The History of Surgery

1

Lydia L. Thurston

Introduction

> "It has been said that there are only two periods in the history of surgery – before Lister and after Lister"
>
> Harvey Graham (1939-)

Surgery has come a long way since the days of Hippocrates when operations were often deemed to be the last resort, and doctors preferred to practice conservative measures before reaching for the knife. The past 2000 years have seen huge paradigm shifts in the theories of science and medicine, and surgery was by no means separated from this. Without the advent of germ theory, the discovery of both asepsis and antibiotics, and the development of anaesthesia, surgery as we know it today would simply not exist. However, surgery did not only have these scientific barriers to deal with, but it also had to overcome millennia of negative publicity surrounding the profession.

Despite these hurdles, the practice of surgery can be traced back as far as pre-historic times, before the advent of written historical records. Indeed, excavations of Ancient Egyptian burial sites have revealed splints made of bark which were used to immobilise a fractured forearm, and ancient tomb paintings reveal the practice of circumcision [3]. The pictures of a variety of surgical instruments inscribed onto the tomb of Kom Ombo, suggest that the repertoire of the Ancient Egyptian surgeon spanned beyond just those two procedures [2] (Fig. 1.1).

The origin of the word surgery comes from the Latin *'chirurgia'*, which in turn comes from the Greek *'cheir-'* and *'ergon'*, literally meaning 'hand' and 'work'. The name itself sets the precedent for the general opinion of the speciality from Antiquity until the eighteenth century. Surgery was thought to be 'handiwork', suitable for craftsmen who might be just as deft at lithotomy as they were at carpentry. The profession had a massive fight on its hands to become recognised as a true partner to medicine.

Ayurveda

> "The patient who has been fed, does not faint, and he who is rendered intoxicated, does not feel the pain of the operation"
>
> Suśruta (c.600 BC)

In Ancient India, around 1500 BC, brotherhoods of priests existed who preached the Sanskrit philosophy of *Veda* ("knowledge"). Vedic writings reveal macro-religious ideas about health and medicine and the worship of individual deities to prevent certain diseases. As well as herbs being used as remedies for illness, some forms of surgery are recorded, such as urinary

L.L. Thurston, MBChB, BA (Hons), DHMSA
Health Education England – Thames Valley,
Warneford Hospital, Oxford, OX3 7JX, UK
e-mail: Lydia.thurston@doctors.org.uk

R.A. Fisher et al. (eds.), *Introduction to Surgery for Students*, DOI 10.1007/978-3-319-43210-6_1

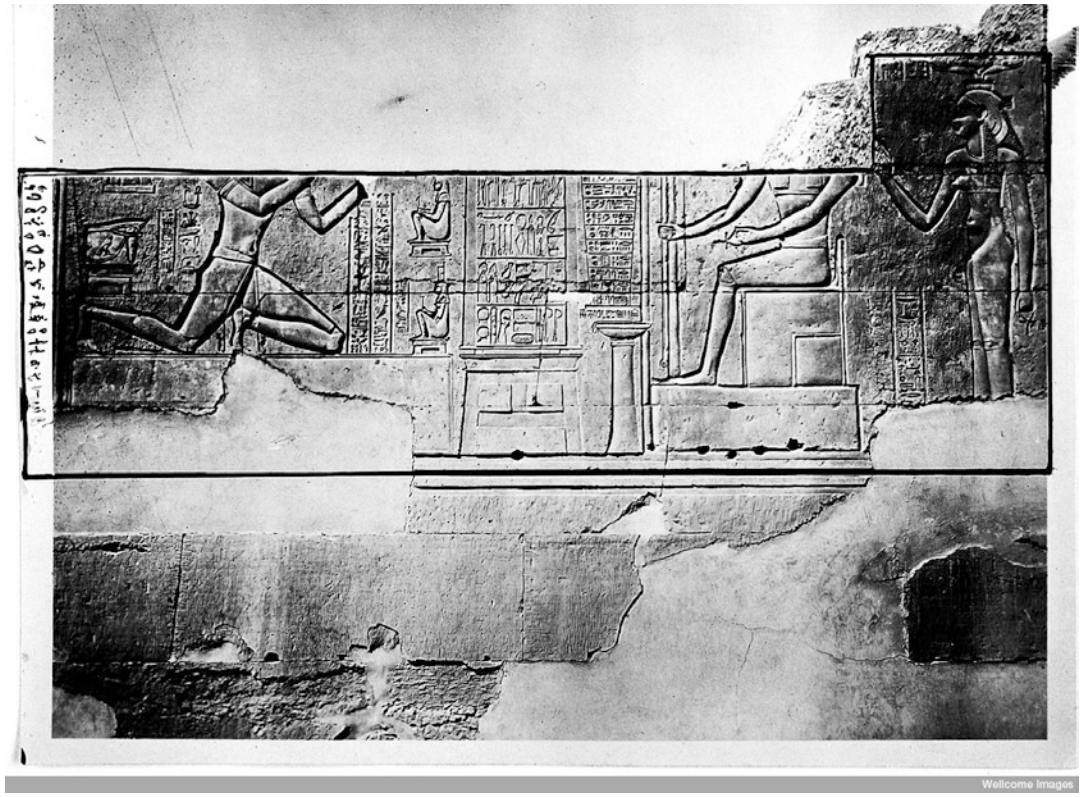

Fig. 1.1 Egyptian surgical instruments – on a bas-relief in the "Birth House" at Kom Ombos, Egypt, B.C. 146 (Wellcome Library, London. Wellcome Images)

catheterisation with reeds to relieve urinary retention, and the cauterisation of wounds to stem bleeding.

