

The History of Dentistry

by

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Abstract

The history of dentistry is a fascinating subject that spans the last five thousand years.

Beginning with the people of Mesopotamia and the Ancient Egyptians, the field of dentistry has evolved from using simple tools made by hand to high-speed electrical drills, digital x-rays, and other state of the art inventions used by today's dentists. It is important to be aware of how this field has transformed in order to have a greater appreciation of what is available for patients in the modern office. In order to develop this better understanding of the field, I give an overview of the history of dentistry starting with ancient times. Gradually, I discuss important events and people that have made an impact on the field as well as dental inventions that improved that way dentistry was practiced. In concluding, I interviewed a current dentist to get her perspective on how she sees dentistry today and where it is heading in the future.

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Introduction

The modern profession of dentistry is characterized by rapidly evolving technology, procedures, and scientific breakthroughs that are improving the lives of people around the world daily. What many do not realize is this has not always been the case. While dentistry can be traced back to pre-historic times, it is only of recent that it has been an area of frequent breakthroughs. This being acknowledged, the history of dentistry is an exciting topic that spans the last five thousand years beginning with the people of Mesopotamia. Starting in 500 A.D., it is interesting that the only people available to practice dentistry in Europe were the monks of the Roman Catholic Church. Later, the monks were forbidden to practice dentistry and this occupation was passed over to barbers. It is unbelievable to think that people went to those who cut their hair to receive a tooth extraction. Advancing through time, it is not until the 1800's when the first dental schools and organizations were founded and the profession began to modernize. Also, the products that are so common today in preventing dental disease such as the toothbrush, toothpaste, and floss were not modified and mass produced until this time period. Finally, it is interesting to know a current dentist's perspective on what the field of dentistry has to offer and where it is heading in the future. All in all, dental history is a topic that everyone should have some understanding of so that they have a better appreciation for the care that they are receiving every time they make a trip to the dentist's office.

Ancient History

Hesy-Re, an Egyptian scribe, is thought to be the first known dentist. Upon his death around 2600 B.C., his tombstone read, "The greatest of those who deal with teeth, and of physicians," (Bremner 39) Obvious from this information, the field of dentistry can be traced back to the beginning of documented history. Some of the earliest detailed records are contained

on Cuneiform tablets from the ancient Babylonian texts (1950-1530 B.C.) and Egyptian writings. According to these texts, ancient civilizations placed the utmost importance on the aesthetics and maintenance of teeth. Many of the earliest dental problems were said to be caused by one of three things: tooth demons, tooth worms, and tooth humors which are unbalanced body fluids (Pangas 197).

Teeth in general also played a large part in the lives of the ancient people. The prophecy tellers of Mesopotamia would use the condition of a newborn's mouth to predict what was in store for the country's future. Some of the prophecies included visions such as if a baby was born with one tooth, then the land would be disturbed by the command of a god. These prophecies would go into detail for many different scenarios including instances such as if a baby was born at the Palace and had all of its teeth, then the days of the prince were at an end. Some of the recorded observations correlate with modern dental conditions. One such is the issue of dental crowding. A prophecy on this condition stated that, "If his teeth are gathered, then he will die," (Pangas 198). Severe cases of

this occur today in pituitary dwarfism. Other conditions noted in the ancient texts include the



An ancient toothbrush carved from a tree branch (ADA).

abnormal coloration of teeth, the grinding of teeth, and the condition of scurvy. Scurvy is a detrimental condition that results in a high rate of death. It is caused by a lack of ascorbic acid, or vitamin C, in the diet. All of these conditions seemed to have some remedy to help heal or comfort the person. For example, to help fight scurvy, wild grapes were prescribed (Evans 1863). It is known today that these are very high in ascorbic acid which would help cure the problem.

Most remedies for different conditions, however, included the use of herbs and other plants along with some sort of incantation.

In Egypt during this time period, the Ebers Papyrus was written and contained detailed remedies for toothaches and other dental diseases. For example, a recipe that was used for a type of toothpaste involved the use of ground pebbles, honey, verdigris, and pulverized fruit (Freeth 18). In regards to aesthetics, the Phoenicians of this time period were already inventing devices to house false teeth in the mouth. Analysis of skeletons from this time period has found gold wires that were used to hold false teeth in the mouth. These were made out of gold, ivory, animal teeth, and even other human teeth (Freeth 19).

