



History of oral surgery

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Abstract

The art of dental surgery has been one of the most innovative historical developments for the understanding and study of the human being, since ancient times multiple civilizations contributed great knowledge about it for its understanding, as they sought to maintain health or recover it.

Since ancient times they performed hemorrhage control, wound management, abscess drainage, dislocations, fractures, extraction of dental organs, and extirpation of tumors, collecting and describing anatomical, clinical, pathological data and surgical techniques.

Undoubtedly, they were also busy documenting their findings and medical advances, with the Edwin Smith papyrus and George Ebers being the first treatises, which recorded surgical procedures and medicines based on plants and natural remedies respectively.

The historical and scientific advances of Surgery and the knowledge of its origin and development are basic to understand its importance and the better understanding of medical work in current times.

Keywords: Dental surgery, medical act, history, historical development

Introduction

Since ancient times the dental art has been considered a constituent area of the medical act, the doctor became the officiant of a consecrating rite that lasted about four thousand years between the dawn of the urban culture of the Mediterranean basin until the emergence of the Hippocratic school ^[1, 2]. All curative actions were performed by physicians, such as operations and treatment of diseases of the mouth and teeth. Before the creation of educational institutions of dentistry, it was subordinated to medicine as a technical medical knowledge without scientific and social recognition ^[1]. The evolution over time of the surgical discipline is interesting because it allows us to know and understand the dental surgical task over time.

Oral disease has existed since the appearance of man on earth, and its origin and evolution have gone hand in hand with medicine, with both disciplines sharing since ancient times the search for and the remedy to pain, suffering and disease.

Dental surgery has emerged and developed throughout history in different cultures and civilizations, therefore, it is the result of the development of human knowledge and its evolution has accompanied social, economic and cultural changes over time. These trial-and-error learning events laid the foundation for what is known today as outpatient surgery, and the advent of technology marked a before and after in the day-to-day activity of surgical procedures.

Analyzing history obeys to a general interest of knowledge, "because it fulfills a function, that of helping us to understand the present" (Luis Villoro, 2005), it seems that if we do not refer to a past with which to connect our present, it will be incomprehensible and meaningless.

The aim of this article is to carry out a systematized research to investigate the relevant historical aspects of surgical-dental work and its medical foundation in history.

Surgical act

The surgical act, also known as surgical procedure or operation, is carried out for various purposes: curative, palliative, diagnostic or prophylactic purposes, may be called surgical steps that include exeresis or section of tissues by means of a cutting instrument, exeresis or removal of a portion of tissue, part of an organ or a complete organ, and synthesis or union of the incised tissues ^[3]. It is also necessary during the surgical procedure to consider the dissection in order to expose the surgical area, the hemostasis essential for the control of transoperative bleeding and the adequate exploration once the surgical procedure is concluded, ensuring that it has been concluded without adverse events or complications.

Historical development

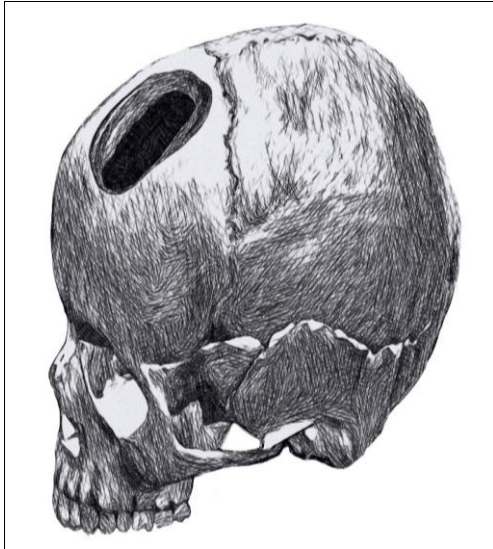
In ancient times, surgery was performed in an intuitive, mystical or religious manner, limited to the care of external injuries, these surgical acts were carried out in an experimental manner, and with the passing of time, it evolved with the contributions of surgeons from different periods and with the discoveries of anesthesia, antibiotics, and the control of inflammation; up to the present time with the development of robotic surgery and minimally invasive surgery. In this sense, the birth of medical and surgical schools was also important, professionalizing surgical education.

In the following, we will describe the timelines of man's evolution on earth and the surgical acts performed during each of the epochs.

Prehistoric times (3000 - 3300 B.C.)

It is the stage from the appearance of the first hominids, until the invention of writing, at this time man was nomadic, later he discovered agriculture, invented the wheel and became sedentary.

