

Teeth & Gums

Care and Relief

Nirankar S. Agarwal, Ph.D.

Teeth & Gums

Oral health is not only important to your appearance and sense of well-being, but also to your overall health. Cavities and gum disease may contribute to many serious conditions, including heart disease, diabetes, respiratory diseases, and premature and low weight babies. Untreated cavities can also be painful and lead to serious infections.

Gum disease is an inflammation of the gums, which may also affect the bone supporting the teeth. . . Left untreated, gum disease can lead to the loss of teeth and an increased risk of more serious diseases, including heart disease and stroke. The bacteria in plaque can travel from the mouth into the bloodstream, and has been linked to the clogging of arteries and damage to heart valves. The same bacteria can also travel to the lungs, causing infection or aggravating existing lung conditions. There is also a link between diabetes and gum disease. People with diabetes are more susceptible to gum disease, and it can put them at greater risk of diabetic complications.

– Health Canada

http://www.hc-sc.gc.ca/iyh-vsv/life-vie/dent_e.html [Download 15 sep 06]

Unlike vitally important organs such as heart and lungs, human beings can do without teeth if they must. However, this should not be construed to minimize the importance of teeth. Seemingly they grind the food for better digestion while mixing it with salivary enzymes in the oral cavity. But the teeth are required for more than mastication. They contribute quite substantially as an adjunct to one of the most pleasurable sensations in our lives, the pleasure of taste, and producing legible sounds - pleasures which endure while many others drop

off as we age. Bad oral health can also become a harbinger of life-threatening conditions such as respiratory and heart disease. It is not for nothing that a separate discipline - dentistry - has been instituted by modern medicine.

WHAT FACTORS ARE RESPONSIBLE FOR TEETH AND GUM DISEASE?

Let us first look at the tooth and associated structures to comprehend their purpose. We can then glean the problems that may arise to mar their functionality.

ANATOMY OF THE TOOTH

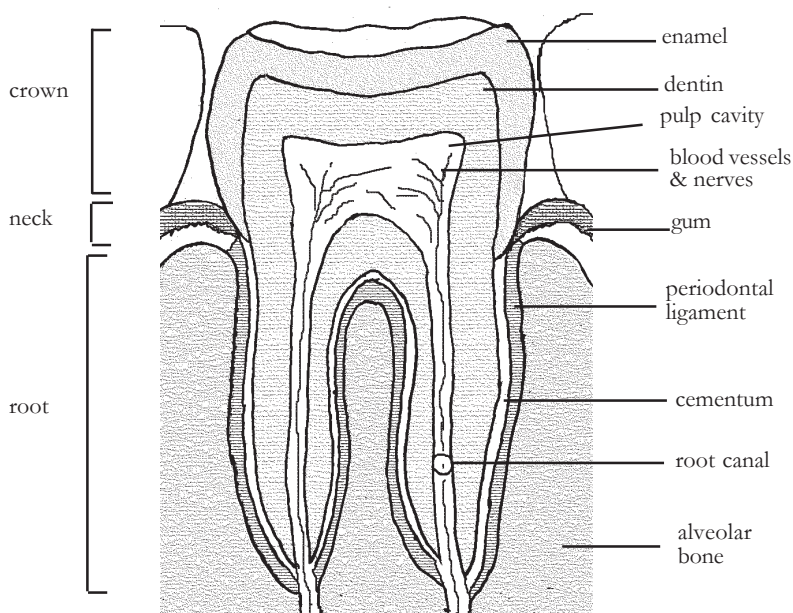
Basically, teeth are pestle like structures for tearing, cutting and grinding food. The only entirely alive tissue in the tooth is the **Tooth Pulp** – comprising of blood vessels, lymph vessels, nerves and connective tissue – entering the pulp cavity through a narrow root canal. Rest of the tooth is made up of dentin, cementum and enamel. These three substances are all composed of the same hardened inorganic salt, Hydroxyapatite, and organic tissues in varying proportions [see table].