The next wave of dental information did not develop until around 500-300 B.C. with the writings of the Greek scholars Hippocrates and Aristotle. In their writings, they discussed the eruption pattern of teeth as well as the treatment of diseased teeth and gums. Hippocrates made an “improvement” upon the toothpaste recipe in which he used ground mice, the head of a hare, and white stone (Freeth 18). Aristotle became the first person to write about the comparative anatomy of teeth between humans and different animals. Also, in these writings, was the first mention of using forceps to extract teeth. This was a much easier and efficient way of pulling teeth compared to other tools such as the hammer and chisel of that time. Finally, details were given on dental appliances such as the use of wires to stabilize loose teeth and broken jaws.

Around the time of Christ, a Roman physician named Archigenes went against all other philosophies and said that toothaches were caused by a material that is inside the tooth, pulpitis. While he was somewhat accurate in this discovery, his method of curing the problem was appalling by today’s standards. He designed a drill to remove this material, known today as the blood vessels and nerves, then replaced it with roasted earthworms, spikenard (an oil that is

believed to be derived from the plant *Nardostachys grandiflora*), and ground up eggs of spiders. Celsus, another man of this time period from Rome, began to use the first dental fillings. Again, the idea was revolutionary, but the reason for utilizing the practice was not fully correct. The lead fillings he designed were used to hold a broken tooth together such that the extraction would be a much easier procedure (Bremner 54). Following these new ideas, there was not another significant advancement in dentistry throughout the next five hundred years.

The Middle Ages

Around 500 A.D., monks became the main providers of medicine, surgery, and dentistry. This was due to their higher education during this time period. However, while they did possess a lot of knowledge, they did not develop much advancement for the field of dentistry. Most of what they practiced was procedures that they learned from the more experienced monks (Bremner 76). This began to dwindle to an end when a series of Papal edicts were published by Pope Innocent II in 1130 and ending with Pope Alexander III in 1163. The announcements declared it illegal for monks to practice medicine and dentistry. This led to the arrival of a new series of dentists.

The new dentists, the monk's barbers, were those who had the proper equipment and had seen the most procedures due to their frequent visits to the church. Barbers were constantly at the church shaving monks' heads; therefore, they had witnessed many dental procedures and had numerous razors and scalpels that would be necessary for providing dental work. In France around 1210, a group of barbers joined to form The Guild of Barbers. This group separated into two individual unions. One union, known as the surgeons, was educated and well-trained to undergo the complicated surgical procedures that some dental techniques required. The lay barbers were the other union that continued to work as barbers, but also had the ability to

practice simple dentistry such as tooth extractions and other hygienic services (Bullough 448). In the 1400's, there were a series of decrees issued in France that strictly prohibited lay barbers from practicing surgery other than simple extractions of teeth.

The 1500's were highlighted by the first book published solely on dentistry. The Little Medicinal Book for All Kinds of Diseases and Infirmities of the Teeth, written by a German named Artzney Buchlein, was a guide for barbers and surgeons on how to practice dentistry. In this book, the issues of oral hygiene, tooth extraction, tooth drilling, and the use of gold fillings were addressed (Freeth 19). This book was the main resource for dentistry until 1723 when the "father of modern dentistry", Pierre Fauchard, published a book that would change the field of dentistry forever.

The Beginning of Modern Dentistry

Pierre Fauchard, a French physician, began obtaining information about dentistry in 1718



A portrait of "The Father of Modern Dentistry", Pierre Fauchard (Vaux).

when he moved to Paris. While there, he undertook the task of writing a scientific book on the field of dentistry because he noticed there were no detailed texts on this subject. He obtained much of his information by studying and interviewing dentists as they practiced. Also, he compiled vast amounts of other information by studying books that had already been published on medicine. In 1728, his book was finally published in two separate volumes entitled Le Chirurgien Dentiste which can be translated into The Surgical Dentist.

Enclosed in this book was a complete description of most areas known to dentistry at the time. For example,

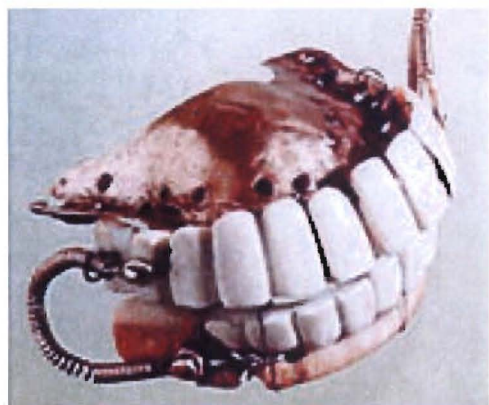
Fauchard discussed proper doctor to patient etiquette in the dental practice. During a visit, the doctor should welcome the patient and seat them in the appropriate room. While performing whatever procedure is needed, the doctor should be behind the patient to reduce the fear that can develop in them. Also, he proposed that a dentist's chair light should be used in order for the doctor to work accurately.

