

Effect of Buzz Group Method for Teaching Anatomy to Medical Undergraduates in A Small Group

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Abstract

Background: Traditional lecture-based methods in anatomy often result in passive learning and limited student engagement. Active learning strategies like the Buzz Group Method may enhance student participation, understanding, and retention of anatomical concepts.

Objectives: To assess the impact of the Buzz Group Method on students’ academic performance and to gather faculty perceptions regarding its feasibility and effectiveness in anatomy teaching.

Methods: An interventional study was conducted in the Department of Anatomy, Jawaharlal Nehru Medical College, AMU, Aligarh, involving 85 first-year MBBS students. A pre-test/post-test design was used. Students were given a structured MCQ-based pre-test on the mandible, followed by a teaching session using the Buzz Group Method. A post-test with the same questions was conducted to measure learning gain. Faculty feedback

was also collected using a structured questionnaire. Data were analyzed using descriptive statistics and paired t-test, with $p < 0.05$ considered statistically significant.

Results: A significant improvement was observed in post-test scores compared to pre-test scores for several questions, particularly those related to nerve supply and muscle attachment ($p < 0.05$). Faculty feedback indicated strong agreement that the method enhanced student interest (72%), participation (76%), and understanding (72%).

Conclusion: The Buzz Group Method was found to be an effective small-group teaching strategy for anatomy, promoting active participation and better understanding among students. Faculty feedback also supported its feasibility.

Keywords: Buzz Group Method, Anatomy Teaching, Active Learning, Medical Education, Small Group Discussion

Introduction

Anatomy is a cornerstone of medical education, essential for understanding the human body and for clinical practice. Traditionally, it has been taught through didactic lectures and rote memorization, which often leads to passive learning and limited student engagement. With the rollout of Competency-Based Medical Education (CBME) in India, there's a pressing need for active, student-centered teaching methods that encourage deeper understanding and critical thinking.

The buzz group method is one such innovative approach. It involves small, temporary discussion groups where students exchange ideas before sharing with the larger class. This encourages active participation, teamwork, and better retention of knowledge—critical components of modern medical education.¹

Recent Indian studies have shown the academic benefits of buzz groups, particularly in clinical postings and classroom settings. In an interventional crossover study, two batches of 40 medical students were exposed to buzz group and traditional teaching methods. Results revealed significantly higher scores in learning, problem-solving, and communication skills in the buzz group cohorts.² These findings are aligned with the CBME model and suggest buzz groups could be a useful complement to conventional instruction.

Student perceptions also support the effectiveness of this method. In a study involving 100 first-year MBBS students, more than 94% felt that buzz group discussions improved their confidence and communication. A majority also reported better retention and a more engaging classroom experience.³ Such feedback indicates that buzz groups are not only effective pedagogically but also well-received by students.

Buzz sessions were also studied in the physiology department at GMC Srinagar, where both faculty and students found them to be more interactive and engaging than traditional lectures. The sessions improved reasoning, teamwork, and overall participation, making the learning environment more dynamic.⁴

Buzz groups are also versatile and can be integrated with other active learning tools. For instance, when combined with audiovisual media in English language classes, the buzz method was found to increase speaking skills and vocabulary acquisition, especially among students with low confidence levels.⁵ These benefits could easily translate to anatomy learning, where spatial and visual understanding is key.

Importantly, the buzz group method appears especially suited for Indian students who often come from teacher-centered learning environments. In a study on English speaking skills, students using buzz groups showed improvements in pronunciation, fluency, and grammar, while also becoming more confident in class participation.⁶

Its applicability extends across various academic disciplines. For example, in teaching listening comprehension, buzz groups were significantly more effective than traditional lecturing. Students with high self-esteem especially benefited from this interactive format.⁷ The same method has also been applied successfully in reading comprehension and writing instruction, reinforcing its effectiveness in promoting critical thinking and retention.⁸

Despite its clear advantages, buzz groups remain underused in Indian medical colleges, where conventional lectures dominate. A study conducted in the UK emphasized the importance of aligning anatomy teaching with student preferences, showing that students

avored more interactive methods, including group learning.⁹ This indicates a global trend in which medical students seek more participatory and hands-on learning experiences.

