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"PERCEPTION OF BAMS STUDENTS ON ANATOMAGE TABLE VERSUS CADAVERIC DISSECTION IN LEARNING HUMAN ANATOMY: A PRELIMINARY CROSS-SECTIONAL SURVEY STUDY

Dr. Sajina P. S.*[1], Dr. Divya K.[2], Ms. Sadhana Bhat[3]

[1]Assistant Professor, Department of Sharira Rachana, SDMIAH, Bengaluru.
[2]Associate Professor, Department of Agada tantra, SDMIAH, Bengaluru.
[3]III BAMS, SDMIAH, Bengaluru.

***Corresponding Author: Dr. Sajina P. S.**

Assistant Professor, Department of Sharira Rachana, SDMIAH, Bengaluru.

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Abstract

Background: Technological advancements have introduced virtual dissection tools such as the Anatomage Table into medical education. However, cadaveric dissection remains a traditional and integral component of anatomy learning. This study aimed to evaluate BAMS students' perceptions of both methods in learning anatomy. **Methods:** A cross-sectional survey was conducted among 232 undergraduate medical students from different academic years who had exposure to both the methods. Convenience sampling was employed. Data were analysed using descriptive statistics. **Results:** Among the participants, 77.15% were female and 22.85% were male. The Anatomage Table was preferred for identifying smaller anatomical structures such as arteries (41.81%), veins (40.09%), nerves (38.79%), and lymph nodes (47.41%). In contrast, cadaveric dissection was favored for studying larger structures, including bones (71.55%), muscles (70.26%), joints (59.48%), ligaments (46.55%), and organs (75%). Dissection was also perceived as superior for understanding spatial relationships, anatomical variations, and clinical correlations, while the Anatomage Table was considered more time-efficient and useful for quick revision. **Conclusion:** While the Anatomage Table enhances visualization and understanding of finer anatomical details, cadaveric dissection remains the preferred method for studying larger structures and developing tactile and three-dimensional understanding. A blended approach integrating both methods may optimize anatomy education.

KEYWORDS: Anatomage, cadaveric dissection, Ayurveda students, Human anatomy.

INTRODUCTION

Anatomical sciences contribute substantially to the preclinical curricula of many health sciences programs and form a strong basis for clinical practice.[1,2] A thorough understanding of human anatomy is vital in clinical practice as it forms the basis for medical examination, making diagnoses, operating surgeries, and performing other medical interventions.[3]

During dissection, students dedicate a significant amount of time to locating structures and in the process, inadvertently acquire knowledge about the adjacent tissues or structures and how they are interconnected. Consequently, students gradually develop a comprehensive three-dimensional comprehension of the human body. This exploration is considered an important part of the learning experience with the inherent advantage of leading learners to more active engagements with the human specimen.[4]

With advancements in educational technology, digital anatomy tools such as the Anatomage Table have emerged, offering three-dimensional visualization and interactive exploration of human anatomy.

There is an increased need for the use these innovative technologies in anatomy education due to challenges with acquiring bodies for dissection, difficulties in preserving acquired bodies, the laborious nature of body dissection, increasing educator-to-student ratios, evolving learning habits of students and cultural reservations toward human body dissection. Although

these technologies assist in anatomy education they lack the experiential value offered by human specimens. However, their accessibility, interactivity, cost-effectiveness, and avoidance of ethical and cultural concerns contribute to their widespread adoption among the current generation of students and universities.[5]

Despite these advantages, there remains a debate regarding their effectiveness compared to traditional methods. Although several studies have evaluated virtual dissection tools among students of conventional system of medicine, there is limited evidence regarding their effectiveness and acceptance among undergraduate Ayurveda (BAMS) students. Understanding student perception is essential for optimizing teaching methodologies in competency-based medical education. The present study is an attempt to address the existing gap by comparing BAMS students' perception of Anatomage and cadaveric dissection in learning human anatomy.

MATERIALS AND METHODS

Study design: The study was carried out between May and June of 2025 and was a quantitative cross-sectional questionnaire-based study conducted among BAMS medical students.

Participants & Sampling

Convenience sampling was used. BAMS students who had exposure to both cadaveric dissection and the Anatomage Table were included. Students without prior exposure to either method were excluded. In total, 232 undergraduate medical students from the 1st Professional Year, 2nd Professional Year (Junior), and 2nd Professional Year (Senior) batches were selected for the study.

Data was collected using an online questionnaire that was administered via Google Forms. The purpose, aims, objectives, potential risks, and benefits of the study were provided in an online document. Confidentiality and anonymity were ensured by requiring no participant's identifiers on the consent form and the questionnaire. The questionnaire finally comprised 20 close-ended questions that solicited information on demographics, experience with traditional human body dissection and virtual dissection, and perception of virtual dissection.

Variables: The two main outcome variables of the study were[1] students' experience with traditional human body dissection and[2] students' experiences and perceptions of anatomage virtual dissection table use.

