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Dissection or Prosection: Analysing the Best Practical Method to Teach Gross Anatomy of Limbs

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Abstract

Background: As the National Medical Commission of India, introduced competency-based medical education, dissection lab hours for medical students have been consistently reduced. This has prompted the students to explore alternative methods for learning gross anatomy beyond dissection. This survey aims to analyse the performance of medical students based on their preferred anatomy learning styles within the context of reduced dissection lab hours. **Material and methods:** An observational study was conducted with 150 first-year MBBS students. Once the upper and lower limbs were completed, an examination was conducted on both theoretical and practical aspects. The exam marks of each student were recorded. Students getting 50% marks in theory and practical exams were considered pass. Students were questioned about their learning methods, which they followed in the dissection lab after exams, and answers were noted and analysed statistically. **Result:** Out of 150 MBBS 1st year students, 100 students (66.6%) chose dissection, 30 (20%) chose prosection, and the remaining 20 (13.4%) students chose both dissection and prosection methods. The number of students who adopted dissection as their learning method got test marks $\geq 50\%$ is 85%, whereas the test score of students who chose both dissection and prosection is 75% and the only prosection is 33.33%. **Conclusion:** The dissection method is the best method for learning the gross anatomy of limbs. It provokes the students to be involved in group activities and gain knowledge in anatomy. Finally, students achieve good results in examinations.

Keywords: Dissection, prosection, gross anatomy, competency-based medical education, and practical examination.

Introduction:

Human Anatomy is a fundamental scientific discipline and a key element of surgery. (Custers EJFM., 2010). It presents challenges due to its various subdivisions and is heavily emphasized in the 1st year of medical education.

(Balagobi B et al., 2023). Many students struggle with anatomy because of the sheer volume of materials and new terminologies. The optimal practical method for teaching remains a topic of discussion. [Nnodim JO., (1990), Jones DG., (1997)]. Traditionally the best practical method to teach gross anatomy is dissection. Anatomy faculties often highlight the value of dissection. (Ghosh SK., 2017). Numerous studies have examined the framework of anatomy curriculum and various practical approaches like using anatomy models, dissection, and prosection. (McWatt SC et al., 2021). Any new teaching method should enhance student learning and improve exam outcomes. Adopting a newer technique should depend on the availability of cadavers, and qualified teachers and ultimately benefit student's performance in assessments. (Brenner E et al., 2003). As National Medical Commission of India introduced Competency-based medical education (CBME), dissection hours are notably reduced from 12 hours/ week to 8 hours/week. As Anatomists, we believe time spent in the dissection lab is precious and should be utilized effectively. Given the context, the present study was conducted to gather student feedback on their preferred methods of learning anatomy in the dissection lab and to relate that preference to their exam performance.

Materials and Methods:

An observational study was conducted from December 2023 to February 2024 with 150 first-year MBBS students after obtaining their consent. The study began by teaching the gross anatomy syllabus, starting with the limbs, followed by other human body regions through didactic lectures. Subsequently, students engaged in cadaveric dissection or prosection of human body parts for approximately 8-10 hours per week.

Upon completion of the limbs section, a theory and practical examination was administered to assess their knowledge. The theory examination conducted for 3 hours, which was scored out of 100 marks, consisted of the following components: 10 multiple-choice questions, two long answer questions worth 15 marks each, seven short answer questions worth 6 marks each, and six very short answer questions worth 3 marks each. The practical exam, which was conducted for 2 hours and scored out of 100 marks, consisted of the following components: 20 gross spotters, each worth 5 marks, utilizing cadaveric limbs. Each spotter required students to identify tied, pinned, or probed structures, after which they were asked to answer sub-questions regarding the attachments, actions, branches, or applied anatomy of the identified structures. A passing score of 50% was required in both the theory and practical exams, with the marks recorded accordingly.