Next in the book came various theories that Fauchard had developed while studying dentistry. First, he denounced the theory that tooth decay was caused by tooth worms. His research under a microscope never provided conclusive evidence that worms were present in the decay. This was of particular importance since this theory had been around since 2000 B.C. He hypothesized that instead of tooth worms, most decay was caused by bacteria living in the mouth that ferment sugar. This fermentation process released excess acid which decayed teeth. With this assumption, he advised people to consume less sugar. In agreeing with past dental practices, he endorsed the idea that the use of urine as a mouthwash should be used to treat tooth decay. Today, it is known that ammonia was the active ingredient in urine.

Lastly, Fauchard wrote extensively on the procedures used in dentistry. He developed the idea of using fillings made out of amalgams such as tin, lead, and gold to fill in the spaces where decay had been drilled out of the tooth. These amalgams were beneficial because they were more malleable and cheaper than pure gold or other compounds. There were also detailed descriptions as to different instrumentation and appliances for various procedures. He introduced his version of the dentist drill as well as various false teeth, wires, and braces. He suggested that children were easier patients for braces than adults because the roots of their teeth were smaller and consequently easier to move. Overall, Fauchard introduced the field of dentistry to the scientific world. It was no longer accepted to travel to the barber for a tooth extraction. He proved that

there are specific ways that dentistry should be practiced and these volumes helped transform dentistry into the way it is practiced in modern times (Vaux). What followed this publication has

been an onslaught of new procedures, training, and technology that is still evolving today.



A set of George Washington's dentures created by John Greenwood (ADA).

Important to the United States was the arrival of John Baker from England in 1760. Baker launched the profession into America by becoming first practicing dentist of the area. He also trained Isaac Greenwood whose son, John, was the dentist that designed and created George Washington's famous wooden dentures.

Analysis of Washington's dentures has led to more information on how these appliances were constructed in the eighteenth century. Interestingly enough, the dentures he wore were not made of wood. In fact, they were carved from the tusk of a hippopotamus along with gold, lead, and human teeth. For placement into the mouth, springs were located on the gold plates that held the teeth onto the appliance. The springs were then pushed up against the upper and lower ridges of the mouth in order to hold the dentures in place. Unlike dentures used today, Washington had to actively use force to keep his mouth closed (Escoe 38).

Moving into the nineteenth and twentieth centuries, a new era of dentistry was formed. During this time period, personal dental items such as the toothbrush, toothpaste, and floss were among things that began to be mass produced. Likewise, the instruments used by dentists became more advanced. Also, the first dental school was established as well as the first dental association. All around, this time period became a rapid improvement for everyone involved in the field of dentistry.

Personal Dental Hygiene

According to archeological findings, the toothbrush has been around since prehistoric times. The ancient toothbrush was made out of a very small tree branch. This branch was carefully chosen from some type of aromatic tree to freshen the user's breath, and was also very small (about the size of a pencil). On one side of this, the end would be chewed such that there were bristles that could be used for the actual brushing of the teeth. The other side of this stick was usually pointed and could be used like the modern toothpick in order to remove trapped food and other debris that would accumulate between the teeth. Amazingly, the first bristled toothbrush was not made until around 1780 in England by a man named William Addis (Hyson 74). His first toothbrush was constructed from the bone of a cow that was carved down to the proper size. The head of the toothbrush contained natural bristles that were obtained from the necks of pigs from the northern areas of China and Siberia so that they were somewhat stiff. These bristles were held into holes that were carved out of the head of the bone by small wires. This new invention was put into use and, throughout the early 1800's, its popularity grew tremendously throughout Europe.

In 1844, the first toothbrush was manufactured in America by Dr. Meyer L. Rhein. While the industry was slow to take off, eventually the Florence Manufacturing Company of Massachusetts endorsed the idea and began mass producing them in 1885. Around this time, another type of toothbrush was being introduced in Switzerland. Known as the electric toothbrush, it was powered by battery and required less mechanical force to operate. However, this was not introduced in America until 1960 by Squibb Pharmaceutical mainly because of the population's lack of brushing habits. Most people in America did not accept the habit of teeth

brushing until the end of World War II when soldiers arrived home with the habit that was mandated by the Army (Hyson 77).

