

Information about Your Teeth

Haywards Heath & District Probus Club



History

Dentistry is one of the oldest of all medical professions, dating back to 7000 BC with the Indus Valley Civilisation* or even earlier to prehistoric man. But, it wasn't until 5000 BC that descriptions related to dentistry and tooth decay appeared. Dentistry is thought to have been the first specialisation in medicine.

Dental disease has plagued humanity throughout history. Our ancestors relied on what was available to provide the tools and treatments based on their understanding. While our forefathers may not have understood the cause of their dental pain, they managed to find ways to alleviate discomfort, fight infection, and restore the function of their teeth. Research indicates that dental drilling dates back 9,000 years, proving prehistoric man's ingenuity. Primitive dentists drilled nearly perfect holes into teeth of live patients between 5500 and 7000 BC, shown by recent carbon dating of at least nine skulls with 11 drill holes found in a graveyard in Pakistan. It is thought that a small bow was used to drive flint drill tips into patients' teeth, a method that probably evolved from intricate ornamental bead drilling. Skeletal remains from Mehgarh (now in Pakistan) dated to that time show evidence of teeth having been drilled with flint tools to remove decay, a method found to have been "surprisingly effective".**

* A Bronze Age civilisation in the northwestern regions of South Asia, lasting from 3300 BCE to 1300 BCE, and in its mature form from 2600 BCE to 1900 BCE.

** See: <http://news.bbc.co.uk/1/hi/sci/tech/4882968.stm>



Picture Credit: "dentist's chair" by Dr Sam C is licensed under CC BY-NC-SA 2.0

Some ancient cultures blamed pain and disease on evil spirits. People commonly believed that tooth decay was caused by worms burrowing holes in teeth throughout much of recorded history. The hypothesis originated from the observations of how worms burrowed holes in wood. The theory of tooth worms dates back as far as 5000 BC.

In ancient Greece, Hippocrates and Aristotle wrote about dentistry, specifically about treating teeth - including the eruption pattern of teeth, treating decayed teeth and gum disease, extracting teeth with forceps, and using wires to stabilise loose teeth and fractured jaws.

It was not unusual for the poor to have healthier teeth than the rich due to the differences in their diets. Whilst the rich could afford sugar, the poor could not.

It took a long time for a book to be published devoted entirely to dentistry: *The Little Medicinal Book for All Kinds of Diseases and Infirmities of the Teeth* was published in Germany in 1530. It was written for barbers and surgeons who treated the mouth - it covered practical topics such as oral hygiene, tooth extraction, drilling teeth, and placement of gold fillings.

Caution: No advice is implied or given in articles published by us. This guide is for general interest only - and should never be used as a substitute for obtaining advice from your doctor, dentist or other qualified clinician/medical practitioner. The facts are believed to be correct as at the date of publication, but there may be certain errors and omissions for which we cannot be responsible. The hyperlinks were valid at the date of publication.

Information about Your Teeth

Haywards Heath & District Probus Club

Defining the Profession

Historically, dental extractions have been used to treat a variety of illnesses. During the Middle Ages and throughout the 19th century, dentistry was not a profession in itself - often, dental procedures were performed by barbers or general physicians.

In the 14th century, Guy de Chauliac most probably invented the dental pelican (so-named as it resembled a pelican's beak) used to perform dental extractions until the late 18th century. The pelican was replaced by the dental key, which in turn, was replaced by modern forceps in the 19th century.

Instruments used for dental extractions date back several centuries. Blacksmith's tongs or pliers were used for extractions. Barbers usually limited their oral work to teeth extraction to alleviate pain and solving associated chronic tooth infection. Sometimes, it didn't work to plan - ever-present was the danger of infection, and a few patients bled to death. One estimate suggests that one death in ten in London in the 1660s was linked in one way or another to toothache.