After the examinations, the aims and objectives of the study were explained to the 150 students, who were assured that their responses would remain confidential and used solely for research purposes. Students were asked to indicate their preferred learning method in the dissection lab, choosing from options such as dissection, prosection, or both, with multiple selections discouraged. Their

responses were calculated as percentages, and their comments were considered for correlation. Test scores with each student's chosen method of learning were compared and recorded in percentage.

Result:

Out of 150 MBBS 1st year students, 100 students (66.6%) selected dissection, 30 (20%) selected prosection, and the remaining 20 (13.4%) students selected both dissection and prosection methods as shown in Plate - 1 and Table -1. Exam scores of both theory and practical of each student were compared with the method of learning gross anatomy of limbs in dissection laboratory. Among 100 students who selected dissection, 85 students (85%) scored $\geq 50\%$ and 15 students (15%) scored $< 50\%$. Among 30 students who selected prosection, 10 students (33.33%) scored $\geq 50\%$ and 20 students (66.66%) scored $< 50\%$. Among 20 students who selected both dissection and prosection, 15 students (75%) scored $\geq 50\%$ and 5 students (25%) scored $< 50\%$ as shown in Plate - 2 and Table - 2.

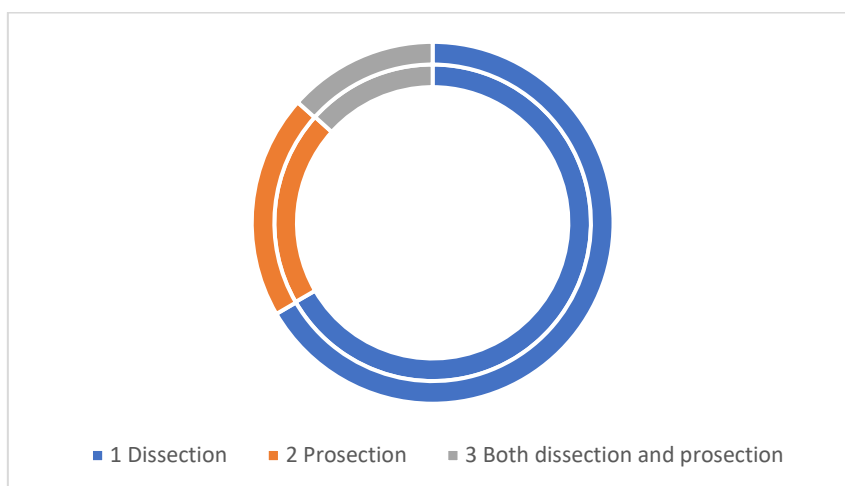


Plate-1: Students' practical learning method distribution.

Table -1: Percentage of students learning method

S.No	Practical learning methods	Number of Students' response (n=150)	Percentage (%)
1.	Dissection	100	66.6
2.	Prosection	30	20
3.	Both dissection and prosection	20	13.4

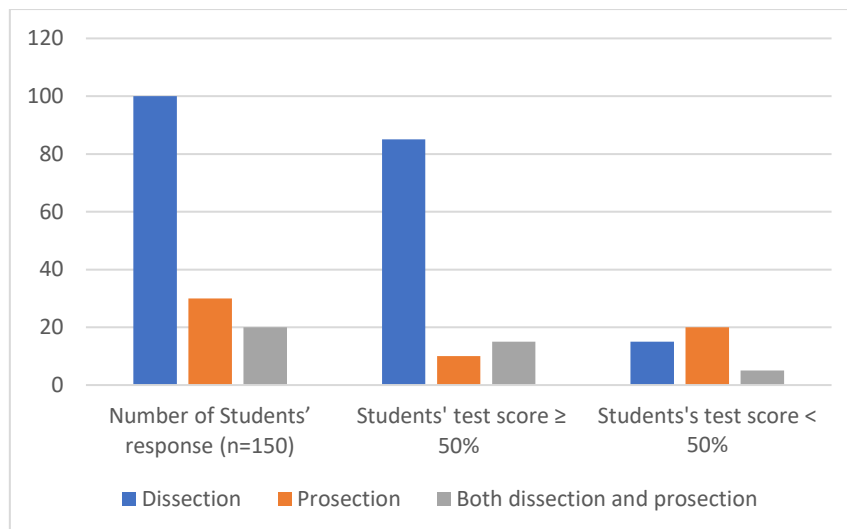


Plate- 2: Students' practical learning method with test score distribution.

