ORIGINAL ARTICLE

A Journey in Time; Muslim, Arab, and Persian Physicians and the History of Surgery

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Abstract
The role of Muslim, Arab, and Persian scholars and physicians in shaping modern medicine and surgery practice is often overlooked in scholarly discussions and is often underappreciated in modern literature. Muslim, Arab, and Persian scholars advanced surgical techniques and knowledge. They played a pivotal and important role in translating and preserving classical Greek and Roman medical and scientific texts and knowledge, which later significantly influenced the European Renaissance. Their work laid the foundation for many modern surgical practices and techniques and continues to inspire medical professionals worldwide. This abstract aims to shed some light on the significant contributions of figures such as Rhazes, Haly Abbas, Albucasis, Avicenna, and Ibn Quff to the development of surgery and surgical specialties, including general surgery. By highlighting these contributions, we seek to rectify the historical oversight and endure the profound impact of these scholars and their contributions to the field of medicine and surgery.

Key words: Arabs, Physicians, Persian, History, Islam, Surgery

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Introduction

Muslim, Arab, and Persian physicians and scholars played an important role in the development of modern medicine and surgery between 800 and 1450 AD; however, the impact has been poorly commemorated (Tsoucalas, et al., 2016, pp. 95-97; Majeed, 2005, pp. 1486-1487; Hajar, 2013, part III, pp. 43-46). Muslim, Arab, and Persian scholars translated Greek, Syriac, Pahlavi, and Sanskrit scientific work to Arabic, with the translation movement reaching its peak with the establishment of "*Bait-al-Hikma*" (The House of Wisdom) in Baghdad in 830 AD (Figure 1) (Algeriani, and Mohadi, 2017). Consequently, Arabic became a crucial scientific language by preserving ancient scientific knowledge (Edriss, et al., 2017, pp. 223-229). During this time, the Arabian hospitals were centers of medical education, establishing many of the concepts and structures that we see in modern hospitals, such as clinical education, personal and institutional hygiene, medical records, and pharmacies (Majeed, 2005, pp. 1486-1487). Therefore, the Muslim, Arab, and Persian physicians excelled in surgery, initiating a new era of more complicated procedures, mainly utilizing Greco-Roman surgical instruments while developing their own. Those instruments were detailed and described in what seems to be the first known illustrated surgical instrument books in history (Tsoucalas, and Sgantzos, 2017, pp. 1636-1645; Falagas, Zarkadoulia, and Samonis, 2006, pp. 1581-1586; Zarrintan, et al., 2020, pp. 437-440).

This review aims to describe the early surgical efforts of five main surgical pioneers in the golden Islamic era: Rhazes, Haly Abbas, Albucasis, Avicenna, and Ibn Quff.

Figure 1. Bayt al-Hikmah (The House of Wisdom); a destination for intellectuals and an academy of knowledge attracting brains from far and wide during the Abbasids caliphate (750-1517 AD) (Algeriani and Mohadi, 2017).

Methods

A comprehensive search of articles published in MEDLINE (PubMed), EMBASE, Web of Science, and Google Scholar was conducted in June 2023. Original manuscripts were also downloaded and accessed via the Library of Congress to access the Arabic original scripts. The Terms used were Arab, Muslim, Islamic, surgery, surgeon(s), Cancer,

Rhazes, Haly Abbas, Albucasis, Avicenna and Ibn Quff. Both authors performed abstract screening, and irrelevant studies and publications were excluded. Additional Arabic resources were also accessed for data comparison.

Early Surgical Experiences - *Abu Bakr Al-Razi* (Rhazes)

Abu Bakr Al-Razi (known as Rhazes) (865-925 AD) was a Persian physician, philosopher, chemist, pharmacist, and scholar who worked in Baghdad (Figure 2). He is credited for the establishment of Baghdad Hospital. It is narrated that when he was asked to build the hospital, he selected multiple areas in the city and hung pieces of meat, and the place where the meat remained longest without rotting was the chosen location for the hospital (Zaki, 1966, pp. 110–113). He wrote over two hundred medical books, including one of the earliest illustrated surgical instruments books (The Book of Surgical Instruments) (Emami, et al., 2012, p. 747). He was also credited for being the first physician to use general anesthesia in the inhaled form with an anesthetic sponge (Tsoucalas, et al., 2016, pp. 95–97), which he described as a "sponge immersed in a solution of opium, Hyoscyamus, Mandragora and Loiseleuria for inhalation before any surgery" (Tsoucalas, and Sgantzos, 2017, pp. 1636–1645).

