

ORIGINAL ARTICLE

A Short Review on *Albucasis* Achievements in Dentistry based on His Book: *Al-Tasrif li man Ajaz an-il-Talif*

Abstract

Abu al-Qasim Khalaf ibn al-Abbas al-Zahrawi, also known as *Albucasis*, is one of the greatest physicians and surgeons in Islamic world who is best remembered for his medical encyclopedia, *Al-Tasrif li man ajaz an-il-talif* (An Aid for Those Who Lack the Capacity to Read Big Books). *Al-Tasrif li man ajaz an-il-talif* (An Aid for Those Who Lack the Capacity to Read Big Books). *Al-Tasrif* was translated into Latin by Gerard of Cremona in 1497 and was considered as a reference book in European universities until the seventeenth century. The original Arabic text of the thirtieth treatise along with the English translation has been published by the university of California in 1973 under the title of "*Albucasis on Surgery and Instruments*". This treatise has also been published in Iran. *Al-Zahrawi* has done a great work in medical sciences, particularly in dentistry, by introducing different surgical methods and instruments, but unfortunately most physicians are not familiar with his efforts and achievements.

In this book, *Al-Zahrawi* presented dental diseases in five parts. In each chapter, he illustrated different tools and instruments and represented clinical experiences and treatment methods step by step.

In this article, we have reviewed innovations, instruments, diseases and patterns of clinical experiences in the field of dentistry which has been introduced by *al-Zahrawi*, and in addition to honoring the efforts of Islamic scientists and the role of traditional Islamic medicine, we have tried to bestow some of the inspirational experiences of our predecessors which may be used in modern medicine.

Keywords: Traditional medicine, Dentistry, *Zahrawi*, *Al-Tasrif*

Received: 6 Aug 2014; Accepted: 5 Feb 2015; Online published: 15 Feb 2015

Research on History of Medicine/ 2015 Feb; 4(1): 3-8

Mohammad Reza
Noras^{1,3*},
Musalreza Hajzadeh²,
Arash Arianpoor³

¹Faculty of Traditional Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

²Department of Physiology, Medical School, Mashhad University of Medical Sciences, Mashhad, Iran

³Student Research Assembly, Mashhad University of Medical Sciences, Mashhad, Iran

Correspondence:

Mohammad Reza Noras,
Faculty of Traditional Medicine, Bisim
Intersection, 6th Jahad, Mashhad, Iran
E-mail: Noras.MR901@gmail.com,
NorasMR901@mums.ac.ir



Introduction

Notwithstanding that there is no precise information about the origin and history of dentistry, we may understand the extent of our ancestors' knowledge about dental diseases and their endeavors to cure them by reviewing the literature published in Iran and other countries during Islamic era. In that epoch, there were many outstanding scientists who had played a significant role in the improvement of dentistry. *Ali ibn Sahl Rabban al-Tabari*, for instance, was a great physician in the ninth century who has elucidated the appearance and development of the teeth and related diseases in his book, "*Firdous al-Hikmah*"¹. His exceptional pupil, *Mohammad ibn Zakariya al-Razi* (854 – 925), who became a prominent personage in Islamic golden age, has suggested numerous methods to treat dental diseases and mentioned many valuable notes on dental health and oral hygiene in "*Kitab al-Mansouri*". He has also described tooth extraction techniques and treatments for odontalgia and halitosis in his other book, known as "*Kitāb Būr' al-sā'ah*"^{2,3}.

Ali ibn al-Abbas al-Majusi Ahvazi, who lived through the tenth century and is considered as one of the greatest physicians of his time has also mentioned odontalgia, gingivitis, halitosis and other diseases of the oral cavity, along with dental polishing material in his book "*Kitab Kamil as-Sinaat al-Tibbiyya*"⁴.

