

ORIGINAL ARTICLE

Use of Anatomage Virtual Dissection table for Teaching Anatomy in Medical College

FAUZIA QURESHI¹, UZMA WASEEM², RAAFEA TAFWEEZ³, SYEDA ZAKIA⁴, SIBGHA FATIMA⁵, FARIHA QURESHI⁶

¹Associate Professor Akhter Saeed Medical & Dental College Lahore

²Assistant Professor Shalamar Medical College Lahore

³Professor Azra Naheed Medical College Lahore

⁴Demonstrator Azra Naheed Medical College Lahore

⁵Assistant Professor University College of Medicine and Dentistry

⁶Professor Akhter Saeed Medical & Dental College Lahore

Correspondence to Fauzia Qureshi, Email fauziaimran77@gmail.com Cell No.03224180531

ABSTRACT

Background: Conventional teaching methodology for subject of Anatomy by use of cadaver is becoming obsolete because of unavailability of cadaver to the medical institutes. Anatomy is an important subject in basic medical sciences, thus need to be taught in depth in early year of medical curriculum. As availability of cadavers for teaching Anatomy has become extremely difficult.

Aim: To evaluate students' opinion on the use of the Anatomage 3 D virtual dissection table as an additional teaching tool to cadaver dissection in studying anatomy and understanding the relations of structures.

Methods: A descriptive retrospective study was held at the department of Anatomy Azra Naheed Medical College. An electronic questionnaire was given to 2nd year MBBS students in which 6 questions regarding opinion of students who were taught through cadaveric specimen & 3D Anatomage table, regarding use of 3D Anatomage for active learning of anatomy topics.

Results: Present study showed that the most of the students preferred using 3D Anatomage for learning anatomy as it enhances active learning. 80.4% responded positively in developing deeper understanding of the topic with use of Anatomage table as compared to conventional teaching. 89.5% responded positively to visualize better the anatomical features of different parts of body with the help of anatomage table. 81.7% responded positively regarding use of Anatomage table in active learning and in developing interest in subject of Anatomy.

Conclusion: Students consider the use of the anatomage table, an effective teaching tool for gross anatomy, for visualizing anatomical relation of different parts of the body, for deeper understanding and active learning of Anatomical features, and in developing interest in the subject of Anatomy. Students can incorporate digital anatomy into the learning and teaching of basic medical science. The use of 3DAnatomage table gives the impression to have an important role in Medical education

Keywords: Anatomage Virtual dissection table, Traditional dissection, Learning anatomy, 3D interactive anatomage table.

INTRODUCTION

Anatomy is a basic and foundation subject in medical science teaching regardless of specialty throughout the world. In past only lectures, demonstrations and dissection were in practice for teaching anatomy but now teaching methodology has been revolutionized by interactive multimedia and imaging¹. A sound knowledge of gross anatomy for 1ST & 2ND year medical students make strong base for proper learning of clinical subjects in later part of their undergraduate and postgraduate medical courses². In last few years medical colleges have to face many challenging situations and problems at various levels regarding availability of cadaver for teaching anatomy. Most important challenges are legal, socio-economic, religious, cultural and educational issues.

3D interactive Anatomage Table is a well-developed digital solution for teaching and learning anatomy. Software is developed in which 14 Stereoscopic 3D images of different parts of human body were taken by X-ray, computerized tomography (C.T.) scan, and magnetic resonance imaging (MRI) of the whole human body³.

The blast of such innovative technologies in recent years has fetched medical education especially anatomy into a new domain⁴. The Anatomage table was developed by collaboration of clinical anatomy department of Stanford University and a 3-D Medical Technology Company located in California. The technology allows virtual dissection and reconstruction of the human body layer by layer⁵. 3 D Virtual dissection table allows students to isolate, remove, reconstruct, and zoom in and out, different structures of human body. By using virtual knife, one can dissect human body and able to appreciate anatomical relationships⁶. Anatomage table has been utilized to teach basic & clinical anatomy to undergraduate, postgraduate medical students. This 3D dissection table can be connected to auditoriums for

Received on 15-07-2022

Accepted on 25-11-2022

lecture and training sessions⁷. Currently, the 3D anatomage table has been adopted by many of the world's leading medical schools and health care institutes⁸. Recent study was conducted to compare the learning with 3D dissection table as compared to learning with cadaveric teaching in anatomy. As perception of medical students regarding utility of "Anatomage" virtual dissection table was important for active learning.

MATERIAL METHOD

The study was conducted on 2nd year MBBS medical students in anatomy department who were using anatomage table as a part of teaching tool in their second year at Azra Naheed Medical College Lahore. The data was collected through a 6-item questionnaire with five options (strongly agree, agree, neither agree nor disagree, strongly disagree & disagree). The study was done in month of July 2022 just after completion of one year course. The questionnaire was circulated via google form among the class of 77 students and students were requested to respond with their consent without any pressure and consequences. Permission from ethical committee was obtained.