Ayurvedic medicine was established hundreds of years later, not long after the birth of Christ. The first and most defining texts of Ayurvedic medicine are the *Caraka Samhita* and the *Suśrutasaṃhitā.* The latter is attributed to Suśruta, a physician who taught surgery and advocated the use of dead animals and vegetables for practising various procedures. In reality, the text has been revised many times, and is unlikely to be written by Suśruta's own hand but is thought to be based on his oral teaching (Fig. 1.2). Surgical procedures discussed in his text include cataract couching and forehead rhinoplasty, whereby he remodels the nose of a patient using skin from their forehead. Over one hundred surgical instruments are described in the *Suśruta*, including details about their manufacture, but unfortunately none of these ancient instruments have survived. One theory is that surgery was given up by caste Brahmins and delegated to other artisan surgeons who continued to practise well into the mid-twentieth century [8].

The Classical Period

> "He who wishes to be a surgeon should go to war"
> Hippocrates (460–371 BC)

Legend has it that Hippocrates (460–371 BC) was born on the island of Cos and was a true descendent of Asclepius, the Greek God of Medicine. As well as being revered as the 'father of modern medicine', Hippocrates' name is also attributed to the Hippocratic Corpus; a body of around sixty medical manuscripts that were actually drawn together around 250 BC, long

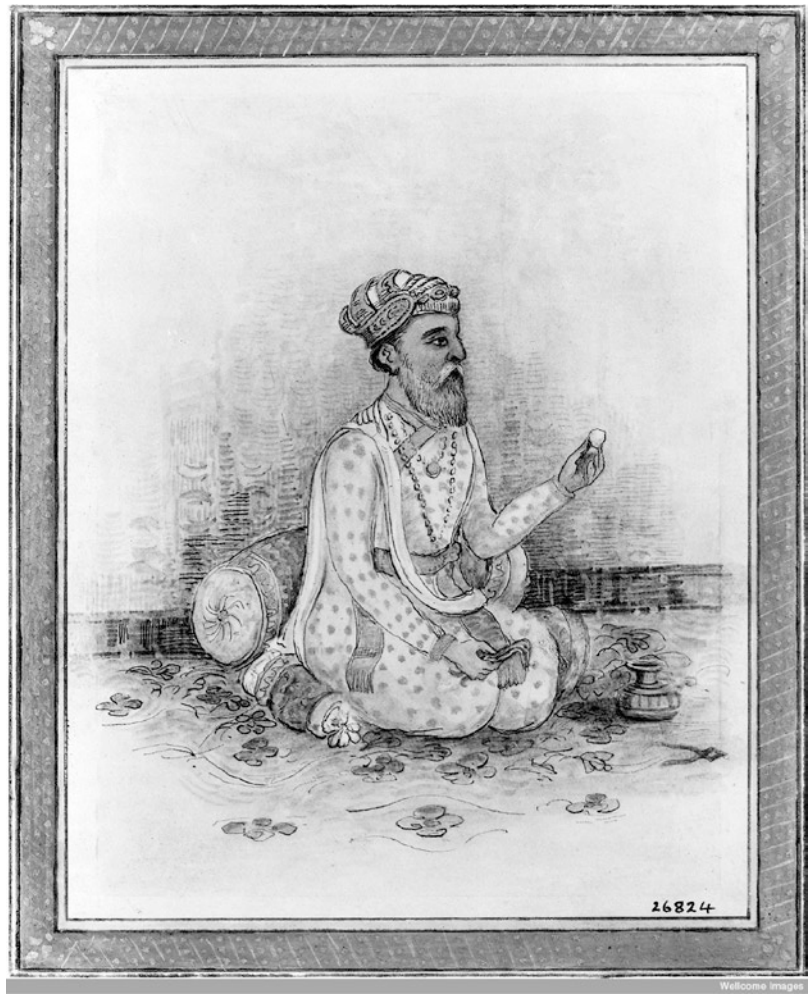

Fig. 1.2 Portrait of Suśruta by H. Solomon (Wellcome Library, London. Wellcome Images)

after Hippocrates' death. How much of the Corpus was actually written by Hippocrates himself is a subject for debate, but nevertheless it formed the foundations of medical knowledge for the next thousand or so years. The Corpus contains some advice on the management of surgical conditions, in particular head injuries, wounds, fractures, bladder stones and gangrenous limbs. However, it mostly advocated conservative medical treatment over 'dangerous' surgical intervention. For example, catheterisation was opted for over lithotomy for bladder stones, and amputation was only performed as a last resort. In fact, the Hippocratic Oath itself seems to forbid the practice of cutting by physicians: "I will not cut, and certainly not those suffering from stone, but I will cede this to men who are practitioners of this activity". However, there has been much discussion about whether this denotes surgery as a whole, or is an early concept of surgical specialism [4].

Hippocratic medical theory was based on *vis medicatrix naturae* ("the healing power of nature") and the balance of the four 'humours', namely phlegm, blood, bile and black bile. The equal distribution of these bodily fluids in the human microcosm was deemed essential for health. Illness struck when there was an imbalance, therefore treatment was focused on maintaining an equilibrium [1].

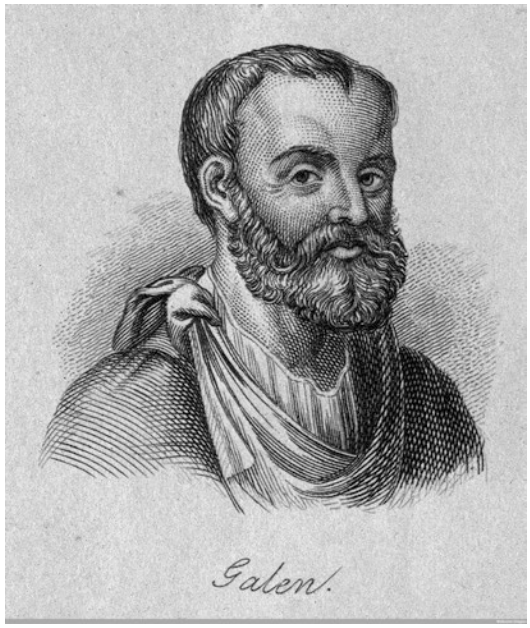

Fig. 1.3 Line engraving of Galen (Wellcome Library, London. Wellcome Images)

A few hundred years later in Ancient Rome, Celsus (25 BC–AD 50) wrote *Artes,* essentially an encyclopaedia of medical and surgical theories. His work is divided into eight books, the last two of which discuss surgical conditions and their treatment. Celsus is the author of the terms *calor, dolor, rubor* and *tumor*, which every doctor is familiar with today as the cardinal signs of inflammation.