Furthermore, vertical integration of anatomy education throughout clinical years has been recommended by medical students. A study found that learners wanted anatomy teaching modules tied more closely to clinical practice, preferably through modular and interactive formats like buzz sessions.¹⁰ These findings support the idea that buzz groups can enhance anatomy instruction not only in the preclinical years but also during clinical rotations.

Given this background, the current study aims to evaluate the effect of buzz group teaching on medical undergraduates learning anatomy in a small group setting in India. The goal is to assess both academic outcomes and student satisfaction, providing evidence for incorporating this method into standard anatomy curricula.

Methodology

This interventional study was conducted in the Department of Anatomy, Jawaharlal Nehru Medical College, Aligarh Muslim University (AMU), Aligarh, Uttar Pradesh. The participants included 85 first-year MBBS students, who were enrolled in the academic session during the time of the study. Prior to initiation, ethical clearance was obtained from the Institutional Ethics Committee, and permission was granted by the Dean of the faculty.

The study followed a pre-test/post-test design to evaluate the effectiveness of the Buzz Group Method in enhancing students' understanding of the anatomy of the mandible. A structured questionnaire consisting of 10 multiple-choice questions (MCQs) was developed by

subject experts. These questions focused on key anatomical concepts of the mandible, such as its structure, associated joints, muscle attachments, and nerve supply.

Initially, a pre-test was administered to all participating students to assess their baseline knowledge. Following this, students were divided into small groups of 6–8 members. Each group was given a topic related to the mandible and asked to discuss and analyze the content collaboratively for a fixed duration (15–20 minutes). After the group discussion, each group shared their findings with the entire class.

A post-test comprising the same set of 10 MCQs was conducted immediately after the session to measure the gain in knowledge. The results of the pre- and post-tests were compared and statistically analyzed using descriptive statistics and paired t-test, with a p-value < 0.05 considered statistically significant.

Additionally, a faculty feedback questionnaire was distributed to 25 faculty members involved in the session. The feedback form included 10 Likert-scale statements to gather their perceptions on the feasibility, effectiveness, time investment, and impact of the Buzz Group Method on student learning and engagement.

Results

In most of the test items, there was a noticeable improvement in the students' understanding from the pre-test to the post-test. For instance, the question about the largest and strongest bone of the face, which had a pre-test accuracy of 90.9%, saw a significant increase to 97.8% in the post-test ($p = 0.001$), indicating a strong positive effect of the method. Similarly, students showed marked improvement in identifying the mandibular foramen's nerve, with correct responses increasing from 72.7% to 100% ($p = 0.005$), suggesting that the method

significantly enhanced their knowledge in this area. Other areas, like the articulation of the mandible and the condylar process function, also showed increases in correct responses, though the changes were not statistically significant ($p = 0.385$ and $p = 0.069$, respectively). One notable area of significant improvement was the attachment of the temporalis muscle to the coronoid process, where correct answers

jumped from 50.0% in the pre-test to 92.7% in the post-test ($p < 0.0001$), showing a marked gain in knowledge. While some areas did not show significant changes, the overall trend indicates that the Buzz Group Method was effective in improving students' knowledge of the mandible, with particular success in certain aspects of its anatomy (Table 1).

Table 1: Pre-Post Test Comparison

		Group		Total	p-value
		Pre Test	Post Test		
1. Which of the following is the largest & strongest bone of the face?	Mandible	40 (90.9)	40 (97.8)	80 (94.1)	0.001
	Maxilla	2(4.5)	0	2(2.4)	
	Zygomatic bone	2(4.5)	1(2.4)	3(3.5)	
2. The mandible articulates with which skull bone?	Occipital bone	1(2.3)	0	1(1.2)	0.385
	Sphenoid bone	1(2.3)	0	1(1.2)	
	Temporal bone	42(95.5)	41(100)	83(97.6)	
3. Which part of the mandible contains the sockets for the lower teeth?	Alveolar process	37(84.1)	38(92.7)	75(88.2)	0.385
	Body	6(13.6)	3(7.3)	9(10.6)	
	Ramus	1(2.3)	0	1(1.2)	
4. The mental foramen is located on which part of the mandible?	Body	37(84.1)	41(100)	78(91.8)	0.069
	Condyle	1(2.3)	0	1(1.2)	
	Coronoid process	3(6.8)	0	3(3.5)	
	Ramus	3(6.8)	0	3(3.5)	
5. The mandibular foramen is an opening for which nerve?	Facial nerve	6(13.6)	0	6(7.1)	0.005
	Glossopharyngeal nerve	1(2.3)	0	1(1.2)	
	Hypoglossal nerve	5(11.4)	0	5(5.9)	
	Mandibular division of the trigeminal nerve	32(72.7)	41(100)	73(85.9)	
6. What is the function of the condylar process of the mandible?	Articulation with the temporal bone	37(84.1)	41(100)	78(91.8)	0.069
	Formation of the lower jaw angle	3(6.8)	0	3(3.5)	