In our part of world Anatomage table has been made available in very few medical institutes & Azra Naheed medical college was the first institute in province of Punjab to use this facility for Anatomy teaching. This study was designed to assess the response of students on the use of this new teaching technology. Students were asked following questions regarding use of anatomage table for learning anatomy subject.

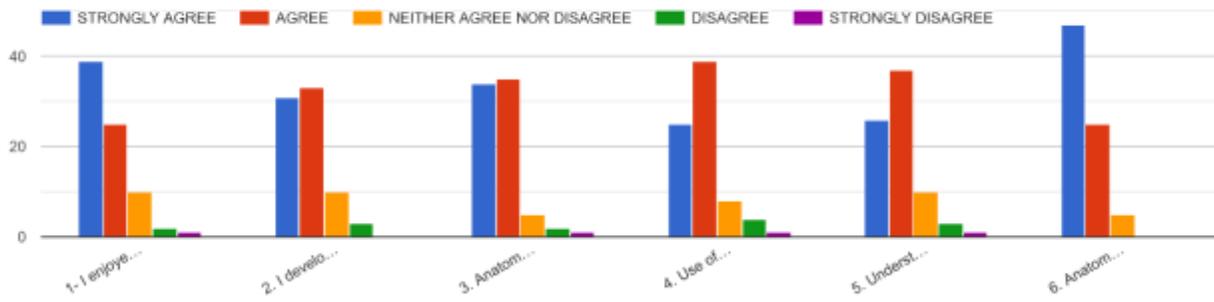
Questions

1. I enjoyed the whole process of using 3 D Virtual Anatomage table for learning gross anatomy.
2. I developed deeper understanding of the topic with use of Anatomage table as compared to conventional teaching.

3. Anatomage table helped me to visualize better the anatomical features of different parts of body.
4. Use of Anatomage table enhanced my learning experience and interest in subject of Anatomy.
5. Understanding the anatomical relations of different part of body with Anatomage take less time than traditional learning with dissection.
6. Anatomage table should be included in routine teaching during SGD (small group discussion).

RESULTS

Fig. 1: Response of students regarding use of anatomage table as a learning tool.



Graph showed in Fig. 1 the response of 2nd year medical students towards use of anatomage virtual dissection table as learning tool. We considered 2 options (strongly agree & agree) as positive response and rest of three options (Neither agree nor disagree, strongly disagree & disagree) as negative response . Total 77 students responded to questionnaire, 80% responded positively (49% strongly agreed & 31% agreed) whereas only 20% responded negatively regarding use of anatomage table for learning gross anatomy.

80.4% responded positively (38.9% strongly agreed & 41.5% agreed) whereas only 19.6% responded negatively to question related to developing better understanding of the topic with use of Anatomage table as compared to conventional teaching .

89.5% responded positively (44.1% strongly agreed & 45.4% agreed) whereas only 10.5% responded negatively to question related to visualize better the anatomical features of different parts of body with the help of anatomage table. 81.7% responded positively (32.4% strongly agreed & 49.3% agreed) whereas only 18.3 % responded negatively to question regarding Use of Anatomage table enhanced my learning experience and interest in subject of Anatomy.

80.5% responded positively (33.7% strongly agreed & 46.7% agreed) whereas only 19.5% responded negatively to question regarding Understanding the anatomical relations of different part of body with Anatomage take less time than traditional learning with Dissection .

Fig. 2: Teaching session with 2nd year MBBS students in anatomy department ANMC.



Fig. 3: Teaching session on Anatomage table showing skeleton of human body.

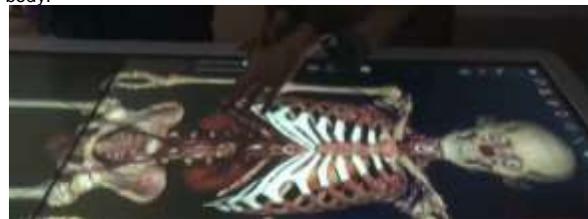


Fig. 4: Anatomage table showing human body with transverse section on selected level along with CT scan.



93.4% responded positively (61% strongly agreed & 32.4 % agreed) whereas only 6.6% responded negatively to question related to use of Anatomage table should be included in routine teaching during SGD (small group discussion).

Gross anatomy teaching is done in dissection hall timings in the form of demonstration/dissection and in SGD (small group discussion).this include skill sessions as well and help in grasping a sound knowledge and concepts of structure of human body.