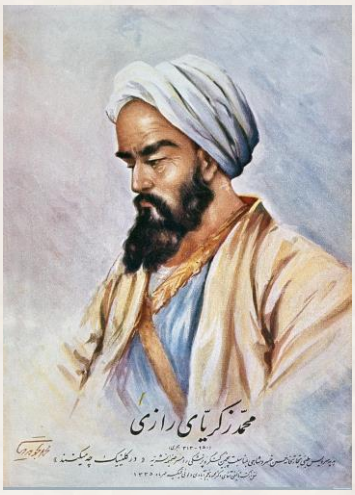

Figure 2. Portrait of Rhazes (al-Razi) (AD 865 - 925), a physician and alchemist who lived in Baghdad. Wellcome Collection. Attribution 4.0 International (CC BY 4.0). (Wellcome Collection, 2023)

His work includes a public health book directed to travelers and people without access to medical care. In this book, "*Man La Yahduruhu Al-Tabib*" - (For One without a Doctor), he described diets and drug components that can be prepared at home according to detailed instructions (Edriss, et al., 2017, pp.223-229). His other well-known book was dedicated to the Abbasid caliphate, Al-Mansour, hence called "*Al-Mansouri*," in which he detailed his thoughts on anatomy, hygiene, orthopedics, wounds, sores, and therapeutics (Emami, et al., 2012, p. 747). It was translated into Latin in 1187 and became Europe's most widely read medical book (Edriss, et al., 2017, pp. 223-229). He is one of the earliest pioneers to differentiate the management of open fractures from closed fractures (Ince, et al., 2023, p. 214). He also recommended that infected wounds heal with second-

ary intention following debridement (Ince, et al., 2023, p. 214).

Rhazes was also interested in medical education and encouraged research among his students: "… collect medical books, as many as you can. Make one of your own from your daily observations and record in each case: definitions, causes, signs, treatments, and ominous signs; this will be your personal treasure" (Edriss, et al., 2017, pp. 223-229). His research was methodological aiming to reduce bias in his observations, "if you want to study the effect of bloodletting on a condition, divide the patients into two groups, perform bloodletting only on 1 group, watch both and compare the results" (Edriss, et al., 2017, pp. 223-229; Hajar, 2013, part IV, pp. 93-95). He was also known to encourage constructive criticism while maintaining the respect to the teachers and masters, "in the medical field, similar to philosophy, one should not readily accept submission fully to the superior's understanding without questioning and reasoning and should not depend fully on their input without investigation and research" (Zaki, 1966, pp. 110-113; AlSalhi, 2010, pp. 81-84).

Alongside his surgical instruments book, Rhazes's contributions to the surgical field were remarkable. He was the first to use animal gut, specifically catgut, for suturing wounds (Tsoucalas, et al., 2016, pp. 95-97; Hajar, 2013, part IV, pp. 93-95). He also described in his book "*Al-Hawi*" - (The Comprehensive Book) some of his clinical surgical experiences in the management of bowel obstruction, peptic ulcer disease, and jaundice (AlSalhi, 2010, pp. 81-84). He described performing hemorrhoidectomies for "prominent" hemorrhoids using cautery (Ince, et al., 2023, p. 215). He also focused on the surgical aspects of cancer. In his book "*Al-Fosool*" - (The Chapters), he differentiated between advanced and early cancer. He suggested leaving latent and asymptomatic cancers untreated to prolong survival (Edriss, et al., 2017, pp. 223-229; Hajar, 2013, part IV, pp. 93-95). He also recommended not to use cautery for all cancers, which was the common practice at that time: "As far as I am aware, internal cancers are not recoverable, and treatment of these cancers would accelerate a patient's death. I have observed cases with the palate, anal or vaginal cancers in which surgery and wound cauterization prevented wound healing and caused patient's torment till death" (Edriss, et al., 2017, pp. 223-229). He also advised that patients with cancer should have blood-thinning food served cold, which could translate to his thoughts on deep venous thrombosis prophylaxis (Emami, et al., 2012, p. 747).

