

Dental Health & Treatment

Dental Cosmetics & Dental Beauty



- *How to get a great smile**
- *How to replace missing teeth the right way**
- *How to prevent dental disease**
- *How to avoid bad breath**
- *How to save big money on dental bills...**
- *And lots more**

Howard B. Marshall, D.D.S.

A noted periodontist with more than 30 years experience helps you get the healthy smile of your dreams, and answers all your questions.

ABOUT THE AUTHOR

Dr. Marshall has been in practice for over thirty years. He originally graduated from the University of Pennsylvania School of Dental Medicine, followed by a second year of training at Boston University's Graduate School of Medicine, Department of Stomatology. He then entered the United States Air Force, and served for two years as a captain in the dental services department.

Upon return to the United States, Dr Marshall limited his practice exclusively to Periodontics for 16 years. Subsequently, because of his additional background as a highly trained sculptor and painter, he elected to become expert in cosmetic and restorative dentistry. Today, in addition to his periodontal background, he has over twenty years of experience in restorative and cosmetic dentistry. He has taken well over one hundred postgraduate courses. He has placed over 4000 dental implants. Where necessary, he has rebuilt the bone into which the needed implants were placed. He has also restored the teeth by placing crowns on top of the implants.

Dr. Marshall has not only rebuilt many mouths, but also created beautiful smiles. In addition to traditional Veneers, he has also trained in the LUMINEER concept. He has worked in cooperation with other expert dental teams of specialists, or as the periodontal or implant surgeon in conjunction with a restorative dental specialist. He believes very strongly that patients should get total comprehensive treatment planning, and that, where health and budget allow, dentists and patients are best served by state of the art techniques. He also believes in preventing future disease, and in counseling with advanced nutritional information for a patient's overall health.

Dr. Marshall's previous dental book for the public (1980) was: "How to Save Your Teeth-The Preventive Approach."

He has been awarded over 10 patents for his research on a one-visit tooth replacement system, which he hopes to introduce to the marketplace sometime in the next two years.

Dr. Marshall practices in New York City, New York, USA.

Contents

INTRODUCTION	Why You're Going to Lose Your Teeth (and What Can Be Done to Stop It)	1
ONE	Why You Have Dental Disease and Bad Breath	2
TWO	How You Can Have Healthy Gum and Bone	18
THREE	How You Can Have Strong, Healthy Teeth	37
FOUR	The Right Diet for Strong Teeth and Bone	45
FIVE	How You Can Get from Birth to Dentures Without Really Trying!	55
SIX	Finding a Good Dentist	65
SEVEN	Dental Costs and Why They Vary	69
EIGHT	What You Should Know About a Good Dental Examination	73
NINE	How Teeth are Repaired, Including Full Mouth Reconstruction	80
TEN	The Dental Specialties: Why Do You Need Them and When Do You Use Them?	93
ELEVEN	Oh, My Aching Jaw! (The TMJ Syndrome) (Also Known as TMD)	143
TWELVE	The Most Frequently Asked Dental Questions—and Answers	147
THIRTEEN	Secrets of an Attractive Smile	155
FOURTEEN	New Techniques for Pain Control	163
FIFTEEN	Dental Emergencies and Special Situations	167
SIXTEEN	Dental Insurance: What You Should Know About it	175
EPILOGUE	Your Dental Future and the Future of Dentistry	182
INDEX		185

INTRODUCTION

Why You Could Lose Your Teeth (And What Can Be Done to Stop It)

We all want to look our best. That includes having a great smile. **We are going to discuss all of the secrets of getting a great smile later in the book, but first, you need to be aware of something. Did you know that every year thousands of people are in danger of losing their teeth?** Some of the teeth that are removed could have been saved. Every year millions of dollars are spent drilling teeth, filling them, pulling them out, and replacing them. Much of the time, cost and pain could have been avoided. Did you know that in the United States over 100 million adults have some form of periodontal disease (pyorrhea) In many, it has reached an advanced stage.

Periodontal disease accounts for the greatest loss of teeth in humans. The disease starts in children in the form of gingivitis (inflammation of the gum). If untreated, it often goes on into the adult as periodontal disease (bone loss).

The same wide spread of incidence of decay exists particularly in children and young adults. If no more decay were to occur, it would still be impossible to drill and fill all the remaining cavities with the current dental manpower. This dental epidemic may be attacking you, and your family. **What are you doing at this time to prevent destruction in your own mouth? How can you avoid major costs, time loss, and dental pain? Do you want to have good, sound teeth, healthy gums and bone? Would you like to eliminate bad breath? Yes? Read on!**

The very first step you can take to prevent disease is to learn what causes it. Learn what mouth bacteria can really do. Realize that even though dental disease is occurring at a microscopic level, much of it can be prevented by taking only a few minutes a day to hit the agents of disease where it will hurt them. You must learn how diet influences breakdown, and what foods are most destructive.

You must know which foods and vitamins help build tissue resistance, what you should and should not feed your child, and what harmful foods you should stop eating. You can arm yourself to prevent future dental breakdown.

But what if you want to know the current condition of your mouth? Better read on and find out what a thorough dental examination consists of, how to choose a dentist, and when to use a specialist. Find out whether your dentist is keeping up, and how to determine, once you're in his office, whether his philosophies are progressive. Learn about a simple home kit to reduce dental disease if directions for its use are followed exactly as described in this book, and coordinate it with the dietary information also presented here.

I am going to try to cover everything you've wanted to know about your mouth, your smile, bad breath, cavities, gum disease, children's dentistry, tooth movement, restorations, replacements, and more. If you are a younger or middle-aged person, with all or most of your teeth, and take the time to learn what is in this book, you may save between \$50,000 and \$100,000 in the course of your lifetime.*

Let's start on this self-help adventure now. I truly want to help you avoid lots of pain and lost time. I'd like you to keep your teeth as long as possible . . . your entire life!

* Based on current costs of full periodontal care and full-mouth rehabilitation, as well as the frequent need to have "re-do" dental work over the years because of decay, root canal problems, or tooth loss that occurs in the non-periodontally treated mouth.

