



ANCIENT SURGERY

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Introduction

- **Great civilizations developed in ancient times in many parts of the world & particularly in the Mediterranean: the "*Cradle of Civilization*"**
- **Medicine & Surgery have a long history in the Mediterranean. They go back to the ancient Egyptians & Greeks & continue with the descendants of Alexander the Great & the Romans**

**This is a rather advanced surgical procedure
Is this evidence of early trepanation?**



Trepanation

- **Trepanation was particularly popular in ancient Peru, where sharp knives, stones & bronze were used as surgical instruments**
- **Skulls, belonging to the prehistoric period, were found with up to 5 holes. We don't know why these "operations" were performed. Were these a kind of treatment for war injuries of the scalp, or were they performed in order "to release" & "expel" bad spirits out of the body?**
- **People who survived the operation had their wounds covered either with a shell or with silver & gold**

Trepanation in Greece

A surgeon performs an operation on a patient's head while god Asclepius (who has a supernatural size) is looking upon





“Brain surgery” on a young woman, circa 2000 BC

Ancient surgery in India



Varanasi, is the city of Buddha on the banks of river Ganges. This town is a destination for millions of Hindus, who come to bath in the holy river

- But Varanasi is also the home of ***Ayurveda***, one of the oldest medical disciplines in the world
- Among the ancient writings found in Varanasi is ***Samhita***; a book describing the tradition of surgery in India
- Its author lived over 3.000 years BC

Illnesses & instruments described in Samhita

- In *Samhita* over 1.000 surgical conditions are listed, including injuries, illnesses related to ageing & mental diseases
- The book also describes 100 blunt & 20 sharp surgical instruments, many of which have similarities to instruments that are in use today

Surgical techniques prescribed in "Samhita"

- Also in *Samhita*, some extraordinary surgical techniques were described, including a revolutionary nose reconstruction
- Amputation of nose was a common practice in ancient India for punishing criminals & this is why renoplasty was so popular there.

What about surgery in ancient Egypt?

- In November 2001, in the shadow of the royal pyramid in Sakkhara near Cairo, archaeologists made an extraordinary discovery
- Buried under 5 meters of sand was a tomb that had been hidden since 2000 BC
- In the writings found on the walls it was mentioned that surgery had been practiced in ancient Egypt extensively!



Warfare



- **Ancient Egyptians operated mainly on their wounded soldiers**
- **Surgical tools, that included knives, drills, saws, hooks, forceps & spoons were also found**
- **Egyptian physicians classified wounds into 3 categories: wounds that could be treated or not & wounds that were contended**
- **A contend wound meant that the physician had to wait & see if the patient was going to survive, before operating**
- **Some of the treatments applied to wounded soldiers were found in the Edwin Smith Papyrus**

Ancient medical treatise



- In 1862, the first most important evidence about ancient surgery was found in Luxor
- An archaeologist, **Edwin Smith**, used to buy fake papyrus & sell them as genuine. But one of those papyri looked genuine to him. Smith found that this was an ancient medical treatise & kept it for himself
- In the 1930's, this treatise was fully translated & its huge significance was then recognized

The Edwin Smith Surgical Papyrus



- The Edwin Smith's surgical papyrus was a detailed writing of surgical treatments for wounds, starting with head injuries
- This papyrus described each individual trauma in detail: how it was diagnosed, examined & treated
- Finally, it was explained how a gaping wound was stitched with acacia thorns as needles & pieces of flax as suturing material!



An ancient operating room in Egypt

Ancient surgery in Greece



***Mahaon*, one of the sons of god *Asclepius*; was considered the first military doctor in Greece**



Mahaon treating the wounded King Menelaus of Sparta during the Troy war



A Greek surgeon trying to excise an arrow from the abdomen of a wounded soldier



Achilles is bandaging a war injury of Patroclus during the war in Troy

Usually, the wounded heroes treated a war injury by themselves!

