

## Supplementation of Dissection Videos and Simultaneous Osteology Teaching to Improve the Concepts of Anatomy During Routine Classroom Dissections in First M.B.B.S. Students

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### Abstract

The provision of learning gross anatomy in medical colleges provides an emotional as well as intellectual approach to medical education. The teaching of gross anatomy has, for centuries, relied on the dissection of human cadavers. Past research suggests that students find work on a cadaver to be distressing, but also rewarding. Hands-on educational experiences on cadavers can also stimulate student's interest, increase knowledge retention and enhance development of clinical skills. Learning on human cadavers is complex learning experience and is not easy to quantify and evaluate objectively.

Such aspect pertains to question of professionalization, social skill and attitude towards death. There have been pro and con arguments on whether medical students should dissect the whole body or learn from pre-dissected bodies. The present study is an attempt to improve the concepts of Anatomy by supplementation of dissection videos and simultaneous osteology teaching during routine classroom dissections.

**Keywords:** Dissection-Videos; Osteology; Cadaveric-Dissection; Complex-Learning; Structured-Assessments; Medical-Education.

### Introduction

The provision of learning gross anatomy in medical colleges provides an emotional as well as intellectual approach to medical education. The amount of Anatomy teaching required in undergraduate curriculum and the best way to impart this knowledge are issues that are frequently debated by medical community [1].

The teaching of gross anatomy has, for centuries, relied on the dissection of human cadavers [2]. Past research suggests that students find work on a cadaver to be distressing, but also rewarding [3]. Hands-on educational experiences on cadavers can also stimulate student's interest, increase knowledge retention and enhance development of clinical skills [4].

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With increasing number of medical colleges and increased demand for cadavers together with technological advancement, utility of dissection has generated discussions, more so in recent past, with favours growing towards the use of multimedia tools, computer software packages, models including plastinated specimens and imaging techniques [5,6,7,8,9]. The proponents of latter methods substantiate the views on the continuation of practice of dissection for and against rather convincingly [10].

Anatomical dissection is systematic exploration of preserved human cadaver by sequential division of tissue layers and liberation of certain structures by removal of regional fat and connective tissue with the aim of supporting the learning of gross anatomy by visual and tactile experience. Learning on human cadavers is complex learning experience and is not easy to quantify and evaluate objectively. Such aspect pertains to question of professionalization, social skill and attitude towards death [11]. There have been pro<sup>6,12</sup> and con [13,14] arguments on whether medical students should dissect the whole body or learn from pre-dissected bodies.

The present study is an attempt to improve the concepts of Anatomy by supplementation of

dissection videos and simultaneous osteology teaching during routine classroom dissections.

### *Context of the Study*

The potential of a cadaveric dissection to give better understanding of Anatomy to medical students is remarkable.

The aim of the present study is to identify a strategy that makes dissection not only interesting but also more purposeful, clinically oriented and contribute more to the overall understanding of human anatomy within a limited time period. This approach would also make students enthusiastically participate in the dissection, comprehend and communicate the anatomical facts and grasp the clinical bearing of the part under dissection.

### *Aim*

To improve the concepts of Anatomy in first M.B.B.S. students

### *Objectives*

1. To give exposure for relevant dissection videos to the study group of students prior to the routine classroom dissections.
2. To expose simultaneous relevant osteology teaching to the study group of students during routine classroom dissections.
3. To assess the study group and control group of students separately on the same topics by structured Theory (M.C.Q. and S.A.Q.) and Viva-voce.
4. To compare the scores of study group and control group of students.
5. To have a feedback from the study group and control group of students regarding the teaching-learning methods after the assessment.
6. To discuss the scope and limitations of implemented teaching-learning method towards the improvement in concepts of subject.

### **Material and Methods**

The present study sample consisting of 40 medical undergraduates of first year bachelor of medicine and bachelor of surgery (I M.B.B.S.), in preclinical phase of five years bachelor entry course at Topiwala National Medical College, Mumbai – 400 008.

These students were divided into two groups (20 study group and 20 control group with at least 75% of attendance during the study). Both groups were of equal size with similar age and sex composition and also similar prior academic performance in terms of overall percentage obtained in high school (Grade II) passing examination.

A pre-test was conducted in the form of questionnaire about basic concepts of relevant topics in Anatomy to ensure that there is no statistical difference between baseline knowledge in Anatomy and learning ability between the two groups.

Study group of students were exposed for relevant dissection videos prior to the routine classroom dissections in addition to traditional / conventional methods.

