2004

Areté and the Rise of Orthopedics

Stephanie Johns

Follow this and additional works at: https://knowledge.e.southern.edu/senior_research

Recommended Citation

This Article is brought to you for free and open access by the Southern Scholars at KnowledgeExchange@Southern. It has been accepted for inclusion in Senior Research Projects by an authorized administrator of KnowledgeExchange@Southern. For more information, please contact jspears@southern.edu.
Areté and the Rise of Orthopedics

Stephanie Johns

Senior Project
Project Advisor: Dr. McArthur
An excited murmur rushes across the stadium as the athlete treads lightly onto the field. Slowly, almost methodically, he proceeds to the center of the arena. Picking up the discus, he poises himself in preparation for its release. Picture this instant, frozen in time. Glistening in the morning sun, the athlete’s body is an immaculate model of perfection. Every muscle throughout his body is precisely chiseled. His perfectly flawless form seems to be a direct masterpiece of God himself.

An obsession for perfection shadowed every aspect of life in ancient Greece. This desire for excellence led not only to the perfection of philosophy, art and science, but also to the necessity of obtaining a flawless form. By reading epic works, such as Homer’s *Iliad* and *The Odyssey*, and viewing classical sculpture [see Fig. 1], it becomes clear that Greek thought and culture revolved around, admired, and strove for the perfect body form. To the ancient Greek, a true man maintained his physique at the highest possible level. The aspiration the Greeks possessed for an unblemished body developed into a love for athletics and gymnastics.

Gymnasia and athletic schools, dotting the rocky Greek landscape, became places where men labored to mold their bodies into the ideal

---

form. The frequent accidents such as bone fractures and joint dislocations that took place in these facilities allowed them to become valuable places for learning and improving the skills of bone and joint manipulations. The gymnasia and athletic schools afforded constant opportunities for learning, which greatly aided in the advancement of orthopedics in Ancient Greece.

What is *areté* and to what extent did it influence Greek culture? How did a desire for perfection lead to a rise in athletics? What role did the athletic schools play in society? How did these athletic schools and training facilities affect the knowledge and practice of orthopedics? What physicians and philosophers lead ancient Greece in the development of medicine and orthopedics? Most importantly, what techniques were developed for the treatment of injuries and how effective would they have been? This paper attempts to answer these questions as it links together the idea of *areté* with the development of orthopedics.

**A Quest for Perfection**

The Greeks strove for what they called *areté* (*ἀρετή*). This concept resided in the inner spirit of every ancient Greek. However, at the same time, all Greeks continuously struggled to achieve this seemingly unattainable ideal. Areté has been defined as virtue, being the best one can be, effectiveness, pride, valor, and reaching one’s highest human potential. The concept of *areté*, however, embodies many ideas and none of these definitions can truly fulfill its meaning.

---

3 Definition is compiled from: Cartledge, 300-301; Green, 313; and Couch & Geer, 80-81, 504-505.
Herbert Couch and Russel Gear suggest that the term arete eventually embodied optimum conduct, which engulfed the moral, spiritual and ethical conduct of the entire man. This conduct should surpass the Greek's role and responsibility in any other position he held in life and become a part of the man himself.4

By the middle of the fifth century B.C., Greece had excelled beyond all her contemporaries in nearly every facet of life. Ancient Greeks lived in a world that admired excellence not only in conduct, but also in philosophy, art and medicine. The idea of arete embodied physical perfection as well as perfection in other aspects. The Grecian mind highly valued physical beauty. The concept of arete inspired men in the ancient world to strive for flawlessness through athletics. This age of athletic excellence was also the era in which Greek sculpture and art soared to its peak. As an attempt to portray the world around them in the way they believed it should exist, great sculptors created ideal forms of the human body.5

**Athletics in Society**

In the ancient world, education took place in the gymnasion. Life for young men revolved around the fitness centers. Not only did these facilities offer training in physical skills, but they also became important social centers where many aspects of life were taught. Along with areas for athletics and training, the gymnasium

---

contained sanctuaries of the gods and libraries for reading and education.  

