# Unit 3 – Medical Practice in Antiquity

We would really want to know the origin of ancient Greek medicine, but it is almost impossible to fulfill this desire: not only written sources are absent but also archaeological data are so far considered inadequate. Thus, history of Greek medicine necessarily starts with Homeric poems, Odyssey and Iliad, the older Greek texts extant.

Homer was not of course a physician and his two poems are not medical treatises. So, someone who wants to use the Homeric poems as sources for medical information, has to keep in mind three things: 1) Homer refers to medical issues only as a means to show his poetic ability and not his medical capacity. 2) While the civilization described in the poems is the Mycenean (1580-1200 BC), Homer does not hesitate to incorporate in his poems cultural elements from his own era, which makes it quite difficult for us to differentiate medical information from Homer's time from those of the time of his heroes. 3) In the world of gods and heroes everything is different: laws work in a different way and miracles are not an uncommon phenomenon. Nevertheless, the Homeric poems may help us form some idea on medicine of that distant era.

Medicine in Homer's time is completely religious and theocratic. The rage of gods was almost the sole cause of human disease and it was in their hands whether a sick patient would be cured. Several gods were related to medicine: Hephaestus, Hera, Artemis, Athena and of course Apollo, the god of medicine. According to the myth, Apollo had a son, Asclepius who – we will see later – thrived in medicine. Asclepius himself had two sons, Machaon and Podalirius; we learn about them from Homer. But to those two, Homer attributes no war virtues: they were not big, nor brave, nor fast. The only thing distinguishing them from the others was that they were "virtuous healers" . From a different source we learn that "To the one of them, his father gave lighter hands, to extract arrows from the flesh, to cut flesh and to heal wounds; to the other one, he granted the ability to recognize and understand the unseen within the human body and to heal the incurable". In today's terms we would say that Machaon practiced surgery and Podalirius practiced internal medicine!

As we already mentioned, Asclepius was the son of Apollo. In the history of medicine, he overshadowed all gods related to medicine, even his own father. Numerous scholars have tried to understand how this happened. For some of them, Asclepius was initially a chthonic god from Thessaly who in time degenerated in a simple hero but later, almost accidentally, reclaimed his initial divine status. For others, including Ludwig and Emma Edelstein, it did not take long until Asclepius became the patron of doctors. Taking into account that for many centuries doctors practiced medicine travelling, it does not take much to understand that nothing could grant them the needed prestige better than the fake belief that doctors are descendants of Asclepius. And this is actually the content of the term "Asclepiads": not priests but descendants of Asclepius. In reality, Asclepius did not cure patients but he simply protected doctors and they cured patients. In people's mind the hero, the patron of doctors, identified so much with medicine that he became the principal doctor. His deification must have occurred around the end of the 6th century BC and probably in Epidaurus. From that point, Asclepius' worship started spreading fast: more than 400 sanctuaries and temples were devoted to him, some of which kept running until the 6th century AD. The most famous though were those of Trikke, Epidaurus, Cos, Athens, and Pergamum. Patients visited the

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Asclepieia asking Asclepius to heal them from their diseases. He allegedly appeared in their dreams and indicated the appropriate treatment. In many cases, the god himself treated the patient using only his touch or a medicament, or a mild surgical intervention or by simply applying bandages.

The pre-Socratic philosophers played a key role in the gradual detachment of medicine from gods and miracles. They started enquiring on the meaning of life, on the material of the world, on the natural phenomena. They soon realized that the rules governing nature also govern the human being and that the methods used to examine the natural phenomena should also be applied in the examination of the phenomenon of health and disease. Empedocles was the philosopher whose theories later gain a special meaning. In the center of his teachings were the four eternal, qualitatively invariable elements: fire, water, earth and air. The mixture/union of these elements in the appropriate analogies creates harmony. Empedocles' harmony – and subsequently health – exists in the symmetry during the mixture of the four elements. We are quite certain that this philosophical belief formed the basis on which Hippocratic medicine evolved.

