Medical Assistant

The History of Medicine

Coursework 101
OBJECTIVES

At the end of this lesson the student will:

1. Explain contributions of different nations and societies to the development of modern medicine.
2. Explain how the caduceus may have been acquired as the medical symbol.
3. Explain the reason Hippocrates is known as the Father of Medicine.
4. Explain the differences in the role of the physician, the surgeon, and the barber – surgeon.
5. Identify the contributions of medical innovators in history.
Vocabulary - Define

- Acupuncture
- Anesthesia
- Apothecaries
- Apprenticeship
- Asepsis
- Bloodletting
- Caduceus
- Cautery
- Coagulation
- Disease
- Epidemics
- Exorcism
- Guilds
- Hippocratic oath
- Hirudin
- Infectious
- Nihilism
- Pandemic
- Physicians
- Plague
- Practitioners
- Roentgen
- Scientific
- Surgeons
- Surgery
- Trephining
- Vaccination
Ancient History

- Ancient times were filled with infectious diseases and epidemics as well as illnesses and injuries caused by dietary deficiencies and an unhealthy or hostile environment.
- Eighty percent of primitive human beings died by the age of 30 as a result of a hunting accident or violence.
- Primitive individuals lived primarily alone, so there was little risk of widespread diseases or plagues.
- When these individuals moved from their solitary lifestyle to one of a community-based, including farming, and domesticating animals, epidemic diseases resulted.
Ancient History

• The epidemic of disease during these times was related to overcrowding, filth, and the natural presence of microorganisms.
• People of this era did not understand the concept of microorganisms, or the function of the human body, and the presence of disease was often blamed on evil spirits, demons, and supernatural forces, as punishment for disobedience to the gods.
• Treatments involved rituals to drive out demons.
• Herbs and plants were used as medicine.
  Examples:
  - Digitalis from foxglove plants
  - THEN, leaves were chewed to strengthen and slow heart rate.
  - NOW, medication is administered by pills, IV, or injections.
Early Egyptians

- First to keep accurate health records.
- Superstitious
- Identified certain diseases
- Prescriptions were written on papyrus.
- Egyptian physicians were priests who studied medicine and surgery in the temple medical schools.
- Temples were places of worship, medical schools, and hospitals.
- Only priest could read the medical knowledge from the god, Thoth.
- The pharaoh kept many specialists.
Early Egyptians

• Believed that blood in the body flowed through canals like those constructed along the Nile for irrigation.
• When physicians suspected that these canals were “clogged”, they were opened by bloodletting, or the application of leeches. The leech not only removed blood and disease toxins but also produced hirudin in the process, which prevented coagulation.
• The physicians were very conservative in their medical practice. They adhered to the rules of the Sacred Books so they would be free from blame if a patient died.
• If the physician tried a different treatment and the patient did not survive, the physician was executed.
Early Egyptians

• An Egyptian named Imhotep was considered outstanding and became the physician for the royal family.

• As a reward, he was given deity and named the Egyptian God of Medicine.

• By the year 2000 BC, the ruler of Babylon established a legal code for medical practice that set fees for services and established rules of conduct. It provided that the physician’s hands be cut off if the physician killed a patient or destroyed the patient’s sight.

• Special Note – These penalties only applied to patients from nobility – a slave just had to be replaced.
Early Egyptians

- Embalming
  - Done by special priests (NOT the doctor priests)
  - Advanced the knowledge of anatomy
  - Strong antiseptics used to prevent decay
  - Gauze similar to today’s surgical gauze

- Eye of Horus
  - 5000 years ago
  - Magic eye
  - Amulet to guard against disease, suffering, and evil
  - History: Horus lost vision in attack by Seth; mother (Isis) called on Thoth for help; eye restored
  - Evolved into modern day R$x$ sign
Early Egyptians

• Human dissection was studied in Alexandria, Egypt, and students throughout the world went there to study and use its library of 700,000 books. Alexandria became the center of learning and the home of a famous medical school.

• Some medical practices still used today.
  – Enemas
  – Circumcision (4000 BC) preceded marriage
  – Closing wounds
  – Setting fractures
Greek Influence

- They believed that Apollo, the Sun God, taught the art of medicine to a centaur who in turn taught others, including Asklepios, the Greek God of Healing, who lived around 1250 BC.

