

IMPACT OF OSTEO-TALK (SMALL GROUP TEACHING) ON UNDERSTANDING OSTEOLOGY AMONG FIRST-YEAR MBBS STUDENTS: A CROSS-SECTIONAL STUDY

Sangeetha K¹, Shashi Bhushan Gollapalli², S Manonmani³

Received : 02/03/2026
Received in revised form : 03/04/2026
Accepted : 22/04/2026

Keywords:
Osteotalk, Small Group Teaching, MBBS Students, Active Learning, Medical Education.

Corresponding Author:
Dr. Sangeetha K,
Email: drsangeethak2021@gmail.com

DOI: 10.47009/jamp.2026.8.3.4

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (3); 18-21



¹Associate Professor, Department of Anatomy, BGS MCH, Nagaruru, Bangalore, India.
²Professor, Department of Anatomy, PES Institute of Medical Sciences and Research, Kuppam, India.
³Associate Professor, Department of Anatomy, MVJ Medical College, Bangalore, India.

ABSTRACT

Background: Osteology is a fundamental component of anatomy teaching for first-year MBBS students. Traditional lecture-based methods often limit student interaction and may not adequately support the development of spatial understanding of skeletal structures. Interactive teaching approaches such as small group learning have been increasingly adopted to enhance student engagement and comprehension. **Objective:** To evaluate the effectiveness of OsteoTalk, a structured small group teaching strategy, in improving understanding of osteology among first-year MBBS students. **Materials and Methods:** A cross-sectional interventional study was conducted among 200 first-year MBBS students in the Department of Anatomy. Students were divided into 20 small groups of 10 participants each. In each group, two students led the demonstration of upper and lower limb bones under faculty supervision. Sessions were conducted in the dissection hall and histology laboratory over a period of six weeks. Knowledge gain was assessed using pre-test and post-test multiple-choice questionnaires comprising 20 questions. Student perceptions were evaluated using a validated five-point Likert scale questionnaire. Data were analyzed using descriptive statistics and paired t-test. **Results:** The mean pre-test score was 11.2 ± 2.8 , which increased significantly to 16.4 ± 2.3 in the post-test ($p < 0.001$). A total of 92% of students showed improvement in their scores. Student feedback indicated positive perceptions, with 92% reporting improved conceptual understanding, 90% improved peer interaction, and 88% finding the sessions more engaging than traditional lectures. **Conclusion:** OsteoTalk, a structured small group teaching approach incorporating student-led demonstrations and peer interaction, significantly improved understanding of osteology among first-year MBBS students. The method enhanced engagement, collaborative learning, and conceptual clarity. Incorporating such interactive, student-centered strategies may improve learning outcomes in undergraduate medical education.

INTRODUCTION

Anatomy is a fundamental discipline in medical education and provides the structural basis for understanding human health and diseases. Osteology, a branch of Anatomy, involves the study of bones, represents a core component of the anatomy curriculum during the first year of the MBBS program.^[1] A clear understanding of bone morphology and spatial orientation is essential for many clinical specialties including orthopedics, radiology, and surgery. Traditional lecture-based teaching methods have been widely used in anatomy education. However,

these approaches often limit student interaction and active participation during learning.^[2] As a result, students may experience difficulties in visualizing three-dimensional anatomical structures.

Recent advances in medical education emphasize active learning strategies that encourage student engagement and deeper understanding. Modern medical education increasingly emphasizes student-centered learning strategies. Small group teaching encourages discussion, collaboration, and active participation, which can enhance conceptual understanding and retention of knowledge.^[3,4]

To promote interactive learning in osteology, a structured small group teaching method known as

Osteotalk was introduced. The present study was conducted to assess the effectiveness of this teaching approach in improving student understanding and learning experience. Studies have shown that interactive teaching approaches significantly improve academic performance among students in science and medical disciplines.^[5]

Small group teaching promotes discussion, collaboration, and problem-solving skills among students and has been recognized as an effective teaching method in medical education.^[6,7]

Previous research has also indicated that innovative teaching strategies can enhance retention of anatomical knowledge and improve learning outcomes.^[8,9]

Collaborative learning methods help students exchange ideas, develop critical thinking, and improve academic performance.^[10] Students in medical education often benefit from diverse learning styles and interactive learning environments.^[11] Team-based and group learning approaches have been successfully implemented in anatomy teaching to improve student engagement and comprehension.^[12]

Curriculum integration and innovative teaching methods are increasingly being adopted in modern medical education systems.^[13] Research in medical education continues to emphasize the importance of student-centered teaching methods.^[14] Despite these advances, anatomy teaching continues to evolve to meet the needs of modern medical curricula.^[15]

MATERIALS AND METHODS

A cross-sectional interventional study was conducted in the Department of Anatomy at [Institution Name] among 200 first-year MBBS students.

1. Small Group Formation and Demonstration

Small groups of 10 students each were formed, making a total of 20 groups. In each group, two students had taken lead to demonstrate the osteology of the upper limb and lower limb bones individually on different dates.