Table -2: Percentage of Students' test score related to their adopted practical learning method.

S.No	Practical learning methods	Number of Students' response (n=150)	Number of students and test score ≥ 50%	Number of students and test score < 50%
1.	Dissection	100	85 (85%)	15 (15%)
2.	Prosection	30	10 (33.33%)	20 (66.66%)
3.	Both dissection and prosection	20	15 (75%)	5 (25%)

Discussion:

The dissection approach is the most effective way to learn cadaveric gross anatomy. (J. Older., 2004). Students' curiosity about the structures is piqued by cadaveric dissection. Additionally, it serves as the foundation for future surgical procedures. [L. M. Newell R., (1995), Ellis H., (2002)]. Although system-based learning has been implemented in medical schools in wealthy nations, the dissection technique of teaching human anatomy is still used. In addition to dissection, other methods such as prosected cadaveric specimens, anatomical models, and plastinated models are employed. [Heylings DJA., (2002), Moxham B et al., (2007), Naz S et al., (2011)].

Prosection is the pre-dissected cadaver. Students can easily recognize structures when learning anatomy through prosected specimens but require constant support. (Drake RL., 2007). In prosected specimens, the human body's architecture is not fully perceived. As prosection is carried out by qualified faculty, students lose confidence and the ability to dissect the structures. (McLachlan JC et al., 2004).

Only thirty of the 150 students in the current study chose prosection as their learning strategy. Only 10 (33.33%) of them did well on the test, while the other 20 received less than 50%. Students explained that they were merely mugging up for tests while studying gross anatomy in the prosected cadaveric limbs. Even while the prosection method decreased anxiety and stress among students and required less time for revision, actual learning did not occur.

Despite the fact that dissection requires expertise, time, and cadaver availability, 100 students chose this technique to learn the gross anatomy of limbs; 85 (85%) of them received a score of >50% on their tests, while just 15 (15%) received less than 50% marks. Students were excited to identify the structures during the cadaver dissection, and they also learned how to use the device for future clinical practice.

There were only 20 students who used both dissection and prosection in this study, and 15 of them did well on tests. Students who chose both dissection and prosection expressed that they would like to perform dissection first, under the supervision of qualified teachers, and that prosected specimens may be used for revision. According to our research, students who chose dissection as their learning strategy performed better on tests than those who chose other options. The outcome of this study was similar to the studies performed by S.G. Kalthur et al., 2022 and Mahat S et al., 2022.

We request the National Medical Commission to extend the dissection lab hours and to monitor cadavers' availability as mandated in the medical college in India. As a result, students will be able to use the dissection lab hours for academic purposes with ease. They are educated to recognize and distinguish between structures such as arteries, veins, nerves, muscles, etc. on their initiative to improve their dissection skills. Their confidence will grow, and they might become surgeons in the future. It also improves self-directed learning and peer teaching. Students can visualize structures and their relationships in three dimensions. Ultimately, students will have less difficulty in learning gross anatomy, especially limbs, and do better on tests.

Conclusion:

In this study, 150 first-year MBBS students used a variety of practical techniques, such as dissection and prosection, to learn the gross anatomy of limbs. Our findings suggest that cadaveric dissection is the best approach because it closely resembles performing surgery in real life, giving students a sense of being a surgeon. Additionally, dissection helps students understand the precise relationships and architecture of the structures. While each practical

technique has advantages and disadvantages, dissection is suggested because it provides a precise image of the structures as they are in real life, and it also enhances student self-directed learning and peer teaching, both of which may improve their exam results.

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