ONE

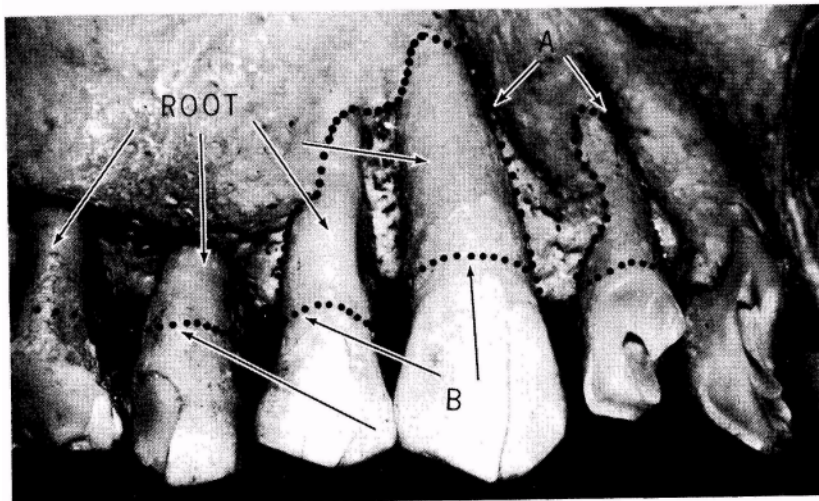
Why You Have Dental Disease and Bad Breath

DENTAL DISEASE AS A CHAIN REACTION

Just because your mouth doesn't bother you does not mean it's healthy. Since disease in the body starts out on a cellular level, the first breakdown is so small that you don't even know it's happening. Your brain centers tell you something is wrong only after a lot of tissue or structure has been destroyed. Just as people can walk around with cancer for years and not be aware of it, you can be getting breakdown in your gum and supporting bone without knowing it. When your tooth has just a little decay, or your gums are just slightly inflamed, they don't hurt. Yet, at some stage, you'll feel it. Most people are surprised when the dentist tells them they have a problem. The patient says, "But I don't feel it!" or "How come it doesn't hurt?" Believe me, by the time it hurts, or gums bleed, you are in trouble! Big trouble! One of my patients brought in her husband for a much needed checkup. He hadn't been to a dentist in seven years, since leaving the military. Two teeth had to be extracted, two more required root canals, and he had lost one third of the bone around his teeth. Could all this have been avoided if he was seen earlier? Most likely yes!

The photograph below shows severe bone loss and tooth breakdown in a skull. How did this individual lose the supporting bone around the teeth? Which teeth could still be saved, and which would be hopeless, if this patient were alive?

16



HOW TO SAVE YOUR TEETH
 ADVANCED PERIODONTAL DISEASE IN HUMAN SKULL
A shows the level to which bone has been lost
B shows where the bone level was originally.

Because I've spent much of my adult life treating badly broken down mouths, like the one above, and know how much a patient may have to go through, emotionally and financially, to repair the breakdown, I'd like to see you avoid dental pain and large dental costs. I'd rather you not have the mouth like the one shown above. Let's analyze the problem together so you can prevent as much future trouble as possible. First, let's consider dental disease and see what causes it. We want to know which tissues break down, and why early breakdown, if not corrected, is like a chain

reaction. Each untreated problem helps create a bigger problem. The consequences of a chain of dental breakdown are truly amazing:

1. The loss of your first permanent molar causes six other teeth to shift, the result of which is a bad bite on that side of your mouth.
2. A small cavity, not treated, gets larger, then infects the nerve, causing great pain. To fix the problem may require root-canal work or loss of the tooth.
3. Bleeding gums, left untreated, may ultimately cause destruction of the underlying bone. This could lead to loose teeth and finally tooth loss. Can you imagine biting, into an apple and leaving your tooth in to keep the core company? Or not ever chewing steak or corn on the cob again?

I'm sure that, like most people, you logically assume that if not in pain, your mouth is probably healthy. Not true! Most mouths in the United States and other countries are dentally diseased, if you realize that disease occurs at a cellular and sub-cellular level. We know today that when cell membranes are disrupted, there are changes within the cell that deviate from normal, we have the beginning of disease. We often do not experience the results of this breakdown until much later in time. As a dental patient, just because you don't experience pain does not mean you don't have any dental disease occurring. Unfortunately, dental disease may not be recognized very early. Consider yourself fortunate if your dentist has early disease detection and prevention in mind when he examines you.

Dental disease can basically be considered a cause-effect relationship. Bacteria act on your teeth or on your gum and weaken and destroy your enamel or gum tissue. The results of this breakdown in the United States alone are quite substantial.

Let's look at the following facts:

When we talk about dental disease, we are talking about caries (decay), and periodontal disease.

Periodontal disease (periodontitis) is a chronic inflammatory disease primarily associated with adults caused by infection of the supporting gum tissues around the teeth. The infection itself is caused by bacteria. It travels along the surface of the tooth roots, creating periodontal pockets and the destruction of the attachment of the gum to the tooth and the supporting bone. The extent of this condition is measured by the depth of the periodontal pockets, the amount of loss of gum attachment, the pattern and extent of bone loss, or a combination of the above. Gingivitis, which is the earlier stage of inflammation of the gum, is reversible if it has not yet reached the level of the bone. As people get older, one often finds gum recession. Surveys* have shown that there is an increase in periodontitis as the population ages, and that by age 55 to 64, approximately 20% had periodontal disease (1981 survey). Gingival recession (1985-1986 survey) was found in approximately 46% of the older group. In a later survey (1988-1994), 35% of participants had periodontitis based on pocket depth and an even greater number (64%) when the disease was based on loss of attachment. Thus we can see that a considerable number of people in the United States are suffering from periodontal disease, which does not produce pain, but can lead to extensive bone loss and, later, tooth loss if not treated. It should be noted that overall, considering the past 50 years of available data, there has fortunately been an overall reduction in the total amount of people in the US who would be classified as having periodontal disease, especially of the severe form. There has also been a steady reduction in the number of people who have lost all their teeth.