Initially, a pretest was conducted before the session was started. Later, 20 groups were arranged, out of 10 groups started demonstrating in dissection hall,

while the remaining 10 groups were conducted in the histology lab. In each group, two students were able to give the demonstration of individual bones of the upper limb followed by lower limb., which was again monitored by a faculty of Anatomy department

2. Discussion and Interaction

Approximately 10–15 minutes were allotted for each bone demonstration. This was followed by a discussion session of about 2–3 minutes. The discussion among the participating students was smooth and interactive. During discussion, students participated actively without hesitation, which proved to be a significant advantage for their learning. The two students who led each group, priorly prepared for the osteotalk, with the guidance from the teaching faculty of the Anatomy Department.

Data Analysis

Descriptive statistics were used to summarize the data. Paired t-tests were conducted to compare pre-test and post-test scores, with statistical significance set at $p < 0.05$.

RESULTS

The mean pre-test score was 11.2 ± 2.8 , which increased significantly to 16.4 ± 2.3 in the post-test. Statistical analysis using a paired t-test showed a highly significant improvement ($p < 0.001$), indicating the effectiveness of the OsteoTalk intervention.

Out of 200 students, 184 students (92%) showed improvement in their scores, while 16 students (8%) showed no change, and none demonstrated a decrease in performance.

Student perception analysis using a five-point Likert scale revealed strong positive feedback:

92% reported improved conceptual understanding
90% experienced better peer interaction
88% found the sessions more engaging than traditional lectures
85% recommended continuation of the OsteoTalk method.

These findings suggest that OsteoTalk not only enhanced knowledge acquisition but also promoted active participation and collaborative learning

Table 1: Comparison of Pre-test and Post-test Scores

Test	Mean Score	Standrad deviation	P-value
Pre-test	11.2	2.8	<0.001
Post-test	16.4	2.3	

Table 1: A significant improvement in scores was observed after the OsteoTalk sessions

Parameter	Percentage
Improved understanding	92
Engaging sessions	88
Peer interaction	90
Recommend continuation	85

Table 2: Change in Student Performance After OsteoTalk Sessions

Score Category	Number of Students	Percentage
Improved scores	184	92%
No change	16	8%

Decreased score	0	0%
Total	200	100%

Table 3: Student Perception of OsteoTalk Sessions (Likert Scale)

Parameter	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Improved conceptual understanding	60	32	8	0	0
Sessions were engaging	55	35	10	0	0
Improved peer interaction	58	32	10	0	0
Better than traditional lectures	50	38	12	0	0
Recommend continuation	52	33	15	0	0

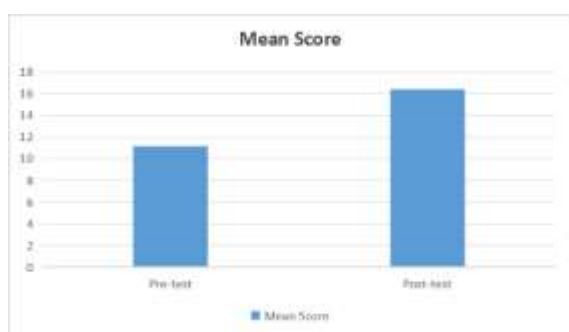


Figure 1

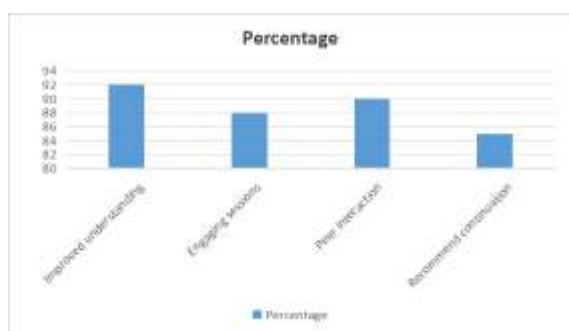


Figure 2

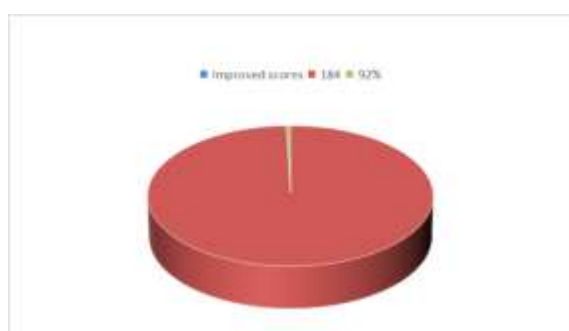


Figure 3

DISCUSSION

The present study demonstrated a statistically significant improvement in osteology learning following the Osteo-talk intervention, with mean scores increasing from 11.2 ± 2.8 to 16.4 ± 2.3 ($p < 0.001$). A high proportion of students (92%) showed improvement, indicating the effectiveness of structured small group teaching.

These findings are consistent with previous studies on active learning. Freeman et al. reported that active

learning strategies improved student performance by approximately 6% in examination scores compared to traditional lectures.^[5] The magnitude of improvement observed in the present study is higher, which may be attributed to the combined use of peer teaching and hands-on bone demonstration.