- The priest in the temples of Asklepios, also called Aesculapius, used massage, bathing, and exercise in treating patients. These priests also depended on the magical power of large, yellow, nonpoisonous snakes. After patients purified themselves by bathing and submitted offerings to the Gods, they were given tablets to read that described cures of former patients. They were then put into a drug-induced sleep and kept within the temple. During the night, the snakes licked the wounds and Asklepios applied salve. The god was usually depicted holding a staff with a serpent coiled around its shaft.

- It is believed that this is the origin of the medical symbol known as caduceus.
Greek Influence

- The Greeks absorbed ideas, drugs, and earlier methods of treatment from many of the countries and lands that they invaded. This curiosity and thirst for knowledge started medical research, and they began to investigate the causes of and reasons for illness in nature.

- The Greeks also concluded that poor sanitary practices contributed to the spread of disease.

- About 500 BC Alcmaeon dissected animals to study sight and hearing.

- Empedocles believed that blood gave life and the heart distributed it around the body.
Greek Influence

- First to study causes of diseases
- Research helped eliminate superstitions.
- Sanitary practices were associated with the spread of disease
- Hippocrates, the founder of scientific medicine, was born about 460 BC on the Island of Cos. During his 99 years of life, he propelled medical practice out of the realm of priests and philosophers and produced an organized method of gaining knowledge through the means of observation. He taught that illness was the result of natural causes and not punishment for sin. He advocated examining a patient’s environment, home, and place of work. He stressed the importance of a good diet and cleanliness.
Greek Influence

• Hippocrates felt that medical knowledge could only be acquired through accurate clinical observation of the sick. He discovered that the course of certain diseases could be traced by listening to the chest of a patient. He is best known for his code of behavior known as the Hippocratic oath, which medical schools still teach, and physicians repeat as they enter into practice. For all of his accomplishments Hippocrates became known as the Father of Medicine.
Greek Influence

• Aristotle, a contemporary of Hippocrates, was a philosopher and scientific genius and became the tutor of Alexander the Great.
• He brought together medicine, biology, botany, and anatomy. His findings were based upon animal dissection because human dissection was illegal where he lived.
Hippocratic Oath (Modern Version)

I swear to fulfill, to the best of my ability and judgment, this covenant:

• I will respect the hard-won scientific gains of those physicians whose steps I walk, and gladly share such knowledge as is mine with those who are to follow.

• I will apply, for the benefit of the sick, all measures which are required, avoiding those twin traps of overtreatment and therapeutic nihilism.

• I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon’s knife or the chemist’s drug.
Hippocratic Oath (Modern Version)

• I will not be ashamed to say “I know not,” nor will I fail to call in my colleagues when the skills of another are needed for a patient’s recovery.

• I will respect the privacy of my patients, for their problems are not disclosed to me that the world may know. Most especially must I tread with care in matters of life and death. If it is given me to save a life, all thanks. But it may also be within my power to take a life; this awesome responsibility must be faced with great humbleness and awareness of my own frailty. Above all, I must not play at God.
Hippocratic Oath (Modern Version)

• I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person’s family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick.

• I will prevent disease whenever I can, for prevention is preferable to cure.

• I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm.
Hippocratic Oath (Modern Version)

• If I do not violate this oath, may I enjoy life and art, be respected while I live and be remembered with affection thereafter. May I always act so as to preserve the finest traditions of my calling and may I long experience the joy of healing those who seek my help.

(Written in 1964 by Louis Lasagna, Academic Dean of the School of Medicine at Tufts University.)
India’s Contribution

• The Sacred Books, that were used by early Egyptians tell of priest-doctors in India around 1500 BC and listed their deadly diseases as malaria, dysentery, typhoid, cholera, the plague, leprosy, and smallpox. The Hindus had the world’s first nurses and hospitals. There was extensive use of drugs, including those for anesthesia that undoubtedly assisted with the main Hindu contribution to the art of healing: surgery. Their knowledge of anatomy was limited, but their surgeons performed a fairly technical form of cataract and plastic surgery.

• Early writings reveal that they used approximately 120 surgical instruments in many different operations.
India’s Contribution

• The Hindu environment was greatly improved with walled sewer drains and underground water pipes. Their level of medical knowledge and drugs spread to other lands through trade, migration, and by conquerors.
Chinese Influence

• The Chinese, had a highly developed center of early medical learning. Their belief in evil spirits as the cause of illness gradually changed; they began searching for medical reasons for illness.

