

The Approaches of Technology in Veterinary Anatomical Teaching

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Abstract

The term anatomy is coming from Greek Ana 'on, upon' and Temno 'I cut'. Today, the basis of anatomy education is the work performed on cadavers. However, due to difficulties in modern and alternative approaches to participate in the educational process, an essential element of today's educational process. In recent years for both time and training costs advantages and in order to ensure a healthy laboratory conditions, such methods, computer-assisted learning, simulation-based training, using true-to plastic anatomical models, plastination started to be used.

Introduction

The veterinary anatomy, one of the basic veterinary sciences, is one of the initial branches of veterinary medicine that studies the normal shape, structure and the organs of the animal body as well as the structural and functional relations between these organs. Within an etymological frame, the term anatomy is formed by the combination of two ancient Greek words, Ana (remove) and Tomy (cut). It is expressed in the form of separation by cutting and removing. The term anatomy is 'Dissection' for Latin. Recently 'Dissection' is a term being used as a method for the examination of cadavers.

The Historical Process of Anatomy

Veterinarian need to know how the combination of all subsystems of the body works in harmony, in order to understand if there is a pathology in any part of the body or not. This is why anatomy is important for the veterinary education. When we look at the historical process of the anatomic studies, during the first period, we see the drawings of scientists that the internal organs of animals, as well as external images on the walls. The first written records of Anatomy are said to have begun with Alcmeon from Craton 500 years before (Gurbuz, Karlokaya & Mesut, 2004). The scientific and experimental style of today's medicine began at 3. Century BC. with the dissection experiments. During this period. To investigate the structure and the working system of the animal body. Studies on cadavers formed the basis of anatomical education. Knowledge has increased rapidly as a result of these studies with animal cadaver (In line with the recent technologic developments, today it has been started to be found difficult to study with the cadavers by the animal and consequently the final developments led to the shift in the direction of the technology. The method of "Parafinization" has been developed by Deegener and Brendt in 1914. Since the structure of the samples are dry in this method, the natural image of them are shown as to be resistant to external forces. However, they are heat-sensitive and are not protected against flammability (Buyruk, Groen, Kempermann & Altunicn, 1990). In 1977, Gunther von Hagens developed plastination, which has been more useful and increasingly used method at present. He organized an exhibition of plastination in Japan in 1995 for the first time.

Veterinary anatomy is the major basic subject in the study of veterinary medicine and related biochemical sciences. The anatomy laboratory, for example is an ideal environment for growing and accessing earlier skill and introduce students to the need of communicating effectively with each other and the staff. The use of Peer assisted learning, term based learning and near Peer teaching have been shown as method that can promote communication skill development the required anatomical knowledge and understanding.

Cultural changes, scientific progress and new direction in veterinary education have modified the role of dissection anatomy in veterinary college. In order to understand the present situations, it is necessary to mention some important facts that change the way in which anatomy is taught and also to analyze the role of the dissection in this process.

Dissection is a primary teaching tools in veterinary anatomy. Animal dissection is an integral part in the learning of veterinary anatomy students learn the basic constructional principles of the animal body by dissecting the cadaver. The benefits include the gaining of practical skills such as appreciation of the body structures, first-

hand understanding of anatomical variability, learning teamwork and peer interaction. Technology Innovation and other resources created in the last 35 years had stimulated a discussion about the role of dissection as a teaching tool.

In recent times, the value of the dissection has been challenging subject of discussions due to high cost and problem with the ethical issues. With the advent of new technique and computers alternative method of anatomical teaching have come into existence. However, the Gross Anatomy dissection

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offer the unique possibility of learning through practical and development of manual skill required for adequate comprehension of the subject matter. Many institutions have overcome problems surrounding deception with the plastic models, plastic specimens are modeled to perfection and process a longer self-life than cadaver but they will eventually pose problems.

The role of dissection and the teaching of anatomy evolved during the last half of the 20 century, resulting in new preservation techniques and technological tools based on the imaging.

Training with Cadaver: Currently the practical studies on cadaver are forming the basis of anatomy training. The student can learn the macroscopic structures of anatomic formations, the relationships between them and their vicinity by touching and seeing in the studies on cadaver. However, the difficulties of finding cadaver for veterinary anatomist, loss of form and degeneration of tissue in the post mortem term, diversifications in the structure, colour and smell as a result of the chemical usage for detection make the studies on cadaver unsuitable. It is known that formaldehyde, the chemical material used on cadaver, causes irritation of respiratory tracts and eyes of people and determines several health problems. (Ohmichi, K., Komiyama, M., Matsuna, Y., Takanashi, Y., Miyamoto, H., & Kadota, T., et.al., (2006).

Education by using cast models and plastination:

Plastination created by the Gunter Von Hagens was an innovation in the anatomy laboratory at Heidelberg University in Germany in 1978, and it is currently used in both teaching and research.

Plastination is a relatively new advancement in cadaver Science; an effective techniques of tissue preservation of entire organ or cross section body slices. Using polymer such as resin, silicon, polyester give different mechanical properties but ultimate results in a robust, dry odourless and life-like specimens, which can be used while in the educational capacity in gross anatomy.

