

Kitab Al-Tasrif: The Celebrated Medical Encyclopedia of Al-Zahrawi (936–1013 CE)

Ashfaque Ahmad¹, Rahemeen Bano², Sania Sultana³, Mehsan Bin Hussain Barawaz⁴

¹*Corresponding Author, Research Officer (Unani), CCRAS-National Institute of Indian Medical Heritage, Hyderabad, India*

²*Unani Consultant, ^{3,4}PG Scholar, Govt. Nizamia Tibbi College, Hyderabad, India*

Abstract—With the rise of Islamic civilization and the expansion of Arab interactions with other cultures, Muslim scholars began to acquire and assimilate the scientific and medical knowledge available at that time. This knowledge was obtained from the conquered regions as well as from the Nestorian Christians who had been expelled from the Byzantine Empire and had preserved the intellectual heritage of earlier civilizations. Among the greatest achievements of Islamic medicine is *Kitab al-Tasrif li-man ‘Ajaza ‘an al-Ta’lif* (“The Method of Medicine”), a thirty-volume Arabic medical encyclopedia written around 1000 CE by Abu al-Qasim al-Zahrawi, devoted nearly fifty years to the completion of this monumental work, which contains extensive information on diseases, injuries, medical conditions, treatments, and surgical procedures. The encyclopedia covers a wide range of medical disciplines, including surgery, medicine, orthopaedics, ophthalmology, pharmacology, nutrition, dentistry, obstetrics, and pathology.

The final treatise of *Kitab al-Tasrif*, devoted entirely to surgery, became the most celebrated section of the work. Al-Zahrawi regarded surgery as the highest branch of medicine and emphasized that no one should practice it without thorough knowledge of anatomy, physiology, and the other branches of medical science. In the introduction to this treatise, he advised aspiring surgeons to study the writings of earlier scholars and to gain expertise through continuous observation and practical experience.

Al-Zahrawi is widely regarded as the greatest medieval surgeon of the Islamic world and is often referred to as the father of modern surgery. His pioneering contributions to surgical techniques and instruments profoundly influenced both Eastern and Western medicine for centuries, with many of his innovations remaining relevant in modern medical practice. *Kitab al-Tasrif* describes more than 200 surgical instruments and continued to serve as a standard reference in Europe until the eighteenth century. He was also the first

physician to describe ectopic pregnancy and to recognize the hereditary nature of haemophilia. In addition, he mentioned several *Advia Mukhaddira* (anaesthetic drugs), reflecting his advanced understanding of pain management in surgical practice.

I. INTRODUCTION

Kitāb al-Taṣrīf li-man ‘Ajiza ‘an al-Ta’lif is the monumental medical encyclopedia of Abu al-Qasim al-Zahrawi and is widely regarded as one of the greatest achievements in the history of medicine and surgery. Compiled over nearly fifty years of study, teaching, and clinical practice, the work reflects al-Zahrawi’s vast medical experience and his enduring contributions to the advancement of medical science. Written in the Arabic language, *Kitāb al-Taṣrīf* comprises thirty treatises (*maqālāt*) and represents a comprehensive synthesis of the medical knowledge of its age.

The encyclopedia covers a broad range of medical disciplines, including surgery, anatomy, clinical medicine, *materia medica*, dentistry, obstetrics and childbirth, bloodletting, dietetics, and the theory of temperament in relation to disease. Al-Zahrawi described more than one hundred diseases along with their methods of treatment, demonstrating both his clinical expertise and systematic approach to medicine. According to Ibn Abi Usaibi’a, al-Zahrawi authored several distinguished medical works, among which *al-Taṣrīf* is considered the most complete and authoritative.

A remarkable feature of the work is al-Zahrawi’s emphasis on medical ethics and patient care. He stressed the importance of maintaining a compassionate and positive doctor–patient relationship and referred affectionately to his students

as “my children.” He also emphasized that patients should be treated equally regardless of their social status. Furthermore, he encouraged physicians to observe individual cases carefully in order to achieve accurate diagnosis and effective treatment.

