Le Infezioni in Medicina, n. 4, 461-467, 2019

Thessaly and medicine from ancient Greek mythology to contemporary times: A perpetual relationship

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SUMMARY

The aim of this narrative review is to provide an overview of the connection between Thessaly and the development of medicine from ancient Greek mythology to contemporary times. From Chiron to Asclepius, from Asclepius to Hippocrates, and from Hippocrates to the true Hippocratic epidemiologist Dimitrios Trichopoulos, a plethora of myths and facts indicate the strong and perpetual alignment between Thessaly and the science of medicine.

Keywords: medicine, Asclepius, Hippocrates, history, Thessaly.

INTRODUCTION

Thessaly is located in the central part of Greece and is surrounded by the holy mountain of Mount Olympus, the mythical mountain of Mount Pelion and the mountain range of Pindos (Figure 1). The aim of this narrative review is to provide an overview of the connection between Thessaly and development of medicine from ancient Greek mythology to contemporary times [1].

ANCIENT TIMES

Centaur Chiron

According to Greek mythology Centaur Chiron represents a prominent figure in the legendary period of medicine. Chiron, in Greek mythology, one of the Centaurs, was the son of the Titan Cronus and Philyra, an Oceanid or sea nymph. Chiron lived at the foot of Mount Pelion in Eastern Thessaly. Unlike other Centaurs, who were violent, he was famous for his wisdom and knowledge of medicine. Many Greek heroes, including Heracles, Achilles, Jason (leader of the Argonaut campaign), and Asclepius, were instructed by him. Chiron frequently appears in the legends of his grandson, Peleus, and his great-grandson, Achilles [2] (Figure 2).

Figure 1 - Map of the Ancient Thessaly.

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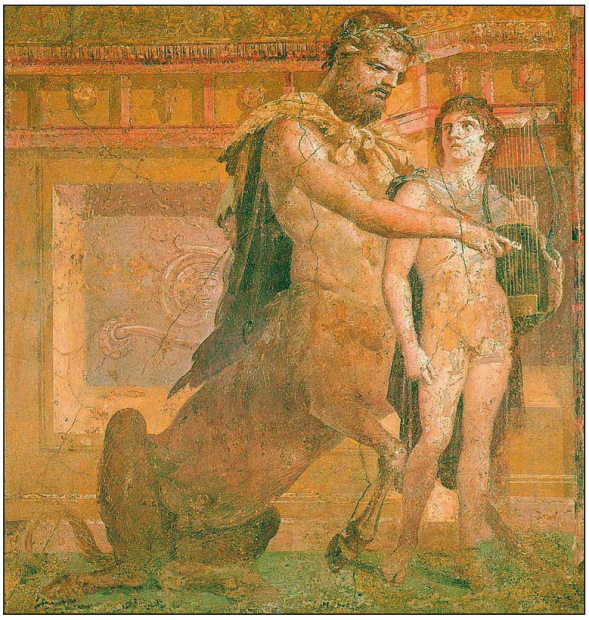

Figure 2 - The Training of Achilles by Chiron' fresco from Herculaneum 1st century AD (Museo Archeologico Nazionale, Naples, Italy). Asclepius.

The early myths of Chiron demonstrate that medical education and the transmission of therapeutic knowledge were centred on Thessaly. Before the establishment of medical schools on Cos or Cnidus, or the healing temple of Epidaurus, Thessaly was the mythic setting for instruction to medicine [3, 4].

In ancient world religion was strongly linked to everyday life. Consequently, the core of medicine was spirituality and religiosity. Ancient mythographers generally regarded Trikki (modern, Trikala, Western Thessaly) as the place of Asclepius' birth. Asclepius, the mythological god of medicine, was born in 1240 BC and lived in ancient Trikki on the banks of the river Lithaeos, the current city of Trikala (Western Thessaly). He was the son of Apollo and of the Trikkaian princess Koronis (Arsinoe). He was married to Epione, and they had many children. However, two sons of Asclepius, Machaon and Podalirius, propagated his art in the whole Ancient Greece [5] (Figures 3-5). Both of them participated in the Trojan War as chief medical officers and were attached to the Greek military forces [6, 7]. Asclepius was a physician who had been tutored - on mount Pelion - by Chiron and collected medicinal herbs from

Figure 3 - National Gallery of Art: Apollo entrusting Chiron with the education of Asclepius. Hendrick Goltzius 1558-1617.

