Oral hygiene products: How far have we come in 6000 years

Article *in* Periodontology 2000 · November 1997

Impact Factor: 3.63 · DOI: 10.1111/j.1600-0757.1997.tb00099.x · Source: PubMed

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Periodontology 2000, Vol. 15, 1997, 7–14
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PERIODONTOLOGY 2000
ISSN 0906-6713

The history of oral hygiene products: how far have we come in 6000 years?

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As we approach the year 2000, it is appropriate to reflect on advances made in personal oral hygiene. Dental caries and periodontal disease are the two most common chronic human diseases. Their prevalence is undoubtedly higher than in prehistoric times. Is this a "tribute" to progress in oral hygiene products? Realistically, the diseases are kept at bay by personal and professional oral hygiene – in spite of a pathogenic diet and lifestyles and numerous iatrogenic factors. Let us reflect on the history of oral hygiene aids, lest we repeat past folly!

Halitosis

Early attempts at intimate inter-personal relationships may have been hampered by offensive mouth odor. Indeed, bad breath has been observed for thousands of years (10). The problem is addressed in the Jewish Talmud, as well as by Greek and Roman writers. Mohammed is said to have thrown a congregant from the mosque for having the smell of garlic on his breath. Islamic teaching stresses the use of a special wooden stick, the siwak, for cleaning the teeth and preventing bad breath. Folk remedies for bad breath abound and many are still in use. The Bible (Genesis) mentions labdanum (mastic), a resin that has been used in Mediterranean countries for breath freshening for thousands of years; it may be the original chewing gum. Other folk cures include parsley (Italy), cloves (Iraq), guava peels (Thailand), and eggshells (China). The Talmud suggests peppercorns. Modern literature on bad breath dates to a monograph published in 1874 by Joseph Howe.

Mouthrinse

Mouthrinse represents one form of attack on oral malodor. The first reference to mouthrinsing as a formal practice is credited to Chinese medicine, about 2700 B.C.E., for treatment of diseases of the gums (14). The recommendation was rinsing with the urine of a child. Mouthrinsing as an adjunct to mechanical cleansing became popular with the upper classes in the Roman period. Pliny recommended salty water used in an uneven number of mouthfuls, and Hippocrates advocated a mixture of salt, alum and vinegar. Other old favorites included a mixture of honey, oil and beer and a combination of dill, anise seed, myrrh and pure white wine.

"Therapeutic rinsing" was especially popular among the Europeans, and persisted until the early 18th century. Urine was considered as an effective aid in curing many diseased parts of the body because its salt concentration is comparable to that of blood. The possible therapeutic value of urea and ammonia was not considered.

Mouthrinsing also had a religious connection. The Talmud contains instructions for rinsing the mouth between meals to remove food remnants and prevent admixing of meat and milk products, a violation of the dietary laws (11).

Mechanical tooth cleaning and mouthrinsing were established practices by the 16th century (4). The *Zene Artzney* (Medicines for the Teeth), published in Germany in 1530, the first printed work devoted exclusively to dental therapeutics, contained a section on "How to save the teeth". The recommendations included washing the mouth with burnt alum mixed with vinegar or myrrh boiled in wine. The final suggestion was "always after eating, wash

the mouth with wine or beer, in order to wash away all that might adhere to the teeth and make them decay, produce bad odor, and destroy them". This very popular book underwent 15 separate editions between 1530 and 1576.

W.D. Miller, in support of his chemoparasitic theory of tooth decay, pointed out that there are

> places around every dentition which will remain untouched by even the most thorough application of an antiseptic, or the antiseptic will reach them in so diluted a condition that it possesses little or no action.

He noted that many antiseptics cannot be used orally because they are injurious to general health, can injure the mucous membranes and teeth or have to be excluded because of bad taste or smell. He concluded that the preparation of a mouthwash that possesses an antiseptic action of any importance would be accompanied by the greatest difficulties.