* Roy C. Page & Paul I. Eke: *J. Periodontal.*, 2007: 78:1387-1399

Caries (decay) is a disease that attacks the teeth of younger people, primarily. Children are subject to decay in their first set of teeth (primary teeth) as well as when their permanent teeth erupt in the mouth. There are many causes, but first and foremost would be the presence of sugar or other carbohydrates that are easily broken down into sugars in the mouth. Bacteria attack these sugars, forming acids and other byproducts on the teeth. This breaks down the outer layer of the tooth (the enamel) and, after penetrating this very hard outer layer of the tooth, decay can then reach into the dentin, which is less mineralized, and rapidly cause further softening of the tooth structure. If it gets deep enough, the decay enters the nerve, causing a toothache, and the need for removal of the nerve (root canal treatment) or extraction. There has been a definite correlation between incidence of caries and poverty, at least in the US. There has been an overall reduction of decay over the past 40 years in adults, but an increase in children age 2 to 5 as of the last US Public Health Study.* In the age group of 2 to 11, 25% of children had decay in primary teeth. Decay tended to decrease in the permanent dentition of adolescents, and most adults. Sealants have probably been very helpful in reducing decay in that age group; for seniors, there was a reduction in root decay, but not of decay in the crowns of the natural teeth.

1. It has been estimated that there are 70 million adult Americans with periodontal disease.
2. Before age 40, decay is the main cause of tooth loss, after 40 it is from periodontal disease.
3. From the time teeth erupt in the mouth of a baby, they are subject to decay.

The sad part is that most dental problems can be prevented.

VARIABLES IN TOOTH BREAKDOWN

Why does all this breakdown occur? Any tissue in the body is a product of its genetic inheritance. But tissues are also influenced by nutrition during formation, and by their environment after formation. The cells of most tissues are constantly metabolizing, frequently regenerating, sometimes dying and being replaced. Nutrition is directly involved in all these reactions because it supplies the essential building blocks of amino acids, vitamins, minerals, and other molecules that permit repair and renewal. This is as true for your gum and bone as for any part of your body. Interestingly, enamel and dentine are unique. They are hard, calcified tissues. Once formed, the original structures do not regenerate, though they may re-mineralize to a limited degree.

When you think about teeth, gum, and supporting bone, you should be aware of these three areas:

1. Fluoride
2. Diet
 - a) The mother's diet during pregnancy
 - b) The infant's diet before and after the teeth enter the mouth
3. Oral hygiene

Depending on the interaction of these three variables, the baby's teeth may have average, more, or less resistance to breakdown. In the next chapter, you'll learn about preventing disease, but for the moment let's think about the various causes of dental disease. For example, given a

* "Trends in Oral Health Status, U.S., 1988-1994 and 1999-2004," National Center for Health Statistics, *Vital Health Statistics*, U.S. Dept. of HHS, series 11, no. 248

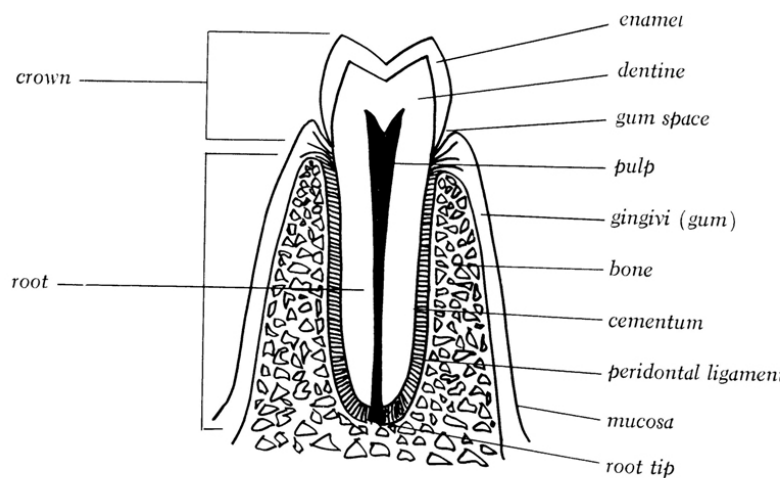
baby whose teeth are showing decay, what factors could cause the decay? For purposes of consideration, let's make four assumptions:

1. Assume that the teeth were genetically programmed to form normally.
2. Assume that the water fluoridation is adequate (correct range would be 1.0 part per million in a sample of water) and that the baby is getting some of this water.
3. Assume that the mother tries to clean the baby's teeth once a day.
4. Assume that diet is the only possible cause for breakdown in our example.
5. If diet is the cause, then as a good detective, you must still raise two questions:
6. How did the pregnant mother's diet influence the baby's developing teeth and developing tissue?
7. How did the newborn's diet influence the teeth before and after they erupted?

You might also wonder how the diet influences the repair of worn-out structures in the pulp of the tooth, the gum, and the bone throughout your life. We will provide the answers to these questions in Chapters 3 and 4. For the moment, let's examine the tooth itself to see what it's made of, so we will later understand what parts of the tooth break down from disease.

WHAT A HEALTHY TOOTH LOOKS LIKE

To visualize a healthy tooth, look at the cross-section drawing below. The portion of the normal tooth above the gum is called the crown. Its covering is a hard substance called enamel. Enamel is 97% mineral, and surrounds the core of the tooth crown.



CROSS-SECTION OF TOOTH AND SUPPORTING TISSUES

The portion of normal tooth below the gum is called the root. It is primarily dentine, covered by a thin layer of tissue called cementum. The core is made of dentine, both in the crown and in the root. Dentine is 75 percent mineral, the rest being organic material and water. The dentine fills the inside of the tooth, forming most of the bulk of the tooth. It surrounds a "living" tissue, at the center of the tooth, called the pulp. You probably know it as the "nerve." The pulp consists of live cells, nerves, and blood vessels which nourish the tooth. It is very fragile and, if injured by decay, or trauma to the tooth, or extremes of cold or hot, the pulp may die. This generally causes you pain and is what you know as a "toothache." A dying or dead nerve can cause one of the most severe pains known to man.

