SURGERY IN ANCIENT ROME

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With their belief in the healing power of gods combined with the influence of the Greeks in finding empirical evidence of the origins of diseases, ancient Romans made significant contributions to the history of medicine.

Healthy lifestyle

Daily life in Rome was generally harsh by today's standards. Besides the many hazards of simply surviving daily life, physical illness and injury were significant concerns. How did the Romans deal with these challenges? They stayed fit.

The Romans believed that a healthy mind equaled a healthy body. They also observed that a fit body could fight diseases more effectively than an unfit one. Rather than spend money on doctors, Romans spent their income on staying fit.

Celsus, a Roman writer generally believed to have lived circa 175 or 180 CE, is credited with saying, "A person should put aside some part of the day for the care of his body. He should always make sure that he gets enough exercise, especially before a meal."[9]

All eight volumes of Celsus's *De Medicina* (*On Medicine*) have been discovered intact. From his writings, historians concluded that Celsus knew the difference between fresh wounds and ulcers that were slow to heal. He also knew how to prevent hemorrhages by clamping blood vessels. Complex surgical procedures, such as goiter and cataract removal, were described in his works, as well as plastic surgical procedures, including "countercircumcision" and gynaemastia (breast reduction).[3]

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Ancient beliefs

The Romans maintained that diseases and catastrophic natural occurrences were caused by gods. Prayers, sacrifices, and pagan rites were considered the only ways for healing to occur.

"Prior to the Christian era, there were temples, such as the Aesculapium on the Tiber Island, where the sick spent the night in prayer to the gods hoping to receive a cure, and 'doctors' made rounds doing what little they could. And there were establishments to house the dying or sick, essentially to keep them off the streets. The concept was not to cure or even care, but to keep the wretched and sickly poor off the streets. Out of sight, out of mind, so to speak."[11]

Thanks to the influence of the Greeks, the Romans were also starting to discover at this time, that there were often explanations for many seemingly unexplainable phenomena. For example, the Romans noticed an increase in disease among people who lived near malaria-infested swamps and in areas with bad sewage problems. This led them to conclude that illnesses could have a natural cause, which resulted in their creating a system of aqueducts and sewer pipes to improve the public health of all Roman citizens. "In this sense, the Romans were the first civilization to introduce a program of public health for everyone regardless of wealth."[9]

The Romans also took great care in where they built their cities, homes, and military encampments:

"When building a house or farm, special care should be taken to place it at the foot of a wooded hill where it is exposed to health-giving winds. Care should be taken where there are swamps in the neighborhood, because certain tiny creatures which cannot be seen by the eyes breed there. These float through the air and enter the body by the mouth and nose and cause serious disease."—Marcus Varro[9]

"There should be no marshes near buildings, for marshes give off poisonous vapors during the hot period of the summer. At this time, they give birth to animals with mischief-making stings which fly at us in thick swarms."—Columella[9]

Clean water was also very important in Roman society. Towns, military camps, and villas were almost always built near springs, so that a ready supply of moving water was available.

Courtesy of Historical Collections & Services, Claude Moore Health Sciences Library, University of Virginia.

FIGURE 1: Scalpels

But as the cities grew in population, the need for water increased. The lead pipes of the time were not sturdy enough to handle the large amount of water needed to flush waste out of an expanding city, and bronze—although available—was too expensive for such a massive undertaking.

The techniques for manufacturing cast iron pipes were not known to the ancient Romans, so they instead invented a system of conduits that moved water overland. When the water needed to cross valleys or rivers, the Romans built aqueducts that served as bridges for the water to cross. As the water neared the cities, it was directed into smaller bronze or ceramic pipes, which slowed the water's speed and allowed the Romans to direct water into homes and buildings. By 97 CE, an estimated one billion liters of water were pumped into Rome each day.

Good personal hygiene, which was important to the Romans, could be achieved with this system of clean water, and Romans eventually became famous for their baths—used by both rich and poor citizens. Even the sick were encouraged to bathe regularly, because it was believed that cleanliness would speed the healing process.

