

Ancient human cadaveric dissection

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History reveals that the practical learning of Anatomy with the help of Human dissection has passed through various phases with ups and downs. Diocles of Carystus had dissected human fetus in 380 B.C. and he used the word Anatomy in his writings. Hippocratic school described the suture lines in the skull and gave the anatomical information of the shoulder region in 400 B.C. This is a clear testimony that Hippocratic school must have examined the human body, otherwise such description would have not come in the literature (Gardner et al 1965)

Galen described the dissection of human body as well as the animals. The first documented human dissection was performed by Herophilus of Chalcedon and Erasistratus of Chios of Ptolemaic Medical School in Egypt. In public dissection, the dead bodies of criminals were utilised. Vivisections were performed quite frequently in those bodies. The Aurelius Cornelius Celsus, the Aristocratic Roman has incorporated this information in his Encyclopedia, which was written in A.D. 30. This still stands as a excellent medical literature for further review (Gardner et al 1965).

Historians have accused Herophilus for performing six hundred human dissections including dissections which were conducted by him on the living individuals. He was accused to the extent that he even opened the womb of a mother to take out the fetus for the purpose of Anatomical dissection. This description was given by an christian writer, Quintus Tertullianus known as Tertullian, who lived in Carthage from 155 to 222 A.D. (Gardner et al 1965).

After the decline of Alexandrian School (250 B.C.- 50 B.C.) a pioneer institution which played a significant role in raising the status of this science. The human dissection was ceased out in 150 B.C. in Alexandrian

School. Egypt was also absorbed into Roman Empire in 30 B.C. and thus the progress of practical learning of Anatomy remained suppressed for more than one thousand years(dark age 50 B.C. to 1050 A.D.).

Historians often described that Galen of Pergamum (130 AD to 200 AD) had no knowledge of the structure of human body. But how one could deny the fact that he might have not seen the human dissection after having learnt that he studied at Alexandrian School, where human dissection were frequently organized. Galen mentioned that he saw two skeletons, one cleaned by birds and other by putting the bones in water (Singer 1957).

Having acquired the knowledge of bones, Galen wrote a book entitled " BONES FOR BEGINNERS ". Evidences further confirm that he had dissected even animals to supplement anatomical knowledge in the existing literature. Due to scarcity of the human cadavers, he dissected apes and monkeys. It is often said that the Galenic literature contained some irrelevant facts of Anatomy but these might have crept in as a result of the observations of animal Anatomy. However one should appreciate Galen's contribution who took immense pain in keeping this science alive in a situation when there was marked scarcity of the human cadavers for the purpose of dissection. He did so inspite of the fact that he was a busy physician (Singer 1957).

The human dissection was completely under the suppression from 199 A.D. until the later part of the first millennium. This was because of wide spread superstitions of various nature and beliefs which rendered the people to remain quite apart from the practical approach of human dissection. Talmudic writings of ancient Hebrews gave various theories of superstitions.

Islamic countries availed the opportunity to preserve the western anatomical literature but did not make significant contributions due to various obstructions imposed on the human dissection in those days. Literature reveals that dissections were continued in Alexandria and a christian surgeon even opened the still living victim from pubis to chest to study the human anatomy. This has been cited by Theophanes in A.D. 810. This gives a promising information that the people were quite enthusiastic and tried their level best to explore this science inspite of various oppositions imposed in their approach and ways (Singer et al 1957).

Human dissections came in vogue again in 12-13 century in south Europe. It was indeed a blessing that Frederick II, emperor of Holy Roman Empire ordered and desired that a public dissection should take place every fifth year at the Medical School in Salerno. This order was issued in the year 1238. This could be considered as a relevant fact that its importance was even realized by his majesty, which might have been due to any other reason. His intellectual status could be further evaluated from the fact that he also declared that no surgeon will be allowed to practice unless he/she studied anatomy for one year. This order was quite conflicting in a situation where physician of Salerno declared the dissection of human body as Horrible action especially to the Catholics.

This information is quite relevant in the context of present situation where we are considering to reduce the quantum of Anatomy teaching in the recent orientation of Medical education without considering its significant role in the enhancement of basic understanding of the medical sciences.

In 1156. the university of Bologna was started in the Northern Italy, with the primary aim of imparting legal teaching with the purpose of reinforcing the understanding of legal values in respect of structures of human body and thus dissections were organized in Bologna. However

it was initially under the control of Law faculty. Gradually in 1306, the medical school became independent to choose its own dissection. It is remarkable that first Medicolegal postmortem was performed in the middle of 13th century in Bologna to investigate the cause of death. In other words anatomical observations were recorded while performing the postmortem examination. William of Saliceto, a surgeon at Bologna, wrote a book on " SURGERY and ANATOMY" in which he mentioned that he performed a postmortem examination in 1275 to find out the cause of death. Similar autopsies were also done in 1295 and in 1300. Therefore, historical facts indicate that the anatomical knowledge was inculcated during the postmortem examination of the human dead bodies, and gradually this knowledge of Anatomy was further utilized to substantiate the evidence in Forensic assessment of the cause of death of the human beings.