Perhaps the most famous physician of the Roman period was Galen (AD 129–c. 216). Born in Pergammon, Galen (Fig. 1.3) conducted his medical studies in Alexandria, before returning to his home city, where he became an expert in trauma surgery by working as a surgeon to the gladiators. He arrived in Rome in AD 162 where he truly made his name. Galen was an avid dissector, and his works formed the basis of anatomical knowledge until the Renaissance period. He wrote almost 350 separate works, all of which were based on Hippocratic medicine and Humoral theory. Surgical reflections are spread throughout some of these, including a description of the removal of nasal polyps [3].

The Medieval Period

> "It is impossible to be a good surgeon if one is not familiar with the foundations and general rules of medicine [and] it is impossible for anyone to be a good physician who is absolutely ignorant of the art of surgery"
>
> Henri de Mondeville (1260–1320)

It would be wrong to discuss medicine in the medieval period without mentioning the developments in medicine and surgery that were taking place in the Middle East. At the time, the Arab World had found itself under a variety of ethnic influences, especially from the Byzantine Empire and the persecuted Syriac-speaking Christians. These groups passed on the principles of medical knowledge, which had mostly been acquired from the teachings of Greek medicine in Alexandria. In the ninth century the Greco-Arabic translation movement got underway, and the majority of Greek medical texts were translated into Arabic; forming the foundations of the development of Islamic medicine. Key figures in this development include the famous Avicenna (d. 1037) (Fig. 1.4), whose *Canon of medicine* (a medical encyclopaedia divided into five books) was hugely successful, and was still used as a textbook in European universities up until the eighteenth century; Ibn al-Nafīs (d. 1288), an Arabic philosopher and physician who discovered the pulmonary transit centuries before Realdo Colombo (1516–1559) and William Harvey (1578–1657); and Al-Rāzī (c. 865–925), a physician who lived and worked in Baghdad and wrote a multitude of treaties on medicine and philosophy [7]. Lists of surgical instruments and operations performed can be found in some surviving Byzantine manuscripts, and al-Rāzī discusses surgical procedures in many of his works. However, there is no evidence that the surgery discussed was actually ever carried out [10].

Fig. 1.4 Portrait of Avicenna (Wellcome Library, London. Wellcome Images)

Albucasis (c. 936–1013) was a Muslim physician who practised in Cordoba, and is recognised for his contribution to surgery, in particular his illustrations of surgical instruments used at the time. He specialised in cautery, 'incisions and perforations', and bone-setting [6].

Significant surgeons in the 'Medieval West' included Henri de Mondeville (1260–1320), Guy de Chauliac (1298–1368) and John of Arderne (1307–1370). Mondeville was born in Normandy and studied in Bologna, before moving back to France. He was a military surgeon to the French royal family and lectured extensively on surgery. He developed a new technique for wound healing; simple bathing of the wound, immediate closure and dry dressings, thus promoting dry healing without suppuration, which had been advocated by Hippocrates. Chauliac wrote the *Chirugia Magna*, an extensive reference in which he tried to portray surgery as a learned art. John of Arderne was an English surgeon who developed a treatment for anal fistulas, performed by placing the patient in the lithotomy position.

In Northern Europe in particular, there remained a wide gulf between surgeons and physicians, and the teaching of surgery was mainly organised on a guild basis. In Paris, a surgeons' organisation was established at the College of St Cosme (1210), with practical training and the opportunity to gain a degree and licence to practise. The Fellowship of Surgeons was founded in London in 1368, and a Company of Barbers in 1376. It wasn't until 1540 that this Company joined with the Guild of Surgeons, forming the Barber-Surgeons Company, which was chartered by Henry VIII (Fig. 1.5).

The Renaissance Period

> "A chirurgien should have three diverse properties in his person… that is to say, a heart as the heart of a lion, his eye like the eyes of a hawk, and his hands as the hands of a woman"
>
> John Halle (1529–1568)

The Renaissance period involved the cultural rebirth of classical ideas and theories, across all academic fields. It was the age of philosophical revival and the celebration of classical works. This resulted in the mass re-translation of original Greek and Latin texts, aided by the recent invention of the printing press (1450) and spurred by the fear that several medical mistranslations had occurred throughout the ages. The resurgence of the classics also spread to the world of art, which celebrated the form of the human body, and sparked interest in anatomy. Galen's *de anatomicus administrandis* ("On the handling of anatomical matter") was discovered anew in 1531, and contained a step-by-step guide on how

Fig. 1.5 King Henry VIII granting a Royal charter to the Barber-Surgeons Company. Wood engraving by H.D. Linton after H. Holbein (Wellcome Library, London. Wellcome Images)

to carry out a dissection. The true father of anatomy in the renaissance however, was Vesalius (1514–1564) (Fig. 1.6). Vesalius was an avid dissector, and believed that true anatomy could only be learnt from cadavers. Although he was a supporter of Galen, he soon discovered through his dissections that there was some discrepancy between the anatomy before him on the table, and that described by Galen. It came to light that Galen had actually carried out all of his dissection on animals, and therefore physicians and surgeons had been learning erroneous anatomy for centuries. This was a momentous event in the history of anatomy and led to the creation of Vesalius' masterpiece *De humani corporis fabrica.* The development of anatomy was essential for the progression of surgery as a specialty, as although it was taught by physicians, the dissection itself was often carried out by surgeons. It was also essential for the understanding of physiology, and led in turn to the most recognised discovery of the pulmonary transit by Colombo (excluding of course Ibn al-Nafīs' discovery in the thirteenth century) and to the discovery of circulation by Harvey.