Most Roman households had toilets, as did all military forts. "By 315 CE, it is said that the city of Rome had 144 public toilets, which were flushed clean by running water."[9] To flush this vast system of wastewater out of the cities, Romans invented and created highly efficient sewers, considered by some to be one of the Roman empire's greatest achievements.

Lack of hospitals

Hospitals, as they are known today, did not exist in ancient Rome. Medical facilities were only available in military camps. Some of the wealthier families had buildings called valetudinaria on the grounds of their estates, but these were built primarily "to deal with sick or injured slaves and to isolate them from the rest of the staff and family."[11]

The concept of the modern hospital did not come into existence in Europe until well after the time of Constantine and the rise of Christianity. "While these early Christian hospitals were grossly inadequate in terms of medical capabilities (they essentially served as last stops for the dying or quarantine centers), the concept of providing care to the public was the actual intent."[11]

Courtesy of Historical Collections & Services, Claude Moore Health Sciences Library, University of Virginia.

FIGURE 2: Bone levers

FIGURE 3:
Surgical scissors

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Roman physicians

The medical profession in ancient Rome was not highly regarded. It was considered "a low social position, fit for slaves, freedmen and non-Latin citizens, mainly Greeks. While there were some who were respected, most were considered just as they were—cheaters, liars and quacks. The majority of doctors, at least early on, were self-taught or apprenticed practitioners who simply claimed to be healers, with little basis in scientific, medical knowledge. Many doctors did try to find effective treatments and perform valuable services for the community, but even more were simply engaging in ways to con and cheat their patients. Since there were no licensing boards, no formal requirements or education for entrance to the profession, anyone could call himself a doctor. If his methods were successful, he attracted more patients; if not, they simply moved on to another career."[2] With their less-than-spectacular success rates, Roman physicians were viewed with suspicion and scorn by the rest of society.

Some of the wealthier physicians established practices that resemble those of today, with an office and staff. "Others simply advertised their services on the streets, going so far as to perform simple surgeries in front of crowds to increase their notoriety."[2]

Beauty supplies and cosmetics were commonly sold by doctors, and most were willing to treat any ailment, if the price was right. This was despite their recognition that their treatments were usually ineffective. There are even reports of doctors being hired as assassins and poisoning their patients.[2]

With the establishment of a medical school around the first century in the Common Era, the field of ancient medicine became more uniform and practical. Surgeons grew more skilled and valued. The largest gains in knowledge, though, continued to originate from procedures and observations performed by the medical corps of the Roman military. These advances formed the basis for the entire field of medicine for the next two millenia.[2]

Galen

By far the most famous and important physician of the Roman world was Galen, who was born in 129 CE. Galen served as a physician for the gladiator school in his hometown of Pergamum, in modern-day Turkey. The knowledge and experi-

Courtesy of Historical Collections & Services, Claude Moore Health Sciences Library, University of Virginia.

FIGURE 4:
Cupping vessels for bloodletting

ence he gained in trauma and wound treatment had an enormous impact on the history of medicine and led him to regard wounds as "windows into the body."[6]

After leaving the gladiator school, Galen moved to Rome and became personal physician to the Emperor Marcus Aurelius. As part of his royal duties, Galen performed many surgeries that were not replicated for almost 2,000 years, including brain and eye surgery.[6] "To perform cataract surgery, Galen would insert a long, needle-like instrument into the eye behind the lens. He would then pull it back slightly and remove the cataract. The slightest slip could cause permanent blindness."[6]

Galen continued to do experimental surgeries throughout his life, including public vivisections of animals to study the anatomy and function of the kidneys and spinal cord. In one of these public displays, Galen dissected a live pig, cutting its nerve bundles one at a time and ending with the laryngeal nerve (now also known as Galen's nerve), which ended the pig's squealing. In other demonstrations, he tied the ureters of live animals to prove that urine is produced in the kidneys, and he severed spinal cords to study paralysis.[6]