The root of the tooth is covered by a thin, hard material called cementum. The tooth sits in the jawbone, but is separated from it by a ligament called the *periodontal ligament*. The ligament is mainly composed of collagen fibers. The collagen fibers inserting into the cementum help attach the tooth to the surrounding bone. In a normal mouth, where the tooth emerges through the gum, the root stops and the crown begins. The crown is what you see in your mouth, and what you usually call a tooth. Actually, a "tooth" consists of the crown and the root underneath. Remember, the outer Layers of the crown are made of enamel, and the material inside is the dentine. Please look carefully at the drawing, and orient yourself to the different tissues of the tooth. The better you remember this drawing, the more easily you'll understand the rest of the dental story.

THE ROLE OF BACTERIA IN DECAY

Without bacteria your teeth would not decay. You have millions of bacteria in your mouth, mainly between your teeth, on your teeth near the gum, and on the tongue. The bacteria have lunch on the food left on the teeth, and like some foods more than others. As bacteria eat and digest the food left on the teeth, they form acids. These acids dissolve the hard mineral surface of your teeth and make holes. We call this process decay. We call the hole a cavity. Lots of holes equal lots of cavities.

The Role of Sugar

People and bacteria have something in common—they both love sweets! Some authorities believe that the worst sugar of all for teeth is sucrose, or ordinary white table sugar. Other authorities feel that glucose or fructose are pretty bad, too. Contrary to some people's relief, brown sugar is just as bad as white sugar. How much importance to give the sugars (glucose, fructose, and sucrose) and refined carbohydrates in causing decay is still not clear to researchers. There are many modifying factors to the sugar-carbohydrate question, including:

1. The chemical structure of the carbohydrate eaten
2. Its consistency (solid, liquid, chewy, sticky, etc.)
3. When it is eaten (i.e., before bedtime, between meals, or with meals)
4. How free the mouth is from dental bacterial plaque when the food is eaten
5. How soon the mouth is cleansed after eating
6. The amount of fluoride in the enamel of the tooth
7. The acidity of the saliva (pH)

Surprisingly small amounts of sugar are all that is needed to offer fermentable food to bacteria. Above those levels, additional carbohydrates or sugars do not seem to change the picture. Thus, in spite of current food fad mythology, the sugar-decay picture is not as simple and clear-cut as one would like.

In spite of this, there are enough scientific papers which have found the role of the "sugars," especially sucrose, to be of concern in causing decay, that it would seem prudent to reduce intake, and restrict it to meal times, until more definite research data is obtained.

It is obvious that sugar is found in many foods, in addition to being eaten in raw form. The table on pages 24-25 can give you an idea of how much sugar is found in some of the common foods you eat. (Reprinted with permission of the American Dental Association.)

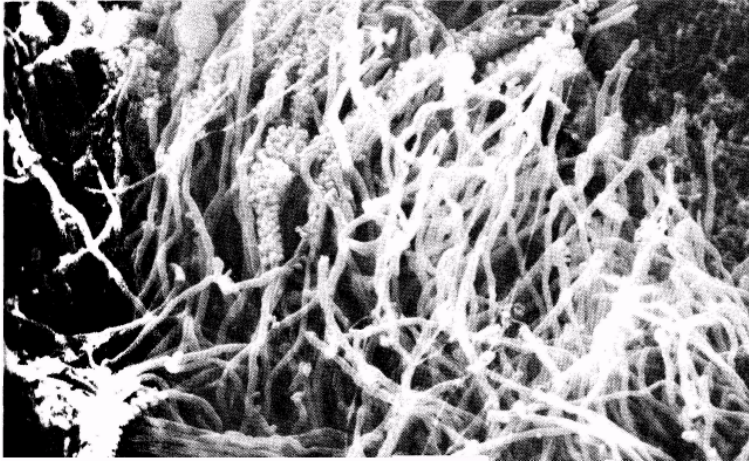
This table is pretty surprising. There's plenty of sugar in many baby foods, and in many cold cereals. Naturally, there's lots in jelly, jam, pancake syrup, and candy. Sure it tastes good,

but what a price the child, or you, may pay in money, time, and maybe pain at the dental office.

Some Important Facts about Bacteria

Let's get back to bacteria, because they are important. There are at least eighty different kinds of bacteria in the mouth, although only a few kinds are considered most responsible for causing decay. We said that certain bacteria have the ability to break down the sugars into acids. Some bacteria also produce a complicated material called dextran, which is sticky and allows the bacteria to hold tightly to your tooth surface. Other bacteria stick right to the tooth surface itself and work directly on decaying enamel. Still others settle on the backs of the earlier bacterial arrivals.

How do these bacteria, organized in your mouth, do their damage? Basically, they lie in a slimy meshwork composed of several things: saliva, dextran, other bacteria, and food- and salivary-breakdown products. This whole mixture is called plaque. Plaque (pronounced plak) is the most important word to remember in this book.



PLAQUE SHOWING BACTERIAL FORMS UNDER HIGH MAGNIFICATION

What plaque looks like under the microscope is shown in the illustration above. There are some interesting facts to know about plaque and decay:

1. Studies have shown that without bacterial plaque, experimental animals on cavity-prone diets do not develop cavities.
2. Different bacteria are responsible for decay produced in different sites on the tooth.
3. Some bacteria cause decay on the sides of the teeth, some at the gum line, and others on the biting surfaces of the teeth.
4. The bacteria work to destroy the enamel by forming acids.
5. As the acids and the bacteria get deeper into the tooth, different kinds of bacteria actually work together to destroy tooth structure.
6. Bacteria near the tooth surface need oxygen to live.
7. As decay progresses, other bacteria that require less oxygen take over in destroying the tooth.
8. Final result: Your hard tooth has a hole with soft rotting material in it.