The thirtieth and final treatise, devoted entirely to surgery, earned al-Zahrawi lasting international recognition. It is widely acknowledged as the first systematic, comprehensive, and illustrated manual of surgery in medical history. In this section, al-Zahrawi described numerous surgical procedures and introduced more than two hundred surgical instruments, many of which influenced both Eastern and Western medical traditions for centuries. His pioneering work laid the foundation for the development of modern surgical practice and secured his reputation as one of the greatest surgeons of the medieval Islamic world.

II. AUTHOR

Abū al-Qāsim Khalaf ibn al-‘Abbās al-Zahrāwī (936–1013 CE)

Abu al-Qasim al-Zahrawi, known in the West as Abulcasis, was a distinguished Andalusian Arab physician and is widely regarded as the greatest surgeon of the medieval Islamic world. Alongside eminent scholars such as Al-Razi and Avicenna, al-Zahrāwī occupies a central position in the history of Islamic medicine. He is often celebrated as one of the earliest and most brilliant Arabic surgeons and among the most influential medical authorities of the medieval period.

Al-Zahrāwī was born in al-Zahrā’, a suburb near Cordoba founded in 936 CE by Abd al-Rahman III. He spent most of his life in Córdoba, one of the foremost intellectual and cultural centres of medieval Europe and the Islamic world, where he studied, taught, and practiced medicine and surgery. During this period, Córdoba flourished as a renowned centre of learning, possessing numerous hospitals, academies, and libraries, including the celebrated caliphal library, which reportedly contained hundreds of thousands of volumes. Its scholarly environment rivalled, and in some respects surpassed, those of major centres such as Baghdad, Toledo, and Seville.

Al-Zahrāwī lived during the height of the Umayyad Caliphate of al-Andalus, an era marked by strong royal patronage of science and scholarship. He served as court physician to Al-Hakam II, which granted him access to the finest medical knowledge and resources available at the time. This privileged position enabled him to refine his clinical expertise and to develop innovative surgical techniques and instruments that transformed medical practice.

He devoted his life to the advancement of medicine, particularly surgery, and his monumental encyclopedia, *Kitāb al-Taṣrīf li-man ‘Ajiza ‘an al-Ta’līf*, gained widespread recognition throughout both the Islamic world and medieval Europe. The work laid important foundations for the development of modern surgery and remained a standard medical reference for several centuries.

Often honoured as the “father of modern surgery,” al-Zahrāwī is remembered for his systematic methodology, clinical precision, and remarkable originality. His contributions extended across multiple branches of medicine, including surgery, orthopaedics, gynaecology, obstetrics, pharmacology, and dentistry. His influence shaped medical education and surgical practice in both the Islamic world and Europe well into the Renaissance period.

Among his most significant contributions are:

- One of the earliest descriptions of the hereditary transmission of haemophilia
- The use of ligatures to control bleeding, centuries before Ambroise Pare
- A description of spinal tuberculosis, later known as Pott’s disease
- Surgical treatment of breast cancer through mastectomy
- The introduction of catgut sutures and the use of silk for wound closure
- The use of forceps in assisted childbirth
- The application of cotton in surgical dressings and haemorrhage control
- Early techniques for the management of dislocations and obstetric positioning

He also described procedures that anticipated later surgical innovations, including methods for reducing dislocated shoulders and advanced obstetric techniques. His detailed clinical observations reveal an

extraordinary level of empirical understanding and surgical sophistication for his era.

Al-Zahrāwī's legacy endured long after his death. His works continued to influence European medicine for centuries, and his memory remains honoured in Cordoba, where the street known as Calle Albucasis preserves his name. In later medical traditions, he was frequently ranked alongside great physicians such as Avicenna and Al-Razi, reflecting his enduring stature in the global history of medicine.

III. SURGICAL CONTRIBUTIONS

Abu al-Qasim al-Zahrawi made remarkable and original contributions to the development of surgery through his innovative clinical methods, operative techniques, and surgical instruments. His monumental work, *Kitāb al-Taṣrīf*, contains detailed descriptions and illustrations of more than 200 surgical instruments, many of which were designed or refined by al-Zahrāwī himself. These included scalpels, probes, syringes, forceps, curettes, hooks, specula, cauteries, and surgical needles. His systematic presentation of surgical tools and procedures established a new standard in surgical literature and practice.