His public dissections were very valuable in debating the biological theories of the time and were one of the primary means of academic learning in Rome for citizens as well as for medical students. So significant were the findings of his research that his writings were still used as manuals for physicians in the early 1800s, and Galen—together with Hippocrates—is considered one of the earliest and most significant contributors to the history of medicine.[6]

Surgical procedures

In ancient Rome, it was commonly recognized that blood moved through the body via a system of arteries and veins. Surgeons knew how to stop the flow of blood by using tourniquets, arterial clamps, and ligatures. They also knew how to prevent deadly gangrene by performing amputation of the infected limbs.

Historians have learned that Roman surgeons performed cataract surgery by pushing a thin needle through the eye to break up the cataract. Then the small pieces were suctioned through the small hole in the needle, restoring at least a moderate amount of sight to the patient.

"Other operations involved plastic surgery. One report discusses an individual getting his earlobes repaired after years of wearing heavy earrings. The excess lobe was trimmed, and the hole sewn together. Freed slaves prompted another common, but expensive, plastic surgery. The brandings and scars of the freed slave could be removed for a price. This would minimize the recognition and stigma of having been a slave in this ancient society."[13]

"Perhaps the most amazing operations were performed on the brain. Trepanation, the name of the procedure used, provided relief to patients with incurable headaches and relieved pressure on the brain resulting from head injuries. The surgeon used a cylindrical drill bit to cut a circle in the skull. He would rotate the drill using a bow-like device, much like the ones used to rub sticks together in making a fire. Patients had a high survival rate, and, amazingly, no anesthetic was needed."[13]

When used, anesthestics in ancient Roman times could not compare to today's standards. "Surgeons wanted to minimize the screaming and fighting of patients during surgery; the pain of the patient, however, still scared many. They used opium, henbane, and mandrake. Opium numbed the patient and limited movement. Henbane induced sleeping and a slight amnesia. Finally, mandrake slowed the heart rate and deadened pain. Even with the help of these anesthetics, the standard for a good surgeon was speed!"[12]

It was perhaps because of this and the low-survival rates of many surgeries that led Roman society to place such a high value on diet, gymnastics, exercise, massage, and sea-bathing.