THE SUGAR IN YOUR FOOD

		APPROXIMATE SUGAR CONTENT IN TEASPOONFUL OF GRANULATED SUGAR
BEVERAGES	SIZE PORTION	
cola drinks	1 (6 oz bottle or glass)	3 1/2
cordials	1 (3/4 oz glass)	1 1/2
ginger ale	6 oz	5
highball	1 (6 oz glass)	2 1/2
orangeade	1 (8 oz glass)	5
root beer	1 (10 oz bottle)	4 1/2
Seven-Up*	1 (6 oz bottle or glass)	3 3/4
soda pop	1 (8 oz bottle)	5
sweet cider	1 cup	6
whiskey sour	1 (3 oz glass)	1 1/2
CAKES AND COOKIES		
angel food	1 (4 oz piece)	7
apple sauce cake	1 (4 oz piece)	5 1/2
banana cake	1 (2 oz piece)	2
cheese cake	1(4 oz piece)	2
choc, cake (plain)	1(4 oz piece)	6
choc, cake (iced)	1 (4 oz piece)	10
coffee cake	1 (4 oz piece)	4 1/2
cup cake (iced)	1	6
fruit cake	1 (4 oz piece)	5
jelly roll	1 (2 oz piece)	2 1/2
orange cake	1 (4 oz piece)	4
pound cake	1 (4 oz piece)	5
sponge cake	1(1 oz piece)	2
canned fruit juices (sweet)	1/2 cup	2
canned peaches	2 halves and 1 T syrup	3 1/2
fruit salad	1/2 cup	3 1/2
fruit syrup	2T	2 1/2
stewed fruits	1/2 cup	2
DAIRY PRODUCTS		
ice cream	1/2 pt (3 1/2 oz)	3 1/2
ice cream cone	1	3 1/2
ice cream soda	1	5
ice cream sundae	1	7
malted milk shake	1 (10 oz glass)	5
JAMS AND JELLIES		
apple butter	1T	1
jelly	1T	4-6
orange marmalade	1T	4-6
peach butter	1T	1
strawberry jam	1T	4
DESSERTS, MISCELLANEOUS		
apple cobbler	1/2 cup	3
blueberry cobbler	1/2 cup	3
custard	1/2 cup	2
French pastry	1 (4 oz piece)	5
fruit gelatin	1/2 cup	4 1/2
apple pie	1 slice (average)	7
apricot pie	1 slice	7
berry pie	1 slice	10
butterscotch pie	1 slice	4
cherry pie	1 slice	10
cream pie	1slice	4
lemon pie	1 slice	7

THE SUGAR IN YOUR FOOD (Continued)

FOOD ITEM	SIZE PORTION	APPROXIMATE SUGAR CONTENT IN TEASPOONFUL OF GRANULATED SUGAR
brownies (unfrosted)	1 (³ / ₄ oz)	
chocolate cookies	1	1 ¹ / ₂
Fig Newtons	1	5
gingersnaps	1	3
macaroons	1	6
nut cookies	1	1 ¹ / ₂
oatmeal cookies	1	2
sugar cookies	1	1 ¹ / ₂
chocolate éclair	1	7
cream puff	1	2
donut (plain)	1	3
donut (glazed)	1	6
CANDIES		
average choc, milk bar	1 (¹ / ₂ oz)	2 ¹ / ₂
chewing gum	1 stick	¹ / ₂
chocolate cream	1 piece	2
butterscotch chew	1 piece	1
chocolate mints	1 piece	2
fudge	1 oz square	4 ¹ / ₂
gumdrop	1	2
hard candy	4 oz	20
lifesavers*	1	¹ / ₃
peanut brittle	1 oz	3 ¹ / ₂
CANDIES FRUITS AND JUICES		
canned apricots	4 halves and 1 T syrup	3 ¹ / ₂
mince meat pie	1 slice	4
peach pie	1 slice	7
prune pie	1 slice	6
pumpkin pie	1 slice	5
rhubarb pie	1 slice	4
banana pudding	¹ / ₂ cup	2
bread pudding	¹ / ₂ cup	1 ¹ / ₂
chocolate pudding	¹ / ₂ cup	4
Cornstarch pudding	¹ / ₂ cup	2 ¹ / ₂
date pudding	¹ / ₂ cup	7
fig pudding	¹ / ₂ cup	7
Grape nut* pudding	¹ / ₂ cup	2
plum pudding	¹ / ₂ cup	4
rice pudding	¹ / ₂ cup	5
tapioca pudding	¹ / ₂ cup	3
berry tart	1 cup	10
blancmange	¹ / ₂ cup	5
brown Betty	¹ / ₂ cup	3
plain pastry	1 (4 oz piece)	3
sherbert	¹ / ₂ cup	9
SYRUPS, SUGARS AND ICINGS		
blown sugar	1T	*3
chocolate icing	1 OZ	5
chocolate sauce	1T	3 ¹ / ₂
corn syrup	1T	*3
granulated sugar	1T	*3
honey	1T	*3
Karo syrup	1T	*3
maple syrup	1T	*5
molasses	1T	3 ¹ / ₂
white icing	1 OZ	*5

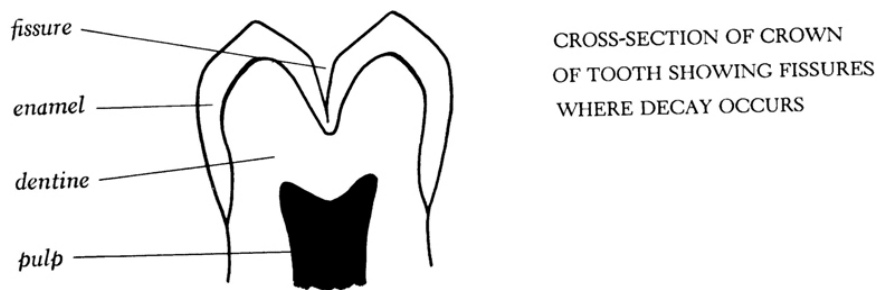
*actual sugar content

HOW DECAY OCCURS

Now that you understand what a tooth is made of, let's see how decay occurs. We said that bacteria break food products, especially sugars, into acids, which dissolve the enamel crystal. The bacteria themselves produce enzymes, which destroy the cementing material between each crystal. As the enamel dissolves, a hole forms. This hole is called a cavity.