Study group of students were also exposed for simultaneous osteology teaching during the routine classroom dissections.

However the control group of students were dissected by the traditional / conventional method using Cunningham's manual for dissection<sup>15</sup> and also exposed for separate i.e. in isolation osteology teaching (as it is a routine practice i.e. traditional / conventional method).

Both these groups were assessed separately by conducting a Post-test covering the topics i.e. at the end of superior extremity dissection by structured Theory (M.C.Q. and S.A.Q.) and Viva-voce.

The post-test was conducted by a teaching faculty in subject of Anatomy and previously unrelated to the present study to avoid evaluator's bias.

The scores obtained in percentage in two groups were compared by applying 'Z' test [16].

The data gathered from the questionnaire i.e. feedback was analyzed.

The scope and limitations of the implemented teaching-learning method were discussed.

It was also noted that both groups had equal number of total hours available for dissection and equal time duration for self study. Informed written consent was obtained from all the subjects. Students from control group were not deprived of new methodology since they were also exposed for the teaching methodology implemented for study group after the assessment. Cadavers used in the study were obtained by the body donation program of our department and unclaimed bodies received in the department following all ethical guidelines. There were no dropouts from the study.

## Results

### Evaluation

A pre-test was conducted in the form of questionnaire about basic concepts of relevant topics in Anatomy.

A post-test was conducted covering the topics with structured Theory (M.C.Q. and S.A.Q.) and Viva-voce. The percentages of scores obtained in two groups were compared by applying 'Z' test [15].

Student's feedback was taken pertaining to various aspects of implemented Teaching – Learning method using a questionnaire having 3 point Likert's Scale and by asking close ended questions.

A pre-test result showed that there is no statistical difference between baseline knowledge in Anatomy and learning ability between the two groups.

The Post-Test results shows statistical significant difference at must know, desire to know and nice to levels of questions in multiple choice questions, short answer questions and viva-voce. Study group students are the high achievers.

The above table shows that the implemented Teaching-Learning methodology was very well accepted by the students which leads to better understanding, improvement of the concepts and outcome during assessment.

**Table 1:** Pre-Test result-percentage of correct answers

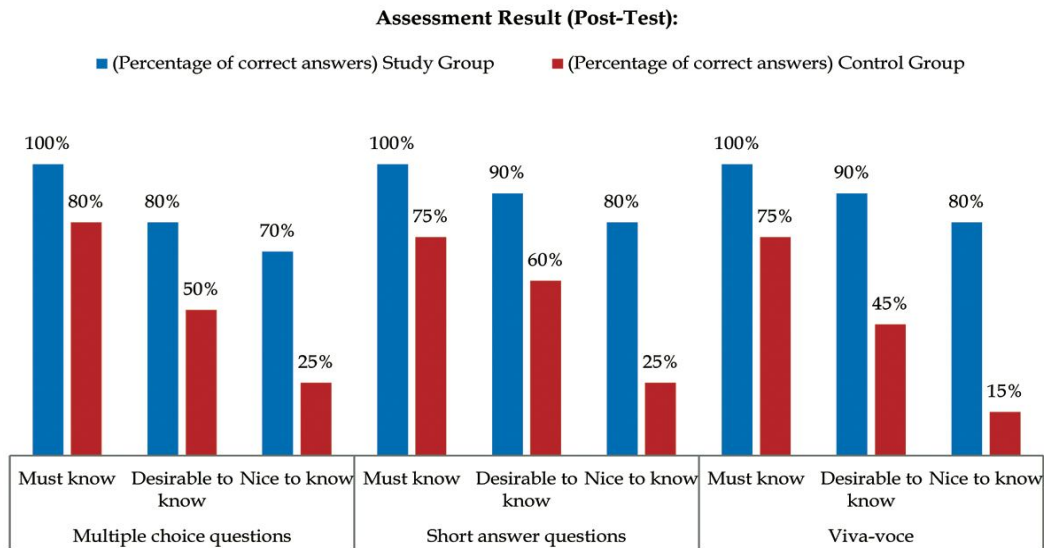
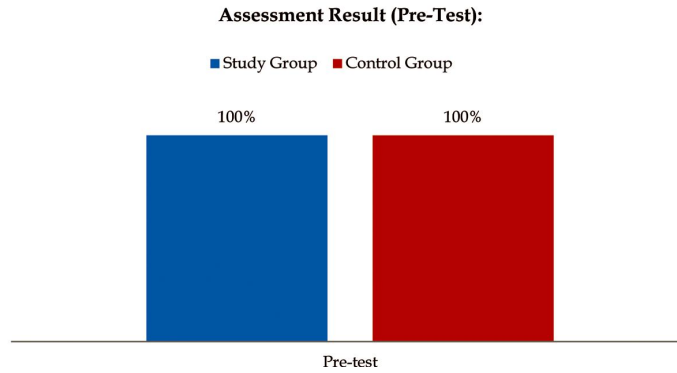
Groups	Total No. of Students	Pre -test (Percentage of correct answers)	'Z' Value	'p' value
Study Group	20	100%	00	p > 0.05
Control Group	20	100%		