Listerine®, a product over 115 years old, remains a popular mouthwash. The original amber-colored Listerine® (a blend of four oils – thymol, menthol, eucalyptol and methyl salicylate), was formulated by Joseph Lawrence and Jordan Wheat Lambert. They named their formula after the English physician Sir Joseph Lister, who performed the first antiseptic surgery. In 1884, Lambert formed a company to manufacture and market Listerine® to the medical community. Initially used as a multi-purpose antiseptic, it was soon discovered to be especially helpful for killing oral germs. As a result, in 1895, Lambert extended the sale and promotion of his product to the dental profession. By 1914, the Listerine® formula was so popular and effective it became one of the first prescription products to be marketed over-the-counter, and virtually invented the contemporary mouthwash category.

Freshening bad breath has been the traditional use of mouthrinse. In addition to this traditional cosmetic use, therapeutic mouthrinse is now available. The active ingredients of most types of mouthrinse include quaternary ammonium compounds, boric and benzoic acids, and phenolic compounds. As with dentifrices, commercial sales of a rinse are closely related to taste, color, smell and the pleasant sensation that follows use. This sensation is often enhanced by the addition of astringents such as alum, zinc stearate, zinc citrate, and acetic or citric acids. The American Dental Association recognizes that mouthrinse containing chlorhexidine and the Listerine® formula is effective in controlling plaque and gingivitis (5).

Toothpicks

Skeletal remains indicate noticeable occlusal wear of the dentition of our ancestors as well as considerable interproximal bone loss (4, 6). Toothpicks, in whatever form, probably provided relief from persistent food impaction. The intent of early humans was probably not to clean the teeth but simply to remove an unpleasant subjective sensation. Twigs or splinters of wood, unraveling at their end from rubbing and the softening action of saliva, probably evolved into chewing sticks and primitive brushes. This could be recognized as oral hygiene.

The toothpick eventually became part of a personal care kit along with a depilatory tweezer and an ear wax scoop. The most famous and first-known toilet set was found in a Mesopotamian king's tomb dating to 3000 B.C.E. Artisans fashioned a golden toothpick, a part of the toilet set, connected to a ring by golden wires and housed in a golden case, conical in form and richly decorated with ribboned filigree work. Variations of this basic toilet set have been found throughout Europe, the Middle East and East Asia.

The Romans often provided toothpicks for guests, along with spoons and knives. The ancient Chinese made cast bronze pendants for use as toothpicks, a practice that was also popular in Europe from the 15th to 19th centuries. Wealthy citizens often carried their gold or silver toothpicks in fancy cases and used them ostentatiously at meals.

People in most societies, however, could not afford toothpicks as an art form or as a symbol of conspicuous consumption. For these Greeks and Romans and for other cultures, the mastix tree (*Pistacia lenticus*), "the toothpick tree", provided effective slivers. The Greeks tended to keep these little instruments in their mouths continuously and were often referred to as "toothpick chewers".

What was originally a means of relieving discomfort became, in time, part of a ritual of personal cleanliness, but largely for reasons of vanity, the appearance of the teeth, rather than tooth preservation.

The chewing stick (miswak or siwak)

The use of the chewing stick is an ancient pre-Islamic custom (9). Mohammed was an enthusiastic supporter of its use as a "purgative for the mouth", and

he developed rules and rituals for the correct and effective use of the miswak. One of Mohammed's biographers wrote:

> Even the approach of death did not keep the Prophet from demanding the siwak because it is the most elegant thing that one can use and the most fitting to be found beautiful, for it makes the teeth white, clarifies the understanding, makes the breath fragrant, extinguishes the gall, dries up the phlegm, strengthens the gums around the teeth, makes the glance clear, sharpens the power of the vision, opens the bowels and whets the appetite.

This testimonial suggests why Muslims for hundreds of years have used the miswak and why for some it is not only a personal hygiene aid but a spiritual habit.

Although the miswak (or siwak) may have been used with "toothpowders" and "extract of roses", it is most commonly used as a single or sole cleansing agent, used as a toothbrush but without toothpaste.