Greeks believed that athletic instruction played a vital role in the development of the youth. In the gymnasia, children trained in skills such as our modern day track and field events of running, discus throwing, and jumping. They trained in contact sports such as wrestling and boxing as well.

One of the most violent sports in ancient times was the pankration. Pankration, meaning "complete strength" or "complete victory," combined techniques from both wrestling and boxing. It was a no-holds barred fight that expressed the violent side of Greek culture. Only biting and gouging out opponents' eyes were forbidden.

All of the skills developed from training in these sports prepared the Greek youth for the battlefield. The usefulness of these skills is described in a conversation between two ancient philosophers, Solon and Anacharsis. Anacharsis questioned Solon as to what purposes wrestling and boxing served. Solon replied:

> All this is useful in war in the event that one has to pick up a wounded comrade and carry him out of the fight, or grab an enemy and bring him back to one's own lines. For such reasons we train them to the limits and set the most difficult tasks so that they can do the lesser ones with greater ease.

---

8 Quoted in Miller, 30.
The threat of war was ever present in Greek life. The Greeks relied upon a battle strategy called the hoplite phalanx formation.\textsuperscript{9} This formation consisted of a line of heavily armed spearmen at least six ranks deep. The men lined up, shoulder to shoulder, relying on discipline and unity to win battles. Each soldier protected his neighbor’s left side with his shield. Because of this type of teamwork, success depended on the formation not being broken. If the ranks were not held, battles would be lost.

A full set of armor required for the hoplite phalanx weighed at a minimum fifty pounds. Every young Greek trained both in handling the weapons and in maneuvers that could be useful in battle. The gymnasia played a useful role in military training. Virtually every athletic competition in ancient Greece tested martial ability. When young men turned eighteen, they were required to spend two years training in the gymnasia. Here they developed agility, strength and wisdom. The required military training, athletic competitions and musical contests that occurred in the gymnasia and athletic facilities ensured that these establishments did not become exclusive to the elite society. Common people were also able to have access to the facilities at the gymnasia.\textsuperscript{10}

Competitive sports brought prestige not only to the successful athlete, but to his family as well. An athlete who was victorious became a hero to his family and his town. Everyone admired the triumphant champion. Athletic competitions in ancient Greece were not

\begin{footnotes}
\textsuperscript{9} Poliakoff, 95.
\textsuperscript{10} Cartledge, 212.
\end{footnotes}
set up as team sports but as solo events where the athlete could achieve individual accomplishment.\textsuperscript{11} This hunger for acclaim led the Athenians to hold contests resembling our "Mr. Universe" competitions where beauty and strength were judged.\textsuperscript{12}

Thus, athletics were infused with Greek society. Adults as well as young boys exercised in the gymnasia. By working out, wrestling, dancing, boxing and learning martial arts, the men shaped their skills and their bodies. Through exercise and athletic training, the Greek soldier attempted to achieve areté, to possess an educated mind in a flawless body.\textsuperscript{13}

**The Rise of Medicine and Orthopedics**

More than any science, medicine is apt to develop quickly. Injury and suffering have been present from the commencement of life on this planet. From the beginning, man has attempted to relieve the pain, ease the suffering and heal the sick. Medicine merely developed out of the necessity to meet human needs.

A recorded development of medicine can be seen as early as in the days of Homer (ca.700 BC). By this time, Aesculapius had become the leading figure in medicine. Aesculapius is believed to have actually been an excellent physician during his life. However, upon his death, he was deified. Before his birth, according to an ancient Greek myth, the god Apollo took Aesculapius from the womb of Koronis, Apollo's adulterous mistress. After Aesculapius grew to be a child god, Apollo


\textsuperscript{12} Cartledge, 223.

handed him over to Chiron, a centaur that knew a lot about the healing arts. Chiron taught the young Aesculapius everything he knew in the field of medicine, but Aesculapius' knowledge quickly exceeded that of his teacher's.\textsuperscript{14} It is said that Pluto became upset because of Aesculapius' success in saving lives. His grandfather, Zeus, struck him with a thunderbolt so that Aesculapius would die and not be able to surpass the other gods. His children, however, carried on his work, allowing Aesculapius' knowledge to live through them.