**Table 2:** Assessment result (Post-Test)

Assessment Methods	Type of questions	Groups (Percentage of correct answers)		'Z' Value	'p' value
		Study Group	Control Group		
Multiple choice questions	Must know	100	80	09.17	p < 0.05
	Desirable to know	80	50	14.79	p < 0.05
	Nice to know	70	25	14.46	p < 0.05
Short answer questions	Must know	100	75	09.93	p < 0.05
	Desirable to know	90	60	13.17	p < 0.05
	Nice to know	80	25	13.52	p < 0.05
Viva -voce	Must know	100	75	09.93	p < 0.05
	Desirable to know	90	45	13.32	p < 0.05
	Nice to know	80	15	12.30	p < 0.05

**Table 3:** Percentage of answers of questionnaire (study group)

Sr. No.	Questionnaire	Yes (%)	Not Sure (%)	No (%)	
1.	Do you think that supplemented Teaching-Learning method is helpful towards the improvement in understanding of the topics?	100	00	00	
2.	Do you think that retention of the topic would be better by this Teaching-Learning method?	100	00	00	
3.	Whether the implemented Teaching-Learning method is useful for recalling memory to answers of multiple choice questions?	100	00	00	
4.	Whether the implemented Teaching-Learning method is useful in writing the theory examination?	100	00	00	
5.	Whether the implemented Teaching-Learning method is useful for recalling memory to answer in viva-voce?	100	00	00	
6.	Whether the topics covered by the implemented Teaching-Learning method within the stipulated time?	100	00	00	
7.	Whether the implemented Teaching-Learning method is useful to recall the information for clinical correlation of the topics?	95	05	00	
8.	Whether the implemented Teaching-Learning method has increased your interest towards active participation in dissection?	100	00	00	
9.	Would you like to opt the implemented Teaching-Learning method for remaining topics?	95	05	00	
10.	How do you rate the implemented Teaching-Learning method?	Very Good (90%)	Good (05%)	Fair (0%)	Poor (0%)



**Annexure: I**  
**Informed Consent**

I, Mr./Miss. ....

Age: ..... years hereby voluntarily and willingly give my consent to participate in the curriculum innovation project entitled **“Supplementation of dissection videos and simultaneous osteology teaching to improve the concepts of Anatomy during routine classroom dissections in first M.B.B.S. students”** being conducted by **Dr.Sumedh G. Sonavane** in the department of Anatomy.

I have been explained about the project and have understood that the purpose of this study project is for educational research only and that the information provided by me shall be treated with total confidentiality and that it shall be used purely for academic purpose only and shall not have any effect on my academic performance. I have also been explained that my identity shall not be revealed.

In this project I am willing to participate with full attendance. I have given my consent in complete consciousness and without being under any pressure.

Signature

(Name: .....)

Date: / /

Place: Mumbai – 400 008

**Annexure: II**

**Feedback Form for Studygroup Students**

(Please give your valuable feedback about implemented Teaching-Learning methodology)

**Instructions:**

Please mark the single best response for each of the following questions.

Sr. No.	Questionnaire	Yes	Not Sure	No	
1.	Do you think that supplemented Teaching-Learning method is helpful towards the improvement in understanding of the topics?				
2.	Do you think that retention of the topic would be better by this Teaching-Learning method?				
3.	Whether the implemented Teaching-Learning method is useful for recalling memory to answers of multiple choice questions?				
4.	Whether the implemented Teaching-Learning method is useful in writing the theory examination?				
5.	Whether the implemented Teaching-Learning method is useful for recalling memory to answer in viva-voce?				
6.	Whether the topics covered by the implemented Teaching-Learning method within the stipulated time?				
7.	Whether the implemented Teaching-Learning method is useful to recall the information for clinical correlation of the topics?				
8.	Whether the implemented Teaching-Learning method has increased your interest towards active participation in dissection?				
9.	Would you like to opt the implemented Teaching-Learning method for remaining topics?				
10.	How do you rate the implemented Teaching-Learning method?	Very Good	Good	Fair	Poor

