Section: Medical Education

Original Research Article

A COMPARATIVE STUDY ON TRADITIONAL METHOD (CADAVERIC DISSECTION) VERSUS REINFORCED RECORDED VIDEO ASSISTED LEARNING OF GROSS ANATOMY IN DISSECTION, AMONG PHASE I MBBS STUDENTS

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ABSTRACT

Background: Cadaveric dissection is the gold standard method for teaching gross anatomy. It provides a hands-on, immersive learning experience that helps student to understand spatial relationships and anatomical variations. Dissection also fosters teamwork and respect for the human body; however, it is resource-intensive and presents ethical and logistical challenges, including the availability of cadavers and sufficient, qualified trained teaching staff is also a big challenge. Recorded video assisted teaching method **is** a modern, accessible alternative that allows repeated viewing and flexible learning. However, videos lack tactile feedback and real-life anatomical variability. Previous studies suggest that both methods are valuable for Anatomy education. Integrating cadaveric dissection with video assisted learning method may combine the strengths of both approaches and improve the learning outcome.

Materials and Methods: The study was conducted in dept of Anatomy at Raichur Institute of Medical Sciences among 150 Phase1 MBBS students of the 2023-24 batch. A non-randomized experimental cross-over design was used to compare traditional cadaveric dissection with reinforced recorded video-assisted teaching. Teaching materials included dissected specimens and high-resolution video recordings of faculty demonstrations. Ethical approval was obtained from IEC, RIMS Raichur.

Results: Practical examination results showed no statistically significant difference in student performance between cadaveric and video assisted learning methods(P=0.9698). however, a significant correlation was observed in student perception of the two teaching methods (P=0.0031). Feedback analysis indicated that most students preferred recorded videos assisted learning followed by cadaveric dissection methods as the most effective method for learning gross anatomy.

Conclusions: Integrating cadaveric dissection and recorded video assisted method combines their strengths for a comprehensive educational experience. In our study, we conclude that recorded video assisted learning method followed by cadaveric dissection is the best approach to learn Gross Anatomy.

Keywords: Cadaveric dissection, Video-assisted learning, Gross anatomy, Medical education , MBBS Students.

INTRODUCTION

Anatomy is a fundamental subject in medical education and has traditionally been taught through cadaveric dissection, which offers students with hands-on learning of anatomical structures and spatial relationships between organs ,which is essential for clinical practice. It also fosters team work and encourages respect for the human body. Despite its educational value, cadaveric dissection presents several challenges. It is resource -intensive and requires adequate infrastructure, trained faculty and availability of cadavers. Ethical considerations and logistical limitations may also restricts its use in some institutions. Recorded video-assisted instruction has emerged as a supplementary teaching method in anatomy education. It provides several advantages including flexible learning, accessibility outside the dissection hall enabling repeated viewing and independent study. However it lacks the tactile experience and does not fully replicate the variability present in real human body. Both methods are valuable in anatomy education, and integrating them could enhance learning.[1-10] The present study was conducted to compare effectiveness of cadaveric dissection and reinforced recorded video assisted learning among Phase 1 MBBS students at Raichur Institute of Medical Sciences. Raichur.

MATERIALS AND METHODS

Setting -: The study was conducted in the Department of Anatomy at Raichur Institute of Medical Sciences, Raichur.

Study population– All Phase1 MBBS students enrolled in the academic year 2023-24 were considered eligible for participation.

Inclusion Criteria-

First year MBBS students who were willing to participate.

Students who provided written informed consent.

Exclusion Criteria-

Students who were absent during the either phase of intervention

Students who did not complete assessment in both phases of intervention.

Sample size for quantitative studies– 150 Phase1 MBBS students of 2023-24 batch participated in study.

Study design – This study was designed as a Non Randomized Experimental Crossover study (interventional – as we can see the behavioural changes in student when they learn dissection through recorded videos).

Materials: The following materials were used in the study

Dissected Specimens,

Mobile phone camera(200 mega pixels) for recording dissection demonstrations,

Lecture hall equipped with LED screen,

Laptop and projector,

Audio-video connection cable

Methodology: Interventional study by using reinforced recorded video assisted dissection classes. Phase 1 150 MBBS students were divided into 2 equal groups

Group A: Roll numbers1 to 75

Group B: Roll numbers 76 to 150.