Dental diseases and oral health was also mentioned in "*The Canon of Medicine*" by one of the greatest Iranian physicians, Avicenna (980-1037), as well as "*Zakhireh-i Kharazmshahi*" the first Iranian medical encyclopedia in Persian, written in the twelfth century by Jorjani and in many other literatures^{5,6}.

Among these elites of medical sciences, the name of '*Abu al-Qasim Khalaf ibn al-Abbas al-Zahravi*' is noteworthy. *Al-Zahravi*, also known as *Albucasis*, was one of the greatest Muslim physicians whose efforts were the cornerstone for many scientific advances, especially in the field of surgery. His works in medicine, in Andalusia and the west of Islamic territory may be considered equivalent and concordant with *Ali Ibn Abbas Ahvazi* and *Avicenna*'s endeavors in the east of civilization during the fourth century. There is no evidence about the exact date of his birth and demise⁷, but some historians believe that he may have been born in 324 AH (936 A.D.), in the city of al-Zahra, Spain and deceased in 404 AH (1013 A.D.)⁸.

Ibn Abi Usaibia has briefly mentioned *al-Zahravi* and considered him as a dexterous pharmacist⁹. Some consider him

1. Tabari, 2008.
2. Dehkhoda, 1998.
3. Razi, 2003.
4. Ahvazi, 2009.
5. Jorjani, 2001.
6. Avicenna, 2005.
7. Dehkhoda, 1998.
8. Nabipour, 2000: 136-140.
9. Ibn-Abi-Usaibia, 1970.



as the third most genius physician after *Razi* and *Avicenna*¹⁰ and as Nasr has stated, *Zahrawi* was the greatest Muslim surgeon¹¹. His worthwhile book, *Al-Tasrif li man ajaz an-iltalif*, introduced him as one of the foremost founders of surgery. Gerard of Cremona translated this book from Arabic to Latin in the second half of the twelfth century. The book was published in Venice, for the first time in 1497 AD followed by two other publications in 1499 and 1500 AD. It has been reissued in 1520, 1532 and 1540 in Venice and in 1778 a Latin translation along with the original Arabic text was published in Oxford. It has also been translated to French in 1861. Numerous publications of this medical encyclopedia, which bears witness to the proficiency of the writer, has contributed to the extension of surgery and surgical methods to the west¹⁰.

Materials and Method

In this descriptive inquiry, we mainly reviewed “*al-Tasrif*”¹². In addition, literature search was done within electronic databases including: PubMed, Scopus, Cochrane library, Google Scholar, Sid, Iranmedex and Magiran. “*al-Tasrif*”, “*al-Zahrawi*”, “*Albucasis*”, “*Traditional Medicine*”, “*Islamic Medicine*” and “*Dentistry*” were used as search key words, and the results were limited to articles published between 1990 and 2012.

Discussion

The *Kitab al-Tasrif* is composed of 30 treatises of which 29 are about different aspects of medicine, including basic sciences, herbal medicine, different diseases, their treatment and prevention and many other titles. The last article is focused on surgery which is translated in many languages¹². This treatise has three chapters which is be briefly described here.

In the introduction of the first chapter *al-Zahrawi* has declared that his main interest in writing this book was the fact that there were no experienced physicians in his city. Furthermore, the medical profession was in the hands of inappropriate individuals and there was no comprehensive reference for physicians and medical students. In the remainder of this section, he has mentioned various diseases, including oral diseases such as fistulas, inflammation of soft palate and toothache along with treatment methods such as cauterization.