	Muscle attachment	2(4.5)	0	2(2.4)	
	Passage of nerves	2(4.5)	0	2(2.4)	
7. Which muscle primarily attaches to the coronoid process of the mandible?	Buccinator	5(11.4)	0	5(5.9)	<0.00
	Lateral pterygoid	8(18.2)	0	8(9.4)	
	Masseter	9(20.5)	3(7.3)	12(14.1)	
	Temporalis	22(50.0)	38(92.7)	60(70.6)	

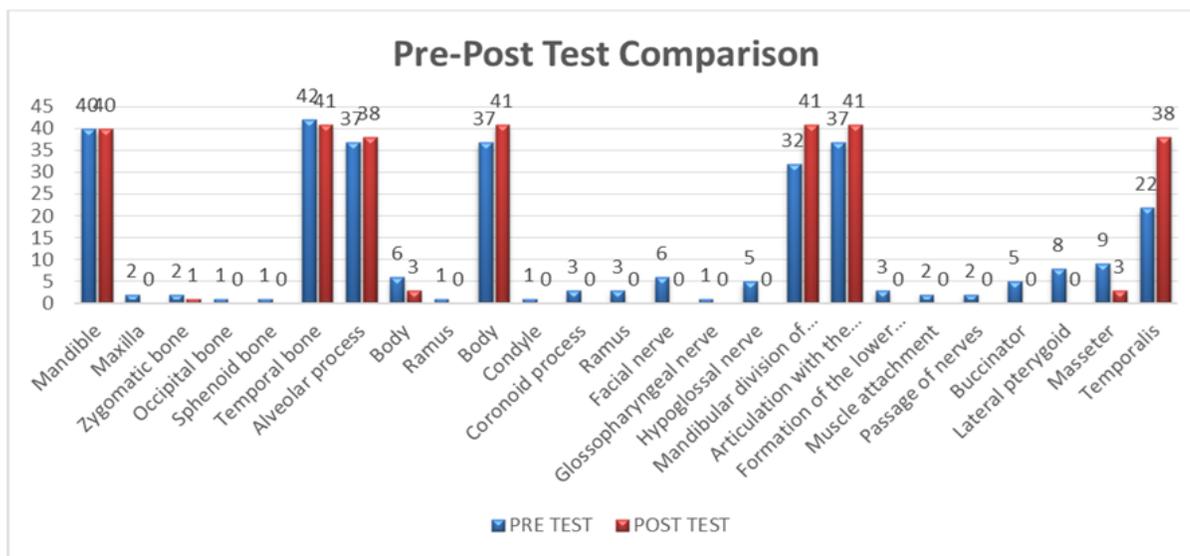


Figure 1: Pre-Post Test Comparison

Faculty feedback on the Buzz Group Method for teaching anatomy was overwhelmingly positive. The majority of faculty members (72%) felt the method created student interest, encouraged participation, and promoted collaborative learning. Additionally, 64% believed it was feasible for other anatomy topics, and 72% agreed it led to better understanding. While concerns about the time and planning required were noted, with 48% finding it time-consuming, 72% felt it was well-suited for small group discussions. Moreover, 84% agreed that it facilitated healthy teacher-student relationships. Overall, the method was regarded as an effective and engaging teaching approach, despite some logistical challenges (Table 2).

