

## **DENTISTRY DEVELOPMENT OF SCIENCE**

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**Annotation:** Dentistry, the profession concerned with the prevention and treatment of oral disease, including diseases of the teeth and supporting structures and diseases of the soft tissues of the mouth. Dentistry also encompasses the treatment and correction of malformation of the jaws, misalignment of the teeth, and birth anomalies of the oral cavity such as cleft palate. In addition to general practice, dentistry includes many specialties and subspecialties, including orthodontics and dental orthopedics, pediatric dentistry, periodontics, prosthodontics, oral and maxillofacial surgery, oral and maxillofacial pathology, endodontics, public health dentistry, and oral and maxillofacial radiology. Early dentistry.

**Key words:** Dentist, pathology, endodontics.

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Dentistry, in some form, has been practiced since ancient times. For example, Egyptian skulls dating from 2900 to 2750 BCE contain evidence of small holes in the jaw in the vicinity of a tooth's roots. Such holes are believed to have been drilled to drain abscesses. In addition, accounts of dental treatment appear in Egyptian scrolls dating from 1500 BCE. It is thought that the Egyptians practiced oral surgery perhaps as early as 2500 BCE, although evidence for this is minimal. An early attempt at tooth replacement dates to Phoenicia (modern Lebanon) around 600 BCE, where missing teeth were replaced with animal teeth and were bound into place with cord.

True restorative dentistry began with the Etruscans, who lived in the area of what is today central and northern Italy. Numerous dental bridges and partial dentures of gold have been found in Etruscan tombs, which date to about 500 BCE. The Romans, who conquered the Etruscans, adopted Etruscan culture, and dentistry became a regular part of Roman medical practice. The Greeks also practiced some form of oral medicine, including tooth extractions, from the time of Hippocrates, around 400 BCE.

In the Eastern world, dentistry had a totally different history. There is evidence that the early Chinese practiced some restorative dentistry as early as the year 200 BCE, using silver amalgam as fillings. Oral medicine was part of the regular medical practice in other early Asian civilizations, such as those in India and Japan.

Because of the proscription in the Qur'an, the sacred scripture of Islam, against mutilating the body, surgery was not practiced in Islamic countries. Instead, reliance was placed upon healing through the use of herbs and medicines; preventive dentistry through strict adherence to oral hygiene became paramount. The writings of early Arabic physicians, such as Avicenna and Abū al-Qāsim, show that scaling and cleaning of teeth were practiced. Extractions were rare and were performed only when a tooth had been loosened.

Development of dentistry in Europe

With the demise of the western Roman Empire about the year 475 CE, medicine in Europe declined into a torpor that would last for almost a thousand years. About the only places where medicine or surgery was practiced were monasteries, and monks were aided in their surgical ministrations by the local barbers, who went to the monasteries to cut the monks' hair and shave the monks' beards. In 1163 a church council at Tours, France, ordered that henceforth no monks or priests were to practice any surgery, since it was felt that the shedding of blood was incompatible with the holy office of the clergy. Thus, the only people who had any rudimentary knowledge of surgery were the barbers, and they stepped into the breach, calling themselves barber-surgeons. They practiced simple dentistry, including extractions and cleaning of teeth. In the 1600s a number of barber-surgeons began restricting their activity to surgery and dropped the word "barber," simply calling themselves surgeons. In England, Henry VIII granted a charter to a combined group of barbers and surgeons, which ultimately evolved into the Royal College of Surgeons.

In 1530 the first book devoted entirely to dentistry was published in Germany and was written in German instead of Latin. It addressed barber-surgeons and surgeons, who treated the mouth, rather than university-trained physicians, who ignored all diseases of the teeth. Subsequent to this publication, other surgeons published texts incorporating aspects of dental treatment.