But before examining Hippocratic medical practice, let's see what else exists in Hippocrates' era. We find two famous medical schools: the school of Cos and the school of Knidos. The latter is probably older, and we may assume that it would have remained the most important one, if Cos hadn't given birth to Hippocrates. Each school had its own physiognomy. Their differences were numerous, but we do not know much about Knidos. We learn from Galen that the Knidean doctors mainly tried to include illnesses in certain categories, speaking of seven "diseases of the bile", twelve "diseases of the bladder", four "diseases of the kidneys", four "jaundices" etc. They simply observed and described the different ways in which diseases may appear. In contrast, according to Galen, Coan doctors focused on determining the common characteristics of each disease. The effort for specific and systematic description of the symptoms of different diseases and for prognosis of their outcome was the main focus of the method of the Coan doctors.

As for Hippocrates himself, the renowned father of medicine, the only biographical elements that may be considered as historical reality on the basis of testimonia are the following: He was born on 460 BC in Cos and his father was Heracleides. His activity must have reached his peak by the beginning of the Peloponnesian war. He travelled a lot and he died very old. Until the 2nd century AD, his grave was located near Larissa. Under his name we have 60 treatises written in ionic dialect, the Hippocratic collection. For none of these texts can we be certain that Hippocrates himself wrote it, not even for the famous Oath. In any case, except certain treatises of the collection that must have been written much later, most of the collection was produced between the second half of the 5th century BC and the second third of the 4th century BC. Nevertheless, most of the treatises are Hippocrates' spiritual children, meaning that in those texts we find medicine as Hippocrates understood, practiced and taught it.

## 1. Characteristics Of Hippocratic Medicine

1) Hippocratic medicine was against any supernatural explanation relating to the cause of diseases: for the first time only natural were the causes of every illness.

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2) Nature was considered as the main therapeutic factor. The doctor should reinforce or even fix organism's natural defensive effort: the most accurate method was the use of "contraries"

3) Hippocratic medicine showcased for the first time the importance of "diet", meaning the way a person should organize his life (food, sleep, exercise, sex, etc).

4) Observation was the main diagnostic method.

## 2. Basic Hippocratic Teachings

The most important achievement of the Hippocratic medicine was the beginning of disengagement of medicine from the theocratic beliefs, as proved in On sacred disease: "With the disease called sacred, here is how it is: I do not believe at all that this disease is more divine than the rest of the diseases or more sacred. I believe that for this one there is a natural cause like for the rest". So, having stated that there is no supernatural causation for any illness, the Hippocratic physicians need a logical interpretation for the etiology of diseases thus constructing a new system of "physiology" and "internal medicine", This system is comprised of: Empedocles' four basic elements (air, fire, earth, water), four humors circulating within the human organism (blood, yellow bile, black bile and phlegm), four organs related to the four humors (heart, liver, spleen, brain), and four capacities also relating to the humors (warm, dry, cold, humid).

Anatomical knowledge barely exists, only through injuries or animal carcasses, explaining the numerous anatomical errors encountered in the Hippocratic Collection. Heat is the vital agent and pneuma is a necessary element of physiology. Liver creates blood that is distributed to the body through veins. The blood is vivified in the heart with the existing "innate heat". Pneuma is also vivified in the heart and is distributed to the body for conservation of the sensory and motor functions. The brain is considered to be the center of thought, motion and sense.

**Etiology of humoral imbalance**

Three may be the causes leading to imbalance of the four humors:

1) The temperament of each person, relating to the physical and mental condition of the person,

2) Environmental factors of the patient's residence, such as the climate, the type of ground, the amount of sunlight, the types of water, the winds blowing, the current season and the dietary habits of the area.

3) Heredity, since the Hippocratic physicians are writing about illnesses passing from one generation to another.

**Hippocratic clinical method**

According to the Hippocratic physicians, illnesses may be categorized in two ways: according to their distribution (epidemic/endemic/sporadic), and according to their course (acute/chronic).

Their most important contribution though, relating to the medical method is the formation of a "protocol" a doctor should follow when visiting a patient. First the doctor should learn the patient's medical history

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from the patient himself and from his relatives or companions. Then, he should examine the patient surveying his posture, his nourishment, the color of his face, the odor of his body, his digestion, obvious alterations of the viscera, and his excretions, including perspiration, feces, vomits, expectorations, and urine. Especially for urine, the doctor should check the quantity, the color, the smell, and the existence of residues or nebula using only his eyes and nose (uroscopy). It is noteworthy that up until today, the hue and quantity are also recorded. Next, the doctor should check the patient's temperature by placing his hand on the patient's chest and his pulse for any abnormalities. Then, the doctor palpates the patient and performs auscultation placing his ear on the appropriate body area.

