

ants with open jaws on the suture line and when the ants close their jaws their heads can be cut off. Evidently Albucasis here is using **Arabian ant-nippers** to act like the modern Michel clips, but furthermore, ants secrete formic acid in their oral secretion, an antiseptic material acting directly at suture line (hence the latin name formicae for ants; fornication, a sensation like that of ants creeping on the skin). Ants nippers are still currently used by African tribes as a way of bringing skin edges together. Ants are probably attracted chemotactically to the wound; they insert their mouth piece in the edges (like a mechanical clip) after which their bodies are cut off leaving mouth pieces with their heads on the wound.^{4 a, b, c} It is interesting to notice that while Albucasis uses larger Arabian ants for therapeutic purposes, Rhazes uses small ants for diagnostic purposes; he spills a patient's flask of urine on the ground and if ants gather around it, the diagnosis for diabetes is positive! It is also interesting to note that bites of both large ant nippers and small sugar ants are harmless, while bites of medium-sized ants may cause severe allergic reactions (in 17% of cases) or even death (in 1% of cases).⁵

Albucasis explained that the intestine may also be sewn up with the fine suture extracted from an animal's gut after being threaded in a needle (**catgut**). The rubbed-down gut is well-scraped and well cleansed prior to drying. While gut was used by the earliest Greeks for bow-strings, it was never used for surgical purposes until the Arab era of Surgery. Albucasis' book, therefore, represents the earliest reference to this now universal suture material.

ARABIC PRACTICE OF ABDOMINAL SURGERY AND SURGERY IN GENERAL

Operative surgery is heavily dependant on in-depth knowledge of anatomy; infection and anti-sepsis; and proper surgical instruments for haemostasis, cutting, dissection, suturing and closure.

In-depth Knowledge of Anatomy and Dissection

The work of **Yuhannah Ibn Masawayh** on animals won the admiration of Caliph **Al-Mutasim** around 830 AD, who was so interested that he made a special dissection hall available for **Yuhannah's** use on Tigris river bank and provided him with apes specially brought for him from Nubia in Africa. Furthermore, Avenzoar performed the first experimental tracheostomy on a goat and noticed that it was alive many days after the procedure. **Dead Animals** were extensively used by Avicenna, Rhazes and Ibn Tufail for experimental work. "**Hai Ibn Yakthan**" story (written by **Ibn Tufail** before 1185 A.D.) was a scientific masterpiece; it was about a baby (Hai Ibn Yakthan) on an island where he was adopted by a deer mother which had lost its baby. The boy grew up in the jungle; his adopting mother died and he was shocked. He then started dissecting the deer body. The anatomical description of dissected deer indicated Ibn Tufail's immense knowledge in animal dissection. The story was translated into Latin as "**Philosophus Autodidactus**" by Mirandola (1494 A.D.) and Pocock (1671 A.D.) and appeared in many languages. Both "Robinson Crusoe" by Daniel Defoe and "Tarzan" by Edgar Rice Burroughs were corruptions of "Hai Ibn Yakthan" story, or "Philosophus Autodidactus". Furthermore, there is a plethora of **Muslim books on Animal kingdoms, Animal anatomy and behaviour**; they represent a remarkable wealth in the scientific literature. "Hayat Al-Hayawan Al-Kubra" (The Life of Animals) by Al-Dumairi, "Aja'eb Al-Maklokat Wal Hayawanat Wa Ghara'eb Al-Mowjoodat" (Wonders of Creatures and Animals) by Al-Kizweeni, and "Kitab Al-Hayawan" (The Book of Animals) by Al-Jahidh are only a few notable examples.

However, Qur'an (the backbone of Islam) instigates its followers to look closely into the structure of the human body itself: "**We shall show them Our portents on the horizons and within themselves**" Fusila XLI, verse 53. "**And in yourselves, Can ye then not see?**" Al-Thari'at, verse 21.

While unpurposeful handling of Muslim dead bodies was strictly forbidden, a purposeful dissection was mandatory in surgical practice and in surgical teaching and training; it was imperative in post-mortem examination for medico-legal reasons in suspected cases of death, such as poisoning and assault cases; and finally, it is crucial in identifying the underlying causative agents in epidemics of infectious diseases. In fact, there is a strong evidence that it is the Arabs who have actually established anatomy on extremely high standards and made it an essential prerequisite for surgical practice. They