By the 1700s in France, a number of surgeons were restricting their practice to dentistry, and in 1728 a leading Parisian surgeon, Pierre Fauchard, gathered together all that was then known about dentistry in a monumental book, *The Surgeon Dentist, or Treatise on the Teeth*. In it he discussed and described all facets of diagnosis and treatment of dental diseases, including orthodontics, prosthetics, periodontal diseases, and oral surgery. Fauchard effectively separated dentistry from the larger field of surgery and thus established dentistry as its own profession. Fauchard is known today as the father of modern dentistry. Other surgeons in Germany and France, who made notable contributions to the field of dentistry, readily followed his lead.

English dentistry did not advance as far as French dentistry in the 18th century. The guild that had united the barbers and surgeons was dissolved in 1745, with the surgeons going their own way. Some barbers continued their dental ministrations and were designated "tooth drawers." A second group, as a result of the French influence, referred to themselves as "dentists," while those who did all manner of dentistry were called "operators for the teeth." The first English book on dentistry, *The Operator for the Teeth*, by Englishman Charles Allen, was published in 1685; however, no other works on English dentistry were published until Thomas Berdmore, dentist to King George III, published his treatise on dental disorders and deformities, in 1768. In 1771 English surgeon John Hunter, famed as the father of modern surgery, published *The Natural History of the Human Teeth*, an outstanding text on dental anatomy. Hunter also pioneered the transplantation of teeth from one individual to another, and, because of his tremendous reputation, this practice was widely adopted. Although tooth transplantation between individuals did not prove successful, it was nevertheless the first attempt to transplant human tissue from one person to another. In 1806 English dentist Joseph Fox, who served on the staff of Guy's Hospital in London, offered the first observations on what is today recognized as the "rejection phenomenon" of transplants.

#### Dentistry in 18th- and 19th-century America

The beginnings of dentistry in the United States came in the 1630s with the settlers of the Massachusetts Bay Colony, who were accompanied by barber-surgeons. One of the first dentists in America was English surgeon and dentist John Baker, who settled in Boston in 1763. Other immigrants to follow included Robert Wooffendale, who emigrated from England in 1766 and practiced in New York City, and Jacques Gardette, who moved from France in 1778, eventually settling in Philadelphia. In early colonial America, dental care was also rendered by artisans such as ivory turners. One such artisan was Isaac Greenwood, who began practicing dentistry in 1779 and is considered to be the first American-born dentist. Four of his six sons became dentists. The most prominent, John Greenwood, served as George Washington's dentist. Other craftsmen performed a variety of dental services, the most well known being Paul Revere, who practiced dentistry for seven years in Boston. The first book on dentistry to be published in the United States appeared in 1801 and was written by Richard Cortland Skinner, a young immigrant from England.

By the first quarter of the 19th century, the United States had become the leading centre in the world for dental developments. From 1839 to 1840 three major events in dental practice facilitated the establishment of dentistry as a true profession. In 1839 the first dental journal, the *American Journal of Dental Science*, was launched; in 1840 the first dental school, the Baltimore College of Dental Surgery, was established; and in 1840 the first national society of dentists, the American Society of Dental Surgeons, was founded in New York City.



*Horace Wells*

Great new advances in the field came about very quickly at this time. In 1844 American dentist Horace Wells discovered the anesthetic properties of nitrous oxide, which he promptly

began using while performing tooth extractions. In 1846 another American dentist, William Thomas Green Morton of Boston, successfully demonstrated in public the effectiveness of ether anesthesia. Because Wells's own public demonstration prior to Morton's was unsuccessful, a controversy erupted over who deserved credit for the remarkable discovery of anesthesia. However, the two major health organizations in the United States—the American Dental Association and the American Medical Association—voted in favour of Horace Wells in 1864 and 1870, respectively.

Numerous advances in equipment, materials, and techniques followed one upon the other. In 1864 vulcanized rubber was introduced as a substitute for difficult and costly gold dentures, allowing dentists to supply dentures at a lower cost. The introduction of a foot-treadle drill in 1871 by American dentist James Beall Morrison of Missouri supplanted awkward handheld drills and gave dentists the ability to create intricate and aesthetic restorations.

