

AL ZAHRAWI: FATHER OF SURGERY

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*Abu al-Qasim Khalaf ibn al-Abbas Al-Zahrawi
(A.D. 936 - 1013)*

On opening a tumour arising from a blood-vessel, called an aneurysm

When an artery is injured and the overlying skin scars, a tumour very often arises from this; the same thing happens to a vein: a swelling and a tumour. And these are the signs by which you may diagnose whether the swelling and tumour arise from an artery or a vein: if it be from an artery the tumour will be a deep and elongated mass; and when you press upon it with your finger there will be a feeling of pulsation. But if it arises from a vein the swelling will be circular and superficial. It is dangerous to make an incision on tumours of this kind, especially in the axilla, the groin, the neck, and in many other parts of the body; it is indeed highly dangerous, so in these you must avoid treatment by the knife; also in those in the limbs and in the head it must be avoided. But any such that arises from the inflation of the mouth of an artery, you may cut down in the skin over that with a longitudinal incision; then open up your incision with hooks and dissect away the artery, freeing it from the tissues till it is laid bare. Then run a needle beneath the artery to reach the other side, and tie the artery in two places with a double thread, as I showed you for the extraction of the temporal arteries. Then with the scalpel prick the part between the two ligatures and let out all the blood and get the tumour down. Then apply dressings to excite suppuration until the ligatures fall away; then dress with suitable ointments until healed. If the swelling be due to a vein that has been penetrated, you should gather up with your hand as much of the tumour as you can, together with the skin; then pass a needle beneath the place which you have grasped in your hand and run it through, threaded with a double thread, until it emerges at the other side; then with it tie a strong ligature round the swelling . . . If you fear that the threads may come loose, pass a second needle and thread beneath the whole tumour to intersect with the passage of the first needle; and tie your threads in four places. Then incise the tumour in the centre to extract the contents. Then cut away the superfluous skin and leave what has been ligatured. Then out on that a pad previously soaked in wine and oil; then apply the treatment with lint and ointments until healed.

*Albucasis, Book II, Chapter 49,
On Surgery and Instruments*

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Abu al-Qasim Khalaf ibn al-Abbas Al-Zahrawi wrote the above description of aneurysms and their surgical treatment over one thousand years ago. Al-Zahrawi is known in the West as Albucasis. He wrote *Kitab Al Tasrif*, a 30-volume medical textbook which included sections on surgery, medicine, orthopedics, ophthalmology, pharmacology, nutrition, etc. The thirtieth treatise, *On Surgery and Instruments*, is considered the first rational, complete, and illustrated treatment of its subject. He described many operative procedures and instruments which do not appear in extant classical writings and which may be regarded as his own. Therefore, he was the first to describe the procedures and instruments mentioned in his book. The book on *Surgery* included many pictures of surgical instruments and explanations of their uses.

Examples of surgical instruments he invented are:

- The tonsil guillotine (II, 36, p.301) and its use,
 - The concealed knife and its case for opening abscesses (II,46 and fig 112, p.357),
 - The trocar for paracentesis (II,54, p347);
 - The possibility that Albucasis or his contemporaries invented true scissors (II,57, p217, p239 and several figures);
 - The syringe (II,59 p407),
 - The lithotrite (II,60 p417),
 - His design of vaginal speculum (II, 77 p485).
- The chapter on gynecological instruments gives reason for thinking that Albucasis anticipated Chamberlen's obstetric forceps, though not for live delivery.
- The description of possibly, thrombophlebitis migrans
 - The well illustrated account of the reducing table for extending limbs in order to reduce dislocations or displaced fracture ends
 - The formula for a kind of plaster casing anticipating the modern plaster cast.

His book on *Surgery* covered a wide variety of surgical procedures: use of cautery in diverse conditions, venesection, treatment of wounds, obstetrical and gynecological procedures, orthopedics, cataract extraction, removal of urinary stones, etc. He described the exposure and division of the temporal artery to relieve certain types of headaches and reduction mammoplasty for excessively large breasts. He wrote extensively about injuries to bones and joints. His description for reducing a dislocated shoulder pre-dates Kocher by several centuries.

Al Zahrawi outlined the use of caustics in surgery, fully described tonsillectomy, tracheotomy and craniotomy – operations he had performed on a dead foetus. He explained how to use a hook to extract a polyp from the nose, how to use a bulb syringe he had invented for giving enemas to children, and how to use a metallic bladder syringe and speculum to extract bladder stones.

The fame of *Surgery* spread rapidly in the Islamic world. In the second half of the 12th century it was translated into Latin at Toledo by Gerard of Cremona, under the title of *Liber Alsaaharavi de cirurgia*. Its influence on Italian and subsequently French surgeons was enormous. Gerard's version was first printed at Venice in 1497 and in the following century it appeared in numerous editions. The first modern edition of the text, with a Latin translation by John Channing, was published at Oxford in 1778. The first translation of the *Surgery* into modern language was Lucien Leclerc's French version *La Chirurgie d'Albucassis*, published in Paris in 1861. Al Zahrawi's *Surgery* shaped European surgical practice up until the Renaissance.

Al Zahrawi was born in A.D. 936 in the city of Al Zahra, five miles northwest of Cordoba, Spain. *Medinat Al Zahra*, which means "City of Flower" or "Blooming City", was the capital of Al Andalus in the 10th century. Referred to as the forgotten Versailles of the Middle Ages, it was renowned for its dazzling complex of palaces full of wondrous treasures. Although not as well-known as the Alhambra in Granada, Spain, descriptions of *Al Zahra's* marvels by writers and travelers makes it the most magnificent monument of Islamic Spain. However, the city shone and flourished for only 80 years – it was sacked by Berbers from North Africa, Islamic purists who considered the Muslim culture it represented far too liberal in its interpretation of the Koran. The raid effectively wiped the city off the map for a millennium – it lay forgotten and buried. It was only ninety years ago that the ruins were discovered and only in recent times did the Spanish government painstakingly begin to restore some of the palace-ruins.

