

## ANATOMY TEACHING: A STUDENT'S PERSPECTIVE

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### ABSTRACT

**Background:** The advent of 21<sup>st</sup> century has brought about revolutionary changes in medical education. Medical educators are debating the effective application of traditional and newer teaching and learning (T/L) methodologies. The present study aimed to obtain the student's perspective on the present T/L methodology in anatomy and also the content and duration of anatomy teaching so as to help the educators design a more effective anatomy T/L programme.

**Methodology:** The 4<sup>th</sup>, 5<sup>th</sup> year MBBS students and interns were administered questionnaires to rate the T/L aids and give suggestions to improve the teaching of anatomy through close and open ended questions.

**Results:** Amongst the teaching aids, excellent / good rating was given by 80.3% students to classroom teaching on the black-board, followed by 68.3% to dissection. Amongst the learning aids, excellent / good rating was given by 72.3% students to dissection and 67% to lectures. Further, 55% students opined that anatomy should be taught over 12 months (excluding examinations) whereas 37.6% suggested it to be taught in 18 months. The need to introduce anatomy teaching sessions during the later part of the medical curriculum was felt by majority (95.2%) of the students.

**Conclusions:** The traditional T/L methods like dissection, lectures and black-board teaching are preferred by the newer generation learners also and should be integrated with newer teaching modalities and modern technology. The anatomy syllabus being taught in the present MBBS curriculum is adequate, however the time allotted for anatomy teaching needs to be increased by 2 to 6 months. The study further suggests that there is a need to reinforce anatomy teaching in the clinical years.

**KEY WORDS:** Curriculum, Teaching aids, Learning aids, Dissection, Medical students.

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### INTRODUCTION

Anatomy is an important subject in medical sciences. It has been considered the foundation of medicine for hundreds of years and this view is supported by clinicians, students and general

public [1]. Anatomical knowledge is essential not only for surgeons, but also for anyone who performs an invasive procedure on a patient; carries out emergency procedures; examines radiological imagings; performs a physical

examination of a patient or explains a procedure to a patient [2].

Changes in undergraduate MBBS curriculum have reduced not only the amount of time dedicated to anatomy and dissection but also the teaching staff [3, 4]. Since these changes in medical education are here to stay, we the teachers must learn to adapt and make teaching more effective. Learners are the most qualified sources to report effectiveness of the learning experience. Various studies have taken the feedback from the learners i.e. the students for assessment of the complex topic of anatomy teaching [5, 6]. By evaluating the student's perception towards teaching of anatomy we can better assess the existing teaching methodology and also design a future programme for the better teaching and understanding of the subject.

Anatomy is taught in the 1<sup>st</sup> year of UG curriculum, although anatomical knowledge is assessed throughout the MBBS curriculum, may it be in the wards or in many specialist examinations like surgery, radiology and orthopaedics. Therefore, 4<sup>th</sup> and 5<sup>th</sup> year students and interns represent a better group for taking feedback than the current students, as their responses will be more educated and unbiased.

So, the present study aims - a) to obtain an insight into the views of medical students on the present teaching and learning methods in anatomy b) to document the areas of concern regarding content, duration and application of their anatomical knowledge and c) to elicit their suggestions to make the teaching and learning process in anatomy more effective.

## MATERIALS AND METHODS

A cross-sectional study was carried out during the academic year 2015-16 amongst the 4<sup>th</sup> & 5<sup>th</sup> year MBBS students and interns of two medical colleges in North India. The students were contacted at a suitable, available time. The purpose of the study was explained and participation was voluntary. Each student gave a written informed consent to participate in the study. Two hundred and fifty anonymous, pre-designed and pre-validated questionnaires containing close and open ended questions were distributed randomly amongst the students.

The questionnaire collected information regarding the college and professional year of the students. The students were asked to rate the teaching and learning aids in anatomy from poor to excellent and enlist the difficulties faced in learning anatomy. They also gave their perceptions regarding the syllabus of anatomy, the adequate and appropriate time for teaching anatomy in the MBBS curriculum. Suggestions were invited in order to improve the teaching of anatomy through open ended questions.