DISCUSSION

The trends in medical college have been changed in last few years, with the availability of new technology-assisted instruments and equipment . Anatomage has developed as new teaching methodology and innovative effective learning tool for deeper understanding of anatomy subject⁴. Anatomage 3D virtual dissection table also offers the learner to visualize 3D view of the size, position and relationships of all systems, neurovascular bundle and Musculoskeletal system of human body in coronal,

transverse and sagittal planes. This provides the student to move human body up and down to check the structures at different levels of cross section⁹. Custer and Michael described the perceptions of imaging science students in regard to use of Anatomage Virtual Dissection Table, it seems to be important role in medical educational institutes and effective tool in teaching anatomy related to health care profession¹⁰. The subject of anatomy is important for future doctors it must be taught to the medical students in educational fashion of the day¹¹.

In a research conducted by Gross & Masters on Undergraduate students regarding use of Anatomage Table, 67% of students selected the Anatomage Table option. Students reported that they enjoyed learning anatomy by rotating and spinning whole body with anatomage table. It helped to visualize superficial and deep structures of body which was really amazing¹². Baratz et al, conducted a research to evaluate the Anatomage Table compared to traditional dissection as a teaching tool for gross anatomy. Research was specifically on Musculoskeletal system, pelvis & perineum. Result showed significant higher scores on quizzes in musculoskeletal anatomy with group using anatomage table as learning tool. Students were more excited with use of anatomage table and were eager to learn more¹³. As recent study also showed that students preferred to use the anatomage table for learning gross anatomy.

Another study conducted in Department of Anatomy (UQUMED), during academic year (2017-2018) regarding use of 3D virtual anatomage table for teaching purpose. Alasmari WA recommended the use of Anatomage as learning resource in addition to cadavers and claimed anatomage table to be beneficial, because of few reasons, unlimited use, no time consumption during embalming and dissection of dead body for teaching purpose. Learner can cut the body into horizontal, sagittal and longitudinal planes and reconstruct it. CT scan slices correlates with transvers sections are also helpful for understanding anatomy¹⁴.

Brown et al found that medical students actively engaged in learning of Anatomy by using 3 D anatomage table. The interactive nature of the Anatomage table was helpful in developing interest in subject of Anatomy¹⁵. In another study conducted by Bharati AS et al, in GSL medical college to gather student opinion regarding use of anatomage table. 96% of students appreciated the coronal, sagittal and transverse planes and images of body Anatomage as compared to anatomy text book. 95% of students strongly agreed that the Anatomage table helped to visualize body systems. 90% of medical students strongly agreed that 3D dissection table can be used as additional learning tool. 48% of students agreed Anatomage visualisation is better than cadaver¹⁶.

Anatomy education is enhanced and facilitated through the use of accurate anatomical models. The use of three-dimensional (3D) anatomical models is ubiquitous in medical education. Most medical colleges and health science institutes adopt technology-assisted equipment in teaching of anatomy to their students¹⁷. The increase in innovative resources for educational field allows the use of virtual systems in medical profession, which found to be helpful in improving anatomical knowledge. Among these virtual tools, the 3D Anatomage dissection Table 7.0 represents, upto date and innovative anatomical device for teaching and active learning of medical students engaged with health profession¹⁸.

Research done on strategic adaptation in teaching subject of anatomy and basic medical science during covid-19 induced lockdown in 2020. Virtual education system experience by students and faculty proved that use of anatomage table was helpful in fulfilling the demands of education during pandemic crises¹⁹. Preim & Saalfeld conducted a survey on overview of visualization and interaction techniques for teaching anatomy, Anatomy subject is taught under following aspects clinical anatomy, comparative anatomy, radiological anatomy, surgical anatomy, microscopic, macroscopic anatomy and systemic

anatomy. Virtual system integrate all aspects of anatomy²⁰. Many authors have proposed that anatomage table is need of the hour because it not only provides interactive way of teaching anatomy but also can be used for practical anatomy exams. Students can use actively and take the images and videos in storage devices to discuss them later⁹.

CONCLUSION

Students consider the use of the anatomage table, an effective teaching tool for gross anatomy, for visualizing anatomical relation of different parts of the body, for deeper understanding and active learning of Anatomical features, and in developing interest in the subject of Anatomy. Students can incorporate digital anatomy into the learning and teaching of basic medical science. The use of 3D Anatomage table gives the impression to have an important role in medical education.