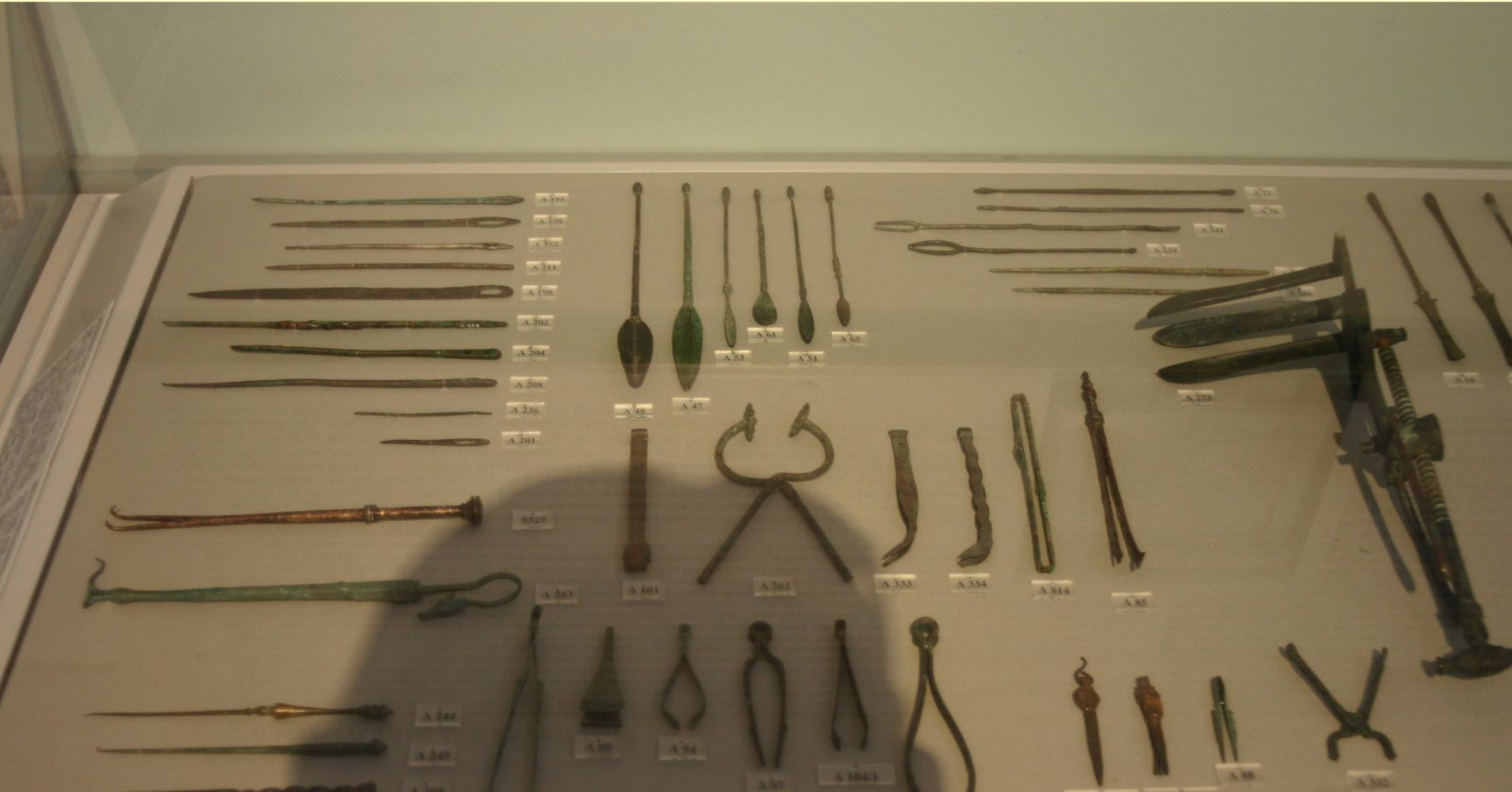
A surgeon on a 500 BC Greek vase suturing a forearm wound





Ancient surgical instruments found in Greece during excavations

Surgical instruments of the Hippocrates era



■ No doubt, many of these instruments have similarities to instruments that are in use today!