For nearly five centuries during the European Middle Ages, al-Taṣrīf served as one of the principal sources of medical and surgical knowledge in Europe and remained an essential reference for physicians and surgeons. Several procedures later attributed to European surgeons had already been described centuries earlier by al-Zahrāwī. Among these were techniques comparable to "Kocher's method" for the reduction of shoulder dislocation and the "Walcher position" used in obstetrics.

Al-Zahrāwī was also the first physician to describe the ligation of blood vessels to control haemorrhage, almost six centuries before Ambroise Pare popularized the technique in Europe. He documented numerous dental instruments and procedures and provided one of the earliest descriptions of the hereditary nature of haemophilia. In addition, he described the surgical ligation of the temporal artery for the treatment of migraine headaches, a procedure that bears remarkable similarity to certain modern migraine surgeries revived in recent decades.

His contributions extended to obstetrics as well, where he described the use of forceps in assisted vaginal

delivery. According to later historians such as Hamidan, al-Zahrāwī introduced at least twenty-six entirely new surgical instruments that had not been used by earlier surgeons.

Among his most notable surgical contributions are:

- Instruments for ophthalmic surgery, including specula, conjunctival hooks, and delicate surgical scissors
- Dental instruments for extraction, wiring of teeth, and the construction of artificial teeth, including the use of ox-bone
- Techniques for tonsillectomy using specialized instruments such as the mouth gag and tonsil guillotine
- Surgical removal of ranula
- Methods for the treatment of lachrymal fistulae
- Clinical descriptions of conditions such as haemophilia, pitting oedema, and the detection of ascites through percussion

Many of al-Zahrāwī's instruments and operative techniques profoundly influenced later surgical traditions in both the Islamic world and Europe. In modified and refined forms, several of these innovations continue to be employed in modern surgical practice, demonstrating the enduring significance of his contributions to the history of medicine and surgery.

IV. HISTORICAL SIGNIFICANCE

For nearly five centuries during the European Middle Ages, *Kitāb al-Taṣrīf* served as one of the principal sources of medical knowledge in Europe. It became a standard reference for both Eastern and Western physicians and surgeons, exerting a profound influence on the development of medieval and early modern medicine. Its impact is clearly reflected in the writings of later European scholars such as Guy de Chauliac, who cited al-Zahrāwī extensively in his celebrated surgical treatise, *Great Surgery (Chirurgia Magna)*.

The enduring significance of Abu al-Qasim al-Zahrawi and his *Kitāb al-Taṣrīf* may be understood through four major aspects:

- Pioneering diagnostic and surgical techniques that were centuries ahead of their time

- A lasting influence on modern clinical and surgical practice
 - A comprehensive and holistic approach to health, disease, and patient care
 - Renewed modern interest in several of his innovative surgical procedures and instruments
- Al-Zahrāwī himself explained that the title al-Taṣrīf reflected his intention to produce a practical and comprehensive manual that would spare physicians the difficulty of consulting numerous scattered texts. The encyclopedia was therefore conceived as an accessible reference work for both students and practicing physicians.

V. TRANSMISSION AND INFLUENCE

Manuscripts of Kitāb al-Taṣrīf are preserved in libraries throughout the world, including digitized copies housed in institutions such as the National Institute of Indian Medical Heritage. Through translations and adaptations, the work played a decisive role in the transmission of Islamic medical knowledge to medieval Europe.

Its most influential translation was the Latin version prepared in the twelfth century by Gerard of Cremona under the title *Concessio ei data qui componere haud valet*, also known as *Liber al-Sahrawi de Chirurgia*. This translation became one of the principal channels through which al-Zahrāwī's surgical knowledge entered European medical education. The thirtieth treatise, devoted entirely to surgery, circulated widely in manuscript form and was first printed in Venice in 1497, further extending its influence throughout Europe.

