

Orthopaedics: The art of medicine and its evolution

Pantelis Limnaios, Panayiotis P. Papagelopoulos, MD, Olga D. Savvidou, MD

*1st Department of Orthopaedics,
National and Kapodistrian University of Athens
ATTIKON University Hospital, Athens, Greece*

Medicine is intensely related with human nature regardless of the presence of civilization, since the treatment is something beyond civilization and rationality. From the cave period, mankind without reasoning and civilization, with the imperative of nature and his instinct seek for cure via through his natural environment.

The first emergence of medicine occurs through the observation of natural districts of human, the animals, on how animals reacted to their injuries and licked their wounds. From observation and eating of plants in a cave, up to modern treatment modalities, thousands of years have passed. The history of medicine is found in stone oblations of Asklepios, and in the myths and history and the scripts of the pioneers of medicine.

Medicine is anthropocentric science, since it emerges from human to human. The motive in the evolution of medicine is the effort of man to protect his health and diligence. It wouldn't be overstatement to claim that after philosophy, medicine among sciences was the reason for the evolution and mental progress of humankind.

The first references to address orthopaedics problems, such as fractures and dislocations are discovered in the temples of Asklepios. There, under the

protection of the God of medicine, Apollon, the son of Asklepios and the holy-therapists (heresies) practiced medicine associated with God's work, since medicine was connected with religion and was considered the Gods's science. The priests of the temples were the first "orthopaedics" in the history to treat fractures, dislocations and inflammation of the bone. These therapists-priests were very well educated and knew about philosophy, soul and anatomy of musculoskeletal system, to be able to address human as integrated entity (body and soul).

The aspicians of the temples, without have nothing previously, created medicine to relief from bone pain and invented the first surgical procedures and practices for the treatment of bone injuries. They were the first that realized that fractures and dislocations caused disturbance in the balance of the body, therefore balance should be restored first, with practical and pharmaceutical means and then restored the bone.

The findings and references in stone ablations, reveal the first analgesic drugs for the bone pain, the mandrake, the poppy and an opioid formulation with wine, the "nepenthes" which reduced the anxiety and the agony of the patient.

«Δήμανδρον καλάβιος γορτύνιον ισχιαλγικόν

CORRESPONDING
AUTHOR,
GUARANTOR

Olga D Savvidou
Address Rimini 1, Chaidari
Athens, GREECE
e-mail: olgasavvidou@gmail.com
tel +302105832399

γενόμενον προσέταξε από μόλεν ες λεβήναν ότι θεραπεύσειν άμα δ' ευθόντα έταμε καθύπνον χ' υγιής εγένετο»

Translation: "Dimandros, the son of Kalavri from Gortina, had sciatica, he ordered him to come to Levina in order to cure him. As soon as he got there, he operated him during his sleep and he was cured." [4]

«Ανήρ τους τας χηρός δακτύλους ακρατής έχων πλαν ενός αφίκετο τον Θεόν ικέτας[...] Επιφανέντα τον Θεόν εφאלέσθαι επί την χήραν και εκτεινε ου τους δακτύλους[...]

Translation: "A man whose fingers were paralyzed, came as patient to He [...] He appeared, held his hand and stretched his fingers [...]" [4]

From the medicine of the temples and theurgy (sorcery or magic) of the Asklepiions, medicine and orthopedics were born by Hippocrates, who was practiced in the temples close to the priests. He was the first who compiled medicine as a form of prevention and diagnosis. His writings were based on the rationality of philosophy with no signs of magic or religion. For Hippocrates mankind was ethereal nature and an injury of the body or a disease destabilized its balance. From Hippocrates we find for the first-time anatomical details about osteology which he learned from autopsies on human skeletons. It is said that he made a replica of the human skeleton for teaching purposes at the medical school in Kos. The development of osteology, in contrast to anatomy of the bowels, is due to the reason that in the period of Asklepeon and Hippocrates, necropsy was forbidden on cadavers (dead bodies).

In Hippocrates's writings we find descriptions of fractures and dislocations and methods of fractures reduction and rehabilitation, with similarities but also differences compare with today methods.

The doctors in Hippocrates' era gave significance to the compliance of the "natural" position of the limb while being tied up, for instance the forearm should be in neutral rotation, the elbow at right angle, and the leg with full extension of the knee. The "natural" position had as a result the relaxation of the muscles and the adjustment to less strength for fracture reduction and restraint.

Based on the type of fractures and dislocation -for



Figure 1: Chisel and nibblers in ancient times

the first time the fractures and dislocations are classified into types- Hippocrates and the doctors in this era used specific table to stretch the injured limb, straps covered with wax to wrap the injured extremity, a kind of a plaster at that period of time and splints from light wood-stick.

