

A Brief History of Medical Anatomy*Uma Breve História da Anatomia Médica*

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Abstract

The focus on anatomy in the ancient world began as a way to determine the nature of the soul. It has been characterized, over time, by a continually developing understanding of the functions of organs and structures in the body. Progress today is centered in the development, evolution and function of anatomical features. The history of anatomy includes not only professors and the support of their institutions but also medical and health students. Some anatomists use their dissection skills in a traditionally artistic way and render their specimens into lasting work of art. The aim of this article has been to clarify the historical development process of the human anatomy over the years.

Key words: Anatomy; Anatomy, Artistic; Human Body; Dissection, History of Medicine.

Resumo

O foco da anatomia no mundo antigo começou como uma maneira de determinar a natureza da alma. Foi caracterizado, ao longo do tempo, por uma compreensão contínua das funções dos órgãos e estruturas do corpo. O progresso hoje está centrado no desenvolvimento, evolução e função das características anatômicas. A história da anatomia inclui não apenas professores e o apoio de suas instituições, mas também estudantes de medicina e saúde. Alguns anatomistas usam suas habilidades de dissecação de um maneira tradicionalmente artística e transformam seus espécimes em uma obra de arte duradoura. O objetivo deste artigo foi evidenciar o processo histórico do desenvolvimento da anatomia humana ao longo dos anos.

Palavras-chave: Anatomia; Anatomia Artística; Corpo Humano; Dissecação; História da Medicina.

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INTRODUCTION

The history of anatomy extends from the earliest examinations of sacrificial victims to the most sophisticated analyses of the human body performed by modern scientists. Humans have long been interested in the form and structure of living things.¹ The study of human anatomy can be traced back thousands of years, at least to the Egyptians, but the science of anatomy did not develop until far later. The development of the study of anatomy gradually built upon concepts that were understood during the time of Galen and slowly became a part of the traditional medical curriculum.²

The focus on anatomy in the ancient world began as a way to determine the nature of the soul. It has been characterized, over time, by a continually developing understanding of the functions of organs and structures in the body. The study of anatomy begins as early as 1600 BC, the date of the Edwin Smith Surgical Papyrus (Figure 1).



Figure 1. The Edwin Smith Papyrus. Source: European Spine Journal (2010).

This treatise shows that the heart, liver, kidneys, vessels, spleen, hypothalamus, bladder and uterus were recognized and that the blood vessels were known to emanate from the heart. The Egyptians seem to have known little about the function of the kidneys and made the heart the meeting point of a number of vessels which carried all the fluids of the body. Despite that, they did not have a theory as to where saliva and sweat came from.³

The nomenclature, applications and methods for the study of anatomy all date back to the Greeks.⁴ A significant variety of medical text by many authors were collected in the Hippocratic Corpus, none of which can definitely be ascribed to Hippocrates himself. The texts reveal an understanding of musculoskeletal structure and the beginnings of understanding of the function of certain organs. The early scientist “Alcmaeon of Croton” began to construct a background for medical and anatomical science with the dissection of animals. He identified the optic nerves and the tubes later named the Eustachius.^{4,5}

It is important to mention the contribution of Herophilus, he was the first physician to dissect human bodies and is considered to be the founder of anatomy.⁶ In addition, he developed a library of anatomical knowledge which was much more informed regarding the

actual structure of the human body in the comparison to previous works.⁷ However, Herophilos was eventually accused by his contemporaries of dissecting live criminals. The number of victims is said to be around 600 prisoners.⁸

The final major anatomist of ancient times was Galen, active in the 2nd century.⁹ Galen compiled much of the knowledge obtained by previous writers and furthered the inquiry into the function of organs by performing vivisection on animals. Due to a lack of readily available human specimens, discoveries through animal dissection were broadly applied to human anatomy as well. The information in these tracts became the foundation of authority for all medical writers and physicians for the next 1300 years until they were challenged by Vesalius and Harvey in the 16th century.¹⁰ Around a hundred of these tracts survive and fill 22 volumes of modern text.^{4,10}

From the 3rd century until the 12th century, human anatomy was mainly learned through books and animal dissection.¹¹ For many decades human dissection was thought unnecessary when all the knowledge about a human body could be read about from early authors such as Galen.¹² In the 12th century, as universities were being established in Italy, Emperor Frederick II made it mandatory for students of medicine to take courses on human anatomy and surgery.¹³

In the universities the lectern would sit elevated before the audience and instruct someone else in the dissection of the body, but in his early years Mondino de Luzzi performed the dissection himself making him one of the first and few to use a hand on approach to teaching anatomy.¹⁴ Mondino de Luzzi put together a book called “Anathomia” in 1316 that consisted of detailed dissections that he had performed, this book was used as a text book in the universities for 250 years.^{14,15} He carried out the first systematic human dissections since Herophilus of Chalcedon and Erasistratus of Ceos 1500 years earlier.¹⁵

In 1489, Leonardo da Vinci began a series of anatomical drawings depicting the ideal human form (Figure 2).