By the 1700s, dentistry had become a more defined profession. In 1723, Pierre Fauchard, the French surgeon credited as the Father of Modern Dentistry, published his influential book, *The Surgeon Dentist, a Treatise on Teeth*, which for the first time defined a comprehensive system to care for and treat teeth. Fauchard introduced the idea of dental fillings and the use of dental prosthesis, and he identified that the acids from sugar and the like led to tooth decay. Fauchard was the pioneer of dental prostheses, and he invented many methods to replace lost teeth. He suggested that substitutes could be made from carved blocks of ivory or bone. He also introduced dental braces, initially made of gold, and discovered that the teeth position could be corrected as the teeth would follow the pattern of the wires. Waxed linen or silk threads were usually employed to fasten the braces. But long before Fauchard's time, Ancient Egyptians crafted dental bridges to replace missing teeth and reattached lost teeth (either human or animal) to adjacent teeth with gold or silver wire.

Toothpaste

Egyptians are believed to have started using a paste to clean their teeth around 5000 BC - before toothbrushes were invented. Ancient Greeks and Romans are known to have used toothpaste, and people in China and India first used toothpaste around 500 BC.

Like today, ancient toothpaste was used to whiten teeth, freshen breath, and clean teeth and gums, but the materials were more abrasive and not as hygienic. Some ingredients of ancient toothpaste included ground-up ox hooves' ashes, burnt eggshells, and pumice. Ancient China used a variety of toothpaste ingredients over time, such as ginseng, herbal mints, and salt. Ancient Greeks and Romans' toothpaste ingredients included crushed bones, oyster shells, charcoal, and tree bark.

The development of toothpaste that is comparable with what we use today started in the 1800s. Before the 1850s, toothpaste was a powder. Early versions in the 1850s contained soap or chalk. Betel nut was included in toothpaste in England around the 1800s too. In the 1860s, some homemade toothpaste used ground charcoal, similar to ancient Greek versions.

By 1873, Colgate saw an opportunity and mass-produced the first toothpaste in jars. Mass-produced toothbrushes followed a few years later. Through 1945, toothpaste contained soap. After 1945, toothpaste manufacturers replaced soap with other ingredients to make toothpaste a smoother paste with ingredients found in present-day toothpaste. Manufacturers and dentists realised abrasive toothpaste ingredients could wear away or damage enamel, so toothpastes with very low abrasiveness were also developed. Toothpaste today typically contains fluoride, colouring, flavouring, sweetener, and ingredients that make the toothpaste smooth, foam and stay moist.

Source: <https://www.colgate.com/en-us/oral-health/brushing-and-flossing/history-of-toothbrushes-and-toothpastes>



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Information about Your Teeth

Haywards Heath & District Probus Club



Toothbrushes

Most historians agree ancient Babylonians and Egyptians created the first 'toothbrushes' from frayed twigs between 3500-3000 BC. The Chinese are believed to have invented the first natural bristle toothbrush in the 1400s, using wild hog's hair for the bristles and bone or bamboo for the handles. These toothbrushes were taken to Europe, and this design was adapted using horsehairs, which many Europeans preferred. Other models in Europe used feathers.

Despite its long history in China, it took many centuries for the bristle toothbrush to arrive in Europe. During this time, Europeans generally cleaned their teeth by rubbing them with rags rolled in salt or soot. An English rag merchant named William Addis is usually credited with inventing the modern toothbrush in 1780. By 1840 the Addis company employed 60 workers and produced four models of toothbrushes: for Gentlemen, Ladies, Children and Tom Thumb. The company *Wisdom Toothbrush/Addis Housewares* still exists today.

Source: Museum of Everyday Life, [HERE](#).

Tomlinson Moseley first produced the earliest example of an electric toothbrush. Sold as the *Motodent*, a patent was filed by his company in December 1937. In Switzerland in 1954, Dr Philippe Guy Woog invented the *Broxodent*. His device was plugged into a standard wall outlet and ran on line voltage. Electric toothbrushes were initially created for patients with limited motor skills and orthodontic patients (such as those with braces).

The first ultrasonic toothbrush, initially called the *Ultima* and later the *Ultrasonex*, was patented in the US in 1992, the same year the FDA gave it approval for daily home use. In the beginning, the *Ultima* worked only on ultrasound, but a few years later, a motor was added to give the *Ultrasonex* brush additional sonic vibration. Today, several ultrasonic toothbrushes simultaneously provide both ultrasound and sonic vibration.

Source: Wikipedia, [HERE](#).