The Pulse Definer - *Abu Al-Hasan Ali Al-Majusi* (Haly Abbas)

Abu Al-Hasan Al-Majusi Ahvazi, also known as (Haly Abbas), was a pivotal figure in the history of medicine, originating from the ancient city of Arrajan during the period between 930/949 and 982/994 AD (Mahmoudi Nezhad, et al., 2015, p. 181; Zargaran, et al., 2013, p. 2196). His intellectual journey eventually led him to Baghdad, where he became a key figure in the medical community, serving as a court physician and practicing at the renowned Azodi Hospital (Zargaran, et al., 2013, p. 2196; Iranikhah, et al., 2016, p. 192). This position allowed him to engage with the most advanced medical knowledge of his time and contribute significantly to the development of medical science during the Islamic golden era (Mahmoudi Nezhad, et al., 2015, p. 181). Haly Abbas is particularly noted for introducing observatory medicine, an approach grounded in empirical observation and systematic analysis, as opposed to the traditional reliance on historical texts and anecdotal evidence. This method marked a significant shift in medical practice, em-

phasizing the importance of data-driven conclusions in the diagnosis and treatment of diseases (Zargaran, et al., 2013, p. 2196).

One of Abbas's most enduring contributions to medicine is his comprehensive medical encyclopedia, *Kamil Al-Sinaah Al-Tibbiyah* (The Perfect Book of the Art of Medicine), also known as *Al-Kitab Al-Malaki* (The Royal Book). This work is recognized as one of the earliest and most systematic encyclopedias in the field of medicine and surgery. The encyclopedia was instrumental in shaping the medical practices of the time and served as a reference for subsequent generations of physicians (Mahmoudi Nezhad, et al., 2015, p. 181; Aciduman, et al., 2014, p. e791). Haly Abbas made significant contributions to cardiology. He accurately described the pulse, defining it as a fundamental indicator of life and overall health. He understood the pulse as a reflection of the rhythmic contraction and dilation of arteries, directly tied to the condition of the cardiovascular system (Mahmoudi Nezhad, et al., 2015, p. 181). Abbas's insights into the pulse cycle were remarkably advanced; he distinguished between the states of systole and diastole, describing them as active and passive phases, respectively (Mahmoudi Nezhad, et al., 2015, p. 182). His expertise extended beyond cardiology into the field of neurology. He made significant contributions to the understanding of neurological disorders by providing detailed descriptions of the pathophysiology underlying various conditions, including headaches, traumatic injuries, meningitis, memory loss, and coma (Zargaran, et al., 2013, p. 2197). His observations contributed to a more nuanced understanding of the brain and nervous system, influencing medical thought and practice for centuries (Zargaran, et al., 2013, p. 2197).

In the realm of surgery, Haly Abbas's contributions were equally significant. He made important observations regarding malignancies and cancers. In The Royal Book, he advocated for the surgical removal of such tumors, introducing the concept of negative margins—a principle still fundamental in modern oncology: "... we say that these tumors (cancer) can occur in any organ in the body but most commonly in the uterus and breasts. Hence, if it was in the breast or other organs that are not close to a major vessel or nerve, it should be entirely resected with the organ while ensuring nothing is left behind" (Haly Abbas, 980a AD, p. 467).

He also described performing a mastectomy in males using an elliptical incision (an incision used currently for most mastectomies): "... gynecomastia often occurs due to fat accumulation, in which the breast needs to be removed. This is done using a crescent incision or two opposite crescents if the breast is very large. All the fat needs to be removed after raising skin flaps" (Haly Abbas, 980a AD, p. 480) (Figure 3). His other contributions in the surgical field include recommendations for the management of gangrene through limb amputation, aimed at preventing the spread of infection and ensuring patient survival (Haly Abbas, 980a AD, p. 492). His detailed accounts of fracture management, especially in the context of skull and cranial injuries, were also highly advanced. He described the use of free bone flaps, a technique that effectively treated complex cranial fractures, laying the foundation for modern cranial surgery techniques (Aciduman, et al., 2010, p. 1474).

Moreover, Abbas made notable contributions to proctology, particularly in the management of imperforate anus. He emphasized the importance of preserving sphincter function and preventing strictures during surgery, recommending careful dilation and surgical intervention to ensure proper healing and function. "In these cases, the midwife should

perforate and dilate it (the anus) with her finger or a sharp knife and care for the muscles not to be dissected. Then she should insert a piece of lint or a lead tube for some days to avoid stricture and help heal the ulcer with wine" (Iranikhah, et al., 2016, p. 192).