The Aesculapia, a temple of faith healing that resembled our modern day health resorts, became the center of early Greek medicine. These temples could usually be found on beautiful land in wonderful climates. In the Aesculapia, the physicians directed healing towards the gods rather than to natural care. Upon acceptance to the Aesculapia, the patients went to the baths, where they were rubbed down, and cleansed. Dream-therapy became the basis for Aesculapian healing. At night, the patients would lay on the floor around a statue of Aesculapius, hoping for a dream that would reveal a cure for their ailment. Most of the time, the priests would

\textsuperscript{14} Bettmann, 16.
put on the mask of the god and appear before the suffering patients, 
pretending to be Aesculapia. 15 [See Fig.2]

Around the sixth century B.C., medicine in Greece slowly stepped aside from the supernatural. Philosophers began to understand that set laws controlled the universe. They discovered that these laws controlled all of nature, including the human body. The Greek physicians began to search for truth in medicine. They yearned for the scientific ability to predict. By striving for accurate diagnosis of conditions their knowledge of the body slowly grew.

The Greeks began to incorporate both science and natural philosophy into their art of healing. The Greeks are the ones who first developed a rational approach to medicine that no longer encompassed magical or religious elements. 16 No longer a mediator between man and god, the true doctor became a friend to the sick. 17 The Greeks are the ones who coined our phrase "physician," which comes from the Greek word φύσις meaning "nature". These ancient healers became naturalists who maintained a separation between their practice and their spiritual beliefs.

Some of the first philosophers to separate sickness from the supernatural were Pythagoras, Democritus and Empedocles. Pythagoras (sixth century B.C.), who is known now as one of the first mathematicians, believed that numbers guided the laws of the universe. He believed that the human body also followed the construction of

---
15 Bettmann, 17-18.
17 Porter. Greatest Benefit, 53.
mathematical rules. A sick man was merely out of accord with the rest of the universe and a doctor simply needed to put him back in sync.\textsuperscript{18}

Democritus (460-365 BC) was more of philosopher than a physician. However, he wrote extensively on the human body, diseases, and diet. He had a rational approach to medicine, believing that set laws controlled illnesses. This belief of illnesses being controlled by set laws carried through to Empedocles, Pythagoras' student. He believed that the body consisted of four humours. It was simply an imbalance of the four humours of the body that caused disease.

These ancient philosophers deeply influenced Greek medicine. It developed more fully, however, in the hands of those who made clinical observations. Medical schools sprouted up across Greece. Ancient medical schools were like guilds, formed societies of physicians with similar views shared among their members. Rather than studying in classes, a man wishing to be a doctor became an apprentice under a renowned physician and followed him from city to city, assisting as a nurse. Personal contact with the great masters of medicine allowed the student to have a more practical training, somewhat likened to the hospital rounds medical students make today. The Greek doctor worked with his hands like any other man of trade. However, because he worked with health, one of the highest interests in Greek society, the physician grew to be the most respected of all craftsmen.\textsuperscript{19} Being considered merely a trade, medicine was not exclusive to the upper class.

\textsuperscript{18} Bettmann, 20.
\textsuperscript{19} Ackerknecht, 50.
The practice of medicine was extremely important in the gymnastic facilities. It has been said that medicine developed out of athletic training and gymnastics. Gymnastic trainers were required to know the best diets and methods of care for the athletes so they could perform at their optimum level. However, they also needed to learn proper techniques to be able to provide care for the frequent injuries that occurred from training and competition. The gymnastic trainer quickly became the most respected early practitioner.