Information about Your Teeth

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Information from the NHS

Based on the information at: <https://www.nhs.uk/live-well/healthy-body/dental-treatments/> © Crown copyright therein is duly acknowledged

The following is a guide to the main treatments carried out by dentists. Some are readily available on the NHS, while some may only be available on the NHS in certain circumstances. As with glasses and prescription costs, you have to contribute towards the cost of your NHS dental treatment.

The cost depends on the type of treatment and to which cost band the treatment applies. Except for teeth whitening, implants and veneers, the treatments below are usually available on the NHS. It's always best to ask your dentist whether the treatment they're recommending is available on the NHS and how much it'll cost before you go ahead. Find out more about NHS dental charges [HERE](#).

Bridges

A bridge is a fixed replacement for a missing tooth or teeth. It's made by taking an impression of the surrounding teeth, which will eventually support the bridge. A bridge is usually created from precious metal and porcelain and will be fixed in your mouth (unlike dentures, which can be removed).

Crowns

A crown is a type of cap that completely covers a natural tooth. It's made from either metal or porcelain and metal and is fixed in your mouth. Crowns can be fitted where a tooth has broken, decayed or been damaged, or just to make a tooth look better. To fit a crown, the old tooth will need to be drilled down, so it's like a small peg on which the crown will be fixed.

Fillings

Fillings are used to repair a hole in a tooth caused by decay. The most common type of filling is an amalgam, made from a mixture of metals. Your dentist will offer the most appropriate type of filling according to your clinical needs. This includes white fillings, if appropriate.

Root canal treatment

Root canal treatment (also called endodontics) tackles infection at the centre of a tooth (the root canal system). When the blood or nerve supply of the tooth has become infected, the infection will spread, and the tooth may need to be taken out if root canal treatment isn't carried out. During treatment, the infection is removed from inside the root canal system, the root canal is filled, and the tooth is sealed with a filling or crown to stop it from becoming infected again. Root canal treatment usually requires 2 or 3 visits to your dentist. Read more about root canal treatment [HERE](#).

Scale and polish

With this procedure, your teeth are professionally cleaned by the dental hygienist. It involves carefully removing the deposits that have built up on your teeth (tartar).

Braces

Braces (orthodontic treatment) straighten or move teeth to improve the appearance of the teeth and how they work. Braces can be removable, so you can take them out and clean them, or fixed, so they're stuck to your teeth, and you can't take them out. They can be made of metal, plastic or ceramic. Invisible braces are made of a clear plastic. Braces are available on the NHS for children and, occasionally, for adults, depending on the clinical need. Read more about braces [HERE](#).

Wisdom tooth removal

The wisdom teeth grow at the back of your gums and are the last teeth to come through, usually in your late teens or early twenties. Most people have four wisdom teeth, one in each corner, top and bottom. Wisdom teeth can sometimes emerge at an angle or get stuck and only emerge partially. Wisdom teeth that grow through in this way are known as impacted. Impacted wisdom teeth can be removed on the NHS. Your dentist may perform the procedure, or they may refer you to a dentist with a special interest or a hospital's oral and maxillofacial unit.

Information about Your Teeth

Haywards Heath & District Probus Club

You'll usually have to pay a charge for wisdom teeth removal. If you're referred to a hospital for NHS treatment, you won't have to pay a charge. Your dentist can also refer you for private wisdom teeth treatment if you wish. Find out more about wisdom tooth removal [HERE](#).

Dental implants

Implants are a fixed alternative to removable dentures. They may be the only option if the loss of teeth has caused the mouth to shrink, so it can no longer support dentures. You can use implants to replace just a single tooth or several teeth. To fit an implant, titanium screws are drilled into the jaw bone to support a crown, bridge or denture. Replacement parts take time to prepare. This is to ensure that they fit your mouth and other teeth properly. This means they may not be available on your first visit to the dentist. Implants are usually only available privately and are expensive. They're sometimes available on the NHS for patients who can't wear dentures or whose face and teeth have been damaged, such as people who have had mouth cancer or an accident that's knocked a tooth out.

Dentures or false teeth

More commonly known as false teeth, dentures are fitted to replace natural teeth. A *full set* is used to replace all your teeth. A *part set* is used to replace one or more missing teeth. Dentures are custom-made using impressions (mouldings) from your gums. They're usually made from metal or plastic. They're removable, so you can clean them, although part dentures can be brushed simultaneously with your other teeth.