The second chapter is organized according to different

10. Medhat-Islam, 1999.

11. Nasr, 1980.

12. Zahravi, 1995.



body parts. Under the section of “*Oral and Dental Diseases*” which is divided into five sub-sections, the writer has illustrated the related instruments and explained about his experiences as well as others’. This chapter is full of noteworthy practical ideas which will be concisely discussed further. In this chapter, the author has explained the physical examination of the oral cavity and indicated that to facilitate oral examination, one could use a silver or copper knife to hold the tongue with. He has also suggested the methods and instruments for tooth scaling, a process which is believed to be one of his own innovations. He has stated: “[S]ometimes there collect upon the inner and outer surface of the teeth and also between the gums, rough scales, ugly, sometimes black or yellow or green, from which corruption is communicated to the gums and thus the teeth become unsightly”¹³. It is notable that *al-Zahrawi* has indicated the fact that different kinds of scraping-tools are mandatory for each different tooth (such as molars), for different parts of a tooth (i.e. inner and outer surface) and even for different individuals¹⁴.

Al-Zahrawi indeed was aware of the tooth extraction complications, such as bleeding, tooth breaking and extraction of the wrong tooth. Thus, in this chapter, he has thoroughly described the steps of the tooth extraction, from the positioning of the patient to instruments and even the amount of pressure needed. To control the bleeding after the tooth extraction, *al-Zahrawi* has utilized blue vitriol (CuSO_4) and in not responding cases, cauterization is used. He also has mentioned that to avoid extracting the wrong tooth, a physician must be thorough and carefully examine the oral cavity to find the right tooth. *Al-Zahrawi* has suggested that a dentist could separate the decayed tooth from the gums with the aid of a scalpel so as to avoid breaking the tooth, one of the complications of the tooth extraction. For sanitizing the oral cavity, especially after tooth extraction he has recommended gurgling with salt water, vinegar or wine. *Al-Zahrawi* prohibits people from referring to non-specialists (i.e. phlebotomists and barbers) for tooth extraction and in his book, he warns them about its consequences. In the *Kitab al-Tasrif*, *al-Zahrawi* has suggested methods to retrieve a healthy fallen tooth and to build dentures. The author has recommended to wire a healthy fallen tooth, or a denture made from a cow’s bone instead, to the nearby teeth with gold. He also indicates that if a tooth, especially in women, is out of place the nearby teeth can be extracted or chopped with a sharp instrument to accommodate that. Utilizing a file to smooth down

13. *al-Zahrawi*, 1973: 272.

14. *Ibid.*



the crooked teeth is considered to be one of his innovations in dentistry. This shows the depth of his knowledge and proves that he was aware of the necessity of both beauty and function of the teeth. He has also emphasized the root-end resection and to do so, he advised that a dentist should put a cotton impregnated with oil on the site of injury for a couple of days to soften the gums and then remove the unhealthy root with a suitable tool (so called root resection).

Al-Zahrawi is probably the first physician who used dental instruments to remove tartar, a hardened dental plaque which, in his opinion, was the main cause of periodontal diseases.

In the second chapter of the book, the author has described dental fistulas and their treatment with cauterization. He has also described the tonsillectomy and surgical treatment of other similar oropharyngeal conditions; furthermore, the author has illustrated many surgical instruments in his book, such as "*Sannareh Basite*", "*Sannareh Amia*", "*Sannareh zat Mokhtatin*", "*Mabza Barid*" (scalpel), among many others (Figure 1).