In training and competition, it became a common occurrence for wrestlers and boxers to cause injury to their opponents. Many vicious, “limb-threatening” ways of attacking one’s opponent were legal methods of fighting. It has been suggested that in the palaestra, injuries such as dislocations were intentionally produced. It is likely that the most common injuries at the gymnasium were shoulder and hip dislocations. [See Fig. 3] Oftentimes, gladiator contests, acrobatics, and other athletic activities resulted in fractures as well as dislocations. The numerous joint

---

20 Porter. *Patients*, 40
21 Poliakoff, 17.
22 Poliakoff, 27.
dislocations that occurred in the gymnastic facilities allowed for a vast amount of knowledge and experience to be gained with regards to the reduction of joints.

The myriad of fractures occurring in the gymnasias allowed the setting of broken bones and the understanding of how they healed to become quite advanced, as well, in ancient Greece. The trainers in the gymnasias had an enormous opportunity to expand medical understanding through their encounters with everyday accidents.25 The best of the Greek physicians agreed that medicine simply developed out of gymnastic training and coaching. These injuries created a necessity for the coaches to learn how to aid the athletes.

Democedes of Croton, a great physician, is a doctor who developed his skills from working with gymnastic injuries. Like many other physicians of the time, he gained medical knowledge through being a gymnastic surgeon and treating the frequent injuries at the gymnasias. He gained fame however, when he became a prisoner of war in Perseopolis and allegedly reduced King Darius' (fifth century B.C.) dislocated ankle.26

Hippocrates

Hippocrates, known as the "father of medicine," is probably the most famous physician of ancient Greece. His writings are the source from which we gain much of our knowledge of Greek medicine. In his works, he discusses in depth the treatment of many illnesses and injuries, including the treatment of dislocations and fractures.

26 Ibid., 20.
Other than his works however, very little is known about this great physician’s life. Born on the Island of Cos in 460BC to a family of “Aesculapiads” (temple healers), Hippocrates began his medical training at an early age. It appears as though he first studied medicine under his father Heraclides, but upon the death of his parents, he traveled to Athens and continued his study by learning the great philosophies of the time. Upon receiving an education from the finest schools, Hippocrates gained experience by traveling throughout Greece and practicing medicine.

Hippocrates and his followers set aside the common belief that the gods and the supernatural caused disease. Rather, they chose to found their knowledge of medicine purely on the patient study of the origins, signs and development of diseases.27 The Hippocratic physician treated patients with the mindset that nature has its own strong healing power.28

About seventy books on the treatment of medical conditions, collected in a volume called Corpus Hippocraticum, are attributed to the name of Hippocrates. Many of these, however, seem as though they may be the works of other physicians. Only nine works are considered to truly be the work of Hippocrates himself.29 However, by means of these writings, Hippocrates and other physicians of the ancient world were able to systemize medicine, building it up as a science and raising the status of the physician.

28 Ackerknecht, 61.
29 Nathan Smith Davis. *History of Medicine with the Code of Medical Ethics*. (Chicago: Cleveland Press, 1902), 22.
Hippocrates is credited with two very detailed and rather accurate treatises on dislocations and fractures: *Joints* and *Fractures*. He also wrote a small volume, *Mochilicon* (On Levers), which contains many odds and ends dealing with orthopedics. The methods Hippocrates outlined for the reduction of joints are similar to the methods used today. His techniques for setting and splinting fractures are precise and well recorded as well.\(^3\)\(^0\) The knowledge obtained from the gymnasium and palaestra, as a result of the frequent injuries to limbs and articulations, is reflected in Hippocrates' writings on joints and fractures.\(^3\)\(^1\)

It is natural to think that with intelligence and skill, man should be capable of repairing any injuries he has inflicted upon himself. When a problem is evident, such as a broken bone or a dislocated joint, it is quite a bit easier to decide on a treatment than if the problem is an internal illness. Injuries such as dislocations, fractures and broken bones create substantial deformities that can easily be seen. Unlike other doctors, surgeons dealing with fractures and dislocations are compelled to treat tangible and obvious problems. It then seems reasonable that the most effective treatments in the *Corpus Hippocraticum* are the ones dealing with the treatment of wounds, joints and fractures.\(^3\)\(^2\) As is evident in Hippocrates' work on orthopedics, the treatment of fractures and dislocations was the most advanced form of medicine in ancient Greece.

