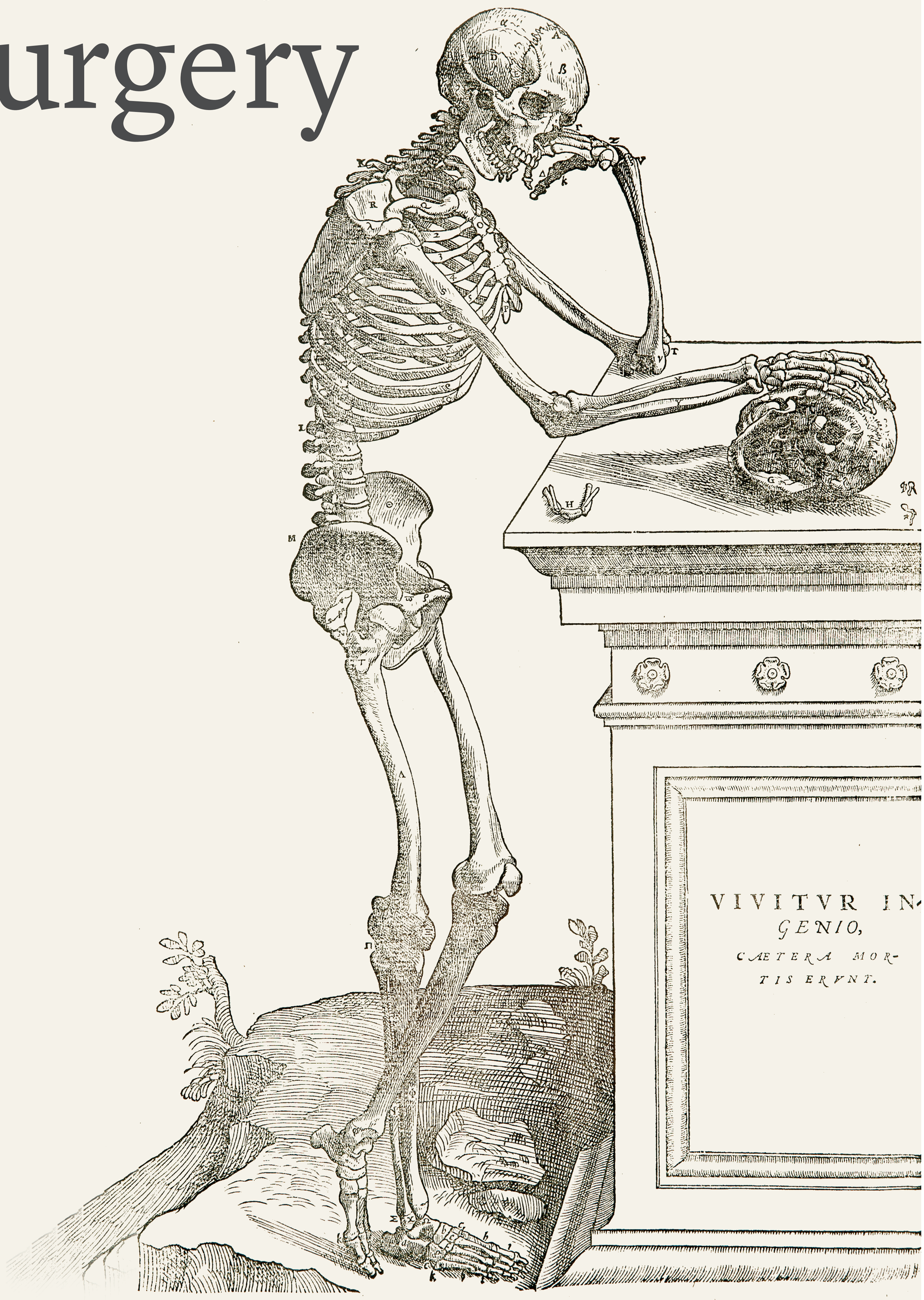
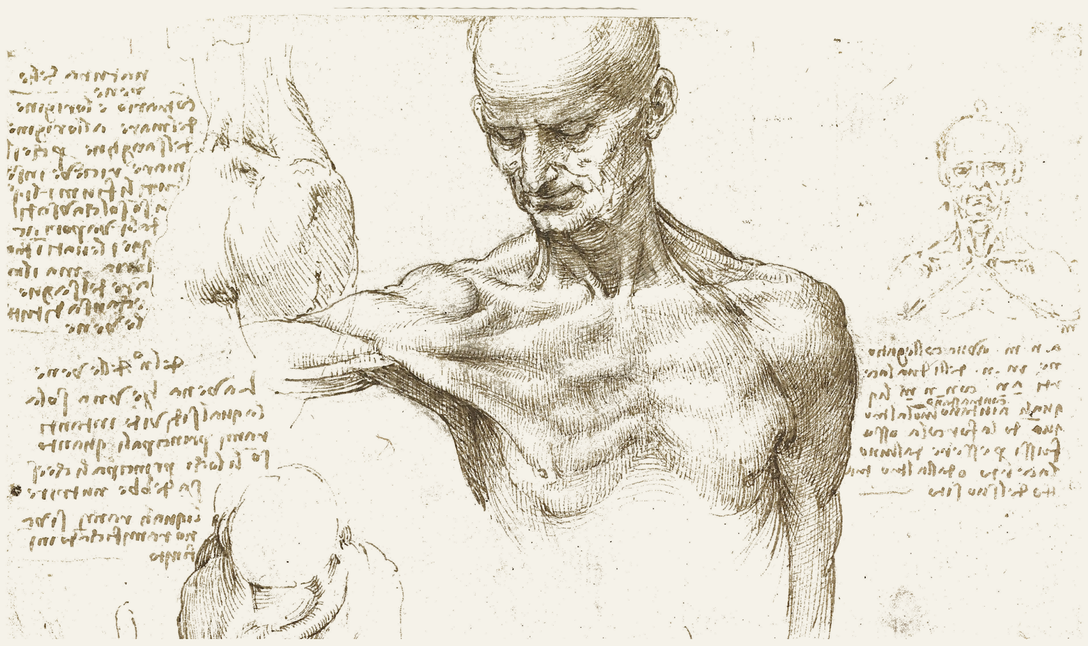
# Art, Anatomy & Surgery