Biases: The convenience sampling method employed in participants selection has an inherent bias to recruit only easy-to-get and willing students to participate in the study and thereby, potentially missed out on some other useful information from hard-to-get or uninterested students.

Statistical Analysis: Data were entered and analyzed using Microsoft Excel (Microsoft Corporation, USA). Descriptive statistics such as frequencies and percentages were calculated.

RESULTS

Table 1: Sociodemographic characteristics of study participants.

Parameters		Frequency	Percentage
Age	19	23	9.9%, n = 23
	20	49	21.1%, n = 49
	21	54	23.3%, n = 54
	22	80	34.5%, n = 80
	23	14	6.0%, n = 14
Sex	Male		22.8%
	Female		77.2%
Academic year	First year		
	Second year		
	Final year		

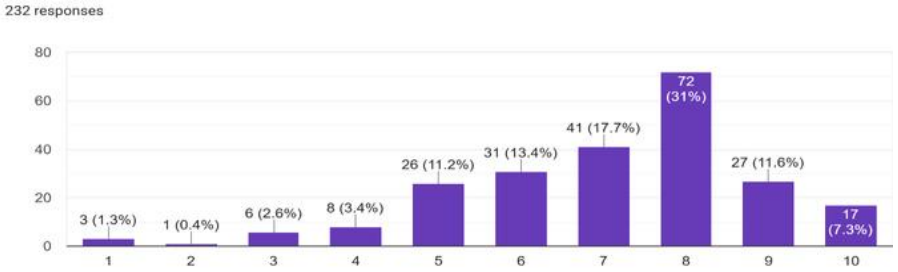
Table 2: Identification of structures through different methods N = 232.

Structures	Anatomage		Dissesction		Equally in both	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Artery	97	41.81	69	29.74	66	28.45
Vein		40.09	78	33.62	61	26.29
Nerve	90	38.79	81	34.91	61	26.29
Lymph node	110	47.41	73	31.37	49	21.1
Bone`	12	5.17	166	71.55	54	23.28
Muscle	23	9.91	163	70.26	46	19.83
Joints	28	12.07	138	59.48	66	28.45
Ligaments	66	28.45	108	46.55	58	25
Organs	7*	3	174	75	51	21.98

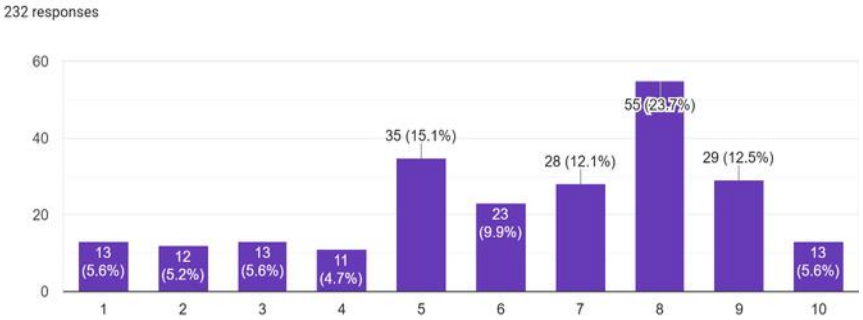
Table 3: Experience of participants with different methods.

	Anatomage		Dissesction		Equally in both	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Which method were you able to visualise spatial relationship of structure	43	18.1	126	54.3	64	27.6
Which method do you think will give better foundation for other basic sciences	17	7.3	125	53.9	90	38.9
Method that helped you to identify anatomical variation in a better way	23	9.9	154	66.4	55	23.7
Which method could you understand clinical implication better?	36	15.5	140	60.3	57	24.4
Which method is more engaging	1	0.4	189	81.5	34	14.7
Which method is more effective with time management and quicker identification of structures?	115	49.6	73	31.5	44	19

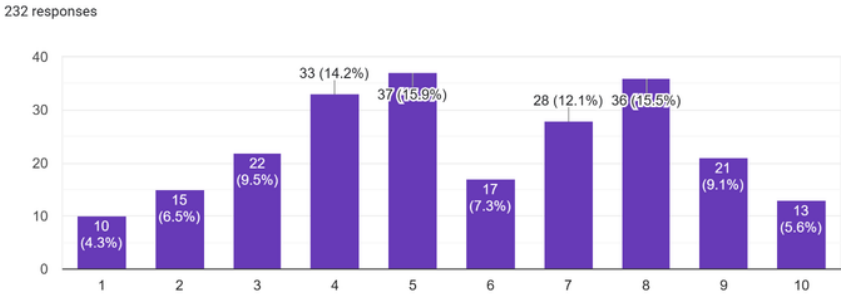
1. How effectively did Anatomage help you understand the 3D structure? (On a scale of 1-10)