\(^3\)\(^0\) Fielding H. Garrison. *An Introduction to the History of Medicine*. (Philadelphia: W.B. Saunders company, 1929), 97.


Hippocratic Treatments

Many wrestling moves could have easily caused shoulder dislocations. [See Fig.4] The humerus can be dislocated two ways, either forwards or downwards into the armpit. Hippocrates claimed only to have seen the dislocation of the shoulder downwards. He notes that when this type of dislocation occurs, the humeral head can be seen in the armpit, the outer part of the arm is flattened, the elbow is prominent, and the arm cannot be lifted easily. Hippocrates offers several methods of reduction for the patient with a dislocated shoulder.

Hippocrates notes that the patient who is prone to frequent dislocations can usually relocate his shoulder on his own by placing the knuckles of his opposing hand in the armpit and forcing the joint upwards. This is a technique that could still be used today by those who encounter frequent dislocations. Hippocrates also suggests a method of reduction by pulling the forearm towards the spine and then pulling the arm upward. This technique, in reality, seems as though it would be more useful in the reduction of a posterior rather than a downward dislocation. Both of these methods, however, rotate the bone and force it to return to its natural position.33

---

Another, more natural, technique requires the physician to use his heel to aid in the reduction. [See Fig.5] While the patient is lying on his back, the physician is to face him, taking hold of the dislocated arm and pulling it while pushing his foot against a round ball which is placed in the patient’s armpit. A person seated above the patient’s head should hold the ends of a strap, which is wrapped around the ball, and pull on it while pushing his own foot against the top of the patient’s shoulder.\(^{34}\) This would also be an effective method of reduction for a dislocated shoulder.

Hippocrates gives several other techniques of reduction, but the strongest of all the methods is given last in his treatise on shoulder dislocations. This method requires the use of a board, at least five inches across, two inches thick

\(^{34}\) Hippocrates and Galen, 92.
and two cubits long to be used in aiding the reduction. The board should be pressed into the armpit and fastened to the arm in three places: below the humerus, above the elbow, and above the wrist. The arm is to be placed over a crossbeam or the rung of a ladder so that it hangs on one side while the body stands on the other. The dislocated arm is to be pushed down on the one side of the beam while the patient on the other side sinks down. This is the strongest mode of reduction, and the only one capable of relocating joints that have been out of socket for an extended period of time.\(^{35}\) [See Fig. 6]

Certain wrestling moves could also cause hip dislocations. [See Fig. 7] Hippocrates writes that the hip can be dislocated in four ways: to the inside, which Hippocrates records as the most frequent mode, to the outside, which is the second most frequent type of hip dislocation, or to the front or back, which he claimed to have rarely seen.\(^{36}\) Hippocrates accurately describes the signs of varying dislocations. On the inward dislocation, he writes that the injured leg is longer than the healthy leg, the gluteus maximus appears to be hollow, and the foot is pointed outward. Reduction of the hip is similar to that of the shoulder. The only differences are that extension in the direction of the foot should be applied by means of straps placed above the knee and at the foot and

---

\(^{35}\) Hippocrates and Galen, 93.

\(^{36}\) The most frequent mode of hip dislocation today is to the outside. It is thought that perhaps certain wrestling maneuvers resulted in an inward dislocation.
straps for counter-extension are to be fastened around the perineum. During reduction of the hip, the head of the femur should be struck with the physician's hand to force it outward.  

The techniques Hippocrates describes for treating dislocations would have been very effective. Francis Adams, a respectable surgeon of the late nineteenth century thought that up until his time, the most complete and accurate account given on surgery and the reduction of dislocations could only be found in the Corpus Hippocraticum. Around 1921, when Charles Singer wrote his influential essay "Medicine," the techniques used in the treatment of reductions in ancient Greece closely resembled those practiced in his time.

Celsus and His Treatments

Surgical procedures found in the writings of Celsus show the greatest progress in surgery from the time of Hippocrates. Celsus (25 BC to 45 AD) was not a physician but rather a compiler of encyclopedias. His work on medicine, De Medicina, is made up of eight books, the first four concerning diseases to be cured by healthful living and the last four concerning diseases to be cured by drugs and surgery. His eighth book deals extensively with the shapes and locations of the bones and the treatment of fractures and dislocations.