	Hydroxyapatite %	Water %	Organic matter %
Dentin	70	10	20
Cementum	65	12	23
Enamel	96	Less than 4	Less than 4

As the figure below shows, tooth can be divided in to 4 parts:

Pulp cavity forms the core of the tooth and houses tooth pulp.

Crown is the visible 1/3 portion of the entire tooth. Formed mostly from dentin, it is coated by enamel, the hardest substance in human body, for this is the part that tears, chews, and grinds the food.



Root is the the covered 2/3rd portion of tooth. Root is mostly dentin wrapped up by softer cementum which affords better binding to the bone.

Neck of the tooth is the narrow boundary at the junction of the crown and the root where the gum lining begins.

Attachment of tooth: The root of the tooth is embedded within the bone socket of the jaw. Through its cementum it forms a strong binding to the connective tissue, the periodontal (*peri*=around, *odontos*=tooth) ligament or periodontal membrane, of the bone.

Protection of the unexposed part of teeth: The root of the tooth and the bone are completely surrounded by a firm fleshy tissue, **gum**, also known as **gingiva**. At the neck of the tooth, the gum fits snug against the tooth like a rubber gasket obstructing entry of food, debris or bacteria, thus protecting the root from damage.

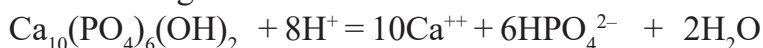
THREATS TO THE HEALTH OF TEETH & GUMS

1. Since teeth are mostly non-living material, they are prone to irreversible decay due to dissolution and erosion of the inorganic material.

2. The anchoring function of the hidden part of tooth can also be compromised if bacteria and food particles penetrate between the gum and the root and damage the living tissues and the bone.

HOW TO CURTAIL OR MINIMIZE TOOTH DECAY?

Unlike common salt (sodium chloride), hydroxyapatite (HAP), the calcified phosphate salt of the tooth material, is not soluble in water. However, scientific research has found that when the pH in the mouth drops down to 5.5 or less [fluid in mouth becomes acidic, see below], irreversible erosion, of even the hardest body material – enamel, takes place and tooth begins to permanently lose its constituent matter. This is due to the fact that HAP becomes soluble in acid medium vide the following chemical reaction:



[**Note:** pH is a measure of acidity & alkalinity. pH scale runs from 0-14. Seven is totally neutral, neither acidic nor alkaline. Above 7, increasing numbers denote higher basicity. Below 7, lower the number, stronger the acid. Since it is a logarithmic scale, a difference of 1 means a 10-fold variation in acid or alkaline strength. Thus a medium with pH 5, is 10 times more acidic than the one of pH 6].

There are two ways of introducing acids in the oral cavity. Consumption of acidic foods, or by the action of ever present bacteria on foods. The most common bacteria in the mouth cavity are *streptococcus mutans* which generate acid while acting on fermentable carbohydrates (candies, soft

drinks, sweets, sweet fruits, and other myriad foods containing carbohydrates) to derive nutrition.

Soft drinks, in particular, are a ‘**double trouble**’ menace against the teeth – not only does the excessive sugar gets converted into copious amounts of acid by the bacteria but they typically are quite acidic to begin with. The following table lists some popular brands, their pH & sugar content, and number of times acid strength exceeds from pH 5.5 (the threshold of permanent erosion), mentioned above:

Soft Drink brand	Sugar (grams) per 355 ml	pH	Approx. X acid strength from pH 5.5
Coca Cola	39	2.53	1,000
Pepsi	42	2.49	1,000
Mountain Dew	31	3.22	250
Sprite	26	3.42	100
7-UP	26	3.19	200
Gatorade (sport drink)	14	2.95	500
Orange Minute Maid	47	2.80	400
Dr. Pepper	27	2.92	500
Lipton's Lemon Iced Tea	33	2.90	380

Children/adolescents are at much greater risk of tooth decay

For the teeth of children, adolescents and young, consumption of excessively acidic foods, such as sour candy and soft drinks can be a much greater threat. As is evident from the table below, tooth formation is not complete until late teens or early twenties. In the formative stages, less hardened tooth material is naturally prone to easier and faster dissolution & erosion, leading to weaker teeth to begin with.