With the invention of the bristled toothbrush, it was also discovered that there needed to be some other agent to enhance the effectiveness of brushing one's teeth. Comparable to the history of the toothbrush, toothpaste had been around since ancient times. In fact, there is evidence that it was being used as early as 500 B.C. in China and India. These toothpastes began to become more modernized with the addition of soap in 1824 by a dentist named Dr. Peabody. Later, chalk was introduced into the mixture by John Harris in the 1850's. By 1873, toothpaste underwent mass production in a jar by the Colgate company. While it was great to finally have this available, the jar was not very practical due to its rigid structure. This problem was very readily cured with the invention of the collapsible tube by Dr. Washington Sheffield in 1892. From here, it was not until after World War II that toothpaste began to see any more modifications. The first was the substitution of better detergents for soap. This involved the replacement of soap with sodium lauryl sulphate and sodium ricinoleate. Starting with Proctor and Gamble in 1956, Crest toothpaste had added sodium fluoride into its ingredients. By the 1980's, almost all toothpastes had replaced sodium fluoride with calcium fluoride. This not only provided the teeth with fluorine, to prevent decay, but it also provided calcium which is beneficial for tooth development and structure (Gelbier 612). With the evolution of these two main dental tools, toothbrushes and toothpastes, a discussion is needed on the basic scientific reasons for why they are so important to daily dental hygiene.

Used together and properly, toothbrushes and toothpastes can help prevent a wide variety of oral diseases and problems such as cavities. Cavities are caused by the over five hundred microorganisms that are living in the oral cavity (Ishikawa 205). Mainly varieties of the

Streptococcus genus, these microorganisms feast on leftover food that is in the mouth. After eating the food, they produce a sticky substance called plaque which contains acid as well as other compounds that are known as volatile sulfur molecules. The acid that is produced can eat away at the enamel, or the hard covering of the tooth, and result in the decaying of the tooth and formation of a cavity. The sulfur particles that arise as the byproduct of the microorganisms results in bad breath. Overall, these can be combated with the use of toothpaste which contains various compounds to help scrub away the bacteria and food stains with the help of a toothbrush. Some toothpastes even contain compounds such as Xylitol and triclosan that can slow the growth of plaque causing bacteria. Xylitol is an artificial sweetener that replaces sugar which causes the acidity in the mouth to decrease. Triclosan is an antibiotic compound that can reduce the amount of bacteria growing in the mouth (Gelbier 614). While these utensils are all useful in providing good oral healthcare, additional measures are recommended and may need to be taken to help prevent disease and decay.

Dental floss is an underestimated dental accessory that can help improve the quality of the mouth and teeth. By examining ancient dental records, it is thought that dental floss may be one of the oldest inventions in the field. Evidence on ancient teeth show grooves that could have been formed by some sort of floss. The modern floss was “re-invented” in 1815 by Levi Spear Parmly, a dentist from New Orleans. He recommended that his patients floss everyday with silk. Later, Johnson & Johnson received the first patent for unwaxed silk floss in 1898 and began mass producing it. The only major changes since this time period are the use of nylon instead of silk and the introduction of waxed floss. Nylon provides better durability and elasticity making the use of floss even more effective. Waxed floss is easier to use than unwaxed floss because it slides between the teeth easier. Overall, the use of unwaxed floss versus waxed floss seems to be

a matter of personal preference with no added benefits of using one or the other. The main purpose for using floss is to remove excess plaque between the teeth and at the gum line. This helps prevent the development of cavities along with gum disease (Sanoudos 4). Even as effective as it is, the American Dental Association believes that only twelve percent of Americans floss daily and forty-nine percent do not floss at all (Sanoudos 5). With these statistics, what else can be used to help remove debris from between the teeth and prevent gum disease?