# Renaissance

In the sixteenth century with the publication of Vesalius' *Fabrica*, which is based on human dissection, anatomy begins its path towards a scientific discipline. This was also facilitated by Renaissance artists who studied the human form. The Florentine Academy of Art had a course in anatomy which obliged students to execute drawings from cadavers and skeletons. Many artists attended public dissections and some, performed their own dissections. Two of the most influential artist/anatomists were Leonardo and Michelangelo.

Leonardo da Vinci (1452-1519) performed over 30 dissections during his career and defined the human body in terms of mathematical and mechanical laws. His early drawings show the skeletons and muscles and then, he became interested in movement: *When you understand the make of the human body, its members, jonctures and several positions these are capable of, apply yourself to the study of motion.*

Leonardo also researched how the internal organs work. He observed the peristaltic contraction of the oesophagus and determined that the heart had 4 chambers and was composed of muscle. Models such as a transparent model of the aorta were used as mechanical aids to his research. Innovative drawings showed the body in rotation and when describing the bones, which he accurately saw as acting as levers on the muscles, he made four views and complemented them with cross and longitudinal sections. He also devised a method of showing the visceral layers of organic structures as if transparent.

Michelangelo Buonarotti (1475-1564) became interested in anatomy when he joined Lorenzo de' Medici's court in c.1492. Many of his dissections took place at the Church of Santo Spirito. Vasari states that: *For the church of San Spirito in Florence, Michel Angelo made a crucifix of wood... This he did to please the Prior who had given him a room wherein he dissected many dead bodies...*

Michelangelo postulated that there was a relationship between architecture and anatomy and the figures in the Sistine Chapel replete in their architectural framing, reflect this interest. Michelangelo used material from his dissections to make casts of muscles in various postures. These were used as models when he painted the slaves (ignudi) in the panels of the Sistine Chapel. Other anatomical references include the *Last Judgement* where St Bartholomew holds a flayed skin (which is a self-portrait of Michelangelo) and the kidney-shaped mantle of the creator in *The Separation of Land and Waters*. This may have been a personal reference for Michelangelo who had kidney stones and was treated by the anatomist Realdo Colombo.

Bartolomeo Passerotti – *The Anatomy Lesson*, 1570 (Wikimedia Commons)

# Andreas Vesalius

Vesalius published his great anatomical work on the structure of the human body in 1543. *De humani corporis fabrica* was published in Basel by Johannes Oporinus and was accompanied by an abridged version for students known as the Epitome.

