

## **Editorial**

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# **History of Anatomy**

Anatomy teaching is one of the cornerstones of a doctor's medical education. Despite being a persistent portion of teaching from at least the renaissance, the format and the amount of information being taught has evolved and changed along the demands of the profession. What is being taught today may differ in content significantly from the past but the methods used to teach this have not really changed that much.

It is one of the oldest basic sciences as we know it was first studied in Egypt. The First recorded school of anatomy was in Alexandria. In Egypt (from about 300 to 2<sup>nd</sup> century AD) where the renowned anatomical teachers Herophilus and Erasistratus dissected the human body and described many of its structures. Before this time, dissection had practiced at various times in Greece and also as a of the mummification process in Egypt during the two millennia.

The earliest descriptions of Anatomy were written on papyruses (PAPER REED) between 3000 and 2500 BCE .Much later human anatomy was taught in Greece by Hippocrates (460 - 377 BCE) who is regarded as father of medicine and a format of the science of anatomy. Hippocrates wrote several books on anatomy. He stated "The nature of the body is the beginning of medical science". His works demonstrates a basic understanding of musculoskeletal structures, and the beginning of understanding of the function of certain organs such as the kidneys. Much of his works, however, and much of that of his students and his followers later relies on speculation rather than empirical observation of the body.

Aristotle (384-322 BCE) was the first person to use the term "anatomē" a Greek word meaning "cutting up or taking apart". The Latin word *dissecare* has similar meaning.

The most influential anatomist in ancient world was Galen (about 130 - 200AD), a physician and profile

writer who studied anatomy at Alexandria and later worked at Rome. However, his anatomy was largely based on the dissection of animals rather than human, seriously flawed by many errors and misinterpretations. Galen's work became the received, unassailable text for anatomy and seems to have exerted a deadening influence on the subject over 1300 years.

After the fall of Roman Empire, the study of anatomy became stagnant in the Christian Europe but flourished in the medieval Islamic world, where the Muslim physician and Muslim scientists contributed to medieval learning and culture. The Persian physician Avicenna (980-1037) absorbed the Galenic teachings on anatomy and expanded on them in the Canon of medicine (1020s), which was very influential throughout the Islamic world and Christian Europe. The Canon remained the most authoritative book on anatomy in the Islamic world until Ibn Al Nafis in the 13<sup>th</sup> century, though the book continued to dominate European for even longer until the 16<sup>th</sup> century.

The Arabian physician Ibn Zuhr (Avenzoar) (1091-1161) was the first physician known to have carried out human dissection and post mortem autopsy. In the 12<sup>th</sup> century, Saladin's physician Ibn Jumay was also one of the first to undertake human dissection and he made an explicit appeal for other physician to do so as well. During a famine in Egypt in 1200, Abdel Latif observed and examined a large number of skeletons and he discovered that Galen was incorrect regarding the information of the bones of the lower jaw and sacrum.

The Arabian physician Ibn Al Nafis (1213-1288) was one of the earliest proponents of human dissection and postmortem autopsy and in 1242 he was first to describe the pulmonary circulation and coronary circulation of blood which form the basis of circulation. Ibn Al Nafis also described the earliest concept of metabolism and developed new system

of anatomy and physiology to replace the Avicennian and Galenic doctrine, while discrediting many of their erroneous theories on the four humours, pulsation, bones, muscles, intestines, sensory organs biliary canals, esophagus, stomach and the anatomy of every other part of the human body.

Andreas Vesalius's (1514-1564 BCE [AD]) master piece *De Human Corporis Fabrica*, published in 1543, marked a new era in the history of Medicine. At that time the study of anatomy became an objective discipline based on direct observation as well as scientific principles. Vesalius recognized the anatomy as the firm foundation of the whole of medicine and its preliminary. Heronymus Fabricius (1537-1619) was responsible for the construction in 1594 of the famous anatomical theater at Padua. He was one of the teachers of William Harvey and it is believed that Fabricius's discovery of the valve in the vein led Harvey to the discovery of circulation of blood. The publication in 1628 of Harvey's book *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* on the movement of the heart and the circulation of blood in animal, represent a mile stone in the history of medicine. The works of Galen and Avicenna, especially *The Canon of medicine* which incorporated the teaching of both were translated into Latin and the Canon remained the most authoritative text on anatomy in European medical education until the 16<sup>th</sup> century. The first major development in anatomy in Christian Europe since the fall of Rome occurred at Bologna in the 14<sup>th</sup> to 16<sup>th</sup> centuries where a series of authors dissected cadavers and contributed to the accurate description of the organs and the identification of their functions. Prominent among these anatomists were Mondino de Liuzzi and Alessandro Achillini.