New dental schools were being established in many parts of the nation. The first dental school to be affiliated with a university was that at Harvard University in 1867. Nevertheless, most dentists were still being trained by a system of preceptorship with an established dentist. The beginning of licensure in the United States came about in 1868, with the states of New York, Ohio, and Kentucky leading the way.

In 1890 American dentist Willoughby Dayton Miller published *The Micro-organisms of the Human Mouth*, in which he proposed the theory that dental caries were the result of bacterial activity. Miller's publication led to a tremendous wave of interest in oral hygiene. In 1913 American dentist Alfred C. Fones opened the Fones Clinic for Dental Hygienists in Bridgeport, Conn., the first establishment for formal training, at the college level, of dental hygienists.

Dentistry in 19th-century Europe



*dentures*

In the 19th century in Europe, several technological developments were taking place. Chief among these developments was the introduction of porcelain teeth for dentures by Italian dentist Giuseppe Fonzi. Fonzi's porcelain teeth provided an appealing alternative to traditional tooth replacement with the repugnant teeth from corpses.



In Britain, dentistry was also coming of age. In 1856 English dentist Sir John Tomes led the formation of the first dental organization in England, the Odontological Society. It was through the activity of this group that the Royal Dental Hospital of London was established in 1858. In opposition to the Odontological Society, a group of dental professionals formed the College of Dentists of England in 1857, seeking independence from the Royal College of Surgeons, which influenced the proceedings of the Odontological Society. The College of Dentists of England established the Metropolitan School of Dental Science, the forerunner of the University College Hospital Dental School. In 1878 the passage of the Dentists Act, which put dentistry under the General Medical Council, led to the authorization and formation of the Dental Register, a precursor to ultimate licensure that prescribed a curriculum for the training of dentists. This system remained in effect until 1921, when new laws provided for stricter requirements for examination and licensure. In 1880 the British Dental Association was established; it remains the most important dental organization in the United Kingdom.

Advances in dentistry in the 20th century



*Teeth whitening*

In 20th-century America, advances occurred in all aspects of dentistry. Frederick McKay, a young American dentist practicing in Colorado, observed a condition of mottling of his patients' teeth, in which there was an almost total absence of decay. Following years of research, McKay and others were able to show that this was due to the presence in the drinking water of high amounts of naturally occurring fluoride, which protects teeth against decay. As a result, public health officials established measures to add fluoride to public water supplies in communities around the United States. Since fluoridation was initiated in 1945, dental caries in children have decreased by more than 50 percent.

In 1896 American dentist Charles Edmund Kells introduced X-ray technology in dentistry and thereby ushered in an era of accurate diagnosis of dental ailments. In addition, in the late 19th and early 20th centuries, American dental pathologist Greene Vardiman Black (sometimes called the father of modern dentistry, although this title is shared with Fauchard) standardized the instruments and restorative materials used by dentists. In 1903 American dentist Charles Land introduced the use of porcelain in crowns, which led to a new era of aesthetic dentistry. In 1907 American dentist William Taggart introduced a precision casting machine that allowed dentists to create gold restorations of great accuracy with a minimum of tooth removal. In 1913 American dentist Edwin J. Greenfield demonstrated the first modern and truly functional dental

implant, paving the way for today's highly successful implant dentistry. The introduction in 1953 of the first commercially successful water-driven turbine drill, developed by American dentist Robert Nelson, led the way to the high-speed dental drill. The Borden air-turbine drill, introduced in 1957 and today used universally, reaches speeds of up to 400,000 revolutions per minute and allows for greater accuracy and control by the dentist and greater comfort of the patient.

Numerous research projects into dental diseases and their treatment are carried out at the U.S. National Institute of Dental and Craniofacial Research in Bethesda, Md., a component of the National Institutes of Health. The work done at such institutes promises a future in which new materials and new methods of treatment greatly diminish oral and dental disease.

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