

## A Review Study on *Mritsamshodhana Paddhati*: A Technique of Embalming and Dissection in Ancient Indian Anatomy

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### Abstract

Anatomy is broadly appreciated as being one of the cornerstones of medical education. Learning anatomy through the dissected cadaver is viewed as the uniquely defining feature of medical courses. Explosion of knowledge in the field of medicine was feasible only due to exploration of human body through human cadaver dissection. *Acharya Susruta* is considered as the father of surgery even today, but if we go through the *Ayurveda* text, essentials of human anatomy are very precisely described by *Susruta*, so *Susruta* should also be considered as the father of human anatomy. *Acharya Susruta* has paid great attention towards the structural organization of the human body. This was emphasized to such an extent *Acharya Susruta* has not only mentioned that no surgeon should start his surgical career unless he is well aware of human anatomy. He not only stressed on the anatomical locations of various body structures but also has given the detailed description, right from development of various organs, intrauterine life of foetus, month wise development of foetus, nutrition of foetus, maternal health etc. In this topic we will discuss specifically about the dissection techniques in ancient Indian anatomy which were described in very scientific manner by the *Acharya Susruta*. *Ayurveda* has described in detail the dissection methodology, nomenclature of human body parts and clinical anatomy as well. *Ayurveda* provides the evidence of existence of knowledge of anatomy before the announcement of modern anatomy. *Ayurvedic Acharya* described various terms, techniques and concepts regarding the human anatomy in the *Samhita*. Till date, very little is known to the western world about the profound description of the subject present in ancient texts of Indian medicine. The present research article is taken to show eternity of our ancient Indian science.

**Keywords:** Ayurveda; Ancient Anatomy; *Mritsamshodhana Paddhati*; Dissection; Embalming.

### Introduction

Anatomical knowledge in ancient India was derived primordially from animal sacrifice, chance

observations of offensively buried human bodies and examinations of patients made by doctors during treatment. The *Vedic* philosophies form the basis of the *Ayurvedic* tradition, which is considered to be one of the oldest known systems of medicine. Healing traditions and medical practices are inextricably tied to human history. The oldest known civilizations have healing traditions and have added to our current system of the medical sciences, particularly anatomy.

The knowledge of human anatomy was revealed by both inspection of the surface of the human body and through human dissection, as *Acharya Susruta* believed that students aspiring to be surgeons should acquire a good knowledge of the structure of the human body. Medical Science was one area where surprising advances had been made in ancient times in India. Specifically these advances were in the areas of human dissection, embryology, plastic surgery, extraction of cataracts, description of *Asthi*, *Sandhi*

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etc. These are not just claims. There are documentary evidences to prove the existence of these practices. In ancient Indian anatomy, the process of embalming has described by Acharya Sushruta. He had explained that description of anatomy of human body from skin is the subject matter of surgery. Therefore one who intends to acquire definite knowledge of surgery should study the anatomy practically by dissecting the dead body properly. For that purpose he had explained the following guidelines for embalming and dissection.

*Acharya Sushruta* planned to first deal with *Srici utpatti kram*, Embryology (*Garbhâvkrânti Ūârîr*) and then anatomy of the human body. He also stressed on the importance of observational and practical experience in surgery. For this he mentioned a separate chapter named 'Yogyâ sutriyâ' in *Sûtra sthâna*. He may be the first person to advocate dissection to gain the first hand knowledge of the human anatomy. *Suæruta* was a strong supporter of human dissection as evident from his texts.

His texts include a systematic method for the dissection of the human cadaver. They were mastered from extensive human dissection which they skilled despite religious interference. He considered that aspiring surgeons must first be an anatomist for skilful and successful surgical practice. The physician or surgeon desiring to have the exact knowledge of *Ualya uastra* should thoroughly examine all parts of dead body after its proper preservation. Practical knowledge along with theoretical knowledge is very essential for any practitioner. If we go through the history of human anatomy it seems that anatomy of modern times is well recognised from the days of renaissance that is from 15<sup>th</sup> century.