Despite these developments in the foundations of surgery, the specialty itself did not advance much beyond the battlefield. Minor conditions such as fractures, burns, lacerations and increasingly commonly, gunshot wounds, remained a renaissance surgeon's staple diet. Military surgeons were the reigning experts of this era, such as William Clowes (1556–1643), an active member of the Barber-Surgeons Company and a naval surgeon who was appointed to the British fleet in the Spanish Armada; John Woodall (1556–1643) who was the surgeon to the East India Company and author of the naval surgeon's handbook, *The Surgeon's Mate;* and Richard

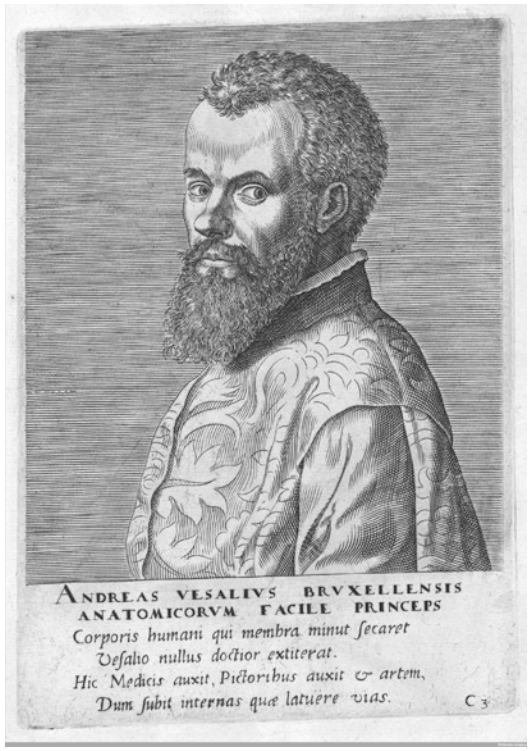

Fig. 1.6 Portrait of Andreas Vesalius 1572 by Phillippe Galle (Wellcome Library, London. Wellcome Images)

Fig. 1.7 Ambroise Paré using the ligature when amputating on the battlefield at the siege of Bramvilliers, 1552. Oil painting by Ernest Board (Wellcome, Library, London. Wellcome Images)

Wiseman (1621–1676), who is known as the 'father of early English surgery'. Wiseman gained his experience in the Civil War and wrote eight treatises on military and naval trauma surgery [8].

Perhaps the most renowned surgeon of this era is the French military surgeon, Ambroise Paré (1510–1590) (Fig. 1.7). Paré started his career at the Hôtel Dieu in Paris, and was later appointed military surgeon in France's campaign against Italy in 1537. During this campaign he made a great discovery on the treatment of gunshot wounds, which had until that point in time been bathed in burning oil. Paré ran out of hot oil, and had to suffice with rose oil, turpentine and egg yolk, which to his great surprise proved to give much better success rates. As well as his work on wound healing, he also introduced the ligature technique to stem bleeding during a limb amputation. Prior to this, hot irons had been used to cauterise the bleeding, and patients had been left with extensive burns, not to forget yet more pain to add to an already agonising procedure (before the advent of anaesthesia). Paré's work became so famous that he was appointed to the service of King Henri II of France, being present as one of his surgeons when the King was fatally wounded in a jousting match in 1559 [5].

Renaissance surgical procedures were mostly simple, routine and principally safe, with wound dressings and blood-letting remaining the most common. There were some attempts at more extreme procedures, such as Gaspare Tagliacozzi's (1545–1599) rhinoplasty technique (Fig. 1.8), which was borrowed from Ayurvedic practice and involved attaching a skin flap from the patient's arm, whilst still attached to their arm, to their nose. The patient had to keep this uncomfortable position for 14 days, until the flap was detached [8].

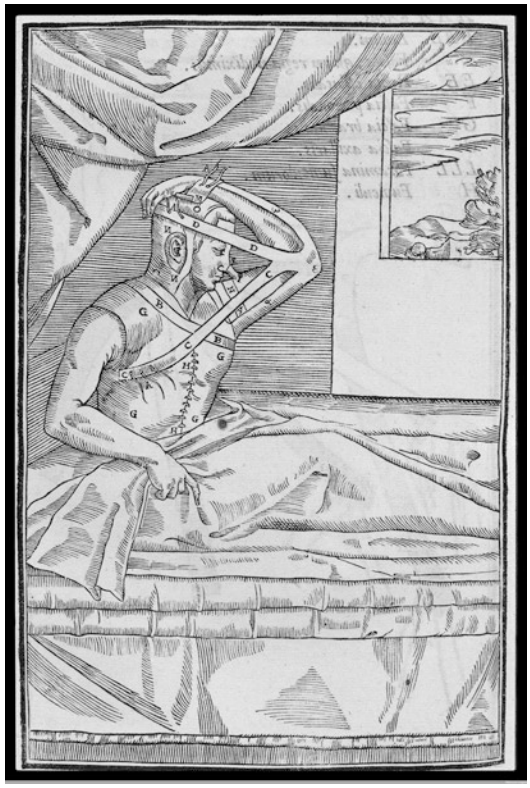

Fig. 1.8 Gaspare Tagliacozzi's rhinoplasty technique 1597 (Wellcome Library, London. Wellcome Images)

The Eighteenth Century

> "I have made many mistakes myself… the best surgeon, like the best general, is he who makes the fewest mistakes"
>
> Astley Paston Cooper (1768–1841)

The eighteenth century covers a period also known as the Age of Enlightenment. The Enlightenment was an era of scientific exploration and discovery, whereby old ideas were challenged, and rationality prevailed. In relation to medicine and surgery, this meant a transition from Hippocrates' age-old humoral theory of medicine to a scientific and observation-based medicine, influenced by the advancement of pathology. This era saw the development of new therapies and treatments such as inoculation and vaccination, as well as the development of new institutions such as hospitals and medical societies as well as the revival of Hippocratic bedside teaching.