Table 2: Faculty feedback

		Count	Column N %
1. Buzz group method of teaching helped in creating interest among students?	Agree	5	20.0%
	Neutral	1	4.0%
	Strongly Agree	18	72.0%
	Strongly Disagree	1	4.0%
2. Buzz group method encouraged active participation of students ?	Agree	4	16.0%
	Neutral	1	4.0%
	Strongly Agree	19	76.0%

	Strongly Disagree	1	4.0%
3. This approach is feasible for use in other anatomy topics?	Agree	7	28.0%
	Neutral	1	4.0%
	Strongly Agree	16	64.0%
	Strongly Disagree	1	4.0%
4. Buzz group method served as an effective reinforcement tool?	Agree	6	24.0%
	Neutral	1	4.0%
	Strongly Agree	17	68.0%
	Strongly Disagree	1	4.0%
5. The approach promoted collaborative learning among students?	Agree	5	20.0%
	Neutral	1	4.0%
	Strongly Agree	18	72.0%
	Strongly Disagree	1	4.0%
6. Buzz group method led to a better understanding of the topic?	Agree	5	20.0%
	Neutral	1	4.0%
	Strongly Agree	18	72.0%
	Strongly Disagree	1	4.0%
7. Buzz group method was time consuming for the faculty]	Agree	9	36.0%
	Neutral	2	8.0%
	Strongly Agree	12	48.0%
	Strongly Disagree	2	8.0%
8. Buzz group method required meticulous planning for the lecture?	Agree	10	40.0%
	Neutral	1	4.0%
	Strongly Agree	13	52.0%
	Strongly Disagree	1	4.0%
9. Buzz group method is more suitable for small group discussion	Agree	5	20.0%
	Neutral	1	4.0%
	Strongly Agree	18	72.0%
	Strongly Disagree	1	4.0%
10. Buzz group method facilitates a healthy teacher student relationship?	Agree	2	8.0%
	Neutral	1	4.0%
	Strongly Agree	21	84.0%
	Strongly Disagree	1	4.0%

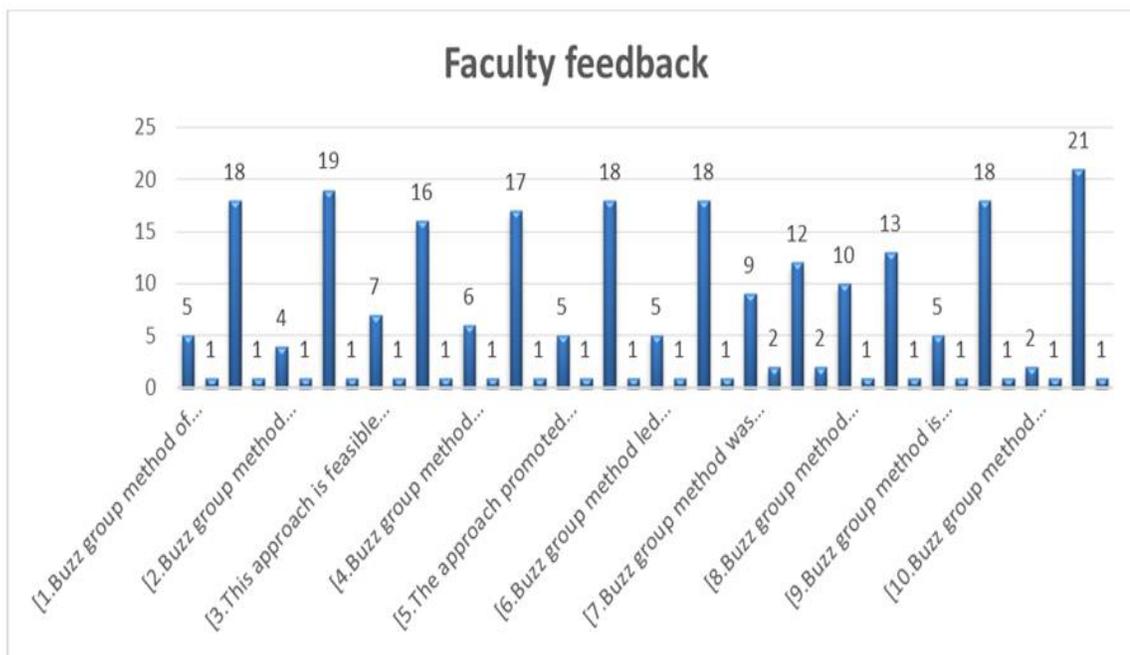


Figure 2: Faculty feedback

Table 3 shows a significant improvement in students’ knowledge following the implementation of the Buzz Group Method. In the post-test, 97.6% of students correctly identified the mandible as the largest and strongest bone of the face, compared to 90.9% in the pre-test. This improvement was statistically significant with a p-value of 0.001, indicating the effectiveness of the method. Incorrect responses for maxilla and zygomatic bone decreased in the post-test, with no students selecting maxilla post-intervention. Overall, the results reflect a clear enhancement in conceptual understanding after the use of the Buzz Group teaching approach (Table 3).