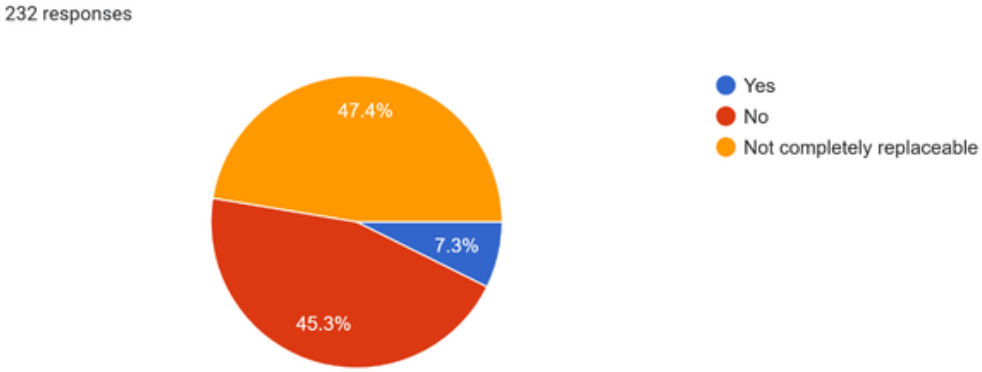
2. Which method was more convenient and was easier to identify the different structures? (On a scale of 1-10)



3. Which method was more realistic



4. Do you think the Anatomage method of teaching could replace the cadaveric dissection method?



DISCUSSION

The present study evaluated the perceptions of BAMS students regarding the use of the Anatomage Table compared with traditional cadaveric dissection in learning human anatomy. The findings demonstrate that both modalities offer distinct educational advantages, reinforcing the importance of a complementary teaching approach.

A key finding of this study is that students preferred the Anatomage Table for identifying smaller and intricate anatomical structures such as arteries, veins, nerves, and lymph nodes. This preference may be attributed to the high-resolution visualization, magnification capability, and layered digital dissection features of the Anatomage system. Virtual dissection platforms allow repeated viewing, rotation, and sectional analysis without structural distortion, which may enhance clarity when studying fine neurovascular details.

Although virtual tools offer enhanced visual clarity, students in the present study perceived cadaveric dissection as superior for understanding spatial relationships and building foundational knowledge for other basic sciences. This may be explained by the experiential and kinesthetic learning involved in dissection. The process of physically locating structures promotes active learning and reinforces long-term memory through multisensory engagement.

Students also reported that cadaveric dissection better facilitated understanding of anatomical variations and clinical implications. This observation aligns with the reality that cadavers present natural variations that cannot be entirely standardized in digital models. Exposure to such variability is crucial for developing diagnostic reasoning and surgical orientation.

However, the Anatomage Table demonstrated advantages in time efficiency and quicker identification of structures. The ability to instantly isolate structures without prolonged manual dissection reduces cognitive load and may support rapid revision, especially during examinations.

Interestingly, despite the technological appeal of digital tools, cadaveric dissection was perceived as more engaging by the majority of students. This suggests that emotional, experiential, and professional dimensions of dissection remain highly valued, particularly in early medical education. The immersive nature of working with real human specimens may foster respect for the human body and strengthen ethical sensitivity.

The findings indicate that digital tools like the Anatomage Table enhance the visualization of smaller, intricate structures, such as arteries and nerves, likely due to their high-resolution imaging and layered dissection capabilities. These results align with previous studies reporting improved comprehension and engagement through virtual anatomy platforms.[1,2]

However, the tactile experience, spatial orientation, and real-tissue variability provided by cadaveric dissection remain unmatched.[3,4] The preference for dissection in studying bones, muscles, joints, and organs highlights the continued importance of hands-on anatomical education.

The study supports a **hybrid teaching model**, integrating digital anatomy systems with traditional dissection to cater to varied learning styles and to bridge cognitive visualization with practical understanding.

The study included a relatively large sample size (n = 232) and participants from multiple academic years, enhancing representativeness. However, certain limitations must be acknowledged. The use of convenience sampling may introduce selection bias. The study relied on self-reported perceptions rather than objective academic performance measures. Additionally, being a single-institution study, generalizability may be limited.

Future research may incorporate objective assessment scores, longitudinal follow-up, and multi-institutional comparisons to better evaluate the pedagogical impact of blended anatomy teaching models.

CONCLUSION

The Anatomage Table serves as an excellent adjunct tool, particularly effective for identifying smaller anatomical structures. Nonetheless, cadaveric dissection remains the gold standard for learning gross anatomy and developing manual skills. Combining both methods can enhance anatomy learning outcomes, improving spatial understanding and clinical relevance. Overall, the **Anatomage Table** was preferred for **smaller anatomical structures**, whereas **dissection** was favored for **larger structures**.

Limitations of the Study

The use of convenience sampling and a single-institution setting may limit the generalizability of the findings. The results are based on self-reported perceptions, which are subjective and prone to bias. Additionally, the absence of objective academic performance measures and the cross-sectional design restrict the assessment of actual learning outcomes and long-term retention.

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Conflict Of Interest: Nil.

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