---

37 Hippocrates and Galen, 117.
39 Garland, 42.
It is evident that by the time Celsus compiled his books, much knowledge had been gained regarding the subjects of fractures and dislocations. Celsus writes that bones can be split in two ways: either in a straight line lengthwise or across the diameter. Oftentimes, when the bone is split across the diameter, it results in jagged edges. This is the worst type of break because the skin is often lacerated and it is difficult to bring the bones back together to allow the fracture to heal.

Broken jaws are not uncommon injuries in wrestling or boxing competitions. [See Fig.8] Celsus records an effective treatment for a broken jaw. He writes that when the jaw is broken, the pieces of bone are always touching one another at some point, rather than separating completely. The method of treatment he prescribes for this type of a fracture requires placing two thumbs in the mouth of the patient and the remaining fingers on the face, forcing the pieces back into position. [See Fig.9] To bandage the wounded area, one is to fold a piece of linen soaked in wine and oil, and smeared with flour, placing it under a second, dry bandage. The bandages are to be wrapped
around the face and tied at the top of the head. This method of securing a broken jaw (without the linen being soaked in wine, oil, and flour) is still used in hospitals today.

Broken arms are also common injuries in sporting events. Exceptional techniques developed for the treatment of these injuries as well as dislocations. Celsus wrote that when the humerus is fractured, the patient should be set on a high stool while the surgeon sits on a shorter stool facing the patient. A bandage should be placed around the patient's neck to support the forearm while a second bandage is to be looped underneath of the armpit and knotted over the head. A third should encircle the lower end of the humerus and hang down towards the ground, its ends tied together. To set the fracture, an assistant puts his arm through the second loop while the surgeon puts his foot into the third loop. Simultaneously, the assistant lifts the second loop while the surgeon pulls down on the third. This extends the humerus and allows it to gently slide back into place. Fig.10 offers an alternative method to this technique, without requiring the aid of an assistant.

Celsus also wrote detailed descriptions on the reduction of the dislocation of joints. He records two types of dislocations. The

---

41 Ibid., 545.
first type is when bones that are normally joined together separate, and the second is when joints slip out of place. If bones joined together separate, there is a depression at the point of disconnection and great swelling occurs. Bones injured in such a way will never truly unite again. Nonetheless, he writes that they should be treated with bandages soaked in wine and oil, similar to those used for the broken jaw.  

Like Hippocrates, Celsus records four types of joint dislocations: to the front, back, to the inside, or to the outside. He observes that where the bone has ruptured, swelling will occur, and where the bone has receded, there will be a depression in the skin. Celsus notes that any joint in the body has the possibility of slipping out of place, but not every type of dislocation can be reduced. Ancient physicians believed that the head, the spinal vertebrae, and a jawbone dislocated on both sides (not being immediately treated), could never be put back into place. With proper care today, all of these dislocations can be forced back into position.

However, Celsus does accurately note that any dislocation, which has resulted in the muscles or ligaments being torn, will never be fully healed and dislocation will occur again. Modern surgery, using advanced technology, has the ability to pin torn ligaments and muscles back together. However, even in using advanced techniques, the torn pieces will never completely unite, allowing for a full recovery.

---

42 Celsus, 559.
43 Ibid., 561.
Dislocation is rare once surgery has been performed, but even the most modern surgical techniques cannot assure the patient with a one hundred percent guarantee that dislocation will never occur again.

The ancient treatments, which Celsus records for the dislocation of the shoulder into the armpit, model those of Hippocrates. He does, however, cover a forward dislocation, which Hippocrates does not discuss. He writes that if the shoulder is dislocated to the front, the patient is to lie on his back with a bandage or a strap placed under his arm. A man is to stand behind the patient’s head holding the ends of the strap. A second assistant is to hold the patient’s forearm, pulling on it while the first assistant pulls on the strap. The doctor is to push the patient’s head back with one hand while raising the elbow with the other hand so that the bone is forced back into place. This, too, is an effective mode of reduction of the shoulder.