Table 3: Comparison of Pre-Test and Post-Test Responses on the largest & strongest bone of the face

			Group		Total	p-value
			Post Test	Pre Test		
1. Which of the following is the largest & strongest bone of the face?	Mandible	Count	40	40	80	0.001
		% within GROUP	97.6%	90.9%	94.1%	
	Maxilla	Count	0	2	2	
		% within GROUP	0.0%	4.5%	2.4%	
	Zygomatic bone	Count	1	2	3	
		% within GROUP	2.4%	4.5%	3.5%	
Total	Count	41	44	85		
	% within GROUP	100.0%	100.0%	100.0%		

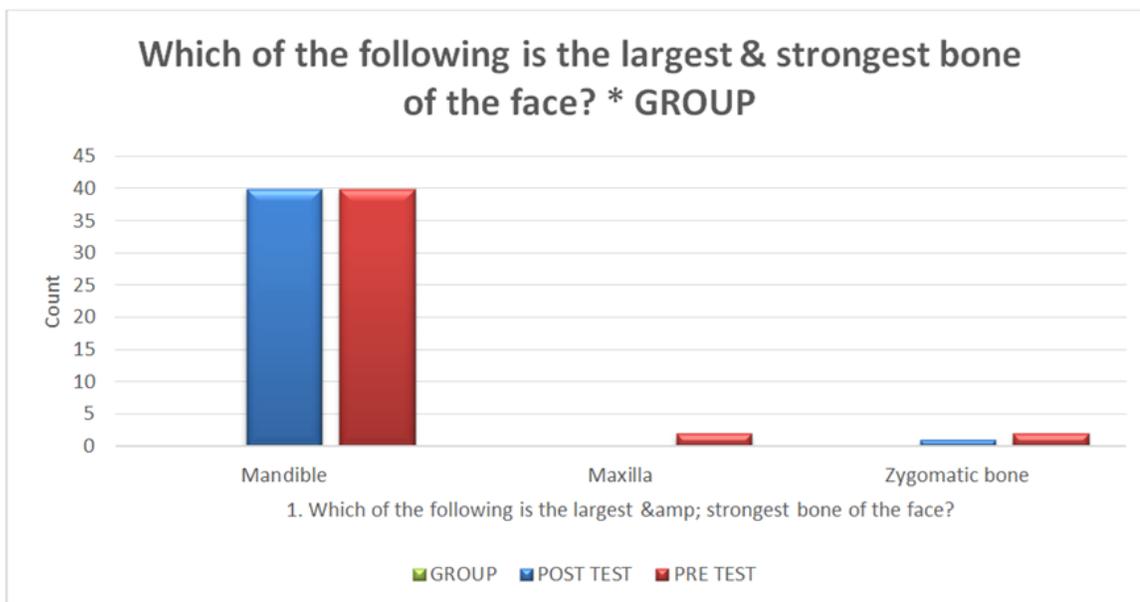


Figure 3: Comparison of Pre-Test and Post-Test Responses on the largest & strongest bone of the face

Table 4 highlights a significant improvement in students’ understanding of the nerve associated with the mandibular foramen following the Buzz Group Method. In the pre-test, only 72.7% of students correctly identified the mandibular division of the trigeminal nerve as the correct answer. After the intervention, this increased to 100% in the post-test. Incorrect responses—including the facial, glossopharyngeal, and hypoglossal nerves—dropped to zero in the post-test, indicating a complete elimination of confusion. The change was statistically significant with a p-value of 0.005, demonstrating the effectiveness of the Buzz Group Method in enhancing anatomical knowledge in this specific area (Table 4).