At this time, surgical procedures included compression and bandaging of wounds to control bleeding and immobilization of fractures with clay casts. Cranial trepanations (Fig. 1) were already being performed in cranioencephalic trauma, to release intracranial pressure and cerebral edema, and wounds were sutured with vegetable fibers.



Source: Our own

Fig 1: Sample a surgical trepanation performed in prehistoric times

Ancient Age (3300 BC - 476 AD).

This stage lasted from 3000 BC until the fall of the Western Roman Empire. With the invention of writing, the ancient age began and the first cities were founded, giving rise to the state and the recording of historical events. The first civilizations were those of Egypt, China, India and the Mediterranean. Surgery has evolved with its great differences and similarities in different cultures.

Egypt

In this culture, the Edwin Smith papyrus (Fig. 2) is the oldest document found, the first treatise on surgery that describes the clinic, anatomy, physiology, pathology and treatments used at that time. It is believed that they were the first to perform circumcision on children, there was already a rational and empirical medicine. The German Egyptologist George Ebers acquired the papyrus and named it after himself. The Ebers papyrus contains a record of herbal medicines, detailing more than 700 recipes and natural medicinal remedies.



Source: Our own

Fig 2: Sample oil painting by Edwin Smith taken from Vargas, *et al.*, 2012^[7], p. 1358.

India

The Hindu surgery figured as a discipline of Ayurveda medicine, this collects the medical doctrines, these writings are the Sushruta Samhita and Charaka Samhita. The first is of a surgical nature, describing perineal carving, stone extraction, hernia healing, abscess drainage and suturing the intestine with ant heads, using henbane and hemp to perform surgery, and the second is of a medical nature, describing body regions, bones, viscera, vessels and nerves (Sancho, 1981, p. 6).

Messopotamia

Located between the Tigris and Euphrates rivers, it included the extinct civilizations of Sumer, Akkadia, Assyria and Babylon. Surgeons operated on cataracts, drained abscesses, extracted teeth and performed phlebotomies. Their actions were governed by the Code of Hammurabi, which was one of the first codes regulating medical work^[3].

Pre-Columbian surgery

Las prácticas quirúrgicas en esa época fue el resultado de las observaciones y experiencias y el acúmulo de conocimientos que inició con el surgimiento de la agricultura en México y en la Costa Norte del Perú, alcanzando un notable desarrollo en algunas culturas^[4]. The immobilization of fractures, the use of moss compresses soaked with turpentine and birch bark as splints, the opening of abscesses with flint blades and eagle feather probes are known. Pre-Hispanic medical and surgical practice in Mexico-Tenochtitlan is considered one of the greatest testimonies of the splendor of their culture^[5, 6].

The Mexica physicians integrated a vast collection of clinical and pathological data, describing a medical-surgical nomenclature that demonstrated their great advances, with dentistry and surgery occupying a preponderant role. The surgeon was known as the Toxotaticitl.

Greece

A mythological medicine was used to treat war wounds, This type of religious practice was rationalized until the arrival of Hippocrates of Cos who rationalized medicine, he assured that the disease had a natural origin, due to an imbalance between the humors: blood, yellow bile, black bile and phlegm.

He was the author of the corpus Hipocraticum with splendid descriptions of wounds, dislocations, fractures, ulcers, hemorrhoids and anal fistulas. The great contribution of Hippocrates was the scientific explanation of medicine, establishing already at that time diagnosis, prognosis and treatment. Not to mention the Hippocratic oath that was concerned with the ethics and integrity of medical work.

Alexandria

The Alexandrian school is distinguished by its studies of anatomy, dissections on corpses and vivisections on the condemned to death, surgery acquires its scientific basis, Herophilus surgeon of Chalcedon establishes the synchrony between the pulse and the heartbeat.

Rome

There was a great influence of Greek physicians, the Romans were the first to create military hospitals, creating the nosocomios, the most prominent representatives of this time were Cornelius Celsus, who described the cardinal

signs of inflammation, Claudius Galen, contributed knowledge in anatomy and physiology, and Antyllus who treated arterial aneurysms and cataracts. In general, the Roman contributions in surgery were the medical specialization and the extensive and diverse surgical instruments.

Middle ages (476 AD-1492)

This era saw the beginning of transformations that began with the fall of the Roman Empire and ended with the discovery of America. The most outstanding events at this time were the invention of the printing press and the arrival of Christopher Columbus in the New World. In Europe, the medieval period opened the way to the foundation of Germanic kingdoms, the expansion of Christianity and the feudal socioeconomic organization.