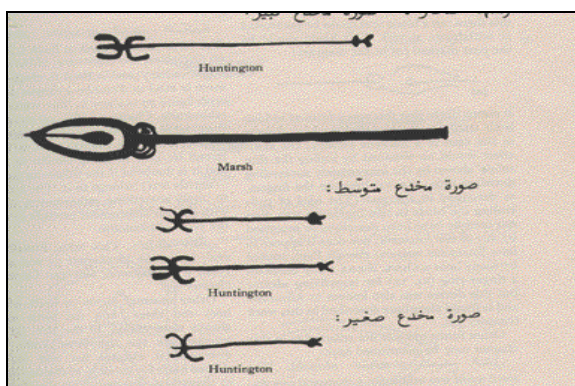
In the beautiful, enlightened, and intellectual city of Al Zahra, Al Zahrawi lived, studied, taught and practiced medicine and surgery. He died in 1013, two years after the sack of Al Zahra. As a result of the city's destruction, little is known about Al Zahrawi.

He was first mentioned by the Andalusian scholar Abu Muhammad bin Hazm (993-1064), who listed him among the great physician-surgeons of Moorish Spain. The first known biography of Al Zahrawi appeared in Al Humaydi's *Jadhwat al-Muqtabis* (*On Andalusian Savants*), completed six decades after Al Zahrawi's death. Al Zahrawi's writings indicate that he devoted his entire life to the advancement of medicine and surgery in particular. He was the first medical author to provide illustrations of instruments used in surgery. There are approximately 200 such drawings in his book on *Surgery*.

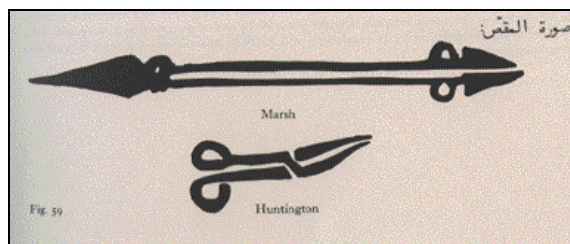
In *Al-Tasrif*, Al Zahrawi emphasized the importance of a good doctor patient/relationship and took great care to ensure the safety of his patients and win their trust irrespective of their social status. He insisted on compliance with ethical norms and warned against dubious practices adopted by some physicians for purposes of material gain. He also cautioned against quacks who claimed surgical skills they did not possess.

It is believed that Al Zahrawi was personal physician to Abd Al-Rahman III, the Andalusian caliph who built *Medinat Al Zahrah* or to his son and successor Al Hakam II. A scribe writing about him says: *"I have been told that Al Zahrawi – God's mercy on him – was extremely ascetic; that half of his work every day he did without fee, as charity; and that he wrote this compendium for his sons over a period of forty years."* Historians analyzing his writings say that in his book, he frequently addressed his students as his "sons" – the generation following him in the medical profession.?

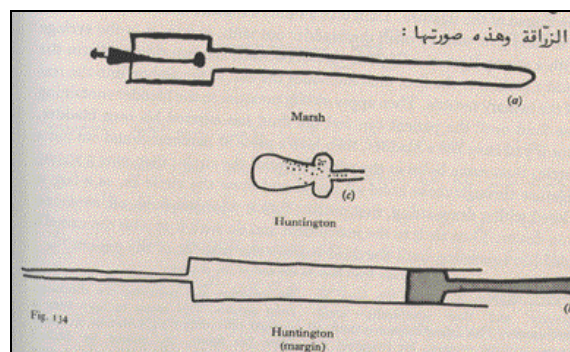
Surgical Instruments by Al Zahrawi and Illustrated in his book on SURGERY



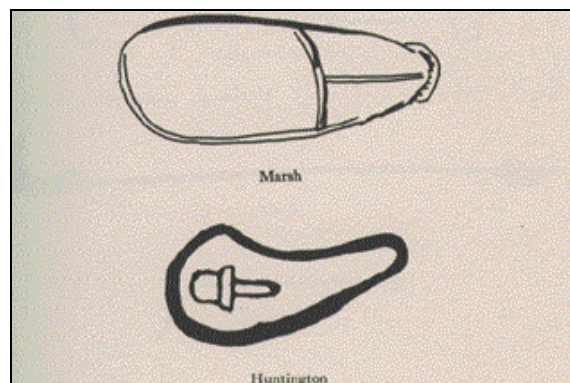
Concealed knife.



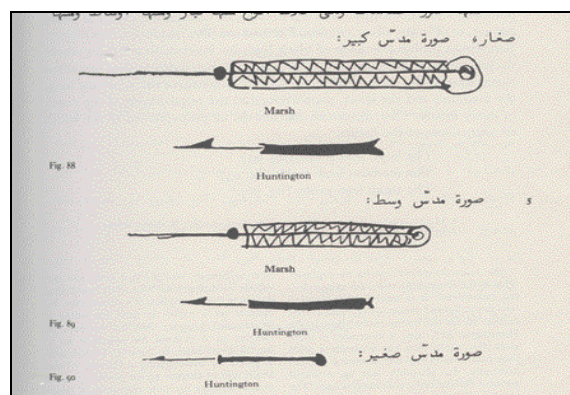
Concealed knife.



Syringe.



Tonsil guillotine



Trocars

Reference:

Spink M.S., Lewis G.L. *Albucasis On Surgery and Instruments. A Definitive Edition of the Arabic text with English Translation and Commentary.* Wellcome Institute of the History of Medicine. London. 1973.