Vesalius was born in Brussels and studied medicine at the University of Paris. It was here that he became interested in anatomy. A conflict between France and the Holy Roman Empire caused him to leave Paris and finish his degree at the University of Padua. In 1537, he wrote his doctoral thesis on the Persian physician Rhazes, and soon after graduation he was appointed to the University of Padua as an Explicator Chirurgiae (Lecturer in Surgery).

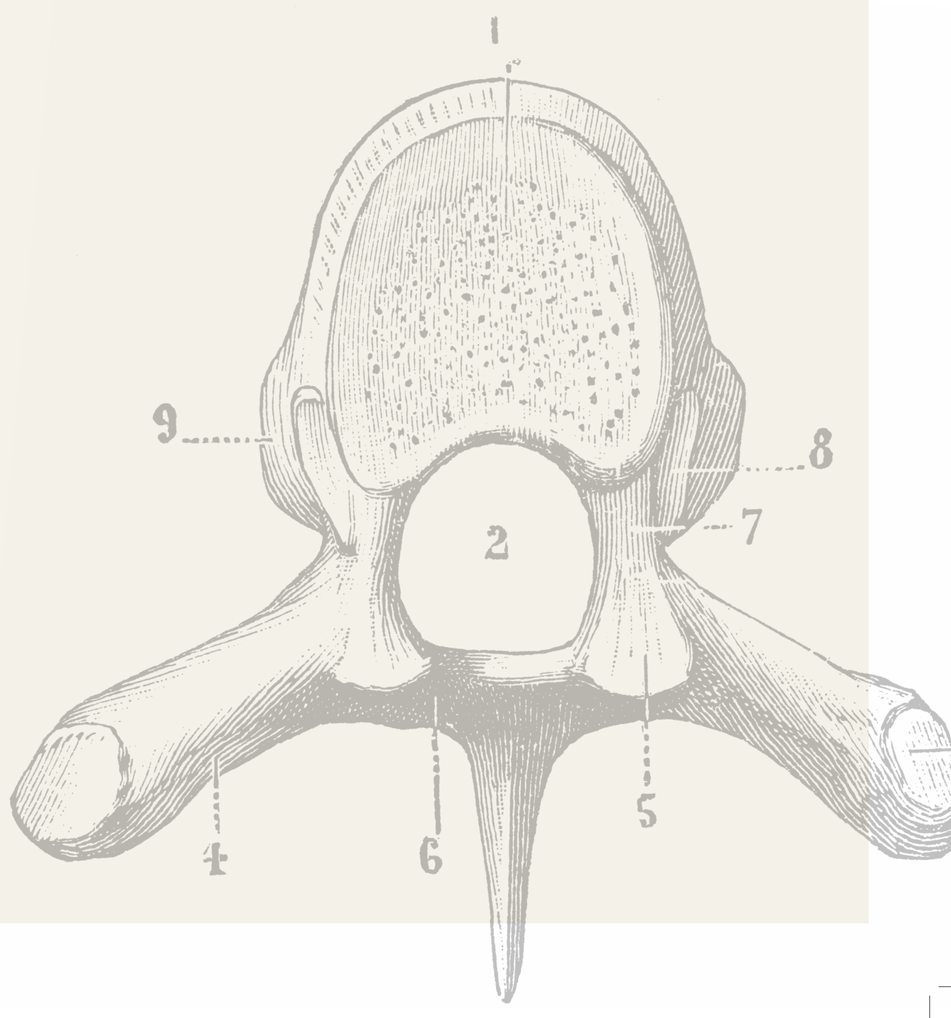
RACS Rare Book Collection

Recognising that anatomy was integral to surgery, Vesalius used dissection to provide charts of the vascular and nervous systems for his students. In 1538, he published *Tabulae anatomicae sex*, which was a compilation of the drawings he used when teaching. The book was illustrated by Johan van Calcar, a Flemish portraitist and student of Titian.

By the early 1540s, Vesalius had discovered that most of Galen's dissections related to animals, particularly barbary apes, and this created errors in Galen's perception of human anatomy. In the *Fabrica*, Vesalius disputes many of Galen's anatomical assumptions.