There were also some improvements in surgical techniques, such as Jacques de Beaulieu's (1651–1719) lateral cystolithotomy for the treatment of bladder stones, which was quicker and involved less damage to the prostate gland than previous techniques. The method was also adopted by William Cheselden (1688–1752), a London surgeon who worked at St Thomas' Hospital and prided himself on his speed, claiming to be able to remove a bladder stone in under 1 min. Jacques Daviel (1696–1762), a French ophthalmic surgeon, also developed a new technique for cataract removal.

The eighteenth century saw some rise (albeit small) in the standing of surgery, especially in France. The teaching of the subject switched from being apprenticeship-based to being taught in the format of lectures and anatomy demonstrations. In 1724, the College of St Côsme was given permission by King Louis XV to teach surgical courses, which led to the establishment of a surgical school. Perhaps the King's affection for the surgeons had been influenced by his predecessor King Louis XIV, whose anal fistula was successfully operated on by the surgeon C. F. Félix (1650–1703) in 1678. By 1794, medicine and surgery were taught to all French students as a combined subject, thereby putting an end to surgery's venerable struggle for recognition.

Although much of the enlightenment took place in France and Continental Europe, England and Scotland were not far behind. Alexander Munro (1697–1767) was a Scottish surgeon who transformed Edinburgh into a major centre for the teaching of medicine and surgery by the creation of Edinburgh Medical School. Munro was responsible for the training of William Cullen (1710–1790), a naval surgeon who went on to become a Professor of Medicine at Glasgow University and was in turn responsible for the teaching of William Hunter (1718–1783). William Hunter established a successful school of anatomy, first in Covent Garden and then in Piccadilly, where his younger brother, John Hunter (1728–1793) (Fig. 1.9) became a fervent dissector and established himself as the leading surgeon of the eighteenth century. His contribution to the study of anatomy and physiology

Fig. 1.9 John Hunter (1728–1793), surgeon and anatomist. Oil painting after Sir Joshua Reynolds (Wellcome Library, London. Wellcome Images)

helped to increase surgery's professional standing as a scientific discipline. He was also a seasoned, albeit nervous lecturer, teaching the likes of Edward Jenner (1749–1823) who was responsible for the discovery of smallpox vaccination, and Astley Cooper (1768–1841), a surgeon based at Guy's Hospital in London who twice served as President to the Royal College of Surgeons, and was greatly responsible for the passing of the Anatomy Act which allowed legal procurement of cadavers for dissection [8].

The Nineteenth Century

> "If a man came in with a compound fracture, he got erysipelas. It was considered part of hospital life"
>
> George Dock (1860–1951)

The momentous scientific discoveries of the nineteenth century caused a revolution in the world of surgery. This was the age that surgeons had dreamed of for centuries, the age of anaesthesia and antisepsis. The Enlightenment had resulted in the Hospital Movement: the development of large teaching hospitals throughout Europe. These provided the perfect playgrounds for modern surgeons, and operations became shows, open to the public and medical students alike to watch.

Influential surgeons in nineteenth century England included George James Guthrie (1765–1856), a military surgeon who specialised in ophthalmic surgery and the treatment of chest wounds, and who advocated battlefield amputations. In France, there was Dominique Jean Larrey (1766–1842), Napolean's Surgeon General who advocated hypothermia for battlefield amputations, developed the concept of the field hospital, and invented the 'ambulance volante', a horse drawn ambulance used to evacuate casualties from the battlefield (Fig. 1.10). Over the border in Germany, Johan Friedricj Diffenbach (1794–1847), a Professor at the Berlin Charité, developed a technique for cleft palate surgery. Across the pond in America, gynaecological surgery was also developing. Ephraim McDowell (1771–1830) performed the first ever ovariotomy, and James Marion Sims (1813–1883) established a treatment for vesicovaginal fistulas.

Until the nineteenth century, "anaesthesia" was achieved with very limited success using alcohol and opium, and relied on the sheer speed of the surgeon operating: the quicker, the better. In October 1846, William Thomas Green Morton (1819–1868), an American dentist, demonstrated the anaesthetic properties of inhaled ether whilst removing a neck tumour from a patient. The procedure was a success and news of this anaesthetic spread like wildfire, with the London surgeon Robert Liston (1794–1847) successfully amputating a thigh from a patient under the effects of ether, as early as December that same year (Fig. 1.11). Ether was found to be irritating to the lungs, and so when James Simpson (1811–1870) discovered the sleep-inducing effects of chloroform, it was used as a replacement. A key moment in the history of anaesthesia occured when Queen Victoria was given chloroform to help her give birth to Prince Leopold in 1853. The anaesthetic

Fig. 1.10 A model of the 'flying ambulance' invented by Larrey in the 1790s (Wellcome Library, London. Wellcome Images)