Patna Manuscripts

The Khuda Bakhsh Oriental Public Library preserves two important manuscripts of al-Taṣrīf. One manuscript, dated 1710 CE, contains twenty-seven of the thirty treatises in 494 folios and is written in the Maghrebi script. The second manuscript comprises only the thirtieth treatise devoted to surgery and consists of 248 folios. Written in the Naskh script in 1188 CE, it contains nearly two hundred drawings and illustrations of clinical and surgical instruments and devices. This manuscript is regarded as one of the earliest and finest surviving copies of the surgical section of al-Taṣrīf, demonstrating the sophisticated

visual and technical tradition of medieval Islamic surgery.

VI. PUBLICATIONS AND TRANSLATIONS

Kitāb al-Taṣrīf li-man 'Ajiza 'an al-Ta'līf achieved widespread circulation and enduring influence through numerous translations, editions, and printed publications across different languages and regions. Its transmission into Latin played a decisive role in shaping medieval European medicine and surgery.

Among the most important editions and translations are:

- The celebrated Latin translation prepared in the twelfth century by Gerard of Cremona under titles such as *Concessio ei data qui componere haud valet* and *Liber al-Sahrawi de Chirurgia*. This translation introduced al-Zahrāwī's surgical knowledge to medieval Europe and became a standard medical reference for centuries.
- The first printed edition of the surgical section (the thirtieth treatise) was published in Venice in 1497, marking one of the earliest printed surgical texts in Europe.
- A modern Latin edition was published in 2012 by Akademische Druck Verlagsanstalt in Graz.
- The authoritative English translation by M. S. Spink and G. L. Lewis, titled *Albucasis on Surgery and Instruments* (1973), was published by University of California Press in association with the Wellcome Institute for the History of Medicine.
- An Urdu translation was prepared by Hakim Nisar Ahmad Kakori in 1947 and published by Darul Isha'at, Kanpur.
- The Arabic text of Kitāb al-Taṣrīf li-man 'Ajiza 'an al-Ta'līf was published in 1986 by the Institute for the History of Arabic-Islamic Science.
- An Arabic critical edition of the thirtieth treatise, al-'Amal bi'l-Yad, edited by Muhammad Yasir Zakkur, was published in 2009 by the Ministry of Culture Syria.
- Important French studies and editions include the work of Lucien Leclerc, published in 1996 by the Institute for the History of Arabic-Islamic Science, and the edition by D. A. Trotter published in 2005 by Niemeyer Verlag in Tubingen.

- A Persian translation of the thirtieth treatise was prepared by Abbas Aram and Mahdi Muhaqqiq in 1996 and published by the Institute of Islamic Studies University of Tehran

VII. CONTENTS

Kitāb al-Taṣrīf li-man ‘Ajiza ‘an al-Ta’līf is distinguished by its encyclopaedic scope, encompassing a wide range of medical disciplines known and cultivated during its time, including pharmacology, clinical medicine, surgery, dentistry, obstetrics, dietetics, and therapeutics. The contents of the work reflect nearly fifty years of Abu al-Qasim al-Zahrawi’s experience in study, teaching, and clinical practice.

A complete manuscript of al-Taṣrīf generally extends to approximately 1,500 pages. Al-Zahrāwī himself states, “wa-jumlat hādhā thalāthūn maqālāh” (“the entirety of this work consists of thirty treatises”), indicating that the encyclopedia is systematically organized into thirty maqālāt (treatises). These treatises vary considerably in length and subject matter; some, such as the fifth, tenth, and fifteenth treatises, constitute only a small portion of the overall work.

The arrangement of the encyclopedia demonstrates al-Zahrāwī’s methodical approach to medicine, progressing from general medical principles and therapeutics to specialized branches of medical science, culminating in the celebrated thirtieth treatise devoted entirely to surgery. Together, the thirty treatises provide a comprehensive synthesis of the medical knowledge of the medieval Islamic world.

The following list presents the treatises in the sequence preserved in the original Arabic manuscripts:

1. Treatise I:

An introductory discourse comprising chapters on the elements, temperaments, compounding of medicines, selected aspects of anatomy, and related foundational subjects, intended as a prelude to the entire work.