Toothbrush: Excessive brushing by abrasive toothbrush and toothpaste may also result in the erosion of enamel..

Mineral loss of teeth leads to weaker teeth and formation of cavities. Loss of cementum from the root due to erosion can result in loosening of tooth from the bone socket.

	Upper teeth (values in mo=month; yr=years)							
Permanent Teeth	Central incisor	Lateral incisor	Canine	First premolar	Second premolar	First molar	Second molar	Third molar
Initial calcification	3-4 mo	10-12 mo	4-5 mo	1.5-1.75 yr	2-2.25 yr	at birth	2.5-3 yr	7-9 yr
Crown Completed	4-5 yr	4-5 yr	6-7 yr	5-6 yr	6-7 yr	2.5-3 yr	7-8 yr	12-16 yr
Root Completed	10 yr	11 yr	13-15 yr	12-13 yr	12-14 yr	9-10 yr	14-16 yr	18-25 yr
	Lower teeth (values in mo=month; yr=years)							
Initial calcification	3-4 mo	3-4 mo	4-5 mo	1.5-2 yr	2.25-2.5 yr	at birth	2.5-3 yr	8-10 yr
Crown Completed	4-5 yr	4-5 yr	6-7 yr	5-6 yr	6-7 yr	2.5-3 yr	7-8 yr	12-16 yr
Root Completed	9 yr	10 yr	12-14 yr	12-13 yr	13-14 yr	9-10 yr	14-15 yr	18-25 yr

<http://encyclopedia.thefreedictionary.com/Tooth+development>

Of course, some erosion will occur with age, but with proper care and judicious use, natural teeth can last well through the old age.

Is it possible to totally get rid of mouth bacteria?

Experts say that the mouth contains over 400 bacteria, most of which are beneficial. In any case it is impossible to free the oral cavity of bacteria entirely, nor is it desirable. The objective should be to severely limit the number of harmful bacteria. By far the biggest culprit to inflict damage is *Streptococcus mutans*. Like all living organisms, bacteria devise ways to ensure their survival and reproduction. For gaining security, globs of bacteria are continuously trying to surround themselves with what is called a biofilm, a sticky creamy coloured mass, more commonly known as **plaque**. Plaques develop mechanisms for attachment to teeth surfaces and their layers of filmy material can often be impervious even to antibiotics.

Reproduction or multiplication of bacteria requires the

presence of carbohydrate nutrients, found in most foods. According to scientists, plaque removal at least once a day and speedy purging of nutrients after meals will prevent the proliferation of harmful bacteria in the mouth.

PROTECTION OF THE HIDDEN PART OF TOOTH AND ANCHORING FUNCTION

As mentioned earlier, the embedded part of tooth, the root, and the bone socket are totally covered by a sheet of fleshy gum. Healthy gums are pink, firm, and closely surround the roots of teeth and the bone. In the process of acting upon carbohydrate nutrients, *Streptococcus mutans* not only produces acid but also harmful enzymes which can attack gums both on the surface and under the gum lining. This can lead to tender, red, bleeding and swollen gums, a condition medically termed as **gingivitis**. If left untreated, gingivitis may progress to infection of the periodontal ligament, erosion of bone material, pus formation, and wobbly tooth (**pyorrhea** or **periodontitis**). This condition is a major cause of tooth loss. Therefore the health of the gums is of paramount importance.

So, WHAT CAN BE DONE TO MAINTAIN THE HEALTH OF TEETH AND GUM?

There are three pillars of Teeth & Gum Care:

1. Cleaning
2. Massage
3. Rinsing

1. Cleaning once a day

The following cleansing procedure is recommended to be followed in the morning. Why in the morning? As mentioned above, bacteria are always attempting to coalesce in to biofilm (**plaque**) and attach to a surface for protection. Due to constant swallowing of saliva during waking hours as well as frequent rinsing, few plaques get opportunity to be formed. Plaque formation is much more facile during sleep.