The tufted twig design also was used in Japan and in the Indian subcontinent. The twig end was cut thin and flat to also serve as a tongue scraper. The modern-style brush, with hog bristles, was developed in China in the late 15th century.

Toothbrushes

The chewing stick became the toothbrush, via tooth cleaning attempts with sponges and rubbing cloths. Most historians (4, 14) trace the development of the first toothbrushes (hog bristles set in oxbone) to 1498 C.E. in China, although there is evidence that Chinese used ivory brush handles and bristles made of hair from a horse's mane as early as 1000 C.E. The bristle brush was reinvented in the late 18th and early 19th centuries. Due to the high price of the hog bristle, brushes did not become widely used until the end of the 19th century. In the first part of the 20th century in the United States, a family toothbrush was common among the poor. Shared toothbrushes were found in boarding houses and college dormitories. The affluent not only quickly added toothbrushes to their toilet sets but elevated the handle to an art form. Ornate handles of precious metals were prized, and such Victorian toothbrushes are currently popular collectibles. In the late 1930s, less expensive nylon filaments began to replace natural bristles; wood and plastic replaced bone handles, and toothbrushes became inexpensive enough for virtually everybody to own one.

The hard versus soft bristle brush controversy is an old one among dentists, and Hirshfeld in his book, *The toothbrush – its use and abuse*, quotes advocates for both positions. In 1814, Benjamin James stated

> When the gums are spongy and liable to bleed from the slightest touch, a hard brush, though apt to occasion much bleeding at first, eventually gives them much firmness and in a short time effects a cure.

Duval, in 1820, took a contrary stand.

> Is the animal which furnishes the hair then, the wild boar, even after its death, as well as during life, to be thus hurtful and dangerous to man? A fine soft brush should be preferred, for while it is sufficient for cleanliness, it possesses none of those inconveniences incident to hard ones.

Gariot attempted a politically correct compromise in 1843:

> Brushes should vary according to their uses. Thus delicate females who take care of their mouths, and whose teeth are easily cleaned, should use a soft brush. Men, who clean their teeth but seldom, require a hard one.

Variations on a theme of hard, natural bristles existed until the late 1930s, when plastic (for handles) and nylon (for bristles) became widely available. By the late 1960s, with the growing awareness of the dangers of enamel abrasion and gingival recession, toothbrushes with soft nylon bristles became the recommendation of choice.

An advertisement in the February 13, 1886, issue of *Harper's Weekly* touted the curative properties of what was perhaps the first electric toothbrush. The handle of Dr. Scott's Electric toothbrush (price, 50 cents) was said to be

> charged with an electromagnetic current, which acts, without any shock, immediately upon nerves and tissues of the teeth and gums... arresting decay... and restoring the natural whiteness of the enamel.

The same advertisement also solicited sales representatives for Dr. Scott's complete line of products,

including electric curlers, electric corsets, and electric belts.

Mechanical plaque removal with a manual toothbrush remains the primary method of maintaining good oral hygiene for the majority of the population. When performed well for an adequate duration of time, manual brushing is highly effective. For most patients, neither of these criteria is fulfilled. The modern power assisted toothbrushes were first introduced in the 1960s, and there have been many modifications. These include oscillating or rotating brushes and "sonic" brushes.

Floss

Levi Spear Parmly (1790–1859), the "father" of oral hygiene and the inventor of dental floss, was a New Orleans dentist who anticipated W.D. Miller's chemicoparasitic theory of tooth decay by exactly 70 years (4). Parmly stated that dental caries could be

> controlled by brushing, by applying a dentifrice polisher of table salt, and by using the waxen silken thread, which though simple, is the most important [for the prevention of dental caries]. It is to be passed through the interstices of the teeth, between their necks and the arches of the gum, to dislodge that irritating matter which no brush can remove and which is the real source of distress.

Parmly also understood that gingival tissues could be favorably affected by regular and systematic brushing and flossing. He wrote:

> The brush when first used should be employed rather delicately, as also the waxed silk, until the gums harden, and regain their arched appearance. Although the gums may at first become subject to a slight bleeding, yet in a few days, by a perseverance of the treatment recommended, this bleeding will cease; nor will the slightest pain be experienced.