• About 3000 BC, the emperor, Shen Nung, who was known as the Father of Chinese Medicine, followed a document through translation that was known as Great Herbal, which contained over a thousand drugs; some of which are still used today.

• The art of acupuncture was originally used as a means to drive out demons. Today this procedure is a respected alternative form of treatment. Acupuncture consists of the insertion of needles of various metals, shapes, and sizes into one or several of the 365 specified spots on the head, trunk, and extremities.
Early Romans

• Medicine was held in very low esteem in the Roman Empire. The Romans despised the wandering Greek physicians who came to Italy about 200 BC, many as slaves. Roman men treated their own families with early, primitive methods. In 46 BC, Julius Caesar gave physicians citizenship rights and they began to achieve status, but the demand for physicians opened to anyone, and little clinical teaching took place. The teachings of Hippocrates were largely ignored, and rival schools of medicine argued about his ideas.

• Claudius Galen, a physician from Asia Minor, emerged, professing to following the teachings of Hippocrates. He became a surgeon for a gladiatorial school after minimal medical training.
Early Romans

- Galen received extensive experience treating the severe wounds the gladiators received in the arenas. He later went to Rome and quickly became famous, but his arrogance caused hostility from other physicians and he was forced to return home. He was called back to Rome by Marcus Aurelius, the emperor. Galen successfully cured the emperor’s stomach ailment, and remained in Rome until his death. He produced over 500 books during this time, and his theories were accepted for the next 1300 years because he claimed they had the authority of Hippocrates.

- However, his philosophy ignored observation and explained disease as unbalanced “humors”. The body was believed to be composed of and regulated by the four humors (fluids) of life; blood, phlegm, black bile, and yellow bile. An imbalance of these humors was thought to result in illness.
Early Romans

- Galen prescribed diets, massage, exercise, and drugs to cool, heat, dry, or moisten the body as needed. His beliefs regarding blood and circulation set back medical progress. He did believe that knowledge of anatomy was necessary, so he dissected pigs and apes relating his findings to humans. His viewpoints went unchallenged until the 16th Century.

- The Romans made almost no contribution to medicine but established superior methods of sanitation and water supply. They realized disease was connected to filth and overcrowding. There were laws to maintain public health and clean streets. They built and extensive underground sewer system, and pure water aqueducts capable of bringing an estimated 300 million gallons of drinking water a day into the city.
Early Romans

• A private hospital system was also developed, first for the wealthy and slaves, then for the campaign armies. Later, public hospitals were founded, and the hospital movement expanded with the growth of Christianity and its tradition of caring for the sick.  
• Despite Rome’s advances, the empire began to fall as political, social and economic factors collapsed. The spread of disease that resulted from the disuse of the drainage system neighboring swamps that resulted in malaria and smallpox outbreaks killed thousands. In 542AD, the remnants of the empire were destroyed by the first major historically known pandemic, a disease occurring at the same time in different places, the bubonic plague. This disease had traveled from China and spread through trade routes to Egypt along the coast of North Africa to Palestine, Syria, and into Europe.
Medieval Medicine

Dark Ages (400-800 AD) and Middle Ages (800-1400 AD)

- Eventually medicine passed into the hands of the Christian Church and Arab scholars. The church did not foster medical science. They recommended prayer and fasting because they believed that illness was a punishment for sin. In 391 AD, a religious fanatic mob burned the great library at Alexandria. Christianity forbade human dissection so anatomy and physiology died except for the teachings of Galen. Priests again became healers, using exorcism and holy relics to cure the sick. Medicine was practiced only in monasteries and monks took on the task of translating and transcription of ancient manuscripts of the classical physicians, a task that preserved and circulated information before the invention of the printing press.
Medieval Medicine

• Terrible epidemics occurred during this time due to the recession of established health standards.
  – Bubonic plague (Black Death)
  – Small pox
  – Diphtheria
  – Syphilis
  – Measles
  – Typhoid fever
  – Tuberculosis
Medieval Medicine

Eventually it was discovered that:

- Crusaders spread disease, and special offices to deal with sanitary problems were developed.
- Realization that diseases are contagious resulted in quarantine laws being passed.
Medieval European surgeons’ practice was limited to nobility, the high clergy, and wealthy merchants. Other patients and minor surgeries were treated by ignorant barber-surgeons. They cut hair, practiced bloodletting, opened abscesses, and occasionally did amputations – all with the same razor. Their trademark became the white poles around which they wrapped their blood stained bandages. The red and white pole has descended to barbers today.
Arab Influence