Mouthwash, while not a substitute, attempts to do many things that flossing and brushing teeth can do. As stated earlier, there have been many bizarre ingredients that have been placed in mouthwash. Disregarding early beliefs, the first legitimate reason for using mouthwash was observed by the 17th century scientist Anton van Leeuwenhoek. Known as “The Father of Microbiology”, Leeuwenhoek first observed living organisms occupying dental plaque. Through experimentations, he found that he could kill the organisms with the use of vinegar and brandy. Next, he used the same procedures and conducted the experiments in his mouth. He concluded that both the vinegar and brandy were either ineffective or not present long enough in the mouth to kill the bacteria (Slavkin 492). This led to no real advancement in mouthwash technology except for the addition of alcohol. The first over the counter mouthwash was sold in 1914 by Listerine. The formula of Listerine, as well as other mouthwashes, was not enhanced until the work of a professor at the Royal Dental College in Aarhus, Denmark named Harald Loe in the 1960’s. Loe observed that a compound called chlorhexidine had the ability to prevent the accumulation of plaque on teeth. It works by attaching to the teeth in the mouth and remaining there for many hours. Today, chlorhexidine is still used along with other ingredients such as calcium fluoride, potassium nitrate, and hydrogen peroxide that can help prevent bone loss and

gingivitis, reduce the pain associated with sensitive teeth, and even promote the whitening of teeth (Slavkin 495).

Tools of the Trade

Even with the advancement of many personal dental hygiene products, there will always be the need for updates in the dental office. Over the last two hundred years inventions such as the dental drill, anesthesia, and filling materials have played a large part in providing adequate dental care for patients as well as comfort. Before the 1800's, patients who received dental care received no anesthesia and, when not extracted, most teeth were either carved or chiseled out. In 1871, the way dentistry was practiced changed forever with the invention of the first dental handpiece with a self-contained motor. Invented by George F. Green, this was the first electric engine in the dental field. In this same year, James B. Morrison invented a foot-treadle dental handpiece that was eventually manufactured by the American S. S. White Company. With these new handpieces, dentists were now able to drill effectively and efficiently in which the bur that was used to cut the tooth would spin at 200-300 revolutions per minute. This was a gigantic step in the field of dentistry and lasted until the 1930's. After this time period, electric engine dental handpieces became more common. With these came higher spinning speeds which led to increased friction while drilling teeth. Water was then introduced into the handpiece in order to cool down the tooth while the procedure was taking place. Today, dental handpieces are able to operate at speeds of over 500,000 revolutions per minute (Gelbier 613).

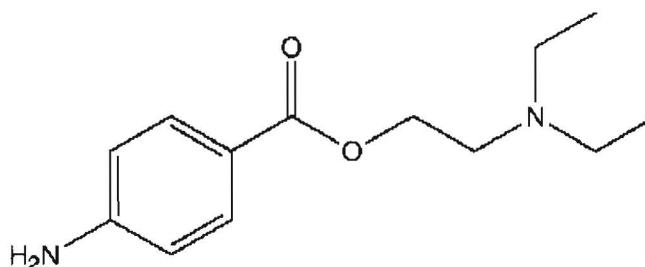
With dental handpieces also came the bits that actually do the cutting called burs. The original burs were made out of silicon carbide. While they were obviously useful enough to cut teeth, they were very ineffective due to the quickness in which they lost their shape. This led to the designing of a diamond bur. Not only was it more effective at cutting the enamel on the

tooth, it was more durable. Created in 1897 in Germany, the first diamond bur was made by hammering diamond dust into a small piece of copper. By 1899 the new diamond burs were on the market for dentists' use. Around 1932, a German industrialist named W.H. Drendel developed an easier process for making diamond burs. By being able to bond the diamond dust onto the post of the bur, this process became much quicker and allowed for a wider assortment of shapes and cutting abilities (Siegel 742). Once the high speed air-turbine handpiece was created in 1957 which could cut up to 300,000 revolutions per minute, diamond burs became commonplace for use in dental handpieces. Along with these advancements in dental handpieces and burs came a growing need for better anesthesia during treatment.

The year 1844 marked the time in which Horace Wells discovered that nitrous oxide was suitable as an anesthesia. This was a monumental step in providing comfort for patients during dental surgery. The problem with nitrous oxide was its tendency to not last long enough for the entire procedure to take place. This resulted in the patient being in an extreme amount of pain, or the dentist would work too fast which would consequently yield poor results (Gelbier 614). In 1884, the first local anesthesia was used. Using cocaine, dentists were able to diminish the pain caused by dental treatment with an injection at the site in the mouth. Unfortunately, cocaine was highly addictive and seemed to cause more problems than it cured. At last, in 1905, the German chemist Albert Einhorn produced the first man-made local anesthetic drug called procaine. Better known today as Novocaine, this amino ester compound was able to minimize pain without any of the side effects that occurred when using cocaine. Also, it had the ability to constrict the blood vessels which decreased the flow of blood around the preparation site. This allowed for quicker and more precise treatment. The only problem with procaine was it caused an allergic reaction due to the metabolism of the ester. The product, para-amino benzoic acid, is allergic to a small