Galen

Born in Pergamum in AD 131, Clarissimus Galenus (known now as Galen), the son of the architect Nicon, was most likely the greatest Greek physician after Hippocrates. By the age of twenty-one, Galen had already become an excellent doctor. He desired to learn more, however, so he traveled throughout the ancient Greek world to study medicine. By the time he returned to Pergamum, he had acquired such an extensive amount of knowledge in medicine, that none of his contemporaries could surpass him.

44 Celsus, 571.
45 To read more on Celsus’ writings on the reduction of joints, see Celsus. De Medicina. Vol III, book 8.
46 Bettmann, 43.
Once back in Pergamum, Galen began to work with the gladiators as their medical supervisor.\textsuperscript{47} In Pergamum, he matured into an amazing surgeon due to his work of treating the gladiators and his experiments with animals, which furthered his knowledge of anatomy. Galen's extensive research made it possible for him to discover many unknown things concerning the bones.

Galen spent most of the wealth he inherited from his father on books and scribes.\textsuperscript{48} He dictated over three hundred books, however only one hundred and eighteen are still surviving. More volumes are attributed to his name than to any other ancient author. He composed eighty-three works on medicine and fifteen commentaries on the writings of Hippocrates.\textsuperscript{49} Nine of Galen's books cover topics in the area of anatomy. Galen's writings and medical thought were at the forefront of medicine well into the sixteenth century.\textsuperscript{50} His writings and medical techniques influenced the world long past his death.

\textbf{Areté and Orthopedics}

The works of these three men (Hippocrates, Celsus, and Galen) dominated the medical world for the next 1500-1800 years. No works existed that could more accurately describe the treatment of bone and joint injuries until the nineteenth century when medical knowledge began to greatly increase. The treatments described in these ancient treatises would have been effective techniques in most cases of trauma to the bones and joints.

\textsuperscript{47} Ackerknecht, 73.
\textsuperscript{48} Ralph Jackson. \textit{Doctors and Diseases in the Roman Empire}. (Norman: University of Oklahoma Press, 1988), 64.
\textsuperscript{49} Davis, 34.
\textsuperscript{50} Bettmann, 44.
As the Greeks strove to fulfill their desire for perfection, they unknowingly increased their knowledge in a field that would seem completely unrelated to their desire. The ever-constant longing for the ideal life, the desire for every man to find his own areté, to become the best that he could possibly be drove this need for perfection. Possibly one of the clearest pictures of perfection that man is able to see exists in the human body. One can look at an immaculately defined body and view perfection. One can, in a way, catch a glimpse of the flawless form that God originally designed our bodies to be. This faint picture propelled the Greeks forward in their quest for the ideal form. Through this quest, athletics rose to a height in ancient Greece incomparable to those in any other ancient civilization.

The harshness of Grecian athletics in the sports of wrestling and boxing caused multiple injuries to both the bones and the joints. With these injuries providing frequent practice, physicians in the ancient world gained a great amount of knowledge and highly advanced their skills in the treatment of fractures and dislocations. Support for this can be gained by considering the treatment of any modern disease or injury. If an unknown problem arises in an isolated case, it is difficult to determine the best solution for the situation. However, the circumstance is different whenever you have an outbreak of a disease or multiple injuries taking place in the same way in specific vicinity. A localized occurrence of an incident allows, the physicians practicing on the masses of patients to receive ample opportunities to determine the best method of treatment for the sick
or injured patients. The gymnasia and palaestra served to provide isolated environments where similar injuries happened on a continual basis. Therefore, the physicians were able to increase their knowledge and their skills concerning the treatment of orthopedic injuries. The treatments that developed two to three thousand years ago were so effective that they carried through time for nearly two thousand years.
Illustrations

Fig.1  This figure is a Roman copy of Myron’s Discus-Thrower (5th century B.C.). Schoder, Raymond V. The Book of Knowledge. Vol.7. Danbury, Grolier Inc., 1984. p.345.