* Dip a soft toothbrush in saline water

* Gently rub all teeth with small sideways strokes at the juncture of teeth and gums with the bristles slanted a little so as to penetrate slightly under the gum line. Most plaques in order to secure a firmer attachment adhere to the juncture of adjacent teeth and the gum lining [just like dust collecting in corners]. You will observe a creamy liquid, mixture of plaque and saliva, effectively dislodged by this operation. If plaque is not removed daily, it may harden to form **tartar**, which look like stains on the teeth, and which furnish rough surfaces for facile attachment of plaques.

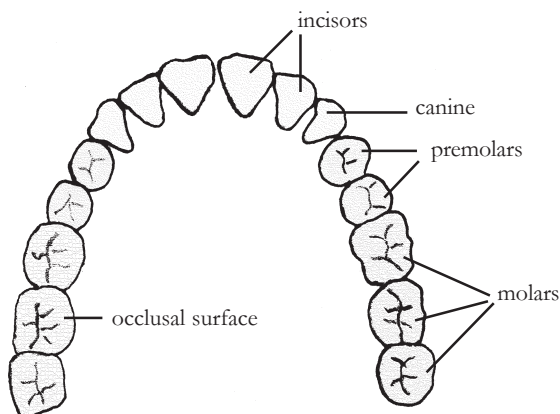
* With a medium toothbrush (also dipped for some time in saline water) with ‘away from the gum’ up or down strokes clean all the teeth in turn. This process will clean the curvatures of the teeth as well. Frequently test teeth with tongue for smoothness. Do not overbrush.

* Gently rub-clean **occlusal** surface (the flat part of molars, see figure of teeth). Be circumspect. This is the surface which does most of the grinding. Erosion of enamel of the occlusal surface is a frequent cause for cavity formation..

* Rub a little finely ground ayurvedic dental powder

(*manjan*) with finger and thumb.

If you must, use pea size amount of toothpaste [see the write-up below about toothpaste] with just a few strokes to leave a pleasant taste.



* Rinse & gargle thoroughly with water

* Rub gently a soft toothbrush over the entire tongue to dislodge plaque and other debris. Rear portion of the tongue is prone to be a repository for harmful microorganisms. Most colds and allied conditions start from the presence of pathogens on that site. Rinse.

2. Massage

Massage of gums stimulates blood circulation to the tissue of gums and teeth, helps maintain suppleness and stimulates firm attachment of gums to the teeth, helps dislodge bacteria and food particles even from under the gums, and reinforces attachment of tooth to the bone by strengthening periodontal ligaments.

The overwhelming importance of massage to dental health was succinctly stated by an eminent yoga teacher as follows:

“If you are so short of time that you can either clean the teeth *or* massage the gums, then *massage gums*”

1. Massage outer gums of upper and lower jaw with index finger and thumb. The stroke should always begin from the gum covering the root of the tooth and move towards the crown. This is to ensure that you do not cause the gum line to recede from the tooth.

2. Inner gums can be massaged sideways if ‘towards the crown’ stroke is too cumbersome.

3. In the morning, devote a few minutes to a thorough massage.

4. Before going to bed, massage gums for a few minutes again.

Scores of people with gingivitis and even early stages of pyorrhea have marvellously benefitted through this regimen of simple but regular massage [in combination with traditional home remedies to remove infection given towards the end of

this chapter]. Some were under medical treatment off and on for a number of years. Nowhere in the modern literature of medicine including numerous websites of eminent medical schools have I come across a reference to massage being promoted as a regular practice. Dentists to my knowledge advise massaging some ointment or medicine in to the gum in case of certain ailments, but not as something to be practiced in daily routine by itself. Yet when you think about it, massage makes great sense. From own experience, I would guess that perhaps half of the benefit derived from rubbing a medicine on the gums is due to massage itself.