**Ancient diagnostic/prognostic factors**

The ancient physicians examine specific facts in order to make an accurate diagnosis and prognosis. The factors considered may be divided in those being common and those being personal. Those characterized as common are factors influencing all people of a specific area and should be considered by the doctor, while those called personal are specific to each patient. Common factors are the stellar bodies, seasons, and area of residence while personal factors are age, sex, family history, and "diet". The physician uses the results of his observations to conclude on the etiology of the illness and to add information in the patient's story, using his own knowledge on illnesses and their causes.

As far as the common factors are concerned, basic astronomical and meteorological knowledge was necessary for the physician, because the location of the stars was the main method of defining seasons. Seasons on the other hand were very important; each season was considered to have standard weather conditions. If a season proceeded normally, meaning "as expected", then it was considered to promote health. Adversely, if the weather conditions were not as expected during a season, then it was considered to promote morbidity. Furthermore, seasons proceeding as expected would produce illnesses with characteristic/usual progression. Such illnesses were considered to be better manageable, with predictable crises and thus, more accurate prognosis. The ancient physicians formed a typology relating seasons to humors: winter raises phlegm, spring raises blood, summer raises yellow bile and autumn raises black bile. Taking into consideration the aforementioned rational on normality and abnormality of seasons and the ancient typology, one may easily understand how normality fortified the typology while abnormality of season's complicated things much. Area of residence was one more "common factor" used for diagnosis/prognosis because each area was supposed to have specific traits that have an impact on the temperament of residents. The existence of water nearby, the mountainous or lowland location, the winds blowing, and other similar facts were believed to play a key role in the way of life and the general health of residents. Among the "personal factors" to be taken into consideration by the physician was age, since it was believed that specific illnesses "prefer" specific ages. Furthermore, the physicians had observed that patients of different age react in a different way towards the same illness, inclining thus towards different prognosis. As far as sex was concerned, physicians noted that women react in a much different way than men towards certain diseases, while there are certain illnesses that appear only in women, such as hysteria. Family history was one more factor that the physician took into consideration since they had observed that several diseases were inherited from one generation to another. Finally, the personal "diet" of the patient was recorded: what was his common dietary plan, did he exercise, did he take baths, what were his sleep patterns and his sex habits? All these details were necessary because the ancient physicians were convinced that "diet" clearly affects the patient's temperament.

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**Ancient diagnostic/prognostic tools**

The ancient physicians used specific tools so as to form an accurate diagnosis and prognosis. From the simplest ones, such as the five senses, to the most elaborated ones, such as sphygmology or auscultation, these where methods that helped the physician treat a patient.

The use of the five senses was one of the first tools in the aid of the ancient physician. The Hippocratic physicians describe how to diagnose or prognose using the natural characteristics of the human being. They believed the physician should know the common and personal characteristics of each patient should converse with the patient on his condition and should use logic to combine that information and reach an accurate diagnosis and prognosis. Galen fully accepted the Hippocratic teaching on the method of diagnosis and provided us with detailed descriptions on the method of use of the diagnostic/prognostic tools. For olfaction, Galen suggests it's use only for verifying that something is wrong, because the smell of urine, feces, ulcers or breath cannot be described, making this sense quite inaccurate. For taste, he distinguished seven different types so as to differentiate perspiration, noting though that its quantity and temperature are more important for diagnosis and prognosis. Galen used hearing so as to evaluate breathing, coughing and flatulence. Direct auscultation though, widely used by the Hippocratic physicians, was of little importance for Galen. He found the main application of the sense of hearing during the conversation between the physician and the patient. He believed it was the main tool to evaluate the content of the conversation, the hue and quality of the voice, the ability of the patient to articulate words and phrases, and his will to respond frankly to the questions of the physician. The sense of touch was used in sphygmology, in temperature check and in palpation mainly of the abdominal or thoracic area. For the sense of sight, Galen suggests its use for examining the patient and for studying the patient's environment. The physician should examine the urine and feces of the patient, his eye pupils, his sleeping posture, the color of his cheeks, his nails, the color and dryness of his skin, the dryness of his eyes and tongue, the presence of blood anywhere, and his tonsils and nose passages. As for the patient's environment, the physician should observe the patient's room and house, and the city, the residence area and all environmental factors that may play any role in the patient's condition.