At the present time, flossing has received the most attention as a method to remove interproximal plaque. However, the difficulty in flossing properly makes this technique less than universal in application. Other interdental cleaning devices such as rubber tip stimulators, wood sticks, and interdental brushes have been developed. "There remains, however, a need for a more versatile and user friendly device that patients could adopt relatively easily, as they have the toothbrush, and which would be appropriate and effective for the majority of patients and most situations in the mouth" (13).

Dentifrices

Throughout the ages, dentifrices have been used for esthetics, removing objectionable odors from the mouth, strengthening the teeth, allaying dental pain and as a prophylactic to ward off epidemic diseases (2). An Egyptian medical manual, the Ebers Papyrus, written about 1500 B.C.E. and compiled from works dating to 4000 B.C.E., contains a recipe for compounding tooth-cleaning preparations.

Most early remedies were designed to relieve toothache and/or prevent the progress of dental caries. The Chinese described a powder to be used to prevent the progress of caries and also to whiten the teeth. The major components were salt and musk. Ammonia, as a component of urine, was also added to the mixture to enhance its efficacy. Reports of clinical trials are lacking.

Hippocrates (460–377 B.C.E.) is generally considered the first to recommend the use of a dentifrice. In his text *De Morbis Mulierum*, in a section dedicated to "Diseases of Women", he describes the "Indian medicament" used to clean teeth and give a sweet smell to the breath. Hippocrates advised that one should prepare the dentifrice by burning the head of one hare and three mice – after taking out the intestines of two of them, but removing neither the liver nor the kidney!

The use of various body parts of the hare and of rodents is quite common in ancient literature. One can suppose our ancestors believed that animals that obviously had strong and continually growing teeth, such as the hare, contained some substance that would pass this attribute on to the human. Stag horns had similar characteristics. Our ancestor scientists derived this early suggestion from animal research!

Celsus advised that one should rub the teeth with a mixture of pounded rose leaves, gallnuts and myrrh. This mixture was advocated to remove stain from the teeth. Myrrh would most likely act as a solvent for some stains and the powdered gall nuts as an abrasive.

The Romans took great care of their teeth. They washed them and rubbed them with wool and made dentifrices from burnt stag's horn and the carbonized heads of hare, mice, and wolves, along with the

burnt heels of oxen and goat's feet. Pounded egg shells, snail shells, and pumice powder were frequently mixed with myrrh. The use of salt was also described by the Romans.

Pliny (23–79 C.E.) advocated use of the ashes of the head of a hare. He stated that any useful dentifrice could be improved by adding spikenard to lessen the bad smell of the mouth. Carbonate of lime was thought to be effective and he described a method for its preparation: "Egg shells should be deprived of their internal membrane and afterwards burnt to afford a good dentifrice". In the year 47, Scribonius Largus described a dentifrice made from barley flour mixed into a paste with vinegar and honey. The skin of a sun dried radish could also be added to the mixture. The mass was divided into balls, each of which was mixed with salt, carbonized, reduced to powder, and flavored with spikenard. The famous physician, Galen, noted that there were many dentifrices and powders described to strengthen the gums and teeth.

Avicenna, who lived in Persia from 980 to 1037, was one of the early consumer advocates in dentifrice evaluation. He advised his patients to avoid hard powders, as they were liable to injure the substance of the teeth. He also noted the importance of remedies to remove tartar and suggested that burnt gypsum be used. This bears a remarkable similarity to the pyrophosphate in use in the 20th century.

A famous physician and philosopher, Moses ben Maimon (known as Maimonides), was born in Cordova in 1135. He studied in Spain and Morocco before emigrating to Palestine in 1165. Later he practiced in Egypt and had the unique distinction of being the physician to both the Moslem Regent of Egypt and Richard the Lion-Heart during the Crusades. One of his significant contributions to the secular literature is his "Medical Aphorisms" (12). Maimonides quotes Hippocrates "If the teeth of a patient with a fever illness become covered with viscous humors his fever is particularly strong". Maimonides adds "These viscous humors develop from the strong heat and are acted upon by the fever so that they become dried out (and thus coat the teeth)". This is one of the earliest observations of an "oral manifestation of a systemic disease". Maimonides left the treatment of this oral hygiene problem to others.