Hippocrates examining a boy complaining of abdominal pain



The era of Alexander the Great



- **As civilization developed, wars became much more extensive than before & thousands were killed or wounded on ancient battlefields**
- **Indeed, it was the campaigns of Alexander the Great in the 4th century BC that gave military surgeons new insights into anatomy**



Alexander the Great while crossing Ellispontos between Europe & Asia

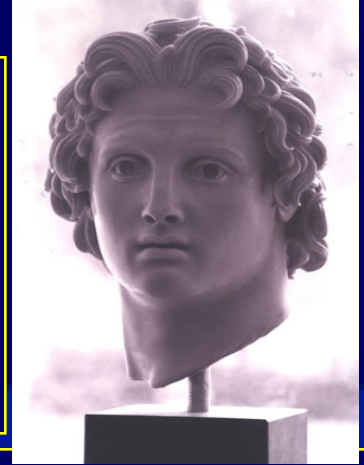


Alexander the Great, fighting against the Persians



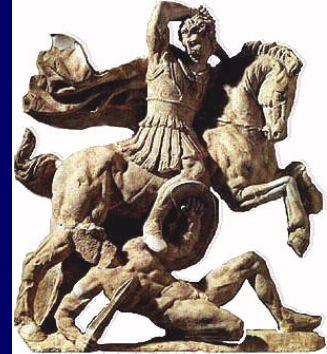
Alexander the Great is offered first aids by his surgeon Kritodemos, while goddess Hygia is watching

The secret weapon of Alexander the Great



- About a century earlier than Alexander's era, Hippocrates had separated medicine from magic & managed to turn medicine into an empirical practice
- This scientific approach helped the battlefield surgeons of Alexander the Great to keep wounded soldiers fit for fighting
- Alexander himself, was wounded many times, but he always survived & his men believed that he was invincible. However, his secret weapon was his surgeon **Kritodemos** from Cos!

Alexander's lethal injury



*Alexander in the battle, detail from the mosaic.
Toronto, 3rd century BC, Museo Archeologico Nazionale*

- During the siege of Multan in Pakistan, Alexander was wounded by an arrow in the chest, leading to extremely inefficient ventilation
- The Macedonian leader was carefully placed on a shield & carried to his tent. The arrow was heavy having a large head. It was the most lethal kind of injury & the hardest to treat
- His men thought that this time Alexander was going to die

But, surgeon Kritodemos took action!

- **Kritodemos decided that the only way to extract the arrow without doing greater damage was to enlarge the wound; but he hesitated as the possibility of Alexander dying in his hands was great**
- **The young commander felt his fear:
“If I have to die, he said to Kritodemos, free me from this agony as soon as possible!”**

So, Kritodemos proceeded with the operation

- **& Alexander went through it in consciousness!**
- **After the removal of the arrow, the haemorrhage could not be arrested. However, Kritodemos with a cool motion covered & pressed the wound & controlled the haemorrhage.**
- **But, by doing this, he also transformed the open pneumothorax to a closed one – a movement that saved Alexander's life!**

The recovery

- **A week after injury & with his wound incompletely closed, Alexander arranged to be carried by a ship down the river, to the main camp**
- **When the ship docked, he walked further & mounted his horse, Voukefalas, in an act of extraordinary will!**

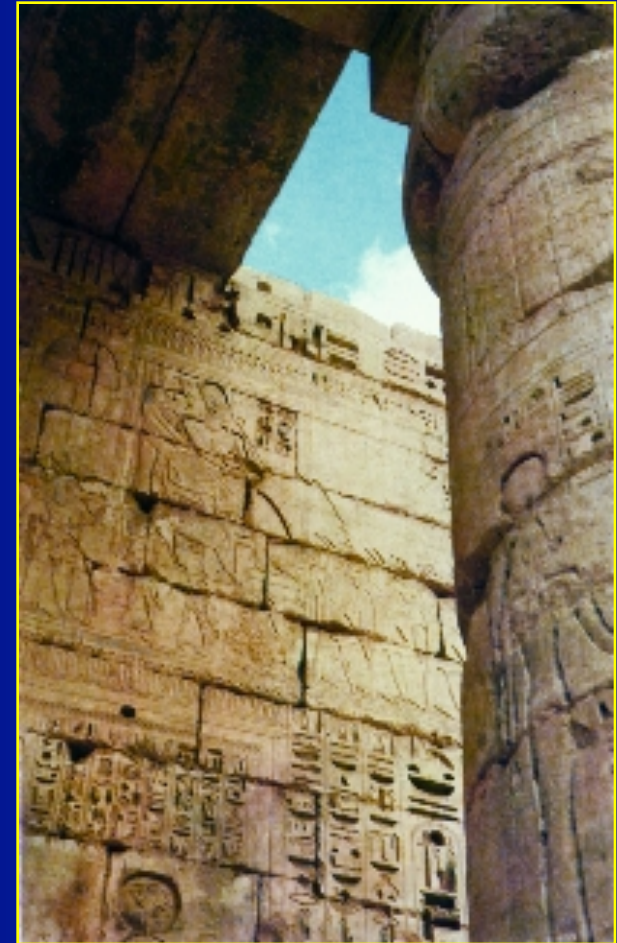
Alexandria as a centre of science in the ancient world