This could be extracted from the opinion of two physicians and three surgeons who utilized the knowledge of Anatomy from evidence of our senses and our Anatomizations of the part in reporting the autopsy of Azzolino, who died in Bologna in 1302.

Due to shortage of the cadavers, only 20 students were allowed to see a male and 30 students to observe a female body. This means that regulation and restriction for the dissection were imposed from the ancient period. The observation of a female cadaver was made compulsory. Even students promoted to higher classes had to come to Anatomy department for the observation of Anatomical structures of female dead bodies for the final clearance from the Anatomy department. This information is particularly more significant for further planning of the curriculum and teaching assignment to the students. Female genital tract could not be well described in the literature. Having realized the gravity of non-availability of cadavers, the city authority at Bologna in 1442, made necessary arrangements to provide two bodies each year to the Medical School(one male and

the other female). These bodies generally belonged to the executed non- Bolognese Foreigners (Sinha 1982).

During this period the Pope Boniface VIII issued a promulgation, which had prohibited the boiling of human cadavers of the crusaders. It was difficult to transport dead bodies of the crusaders as such to the other countries by the ship because they often got putrefied due to lack of knowledge and materials for preservation. It was because of this reason the skeletons of the crusaders were prepared after the maceration and boiling of the dead bodies, so that the skeletons could easily be transferred to other countries. The collection of human skeleton was no doubt linked with the other reasons mentioned above. However this opportunity also enabled the Anatomists to study the skeletons in detail which were nicely put forth in subsequent publications of anatomical text book. This could be considered as an event towards the probe of skeletal system (Singer 1957).

The concept of understanding of human dissection for the knowledge of the structures had spread in the neighboring countries. It is stated that nearly 1300 dissections were performed in England in those days. The illustrations of Oxford's Bodleian library depicts an example of human female vivisection being performed by surgeon in the presence of a monk. The human cadaveric dissections were although carried out mostly at the dead bodies of executed criminal, this very act of dissection was considered to be a phenomenon of Anatomical victimization in the form of punishment after the death and it was desired that the detailed observation of the structures of such criminals be done. Since it was an occasional feature the problem of scarcity of the human cadavers for the purpose of learning anatomy remained continued. In view of this situation and to meet the demand of regular supply of the human cadavers, medical students got themselves involved in various criminal offences for the procurement of the human dead bodies. Reports are available which show that the students were even punished by trial courts for

such illegal works. In view of this tragic incidences, the director of university issued an instruction that no one could bring dead bodies without the permission of the director.

After the incidence of public dissection in Bologna, dissections were also organized in Padua(1341), Pavia, Florence, Siena and other Italian Medical Schools. History reveals that only Mondino de Luzzi and Vesalius came down to dissect the cadavers and delivered lectures from their own dissected human specimens (Sinha 1982).

At the end of 14th century, the naturalism in the Art developed. Notable artists like Durer, Michelangelo, Donatello, Raphael and Leonardo da Vinci used scalpel and dissected human cadavers to improve their Anatomical knowledge. This acquired anatomical knowledge enabled artists to generate natural and forceful expression in their art which also helped in reviving Anatomical teaching.

Leonardo da Vinci(1452-1519) studied the surface measurements, proportions of the body parts and the anatomy of the muscles and their attachment. He also studied the brain, heart, digestive system and anatomy of the fetus. He injected wax into the body cavities to find out contours of the specific organs. He dissected nearly thirty human cadavers and performed dissection even in candle light in the mortuary of Rome- Santo Spirito. He made seven hundred fifty accurate drawings and one hundred twenty anatomical books have been written by him. During those days the cadaver procurement was again a great problem for the Anatomy practical teaching, however the same was pleasurly made available for the postmortem examination. To overcome the problem, anatomists utilized the rooms of autopsy centers to impart anatomical knowledge to the Medical students (Singer 1957).