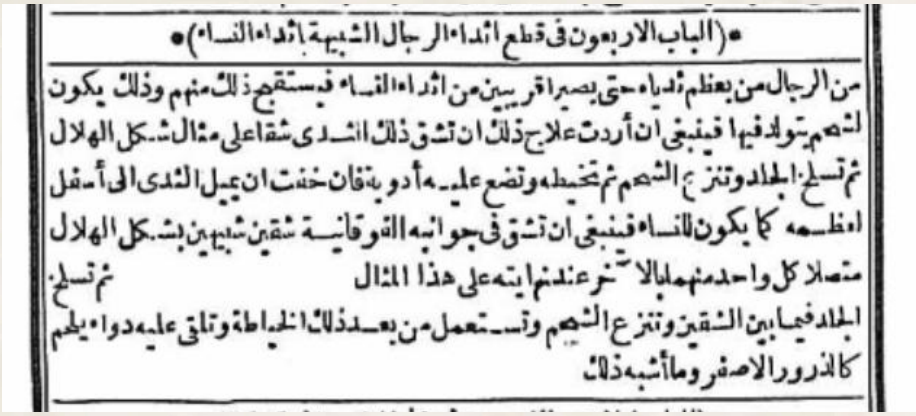
(الباب الاربعون فى قطع اثداء الرجال الشبيهة باثداء النساء)
من الرجال من يعظم ثدياه حتى يصيرا قريبين من اثداء النساء فيستقبح ذلك منهم وذلك يكون
لشحم يتولد فيها فينبغى ان أردت علاج ذلك ان تشق ذلك الثدى شقا على مثال شكل الهلال
ثم تسلخ الجلد وتنزع الشحم ثم تخيطه وتضع عليه أدوية فان خفت ان يميل الثدى الى أسفل
اعظمه كما يكون للنساء فينبغى ان تشق فى جوانبه الفوقانية شقين شبيهين بشكل الهلال
متصلا كل واحد منهما بالآخر عند نهايته على هذا المثال ثم تسلخ
الجلد فيما بين الشقين وتنزع الشحم وتستعمل من بعد ذلك الخياطة وتلقى عليه دواء يلحم
كالذرور الاصفر وما أشبه ذلك

Figure 3. The Perfect Book of the Art of Medicine by Haly Abbas, 1285. Retrieved from the Turkish Manuscripts. (Haly Abbas, 980b AD)

The Procedurist - *Abu Al-Qasim Al-Zahrawi* (Albucasis)

Abu Al-Qasim Al-Zahrawi (Albucasis) (936-1013 AD), known as the "Father of Operative Surgery," was a physician, surgeon, and chemist born in El-Zahra, Cordoba (Amr, and Tbakhi, 2007, pp. 220–221). At his time, Cordoba and the Andalusia region (Spain) were part of the golden Islamic age of civilization and were one of the main cultural and economic centers in Europe and the Islamic world (Al-Ghazal, 2020, pp. 1–6). He reviewed prior surgical knowledge from Persian, Greek, Roman, and Indian civilizations and added his experiences and understanding to produce his famous book "*Kitab Al-tasreef liman ajiza an al-taaleef*" - (The method of medicine) (Reguera Teba, 2023, pp. 63–68). He detailed his surgical knowledge in three chapters of this book, discussing surgical procedures, wound care, fractures, and gynecology (Zakkour, 2006). He stressed on the importance of anatomy and physiology as a prerequisite for surgical knowledge and practice (Cambra, 2016).

His general surgical descriptions are considered one of the earliest in abdominal surgery. He described surgical management of inguinal hernias where he reduced the hernia back and sutured the defect externally (Zakkour, 2006; Motawie, 1999, pp. 435-493). He also described performing bowel anastomosis with a catgut suture and using cauterization for vascular control (Reguera Teba, 2023, pp. 63-68). He is also considered the first to describe and perform a thyroidectomy (Amr, and Tbakhi, 2007, pp. 220-221). He described in details the management of perianal disease, of which many aspects are still used today (Motawie, 1999, pp. 435-493). He accurately differentiated the management of perianal fistula regarding sphincter involvement, as he encouraged performing fistulotomy and curettage if the sphincter was not involved (Motawie, 1999, pp. 435-493). He also emphasized the importance of draining a perianal abscess before it develops into a fistula (Figure 4) (Zakkour, 2006).