The illustrative technique employed in the book is innovative and clearly the work of a competent draughtsman. In the volume devoted to muscles, for example, a series of images which are 'peeled off' to reveal the various muscular layers underneath, are presented. The illustrations are unacknowledged although artist and historian, Giorgio Vasari noted that: *...the illustrations conceived by Vesalius for his Fabrica and drawn by the outstanding Flemish painter, Jan Stephan Calcar are of an excellent style*. It is likely that Vesalius wanted a well-known artist to complete his illustrations. He may have asked Titian who subsequently gave the work to Calcar–an exceptional pupil who had readily absorbed Titian's style. Significantly, the *Fabrica's* engraver was Titian's friend, Francesco Marcolini da Forlf.

Vesalius' interest in classical models, specifically the so-called Canon of Polykleitos, is evident in the *Fabrica*. He states: *It is desirable that the body be as normal as possible according to its sex and of medium age, so you may compare it to other bodies, as if to the statue of Polycletus.* The *Fabrica* undeniably revolutionised the study of anatomy and it also was a source book for artists until the 19th century.




# Amsterdam

In 17th century Amsterdam, public anatomy demonstrations were given by a Praelector Anatomiæ (Lecturer in Anatomy) on the bodies of executed criminals in the Theatrum Anatomicum. They were important public events designed to raise the profile of the Guild of Surgeons of Amsterdam (Amsterdam Chirurijnsgilde) and as an educational tool for those aspiring to be surgeons.

The Guild of Surgeons commissioned well-known artists to paint several of the anatomy lessons and the works invariably included important members of the Guild. As the focus is on the Praelector and Guild members, the anatomy in these paintings is not necessarily accurate.

Attributed to Thomas de Kreyser, the *Osteology Lesson of Sebastiaen Egbertsz*. (1619) indicates the importance of osteology in surgical education. In this early work, the governors of the Guild of Surgeons are depicted with their Praelector. Significantly, the skeleton of the English pirate shown in the work was donated to the Guild in 1615. The dissection of human cadavers was not legalised in the Netherlands until 1655 and until the end of the 17th century, only male bodies were used.

In the fragment of Rembrandt's *Anatomy Lesson of Dr Jan Deijman* (1656), Dr Diejman performs an anatomical dissection of the cerebral membranes of the executed Flemish tailor, Joris ('Black Jack') Fonteijn. The work with its exaggerated foreshortening references *Mantegna's Lamentation of Christ* (c1480). Frank IJpma notes the anatomical inaccuracies and mentions that …*it would be impossible to lift and turn around the falx as Deijman did*.

Dr Frederick Ruysch (1638-1731) became Praelector Anatomiæ in 1667 and remained in the position for nearly 65 years. Ruysch was renowned for his dissecting and preserving skills. Using a syringe invented by Renier de Graaf, he devised an innovative process for preserving body parts. This allowed public dissections which had traditionally been held in the winter, to be scheduled in warmer months.

Adriaen Backer's *Anatomy Lesson of Dr Frederik Ruysch* (1670) is an early example of Ruysch's public dissections. The life-like corpse is testament to Ruysch's preservation methods and lies diagonally on the canvas surrounded by members of the Guild. The statues in the background are of Apollo and Æsculapius and the dramatic composition shows the influence of Rembrandt.

Anatomy dissections were also held in Leiden and Delft and paintings of these 'lessons' promoted artists and surgical guilds. It also reinforced the idea of anatomy as a science and allowed members of the general population to see …*the secrets of nature as revealed by God.*

Adriaen Backer, *The Anatomy Lesson of Dr Frederik Ruysch*, 1670 (Wikimedia Commons)

# William Hogarth

Hogarth's moralising work *The Four Stages of Cruelty* was published in 1751. This series of four engraved and etched prints chart the story of Tom Nero, aptly named after the Roman Emperor. Its pervasive theme is the cruelty routinely meted out to animals in the London metropolis.

The story begins with a group of boys torturing animals in the notorious St Giles district. The worst abuser is Tom Nero and his cruelty towards animals continues as a young man. In the second stage, he is seen beating an emaciated horse to death, and in the third stage his cruelty is epitomised by the murder of his pregnant lover, Ann Gill.