During the first phase of study: When Group A was taught using the traditional cadaveric dissection method, Group B received teaching through reinforced recorded video-assisted method.

In the second phase the teaching methods were reversed for both groups.

Both A and B group were divided into 5 subgroups (A1, A2,A3, A4 ,A5 and B1,B2,B3,B4,B5).(A1=1 to 15 + B1 =76 to 90),two subgroups allotted for myself Dr.Ravi Shankar G, Principal investigator of this study, (A2=16 to 30 + B2=91 to 105) two subgroups allotted for Dr Naveen N.S, (A3=31 to 45 + B3= 106 to 120) two subgroups allotted for Mr. Ravi Varma, (A4=46 to 60 + B4 =121 to 135) two subgroups allotted for Dr Vandana, (A5=61 to 75 + B5 =136 to 150) two subgroups allotted for Dr Radha Pujari. So each faculty member was assigned to take care of two subgroup of students that is total 30 students per faculty. Recorded dissection demonstrations were captured using a high-resolution mobile camera and later projected on an LED screen during teaching sessions and revision classes.

Assessment

Practical exam was conducted for students, to identify and discuss about structures in a region or about gross features of an organ, for 10 marks, for both A and B groups. Performance of the practical exam was documented and statistically analysed. Student's perception on traditional cadaveric method and reinforced recorded video method were assessed by asking to fill the structured feedback forms with questionnaires (A to E for Cadaveric method, and F to J for Video assisted method) based on 5 point Likert scores rewarded by students were statistically analysed.

Statistical Analysis:

Students performance and feedback scores were statistically analysed using the student's paired t-test to compare the effectiveness of two teaching methods. SPSS software used for analysis.

RESULTS

P value was 0.9698(not significant) when the cadaveric method or Reinforced recorded video method was correlated with the performance of students in the Gross Anatomy practical exams. The student to student perception correlation was also calculated and the P value was 0.0031. As shown in Table 1 and 2.

Correlation between questions A (for cadaveric method) and F (for video method), in feedback forms was (P = 0.0003-Significant). Correlation between questions B (for cadaveric method) and G (for video

method), in feedback forms (P = 0.0297-Significant). Correlation between questions C (for cadaveric method) and H (for video method), in feedback forms (P < 0.0001-Significant). Correlation between questions D (for cadaveric method) and I (for video method), in feedback forms (P < 0.0001-Significant). Correlation between questions E (for cadaveric method) and J (for video method), in feedback forms, (P < 0.0001-Significant). As shown in Table 3.

Mean of scores for Question A was 4.0088 and for F was 3.6892(A > F). Mean of scores for Question B was 3.9459 and for G was 3.7770(B > G). Mean of scores for Question C was 3.8243 and for H was 3.3041(C > H). Mean of scores for Question D was 3.9257 and for I was 3.5878(D > I). Mean of scores for Question E was 3.9932 and for J was 3.7365(E > J). As shown in table 4.

For all the questions asked in feedback form, Likert score percentage was calculated for both cadaveric method and recorded video method. For cadaveric method the percentage of strongly disagree is 3%, for disagree it is 8%, for neutral it is 12%, for agree it is 47% and for strongly agree it is 30%. For recorded video method the percentage of strongly disagree is 2%, for disagree it is 17%, for neutral it is 20%, for agree it is 43% and for strongly agree it is 18%. As shown in Graph 1 and 2.

Mode for question K was calculated, it was 4. Each student was asked to give single response to this question and the mode (majority) of their responses was calculated, mode was answer number 4. As shown in Table 5.