Two hundred and eight completely filled questionnaires were received back and the responses obtained were analyzed.

## RESULTS

Out of the 208 participants, 82 were from 3<sup>rd</sup> professional (new final), 74 were from 4<sup>th</sup> professional (old final) and 50 were interns. A majority of the students, 201(96.6%) found anatomy to be an important subject in MBBS curriculum and a further 200 (96.2%) felt it is an interesting subject, whereas a mere 7 (3.4%) did not find anatomy important and 8 (3.8%) did not find it interesting. While rating the teaching aids, excellent /good rating was given by 167 (80.3%) students to classroom teaching on the black-board, followed by 142 (68.3%) to dissection, 94 (45.2%) to models, 89 (42.8%) to multimedia and 68 (32.7%) to power-point teaching, (Table 1)

Further, amongst the learning aids, excellent / good rating was given by 151 (72.3%) students to dissection, 140 (67%) to lectures, followed by 120 (57.5%) to textbooks, 119 (56.9%) to self-directed learning and 110 (52.7%) to pre-dissected specimen. Whereas, computer aided learning received excellent / good rating from only 63 (30.1%) students. (Table 2)

Amongst the subdivisions of anatomy the most difficult as perceived by 37% of students were embryology, followed by neuroanatomy (28.4%), gross anatomy (23.5%) and histology (9.1%). (Figure 1) The easiest was general anatomy according to 112 (53.8%) students, surface marking by 52 (25%) and radiology by 41 (19.7%) students. (Figure 2)

Majority of the students, 189 (90.9%) felt that the time given for anatomy teaching in the present curriculum is inadequate. Out of these

189 students, 104 (55%) opined that anatomy should be taught over 12 months (excluding examinations) whereas 71 (37.6%) suggested it be taught in 18 months, 12 (6.3%) felt 24 months and 2 (1.1%) even suggested 6 months. Regarding the syllabus of anatomy, 186 (89.4%) students felt it is adequate. Out of the 22 (10.58%) students who felt anatomy syllabus is inadequate, 9 (40.9%) suggested increasing and 13 (59.1%) suggested decreasing the syllabus.

The need to introduce anatomy teaching sessions during the later part of curriculum was felt by 198 (95.2%) students. A majority of the students suggested that anatomy be taught once a week (103, 52 %), twice a week (66, 33.4%), daily (17, 8.6%) or once in two weeks (12, 6%) during their clinical postings. The clinical postings during which anatomy teaching was suggested were Surgery by 95.5% students, Orthopaedics (28.3%), ENT (20.7%), Gynaecology (18.8%), Medicine (16.7%) and Ophthalmology (15.2%).

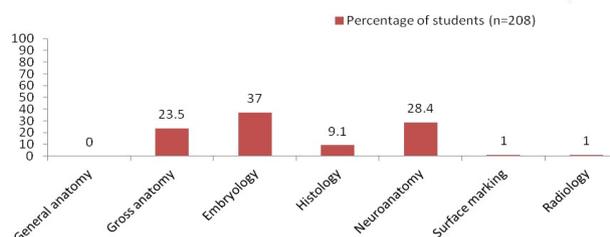
**Table 1:** Various teaching aids rated by students.

Teaching Aids	Percentage of students (n=208)		
	Very poor / Poor	Neutral	Good / Excellent
Dissection	9.6	22.1	68.3
Classroom teaching with power point	24.5	42.8	32.7
Classroom teaching with blackboard	4.3	15.4	80.3
Models	22.1	32.7	45.2
Multimedia	24	33.2	42.8

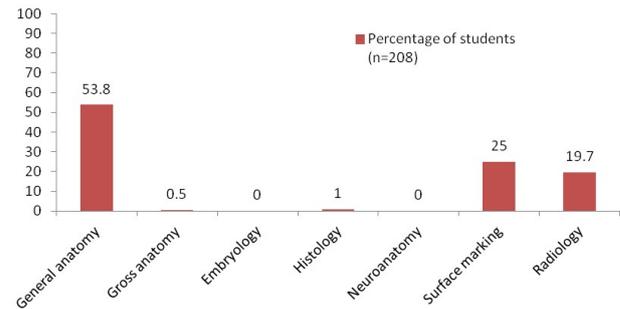
**Table 2:** Various learning aids rated by students.