Now what happens? If the cavity is not attended to by removing the decay and filling the hole in the tooth, the decay goes deeper. Up to this point you have not felt pain, because enamel has no nerves. However, once the decay enters the dentine, you may begin to feel slight sensitivity. This sensitivity is caused by stimulation of processes of nerve tissue that come from the pulp.

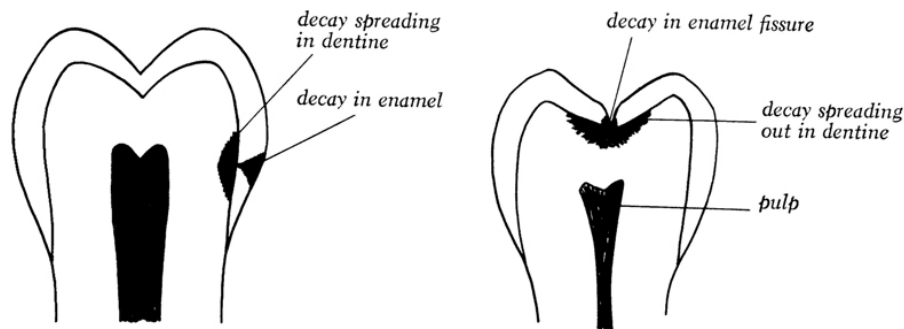
Early cavities generally don't stimulate the nerve so that your brain realizes something is wrong. Unfortunately, the cavity may have to go very deep toward the nerve (pulp) before you are aware of it. If the cavity is spreading, a strange situation occurs. Though there may only be a small hole or opening at the surface of the tooth, you may have a great deal of decay below the opening, as dental decay has the nasty habit of spreading when it reaches the softer dentine.



CROSS-SECTION OF CROWN OF TOOTH SHOWING FISSURES WHERE DECAY OCCURS

WHERE DOES DECAY OCCUR?

Since there is a definite pattern to the decay of teeth, it is helpful to know on which surfaces of the teeth decay most frequently starts and which teeth are most subject to decay. Decay generally occurs on the biting surfaces of rear teeth that have "tops," or biting



CROSS-SECTION OF CROWN SHOWING DECAY ON SIDE OF TOOTH

CROSS-SECTION OF CROWN SHOWING DECAY ON BITING SURFACE OF TOOTH

"tables," as opposed to front teeth, which really have biting "edges." Decay on these rear teeth occurs in the fissures or pits on these "tables." If you look at the teeth in your mouth you'll see lines between solid areas of tooth structure. These are the pits or fissures. In reality, they can run very deeply downward, through the enamel toward the dentine. In cross section, they can look like the illustration on page 26. Beside the tops of the teeth, you can also get decay between teeth, just under the point where the teeth come into contact with each other. Decay occurs in both the pit or fissure, and under the contact point, for two reasons: (1) food and bacteria collect easily there, and (2) they are tough places to reach with a toothbrush.

Lastly, decay can occur on the cheek or tongue side of the tooth next to the gum line. This most frequently occurs if the hygiene is poor. Decay also can occur under an old filling, if it was not well done, or if the original decay was not totally removed. It can also occur if a new filling or gold inlay, onlay, or crown does not have sealed margins or edges where it abuts against the tooth enamel. Because hygiene plays such a major role in preventing decay, you should always brush and floss the entire tooth and gum line daily, remembering that filled or restored teeth are more susceptible to decay than an intact, un-drilled tooth. Just because you've had new dental work, don't think that your teeth can't decay again. One of my patients thought that just because she spent a lot of time and money on her teeth, she had done everything necessary to have a healthy mouth. Not true! Poor dental hygiene means dental breakdown! Remember, just because a woman spends twenty-five dollars on a facial, that doesn't mean that she never has to wash her face again!

How the Nerve Dies

As the decay gets deeper into the dentine, the gases produced by the dying material and by bacterial products exert pressure on the nerve (pulp). You feel this as a toothache. The pain can be very intense. Remember, the pulp is surrounded on all sides by hard tooth structure. If infected or injured, some pulpal cells start to die, and other cells swell due to inflammation. The buildup of fluid and gases in the pulp can cause swelling, which puts pressure on the tissue at the narrow opening near the root tip. With pressure, the blood supply to the pulp is restricted, or cut off. If this occurs, and the pulp dies, the nerves in the tooth can cause a great deal of pain during the process of self-strangulation.

Saving the Tooth if the Nerve Dies

Do you have to lose your tooth if the nerve dies? The answer is no, whether you're an adult or a child. If a child has a toothache, the tooth may be saved, if not too badly decayed. This is done by taking your child to your dentist, or pedodontist (children's dentist). The tooth is anesthetized (made numb), and the dentist then cleans out the decay and removes the upper portion of the pulp where it enters into the root or roots. The procedure is called a pulpotomy.

When decay has not destroyed too much of the baby tooth, it is important to try to save it. It is important because it helps the permanent tooth to erupt into the proper space. If the tooth were extracted, the remaining teeth might crowd together to fill the space, and thereby block out the permanent tooth. These decisions are made by the dentist or pedodontist. We'll go into this in greater detail in Chapter 10, which covers dental specialties.

Because of anatomical differences in the roots of adult teeth vs. children's teeth, partial removal of the pulp is usually not successful in the adult. With an adult, the entire pulp (nerve) in the crown and the root is removed to save the tooth. The tooth is filled with a gummy material called gutta-percha, and then protected from fracturing with a crown. This saves the tooth. The exception to this treatment with a root canal on an adult tooth would be if the tooth had poor

bone support, or was fractured. In this case, it would be necessary to extract the tooth. The missing tooth could be replaced with a fixed bridge, an implant after bone regeneration, an inlay bridge to conserve drilling away of tooth structure (see Chapter 9, pages 151-155), or partial dentures. We'll discuss crowns and inlays in Chapters 8 and 9 and go into more detail on root canals in Chapter 10.