The foundation stone of modern anatomy is the work of Andreas Vesalius. *De Fabrica Corporis Humani*, published in 1543. Earlier to this period the knowledge of anatomy was used mainly for painting i.e. to maintain body part ratio; hunting i.e. even in prehistoric period, the human races were aware about the anatomy of various animals for ease of hunting. Important body organs like heart and lungs were targeted by spear or arrow for causing sudden death of that animal.

#### **Techniques of Human body embalming in Ancient India (Su.Sa.5/49)**

The process of embalming is sub divided under three sections like Selection of cadaver, preservation and method of dissection.

The concern of using humans for dissection was in conflict to the religious law of the time; however, it

was an essential tool for the true understanding of human anatomy. *Suæruta* described the details of human dissection.

#### **Selection of Cadaver**

For dissecting purpose, a cadaver should be selected which has all the body parts present, who had not died due to poisoning or chronic disease, had not attained hundred years of age. Such cadaver should be taken after removing fecal matter from his / her intestines.

#### **Process of Embalming/Preservation**

Whole body should be wrapped by any one of *Munja*, bark, *Kuæa* and flax etc. and kept inside a cage placed in a slowly flowing river to decompose. Before selecting the river for this process it must be remembered that the place should be secluded and the water of that river is not consumed for drinking and other household purpose.

#### **Method of Dissection**

After proper decomposition for about seven nights the cadaver should be removed from the cage and then dissected layer by layer by scraping with the brushes made by any one of *Uuira*, *Bala* (hair), *VeGu* (bamboo) and *Valkala*. In this way after removing skin all the external and internal parts with their subdivisions should be visually examined at maximum. After description of dissection technique, *Acarya Suæruta* mentioned the importance of dissection that the person, who wishes to learn surgery, should keenly study the various body organs of the cadaver. In brief, theoretical as well as practical knowledge of dissection is very useful for enhancing the working skills of a surgeon.

While selecting a dead body for dissection, the criteria are very significant. Such a cadaver should be selected which has all the body parts intact & healthy so that we can get the complete and correct information about the anatomy of human body. He or she should not have died due to poisoning as many corrosive poisons tend to damage the effected organs. In the same manner death due to chronic diseases like tuberculosis also ruins the normal anatomy of affected organ. Specific age group was also a selecting criteria because in old age like after completion of 100 years many anatomical changes occurs like fusion of suture, loss of dentition, degeneration of gonads etc. All these criteria were set to get the real and flawless

knowledge of anatomy. Removing the faeces from the intestine is to ward off bacteria and other pathogens, unpleasant smell and to delay the putrefaction. Wrapping the body with grass etc. is to prevent damage to the body. Keeping inside a cage was to prevent the body being damaged by aquatic animals. The cage was placed in running stream of water or river and its water should not be used or consumed by any living beings. Scrubbing the skin and other structures was being done with brushes of *Uæira*, bamboo to separate soft structures. The time of seven days for completing the dissection and to carefully observe all the parts from external skin to deeper structures was probably considered sufficient for the purposes.

### Techniques of Embalming According to Modern Science

It is the science of preserving human remains by treating them to forestall decomposition by injecting embalming chemicals into the blood vessels. The three goals of embalming are sanitization, presentation and preservation. The development of appropriate preservation method is extremely important for the advancement of medical science, as the study of human anatomy had previously been greatly impeded by the process of decay. Artificial preservation methods undertaken by man are not the only means of preserving corpses. Natural preservation can also take place and required that the cadaver had to be dried in a relatively bacteria-free environment over a long period. Modern embalming techniques are not the result of a single innovator, but rather the accumulation of many decades, even centuries, of research- by trial and error methods.