المقالة (1): ضمنها فصولاً في الاسطقصات والأمزجة وتركيب الأدوية وعيوناً من التشريح وما أشبه ذلك، جعلتها مدخلاً للكتاب

2. Treatise II:

On the classification of diseases, their signs and symptoms, with indications toward their treatment.

المقالة (2): في تقاسيم الأمراض وعلاماتها والإشارة إلى علاجها

3. Treatise III:

On the formulation of compound electuaries (ma‘ājīn) that require fermentation and long-term preservation.

المقالة (3): في صفات المعاجين القديمة التي تخمر وتذخر

4. Treatise IV:

On the preparation of the Great Thēriac and other antidotes, together with simple remedies for all kinds of poisons.

المقالة (4): في صناعة الترياق الكبير وسائر الترياقات والأدوية المفردة في جميع السموم

5. Treatise V:

On the composition, fermentation, and preservation of ancient and contemporary ayyārījāt (purgative compounds).

المقالة (5): في صفات الأيارجات القديمة والحديثة وادخارها وتخديرها

6. Treatise VI:

On purgative medicines prepared from bitter pills and their application in various diseases.

المقالة (6): في صفات الأدوية المسهلة من الحبوب المرة المدبرة في جميع الأمراض

7. Treatise VII:

On emetics, enemas, pessaries, ophthalmic applications, and medicated suppositories.

المقالة (7): في صفات أدوية القيء والحقن والفرزجات والشيفات والقتل

8. Treatise VIII:

On pleasant-tasting, familiar, and safe laxative remedies.

المقالة (8): في الأدوية المسهلة اللذيذة الطعم المألوفة المأمونة

9. Treatise IX:

On cardiac remedies, including collyria, musk-based preparations, and related compounds.

المقالة (9): في أدوية القلب من الشيفات وأدوية المسك وما أشبه ذلك

10. Treatise X:

On the preparation of Itrīfalāt and cathartic boluses (banādiq).

المقالة (10): في صفات الأطريفلات والبنداق المسهلة

11. Treatise XI:

On Jawārīshāt, cumin compounds, and similar digestive electuaries.

المقالة (11): في صفات الجوارشات والكمونيات وما أشبه ذلك من المعاجين

12. Treatise XII:

On aphrodisiacs, agents for fattening and slimming the body, galactagogues, and related remedies.

المقالة (12): في أدوية الباه والمسمنة للأبدان والمهزلة والمدرة للبن ونحو ذلك

13. Treatise XIII:

On syrups, oxymels (sikanjabīnāt), and concentrated extracts (rubūb).

المقالة (13): في الأشربة والسكنجيبينات والربوب

14. Treatise XIV:

On aromatic decoctions, medicated infusions, and soaked preparations, both purgative and non-purgative.

المقالة (14): في النخاخات والمطبوحات والنقوعات المسهلة وغير المسهلة

15. Treatise XV:

On fruit preserves (murabbayāt), their benefits, methods of preparation, and preservation.

المقالة (15): في المربيات ومنافعها وحكمة تربيتها وادخالها

16. Treatise XVI:

On laxative and non-laxative medicinal powders.

المقالة (16): في السفوف المسهلة وغير المسهلة

17. Treatise XVII:

On purgative and non-purgative tablets (aqrāṣ).

المقالة (17): في الأقراص المسهلة وغير المسهلة

18. Treatise XVIII:

On sternutatories, drops, fumigations, medicinal powders, and gargles.

المقالة (18): في السعوطات والقطورات والبخورات والذورات والغراغر

19. Treatise XIX:

On perfumery, cosmetics, aromatic compounds (ghawālī), and related preparations.

المقالة (19): في الطيب والزينة وصناعة الغوالي وما أشبهها

20. Treatise XX:

On collyria, ophthalmic preparations, and medicinal eye applications.

المقالة (20): في الأكمال والشفياقات واللطوخات

21. Treatise XXI:

On dentifrices and remedies for diseases of the mouth and throat.