Kerketion Mountain (current name Koziakas), located near by the ancient city of Trikki in Western Thessaly. His fame and reputation spread throughout the Greek/Hellenic world and - according to geographer Strabo - his skills to heal people created the impression that he had divine power. In addition, it is believed that ancient physicians were connected with Asclepius; the physician-god was the divine patron of the physicians [4]. It has been suggested that the rapid predominance of Asklepius could be attributed to his pop-

Figure 4 - Statue of Asclepius at the birth city of Trikala-Thessaly.

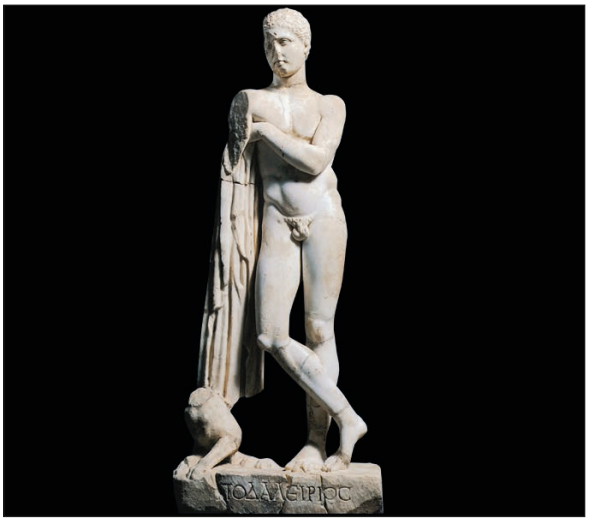

Figure 5 - Statue of Podalirius son of Asclepius physician in Homeric epic. Great Baths of Dion, Greece.

ularity among the poor, who saw in Asklepius a god particularly interested in their health and welfare [8, 9]. Furthermore, in Plato's Symposium Eryximachus (physician) spoke as follows of Asclepius: "*And my ancestor, Asclepius, knowing how to implant friendship and accord in these elements, was the creator of our art, as our friends the poets here tell us, and I believe them; and not only medicine in every branch but the arts of gymnastic and husbandry are under his dominion"* [10]. After his death, Asclepius) was worshipped across the board of ancient Greece. Moreover, his followers founded the healing temples Asklepieia. The Asklepieia could be considered as the first primitive health care campuses/infrastructures in Europe, which were developed in ancient Greece for about 12 centuries [11]. The medical care in Asklepieia was provided by priests. Asklepieia were places of healing with drinking and bathing water facilities, exercise, regimens of diet and dream therapy. In particular, the patients reported the dreams to priests who then prescribed therapies based on the interpretation of the dreams. As it has been highlighted by Marketos, the Asclepian (pre-Hippocratic) period of medicine was based on religious belief on surgery and on regimen. In addition, at that time, the medical practitioner was an herb gatherer [12]. The "Asklepieion" of Trikki, according to the historian Strabo, was the most famous and important [13]. Furthermore, there is some evidence that innovative neurosurgery techniques (trepanation) have been implemented in Thessaly by Asclepios and his followers [14]. Lastly, in Homeric times, in summary, despite the prevailing influence of religion and superstition on Asclepian medicine - Asclepius was mentioned as a child of Apollo and flawless physician (αμύμων Ιητήρ) -, the Asklepieia were linked to the emergence of an embryonic form of a holistic medicine approach [15].

Hippocrates: The father of preventive and therapeutic medicine

Hippocrates was born near the year 460 BC on the island of Kos and was a famous physician and teacher of medicine. Hippocrates' father Iraklidis was a physician and descendant of Asclepius while his mother Phenareti, a descendant of Hercules. Hippocrates had three children (two sons, Thessalus and Draco, and a son-in-law, Polybus) [16-19]. Hippocrates lived in the golden age of Classical Ancient Greece along with very important personalities such as Pericles, Thucydides, and Sophocles. In the golden age of human intelligence, the values of humanism, the explosion of theater and the arts, the introduction of a rational approach and the observation of diseases is something innovative and revolutionary. Hippocrates is credited as the first physician to reject the religious origin and superstition of the human nosology. Indeed, he relieved medicine from superstition, established the ethical rules of the medical profession and finally, he transformed theocratic medicine to rational medicine. He also believed that disease was not punishment of the gods but due to various environmental factors, diet and living habits and conditions. The revolutionary Hippocratic diagnostic system was based on logical reasoning and was consisted of anamnesis, diagnosis, treatment and prognosis. Hippocrates defined three pillars of medical practice: the patient, the disease and the physician. The focus was mainly to the patient than to the disease per se. Consequently, Hippocratic medicine was a person-centered than disease-oriented approach [4]. But beyond clinical medicine, Hippocrates was the founder and father of epidemiology and preventive medicine. As it has been mentioned previously, he was a cornerstone of the Hippocratic diagnostic system. Hippocrates started to analyze observations in order to explore for associations and draw conclusions. These case-reports