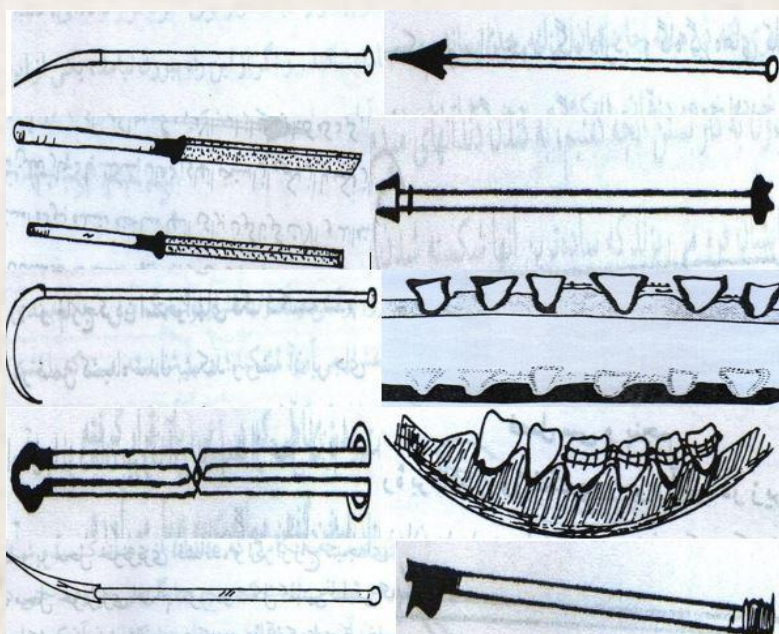


Figure 1. Some of the surgical instruments introduced by Al-Zahrawi.

The third chapter is dedicated to the orthopedics which is beyond the scope of this article.



Conclusion

Al-Zahrawi may be considered as the forefather of surgery along with Avicenna and Rhazes who indeed pioneered Islamic medicine¹⁵. From Islamic golden age, periodontal diseases are discussed, using the evidence and experience found in many references. *Al-Zahrawi*'s findings in the field of dentistry are almost compatible with new references. He was quite precise, presenting detailed descriptions of his experiences, together with illustrations of the surgical tools¹⁶.

Undoubtedly, studying the efforts and achievements of our forefathers is beneficial in proving the new sciences and can show us a path which leads to new discoveries, inventions and innovations, especially in the field of medicine.

References

- Ahvazi A. [*Kamil al-Sanate al-Tebie*]. Translated by Ghaffari MK. Tehran: The institute of Islamic Studies; University of Tehran-McGill University; 2009. [In Persian]
- al-Zahrawi A a-Q K i A. *Albucasis On Surgery and Instruments*. Spink MS, Lewis GL, editors: University of California Press; 1973. [In English]
- Avicenna. [*al-Qānūn fī al-Ṭibb*]. Beirut: Darul Fikir; 2005. [in Arabic]
- Dehkhoda AA. *Dehkhoda Encyclopedia*. Tehran: University of Tehran Press; 1998. [In Persian]
- Hajar R. Al zahrawi: Father of Surgery. *Heart Views* 2006; 7(4): 154-6.
- Hunke S. *Allah's Sun Over the Occident*. Translated by Rahbani M. Tehran: Daftar Nashr Farhang Eslami; 1994. [In Persian]
- Ibn-Abi-Usaibia. [*Uyūn ul-Anbā' fī Ṭabaqāt ul-Aṭibbā*]. Translated by Ghazban SJ, Najmabadi M. Tehran: University of Tehran; 1970. [In Persian]
- Jorjani E. [*Zakhireh-i Kharazmshahi*]. Tehran: Academy of medical sciences; 2001. [in Persian]
- Medhat-Islam A. [*Olamae al-Arab va al-Muslemin*]. Cairo; Darul Fikir; 1999. [in Arabic]
- Nabipour I. Abu al-Qasim Khalaf ibn al-Abbas al-Zahrawi; the greatest surgeon of Islamic civilization. *Teb e Jonub*. 2000;3(2): 136-40.
- Nasr H. *Science and Civilization in Islam*. Translated by Aram A. Tehran; 1980. [In Persian]
- Razi M Z. [*Būr' al-Sā'ah*]. Tehran: Tehran University of Medical Sciences; 2003. [in Arabic]
- Tabari A. [*Firdous al-Hikmah*]. Translated by Madani A, Broujerdi A. Tehran: Mehramin; 2008. [In Persian]
- Zahrawi A. [*Kitab al-Tasrif li-man Ajaza'an al-Ta'lif*]. Translated by Aram A, Mohaghegh M. Tehran: The Institute of Islamic Studies, University of Tehran; 1995. [In Persian]

15. Hajar, 2006: 154-156.

16. Hunke, 1994.