
	Prunes, dried	3 to 4 medium	4
	Dates, dried	3 to 4 stoned	4½
	Figs, dried	1½ to 2 small	4
	Raisins	¼ cup	4
	Currants, dried	2 tbs.	4
fruits and fruit juices	Persimmons, fresh	½ cup	7
	Fruit cocktail	½ cup, scant	5
	Orange juice	½ cup, scant	2
	Pineapple juice, unsweetened	½ cup, scant	2⅗
	Grapefruit juice, unsweetened	½ cup, scant	2⅕
	Grapejuice, commercial	½ cup, scant	3⅗

Adapted from current publications on food values. Courtesy of Dr. Herman Becks, University of California.

AMERICAN DENTAL ASSOCIATION

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