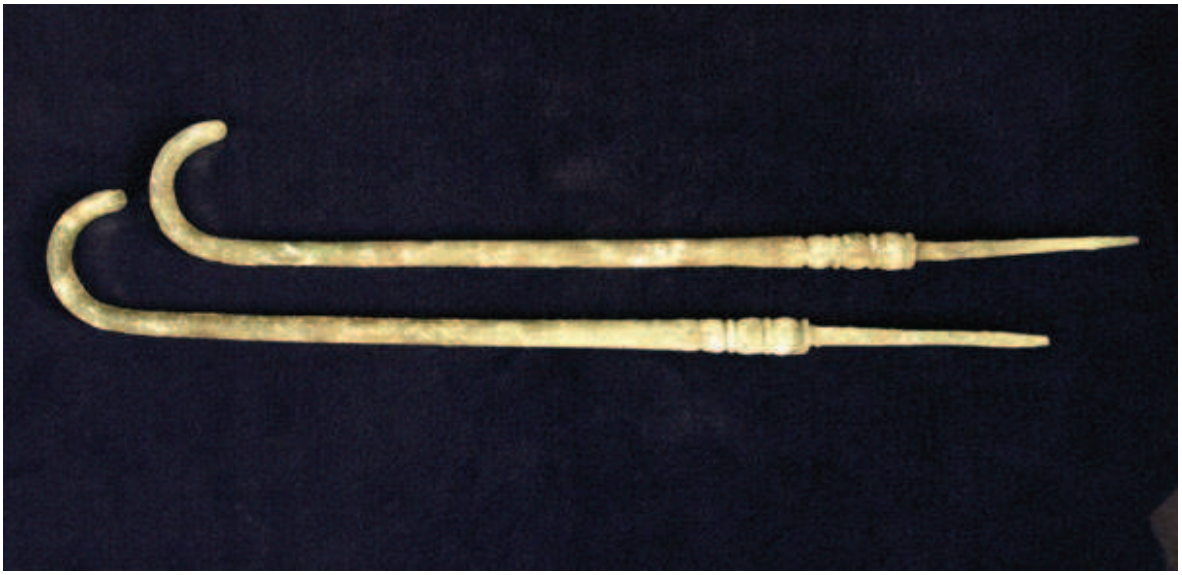
Surgical instruments

The surgical tools found by researchers, especially those discovered in the remains of Pompeii, the city buried by volcanic lava from Mount Vesuvius in 79 CE, provide insight into the tools used by surgeons in Rome. In the home of one Pompeiian surgeon, many surgical instruments, including scalpels, scissors, and bone forceps, were found in pristine condition under the ash of the volcano. "Much of what we know about Roman medicine is because of the 'House of the Surgeon'."[13]

"The instruments found at Pompeii represent the normal range that a surgeon of the time would have needed. They were mostly bronze, brass or copper, but blades and needles were almost invariably made of iron or steel. Most of the instruments could be heated up and used for cautery. By heating the instruments, the surgeons were, without realizing it, sterilizing them."[3]

Instruments found

Scalpels, usually were manufactured of either steel or bronze, or a combination of the two (for example, steel blade and a bronze handle). They were used to make incisions and were typically stored and carried in a wooden box, laid head to tail and separated by small, fixed partitions.



Courtesy of Historical Collections & Services, Claude Moore Health Sciences Library, University of Virginia.

FIGURE 5: Obstetrical hooks/ sharp hooks

Hooks, both sharp and blunt, were employed regularly by Roman physicians in much the same way that surgeons today use them. "Blunt hooks were primarily used as probes for dissection and for raising blood vessels. Sharp hooks were used to hold and lift small pieces of tissue so that they could be extracted and to retract the edges of wounds."[7]

Bone drills, which resembled modern cork screws, were used to remove diseased bone tissue from the skull and to extract foreign objects, such as weapons, from bones. Bone forceps were utilized to extract small objects that were otherwise difficult to remove with the surgeon's fingers. During trepanation of the skull, the surgery described above to relieve headaches, was performed in such a way so that the drill did not penetrate quickly into the dura matter. The surgeon frequently plunged the drill into cold water to avoid overheating the bone.

Catheters, like their modern successors, were employed by Roman surgeons to open up blocked urethra to treat urinary tract infections.

Uvula crushing forceps were often used by the famous physician Galen for treating coughs. Galen used the forceps to crush the uvula and then cut it off. This harmless, but senseless, operation was one of Galen's primary sources of income as well as a popular treatment in ancient Rome.

Several types of vaginal specula have been discovered, and "they generally demonstrate the high degree of engineering skill available to the ancient doctors. Most of the vaginal specula consist of a screw device, which, when turned, forces a cross-bar to push the blades outwards."[7]

Bleeding cups collected blood from a patient in a diseased area of the body. It was thought that removal of the blood would rid that area of the disease. The larger cupping vessel was selected for larger areas of the body, such as the back or thighs, while the smaller cup was likely chosen for smaller areas, such as the arms.