Al-Bayan, a Karaite Jew born in Cairo in 1161, published a treatise called "Hospital Formulary". One chapter is devoted to medicines for the mouth and dentifrices. The dental pharmacotherapy was no more effective than the remainder of the medieval physician's pharmacopoeia. The basic active principles were astringents, germicidal agents and abrasives. He described an arsenic tablet to be used for cavities and the foul odor of the gums and to remedy deterioration of the gums. He also recommended a cooling agent to treat bleeding gums. This contained flower of tamarisk, dry coriander, mauve seed and bamboo concretion. Two dentifrices were recommended to polish teeth, strengthen the gums, and refine the odor of the breath. In most cases, the mouth was to be rinsed with vinegar and rose water following the use of any of the dentifrices. Apparently gingival recession was also known at that time, as Al-Bayan described a dentifrice to relieve pain in the teeth from cold. In England of the 17th century, popular toothpowders contained ground china or earthenware, powdered coral, pumice, crab shells or cuttle bone and were probably applied with a cloth. Charles Allen published a recipe for a dentifrice consisting of magistery (precipitate) of pearls, powder of coral, dragon's blood, and red rose water, which he claimed was so good that it need only be used once a week.

In the early 1600s, "New and Useful Practices of All Kinds for Diligent Barbers" was published in Italy. The author advised,

> ... owing to vapors that rise from the stomach, a certain deposit is formed on the teeth, which may be perceived by rubbing them with a rough cloth on waking. One ought, therefore, to rub and clean them every morning ... or ... the teeth will become discolored and covered with a thick tartar, which often causes them to decay and to fall out.

The 18th century found a large number of products with greatly inflated claims (1). In 1807, a London firm of chemists recommended the use of charcoal as a dentifrice. They claimed

> It gives the teeth a fine healthy-white appearance, destroys the offensive effluvia arising from carious teeth (which is often so great as to contaminate the breath) and will not only prevent the disease of the enamel attributed to scurvy, but even arrest its progress after it has taken place; and is really a remark that people who have suffered much from the toothache have not experienced the least relapse after the continued use of this powder. It is likewise very effective in destroying unpleasant taste in the mouth, in cleaning the tongue in cases of fever, sore throat or indigestion.

These dramatic claims led to criticism by the profession. Thomas Berdmore inveighed against vendors of destructive tooth powders and dentifrices and gave instructions to the public with the object of aiding them to distinguish good from bad. In 1746 Pierre Fauchard stated that people who used opiates, powders and mouthwashes to clean and whiten teeth were dupes. He noted that the chief ingredients of the products were brick dust, pumice, acid juices, spirit of vitriol and alum, all of which wore away the enamel and produced an indelible yellow stain on the teeth. Fauchard described his own concoction, which he claimed would clean and whiten the teeth, strengthen the gums and never endanger the enamel. He also noted that freshly emitted urine was the best mouthwash!

The American Colonies were no better. In 1771, Michael Poree, of Philadelphia, advertised "A composition for cleaning and preserving teeth and gums, likewise, a lotion, which is specific in all disorders of the mouth, eradicating every degree of the scurvy, preserving the teeth from decaying, and redoing them a very beautiful white and sound". In 1779, John Blake, of Philadelphia, and Williamsburg, Virginia, described

> An anti-scorbutic dentifrice for preserving teeth and gums, quite free from any corrosive preparation, and a certain cure for most disorders of the teeth, gums, and foul breath; it is perfectly innocent ... if the teeth and gums have been thoroughly cleaned by some skillful dentist.

The last phrase is quite consistent with statements appearing in products receiving the seal of approval of the American Dental Association!