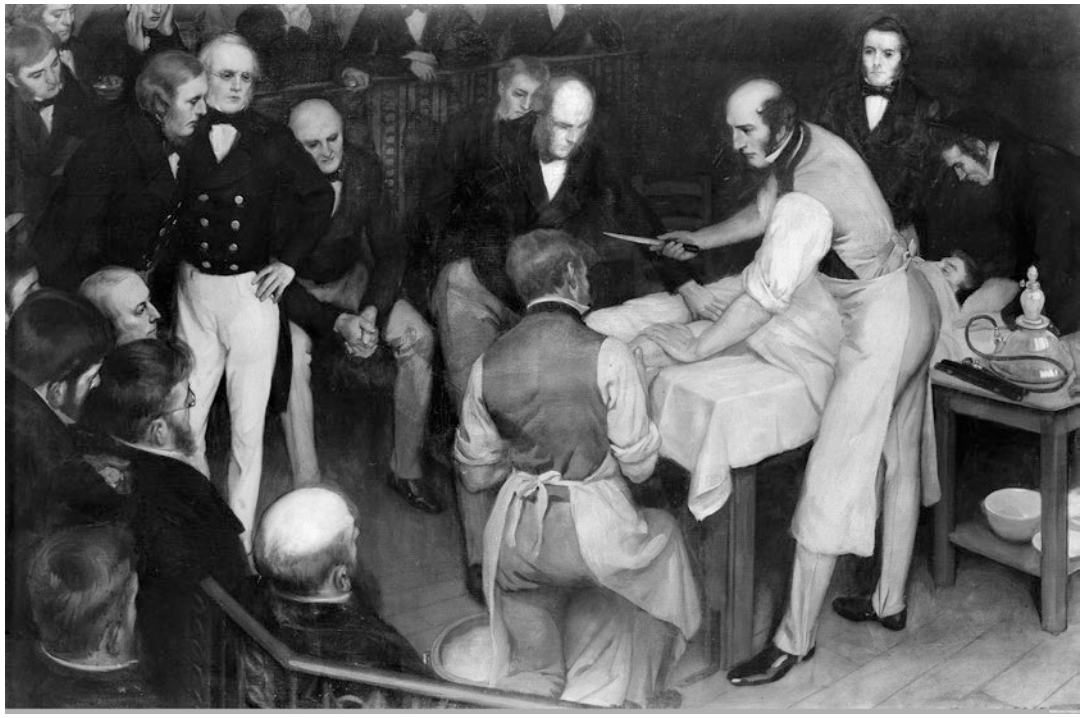

Fig. 1.11 Robert Liston operating, by Ernest Board, circa. 1912 (Wellcome Library, London. Wellcome Images)

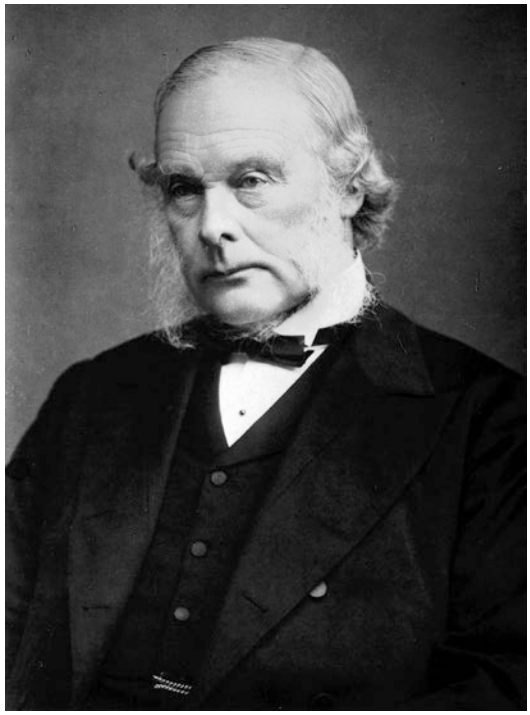

Fig. 1.12 Portrait of The Right Honourable Joseph Lister by Elliot & Fry c.1900 (Wellcome Library, London. Wellcome Images)

was administered by John Snow (1813–1858), and was laced with controversy and public outcry, since women had been giving birth for centuries without the need for pain relief, birth was seen by many Christians as God's punishment for the sin of Eve. The development of local anaesthetic soon followed in 1885, when Carol Koller (1857–1944) succeeded in using cocaine to numb the eye in ophthalmic surgery [11].

Infection was the second major barrier to the development of surgery. At the start of the century, post-operative mortality remained at approximately 40%, largely due to infection. On 16th March 1867, Joseph Lister (1827–1912) published the results of his first antisepsis trial (Fig. 1.12). When Lister dressed eleven cases of compound fractures with his concoction of lint soaked in linseed oil and carbolic acid, none of the patients died. Continuing to use the same technique, Lister found that his death rates post limb amputation dropped significantly from 45.7% without antisepsis, to 15.0% with antisepsis [8].

Lister's antisepsis was initially met with some opposition. His ideas were controversial as they came out before Louis Pasteur (1822–1895) had argued his case for germ theory. Prior to this there had been two schools of thought with regards to infection: miasma theory and contagion theory. The first presumed the existence of 'bad air', caused by rotting vegetation, which in turn led to infection and disease. Contagion theory was the idea that infection and disease could spread from person to person (as in smallpox, or the Black Death), with the concept of spontaneous generation accompanying this theory (the notion that 'animalacules' or tiny disease-causing particles were spontaneously generated by God). Lister was a fan of Pasteur's early work, and believed that there were microbes living in the air that caused sepsis. Pasteur published his germ theory in 1878 in front of the French Academy of Medicine. Germ theory was strengthened by Robert Koch (1844–1910) and his meticulous work on microscopy and bacterial culture. His four postulates still form the basis of microbiology today.

Surgical rubber gloves were introduced in 1889 by the American surgeon William Halsted (1852–1922) to overcome the phenol dermatitis of his scrub nurse, and fiancée, Caroline Hampton. Ernst von Bergmann of Prussia (1836–1907) was the first to use the concept of steam sterilisation for dressings, gowns and instruments in 1886, whilst the Polish surgeon Johannes von Mikulicz (1850–1905) was the first surgeon to wear a surgical mask in 1897. Other attempts at asepsis took a while to catch on, and many surgeons continued to wear their own clothes or old and blood-stained surgical cloaks (Fig. 1.14).