Conflict of interest: Nothing to declare

REFERENCES

1. Sugand K, Abrahams PH, Khurana A. The Anatomy of Anatomy: A Review for Its Modernization. *AnatSci Educ*. 2010;3:83-93.
2. Ghosh, Sanjib. (2014). Resident doctors: Keystone of anatomy teaching. *The clinical teacher*. 11. 461-2. 10.1111/tct.12132.
3. Bin Abdulrahman KA, Jumaa MI, Hanafy SM, Elkordy EA, Arafat MA, Ahmad T, Rasheed S. Students' Perceptions and Attitudes After Exposure to Three Different Instructional Strategies in Applied Anatomy. *Adv Med Educ Pract*. 2021 Jun 4;12:607-612. doi: 10.2147/AMEP.S310147. PMID: 34113204; PMCID: PMC8186936.
4. Tenaw B. Teaching gross anatomy: Anatomage table as an innovative line of attack. *Int J Anat Var*. 2020;13(1): 76-79
5. The anatomage table – visualizing life size anatomy – street anatomy. Available from: <https://streetanatomy.com/2013/06/13/the-anatomage-table-visualizing-life-size-anatomy/>. Accessed April 26, 2021.
6. Anand I, Mahindra K, Singel TC. A comparative study of learning with "anatomage" virtual dissection table versus traditional dissection method in neuroanatomy. *Indian J ClinAnatPhysio*. 2017; 4(2):177-180
7. Duparc F. 3D-Virtual Dissection Table: We did not imagine how much it will be useful for teaching anatomy and clinical anatomy. *Rev ArgAnatClin*. 2017;9:9-10.
8. Macchiarelli G, SaraBernardi M, Adelaide C, Jasmine D, Maria G, Serena B. Student Learning performance in human Anatomy using a virtual dissection table. *Italian J AnatEmbryol*. 2015. <http://dx.doi.org/10.13128/IJAE-21516>.
9. Garcia Martin J, Dankloff Mora C, AguadoHenche S. Possibilities for the use of Anatomage (the Anatomical Real Body-Size Table) for Teaching and Learning Anatomy with the Students. *Biomed J Sci&Tech Res* 4(4)- 2018. BJSTR. MS.ID.001094. DOI: 10.26717/BJSTR.2018.04.001094
10. Custer and Michael, J TomogrSimul 2015, The Utilization of the Anatomage Virtual Dissection Table in the Education of Imaging Science Students Tanya Custer* and Kimberly Michael College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE, USA <http://dx.doi.org/10.4172/jts.1000102>
11. Winkelmann A. Anatomical dissection as a teaching method in medical school: a review of the evidence. *Med Educ*. 2007 Jan;41(1):15-22. doi: 10.1111/j.1365-2929.2006.02625.x. PMID: 17209888
12. Gross M, Masters C. Virtual Dissection: Using Active Learning with the Anatomage Table to Enhance Student Learning. *FASEB J*. 2017; 31
13. Baratz G, Wilson-Delfosse AL, Singelyn BM, Allan KC, Rieth GE, Ratnaparkhi R, Jenks BP, Carlton C, Freeman BK, Wish-Baratz S. Evaluating the Anatomage Table Compared to Cadaveric Dissection as a Learning Modality for Gross Anatomy. *Med Sci Educ*. 2019 Mar 26;29(2):499-506. doi: 10.1007/s40670-019-00719-z. PMID: 34457507; PMCID: PMC8368845.
14. Alasmari WA. Medical Students' Feedback of Applying the Virtual Dissection Table (Anatomage) in Learning Anatomy: A Cross-sectional Descriptive Study. *Adv Med Educ Pract*. 2021;12:1303-1307 <https://doi.org/10.2147/AMEP.S324520>
15. Brown J, Stonelake S, Anderson W, et al. Medical student perception of Anatomage—a 3D interactive anatomy dissection table. *Int J Surg*. 2015;1(23):S17-8.
16. Bharati AS, Kumari NS, Rani VS. A study on student perception of virtual dissection table (Anatomage) at GSL medical college, Rajahmundry. *AcadAnat Int*. 2018;4(2):28-31. doi:10.21276/aaanat.2018.4.2.8
17. Fredieu JR, Kerbo J, Herron M, Klatte R, Cooke M. Anatomical models: a digital revolution. *Med Sci Educ*. 2015;25(2):183-194. doi:10.1007/s40670-015-0115-9
18. Bartoletti-Stella, A.; Gatta, V.; Mariani, G.A.; Gobbi, P.; Falconi, M.; Manzoli, L.; Faenza, I.; Salucci, S. Three-Dimensional Virtual Anatomy as a New Approach for Medical Student's Learning. *Int. J. Environ. Res. Public Health* **2021**, *18*, 13247. <https://doi.org/10.3390/ijerph182413247>
19. Owolabi, J.; Bekele, A. Implementation of Innovative Educational Technologies in Teaching of Anatomy and Basic Medical Sciences During the COVID-19 Pandemic in a Developing Country: The COVID-19 Silver Lining? *Adv. Med. Educ. Pract.* **2021**, *12*, 619–625. [Google Scholar] [CrossRef]
20. Preim, B.; Saalfeld, P. A survey of virtual human anatomy education systems. *Comput. Graph*. 2018, *71*, 132–153.