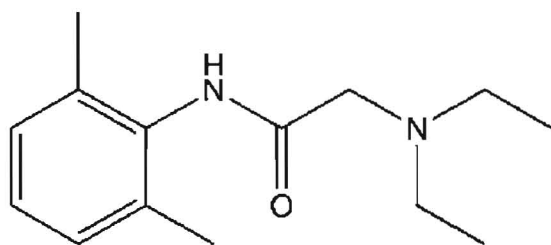
number of people which resulted in an increased level of anesthesia in the blood and a higher toxicity (Jeske 9).

The 1920's brought about easier ways to sterilize needles. With the invention of cartridges during World War I, dentists had the ability to soak needles in solutions such as sodium bichromate, phenol, glycerine,



The chemical structure of the amino ester procaine.

and water after each procedure to prevent the accumulation of bacteria. Along with the practice of boiling the needles once a month, this greatly decreased the chance of causing infection through needles (Gelbier 615). In 1948, a new local anesthesia was introduced that has, over time, replaced the use of procaine. The new chemical, called xylocaine, was even better than procaine due to its increased ability to numb patients who normally would not be able to feel the effects of procaine. Also, many patients who might have been allergic to procaine seemed to not



The chemical structure of the amino amide xylocaine.

have any reaction to the use of xylocaine. This decreased toxicity resulted from xylocaine being an amino amide which did not produce para-amino benzoic acid (Jeske 12). Overall, by the 1960's, needle sterilization procedures such as the

development of disposable needles, better packaging, and the more wide-spread use of autoclaves had been modified, and the administering of anesthesia was a much safer and effective way of providing comfort to patients.

Materials Used in Dentistry

Starting in the 1800's and continuing into today's era of dentistry, the materials used by dentists have drastically changed. Dating back to the 7th century, the Chinese began using a material that is called an amalgam. This is a mixture of metals that will harden after being placed into a drilled preparation of a tooth. In 1816, Auguste Taveau introduced a new amalgam that would be much cheaper to use since it lacked what previous amalgams contained, gold. This new amalgam was a mixture of silver coins and mercury. An early problem with the material, however, was its tendency to expand once placed in the tooth. Along with the concern of mercury poisoning, this caused the American Society of Dental Surgeons to ban the use of amalgam in the United States in 1840 and continue to endorse the idea of filling teeth with gold. By the 1890's, the metals used in the amalgam had been slightly altered, and dentists began using them in the United States. The most recent change in amalgam came during the 1970's. This involved a greater use of copper in the mixture. By raising these levels, the amalgam became even more durable, cheaper to manufacture, and less likely to corrode. The general mixture of amalgam today consists of about fifty percent liquid mercury with the other fifty percent containing the metals copper, tin, silver, and zinc (Greener 27).

Amalgam, with all of its positive aspects, has two main negative problems. The first problem results from the mercury contained in the mixture. Mercury is an element that is known to cause neurodegenerative disease, birth defects, and mental disorders if long term exposure occurs. Due to the leakage of mercury from an amalgam filling, there have been a minority of dentists that disapprove of the use of amalgam. One study, conducted in 2003, concluded that patients with amalgam fillings are exposed to one to twenty-seven μg of mercury per day. Also, dental professionals are exposed to an average of five μg of mercury per day. This has caused proposals of laws banning the use of amalgam as a dental filling material (DeRouen 1785). In

contrast, no evidence has been found that the minute amount of mercury that is released by the filling causes any physical problems to the patients or professionals.

The second problem with amalgam fillings is their look. In a world where many people are concerned with their appearance, silver teeth are not always the color of choice for patients.



An image showing an amalgam filling placed in a molar (Greener).

This led to the use of composite resin fillings.

Composite resin fillings are made from a mixture of powdered glass and plastic resins such as urethane dimethacrylate. This material had its advantages and disadvantages compared to the traditional amalgam.