• A second storehouse of medical knowledge was in the Moslem Arab Empire, which, by 1000 AD, extended from Spain to India. Arabs were eager for knowledge, and the classical learning was translated into Arabic. Medicine began a revival. Arab physicians learned about epidemics, and their great knowledge of chemistry resulted in their major medical contribution in pharmacology. They also continued the Roman system of hospitals, including at least four major teaching centers. All patients were admitted regardless of race, creed, or social status.
• One of the greatest physicians was known as Rhazes, the Arab Hippocrates. He was 40 before beginning medical study and was responsible for the construction of a hospital. He produced about 150 books, including a medical encyclopedia weighing 22 pounds. He based his diagnosis upon observation of disease, and his major contribution was distinguishing smallpox from measles. Anatomy was still based upon Galen’s theories. Due to the Arab belief that it was unclean to touch the human body with the hands, they were not good surgeons. He is credited with the use of animal gut sutures to sew wounds. The major surgical instrument was the cautery, a red-hot iron, applied to wounds and infected ulcers to “burn out the poison,” which was always very painful and disfiguring and often fatal.
Renaissance Medicine (1350-1650 AD)

• Universities and medical schools for research were established combining medical knowledge from both the East and West. Anatomy and Physiology and dissection practices were re-established using animals, and the schools had a highly organized curriculum upon which students tested and were issued agrees to become the first “true” doctors. Hippocrates and Galen remained the unquestioned authorities.

• Medical books were scarce until book publishing was established.
Pioneers in Medicine

15th Century
• Leonardo da Vinci – Created Anatomical Notebook B which included detailed drawings of human anatomy.

16th Century
• Vesalius – He completed human dissections on corpses he took from the gallows or bought from grave robbers. He determined that the structures that Galen dissected were descriptions of primate anatomy and not human. He published a book on the human body that contained over 300 illustrations proving Galen’s errors.
16th Century

- William Harvey – Observed that blood in the arteries always flowed away from the heart while blood in the veins flowed toward it, with valves that prevented it from changing direction. He also realized that the same blood had to be pumped repeatedly. He knew blood passed had to be passed through the lungs to be purified, but he died without discovering the capillaries between the arteries and veins.

- Gabriele Fallopian – Discovered the fallopian tube in women’s anatomy.

- Bartolomeo Eustachi – Discovered the eustachian tube in the ear.
Pioneers in Medicine

17th Century

• Anton van Leeuwenhoek – Invented the microscope; observed microorganisms and blood cells.
• Gabriel Fahrenheit – Introduced the thermometric scale and developed the mercury thermometer.

18th Century

• Edward Jenner – Developed smallpox vaccination.
• Rene Laennec – Invented the stethoscope because he could not hear the heart and lungs in an obese patient with his ear. It was originally a rolled up piece of paper, but later became a wooden tube.
Pioneers in Medicine

18th Century
• Joseph Priestly – Discovered oxygen and nitrous oxide.
• Benjamin Franklin – Invented bifocals and discovered that colds could be passed from one person to another.
• Ignaz Semmelweis – Early pioneer of strict handwashing practices.

19th Century
• WTG Morton – Introduced ether to make his patients more comfortable during surgery.
Pioneers in Medicine

19th Century

• Florence Nightingale – Founder of modern nursing. Established a professional nursing school, and helped improve care provided by hospitals.

• Clara Barton – A civil war nurse, recognized the need for support services for soldiers and established the American Red Cross.

• Louis Pasteur – Discovered microorganisms could be destroyed by heating. The treatment of milk with heat to destroy organisms carries his name, pasteurization. He also discovered a vaccine to cure and treat rabies.
Pioneers of Medicine

19th Century

- Elizabeth Blackwell – First female physician in the United States. She opened a medical college for women in New York, and later a hospital exclusively for women.

- Joseph Lister – Realized microbes in the air caused infections after surgery. Used diluted carbolic acid to disinfect the skin, his hands, and instruments and developed a pump to spray the air. This was the foundation for medical asepsis.

- Ernest von Bermann – Was the first physician to introduce heat sterilization of surgical instruments, and was an early adopter of the “white coat”.
Pioneers in Medicine

19th Century

• Robert Koch – Known as The Father of Microbiology and founder of modern day bacteriology, is known for his role in identifying the specific causative agents of tuberculosis, cholera, and anthrax.