Dentures are important if you lose your natural teeth, as losing your teeth makes it difficult to chew your food, which will adversely affect your diet and may cause your facial muscles to sag. Read more about [dentures](#) and [false teeth](#).

Broken or knocked-out teeth

It's common to break, chip or knock out a tooth. If the tooth is just chipped, make a non-emergency dental appointment to have it smoothed down and filled or have a crown.

If the tooth has been knocked out or is badly broken, you should see a dentist immediately. Your dentist may fit a denture or bridge. If you need an implant, you'll be referred to a dental hospital. Treatment of whatever type can be provided by an NHS dentist and the cost covered on the NHS. Read more about [broken teeth](#) or [knocked-out teeth](#).

Teeth whitening

Teeth whitening involves bleaching your teeth to make them a lighter colour. Teeth whitening can't make your teeth brilliant white, but it can lighten the existing colour by several shades. Standard teeth whitening involves several visits to the dentist, plus sessions at home wearing a mouthguard containing bleaching gel. The whole process takes a couple of months. A newer procedure called laser whitening or power whitening is done at the dentist's surgery and takes about an hour.

Teeth whitening is cosmetic and therefore generally only available privately. It's occasionally available on the NHS if you have a clinical need – for example, to whiten a tooth that's gone black because the nerve has died. Read more about teeth whitening [HERE](#).

Dental veneers

Veneers are new facings for teeth that disguise a discoloured (rather than a damaged) tooth. To fit a veneer, the front of the tooth is drilled away a little, an impression is taken, and a thin layer of porcelain is fitted over the front of the tooth (similar to how a false fingernail is applied). Veneers are generally only available privately, unless you can show a clinical need for them.

Read answers to the most common questions about dentists and dental charges [HERE](#).

Information about Your Teeth

Haywards Heath & District Probud Club

Recent Dentistry Advances

The Heartland Blog ([HERE](#)) nicely summarises some of these dental advances that have happened over the past ten years:

- **Gum Disease Treatment:** Over the past few years, gum disease treatment has started to include regenerative procedures. Bone grafts, membranes and proteins can now stimulate tissue growth that can regenerate bone and tissue and is beneficial in fighting off gum disease.
- **Lasers to detect Cavities:** While the explorer (the instrument dentists use to poke around in your mouth during a checkup) used to be how cavities were always detected, a laser can now do the job as well. A diode laser is the choice for some dentists when searching for tooth decay and cavities in patients.
- **Longer-Lasting Dental Implants:** Dental implants have become more common in recent years. They've also become more dependable. Dental implants often used to fail, but now they have a much higher success rate (about 95%). The typical dental implant will now last over 15 years.
- **More Effective Bonding and Filling Materials:** Most bonding is done now with resin. Resin is shinier, longer-lasting, and easier to blend with a tooth's natural colour.
- **Intra-oral Camera:** This camera is used to better take precise pictures of a patient's mouth in hard-to-see areas, allowing the dentist to assess a patient's oral health better.
- **Thinner Veneers:** With new materials, veneers are now thinner while being just as strong. Less tooth surface is removed when a thinner veneer is added to the front of a tooth surface - meaning more of the tooth can be retained.
- **Nitrous Oxide and Oral Sedation:** Nitrous oxide and oral sedation are used more often because of their effectiveness in calming fearful or anxious patients.
- **CAD/CAM Technology:** This technology makes getting crowns and bridges simpler. Instead of a dentist making a tooth mould for a crown procedure, this technology can take a picture of a tooth and relay the image to a computer to instantly start creating the crown.
- **Digital X-Rays:** Digital x-rays offer a way to capture dental images and display the image onto a computer screen. Digital x-rays also lessen the exposure of radiation compared to traditional x-rays. Digital X-rays also help *endodontists* (dentists specialising in root canals) to see if they have performed the procedure correctly.
- **Air Abrasion:** Air abrasion is used as an alternative to a dental drill for smaller cavities. Air abrasion can treat these cavities through a blast of pellets consisting of aluminium oxide and air without anaesthetic.
- **Better bone grafting techniques:** With implants, bone grafting is necessary when there is a lack of bone. For an implant to *osseointegrate* (bone grown into a metal implant), it needs to be surrounded by a healthy quantity of bone. To achieve an adequate width and height of bone, various bone grafting techniques have been developed.