People gain knowledge by using visual, auditory and touch senses at most. It can be claimed that the usage of three-dimensional plastic models in anatomy education raises the learning performance. On the other hand, although the complex structure of cadaver prepared by formaldehyde includes different variations, it may hide the details wanted to be given to the student. However, the subjects introduced by plastic models are easier to be learnt and comprehended by the student (Gultiken, 2012). The use of virtual materials in education, makes the concepts concrete, easy to understand and facilitate the chance of observation and re-using.

Plastination permits realistic visualization of anatomical concept that are simply too difficult to describe. Nevertheless,

plastinated prosection should ideally be used adjuvant with cadaveric dissection for full appreciation of the interactions between body system and to understand the body as one entity.

Training Based on Simulation

Simulation: Simulation is described as comparing to real, imitating the attitudes those exists in reality (Patrik, 2002). Properties of simulators are valued depending on not only the similarity to the truth, but also the respond to the applications. It can be said that especially the more respond is sensitive, the more qualification is high-level (Modok & Kartal, 2010; Patrik, 2002; Maran & Galvin, 2003).

Advantages of Simulation: Simulation supports one of the basic principles of bioethics "first do no harm" by providing students to notice their mistakes in different scenarios. Provides equal opportunities for each student (Patrik, 2002). In terms of the patients, it minimizes the risks of damage by the educational processes which would be held on them (Ziv, Small & Wolpe, 2000; Ziv, Wolpe & Small, 2003).

Weaknesses of the Simulation: The most important weakness is not to replace clinical education, but only supports (Modok & Kartal, 2010).

Teaching of anatomy with computerized learning package so that student knows exactly what to expect beforehand and how to best spend limited time in the dissection room. The future of anatomy teaching must rely more on visual aids outside the dissection room as a students who accessed web-based computer-added instruction resources scored significantly higher on examination than those who never accept the online content.

Simulation Tools: The simulations can be divided into two main groups: Low-tech simulations and High-tech simulations (Modok & Kartal, 2010).

Three-Dimensional Organ Models; Like skeletal anatomy, lung, heart, larynx models and different gross viscera of different animals used in laboratories.

Realistic High-Tech Interactive Animal Simulator; These are composed of models quietly resembling animals and computer assistant. A realistic medium is maintained by computer assistant and they give the opportunity of managing these complex clinical situations to the students (Modok & Kartal, 2010; Good, 2003).

Virtual Reality Simulations Systems: Technologic education requiring high-level computer assist which is used especially in surgery education (Maran & Glavin, 2003; Modok & Kartal, 2010).

Vascular anatomy can also be better visualized using virtual contrast injection to convert MRI and CT imaging into 3D virtual reality movies sequence. Otherwise study tools, revision sessions and examination can be completed at individual pace and progression can be measured objectively between interval using interactive online e-learning models.

Imaging has become more important diagnostically and anatomy teaching, which has created a need for new expertise to interpret radiographic ultrasound, metabolic imaging and coma and virtual 3D construction such as high resolution CT scan. Radiology educations offer in vivo visualization of anatomy and physiology as well as insight into pathological process.

Since learning is a correlated to relieve of involvement interactive and problem oriented learning adds interest and aids in long-term retention of knowledge to identify clinically relevant anatomical structures. Surgical trainee has the recent luxury to practice proceeding using virtual reality simulation. similar simulation can also be effective for the student visualize and interact with internal organs while offering more accurate insight into surgical careers.

Problem based learning and claim to particular designed for active self-directed learning. Anatomy problem based learning and sitting project will familiarize students with basic pathology and research opportunities to encourage synergy hewing so that student work together to complete learning aim. Over all there is a variety of approaches to enhance further the opportunity for communication skills training and assessment provided for average student in teaching session. Providing multiple opportunity for students to learn and practice their subject appeared to be the to continue development and success.

Summary and Conclusion

We are in an era of educational technologies being used today. Therefore, to engage the modern and alternative approaches into the educational process is an essential element of today's education sector. Teaching anatomy traditionally on cadavers in faculties of medicine is essential because they provide the opportunity of knowing three-dimensional structure and diversity of the body. But in recent years, the bodies as training equipment are being simulated by images, using computer-aided teaching methods; some plastic lifelike anatomical models or other recent methods such as the use of plastination are being used.

The use of all these recent and technologically developed methods allows us to decrease both the required time for training and the cost of education. In addition to these contributions, ensuring the hygienic and healthy conditions in the laboratory environment is becoming a matter of preference as well. The health problems, which the staff working in education may face because of the conventional cadavers' appearance and unpleasant odors caused by formaldehyde, allows working after removal from the pool wetness, are of great importance considering the model and plastinates. However, all of these models, as it is known, may not create a suitable environment to monitor the anatomic variations of the human body and possible pathological structures. Consequently, although it seems to have some negative aspects dealt with, it is still considered to be appropriate, continuing the use of cadavers in education.

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