Palpation was a tool used widely in antiquity and still used nowadays. The Hippocratic physicians used it to diagnose any differentiation in the viscera and Aretaeus of Cappadocia (2nd century AD) used it for diagnosing ascites and peritoneal abscess. Auscultation on the other hand, needed more from the physician who performed it. A very interesting example is the Hippocratic use of auscultation in diagnosing empyema. Sphygmology as a diagnostic tool was already widely used by Praxagoras and Herophilus but it was Galen who really presented it as a part of science. He defined pulse as one dilation and one contraction of the arteries initiated by the heart, and he differentiated and analyzed pulses in detail. It is true that certain types of pulses and the allocation of their function in the heart were already accomplished by Praxagoras and Herophilus but it was Galen who ascertained that every malfunction of the body was apparent through anomalies in the pulse, always due to bad mixture of humors and elements. Uroscopy was another diagnostic tool used by the ancient physicians. Numerous written sources provide information on the use of uroscopy, even from the Hippocratic times. It is true that no other system or organ of the human body provides us with so much information through its excretions than the urinary system. Regardless that it was Magnus of Emesa (3-4th c. AD) who created a categorization of urine, this method was widely used until the Byzantine period and maybe also later.

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**Hippocratic therapeutics**

The essence of Hippocratic therapeutics may be summed up in Aphorisms VII, 87 and IV, 608 "What medicaments do not cure, the scalpel may cure. What the scalpel does not cure, fire may cure. What fire does not cure, should be considered as incurable". This aphorism provides us with a proposed methodology of healing: the physicians should first try to heal the patient using medication; if he fails, he should use surgery. If surgery fails as well, cautery should be used but if cautery does not succeed either, then the illness should be considered as incurable a no other treating attempts should be made. Furthermore, an illness may only be cured if three conditions are fulfilled: the illness should be curable, the patient should be cooperative, and the physician should know what to do.

As far as the Hippocratic methods of treatment are concerned, the physicians first tried to adjust the analogy of the humors using diet. Ptisan (a type of barley gruel) and other types of gruels, water or vinegar mixed with honey, milk or wine were administered so as to ameliorate digestion and facilitate evacuations. We should always keep in mind that the excessive humor causing the disease had to be "emptied" from the body… Medicaments were not of high therapeutic value in the Hippocratic medicine. Physicians prepared their own recipes, obtaining the necessary ingredients from special "herb-gatherers" called "rizotomoi". Surgery on the other hand was used on numerous occasions. Traumatology was of high level, which explains why the Hippocratic surgical texts are considered as the best-written texts of the collection. Usually simple operations with a chisel took place but more difficult ones, like skull trepanation, paracentesis of the lower part of the thorax for removal of pus, and reaming of kidney abscess also eventuated. Trauma and bone surgery were upgraded and traumas were either sutured or bandaged. It should be noted that in open wounds, suppuration was desirable. The Hippocratic physicians were renowned for treating fractures and dislocations, with magnificent techniques of bandaging and resetting. Cautery was another surgical method used widely, whose main therapeutic aim was to dry the humors and defeat suppuration. Bleeding was confronted with medicinal plants, cold compresses, and elevation of body parts, oppressive bandages and cautery.

## 3. Hellenistic Period

Alexander the Great established Alexandria in 332 BC. Under the Ptolemies, Alexander's successors, the city became an economic, artisanal, and business center and a shelter for philosophers, artisans, scholars, and physicians. All arts flourished and medicine was not an exception. Herodotus attested that Egypt was full of doctors and that the residents of Egypt, along with those of Libya, are the healthier people of all. Of course, this flourishment was further encouraged by the permission granted by the Ptolemies to perform dissections.

Two were the figures that dominated the Hellenistic period: Herophilus and Erasistratus. Sadly, none of their texts has survived and we gain our knowledge on their theories and discoveries strictly from fragments and testimonia. Herophilus may be characterized – in modern terms – as an anatomist. He discerned nerves from blood vessels (until this period nerves, veins and arteries where not clearly distinguished), lymphatic vessels (he claimed they contain blood and milk!), arteries from veins, and brain from cerebellum, noting that the brain is the main organ of the nervous system. He strongly believed that

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medical art had to do with three types of knowledge: knowledge concerning health that is enriched by anatomy and physiology, knowledge concerning a disease that is enriched by internal medicine and knowledge of generic elements that is enriched by therapeutics. For the latter, he used diet and numerous medicaments and he applied his methods based on experience and clinical observation. He believed that a good doctor is qualified in both theory and practice, but the excellent doctor is the one who can tell the difference between possible and impossible, reminding the Hippocratic differentiation between curable and incurable.