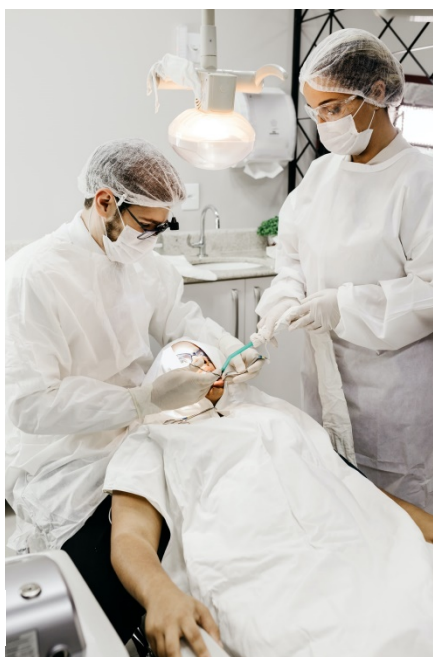


Photo by [Jonathan Borba](#) on [Unsplash](#)

Information about Your Teeth

Haywards Heath & District Probus Club

There are other new technologies already in use, such as:

- **VELscope:** This is a special type of light that a dentist will shine in a patient's mouth to detect any abnormalities. It can see early forms of cancer or disease during an oral cancer screening.
- **Invisalign:** Clear, practically invisible braces that can gently straighten your teeth without the hassle of wearing heavy, metal braces.
- **Cerec One-Visit Crowns:** Unlike traditional crowns, CEREC crowns take just one visit to your dentist. For pros and cons compared to traditional crowns, see [HERE](#).
- **Zoom! Whitening:** A new, state-of-the-art whitening treatment that gives patients fast and easy results making a significant change in their smile and making their teeth up to eight shades whiter.

The Future

One of the truisms of life is that no one likes to go to the dentist despite knowing how important oral health is and how strongly it is connected to our overall health and well-being. Medical Futurist ([HERE](#)) says that: '*an armada of new technologies from virtual reality through artificial intelligence (AI) to CRISPR will revolutionise dentistry and our whole attitude towards oral health in the future.*'

As with **other medical specialities**, disruptive innovations will impact how dentistry will be practised in future and how patients will take care of themselves. You will be able to get your 3D-printed prosthesis in an hour instead of 4-5 sessions at the dentist. How about having a tele-dentist consultation? Or being able to grow new teeth at the age of 80? Take a look at the following selection of what the future holds:

- **Artificial Intelligence:** Already, dentists **employ software** to gain insights in making clinical decisions. These will develop further to integrate AI algorithms to enable clinicians to find the best modalities for their patients.
- **Smart Toothbrushes:** As smart devices proliferate, smart toothbrushes are ready to invade your mouth - checking your oral hygiene and preventing plaque and cavities. Look at the **Kolibree smart electric toothbrush** and Philips' **Sonicare smart toothbrush**, plus several others **on the market** from companies like Colgate and Oral-B.
- **Tele-Dentistry:** Services offered by the likes of **The Teledenists** and **MouthWatch** provide easier and cheaper access to oral and dental care.
- **Computer-assisted design and 3D printing:** 3D printing has the potential to print medicines, prosthetics and even organ replicas. It is already present in the dental world - for example when a patient needs a crown, a dentist must make a mould of the tooth, fashion a temporary crown, and then wait for the dental laboratory to make a permanent one. With a 3D printer doing the hard work, dental labs eliminate the bottleneck of manual modelling and let the business grow. **Stratasys**, **Envisiontech** or **FormLabs** offer such high-tech solutions for dental labs.
- **Intra-oral Cameras:** Sometimes, the dentist cannot see what they want no matter how wide you open your mouth. The advent of intra-oral cameras can remedy this exact problem. **MouthWatch**, **Dürrdental** and **Carestream Dental** are **some of the many companies** to have launched these cameras on the market.
- **Regenerative Dentistry:** The field of regenerative dentistry challenges the notion that some of our teeth fail either due to age, misuse or damage. Researchers from the Universities of Nottingham and Harvard have **developed dental fillings** that allow teeth to heal themselves. These fillings stimulate stem cells to promote the growth of dentin, the main constituent of our teeth, enabling patients to regrow damaged teeth.
- **CRISPR:** This is a ground-breaking genome-editing method, but researchers have recently discovered its immense potential. CRISPR (which stands for *Clustered Regularly Interspaced Short Palindromic Repeats*) is a technology that can be used to edit genes. Chinese researchers **are conducting studies** with the technology to isolate and switch off oral cancer-associated genes. Other researchers are **using CRISPR** to alter the functioning of bacteria responsible for plaque formation.