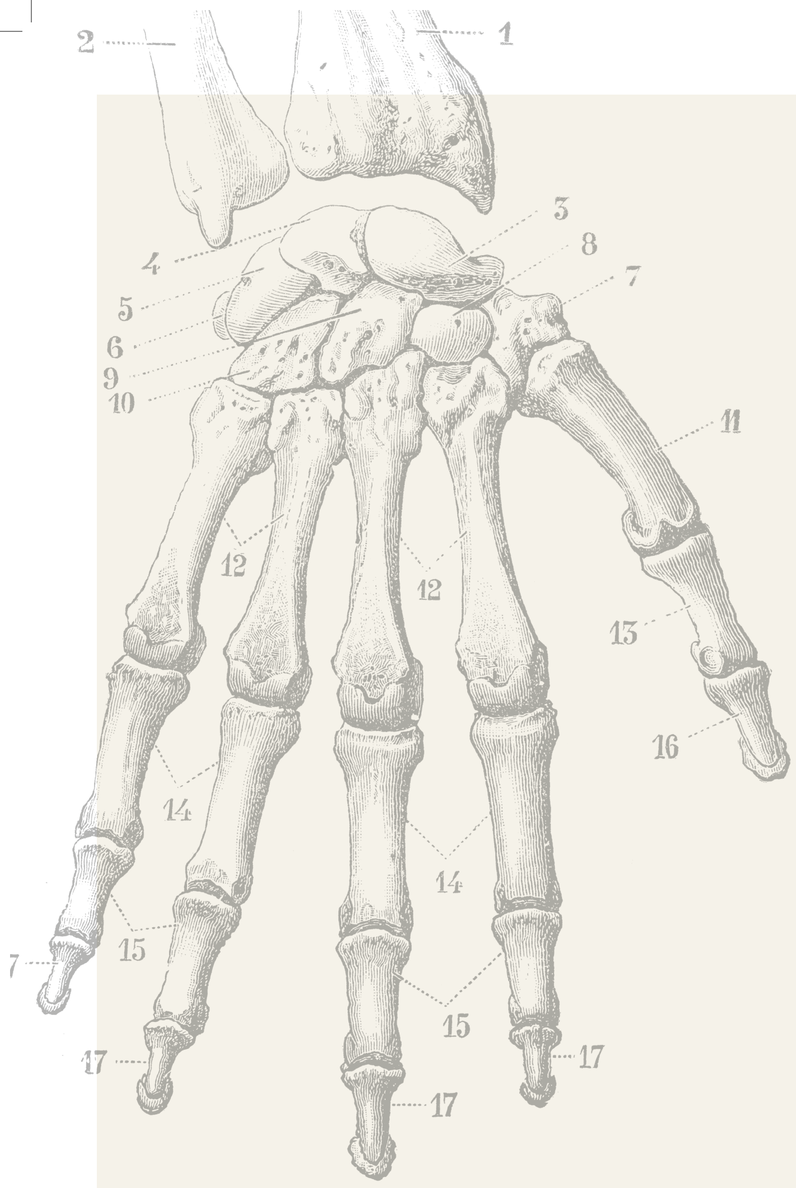
The fourth stage of the series *The Reward of Cruelty* depicts the public dissection of Tom Nero which takes place in the Cutlerian Theatre near Newgate. This is not just an anatomical dissection and there are many illusions in the work that reference Tom Nero's previous life. Nero has been hanged at Tyburn and the rope is still around his neck. Skeletons of two other hanged men – the boxer James Field and highwayman, Macleane, hang in the alcoves at the back of the theatre.

The chief surgeon sits in a tall chair and presides over the occasion like a judge. One of the participants is the renowned ophthalmic surgeon, John Fiske. This character is important because the *Four Stages of Cruelty* have a recurrent theme of moral blindness and the blinding of animals in the early stages of the series, reinforces this idea. As retribution the dead body of Nero is also 'blinded' and his eyes are gouged out with a large knife. This is artistic licence and would not have occurred in a conventional anatomical dissection. A servant is pulling out lengths of intestine and a dog is also eating or sniffing at Nero's heart which has fallen on the floor. Nero's finger is pointing to the tub of boiled bones indicating the ultimate ignominy for those who pursue a cruel and amoral life.

Although there was a more expensive edition, *The Four Stages of Cruelty* was produced mainly on cheap paper so that the prints were easily affordable. The moralising theme is powerful and the concept of anatomical dissection is used effectively. Although some have suggested that Hogarth based *The Reward of Cruelty* on the frontispiece to Vesalius' *Fabrica*, it is likely that he had a multitude of other sources for his anatomical scene.