3. Thorough Rinsing after food intake

It is not necessary to brush teeth after each meal. Actually too much emphasis on brushing may be counter-productive. People do not carry a toothbrush to their routine place of work or local commute. It is a common observation that few people remove remnants of food from their oral cavity after meals or snacks when away from home, perhaps because it has been dinned in to their mind that the only way to clean their mouth is to brush. Actually, as mentioned earlier, few plaques can securely adhere to the teeth during waking hours. What is crucial is to remove remnants of food and such liquids which furnish nutrition for bacteria. It is also a fact that frequent brushing may damage enamel, exposing softer dentin to erosion and cavity formation.

- Rinse mouth a few times with water after ingesting liquids.
- Rub teeth with finger and thumb and rinse several times with water to remove food particles. This also helps in stimulating the gasket like function of the gum to the tooth.
- Use toothpick to dislodge food particles. “The toothpick may be socially taboo but it is a great cleaner.” [*Know*

Your Body, A Reader's Digest Guide, RDI Print and Publishing Pvt. Ltd., Bombay 1988, p.90]. If necessary use floss to remove food from between the teeth. [Look up directions to properly use dental floss on websites, e.g. “Mayo Clinic”; “American Dental Association”, etc.]

- If, for any reason, wash basin is unavailable, sip a little water, swish forcefully around the mouth, and swallow. Repeat. **This is a must after taking anything sweet.**

- Before going to bed, rub teeth & gums thoroughly and rinse. Use toothpick or dental floss to remove particles from between the teeth.

Why do some experts discourage the use of toothpaste?

Much controversy exists in scientific literature about toothpaste. For one thing, it is not essential for cleaning. In the 1980s, responding to some of my dental problems, an eminent periodontist in Madison, Wisconsin, USA, advised me not to use toothpaste. When probed as to the reason, he said that “toothpastes contain smoothing agents. Tongue assesses the cleanliness of tooth by the feel of a smooth surface. The smoothing agent(s) furnish a false sense of cleanliness even though the teeth may not be clean. It is better to use toothbrush alone.” Or words to that effect.

Some health professionals also claim that many chemicals, some of which have never been tested for their effect in human beings, and sweeteners are present in toothpastes. The following information for a few popular brands has been culled from “cosmeticsdatabase” website of Environmental Working Group (EWG), a highly respected NGO from USA:

Product safety hazard (concern) rating. 0 (low concern) to 10 (higher concern).

Colgate 12 Hour Multi Protection Total Toothpaste

Hazard score: **6** (moderate hazard)

Colgate Children's Fluoride Toothpaste

Hazard score: **5** (moderate hazard)

Pepsodent Toothpaste Baking Soda

Hazard score: **4** (moderate hazard)

Close-Up Anticavity Fluoride Toothpaste Gel

Hazard score: **5** (moderate hazard)

Sensodyne Anticavity Toothpaste For Sensitive Teeth With

Baking Soda Hazard score: **5** (moderate hazard)

Source: 'cosmeticsdatabase.com' [downloaded November 20, 2008]

EWG's compilation of data alleges that ingredients in the above products are cause of concern due to their possible link to: Cancer, developmental/reproductive toxicity, violations, restrictions & warnings, neurotoxicity, endocrine disruption, persistence and bioaccumulation, organ system toxicity (non-reproductive), miscellaneous, multiple, additive exposure sources, irritation (skin, eyes, or lungs), occupational hazards.

This website lists hundreds of branded products. It may be prudent to look up the potential health concerns, if any, for the toothpaste you use. If you can't do without toothpaste, you can also find products without safety hazards as presently classified.

BUT WHY ARE THESE HEALTH CONCERNS RELEVANT? WE DON'T SWALLOW THE TOOTHPASTE?