The Twentieth Century and the Evolution of Modern Surgery

The course of surgery probably changed more in the few years after Lister than it had during the previous two millennia. Suddenly a whole new world had opened up to the surgeon. With anaesthesia and a better understanding of postoperative

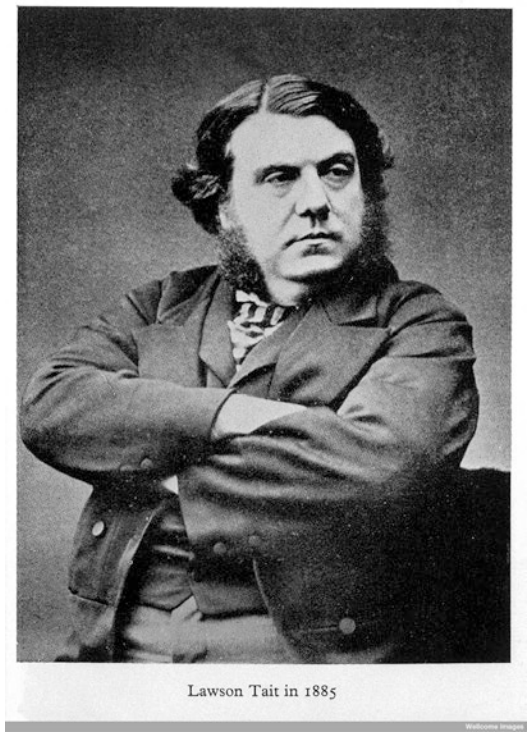

Fig. 1.13 Photographic portrait of Robert Lawson Tait in 1885 (Wellcome Library, London. Wellcome Images)

sepsis, the world was their oyster. Open surgery, which had up until then been unheard of due to high mortality rates, suddenly became plausible. The routine procedures that the specialty had been associated with for hundreds of years took a definite backseat. Procedures that had hitherto been too complex or dangerous to carry out, such as cardiothoracic, abdominal or intracranial surgery, became possible. This was an exciting time for surgery and surgeons found their profile increasing overnight.

Some important figures at the start of this era were:

- The Mayo brothers: William (1861–1939) and Charles (1865–1939). They were famous for William's abdominal and Charles' thyroid surgery. They established the Mayo Clinic in Rochester (Minnesota), carrying out an astounding 23,628 operations in the year 1924.
- Theodor Billroth (1829–1894), a pioneering German surgeon who carried out the first Gastrectomy in 1881 and became known as the founder of modern abdominal surgery. He was also the first to advocate regular postoperative temperature monitoring.
- Robert Lawson Tait (1845–1899) performed the first English appendicectomy in 1880 (Fig. 1.13).
- Carl Langenbuch (1846–1901) was a German surgeon who carried out the first cholecystectomy in 1882, in Berlin.
- E. B. Wolcott (1804–1880) performed the first known nephrectomy to remove a large kidney tumour in 1861.

There are countless names of surgeons who made their mark by being the first to perform new operations. The new profile of surgery developed an attitude that surgery was the answer to any medical problem. This caused a vogue for certain bizarre operations, such as hysterectomies to cure female neuroses.

The progression of surgery was further aided by new diagnostic techniques, such as endoscopy. The first oesophagoscope was introduced by John Bevan, a surgeon at Guy's Hospital, London, in 1868, followed by the first gastroscope that same year. Karl Wilhelm Röntgen's discovery of X-rays in 1896 also opened up a whole new world of exploration for surgeons, and the first barium swallow was carried out in 1904. Ultrasound developed later in the century, followed by Godfrey Hounsfield's invention of computerised axial tomography, or CT scan as we know it today. PETT (positron emission transaxial tomography) and MRI (magnetic resonance imaging) soon followed suit. The ability to look inside the body without reaching for the knife changed the face of diagnostics and allowed surgeons to prepare better for operations.

New diagnostic techniques led to the formation of new surgical specialties, such as thoracic surgery and neurosurgery. Victor Horsley (1857–1916) became the world's first specialist neurosurgeon and worked at Queen's Square Hospital, London (Fig. 1.15). Harvey Cushing (1869–1939) was also a leading neurosurgeon in America, claiming to have successfully removed thousands of brain tumours.

Fig. 1.14 Photograph of Mount Stuart Royal Naval Hospital in Bute. Depicts surgical staff performing an operation without gloves or masks (Wellcome Library, London. Wellcome Images)

Cardiac surgery was another daunting new field which developed quickly. Cardiac catheterisation was first carried out on a patient in 1940 by the American physicians, André Cournand (1895–1959) and Dickinson Richards (1895–1973), although a German medical student named Werner Forssmann (1904–1979) had already successfully inserted a catheter into his own right atrium in 1929. Angioplasty soon followed in 1964, by the Swiss surgeon Andreas Grünzig (1939–1985). Helen Taussig (1898–1986) was an American paediatric cardiologist who made the important discovery that babies who had both Tetralogy of Fallot and a patent ductus arteriosus seemed to be less symptomatic than those who just had Tetralogy of Fallot alone. She deduced that the patent ductus must allow some of the blood to bypass the pulmonary artery stenosis and reach the lungs for oxygenation. She consulted with Alfred Blalock (1899–1964), a cardiothoracic surgeon, who with the help of his research technician, Vivien Thomas (1910–1985), successfully developed a procedure for creating a shunt between the subclavian and pulmonary artery. They performed their first successful operation in 1944 and over the next decade helped to significantly decrease the mortality rate of these 'blue babies'.

The First World War spurred the development of skin transplants as an answer to treating horrific burns and facial injuries. Harold Gillies (1882–1960) being a pioneer in this field, established a plastic surgery unit at Aldershot. The field of transplant surgery developed further with research into immunosuppression and organ rejection. In 1954, the first successful kidney transplant was performed on identical twins by J. Hartwell Harrison and Joseph Murray; and 1967 saw the first ever successful heart transplant by Christian Barnard (1922–2001) in Cape Town, South Africa.