While attending the process of embalming the deceased is placed on the mortuary table in the supine position with the head elevated by a head block. At this point, embalmers commonly perform basic tests for signs of death, things such as lividity, rigor mortis or simply attempting to palpate pulse in the carotid or radial artery. Any clothing on the corpse is removed. The corpse is washed with disinfectant and germicidal solutions. The eyes are posed using an eye cap that keep them shut. The actual embalming process involves four parts:

1. *Arterial Embalming*: It involves the injection of embalming chemicals into the blood vessels, usually via the common carotid artery. Blood and interstitial fluids are replaced by this solution.
2. *Hypodermic Embalming*: A supplemental method which refers to the injection of embalming chemicals into tissue with a hypodermic needle and syringe.

3. *Surface Embalming*: Another supplemental method, to preserve and restore areas directly on the skin's surface and other superficial areas.
4. *Cavity Embalming*: This refers to the replacement of internal fluids inside body cavities with embalming chemicals via the use of an aspirator and trocar. The embalmer makes a small incision just above the navel.

### Chemicals used for Embalming

Embalming chemicals are a variety of preservatives, sanitizers, disinfectants and additives used to temporarily delay decomposition and restore a natural appearance for viewing a body after death. A mixture of these chemicals is known as embalming fluid.

Typical embalming fluid contains a mixture of formaldehyde, glutaraldehyde, ethanol, humectants and wetting agents and other solvents. The formaldehyde content generally ranges from 5 to 35% and the ethanol content may range from 9 to 56%.

### Discussion

The value of anatomical knowledge is very essential for the each and every branch of medical science especially for surgery and will be learnt later by beginners in surgical field. Thus, for a surgeon the knowledge of Anatomy is necessary for performing successful surgery. In this context some basic concepts like embalming, dissection etc. are collected to show that scientific knowledge of human anatomy which was very well known to ancient seers. For the purpose of embalming cadavers were collected from the *Dharmashalas* and places of pilgrimage where an explorer died and there was no near and dear one to cremate the body. Most likely, King's permission was necessary for this reason. Removing the GIT and the adnexa undoubtedly indicates the awareness that if these are allowed to remain in cadaver, the putrefaction of the body is uncontrollably quick. The awareness about "Antra (Intestines)," "Amashaya" (Stomach) and "Pakwashaya" (Large Intestine) etc. was first gained and then attention was given to the rest of the parts. The lividity begins from caecum with the bacteria which spreads to all parts of the body. We must appreciate to the knowledge that the ancient people had. After collecting the body the body is wrapped with Munja (*Saccharum munja*) and Kusha or Darbha (*Desmotachya bipinnata*). The recent researches show that these act as preservatives. The whole covering of the body will delay the process

of decomposition. It is amazing that even at that period there was a great curiosity to study the human body for the purpose of surgical treatment, keeping the cadaver in the running stream at a lonely place which is not frequented by common public and the place away from water fetching places. This idea for selecting the place for dissection must have been finalized after a great experience. *Suśruta* was the first person who resorted to human body preservation and dissection to understand the structures of the body in detail. So we see that the basics for cadaveric preservation are still the same for the purpose of dissection. By the unique method of scraping the body layer by layer he was able to remove the superficial fascia without damaging the soft structures & to note the features of various body parts and describe them accurately.

### Conclusion

During ancient periods embalming was done by wrapping cadaver with some drugs then kept in a cage and placed in flowing water. It was done only for study purposes. Embalming of human body remains for funeral has taken a long road to its present state. Embalming is the art of temporarily preserving human body to prevent decomposition and make it suitable for display at a funeral.

On the other hand, it is a science of preserving the human body for the purpose of anatomical study and research. Most of the medical students do have little knowledge about details of ancient process of embalming. This approach will be useful as an introductory especially for the fresher in medical profession.

*Acharya Suśruta* was the first person who resorted to techniques of embalming and human dissection to study the structures of the body in detail. By the unique method of scraping the body layer by layer he also noted the features of various structures and described them accurately.

With advancement of time, science is expanding its wings in every field but basic principles always remained unchanged. That is the reason modern science also follows all these ancient principles so the knowledge generally found in modern medical literature is nothing but the amendment of *Ayurvedic* knowledge or literature.

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