In the writings of Hippocrates for the first time been there is a mention of an external fixation for tibia fractures by using two leather rings, with one inserted under the knee joint and the other upon the ankle joint, with special bars on the sideways of the rings and four sticks which were stretched, so they can keep the limb in a straight position (figures 1 and 2).

«[...] σφαίρας δύο [...] τα δε προς των άρθρων βραχυτέρους [...] αρμόζουσε δε η μεν άνωθεν των σφυρών η δε κάτωθεν του γόνατος [...] κάπειτα κραναϊνας ράβδους τέσσαρας λαβών ίσον το μέγεθος αλληλίσιν εχούσας πάχος μεν ως δακτυλίας [...] είναι δε χρη ζεύγεα τρία των ράβδων [...] μικροτέρας και βραχυτέρας [...] έστοσαν δε αι ράβδοι εκάτεραι ένθεν αι ένθεν των σφυρών. Ταύτα τοίνυν ει καλώς μηχανοποιηθει την τε κατάτασιν και δικαίην αν παρέχοι και ομαλήν κατά την ιθωρίην και το τρώματι πόνος ουδεις αν ειη [...]»

Translation: "[...] two rings [...] the rings will be thick [...] will fit one above the ankle and the other under the knee [...] then you take four sticks of cranium



Figure 2: Orthopaedic surgical tools

wood equal as thick as in the size of one finger [...] than the sticks to have three pairs longer farther and other shorter [...] the four sticks are placed two on top and the other under each ankle. If the machine is properly positioned it will extend the surface smoothly and aligned to it without causing injury to the wound [...]" [2]

In Hippocrates's writings there are important information about the Hippocrates's pedestal for the reduction of dislocations and fractures of the femur. In the era of Hippocrates there is an emerge of orthopaedics as a surgical specialty, with special references to management of fractures and dislocations with open or closed reduction methods. Especially in open fractures, with the exposure of bone to the environment, a kind of tourniquet, for reduction of bleeding until the surgery was used.

«Καθίνυσθαι δε χρη τον άνθρωπον ούτως, όκως η το εξέχον του οστέου προς την λαμπροτάτην των παρευσεών αυγέων, ως μη λάθη τον χειρίζοντα εν τη κατατάσει, ει ικανώς εξίθυνται. Του γε μην εμπείρου ουδ' αν την χείρα λάθοι επαγομένην το εξέχον άταρ και αλγέει μάλιστα κατά το εξέχον ψαυόμενον.»

Translation: "The patient should be sitting in that site of the room, so that plenty of light could help surgeon to reduce the fractured bones in a straight line. The hands of a skillful doctor will help to observe the

reduction of fracture, since the palpation provokes strong pain." [2]

Regarding the orthopaedic surgical tools the doctors used the chisel (σμίλη), the hammer (σφύρα) and strong nibblers (οστεάγρες) (figure 1) for holding the bones, and the scratch (σκολομαχάριον) a tool made from iron to cut the vertebrae and the ribs. For the cartilaginous parts, which surrounded the bones, they used the grooved chisel and there was a specific saw to cut the bones and a kind of rasp to mitigate the broken ends of the bones(figure2).

The methods and the orthopaedics tools remained unchangeable through the ancient era, with Galino they changed in the Medieval Times.


In the Medieval, for the first time we have the seeds of separation of medicine from bewitchment. The main representatives of orthopedics in the Medieval were Avicenna and Averroes. The doctors of the Renaissance started their first experiments, in order to examine the results, setting the fundamentals of modern medicine and orthopaedics. [1] Autopsies gave the change to collect anatomic information about the body and the bones, and with the beginning of medical experiments, medicine and orthopaedics developed as we know them nowadays.

In pharmacology with the alchemists, we have the differentiation in the manufacture of drugs, since we

have the change from nature's chemistry (χυμεία) to compound chemistry (χημεία). For pain at that time the doctors used chemical compounds without herbal substances. The first alchemist and doctor was Theophrastus Paracelsus from Swiss.

The English philosopher and doctor Roger Bacon and later on William Harvey and Haller were the pi-

oneer of modern orthopaedics and medicine. With their cultivated spirit they evolved the anatomy and physiology and managed to join the old with the new.

[1] The sciences included medicine progress in the centuries based on positivism, basic sciences and philosophical skepticism, makes man more efficient and sophisticated. 

REFERENCES

1. N. Papaspirou: History and Philosophy of Medicine (Athens 1950)
2. Hippocrates: About surgery (Cactus Publications 1992)
3. Galinos: About anatomical surgeries (Cactus Publications 2009)
4. Asclepios and the beginning of medicine (collection works) Exantas Publications

READY - MADE
CITATION

Limnaios P, Papagelopoulos PP, Savvidou OD. Orthopaedics: The art of medicine and its evolution. *Acta Orthop Trauma Hell* 2019; 70(3): 72-75.