Table 1: Practical Exam Marks - Cadaveric method

Score (Maximum marks = 10M)	Frequency	%
<5	43	29.05
≥5	105	70.95
Total	148	100

Table 2: Practical Exam Marks - Video method

Score (Maximum marks = 10M)	Frequency	%
<5	44	29.73
≥5	104	70.27
Total	148	100

Table 3: Correlation between questions for cadaveric method (A, B, C, D, E) versus Video method (F, G, H, I, J)

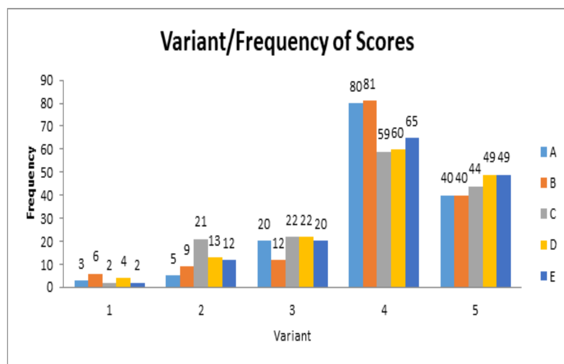
Questions	P
A) Traditional (Cadaveric) dissection method/ F) Reinforced recorded video method helps to identify Anatomical structures effectively	**P=0.0003**
B) Traditional (Cadaveric) dissection method/ G) Reinforced recorded video method helps to understand Anatomical structures effectively	**P=.0297**
C)) Traditional (Cadaveric) dissection method/ H) Reinforced recorded video method provides hands on learning experience	**P<0.0001**
D) Traditional (Cadaveric) dissection method/ I) Reinforced recorded video method create interest in learning Gross Anatomy	**P<0.0001**
E) Traditional (Cadaveric) dissection method/ J) Reinforced recorded video method helps in retention of knowledge of Gross Anatomy	**P<0.0001**

Table 4:

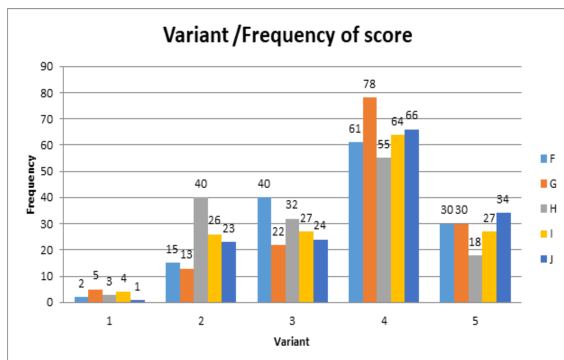
Questions	Number of students	Mean of Likert Scores	Standard Deviation
Variant A	148	4.0068	0.85314
Variant B	148	3.9459	0.98135
Variant C	148	3.8243	1.05441
Variant D	148	3.9257	1.03734
Variant E	148	3.9932	0.95829
Variant F	148	3.6892	0.95370
Variant G	148	3.7770	0.98161
Variant H	148	3.3041	1.06048
Variant I	148	3.5676	1.06370
Variant J	148	3.7365	1.00584

Table 5: Choice of Method (Question K in feedback form – Scores)

variant	Score	%
Choice 1	6	4.05
Choice 2	2	1.35
Choice 3	55	37.16
Choice 4	85	57.43
Total	148	100



Graph 1: Cadaveric method



Graph 2: Video method

DISCUSSION

Here are some of the previous studies comparing traditional cadaver-based dissection with modern virtual dissection technologies, such as Anatomage and dissection videos, in medical education. The comparative analysis suggests that virtual dissection tools like Anatomage enhance the learning experience by providing 3D visualization of anatomical structures, thus aiding students in better understanding the spatial relationships of human anatomy. Anand and Singel's study proposes incorporating virtual dissection tools into undergraduate medical curricula to augment traditional teaching methods.[1]

Darras et al. observed that 78.7% of students believed virtual dissection improved their understanding of anatomy and clinical applications. It also demonstrated that combining virtual dissection with cadaver-based laboratories enhanced student learning.[2] Similarly, Mustafa et al. reported that YouTube and online platforms play a significant role in anatomy learning, with most students using them to supplement gross anatomy studies.[3] Boscolo Berto et al.'s research showed that students using virtual dissection performed better in post-dissection tests, suggesting a potential benefit when integrated with traditional dissection.[4]

Furthermore, Greene et al. highlighted the utility of dissection videos, especially in the early stages of medical education, although usage declined over time.[5] During the COVID-19 pandemic, Natsis et al. found that dissection videos became more prominent, but students still preferred a blend of virtual and physical dissection.[6] Studies by Sinou et al. and Ralte et al. echoed this, emphasizing that while virtual and augmented reality tools are promising, they cannot fully replace traditional methods.[7,8]