Table 4: Comparison of Pre-Test and Post-Test Responses on the Nerve Passing Through the Mandibular Foramen

			Group		Total	P-Value
			Post Test	Pre Test		
5. The mandibular foramen is an opening for which nerve?	Facial nerve	Count	0	6	6	0.005
		% within GROUP	0.0%	13.6%	7.1%	
	Glossopharyngeal nerve	Count	0	1	1	
		% within GROUP	0.0%	2.3%	1.2%	
	Hypoglossal nerve	Count	0	5	5	
		% within GROUP	0.0%	11.4%	5.9%	
	Mandibular division of the trigeminal nerve	Count	41	32	73	
		% within GROUP	100.0%	72.7%	85.9%	
Total	Count	41	44	85		
	% within GROUP	100.0%	100.0%	100.0%		

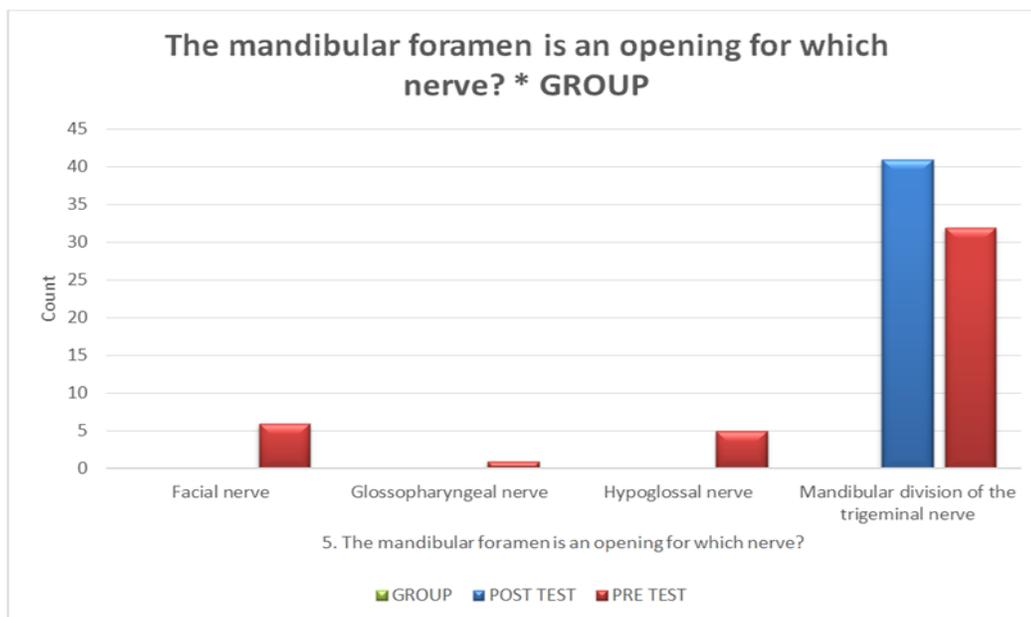


Figure 4: Comparison of Pre-Test and Post-Test Responses on the Nerve Passing Through the Mandibular Foramen

Table 5 illustrates an improvement in students’ understanding of the joint type formed between the mandible and temporal bone after applying the Buzz Group Method. In the pre-test, 86.4% of students correctly identified it as a synovial hinge joint, which increased to 100% in the post-test. Incorrect responses, including cartilaginous, fibrous, and syndesmosis joints, were completely eliminated in the post-test. Although the improvement in correct responses was notable, the change did not reach statistical significance (p-value = 0.111). Nonetheless, the data indicates a positive learning trend following the intervention (Table 5).

Table 5: Comparison of Pre-Test and Post-Test Responses on the Type of Joint between the Mandible and Temporal Bone

			Group		Total	P-Value
			Post Test	Pre Test		
10. What type of joint is formed between the mandible and temporal bone?	Cartilaginous joint	Count	0	2	2	0.111
		% within GROUP	0.0%	4.5%	2.4%	
	Fibrous joint	Count	0	2	2	
		% within GROUP	0.0%	4.5%	2.4%	
	Syndesmosis	Count	0	2	2	
		% within GROUP	0.0%	4.5%	2.4%	
	Synovial hinge joint	Count	41	38	79	
		% within GROUP	100.0%	86.4%	92.9%	
Total	Count	41	44	85		
	% within GROUP	100.0%	100.0%	100.0%		