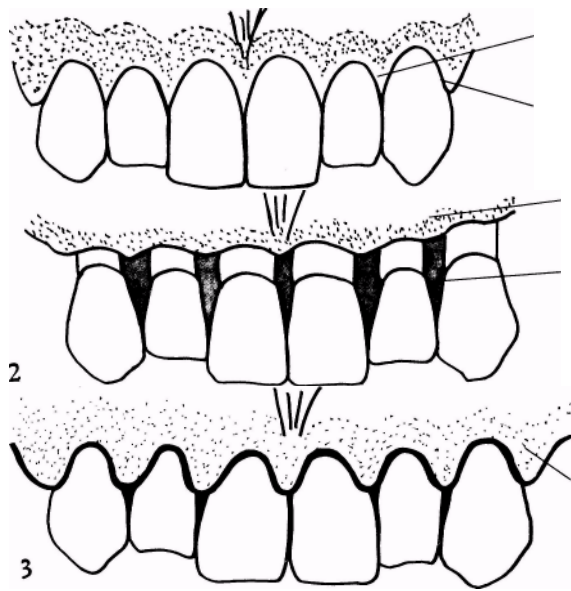
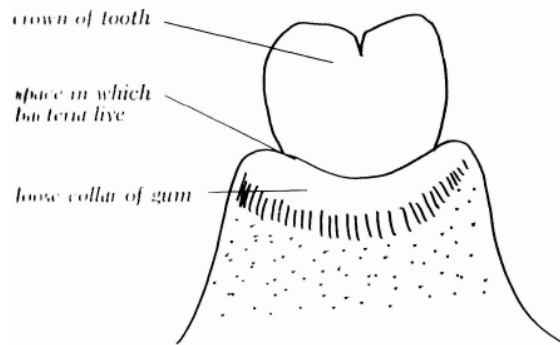
THE TOOTH AND ITS SUPPORTING STRUCTURES

So far we have talked about enamel, dentine, pulps, nerves, pulpotomies, and root canals. All this has to do with an individual tooth. But your tooth isn't floating in space. It's held firmly in the jaw and is surrounded at its neck by a collar of gum. Let's examine the anatomy of the gum for a moment, just to understand how gum disease starts around a tooth.

When your tooth erupts into your mouth, it usually grows out of the gum until most or all of its enamel cap is exposed. After eruption, it looks like the illustration below. If we were to very carefully examine the gum area around the neck of the tooth, we could see the following, assuming the gum is healthy.

1. There is a slightly loose collar of gum around the tooth.
2. There is a very tiny space between the gum tissue and the tooth. It's in this space that bacteria live.
3. The gum when we look directly in the front of our teeth rises up and down between each tooth. It should look like an inverted "V" on the upper teeth, or a pyramid on the lower teeth. The contour of the healthy gum should look like Illustration 1.

RELATIONSHIP OF GUM MARGIN TO CROWN OF TOOTH



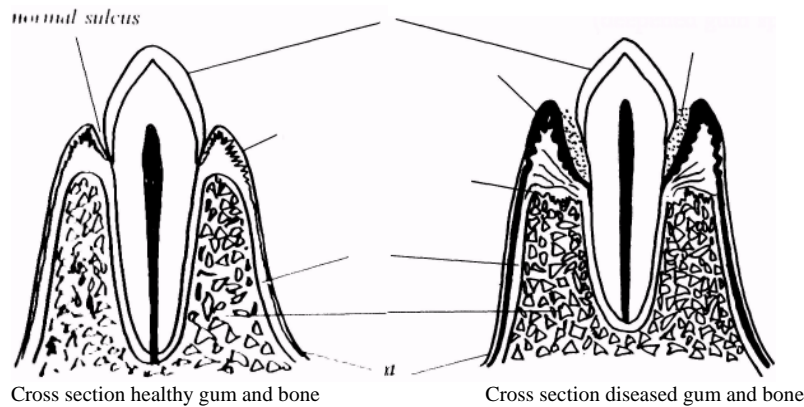
CONTOUR OF NORMAL, RECEDED, AND INFLAMED GUM

4. If you have never had periodontal treatment, and your gum is receded, or flattened out between the teeth, with spaces existing between the teeth, you may already have some gum disease. (Illust. 2)
5. Where the gum passes on the direct front surface of the upper tooth, the edge may have a little roll, above which is a zone of gum that has a textured, or stippled look. Its appearance in health resembles that of an orange peel. This band of gum is called gingiva. When the gum is inflamed, this textured, stippled effect is lost, and the tissue looks shiny, and swollen. (Illust. 3).
6. If you pull your upper lip up, you will see that about one-eighth to one-fourth of an inch above the edge, or margin of the gum is a junction running horizontally. Here the textured gum seems to meet another tissue, which is shinier, redder, and through which one may see tiny blood vessels. The first band of tissue described we called gum or gingiva. The shiny tissue is called mucosa. Where they meet is called the mucogingival junction.

HOW GUM DISEASE STARTS

Gingivitis

The space between the gum lining and the tooth is called the sulcus. It is critically important because it fills up with bacteria very soon after the tooth erupts. These bacteria, if not removed by brushing and flossing, irritate the gum lining. The bacteria and their products produce an irritation in the lining which causes the lining cells to swell and separate. Then certain enzymes, produced by both the bacteria and the body's cells, destroy the material inside the lining cells, or destroy the cementing substances which hold the cells together. This causes the gum lining to leak inflammatory fluid. Then more bacteria come to live on the leakage products and destroy more tissue. When a sulcus becomes diseased, it is called a pocket. A pocket is a space, one side of which is lined by ulcerated gum lining cells (ulcerated epithelial cells) and the other side by the tooth



When this pocket develops, tooth brushing or eating hard foods might cause your gums to bleed. This bleeding is not normal. The gum is composed of two tissues: the lining or surface tissue, called epithelium, and the dense supportive tissue under it, called connective tissue. Certain bacterial enzymes or products, as well as body cells fighting the bacteria, all contribute to further destruction of the connective tissue and its many fiber bundles. A major battle goes on, between the cells your body sends in to fight the bacteria, and other foreign material irritating the gum lining. Although some of the body cells destroy the bacteria, other body cells die in the battle. When these cells die, they release enzymes and other materials which actually destroy more gum tissue and bone. This is a full-scale war! When the bacteria are in the early destruction phase, where the gum lining and the connective tissue are being destroyed, we call this stage gingivitis. In your mouth, you can see this stage if your tissue is red, shiny, flabby, or tender, looks slightly puffy or swollen between the teeth, and, frequently, bleeds easily. This stage is produced by bacterial plaque and is reversible.