Learning Aids	Percentage of students (n=208)		
	Very poor / Poor	Neutral	Good / Excellent
Dissection	9	18.7	72.3
Textbooks	9	33.5	57.5
Lectures	6.2	26.8	67
Pre-dissected specimen	15.3	32	52.7
Computer aided learning	31.6	38.3	30.1
Self-directed learning	14.4	28.7	56.9

**Fig. 1:** Most Difficult subdivision of anatomy related students.



**Fig. 2:** Easiest subdivision of anatomy related students.



## DISCUSSION

The knowledge of anatomy is fundamental to medical practice and the present study attempted to find out the perceptions of MBBS students in their 4<sup>th</sup>, 5<sup>th</sup> year and internship regarding the teaching-learning methods and adequacy of time and content of anatomy curriculum. Majority of students found anatomy to be an important (96.6%) and interesting (96.2%) subject. This is rather expected, as students in the present study have been exposed to clinical classes so they can better correlate the application of their anatomical knowledge, which makes them realize the importance of anatomy in medicine.

A lot of debate has taken place about how to teach anatomy. Anatomy teaching-learning (T/L) methods have evolved as the medical undergraduate curriculum has modernized. Traditional T/L methods of lectures / large group teaching especially using black-board teaching, dissection of cadavers, pre-dissected prosections and tutorials / small group teaching are now supplemented by using power-point or multi-media, anatomical models, simulations and e-learning. The traditionalists favor dissection of human cadavers and the modernists support newer learning modalities like computer assisted learning, problem based learning and self-directed learning [7, 8, 9, 10]. The preference of medical students and anatomy faculty towards both traditional and modern T/L methods is not well studied in India.

In the present study, dissection on cadavers, classroom teaching on blackboard and lectures / large group teaching were rated to be the best T/L methods. In a study by Davis et al, all students and faculty were strongly in favour of access to cadaveric specimens and supported

traditional methods of small-group teaching like tutorials and seminars with medically qualified demonstrators. Other T/L methods, including e-learning, anatomical models and surgical videos, were considered useful educational tools [11]. In another study from South Korea, almost all the students (91.3%) considered cadaveric dissection being useful to the study of anatomy [12]. In our study, excellent / good rating was given by 72.3% students to dissection while 49% students in the Korean study believed that dissection laboratory was the best method of acquiring anatomical knowledge [12]. Various advantages of dissection as described in published literature include development of anatomical knowledge and its vocabulary through appreciation of three-dimensional relationship and anatomical variability, developing fine motor skill, promoting attitude conducive to team working and development of respect to physical body [13].

Computer assisted learning (CAL) was rated as excellent / good by only 30.1% students in the present study. This observation is rather unexpected in modern computer era when several studies also support the value of CAL [9, 10, 14]. In our opinion anatomy must shake off the image of being old-fashioned and welcome clinical relevance, IT revolution, models, body painting and radiographic images in addition to dissection and prosections. Instead of debating traditional versus newer methodology, there should be a balanced, contextual and appropriate use of both T / L methods.

In our study, maximum number of students (37%) found embryology to be the most difficult subdivision while general anatomy was the easiest one (53.8%). To the best of our knowledge this particular aspect so far has not been studied in published literature and this is a unique strength of this study. This knowledge should be kept in mind by the teachers when planning the time allocated to these subdivisions of anatomy and the use of innovative approaches to teach the same.