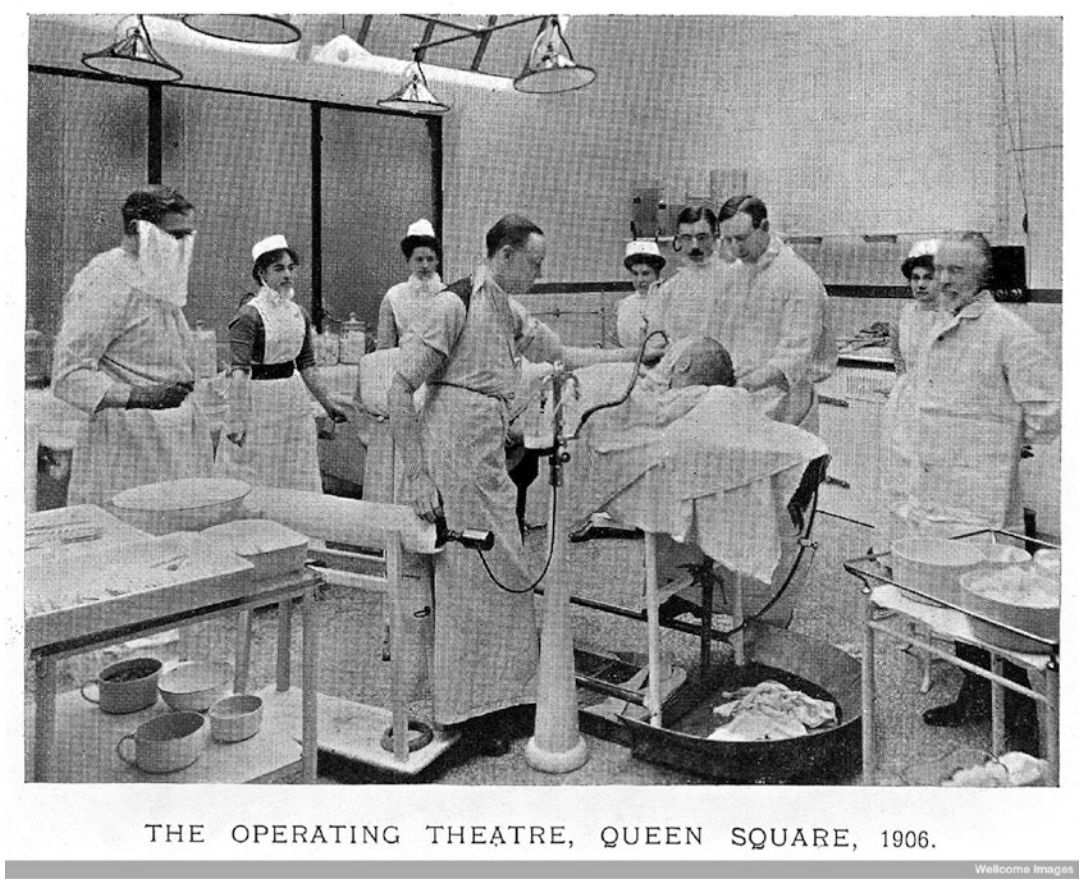

Fig. 1.15 Photograph of Victor Horsley operating at Queen Square, London. 1905 (Wellcome Library, London. Wellcome Images)

Orthopaedic surgery also expanded beyond the days of bone-setting and war wounds. The first total hip replacement in the UK was performed in 1938 by Philip Wiles (1899–1966) at the Middlesex Hospital. Wiles performed six of these operations but his results were lost to follow-up as the Second World War intervened. In the 1950s, Kenneth McKee (1906–1991) was the first to use metal on metal hip replacements, using screw fixation for the cup and a modified Thompson's femoral prosthesis. In the next decade, John Charnley (1911–1982) developed a successful total hip replacement formed of a metal femur with a high-density polyethylene (HDP) acetabulum. Charnley also commandeered the use of bone cement to fixate the prosthesis. Since then further developments in engineering and prosthetic materials, such as higher density plastics and ceramics, have revolutionised the world of orthopaedics and joint replacements [9].

Further Reading

This chapter is intended to be a very brief introduction to the history of surgery. It does not by any means mention every individual who played a role in the development of the specialty, nor does it discuss every event or procedure. The history of surgery is a fascinating and extensive subject in its own right which is well worth investing time in studying further. If you find that this chapter has whet your appetite to find out more, please do refer to the bibliography for further reading.

References

1. Bynum WF. The history of medicine: a very short introduction. Oxford: Oxford University Press; 2008.
2. David AR. Handbook to life in ancient Egypt. New York; [Great Britain]: Facts On File; 2003.
3. Ellis H. A history of surgery. London: Greenwich Medical Media; 2001.
4. Miles SH. The Hippocratic Oath and the ethics of medicine. Oxford: Oxford University Press; 2004.
5. Packard FR. Life and Times of Ambroise Pare\0301, 1510–1590. With a new translation of his Apology and an account of his journeys in divers places … With … twenty-seven … plates and two folded maps of Paris, etc. London; printed in USA: Humphrey Milford; 1922.
6. Pormann PEA. The oriental tradition of Pauel of Aegina's Pragmateia. Leiden: Brill; 2004.
7. Pormann PEA. The mirror of health: discovering medicine in the golden age of Islam. London: Royal College of Physicians of London; 2013.
8. Porter R. The greatest benefit to mankind: a medical history of humanity from Antiquity to the present. London: Fontana Press; 1999.
9. Reynolds L, Tansey EM. Early development of total hip replacement . Wellcome witnesses to twentieth century medicine. Volume 29_ Seminar Transcript; 2007.
10. Savage-Smith E. The practice of surgery in Islamic lands: myth and reality. Soc Hist Med. 2000;13: 307–21.
11. Snow SJ. Blessed days of anaesthesia: how anaesthetics changed the world. Oxford: Oxford University Press; 2008.