First, composite resins can be made to match the color of teeth. This provides patients with a more

aesthetically pleasing appearance than amalgam. The resin is placed on the tooth and then polymerized, or hardened, using a device that usually emits some frequency of ultraviolet light. Next, it can be polished to match the exact color and shape of the tooth. Another advantage of composite resin fillings is their ability to bind to the tooth. Unlike amalgam fillings, it is not necessary to remove extra tooth structure in order to create retention to hold the filling in place. The resin binds directly to the tooth resulting in less tooth structure having to be drilled away (Peutzfeldt 100).

A few main disadvantages sometimes shy dentists away from recommending composite resin fillings all the time. The most obvious disadvantage is the cost. While many insurance rates vary on what they will cover, resin fillings are generally more expensive than the typical amalgam filling. Also, they have an average life span of 7.8 years compared to that of amalgam at 12.8 years (Christensen 1757). Another problem results from the occasional shrinking of

composite resin fillings within the tooth. This can cause food and other debris to leak into the space and cause more decay. This could eventually result in the placement of other fillings or more extreme dental measures. All in all, the amalgam and composite resin materials are the most common dental restorative material used for fillings. It is up to the dentist and patient to decide which material will result in the best outcome for the procedure involved.

The Development of Journals, Schools, and Organizations

The modernization of dentistry resulted in the founding of many publications, schools, and organizations. The first publication of a dental periodical occurred in 1839. Initiated by Dr. Chapin A. Harris, the American Journal of Dental Science was a magazine that allowed for the latest developments in dentistry to be published. This was fantastic for the field because it allowed other dentists to have a way for communicating in the field without having to write a book or using the common word of mouth approach (Bremner 139).

In 1840, the first dental school in the United States was also founded by Dr. Horace H. Hayden and Dr. Chapin A. Harris. The Baltimore College of Dental Surgery was the first to offer any type of dental degree. Specifically, they offered the Doctor of Dental Surgery degree (D.D.S.), which is still available today. The development of a dental school was a gigantic step in the dental profession because it began to provide professional training (Bremner 161). This marked the start of the elimination of all “dentists” that were either poorly trained or completely untrained. The first university affiliated dental school was founded in 1867. The Harvard University Dental School offered what is called the *Dentariae Medicinae Doctorae* (D.M.D.) that is now considered by the American Dental Association to be equivalent to the D.D.S degree. By the year 1900, fifty-seven dental schools existed (Bremner 167). Today, there are fifty-six dental schools in the United States.

One other achievement for the dental field occurred in this same time around 1840. The world's first dental organization was established as the American Society of Dental Surgeons. While this group disassembled by 1856, it was not long until twenty-six dentists met in Niagara Falls, New York to form what is known as the American Dental Association (ADA). Founded in 1859, the ADA is currently the largest and oldest national dental association in the world (Bremner 148). Today, the ADA is involved in all aspects of the field. First, they have an extensive research branch that tests new dental products and offers their seal of approval if the product is satisfactory. Also, with over four hundred employees at their headquarters in Chicago, Illinois, there are many other branches within the organization. For example, they have the largest dental library in the world. Another division, known as the ADA Foundation, is responsible for providing grants for dental research, education, and scholarships. The ADA is an organization that is in place to help everyone involved in the dental field from the patients to the manufacturers and dentists (ADA).

Today's Dentist

The last topic of discussion covers the modern American dentist. What type of people become dentists, and what do these dentists have to deal with on a day to day basis? As discussed earlier, all dentists must receive either a D.D.S or D.M.D. degree at one of the fifty-six dental schools. Including undergraduate courses, this usually requires six to eight years of continued education after high school. Once becoming a dentist, what issues are faced in their day to day activities? First, dentists have a wide array of matters that they have to tend to daily. Patients are the main focus of dentists. Without a patient, there would not be a practice. While it is a joy and privilege for many dentists to work with their patients, it is also a source of stress if the patient is uncooperative. Other sources of stress can include conflicts in the office between

coworkers and struggles in dealings with insurance companies and the government. Studies have shown that the typical dentist's personality includes the need for control (Chambers 1433). This is obvious in the profession due to dentists being able to personally control their own office and the way that it is operated. Dentists also receive great satisfaction in what they can control, such as the quality of work that they do. Overall, a staggering number of dentists seem to enjoy their occupation. While many people in the general public undergo career changes throughout their lives, the ratio of dentists volunteering to change careers to that of other professions is a factor of one in fifteen (1434).