Andreas Vesalius(1514-1564) was a brilliant anatomist. He was born in January 1515 in Brussels. It is said that Vesalius dissected small animals in his childhood. His first discovery dates from the time when

the inferior maxillary bone was single and not formed from the fusion of two bones as Galen had suggested. It was in 1543, when Vesalius was barely twenty eight years of age, he published his masterpiece " De Humani Corporis Fabrica" (concerning the structure of the human body) and his summary entitled Epitome. He dissected six female bodies. Out of six, three were dissected publicly and the remaining three bodies were obtained in unusual situation. He himself did grave robbery and visited cemetery at nights to obtain dead bodies. Once he had to compete with dogs in snatching the dead bodies from the graveyards. This was all due to non-availability of the cadavers to the medical institutions. However, they frequently subjected for autopsy examinations. In 1537 Vesalius accepted the chair of Surgery and Anatomy at the University of Padua. He was the first to receive the salary as a Professor of Anatomy in the University of Padua. In de Fabrica, he corrected more than two hundred errors of Galenic work. He even burned his unpublished book at Padua. This frustration finally compelled him to quit the Anatomical career (Singh 1973).

At the end of 15th century, the dissection began to be held in various parts of Europe. It was used to be organized in town so that passers could witness the act of performing human dissection. This act of human dissection was given the shape of dramatic performances in the form of advertisements. This was aimed to attract people to remove their superstitions and false beliefs which were attached to their feeling against human dissection. Dissections were arranged in winters to prevent the decomposition and putrefaction of the cadavers. This whole affair was aimed at large to mobilize the attention of the people, and to realize its importance in the understanding of medical sciences. In other words to provide better knowledge of the structure of human body in relation to the disease process. Gradually the human dissections were accepted by the people and it resulted in the construction of amphitheatres in 17th century, so as to organize the public dissections.

It is therefore a high time for all of us those who are working in the medical field to emphasize its importance and make the people aware so that dead bodies may be donated to the medical institutions for the learning of human anatomy.

In some of the engravings of dissection theatres in west, the slogans are written in Latin depicting the mortality of the human beings. This act was perhaps an indirect approach to remove the superstitions amongst people related to the theories of resurrections (Singh 1973).

Due to rapid industrialization and increase in population and to meet out the medical facilities and man power, now medical school had emerged out, which caused further deterioration and decline in the supply of human cadavers. The situation was very scandalous in Britain and United States, but less in Europe because the authorities were favoring the human dissection. Henry VIII added in English Law that only the body of the executed murderers would be provided for dissection. This order had adversely affected to cadaveric supply to the Medical institutions.

In 1747, William Hunter established a school of Anatomy in London. Initially two hundred Anatomy students were admitted but in 1823 their number went up to one thousand. This increased admission created problem in the requirement of cadavers. The supplies were inadequate because there was considerable resistance to legitimate supply of the cadavers. On the other hand the code was liberal in Europe in providing human cadavers to the Medical institutions. It was mentioned that the bodies of poor or friendless people should be handed over to the Medical school. In Germany the Law of legitimate supply of cadaver was more favorable (Gardner et al 1965).

In Britain and United States the supply of cadavers took the place of industries and trade and got commercialized. People kept themselves engaged in resurrection , grave robbery, murders, snatching of the

dead bodies so that they could easily earn money by illegal supply of the cadavers to the Medical institutions.

It is said that in London nearly two hundred people were involved in this trade in 1828 and nearly eight hundred bodies were illegally supplied to the institutions and other places for Anatomical studies. Burke and Hare episode of last sixteen murders, defamed Dr Robert Knox and the Government was also blamed for this horrible act of illegal supply of cadavers. Even armed guards were posted at the graves of wealthier citizens. Prices of a body went from 2 pound sterling to 14 pounds(a vast sum in those days). The lack of human cadavers forced British students to shift even to Paris for the Anatomical studies. Anatomical societies also pleaded for legitimate supply of the cadavers. Then this problem was thoroughly investigated by the Government in 1828 and finally in 1832 first Anatomy ACT was passed which enabled this science of Human Anatomy to march ahead shoulder to shoulder to enhance the basic understanding of the human structures (Gardner et al 1965).

It is remarkable to note that long before the western history of Anatomy, the importance of dissection has been emphasized by ancient medical pioneers. It is mentioned "only who has observed the internal mechanism of the human body and is well read in the work bearing on this subject and thus all doubt expelled from his mind is qualified in the science of Ayurveda and has a rightful claim to practice the art of healing (Chelvakumaran 1966).

This is further substantiated by the description of Sushruta who advocated in about 600 B.C. regarding the necessities of human dissection for the practice of Medicine. "That any one who wishes to acquire a

thorough knowledge of Anatomy must prepare a dead body and carefully observe and examine all its different parts."

However it has now become essential to go into depth of ancient history of human dissection, so that some more relevant facts could come out to highlight methods of embalming and procurement of the human cadavers, which was practiced in the ancient India (Sinha 1983).

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