المقالة (21): في السنونات وأدوية الفم والحنك وما أشبه ذلك

22. Treatise XXII:

On remedies for diseases of the chest, especially coughs.

المقالة (22): في أدوية الصدر والسعال خاصة

23. Treatise XXIII:

On poultices, plasters, and external applications for ailments affecting the body from head to foot.

المقالة (23): في الضمادات لجميع علل البدن من الرأس إلى القدم

24. Treatise XXIV:

On the preparation of ointments, including the Palm Ointment and other formulations attributed to Galen and others.

المقالة (24): في صناعة المرهم النخلي وسائر المراهم لجالينوس وغيره

25. Treatise XXV:

On oils, their extraction, therapeutic properties, and applications.

المقالة (25): في الأدهان ومنافعها وأحكام استخراجها

26. Treatise XXVI:

On dietetics for the sick and the healthy, arranged according to diseases.

المقالة (26): في أطعمة المرضى وكثير من الأصحاء مرتبة على الأمراض

27. Treatise XXVII:

On the temperaments and properties of medicines and foods, their correction, powers, and specific characteristics.

المقالة (27): في طبائع الأدوية والأغذية وإصلاحها وقواها وخواصها

28. Treatise XXVIII:

On the refinement of medicines, calcination of mineral substances, and related pharmaceutical processes employed in medicine.

المقالة (28): في إصلاح الأدوية وحرق الأحجار المعدنية وما يتصرف في الطب من ذلك

29. Treatise XXIX:

On the nomenclature of medicinal substances in different languages, their substitutes, shelf-life, compound terminology, measures, and weights.

المقالة (29): في تسمية العقاقير باختلاف اللغات وبديلها وأعمارها وشرح الأسماء المركبة والأكيال والأوزان

30. Treatise XXX:

On manual and surgical procedures, including cauterization, incision, lancing, fracture management, and treatment of dislocations, presented concisely yet comprehensively.

المقالة (30): في العمل باليد من الكي والشق والبط والجبر والخلع مشروحاً مختصراً

Of the thirty treatises that comprise *Kitāb al-Taṣrīf*, twenty-five—constituting nearly forty-six percent of the entire work—are devoted to materia medica and pharmaceutical preparations. This remarkable proportion reflects al-Zahrawi's exceptional mastery in the preparation, formulation, and compounding of medicines, demonstrating the central importance of pharmacology within the medical tradition of al-Andalus.

The thirtieth treatise, however, achieved the greatest fame and enduring influence. Devoted entirely to surgery and surgical instruments, it represents the culmination of al-Zahrawi's extensive clinical experience, practical observation, and surgical expertise. As the foremost representative of Arabic surgery, al-Zahrawi occupies a preeminent place in the history of medicine, embodying the highest stage of the classical Islamic surgical tradition.

This surgical treatise is widely regarded as the first rational, systematic, and illustrated manual of surgery in medical history. Al-Zahrawi explicitly states that his purpose was to revive, preserve, and organize the surgical knowledge of the ancients. In the introduction, he stresses that the surgeon must possess a thorough understanding of anatomy and physiology, be well acquainted with the writings of earlier authorities, and attain proficiency only through sustained practical experience and careful clinical training.

Al-Zahrawi subsequently became the most frequently cited surgical authority of the medieval period. The

celebrated French surgeon Guy de Chauliac cited al-Taṣrīf more than two hundred times in his surgical writings. Similarly, the Italian surgeon Pietro Argallata referred to Abū al-Qāsim as “the chief of all surgeons.” His influence extended from the eleventh through the sixteenth century and continued into the Renaissance, as further evidenced by the frequent references to his work by Jacques Dalechamps.

VIII. LIBER SERVITORIS

The twenty-eighth treatise of al-Taṣrīf, devoted to pharmacy and pharmacology, became known in medieval Europe under the Latin title *Liber Servitoris*. In this section, Abū al-Qāsim al-Zahrawi displays advanced knowledge of pharmaceutical techniques, particularly in the preparation of medicines through sublimation, distillation, and related chemical processes. He provides detailed formulations and explains the preparation of simple drugs (simples), which served as the foundation for more complex compound remedies.