B.T. Longbothom published a treatise on dentistry in 1802, and included a statement on "Improper Applications". He notes

> Will it not strike every thinking person, that a liquid or powder, containing acrimony in its composition sufficient to dissolve a concreted substance, like that in the teeth called tartar, will also destroy the enamel, which, when even slightly injured, too often exposes the teeth to premature decay, whose very labels indicate their evil tendency, by requesting they may be used only so often, and directing that the mouth be immediately washed from any remaining particle.

This logic apparently was not heeded by many of his colleagues nor by the public.

Parmly thought that the tooth powders, tinctures and pastes that contained cream of tartar, alum, brick-dust, and charcoal, variously colored and scented, could injure the teeth. He wrote:

> The best dentifrice that can be used, is common salt; it is perfectly innocent, as it completely dissolves in saliva, and produces all the friction necessary for cleansing the teeth.

David Wemyss Jobson of Edinburgh advised in 1834 that teeth should be scaled and then polished with a powder composed of equal parts of pulverized pumice stone and levigated chalk. He believed that this powder was "far too powerful for frequent application". Jobson further admonished that "all those powders that were recommended for the purpose of rendering the teeth white were to be avoided, and, in cleaning the teeth, no attempt was ever to be made to render them whiter than they naturally were". This is somewhat contrary to the American Dental Association's "Guidelines for Acceptance of Home Use Tooth Whitening Products"!

A Parisian dentist of the same era, J. Lefoulon, was among the first to advocate a pre-brushing rinse. After rising from bed a person had to rinse his mouth with fresh tepid water, because

> if we first use a brush we rub upon the teeth and gums the mucosities which the mouth has gathered during the night, and this is not our object ... After this, it is well to use some dentifrice powder, with which the teeth and gums should be well rubbed by a hard brush.

W. D. Miller ushered in a new era in the science of preventive dentistry. In 1890, he described his chemoparasitic theory of tooth decay. Miller maintained that the exciting cause of dental caries was decalcification of the enamel by weak organic acids, produced by oral bacteria acting on fermentable carbohydrates in contact with enamel. This new theory created a boom in the toothpaste industry, with each manufacturer adding special agents or devoting his attention to separate phases of the problem. The industry underwent a great change to constituents with an alkaline base.

Sodium bicarbonate and salt, separately or in combination, have been used widely as dentifrices, their use preceding the introduction of modern toothpaste (8). In Europe as early as 1905, Carlsbad

salt, consisting of a mixture of potassium sulfate, sodium chloride, sodium bicarbonate and sodium sulfate, was recommended for therapy of "alveolar pyorrhea", to be introduced into gingival pockets after removal of deposits. Hermann claimed brilliant success with such therapy and proceeded to develop a toothpaste of Carlsbad salt. In 1916, Herrick, an American physician, proposed that a saturated solution of sodium bicarbonate be used to cleanse the mouth before retiring. In the event of inflammation the powder was to be rubbed on the gums.

Prior to the early part of the 20th century, the emphasis of dentifrice use was on keeping teeth clean and free of stains. "Everyone" knew that a clean tooth did not decay! It was equally obvious to everyone, however, that teeth still did decay the way most people brushed them. The primary message in advertising was concentrated on claims everyone could believe – cleaner teeth and cleaner breath. Lever Brothers' Pepsodent® became synonymous in the public mind with whiter teeth.

Ipana® pioneered a program to create a widespread public awareness of a hitherto unnoticed oral health problem-gingivitis. "Pink toothbrush" and Ipana® were imprinted on the public mind. Widespread public knowledge of an oral health problem (gingivitis) preceded widespread willingness of the dental profession to devote much time dealing with it! The "ravages" of pyorrhea were made known to the health conscious public. Products used regularly and "in time", along with gum massage, were stated to result in firm, sound gums. The active ingredients of these proprietary formulae were not divulged.

Procter and Gamble, concerned that the competition was succeeding with whitening products, attracted attention to the dangers of abrasion by marketing a nonabrasive liquid dentifrice, Teal®. It failed, allegedly because many users developed unsightly brown pellicle stain.