Anatomy is presently being taught for 12 months (including examinations) in the Indian medical curriculum, according to recommendations of Medical Council of India (MCI). In the present study, 90.9% students felt that time given for

anatomy teaching in the present curriculum is inadequate. Further, 55% of the students were of the view that total 12 months should be dedicated purely to teach anatomy excluding examinations while 37.6% students suggested that period should be increased to 18 months. According to a study by Waterston et al, in a survey of clinicians, majority felt that the anatomical education of medical students was inadequate and below the minimum necessary for safe medical practice and there was widespread support among clinicians for more vertical integration of anatomy teaching throughout the undergraduate curriculum [15]. In another study from Ireland, 50 % anatomy educators felt that there was 'too little' time dedicated to anatomy [16]. In a report presented to Management committee of the Anatomical Society of Great Britain and Ireland, Fitzgerald et al recommended total of 350 hours for teaching Anatomy [17]. In another study 44.2% responders felt that they had received insufficient anatomy instruction [18].

The teaching of basic sciences (anatomy, physiology and biochemistry) was reduced from 18 months to 12 months in 1995 by Medical Council of India. As the basic sciences departments are not revenue generating, medical schools in India as well as globally, have tried to decrease their teaching hours and the associated faculty. However, keeping in view the relevance of basic sciences as the foundation of medical sciences, the present study suggests increasing the duration of anatomy teaching by 2 to 6 months and strongly opposes any further reduction in the duration of anatomy teaching in the undergraduate MBBS curriculum.

There is also a need to move beyond the how, to when and what to teach in anatomy. Many studies have shared the view that the anatomy syllabus taught is voluminous and unnecessary [19, 20]. A minimum working knowledge of anatomy is required which allows a doctor to practice safely and to communicate with other medical professionals and patients effectively [21]. Studies have taken the feedback from the learners i.e. the students for assessment of the complex topic of anatomy teaching [22, 23]. However, in the present study, 189 (89.4%) students felt the syllabus of anatomy presently

taught in the 1<sup>st</sup> year of MBBS curriculum is adequate, whereas, 9 students suggested increasing and 13 students suggested decreasing the syllabus. Various studies have documented that the changes in under-graduate curriculum have led to a decline in the knowledge of anatomy. Studies have attributed this to reductions in allocated time, teaching staff and dissection in anatomy courses [3, 4].

However, instead of concentrating our attention on decreasing the content, rather it should be on increasing the relevance and context of teaching.

In present study, 95.2% students felt the need to introduce anatomy teaching sessions during the later part of curriculum and majority suggested that anatomy be taught once a week (52 %) or twice a week (33.4%) in later years. The clinical postings during which anatomy teaching was suggested were mostly surgical. This observation is expected since doctors in surgical specialties need to operate and dissect human body and need clear knowledge of anatomy. Surgeons advocate experience with dissection not only to learn anatomical detail but to know variations in anatomy and to obtain an appreciation of fully exposed structures [2]. Anatomy is taught in the first year of under-graduate curriculum, although anatomical knowledge is assessed again in many specialist examinations. However there is limited or no exposure to anatomy teaching in later training. Study done on students of Wales and France, suggested that anatomy teaching was very important subject for their clinical studies throughout their training and not only in first professional [24].

In another study, vertical integration of basic science in final year was found to be beneficial and resulted in knowledge gain and improved summative scores. The classes were found to be useful, interesting and thought to help in clinical care and application by majority of students [25]. Based on these observations we recommend vertical integration of anatomy teaching in final year curriculum. The teaching of basic sciences should therefore be accomplished across the entire MBBS curriculum and integrated with clinical application.

## CONCLUSION

The learners agree that anatomy is a core subject and its fundamental role in medical curriculum is undisputed. The traditional teaching and learning (T/L) methods like black-board teaching, dissection and lectures are preferred by the newer generation learners also and should be integrated with newer teaching modalities and modern technology. The challenge should not be to determine the superiority of one method over another, but to maximize learning benefit available from different methods. The anatomy syllabus/ content in the present MBBS curriculum is adequate, however the time allotted for anatomy teaching needs to be increased by 2 to 6 months. The content and duration of anatomy teaching should not be limited keeping in view the contribution of anatomy in providing a strong scientific foundation in preparing future generations of physicians. The study also suggests that there is a need to reinforce anatomy teaching in the clinical years to encourage application of knowledge. Further research in terms of a larger sample size and also incorporating the views of medical educators is suggested for creating better evidence to make anatomy T / L more effective.

**Conflicts of Interests: None**

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