Byzantine Surgery

Paul of Engina contributes 7 books of surgical content, on war surgery, mastectomies, lithotomies, ophthalmology and obstetricia

Medieval - Arab surgery

Its main exponent was Rhazes or Al-Razi of Persian origin and who was known as the second Galen, was of Persian origin, author of the *Kitab al-Mansuri* which contained anatomy, physiopathology and therapeutics. Abulcasis describes the use of cauterization, drainage of abscesses, phlebotomy and removal of tumors.

Western medieval surgery

Three types of surgeons can be distinguished: barbers with empirical knowledge and no training, sworn surgeons or master surgeons who had theoretical training and spoke Latin, and itinerant surgeons specialized in the practice of one or two types of operations. In Italy, the first secular medical schools emerged, being the school of Salerno, considered the first medical school in the world, which incorporated Greek and Arabic knowledge.

Renaissance surgery

In this stage, the progress of surgery had to do with the greater knowledge of anatomy, with Leonardo Da Vinci and Andres Vesalio contributing significantly with their anatomical work: *De humanis corporis fabrica libri septem* (Fig. 3), product of the findings in the dissections practiced.



Source: By Jan van Calcar- <http://seeing.nypl.org/MAIN.html>, Public domain

Fig 3: On the structure of the human body, a book by Andrés Vesalius

Ambrose Paré was an outstanding barber surgeon who considered that a surgery had five functions: “to eliminate what is superfluous, to restore what has been dislocated, to separate what has been united, to reunite what has been divided and to repair the defects of nature”. All his works were written in French.

John Hunter considered the most influential surgeon in the eighteenth century, founder of experimental pathology in England, his research and clinical work resulted in a collection of more than thirteen thousand specimens, his main legacy in surgery. This collection is housed at the Royal College of Surgeons of England.

In 1830 chloroform, ether and nitrous oxide were discovered and began to be used experimentally as an anesthetic agent, and in 1846 John Collins Warren used sulfuric ether experimentally on a surgical patient, resecting a jaw tumor. On the other hand, Joseph Lister introduced the aseptic method in surgical practice, he used carbolic acid by spraying the instruments, sutures and the operative wound with it, and the hands of surgeons and assistants were washed, then the hands were immersed in a solution of carbolic acid for a certain time, and the surgical area was sprayed with sprays of the same product. This protocol was published by Lister in his article: "On the antiseptic principle of the practice of surgery in The British Medical Journal in 1867.

Modern age (1492-1789)

It arises between the Middle Ages and the beginning of the Contemporary Age, from the Renaissance to the beginning of the French Revolution. At this time, science permeated every branch of medical knowledge, the first autopsies were performed to establish the hidden causes of the disease. Surgery begins as a discipline, Lorenz Heister, a German surgeon, writes the first book on surgery, in which he describes the first finding of appendicitis in a cadaver. The specialty of traumatology appears. Benjamin Bell summarized surgical knowledge in the encyclopedia: System of surgery.

Contemporary age

It corresponds to the end of the modern age until the present time. It includes from the independence of Haiti to the fall of the Berlin Wall. It is a time of great French, Russian and Chinese revolutions, through two world wars and struggles for independence and decolonization. Capitalism was consolidated, new information and communication technologies arrived and the globalized world emerged.

In the area of surgery the axiom was knowledge of human anatomy, anesthesia, aseptic and antiseptic conditions in the instruments, the patient, the surgeon and the operating room, and methods for controlling bleeding and maintaining hemostasis.

Conclusions

Undoubtedly since ancestral times with the appearance of man on earth, in all cultures there was the impulse to solve health problems that were initially solved by trial and error, the surgical discipline evolved from remote times of magic and mysticism, to the rationalization of medical work, the arrival of writing, the invention of the printing press, the sharing of knowledge, the establishment of schools and hospitals, acquiring a scientific character and consolidating surgery as a professionally recognized scientific discipline. Today, with the advent of technology, globalization and major advances in diagnostic and therapeutic techniques, surgical care involves quality procedures and provides safety to the patient in need.

Acknowledgment

I dedicate this article to the memory of Dr. Antonio Castellanos Olivares, excellent anesthesiologist and better human being, always ready to teach, guide and support resident physicians in their clinical and research activities. You will always be in my heart beloved friend.

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