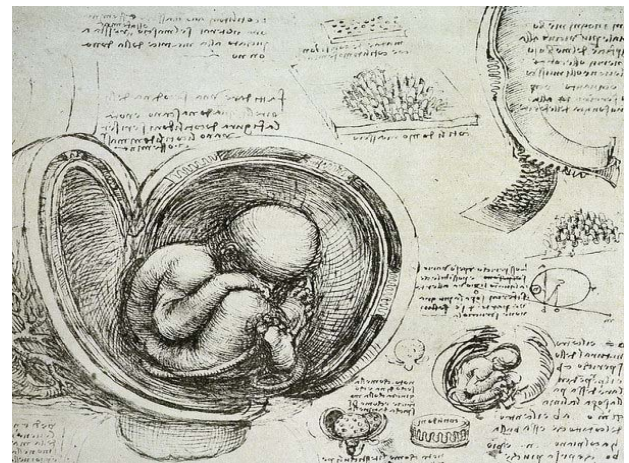


Figure 2. Pen and ink studies of human fetus by Leonardo da Vinci. Source: Britannica (2008)

His work was carried out intermittently for over two decades. During this time he made use of his anatomical knowledge in his artwork, making many sketches of skeletal

structures, organs and muscles of humans and other vertebrates that he dissected.¹⁶ As an artist-anatomist, Leonardo made many important discoveries and had intended to publish a comprehensive treatise on human anatomy. For a period, he produced the first accurate depiction of the human spine, while his notes documenting his dissection of the Florentine centenarian contain the earliest known description of cirrhosis of the liver and arteriosclerosis.¹⁷ None of Leonardo's notebooks were published during his lifetime, many being lost after his death, with the result that his anatomical discoveries remained unknown until they were later found and published centuries after his death.^{16,17}

The study of anatomy flourished in the 17th and 18th centuries. At the beginning of the 17th century, the use of dissecting human cadavers influenced anatomy, leading to a spike in the study of anatomy. Because the study of anatomy concerned observation and drawing, the popularity of the anatomist was equal to the quality of his drawings talents and one need not be an expert in Latin language to take part. Many famous artists student anatomy, attended dissections, and published drawings for money, from Rembrandt to Michelangelo.¹⁸ For the first time, prominent universities could teach something about anatomy through drawings, rather than relying on knowledge of Latin.

Since few bodies were voluntarily donated for dissection, criminals that were hung for murder were dissected. However, there was a shortage of bodies that could not accommodate the high demand of bodies.¹⁹ To cope with shortages of cadavers and the rise in medical students during the 17th and 18th centuries, body-snatching and even anatomy murder were practiced to obtain cadavers.²⁰

The "body-snatching" was the act of sneaking into a graveyard, digging up a corpse and using it for study. Men known as "resurrectionists" emerged as outside parties, who would steal corpses for a living and sell the bodies to anatomy schools.²¹ The lack of bodies available for dissection and the controversial air that surrounded anatomy in the late 17th century and early 18th century caused a halt in progress that is evident by the lack of updates made to anatomical texts of the time between editions. Most of the investigations into anatomy were aimed at developing the knowledge of physiology and surgery. Naturally this meant that a close examination of the more detailed aspects of anatomy that could advance anatomical knowledge was not a priority.^{19,22}

The British Parliament passed the Anatomy Act 1832, which finally provided for an adequate and legitimate supply of corpses by allowing legal dissection of executed murderers. The view of anatomist at the time,

however, became similar to that of an executioner.²³ Many Europeans interested in the study of anatomy traveled to Italy, then the centre of anatomy. Only in Italy could certain important research methods be used, such as dissection on women.^{4,23}

During the 17th century, Galileo Galilei introduced the experimental method to scientific research. This led to innovation and change in anatomy. In Tuscany and Florence, Marcello Malpighi founded microscopic anatomy and Nils Steensen studied the anatomy of lymph nodes and salivary glands. By the end of the 17th century, Gaetano Zumbo developed anatomical wax modeling techniques.²⁴

In the 19th century, anatomical research was extended with histology and developmental biology of both humans and animals. Women, who were not allowed to attend medical school, could attend the anatomy theatres.²⁵ Medical museums provided examples in comparative anatomy, and were often used in teaching.²⁶

CONCLUSION

The history of anatomy includes not only professors and the support of their institutions but also medical and other health students. One of the main sources of income for anatomists was from the teaching of anatomy to medical students and so private

anatomy schools flourished in the 18th century. Anatomical research in the past hundred years has taken advantage of technological developments and growing understanding of sciences such as evolutionary and molecular biology to create a thorough understanding of the body's structures and organs. The progress nowadays in anatomy is centered in the development function, evolution and anatomical features, as the macroscopic aspects of human anatomy have largely been catalogued.

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