**Discussion**

Dissection of a human cadaver is a time-honored tradition for teaching anatomy in medical education. However, in recent years, for variety of reasons, including costs and ethical concerns, some medical programs have ceased cadaver dissection in exchange for virtual dissection of cadavers in cyberspace [3]. The traditional anatomy education based on topographical structural anatomy taught by didactic lectures and complete dissection of the body with personal tuition has been replaced by a multiple range of special study modules, problem-based workshops, computers, plastic models and many other teaching tools.<sup>17</sup> The paucity of cadavers is also weighing the practice of dissection. In an era where the methods and time dedicated to the teaching of human anatomy are changing within medical curricula worldwide, it behooves anatomists to devise alternative strategies to effectively teach the discipline to medical students [17]. The student's participation and the instructor's interest get affected as confusion prevails due to lack of time. Further, dissection can be edited to make it more purposeful by making it more clinically relevant [18]. Various workers have tried and tested methods that inadvertently attempt to redeem dissection.

The faculty of anatomy at the University of North Texas health Science Centre (UNTHSC) has

developed a computer based dissection manual to adjust to their curricular changes and time constraints. Although they place a high priority on computerization on the anatomy laboratory, they remain strong advocates of the importance of cadaver dissection [7]. Ellis emphasizes the teaching in the dissecting room [6]. Likewise, McGarvey and colleagues hold dissection as a positive experience and towards this they have prepared strategies that cope with the stress in the dissection hall [5].

Pratten et al and R. Bhatnagar et al studied shows that students who had undertaken weekly inter course assessments showed significantly improved summative marks compared with those who did not [18,19]. Another study shows that medical students grade dissection as the best method to learn anatomy compared to newer approaches such as models, computer software packages, living and radiological anatomy [20].

The time constraint has compelled the traditional teacher to only teach anatomy that is going to be clinically relevant to them in their subsequent practice [9]. The dissection room teaching when complimented by structured tests would make the student focused for learning and enthusiastically participate in dissection within the given time frame. Chakravarty et al [21] have recommended assessment of anatomy in a problem based curriculum has been implemented since 1982. They have used several methods to assess

the different domains of learning that is knowledge, skill and attitudes using multiple-choice questions, patient managements problems and objective structured practical examination. They acknowledge that training should be based on 'applying processes of reasoning than by memorizing of the facts'.

Arora L and Sharma BR [1] noted that both M.B.B.S. and B.D.S. students found dissection as a tool that helps them in better understanding of Anatomy and provides to visualize different organs of human body and their relationship.

Present study was conducted at Topiwala National Medical College on a small sample with simple counting methods, which enabled to focus on detailed description and their meanings. Thus present findings may not be widely generalisable but is valuable in generating important educational issues.

Since the present study conducted on a limited portion covered in around one month hence the student can gauge his/her own performance vis-à-vis the efforts put in the dissection hall during one month. The students start taking active part in dissection. It gives the student an impetus to do better in the next session. The student's efforts are guided by desire to do well for which he/she is compelled to participate in every day's dissection. Outcome of each dissection was neat and better exposed structures. Each dissection becomes purposeful. The keenness to learn about the clinical aspect is the driving force to enter the dissection hall with enthusiasm and meet the learning objectives. The effort to structure the assessments in sets, which is to identify, seek and show, demonstrate and explain, has yielded good response and it has prompted to apply the implemented methodology to entire body dissection.

The credibility of the implemented Teaching-Learning methodology depends upon the objectivity achieved and their bearings in the final assessment of the student. This necessitated designing the methodology for testing comprehension rather than memorization of the facts. Hopefully, this methodology when implemented at university level would curtail the hitherto practice where there is very little objectivity and uniformity and the students are at the whims and mercy of the examiner.

### Conclusion

The potential of a cadaveric dissection to give better understanding of Anatomy to medical students is remarkable.

The threat to wreck havoc on the very edifice of medical education is to be countered by making dissection indispensable. It is to be achieved by following a planned strategy that makes the student realize the importance of dissection and to increase their curiosity and understanding culminating into better performance in examinations (The present study supports it). Over the years each Institution / University would modify, change and evolve a pattern that would bring in uniformity and objectivity in both conduction of dissection classes and assessments.

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### Conflicts of Interest

All authors have none to declare.

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