He is also one of the earliest surgeons to utilize the knowledge of hemostasis in bleeding control during his procedures. He differentiated between arterial and venous control

for ligation and cautery. In his book "*Al-Tasrif*" he writes, "and know that if an artery was bleeding, it will not stop by pressure only, especially if it was big. It would stop by cauterization, ligation, or the use of hemostatic medications" (Motawie, 1999, pp. 435-493). He also pioneered wound management, explaining the importance of antiseptics and debridement in wounds and differentiating between primary and secondary wound closure (Cambra, 2016).

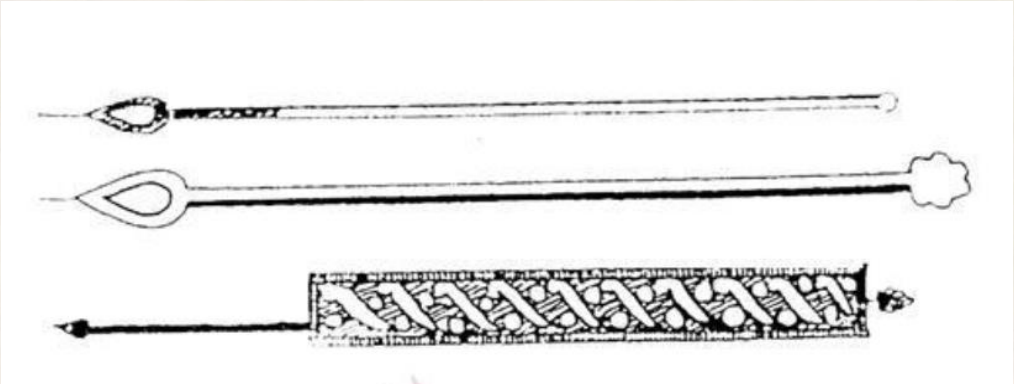

Figure 4. Some Albucasis surgical instruments used for fistulotomy and perianal disease. Credit: Hanan Mutawa, 1999, Surgical Science in Andalusia, Arab Historian Journal. (Motawie, 1999, p. 464)

His contribution to surgical science also included early descriptions of surgical oncology and surgical management of cancer (Motawie, 1999, pp. 435-493). He discouraged applying direct cautery to cancerous growths, as it would lead to ulceration and challenges with wound healing. He also encouraged radical resection of cancer in locations where it could be accomplished, such as the breast or the lower limb, and to avoid major surgery if the cancerous growth was significant, "and I could never cure anyone in such a situation, and never observed anyone doing so" (Zakkour, 2006). He also emphasized the importance of removing the tumor completely, "and then you resect -the tumor- from all around including the skin until you are sure there is nothing left behind" (Figure 5) (Zakkour, 2006; Motawie, 1999, pp. 435-493).

For these contributions and more, he was praised by the Latin author Paulus Ricius "I am not ashamed to say, with the forgiveness of others, that Albucasis is not inferior to any doctor after the father of medicine, Hippocrates, and his interpreter, Galen" (Reguera Teba, 2023, pp. 63-68).

The Supreme Guide – *Ibn-Sina* (Avicenna)

Abu-Ali Al-Husayn Ibn Abdallah Ibn-Sina, or Avicenna (980-1037 AD) was known as the Persian Galen, the father of early modern medicine, and the prince of physicians, for his significant contributions to medicine, and especially to surgery (Figure 6) (Ahmed, and Zargaran, 2020, pp. 204-211). He was born in Old Persia, currently known as the Republic of Uzbekistan (Avicenna, 1973, pp. 166-167). His journey through medicine began at 14 when he dedicated himself to study under two notable physician scholars, *Abu Abdallah al-Natili and Abu Mansur Qumri* (Aldemerdash, 1997, pp. 67-87). He was focused on treating the poor and needy without asking for a price in return and spent the rest of

his time conducting experiments at home and researching new remedies. He became a famous physician at the age of 18 after treating "Nuh the first," the prince of Sammanids, for a gastric ulcer with herbal remedies and a modified dietary pattern. When the prince offered Avicenna a reward of his liking, he asked to be granted access to the prince's large personal library of over 30 thousand books to read and expand his knowledge (Aldemerdash, 1997, pp. 67-87). Besides his notable work as a physician and surgeon, Avicenna was also a renewed mathematician, philosopher, encyclopedist, astronomer, and politician (Dalfardi, and Mahmoudi Nezhad, 2014, pp.2175-2179).