Chemicals can get absorbed in to the body by several pathways. These include eyes, nostrils (lungs), skin, and gastrointestinal tract. Extensive network of capillaries in the oral cavity, especially under the tongue (sublingual) can aid very facile absorption, so much so that a medicine pill of *nitroglycerin* is frequently administered via this route in case

of an angina (heart) attack. As can be seen from the *Absorption Efficiency* table, oral mucosa from mouth cavity in which the toothpaste foam stays for a time has extensive absorption potential particularly when penetration enhancer chemicals are present, as they usually are in most toothpastes. Manufacturers only caution not to swallow the toothpaste. Yet in general, chemicals entering the stomach get broken down more

Absorption Efficiencies from the Physician's Desk Reference

10% - Pill
16% - Gel-Cap
50% - Sublingual
80% - Intra-Muscular Injections
90% - Oral Mucosa Absorption

easily or pass harmlessly through the digestive system. Given the high absorption efficiency of oral mucosa, however, it is not inconceivable that undesirable and harmful ingredients of the toothpaste in the mouth might get an opportunity to enter directly in to the blood stream.

The Fluoride Controversy: Much debate is also going on about the alleged good or bad effects of fluoride in water or toothpaste. Proponents claim that added fluoride leads to less cavities. Opponents assert that additional fluoride causes all kinds of ills from lower IQ, dementia, impaired thyroid function, weaker bones, to cancer and a host of other ailments. [for details about these and other scientific research there are numerous websites on the internet. The website “<http://www.holistimed.com/fluoride/>” may be a good starting point.] Fluoride is promoted usually by most governmental bodies, dentists and big commercial manufacturers of toothpaste. However, there is a growing body of public opinion all over the globe who is genuinely troubled by what they claim

as “fraudulent conclusions” and “faulty manipulation” of research data to support use of fluorides and by downplaying the grave side effects.

If simple routines suggested herein and judicious eating habits can take care of dental health, why expose your body to possible risks seemingly associated with added fluorides?

SUMMARY & SUGGESTIONS FOR MAINTAINING HEALTH OF TEETH & GUMS

1. Clean teeth with soft toothbrush in the morning. Major objective: removal of plaque.

2. Massage gums thoroughly at least twice a day. Objective: Enhanced blood circulation, pliability and firmness of living tissues: gums, periodontal ligament, tooth pulp.

3. Rinsing to remove remnants of food and liquids from oral cavity. Objective: deny nourishment to harmful bacteria.

4. Whole foods are naturally chewy and furnish exercise for the jaw. Avoid or minimize intake of softer processed foods.

5. Diet should provide sufficient calcium (milk and milk products are a good source), and vitamins A, C (*Amla* is excellent. Other sources include berries, citrus fruits, green vegetables), D (Skin produces vit D from sunlight. Milk, eggs, fish are also good sources).

6. Minimize use of soft drinks and sticky foods such as chocolates, toffees, sour candies, sweets, etc. If one can't do without soft drinks and/or sweets, it is better to consume them with meals. Do not forget to thoroughly rinse afterwards.

7. Use toothpick to remove food particles.

8. Mouthwash: Dissolve a teaspoon of rock salt in half litre of water. Add 5 drops of pure clove oil. Shake and use as an effective non-injurious mouthwash, especially at bed-time.

Relief from and potential cure of Infections

1. Few times a day, massage infected area with cold-pressed organic mustard oil for 1-2 minutes, rinse with luke-warm water, but at bed time do not rinse.

2. Soak 2 teaspoon fenugreek (methi) seeds overnight in 1/2 liter water. Bring to boil and then simmer for 40 minutes with the pot covered. Filter pale yellow liquid in to a brown bottle. Kept away from light in a cupboard, it lasts weeks. Take a sip of warm fluid and press the liquid at infected site by puckering the mouth. After 3-4 minutes spit out. Do this 4 times a day till infection is gone.

In the experience of scores of people in India & abroad over 25 years, practically no-cost solutions #1, 2 above have worked better than antibiotics.

Prophylactic (Preventative)

If you are prone to infections due to dental cavities, presence of pockets due to erosion of bone socket, gum inflammations, etc., utilize 1 or 2 above before going to bed on a regular basis as a preventive measure. Another alternative is to keep a whole clove between gum and cheek in the upper jaw.

Aspiration

विश्वं पुष्टं ग्रामे अस्मिन्नातुरम् ॥

– Yajurveda 16:48

In this village [global village], may all sentient beings be robust and healthy.