Fig.2  Jackson, Ralph. Doctors and Diseases in the Roman Empire. Norman: University of Oklahoma Press, 1988. p.144.

Fig.3  Greek Vase ca. 490 B.C.E. Poliakoff, Michael B. Combat Sports in the Ancient World. New Haven: Yale University Press, 1987. p.58.

Fig.4  Poliakoff, Michael B. Combat Sports in the Ancient World. New Haven: Yale University Press, 1987. p.47.

Fig.5  Spector, Benjamin. “Surgical Thought and Practice in Ancient Greece and Rome.” Journal of the International College of Surgeons. 32, no.1 (1959): 107.


Fig.7  Greek Vase ca.490 B.C.E. Poliakoff, Michael B. Combat Sports in the Ancient World. New Haven: Yale University Press, 1987. p.58.

Fig.8  Greek Vase ca.480 B.C.E. Poliakoff, Michael B. Combat Sports in the Ancient World. New Haven: Yale University Press, 1987. p.55.

Fig.9  From MS. Of Appollonius of Kitium, of Ninth Century, Copied from pre-Christian Original. Found in: Livingstone, R.W. ed. The

Fig.10 Spector, Benjamin. “Surgical Thought and Practice in Ancient Greece and Rome.” Journal of the International College of Surgeons 32, no.1 (1959): 106.
Bibliographic Essay

Primary Sources - Translated

In Celsus' eighth book *De Medicina* (edited in 1979), he speaks extensively on the treatment of fractures and dislocations. It was found to be very helpful in providing detailed descriptions of bone and joint manipulations in the ancient world.

The book containing *Hippocratic Writings* and *On the Natural Faculties* (edited in 1955) written by Hippocrates and Galen contains many areas of the writings of Hippocrates, but only covers one of the writings of Galen. Hippocrates' treatises: *On Fractures* and *On the Articulations* are both found in this book. They were both helpful in learning about the Hippocratic treatments of fractures and dislocations. The section on Galen's writings did not however cover as much on his study of anatomy and the bones.

W.H.S. Jones' book translating and discussing *The Medical Writings of Anonymous Londinensis* (edited in 1968) only discusses disease as it was treated and thought of in the ancient world. The anonymous writings do not speak at all on the treatment of fractures or dislocations.

*Hippocratic Writings*, edited by G.E.R. Lloyd (1983) covers Hippocrates' writings *On Fractures*, but these are the same as the writings in the book containing *Hippocratic Writings* and *On the Natural Faculties*. It does not speak at all on Hippocrates' writing *On the Articulations*. 
Erwin H. Ackerknecht’s book *A Short History of Medicine* covers a lot on the history of medicine, but the history covers the earliest times up until recent times, and therefore only touches on Greek medicine and Hippocrates.

**Secondary Sources**

An interesting book covering many topics in the history of medicine is Otto Bettmann’s book *A Pictorial History of Medicine* (1956). It is a graphical book containing excellent histories along with descriptive pictures of historical figures and events in the history of medicine. This book was helpful in provide quite a bit of background information on leading figures in ancient medicine.

Ralph Jackson’s book *Doctors and Diseases in the Roman Empire* contains a lot of information on the origins in medicine, physicians and diseases. However, as the title says, it speaks mostly of medicine in Rome and only talks of Grecian medicine when referring to the origin of specific things.

A detailed account of orthopedic history is covered in David LeVay’s book *History or Orthopedics* (1990). This book provides an enormous amount on the history of orthopedics, including pictures of techniques of treatment. It discusses ancient orthopedics but did not however go into extensive detail in this area. It does, however, contain many interesting pictures from sixteenth century artists and writers that portray the different methods of reduction outlined by Hippocrates in his work *On Articulations*.

For more information on ancient sports, read Michael B. Poliakoff’s book *Combat Sports in the Ancient World* (1987). It gives a
lot of information on the different sports, training, and competition in ancient times. However, it only briefly covers the topics of medicine or injuries.