Finally, Taladtad and Pradhan et al. both emphasized that videos, particularly on platforms like YouTube, are valuable aids in anatomy education, enhancing students' understanding and memorization, though cadaveric dissection remains essential for medical training.[9,10]

In our study students were taught Gross anatomy as explained in methodology. Then, practical exam was conducted. After conducting Gross Anatomy practical exam, marks were awarded for students. Both the methods and respective marks scored by students were analyzed using student paired t-test. The analysis in the present study shows that there is no correlation (P=0.9698) between the cadaveric method or Reinforced recorded video method with the performance of students in the Gross Anatomy practical exams. But, definitely there is student to student perception correlation(P=0.0031). The factors like ability of the student and mood of the student, while appearing for practical exam, may be the cause for student to student perception correlation.

Student paired t-test analysis was done for each question in feedback form

Following were the questions asked for both cadaveric and reinforced recorded video method

A. Traditional (Cadaveric) dissection method / F) Reinforced recorded video method helps to identify Anatomical structures effectively.
B. Traditional (Cadaveric) dissection method / G) Reinforced recorded video method helps to understand Anatomical structures effectively.
C. Traditional (Cadaveric) dissection method / H) Reinforced recorded video method provides hands on learning experience.
D. Traditional (Cadaveric) dissection method / I) Reinforced recorded video method create interest in learning Gross Anatomy
E. Traditional (Cadaveric) dissection method / J) Reinforced recorded video method helps in retention of knowledge of Gross Anatomy.

In the feedback forms, each question had five responses in the form of grading (5 point Likert scale) - 1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree and 5) strongly Agree. Each student was asked to give single response to each question. Likert scoring for each question was statistically analysed for each question by using student paired t- test, following were the results,

Using student t-test formula scores rewarded by students for all the questions in feedback form were analysed, correlation between question A (for cadaveric method) and F (for video method) was significant (P = 0.0003).Mean of scores for Question A was 4.0088 and for F was 3.6892(A > F), Therefore, cadaveric method helps more, in

identifying Anatomical structures, with respect to questions A and F in feedback form.

Next, correlation between question B (for cadaveric method) and G (for video method) was significant (P = 0.0297). Mean of scores for Question B was 3.9459 and for G was 3.7770(B > G), Therefore, cadaveric method helps more, in understanding Anatomical structures effectively, with respect to questions B and G in feedback form.

Next, correlation between question C (for cadaveric method) and H (for video method) was significant (P<0.0001). Mean of scores for Question C was 3.8243 and for H was 3.3041(C > H). Therefore, cadaveric method provides more, hands on learning experience, with respect to questions C and H in feedback form.

Next, correlation between question D (for cadaveric method) and I (for video method) was significant (P < 0.0001). Mean of scores for Question D was 3.9257 and for I was 3.5878(D > I). Therefore, cadaveric method creates more interest in learning Gross Anatomy with respect to questions D and I in feedback form.

Next, correlation between question E (for cadaveric method) and J (for video method) was significant (P < 0.0001). Mean of scores for Question E was 3.9932 and for J was 3.7365(E > J). Therefore, cadaveric method helps more, in retention of knowledge of Gross Anatomy, with respect to questions E and J in feedback form.

One more question K), was asked to students in the feedback form with four responses as follows

Which of the following is best method for learning and retaining Gross Anatomy ?

1. Traditional method
2. Recorded video method
3. Traditional (Cadaveric) method followed by recorded video method.
4. Recorded video method followed by traditional (Cadaveric) method.

Each student was asked to give single response to this question and the mode (majority) of their responses was calculated, mode was answer number 4. Therefore, students have suggested faculty, recorded video method followed by traditional (Cadaveric) method is the best way to learn Gross Anatomy.

CONCLUSION

Most of the previous studies mentioned in my references have concluded that both the methods are important for learning Gross Anatomy. Integrating dissection and video instruction combines their strengths for a comprehensive educational experience.

In our study we can conclude that recorded video method followed by cadaveric dissection is the best approach to learn Gross Anatomy.

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