Prince demonstrated that active learning methods enhance conceptual understanding, although the degree of improvement varies across educational settings.^[3] Similarly, Michael highlighted that interactive teaching strategies improve student engagement and comprehension,^[4] which aligns with the present study where 88% of students perceived the sessions as more engaging.

Small group teaching has been widely supported in medical education. Steinert reported that approximately 80–90% of students perceive small group teaching as more effective and engaging compared to lectures.^[6] This is comparable to the findings of the present study, where a high proportion of students expressed positive perceptions.

In anatomy education, visualization plays a critical role. Bergman et al. reported that interactive and multimodal teaching approaches improve knowledge retention, with improvements ranging between 15–25% in test performance.^[8] The improvement observed in the present study is consistent with these findings.

Peer-assisted learning also contributed to improved outcomes. Johnson and Johnson demonstrated that cooperative learning enhances academic achievement and interpersonal skills.^[10] This is reflected in the present study, where 90% of students reported improved peer interaction.

Team-based learning approaches have also shown effectiveness in anatomy education. Vasan et al. reported improved student participation and performance with team-based learning strategies,^[12] which supports the effectiveness of the OsteoTalk approach.

Furthermore, Lujan and DiCarlo observed that more than 85% of students benefit from interactive and multimodal teaching methods,^[11] which is comparable to the 92% of students reporting improved conceptual understanding in the present study.

Despite these positive findings, variations in the magnitude of improvement across studies may be attributed to differences in study design, duration of

intervention, and assessment methods. The structured format of OsteoTalk, incorporating student-led demonstrations and immediate discussion, may explain the relatively higher improvement observed. However, this study has certain limitations. It was conducted in a single institution and assessed only short-term knowledge gain. Long-term retention and clinical application were not evaluated. Future studies should include multi-center designs and longitudinal follow-up to validate these findings. Overall, the results support the integration of structured small group teaching strategies in anatomy education, aligning with modern trends that emphasize active and student-centered learning approaches.^[14,15]

CONCLUSION

OsteoTalk, a structured small group teaching method incorporating student-led demonstrations and peer interaction, significantly improved the understanding of osteology among first-year MBBS students.

The approach enhanced not only academic performance but also student engagement, collaborative learning, and confidence in discussing anatomical concepts. The findings support the integration of interactive, student-centered teaching strategies into anatomy curricula.

Implementing structured small group teaching methods such as OsteoTalk can serve as an effective alternative to traditional lectures and may contribute to improved learning outcomes in undergraduate medical education.

Acknowledgment: The authors thank the first-year MBBS students who participated in the study and the faculty members of the Department of Anatomy for their support.

REFERENCES

1. Azer SA, Eizenberg N. Do we need dissection in an integrated problem-based learning medical course? Perceptions of first- and second-year students. *Surg Radiol Anat.* 2007;29(2):173–80.
2. Drake RL, McBride JM, Lachman N, Pawlina W. Medical education in the anatomical sciences: the winds of change continue to blow. *Anat Sci Educ.* 2009;2(6):253–9.
3. Prince M. Does active learning work? A review of the research. *J Eng Educ.* 2004;93(3):223–31.
4. Michael J. Where's the evidence that active learning works? *Adv Physiol Educ.* 2006;30(4):159–67.
5. Freeman S, Eddy SL, McDonough M, Smith MK, Okoroafor N, Jordt H, et al. Active learning increases student performance in science, engineering, and mathematics. *Proc Natl Acad Sci U S A.* 2014;111(23):8410–5.
6. Steinert Y. Student perceptions of effective small group teaching. *Med Educ.* 2004;38(3):286–93.
7. Dolmans DH, De Grave W, Wolhagen IH, Van der Vleuten CP. Problem-based learning: future challenges for educational practice and research. *Med Educ.* 2005;39(7):732–41.
8. Bergman EM, Van Der Vleuten CP, Scherpbier AJ. Why don't students remember what they learn? A review of the role of anatomy education. *Med Teach.* 2011;33(5):403–9.
9. McBride JM, Drake RL. National survey on anatomical sciences in medical education. *Anat Sci Educ.* 2018;11(1):7–14.
10. Johnson DW, Johnson RT. An educational psychology success story: Social interdependence theory and cooperative learning. *Educ Res.* 2009;38(5):365–79.
11. Lujan HL, DiCarlo SE. First-year medical students prefer multiple learning styles. *Adv Physiol Educ.* 2006;30(1):13–6.
12. Vasan NS, DeFouw DO, Holland BK. Modified use of team-based learning for effective delivery of medical gross anatomy and embryology. *Adv Physiol Educ.* 2009;33(3):262–7.
13. Harden RM. The integration ladder: a tool for curriculum planning and evaluation. *Med Educ.* 2000;34(7):551–7.
14. Norman G. Research in medical education: three decades of progress. *Med Educ.* 2010;44(6):549–57.
15. McLachlan JC, Patten D. Anatomy teaching: ghosts of the past, present and future. *Med Educ.* 2006;40(3):243–53