الفصل الثالث والخمسون فى علاج السرطان

قد ذكرنا فى التقسيم انواع السرطان وكيف السبيل الى علاجه بالادوية والتحرس
منها بعلاجها بالحديد لئلا يتقرح وقد ذكرنا السرطان المتولد فى الرحم والتحرز من
علاجه وقد ذكرت الاوائل متى كان السرطان فى موضع يمكن استيصاله كله كالسرطان
الذى يكون فى الثدى او الفخذ ونحوها من الاعضاء الممكنة لاخراجه بجمله لاسيما
ان كان مبتديا صغيرا واما متى ورم وكان عظيما فلا ينبغى ان يقرب به فانى ما استطعت
ان ابرئ احدا منه ولا رأيت قبلى من وصل الى ذلك والعمل فيه اذا كان ممكنا كما قلنا
ان يتقدم وتسهل العليل من المرة السوداء مرارا ثم تفصده ان كان فى العروق امتلاء
ثم تنصب قصبة تمكن فيها بالعمل ثم يلقى فى السرطان الصنانير التى تصلح له ثم تفوره

Figure 5. Chapter 53 in Management of Cancer. Abu Al-Qasim Khalaf Ibn Abbas Al-Zahrawi, 1908, The Method of Medicine. Lucknow: Al-Matbaa Publishing. Retrieved from the Library of Congress, (Al-Zahrawi, 1908)

His most renewed achievement is his medical encyclopedia, "*Al-Qanun fi al-Tibb*" (The Canon of Medicine), which was taught as one of the leading medical textbooks in the East and West until the seventeenth century (Ahmed, and Zargaran, 2020, pp. 204-211). It is comprised of five sections including general principles in medicine, simple medicines and drugs, organ-specific pathology, multiorgan diseases, and formulas for compound remedies (Figure 7) (Dalfardi, and Mahmoudi Nezhad, 2014, pp.2175-2179).

While Avicenna had a holistic perspective, he had a special interest and focus on surgery throughout his career. He pioneered basic principles that are still used in current surgical practice. He wore and recommended a green colored gown for surgeons, treated surgical patients in a devoted surgical ward, performed procedures under general anesthesia in sterilized settings, and carefully formulated medicines for perioperative pain and symptom management (Ahmed, and Zargaran, 2020, pp. 204-211). He also introduced many surgical instruments in surgical procedures (Ahmed, and Zargaran, 2020, pp. 204-211).

Avicenna was one of the earliest to describe biliary obstruction and its manifestation as post-hepatic jaundice: "black or yellow jaundice of the whole body reveals an obstruction in the biliary passages" (Avicenna, 1973, pp. 166-167). He also mentioned that "white stool points to obstruction in the biliary passages and goes with jaundice" and "thus jaundice follows gall-stone colic; the colic depends on the retention, the jaundice is the compensatory evacuation" (Ashrafian, 2013, pp. 479-480).

Figure 6. Portrait of Ibn Sina – Avicenna, the prince of physicians (980 – 1037 AD) (Khan, et al., 2020, pp. 173-175)

Figure 7. The Canon of Medicine by Ibn Sina. Avicenna, 980-1037. Retrieved from the Library of Congress. (Avicenna, 1700–1799)

In the Canon of Medicine, *Ibn Sina* also described cancerous tumors and differentiated them from induration: “A cancerous swelling progressively increases in size, is destructive, and spreads roots which insinuate themselves amongst the tissue elements.” He also

described the advanced stages of these tumors: "It does not necessarily destroy sensation unless it has existed for a long time, and then it kills the tissues and destroys the sensation in part." He classified them into autumnal (cold) swellings compared to other types of swellings (hot), which are secondary to inflammation or infection. He used cauterization to excise these autumnal swellings (Avicenna, 1973, pp. 166-167).

His knowledge and practice covered a wide variety of surgical subspecialties. Although it is claimed that he specialized in head and neck surgery, he was the first to describe pivotal procedures in fields like ophthalmology, orthopedics, biliary diseases, abdominal wall hernias, oncology, trauma, and urology (Dalfardi, and Mahmoudi Nezhad, 2014, pp.2175-2179). He was a skilled, knowledgeable surgeon whose experiments, observations, achievements, and commitment greatly influenced the future of medicine and surgery.