In researching more of what dentist's think about their own field and of themselves, an interview was conducted with Dr. Jeanine Green¹. Dr. Green has been in the profession for over eleven years and currently owns her personal dental practice in Muncie, Indiana. When questioned about why she wanted to become a dentist, she responded by saying she wanted to achieve the level of professionalism that is involved with being a dentist. Likewise, self-employment was a goal because it allows one the opportunity to set their office hours and not having to work during nights, weekends, or holidays. Finally, she said that being a dentist gives one the ability to make a difference in the community by helping others. Overall, it seems that dentistry can be a profession that provides benefits to both the dentist and the patient.

Switching subjects slightly, a conversation of the current state of dentistry was discussed. Starting with technology, Dr. Green explained the positive and negative impacts on the rapid development of new technology. First, she said that technology is putting great amounts of pressure on more traditional practices. For example, many products are available that are supposed to "make life easier", but in reality they cause the price of dental care to increase unnecessarily. This is a problem because many patients do not want to pay more for dental care.

¹ This interview was approved by the Institutional Review Board on April 30, 2007.

Also, much of the technology that is being introduced may not be better. For example, many dentist offices today offer flat screen televisions for their patients to watch while they are receiving treatment. While this is great entertainment for the patient, the dentists do not want to pay for this increase in technology. Consequently, the price for these televisions is passed on to the patients. On the opposite side, she expresses that there are some great uses for new technology. One such use involves digital X-rays. Now, it is very convenient in specialty dentistry when X-rays can be displayed in a very short amount of time on a television screen. She continued by saying that dentists are now able to detect things such as oral cancer and tooth decay like never before with the help of specialized equipment. This only improves the chance of people being able to preserve their teeth for a longer period of time.

When asked about the future of dentistry, again she expressed both the positive and negative possibilities. Beginning with a negative possibility, she said that there is now an increase in what is known as commercial dentistry. These are dental clinics that are owned by large corporations. She expressed her displeasure in these clinics due to the lack of personal care that the patients receive. For example, she knew of a person who had visited one of these clinics on four separate occasions. During each time, she was seen by a different dentist. This is a negative practice because it lacks the personal relationship that the patient can develop with the dentist to achieve the best possible dental care. Consequently, this compromises the quality of care due to the decreased continuity of the patient's dental records.

Another view that she has on the future of dentistry is the increase of aesthetic dentistry. It is no secret that the "perfect smile" is something that is of great value by looking at any celebrity today. Dr. Green described how she has seen a trend in more and more people becoming concerned about the color and positioning of their teeth since she has been in practice.

She says this is very positive for the profession because it provides people a relatively inexpensive way to do a small makeover to help them have a boost of self-esteem without the involvement of needles and surgery. When asked about the difference between having teeth professionally whitened and the use of over the counter whitening products such as toothpastes and mouthwashes, she said that the general whitening products have not proven to be very effective compared to the professional products. However, she also expressed that these products are not bad because if people believe they are making a difference, then they will be more inclined to use them. This is obviously beneficial because more people will be determined to brush their teeth even if it is for a reason other than daily cleanings. She did caution that overuse of whitening kits could ultimately result in the wearing down of the enamel and cause dental problems in the future.

In finishing the interview, she mentioned how the people of today should be thankful and grateful that they live in a time where they have the ability to save and preserve their teeth if they want to. She said hopefully the future of dentistry will continue to evolve and become an even more pleasurable experience for patients. Overall, she thinks it is great that children are becoming more accustomed to the field with the use of orthodontics. "Now, it is a status symbol that kids are excited to get braces, and dentistry in general is becoming more 'fun'. It is becoming less painful and the results are becoming better looking and longer lasting." She continued by saying that this has helped increase awareness of the importance of dentistry to both children and parents. In the upcoming years, she said that people can look forward to more teeth being saved, more implants being used, and the possibility of artificially growing teeth.

In conclusion, the history of dentistry is an extensive subject that can give people a better appreciation for what they have today in terms of dental care. It is difficult to imagine traveling

to one's barber today to have a tooth extracted without the use of any anesthesia. Also, it is amazing to think that up until the last one hundred and fifty years, people have not had much access to personal dental care products. By exploring the history of dentistry, it is very encouraging to see the advancements that have been made. This gives hope and anticipation that there will be many more great improvements to come in the profession; likewise, it is a motivator that can drive people to create new things for the field because they know that it has been done before. All in all, the history of dentistry instills a sense of excitement into ones mind because as apprehensive as many are about going to the dentist, now people know that they have a great advantage over those who visited the dentist in the past.

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