Figure 6 - The cenotaph of Hippocrates in Larissa-Thessaly.

included in the "book of epidemics" represent a prodromal form of descriptive epidemiology. Interestingly, almost 20% of the cases reported in the third book of epidemics were related to the region of the ancient Thessaly [20]. In addition, the Hippocratic work refers to an embryonic form of analytic epidemiology. In particular, in his treatise about Wind, Water and Places, Hippocrates analyzed the impact of the total environment (physical and social) on health [9, 21]. Furthermore, he presented a ground-breaking analysis of the differential impact of various political environments on human well-being. Hippocrates pivotally investigated the impact of social determinants on health and he symbolized the genesis of medical sociology. Indeed, he can be considered as the father of medical sociology: "*On this account the inhabitants of Europe are than the Asiatic, and also owing to their institutions, because they are not governed by kings like the latter, for where men are governed by kings there they must be very cowardly, as I have stated before; for their souls are enslaved, and they will not willingly, or readily undergo dangers in order to promote the power of another; but those that are free undertake dangers on their own account, and not for the sake of others; they court hazard and go out to meet it, for they themselves bear off the rewards of victory, and thus their institutions contribute not a little to their courage*" [22] (Figure 6).

18th-19th CENTURY

James Pylarino (1659-1718), Thessaly and the introduction of variolation

Pylarino was born in 1659 at Lixourie (Kefalonia, Ionian Islands, the ancient kingdom of Ulysses). He studied law and medicine in Italy (University of Padua) and practiced medicine in various countries and places across Europe (Crete, Germany, Romania, Russia, Serbia, Constantinople). In Russia he served as a physician to the Tzar Peter the Great. He decided to settle in the capital of Ottoman Empire, Constantinople in 1701 in order to study in depth the introduction of variolation. During his trip to Constantinople he passed through Thessaly. Obviously, he was impressed to observe that old women of Thessaly applied a primitive form of variolation. Indeed, this empirical practice was common among popular healers in Greece and Far East. This random event had a profound impact on the historical process of the development of vaccinations. As it has been mentioned previously, Pylarino returned in Constantinople in 1701 and began to work intensively on the development of the variolation. Eight years later (1709) he was confident that variolation was highly effective. He pivotally has inoculated three children during an epidemic of smallpox and the results were encouraging. Afterwards, the pioneer physician inoculated the members of noble Greek families in Constantinople and no cases of infection were observed among the inoculated persons. It is notable that variolation does represent a prodromic form of Jenner's vaccination and saved a large number of lives over the course of 18th century [23].

Dionysios Pyrros the Thessalian

Dionysios Pyrros the Thessalian (1774-1853) was a polymath, priest, teacher and physician, and was considered the prototype scholar of the Balkan Enlightenment. He was born in the village *Kastanea, Western Thessaly.* Pyrros studied medicine in the Faculty of Medicine and Surgery at the University of Pavia, Italy. He stayed in Italy from 1807 to 1813. After his graduation he came back to Athens, Patra and Chalkis and worked as a physician. Later he went to the capital of the Ottoman Empire (Constantinople) till the eruption of the Greek Revolution (1821). Pyrros fled from Constantinople and went to the Greece and actively participated in the Greek Revolution for Independence. After the liberation of Greece, he lived in Nauplion and in Athens until his death in 1853. He was the first president of the Athens Medical Society. Pyrros the Thessalian is best known for his works "Pharmacopoeia General"

and "Botany Practical". As it has been pointed out by Stefanidis and colleagues, "Pharmacopoeia General" is comprised of 214 prescriptions, 184 medical remedies and 30 otherwise used chemical substances [24]. It is noteworthy that in "Botany Practical" Pyrros presented the plants according to the classification introduced by Carolus Linnaeus. In addition, in "Botany Practical" he mentioned the plant names in six languages (Ancient and Modern Greek, Latin, Italian, French, Turkish). This reference style indicates harmonization with Dioskorides norms ("De Materia Medica").