(Wikimedia Commons)


William Hogarth - *The Painter and his Pug* (self-portrait), 1745 (Tate Gallery, London)




*The Gross Clinic*, 1875 (Wikimedia Commons)

# Thomas Eakins

By the late nineteenth century, surgery was increasingly perceived as a healing profession and this was helped by the work of artists such as Thomas Eakins (1844-1916). Eakins was professor, then director of the Pennsylvania Academy of Fine Arts in Philadelphia. A controversial teacher, he was interested in anatomy and inspired by Eadweard Muybridge, was also fascinated by motion photography.

In 1875 he painted *The Gross Clinic* which depicts an operation on a young man with osteomyelitis of the femur. Dr Gross in a black frock coat lectures to students from the Jefferson Medical College while surgeons cluster around the anaesthetised patient. Eakins himself is represented on the right of the painting and a distraught woman, possibly the patient's mother, sits behind Dr Gross. The dramatic scene highlights the patient and the imposing figure of Dr Gross. Thus, the work has echoes of the earlier Dutch 'anatomy lessons' but the subject matter is different. This is not anatomical dissection, it is potentially healing surgery which will avoid the amputation of a limb.

Eakins submitted The Gross Clinic to the 1876 Centennial Exposition in Philadelphia. Its stark and disturbing realism offended the judges and it was rejected. A critic for the New York Tribune noted: [It was]*...one of the most powerful , horrible yet fascinating pictures that has been painted... but the more one praises it the more one must condemn its admission to a gallery where men and women of weak nerves must be compelled to look at it, for not to look at it is impossible.* The painting was eventually displayed at Philadelphia's US Army Post Hospital.

*The Gross Clinic* portrays a nineteenth century operating theatre before the era of asepsis. In 1889, Eakins painted another surgical subject, *The Agnew Clinic*. In this equally dramatic painting, the surgeons wear scrubs and there is a female nurse, Mary Clymer in attendance. Clearly, the age of asepsis has arrived.

Eakins' work was innovative and uncompromising. It indicates the development of surgical techniques and shows how art can be a means of promoting surgery.

*The Agnew Clinic*, 1889 (Wikimedia Commons)

# Twentieth century

Barbara Hepworth *Theatre Group III*, 1947
(Manchester Art Gallery)

Henry Tonks (1862-1937) trained as a surgeon but later, became a painter and art teacher. Tonks' first appointment was as a house surgeon at the London Hospital under Sir Frederick Treves. He then moved to the Royal Free Hospital in London and from 1892, taught anatomy at the London Hospital Medical School.

However, his medical career was to be short lived. Soon after his first surgical appointment, he began an evening course at the Westminster School of Art with Frederick Brown. Brown saw his potential and in 1892, Tonks accepted a position at the Slade School of Art. He proved to be an exceptional teacher and taught a generation of aspiring British artists. His biographer Lynda Morris stated that: *Tonks used his anatomical knowledge to teach drawing as a swift and intelligent activity.*

During World War 1 Tonks briefly returned to medicine, working as a medical orderly then as a Lieutenant with the RAMC. Significantly, he also worked with Harold Gillies at the Cambridge Military Hospital in Aldershot and the Queen's Hospital, Sidcup. Despite their impressionistic style, his pastel drawings of patients with facial injuries are not really artworks. In an era of black and white photography, together with X Rays, diagrams and facial casts, his colour images, enhanced by a knowledge of anatomy, added to the information about individual patients. After the war Tonks succeeded Frederick Brown as Slade Professor of Fine Art.

Sculptor Barbara Hepworth (1903-1975) commented in 1950: *There is, it seems to me, a close affinity between the work of both physicians and surgeons, and painters and sculptors.* Hepworth's connection with the surgical profession began in 1944 when her daughter, Sarah was hospitalised with osteomyelitis. During Sarah's treatment, Hepworth became friendly with Norman Capener, a surgeon at the Princess Elizabeth Orthopaedic Hospital in Exeter. Capener invited her to watch surgical procedures in both Exeter and London and from 1947-1949, Hepworth produced around eighty drawings of surgeons at work.

Hepworth was particularly interested in reconstructive surgeries and saw parallels with her own artistic practice. She noted: *When I entered the operating theatre I became completely absorbed by two things: first the co-ordination between human beings all dedicated to the saving of a life, and the way that unity of idea and purpose dictated a perfection of concentration, movement and gesture, and secondly by the way this special grace... induces a spontaneous space composition, an articulated and animated kind of abstract sculpture.*

Barbara Hepworth *Reconstruction*, 1947
(Bowness Hepworth)