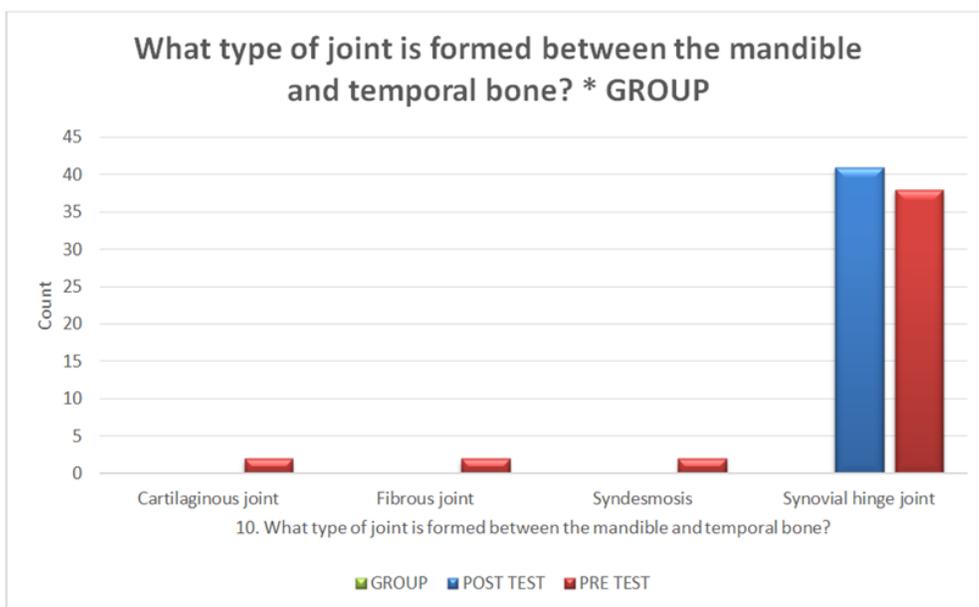


Figure 5: Comparison of Pre-Test and Post-Test Responses on the Type of Joint between the Mandible and Temporal Bone

Discussion

The present study investigating the effectiveness of the Buzz Group Method in teaching anatomy to medical undergraduates demonstrates notable gains in student knowledge and engagement. These findings align well with recent literature that supports active, collaborative learning strategies over traditional didactic approaches in anatomy education.

A 2024 interventional study by Gangwar et al. evaluated Buzz Group teaching in large groups and found that while immediate post-test scores were not significantly different between Buzz sessions and lectures, scores at 15 days post-intervention were significantly higher in the Buzz group. Students also reported improved communication, better retention, and a preference for more Buzz sessions (Gangwar et al., 2024).³ This aligns with our findings where statistically significant improvements were observed in several test items post-intervention, indicating enhanced short-term and potentially longer-term retention.

Similarly, Verma et al. (2024) tested interactive quiz-based lectures versus traditional teaching and observed better post-test performance in the quiz-based group (though not statistically significant). Importantly, students overwhelmingly preferred interactive formats and reported increased participation and understanding (Verma et al., 2024).¹¹ Our faculty feedback also supports this, with over 72% agreeing that the Buzz Group method enhanced interest and participation.

Moreover, Morris et al. (2018) explored near-peer small group sessions in head and neck anatomy and reported significant improvements in student confidence and structural recognition, especially among preclinical students (Morris et al., 2018).¹² This supports our study’s focus on mandible anatomy, which also showed improved accuracy in post-tests, particularly in identifying nerve pathways and bone functions.

Furthermore, a UK-based study by Davis et al. emphasized student preference for traditional small-group, demonstrator-led teaching over newer e-learning tools. Students strongly favored peer interaction and

anatomical models to enhance learning (Davis et al., 2014).⁹ Our findings—where 84% of faculty reported improved teacher-student relationships—suggest that the Buzz Group method fulfills similar preferences for relational, active learning environments.

A perspective-based article by Ghosh (2013) argues that interactive discussions, as seen in Buzz Groups, stimulate critical thinking and prevent disengagement in anatomy classes (Ghosh, 2013).¹³ This is echoed in our results where the highest improvements occurred in questions that required applied anatomical knowledge (e.g., temporalis muscle attachment), reflecting deeper conceptual understanding rather than rote recall.

Another relevant study by Rokade and Shinde (2020) highlighted students' preference for small group teaching and formative assessments in anatomy, reporting that 79% of students favored these approaches (Rokade & Shinde, 2020).^[14] Our study reinforces this with over 64% of faculty affirming the Buzz Group method's feasibility across other anatomy topics.

Conclusion

The findings of our study align closely with recent literature, affirming that the Buzz Group Method is a pedagogically effective, engaging, and student-approved approach for teaching complex anatomical concepts. Its strength lies in fostering collaborative, interactive learning—qualities that students and educators alike increasingly demand in modern medical education.

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