The first challenges to the Galenic doctrine in Europe occurred in the 16<sup>th</sup> century. Thanks to the printing press, all over Europe a collective effort proceeded to circulate the works of Galen and Avicenna and later publish criticism on their works. Vesalius was the first to publish a treatise, *De humani corporis fabrica*, which challenged Galen "drawing for drawing" travelling all the way from Leuven to Padua for permission to dissect victims from the gallows without fear of persecution. His drawings are

triumphant description of the sometimes major, discrepancies between dogs and human, showing superb drawing ability. Many later anatomists challenged Galen in their text, though Galen reigned supreme for another century.

By the 17<sup>th</sup> century, human dissection became an important feature in European medical schools and anatomical museums were established in many cities, and later on whole over the world including Asian countries

The study of anatomy flourished in the 17<sup>th</sup> and 18<sup>th</sup> century. The advent of the printing press facilitated the exchange of ideas. Because of the study of anatomy concerned observation and drawing, the popularity of the anatomist was equal to the quality of his drawing talents. Many Europeans interested in the study of anatomy travelled to Italy then the center of anatomy. Only in Italy could certain important research methods to be used such as dissection on women. M.R. Columbus and Gabriele Falloppio were the pupils of Vesalius, the 16<sup>th</sup> century anatomist. Columbus as his immediate successor in Padua, and afterwards professor of Rome distinguished himself by rectifying and improving the anatomy of bones, by giving correct accounts of the shape and tracing the course of the blood from the right to the left side of the heart, by a good description of the brain and its vessels, and by correct understanding of the internal ear and the first good account of the ventricles of the larynx. Osteology at nearly the same time found an assiduous cultivator in Giovanni Filippo Ingrassias.

During the 18<sup>th</sup> & 19<sup>th</sup> centuries, anatomy published impressive treatises and attractive Atlases with illustrations that introduced new standards for depicting the human body. The storage of cadavers for dissection and anatomical demonstration led to illegal means of procuring the dead bodies. In Britain, the Anatomy Act was passed by Parliament in 1832 and made legal provisions for medical schools to receive unclaimed and donated dead bodies for anatomical studies. This paved the way for similar legislation in other countries like ours.

During the 19<sup>th</sup> century, anatomists largely finalized and systematized the descriptive human anatomy of the previous century. The discipline also

progressed to establish growing sources of knowledge in histology and development biology, not only of human but also of animals. Extensive research was conducted in more areas of anatomy. England was particularly important in research. Demand for cadavers grew so great there that body snatching and even murder into use as a means of obtaining them. In response, the English Parliament passed the anatomy act 1832, which finally provided for an adequate and legitimate supply of corpse for allowing dissection of destitute. The relaxed restriction on dissection provided a suitable environment Gray's anatomy, a text that was a collective effort and became widely popular. Now seen as unwieldy, Gray's anatomy was born out of need to create a single volume on anatomy for the travelling doctor.

The shift from the largely public displays of dissection in anatomy theatres to dissection carried out in classrooms meant that there was a drastic change in who could observe a dissection. Female for example who at this time were not allowed to attend the medical school, could broaden their knowledge by attending the anatomy theatres. So the shift from prosecution of dissection meant a reduction in the number of people that could benefit from a single cadaver. At this time as well as tighter regulation of the medical profession and donation of bodies resulted in various implications for carrying out dissections. Towards the end of the 19<sup>th</sup> century have been largely professionalized at established medical schools/colleges and public dissection was no longer common place.

### **Modern Anatomy**

Anatomical research in the past hundred years has taken advantage of technological development and growing understanding of science such as

evolutionary and molecular biology to create through understanding of the body's organs and structures. Discipline such as endocrinology has explained the purpose of gland that anatomists previously could not explained. Medical devices such as MRI machine, CAT scanners have enabled researchers to study the organs of living people and dead ones. Progress today in anatomy is centered in the development, evolution, and function of anatomical features, as the microscopic aspect of human anatomy has been largely catalogued. The subfield of non-human anatomy is particularly active as modern anatomist seeks to understand basic organizing principles of anatomy through the use of advanced techniques ranging from finite element analysis to molecular biology.

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