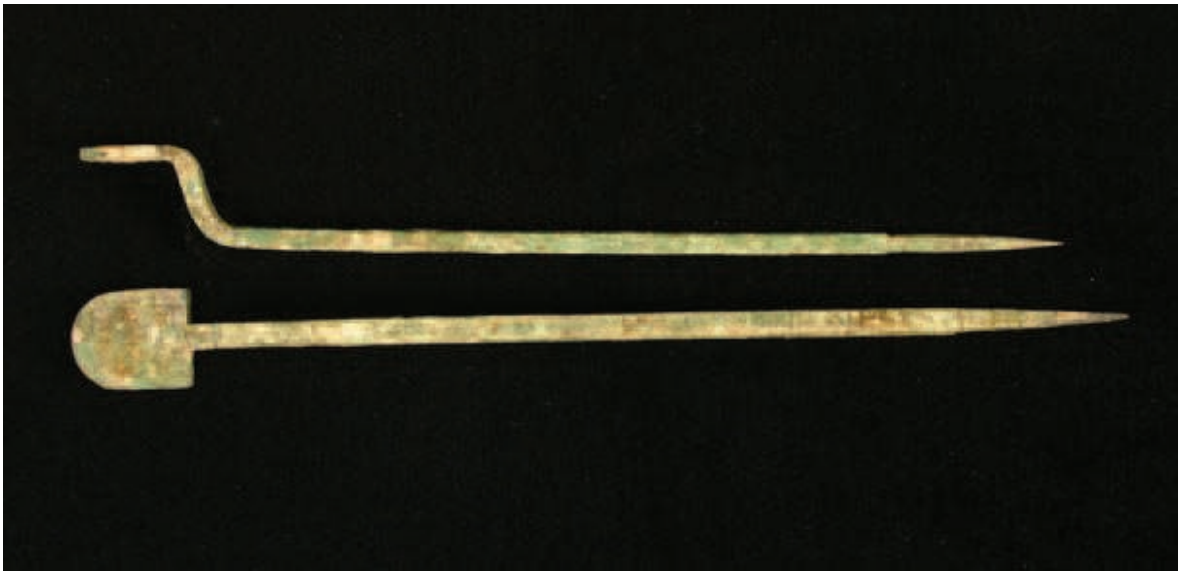
Roman physicians carried wooden medicine boxes to contain their forceps, scalpels, catheters, and even arrow-extractors.

Instrument sterility

It is unclear whether Romans understood the importance of sterilizing their surgical instruments, but they did use many techniques to kill germs that were not formally invented until much later. For example, they boiled their tools before use and would not reuse the same tool on a patient without placing it into boiling water a second time. Wounds were typically washed with acetum, which is actually a better antiseptic than the carbolic acid used by Joseph Lister more than 1,500 years later.

Conclusion

The lack of truly sterile equipment, few if any painkillers or anesthetics, and the reliance on superstitions and myths would probably make any modern-day surgeon cringe when reading



Courtesy of Historical Collections & Services, Claude Moore Health Sciences Library, University of Virginia.

FIGURE 6: Tile cautery

about the medical practices of ancient Rome. In many respects, though, the Romans laid the foundation for certain areas of modern medicine. From the Romans, surgical methods began to be based on their extensive study of anatomy and physiology as well as their examinations of the human body's reactions to disease and injury. The use of physical examinations improved as more detailed patient histories began to be kept, which allowed surgeons to eventually compare cases and share information.

In addition, the vast experience that Roman physicians gained on the battlefield from treating wounded and ailing soldiers, led to a tremendous advancement in knowledge and surgical practices. Furthermore, the bureaucracy of Rome insisted that the treatments and knowledge perfected by military physicians be taught in the new medical schools being formed.

Although physicians still were not regarded highly in Roman society, and many citizens continued to believe that the head of the household was more capable than a doctor of tending to the care of his family, the field of medicine expanded tremendously during the time of the Roman Empire.

About the author

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Sterling has been working in the O.R. exclusively since 1982 and began her perioperative career in 1968. "I have been involved in the 'miracle of medicine' for the last 35 years." At the AST Annual Conference in Las Vegas she presented "Ancient Surgery."

Editor's Note: *The notations BCE (Before the Common Era) and CE (Common Era) are terms that refer to BC (Before Christ) and AD (Anno Domini) as time references. More information about these terms is available online at* ***http://en.wikipedia.org/wiki/BCE.*** *For more information on Galen (also known as Claudius Galenus), see the September 2004 and November 2001 issues of this journal. For more information on ancient medicine, visit* ***http://www.healthsystem.virginia.edu/internet/library/historical/artifacts/antiqua/.***

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