- 2.300 years ago, on the way to Persia, Alexander the Great established his Egyptian capital: Alexandria
- After his death in 323 BC, Alexandria became a great centre of science, where medicine was flourishing



Alexandria, the seat of medical learning

- At the beginning of the 3rd century AD, surgery was enjoying a golden age in Alexandria
- In parallel, the circumference of the earth was measured there, the stars were plotted & Herophilus recorded that the brain & not the heart, was the centre of thought
- But what about anatomy?



Research & anatomy

- **Anatomy was advancing in Alexandria between the Medicine of Hippocrates & that of Galen**
- **For a period of 50 years, doctors, such as Herophilus & Erasistratus, were performing not only anatomical dissections on cadavers but also complicated operations on patients**

Lets take things step-by-step:

- **The key to anatomy is dissection, but in most early cultures it was prohibited**
- **Attitudes changed when philosophers like Plato & Aristotle decided that the body was worthless after the soul left it at death**
- **As a result, Herophilus, a young by that time physician in Alexandria, was given permission to dissect human bodies**
- **His findings revolutionized all kinds of surgery**

Another even bigger taboo, broken

- **Herophilus was allowed to perform also vivisections on living human beings in order to observe the functions of their internal parts!**

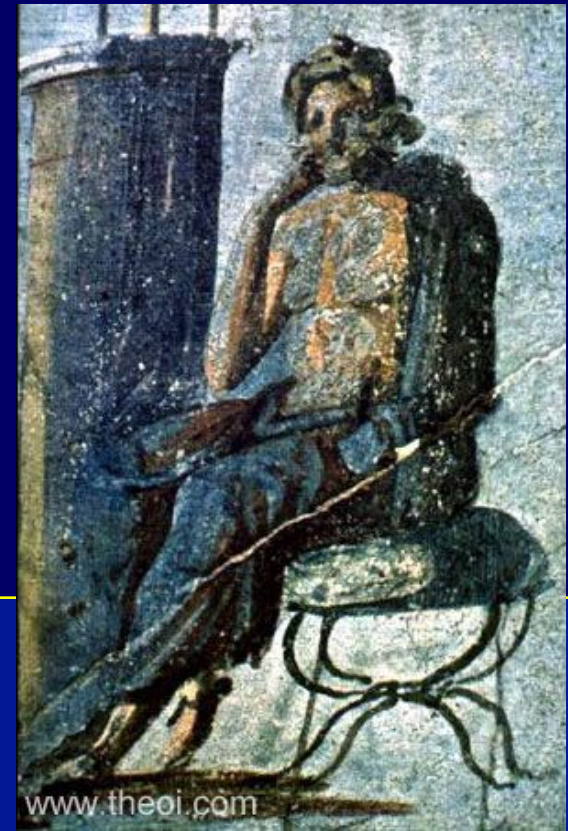
- **These experiments gave Herophilus & his students a better understanding of the human body – & especially of the nerves & the brain**