Erasistratus on the other hand may be characterized – in modern terms – as a physiologist. He studied nerves and blood vessels as well and he believed in the "triple-web" or triplokia of nerves, arteries and veins, noting that there are small links between veins and arteries, which we could nowadays recognize as the capillary vessels. He described the heart and its valves, the liver, and a more definitive theory on pneuma. For the latter, he believed that a part of the inhaled air goes to the left part of the heart where it is revived from the vital pneuma residing therein. Then, it is forwarded to the whole body. Another part of the inhaled air goes to the brain and turns to psychic pneuma, then being forwarded to the body for materializing movement and sense. In medical practice he did not accept the Hippocratic theory of the four humors, while he believed in stereopathology, according to which the seat of the illnesses lies in the solid organs. It is thus fully understandable why he disapproved of the therapeutic use of cathartics, bleeding and enemas (no humor needed to be balanced!). On the other hand, he used few medicaments, leeches, cautery, and diet. In general, the Alexandrine physicians used three types of therapeutic interventions: diet, medication and surgery. The Herophilean physicians developed surgical gynecology and obstetrics, while the Erasistratean physicians worked on invasive surgery and traumatology. As far as hemostasis is concerned, these physicians understood that the Hippocratic measures were insufficient. Thus, they often used venesection as a hemostatic method, by artificially intercepting bleeding to the area of hemorrhage. We should note though that during this period we have the first reports of ligation, while firm tampons were also utilized.

## 4. Roman Medicine

Hellenistic era ends in 33 BC with the conquest of Alexandria by the Romans and the transfer of the capital to Rome. Roman medicine may be characterized as primitive, because it remained the same as the one inherited by the local Etruscan population. The causes of diseases were gods and demons while cure was accomplished with the aid of prayers and invocations. Augury and liver divination were the main diagnostic and prognostic methods, while they widely used medicinal herbs (mainly turnip) and wine as therapeutic tools. One sector though that flourished was the hygiene, since complex drainage systems and baths were developed. The enslaved Greek physicians were not allowed to practice medicine because the Romans were afraid that they were going to poison them.

In this context, in 2nd century AD, Galen appears. For Galen, the most prolific physician of antiquity, the doctor should have excellent knowledge of general medical theory, of therapeutic methods, and of specialized methods of diagnosis of specific pathological entities. He should understand the basic components of the human body and their organization into structures. The basic components are the four humors, the four elements and the four qualities, in full accordance to the Hippocratic theory. The four

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qualities were inherent in the anatomical structures identified by dissection; these anatomical structures were organized in two forms: in homoiomeres or uniform parts (such as the muscle, the bone and the cartilage) and in organic parts or organs (such as the heart, the liver and the lungs). All parts of the body were considered to have a certain krasis or mixture of the four elemental qualities. The krasis may vary from part to part and from person to person but there is an optimum state, necessary for health. Furthermore, in the galenic system of physiology, the body may be divided into three main functional systems:

1. The brain, spinal cord, and nerves; these are responsible for motor and sensory functions

2. The heart and arteries; these are responsible for the vital power and for the preservation of innate heat

3. The liver and veins; these are responsible for the nutrition of all body parts.

Pneuma is another very important health factor. Galen believed that there are three pneumas: the psychic pneuma, associated with the system of the brain, spinal cord, and nerves, the vital pneuma, associated with the system of the heart and arteries and the physical pneuma, associated with the system of liver and veins.

According to Galen, there were three types of diseases: those occurring due to a derangement of the four humors, those occurring due to a derangement in the tissues and those occurring due to a derangement in the organs. He shared the Hippocratic diagnostic methods, but it was sphygmology that he used to the maximum on this purpose. In should be noted that we have seven Galenic and 1 pseudo-Galenic sphygmological treatises! In terms of therapeutics, he used bleeding by means of venesection, arteriotomy, cups, and leeches, while surgery was another treating choice for him.

Galen marked his time and the time after him. He was considered the medical authority of the Middle Ages and his views survived the Inquisition. Greek ancient medical tradition thus was alive for many centuries, passing on the necessity for reasonable etiology of diseases but also numerous anatomical and physiological mistakes.

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