The pharmaceutical significance of this treatise has been emphasized in modern scholarship. For example, Cordonnier studied its transmission in Europe, especially the Spanish translation prepared by Alonso Rodríguez of Tudela and published in Valladolid in 1516. Despite its historical importance, the pharmaceutical dimension of al-Zahrawi's work has not yet received the scholarly attention it fully deserves. Modern researchers such as Sami Khalaf have sought to illuminate this aspect, notably in *A Pharmaceutical View of Abulcasis al-Zahrawi in Moorish Spain*.

The partial transmission and fragmentary circulation of certain treatises—particularly the first, second, twenty-eighth, and thirtieth—occasionally resulted in their being treated as independent works, and in some instances, they were even mistaken for the entirety of *Kitāb al-Taṣrīf* itself.

IX. OPHTHALMOLOGY

Al-Zahrawi's encyclopaedic masterpiece also contains important contributions to the field of ophthalmology. The surgical treatise—the thirtieth maqālah of *Kitāb al-Taṣrīf*—is systematically arranged into three principal divisions:

1. Cauterization (al-kayy)

2. Incision and general operative procedures

3. Fractures and dislocations (orthopaedics)

Within the second division, al-Zahrawi devotes sixteen chapters specifically to ophthalmic surgery, in which he describes approximately twenty-five surgical procedures relating to diseases and disorders of the eye. These chapters reveal not only a remarkable degree of technical sophistication, but also a profound understanding of ocular anatomy, operative technique, and surgical methodology.

His discussions include detailed descriptions of surgical instruments, methods of operative intervention, postoperative management, and the practical considerations necessary for successful outcomes. The precision and clarity of these accounts demonstrate al-Zahrawi's reliance on direct clinical observation and extensive surgical experience. Consequently, his ophthalmic writings represent one of the earliest systematic and comprehensive contributions to eye surgery in the history of medieval medicine.

Medical Association Journal, vol. 176, no. 10, 2007.

- [9] A. A. Khan, *A Historical Description of Unani Medical Literature from the 9th–12th Centuries AD*. Hyderabad, India, 2026.
- [10] M. J. Becker and J. M. Turfa, *The Etruscans and the History of Dentistry: The Golden Smile Through the Ages*. London, U.K.: Taylor & Francis, 2017, p. 146.
- [11] S. Hamarneh, "Drawings and pharmacy in Al-Zahrawi's 10th-century surgical treatise," in *United States National Museum Bulletin*, no. 228, 1961.
- [12] A. von Fleischer, *Moorish Europe*. "His work, *Al-Tasrif*, later translated into Latin by Gerard of Cremona, became the standard medical text for European universities such as those at Salerno and Montpellier. This work was widely used by European medical practitioners for centuries."

REFERENCES

- [1] Abū al-Qāsim al-Zahrāwī, *Albucasis on Surgery and Instruments*, translated and edited under the auspices of the Gustave E. von Grunebaum Center for Near Eastern Studies. Berkeley, CA, USA: University of California Press, 1973.
- [2] A. Holmes-Walker, *Life-Enhancing Plastics: Plastics and Other Materials in Medical Applications*. London, U.K.: Imperial College Press, 2004, p. 176.
- [3] A. Castiglioni, *A History of Medicine*. New York, NY, USA: Alfred A. Knopf, 1958, p. 274.
- [4] "Abulcasis (Alsaharavius or Abu'l-Qasim) (d. c. 1013) Theoretical and Practical Book by Al-Zahrawi," 1519.
- [5] A. J. Butt, *Etiologic Factors in Renal Lithiasis*. Springfield, IL, USA: Charles C. Thomas, 1956.
- [6] E. K. Andrews, *Practice Management for Dental Hygienists*. Philadelphia, PA, USA: Lippincott Williams & Wilkins, 2007, p. 6.
- [7] H. Selin, Ed., *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures*. Berlin, Germany: Springer Science & Business Media, 2008, p. 1545.
- [8] I. Hehmeyer and A. Khan, "Islam's forgotten contributions to medical science," *Canadian*