Surgery in ancient Rome



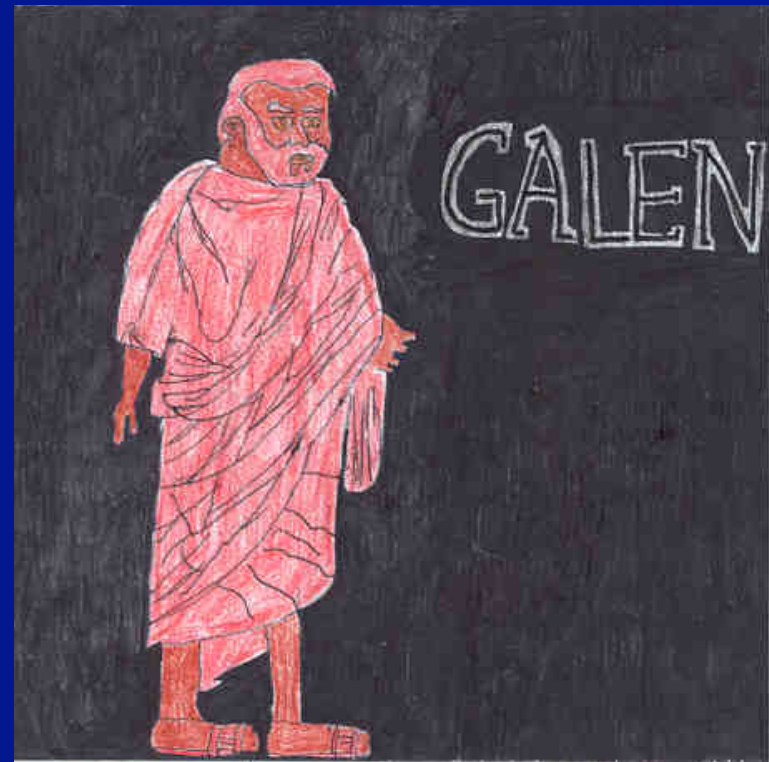
Rome

- From the time of Hippocrates, Greek doctors were recognized as the best in the world
- The Romans admired them & when they conquered Greece in about 100 BC they adopted their practices



Galen

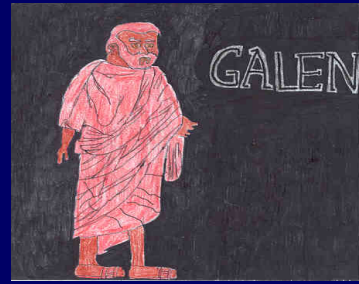
- **The demand for Greek physicians in Rome was great & one of them climbed to the top**
- **This was Claudius Galen (130-200 AD), who was responsible for many huge steps in surgery**





Galen's operating room in Rome

Galen



- Galen was born in Pergamos
- He learned the idealism of Plato, the realism of Aristotle, the skepticism of the Epicureans & the materialism of the Stoics
- Then he went to Rome in 163 AD & remained there for 4 years. During this period he wrote on anatomy & on the teaching of Hippocrates & Plato
- Then he visited many places as Smyrna, Corinth, Alexandria, Crete & Cyprus

Galen was the major doctor of wounded gladiators



- **On his return to Rome he found that gladiators were valuable & that doctors were in great demand to cure their wounds**
- **So, Galen practiced medicine in coliseum**
- **There, he was able to see & feel through the gladiators' wounds, part of the living internal human anatomy, to which others did not have access**

Galen created a golden age of surgery, based on his anatomical findings

- **Of his 600 books only 20 survived & these were rescued by Arab physicians**
- **Arabs captured & preserved some of the ancient medical texts & from the 9th century they started translating them into Arabic on a massive scale**
- **However, Galen's revolutionary work did not reach the Western world until the late Middle Ages. But, many of his theories as well as his huge number of remedies were used empirically by doctors for centuries & became the medical equivalent to a holy book!**

- **The end of the great library of Alexandria & the collapse of the Roman empire marked the end of the progress in medicine & particularly in surgery for hundreds of years**
- **But, with the coming of Renaissance, the knowledge of the ancients was rediscovered**
- **Anatomy was accepted, new discoveries in wound treatment were made on the battlefields & the door to new surgical techniques & practices opened widely**

To conclude,

the fate of surgery is always the same:

an end means & a new beginning!