The Healing artist – *Abu Al Faraj Ibn Ishaq Al Karaki* (Ibn al Quff)

Abu al Faraj ibn Ya'qub Ibn Ishaq, famously known as Ibn al Quff (1233–1286 AD), was a pioneer in the field of medicine and surgery in the 13th century (Takrouri MS., 2010). He was a Christian Arab surgeon and scholar, born in the city of Karak, in the Transjordan district of larger Syria, where he gets his other nickname, Al Karaki. His passion for medicine sparked at a young age when he moved with his father to Ṣarkhad, where the governor summoned his father to serve as a secretary to the Department of Welfare. After his father became friends with *Ibn Abi Uṣaybiah*, a prominent physician and counselor to the governor, he asked if he would teach his son the art of healing (Hamarneh, S.K. 2016). Ibn al Quff learned the basics of medicine from *Ibn Abi Uṣaybiah* at the age of 12 and studied major medical texts by Hippocrates and Rhazes. This was later reflected in his scholarly work as he published his own texts to discuss the viewpoints of his predecessors, such as *Al Oussoul Fi Sharh Al Fousoul* (Foundation in Explanation of Hippocratic Collection) and *Al Kouliat Fi Kitab Al Quanoun Fi Al Tibb* (Synopsis of Avecinna's Canon) (Dalfardi B, Yarmohammadi H. 2016). At the age of 19, and after the fall of the Ṣarkhad province, he moved with his family to Damascus, which spearheaded his launch into the medical field. He was taught by prestigious scholars and had the opportunity to train in work and in great hospitals that served the royal family, civil servants, and army personnel. After proving himself to be an outstanding physician, he was summoned to become an army physician at the age of 29 in his homeland, where he served for 10 years and published his first medical encyclopedia *Al-Shafi al-Ṭibb* (The Comprehensive of the Healing Arts), which includes 12 chapters that transcend the entire spectrum of the medicine, based on his own observations and innovations (Hamarneh, S.K. 2016).

His most famous and prominent manuscript is his surgical manual, *Al Omdah fi sina'at al jiraht* (Basics in the Art of Surgery) (Figure 8), believed to be the earliest medieval Arabic treatise intended solely for surgeons (Yarmohammadi, Hassan et al. 2013). It includes 20 chapters discussing surgical management of different pathologies from head to toe. It includes anatomy, traumatology, anesthesia, and surgical pain management, in which he describes the difference between true and untrue pain relief (Takrouri MS., 2010). In his manuscript, he describes, for the first time, the existence of capillaries in the circulatory system, "Due to the dependency of this blood system [venous system] to the other one [arterial system], these two systems are mostly located near each other within

the body, through the communicating fenestrations between them. These fenestrations are hidden from the eye" (Yarmohammadi, Hassan, et al. 2013). While his main area of focus was surgery, he was a well-rounded physician who contributed to medicine, anatomy, physiology, toxicology, and preventive medicine. His book, *Jame'e Al Gharad Fi Hifz Al Sihah wa Rafi'e Al Maradh* (Compodium in preserving health and eliminating Disease), includes 60 chapters in the area of preventive medicine and is considered a unique manuscript in medieval times (Takrouri MS., 2010).

Figure 8. The first page of Ibn al Quff's manuscript of his surgical book Al Umdah with his full name and a short biography (Takrouri, 2010, p. 5)

At the age of 39, he was summoned back to Damascus, where he served as an academic surgeon and scholar at its Citadel and hospital until his death at the age of 52. Medical students traveled to attend his lectures and learn from his expertise (Hamarneh, S.K. 2016). In his short life, Ibn al Quff served as an outstanding scientist, physician, surgeon, public health expert, researcher, scholar, and teacher, and his contributions to the medical Arabic literature are paramount.

Conclusion

The Islamic, Arabian, and Persian historical contributions to the early development of surgery and surgical procedures have been pivotal. Scholars, including Rhazes, Haly Ab-

bas, Albucasis, Avicenna, and Ibn Quff, established important aspects that are still used in modern surgery. Following the long regional conflicts and disputes, many significant original historical pieces and manuscripts remain unfound, making this an interesting part of history that requires further research and exploration.

Authors' Contribution

Kadhim Mustafa Taqi conceptualized the study, developed the methodology, and conducted the primary review. He also drafted the manuscript and coordinated the overall research process.

Noor AlNasrallah contributed to the study design, provided critical revisions, and drafted a part of the manuscript.

All authors read and approved the final version of the work.

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Conflict of Interest

None.

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