• Paul Ehrlich – Invented the precursor technique to Gram staining bacteria which made it possible to distinguish between different types of blood cells; discovered arsphenamine (Salvarsan), the first effective medicinal treatment for syphilis and initiated the concept of chemotherapy.
Pioneers in Medicine

19th Century

- Wilhelm von Roentgen – Discovered x-rays, which were later called Roentgen rays.
- Elias Metchnikoff – Discovered how white blood cells protect the body from disease.
- Walter Reed – Discovered the cause of yellow fever as a virus carried by a mosquito.
- Marie Curie – Discovered radium, and her work led to the radium treatment of cancer.
Pioneers in Medicine

19th Century

- Humphry Davy – determined that nitrous oxide could be inhaled and used as an anesthetic.
- Samuel Guthrie – combined whiskey with chlorinated lime in an attempt to produce a cheap pesticide, later known as chloroform.
- Sir James Young Simpson – Used the sweet smelling, colorless, non-flammable liquid created by Guthrie as an anesthetic.
- Dmitry Ivanovsky – Discovered that sap from a diseased tobacco plant remained infectious to a healthy plant despite having being filtered. He called the infectious substance a virus. This is considered to be the foundation of virology.
Pioneers in Medicine

19th Century

• Elsie Strang L’Esperance – Established the Strang Clinic due to her concern for early cancer detection.

• George Papanicolaou – Worked in the Strang Clinic, and created the Pap test to diagnose cervical cancer.

20th Century

• Frederic Banting – Discovered and isolated insulin.

• Gerhard Domagk – Discovered that red dye called prontosil killed coccus – family organisms and led to the development of sulfa drugs.
Pioneers in Medicine

20th Century

• Alexis Carrel – Discovered severed arteries could be joined again and be functional.
• Jonas Salk – Discovered that a dead polio virus could cause immunity to polio.
• Alexander Fleming – Discovered the first antibiotic, penicillin.
• Alfred Sabin – Created oral polio vaccine.
• Sigmund Freud – founder of psychoanalysis.
Pioneers in Medicine

20th Century

• Michael DeBakey – Successfully replaced arteries with Dacron tubing, and patient’s did not experience immune reactions; developed the auxillary heart pump.

• Charles Hufnagel – Successfully replaced a heart valve with the first artificial one.

• Joseph Murray and J. Hartwell Harrison – Performed the first successful transplant, a kidney between identical twins.

• Walton Lillehei – Created a pacemaker along with two engineers, with silver-plated wires going through the chest attaching to the surface of the heart.
Pioneers of Medicine

20th Century

• Ake Senning – First physician to implant a pacemaker.
• Norman Shumway – The Father of Heart Transplantation, created the techniques used in the first heart transplant.
• Christiaan Barnard – Using the techniques developed by Shumway completed the first heart transplant.
• Karl Landsteiner – Describes blood compatibility and rejection, which developed the ABO blood system of blood typing.
• Charles Drew – Developed improved techniques for blood storage, blood banks, and blood transfusions.
Pioneers of Medicine

20th Century

- Sir Frederick Gowland Hopkins – Suggest the existence of vitamins and concludes that they are essential to life.
- Paul Dudley – Cardiologist and pioneer in use of the electrocardiograph.
- John H. Gibbon – Successfully uses the heart – lung machine.
- James Watson and Francis Crick – Describe the structure of DNA molecule
- William DeVries – Implants the Jarvik-7 artificial heart, the patient lives 112 days.
Pioneers of Medicine

21st Century

• Luc Montagnier Francoise Barre – Sinoussi – Discovered that a retrovirus caused AIDS.
• Harald zur Hausen – Discovered that human papilloma viruses lead to cervical cancer.
Advances in Medicine in 21st Century

• In 2003, The Human Genome Project was completed.
• 2006, A mini liver the size of a small coin is generated from human cord blood stem cells by doctors at Newcastle University, U.K.
• 2014, The FDA approves the first clinical trials for a wearable artificial kidney.
Discoveries for the Future

• Research is now being conducted to create electronic clothing that allows continuous monitoring of a person by sensors imbedded into a self-contained garment.

• In 1996, the first animal was cloned and this research is being applied to potentially clone organs for transplants.

• Micro-miniaturization technique is being developed that will permit visualization inside the digestive system.

• The future of medicine is promising with medical advancement and our technology driven society.
Reference