After World War II, many dental companies undertook scientific studies to establish a therapeutic rationale for using any dentifrice. Colgate advertised their "Dental Creme" and advocated brushing after meals. Hein (3) notes that few people translated this knowledge into habitual behavior!

At approximately the same time, active ingredients were placed in some dentifrices. The first to appear were urea and dibasic ammonium phosphate (1949). Some of the ammoniated formulations were found to cause gingival inflammation, and we learned that the scientist should not become preoccupied with one facet of oral health so that other effects of the agent on the oral cavity are disregarded.

Chlorophyll-containing dentifrices entered the scene and implanted the word "bad breath" into our national conscientiousness. Hein notes "For a while it seemed as if the entire country would turn green as unwarranted exploitation led to chlorophyll derivatives being incorporated into a wide variety of consumer products including such unlikely items as foot pads and toilet paper".

Those of us who are skeptics and prone to sarcasm are tempted to look back on this era with disdain. However, application of scientific knowledge does not follow discovery as assuredly as night follows day. The world must be ready for this application of knowledge. Without the rising public expectation for therapeutic dentifrices and the greater public awareness about oral disease, there would have been little incentive for industry to undertake the major financial investments necessary to develop proven therapeutic dentifrices.

Colgate marketed a sodium *N*-lauryl sarcosinate dentifrice and the role of enzymes and enzyme inhibitors in promoting and preventing dental caries became public knowledge. We all recall the Gardol® invisible shield! (patented in 1954).

Crest® entered the market in 1955. This stannous fluoride dentifrice is generally acknowledged to have ushered in the modern era of therapeutic dentifrices. However, it was not until 1960 that the American Dental Association allowed its Council on Dental Therapeutics to grant a seal of provisional approval to dentifrices. As Hein (3) notes,

> That decision, which was only reached after a prodigious research effort extending over a decade sponsored by Procter and Gamble and several years of controversy within the ADA, provided the incentive required to assure further development of therapeutically active oral health products for use by the consumer. While there may be several reasons why Crest® rapidly became the largest selling toothpaste in the United States, one of the most important of these certainly was that, when Crest® became available, the public, the dental profession, and the government had been conditioned to anticipate that dental science would yield a proven therapeutic dentifrice.

There is considerable controversy surrounding the use of stain removers and tooth whiteners. Products are being marketed for professional use or for use by the patient at home. Many claims for safety and efficacy are under review by agencies and govern-

mental panels. These dentifrices are divided into two categories-with or without peroxide.

As the year 200 approaches, the most common ingredients found in dentifrices, with accepted potential oral health benefit, include stannous salts, triclosan, zinc citrate and, of course, fluoride. The market for peroxide-baking soda products indicates the public perception of a benefit for this combination. Calculus control is effected by agents such as soluble pyrophosphates and zinc citrate (7). Hypersensitivity at the cementoenamel junction can be alleviated by products containing potassium, strontium or sodium salts.

Dental health has improved dramatically in recent decades, a trend that mouth care companies in a multibillion dollar business have sought to exploit. A society that once survived using neither toothpaste nor mouthrinse now has a bewildering array of pastes and tastes from which to choose, including those with whiteners and fluoride, products for tartar control and sensitive teeth and all combinations thereof.

Summary

How far have we come in the past six millennia? Numerous dental epidemiological studies indicate that people are keeping their teeth longer than ever before in this century. Agents and devices have evolved, by custom and by research, to enable people, with professional assistance, to maintain good oral health. Our diets, our lifestyles and our professional colleagues have "conspired" as pathogenic influences on oral health. The profession has met the challenge by developing and perfecting a myriad of devices and agents to thwart these pathogenic factors. Patient motivation and professional acceptance of preventive dentistry procedures still remain challenges.

We certainly eat well, speak well, look fine and "smell fresh" – but we also have plaque, gingivitis and dental caries. The reader can determine how much progress has been made by reflecting on his or her personal oral health status!

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