CONTEMPORARY TIMES

Dimitrios Trichopoulos (1938-2014)

Dimitrios Trichopoulos was a child of the Thessalian land. He was born in the town of Volos in 1938. His father Vasilios Trichopoulos was a prominent surgeon in Volos and owner of a private surgery clinic. It is worth note that Vasilios Trichopoulos developed considerable social action during the period of Second World War and the subsequent occupation of Volos by the Axis Forces [25]. It is well known that medicine can be a family tradition. This would be the case for Dimitrios Trichopoulos. However, Dimitrios Trichopoulos made a different choice for his scientific career. Initially, he had a view toward becoming a psychiatrist or a neurologist. It was his good luck to meet Brian Mc Mahon, Professor and Chair of the Department of Epidemiology at Harvard. This meeting was critical and shifted him from clinical medicine to epidemiology and preventive medicine. As it has been pointed out, at this moment, Trichopoulos became a contemporary Argonaut and he had decided that epidemiology was his Argo ship and his golden fleece would be found in medical research [26]. By now his scientific career was prolific and bright. Trichopoulos served as Professor of Hygiene and Epidemiology and Head of the relevant Department of Medicine, University of Athens. He was Chair of the Department of Epidemiology School of Public Health and Director of the Cancer Center at Harvard University, USA. In addition, he served as a Professor of Cancer Prevention and Professor of Epidemiology at the University of Harvard, Chair Professor of Epidemiology at the Medical University of Karolinska in Stockholm, Sweden and Member of the Academy of Athens, Greece. The pioneering work of Trichopoulos is very extensive and covers in depth insights in the etiology of cancer, the impact of Mediterranean diet on mortality, and in the role of acute stress on cardiac mortality. The latter work - that was published in 1983 - found an increase in cardiac deaths following an earthquake in Athens. This paper was mentioned by Richard Horton in an editorial in Lancet entitled: "A manifesto for reading medicine". In fact, this paper was included in a list of 27 papers deserving to form a Canon for reading medicine from the ancient times to nowadays [27]. Recently, Bekker and colleagues have pointed out the mutual relation between public health and politics [28]. They have reminisced us of the motto of a Great European philosopher: "*Philosophers have hitherto only interpreted the world in various ways. The point is to change it"* [29]. Indeed, Dimitrios Trichopoulos was able to both interpret and change the world. This was the case of passive smoking and lung cancer. Trichopoulos reported that exposure to passive smoking increased the risk of lung cancer. This finding has led to profound political and social changes in smoking at a global scale [26]. The ban of smoking in public places representing a radical and historical step in tobacco control was based on Trichopoulos' research. But, beyond Trichopoulos' impactful scientific achievements perhaps there are overlooked aspects of his legacy which deserve to be mentioned. In particular, Trichopoulos' contribution to the development of medical bioethics is considerable. He emphasized the public value of epidemiological research and considered the epidemiology as a valuable tool for the implementation of the social responsibility of physicians and health care workers. He wrote in 1982: "*In our era we have noted evidence of revitalization of the social nucleus of medicine and of traditional medical idealism. The growing interest in social and community medicine, the increasing sensitization to environmental pollution and its impact on health and the popularity of the scientific sectors related to medical economics and health care system reflect the previously mentioned trends towards a socially oriented medicine. However, the social responsibility of the physician/health care worker does not end neither with the expression of scientific interest nor with the manifestation of ideological principles. It also requires the concentration of scientifically documented knowledge and the formulation of methodologically sound scientific thinking. Philosophically and technically,*

Figure 7 - The logo of the University of Thessaly and of the Faculty of Medicine.

epidemiology is the most suitable tool for the study of the relationship between environment (physical and social) and human nosology. On the bases of the above the knowledge of the epidemiology is a prerequisite for the implementation of the social responsibility of the medical profession" [30].

The Faculty of Medicine and the University of Thessaly

The University of Thessaly was established in 1984 and the Medical Faculty at University of Thessaly established in 1985 and the first medical students were enrolled in the academic year 1990-1991. The Medical Faculty is located in Larissa. The logo of the University of Thessaly is Centaurs Chiron, and of the Faculty of Medicine God Asclepius and his daughter Health ("Υγεία") (Figure 7) [31].

CONCLUSIONS

From Chiron to Asclepius, from Asclepius to Hippocrates and from Hippocrates to the true Hippocratic epidemiologist Dimitrios Trichopoulos, a plethora of myths and facts indicate the strong and perpetual alignment between Thessaly and the science of medicine [32].

Conflict of interest

The authors declare that they have no conflict of interest.

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