Periodontitis

The bone that surrounds and supports the tooth begins to be destroyed if the disease goes any deeper. Once bone starts to melt away, the disease is called periodontal disease, or periodontitis. Pockets are now deeper and contain more bacterial plaque. At this point, the condition is not reversible. Let's repeat that. Periodontal disease is not reversible. Now you have a problem. The problem is this: you are irreversibly losing bone! Unfortunately, bone loss causes

no pain until very late in the disease. This means that you could lose more than half your bone and not know it.

There are some things you might see in looking at your teeth and gums that would indicate possible bone breakdown.

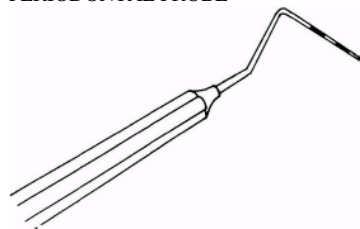
1. If the gums are shiny, swollen, or puffy, you may be losing bone underneath.
2. If the gums have receded, and there are spaces above where the teeth contact (for upper teeth) and spaces below where the teeth contact (for lower teeth), you probably have lost bone.
3. If you have openings or spaces between teeth that you didn't have as a youngster, you probably have lost bone.
4. Another sign of advancing disease would be tooth looseness.

If you suspect, after examining your gums, that you have a gum problem, start caring more carefully for them. This can be done by brushing and flossing correctly, and using a toothpick in a special way. We'll go into detail on techniques in Chapter 2.

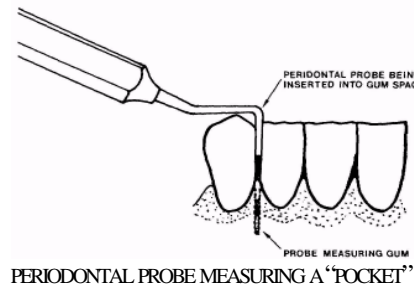
In addition, ask your dentist to "probe" your gums with a periodontal probe. This is a small measuring instrument that slips into the gum space between tooth and gum lining. It is marked in millimeters, and as the dentist measures on several sides of the tooth, he can assess how much gum detachment or bone loss has occurred, probing is essential. Dental X rays cannot show the amount of bone loss that the probe makes evident. Every tooth should be measured this way.

One word of warning: If, for any reason, you think the dentist is not familiar with probing, or is being quick and superficial, and too reassuring with statements like "Everything's O.K.—just brush harder," see a periodontist (gum specialist) for a second opinion. You have too much at stake not to protect your gum and bone. Unfortunately, visual and tactile recognition of periodontal breakdown is tricky, and some dentists assume that they are looking at normal tissue when it's really diseased. So if in doubt, a periodontist can help you with an experienced opinion regarding the condition of your gum and bone.

PERIODONTAL PROBE



It has been shown without a doubt that gingivitis (gum inflammation) is directly related to poor oral hygiene, and can be reversed by daily removal of plaque. The reason it must be daily (just once) is because the bacteria completely re-form every twenty-four hours. If you let them come back, they'll start destroying again. If plaque is not removed within twenty-four to forty-eight hours, it starts to harden. At that point, you can't remove it.



When plaque has hardened and calcified, we call it calculus (also called tartar). If this hard stuff called tartar or calculus has formed between the teeth, then a dentist or trained dental auxiliary should remove the calculus, and you should continue with daily plaque control (see Chapter 2). If calculus is not removed, it serves as a breeding ground for more bacteria. This leads to more breakdown.

The Cause of Bad Breath

Remember one thing: Plaque doesn't only cause decay and gum disease; it is the primary cause of bad breath. The odor comes from decomposing food and decomposing tissue and bacteria. Bad breath has been blamed on many things, from upset stomachs to garlic, onions, certain cheeses, milk, and smoking. All of these can increase the bad breath you already have.

But the single most important cause of bad breath is the garbage on your teeth and in the gum space, and the decomposition of diseased teeth and gum tissue. The surface of your tongue can also contribute. If you remove plaque once a day, clean the top of your tongue, and have decayed teeth cleaned and repaired, most of your bad breath will be eliminated. Get those tender, bleeding gums and gums with periodontal pockets fixed up, and you'll really start to smell kissable. As the advertising industry would say, "Keep the teeth and gums healthy, remove the plaque daily, and you'll be more desirable! Your mouth will feel clean and your breath taste fresh!"

Smoking will make it harder to have clean teeth and non-bleeding gums, because smoke stains leave rough surfaces on the tooth, which bacteria stick to. More bacteria, more odor. If you'd rather not offend anyone after eating, do the plaque control as explained in Chapter 2, and make sure, by being thoroughly examined by a careful dentist, that you have no dental disease. (See Chapter 8 – What You Should Know About a Good Dental Examination.)

Points to Remember

As we said earlier, although gingivitis is reversible, periodontal disease is not. As bone melts away from the gum infection, more bacteria get into the gum space, and more and more destruction occurs. As more bone is lost, the tooth may begin to get loose. At some point, pressures produced by normal chewing may actually rock the tooth in the bone. Continued rocking of the tooth loosens it still further, destroys bone, and may lead to your losing the tooth.

Certain points we have discussed in this chapter are worth repeating:

1. Plaque is the cause of both bacterial decay and gum disease.
2. Plaque must be removed daily to slow or stop disease.
3. Bacteria re-form in twenty-four hours. Therefore, you have to knock them out once every

twenty-four hours.

4. With proper mouth hygiene, and tartar removal at the dental office, gingivitis is reversible.
5. Periodontal disease is not reversible, but is treatable. If not treated, you lose bone and later may lose teeth. It is a chronic disease that must be kept in balance by your efforts and periodic visits for professional tartar removal.

The next chapter will discuss how best to clean your mouth and, when repair has to be done, just what parts of your teeth, gum, or bone are being restored or made healthy.

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