Source acknowledgement: <https://medicalfuturist.com/medical-specialties-with-the-biggest-potential-in-the-future/>

Timeline from the 16th to the early 21st century

- **1530** Artzney Buchlein wrote the first dentistry book.
- **1563** Bartholomew Eustachius published the first accurate book on dental anatomy, *Libellus de dentibus*.
- **1683** Antony van Leeuwenhoek identified oral bacteria using a microscope.
- **1685** The first dental book was written in English - *The Operator for the teeth* by Charles Allen was published.
- **1723** Pierre Fauchard published *Le Chirurgien dentiste*.
- **1764** First lectures on the teeth at the Royal College of Surgeons, Edinburgh by James Rae.
- **1771** John Hunter published *The natural history of human teeth* - giving a scientific basis to dental anatomy.
- **1780** William Addis manufactured the first modern toothbrush.
- **Late 1790s** Nitrous oxide was first used to minimise the pain of dentistry.
- **1820** Claudius Ash established his dental manufacturing company in London.
- **1831** James Snell designed the first reclining dental chair.
- **The 1830s-1890s** The Amalgam War, with recurring conflict and controversy generated over the use of amalgam mercury as a filling material.
- **1843** First British Dental Journal was published.
- **1844** Horace Wells demonstrated nitrous oxide as an anaesthetic.
- **1846** W T G Morton demonstrated ether as an anaesthetic.
- **1846** James Robinson carried out the first tooth extraction under ether in the UK.
- **1851** Vulcanite, invented by Charles Goodyear, began to be used for denture bases
- **1858** Dental Hospital of London opened, the first clinical training establishment for dentists in Britain. Medical Registration Act permitted the College of Surgeons to grant licences in dental surgery
- **1859** Opening of first dental schools in Britain.
- **1860** First licences in dental surgery awarded by the Royal College of Surgeons of England.
- **1871** James Beall Morrison invented the foot treadle engine. A tooth coloured filling material, silicate cement was introduced.
- **1878** First British Dentists Act .
- **1879** First Dental Register was established.
- **1880** British Dental Association was founded.
- **1884** Cocaine was introduced as a local anaesthetic by Carl Koller.
- **1890** W D Miller formulated his 'chemico parasitic' theory of caries (commonly called cavities) in Micro-organisms of the human mouth.
- **1896** G V Black establishes the principles of cavity preparation.
- **1900** Federation Dentaire Internationale was founded.
- **1901** University of Birmingham awarded the first dental degree in Britain.
- **Early 1900s** Novocaine was introduced as a local anaesthetic by Alfred Einhorn.
- **1907** George Cunningham established the Cambridge School Children's Dental Institute.
- **1907** George Northcroft established the first orthodontic study group in the UK.
- **1921** Dentists Act: only registered dentists were permitted to practice.
- **Circa 1932** Synthetic resins were introduced for denture bases.
- **1947** Founding of the Faculty of Dental Surgery within the Royal College of Surgeons of England.
- **1948** The NHS was introduced.
- **1956** Dentists Act: General Dental Council established.
- **1957** High-speed turbine handpiece introduced.
- **1958** Fluoride toothpaste was first marketed in Britain.
- **1985** Water Fluoridation Act passed.
- **2006** The new General Dental Services NHS contract was introduced.

Extracted from: <https://bda.org/museum/the-story-of-dentistry/timeline>

Information about Your Teeth

Haywards Heath & District Probus Club

Sources and Further Reading:

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